Al-Sutari M, Khraisat O. Illness perceptions as predictive factors for anxiety and depressive symptoms among patients with coronary heart disease. *Health Psychology Research*. 2025;13. doi:10.52965/001c.133564

General

Illness perceptions as predictive factors for anxiety and depressive symptoms among patients with coronary heart disease

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Keywords: Coronary disease, perception, anxiety, depression

https://doi.org/10.52965/001c.133564

Health Psychology Research

Vol. 13, 2025

Background

Individuals diagnosed with Coronary Heart Disease (CHD) form specific perceptions about their condition. These illness perceptions (IP) influence several clinical and mental aspects of patients' health outcomes.

Objective

To describe IP in Jordanian patients with CHD and to examine the role of IP domains in predicting anxiety and depressive symptoms in Jordanian patients with CHD.

Methods

In a cross-sectional study, a convenience sample of 193 patients with CHD, who visited the cardiac clinic for routine follow-up, completed the brief illness perception questionnaire and the Hospital Anxiety and Depression Scale.

Results

Participants perceived CHD as a chronic condition with moderate negative consequences and they were highly concerned about their illness. Illness perceptions domains were significantly associated with anxiety and depressive symptoms. Personal control, treatment control, and disease identity were significant predictors of depressive symptoms, while personal control and emotional representation were significant predictors of anxiety symptoms.

Conclusion

Findings indicate that negative illness perceptions are strongly associated with anxiety and depressive symptoms. Study findings suggest that interventions targeting personal control, treatment control, identity, and emotional representation could improve CHD patients' mental well-being.

1. INTRODUCTION

Approximately 200 million people have coronary heart disease (CHD) globally and it was the underlying cause of death in nine million people in 2019.[1] In Jordan, a recent study revealed that over 30 years, cardiovascular diseases remain the primary cause of death among Jordanians leading to a concerning rise in fatalities and escalating healthcare expenses.[2]

Upon diagnosis with CHD, patients develop structured beliefs about their illness. The Common Sense Model (CSM) describes how individuals make cognitive and emotional perceptions of their illness.[3] Illness perceptions (IPs) have been linked to numerous clinical and psychological outcomes in patients with CHD, including mortality and recurrent cardiac events,[4] general health,[5] self-efficacy and medication adherence,[6] and adoption of healthy behaviors.[7]

Coronary heart disease inversely impacts patients physical and mental well-being. Anxiety and depression are the most common mental health conditions among patients with CHD,[8] with a global prevalence of 25.4% for anxiety and 31.3% for depression.[9] Research evidences show that IPs are associated with anxiety and depression. Findings from a recent study revealed that negative illness consequences and emotional response were significant predictors of depressive symptoms, while higher personal control and comprehensibility were significant predictors of lower anxiety symptoms.[10] Another study showed that low perception of coherence and higher illness identity were associated with higher anxiety and depression.[11] In patients with heart failure, Chen et al. (2020) found that IPs mediated

the relationship between physical symptoms and depressive symptoms.[12] Although previous studies indicate that IPs are important determinants of anxiety and depression, there is a paucity of research examining these relationships among patients with CHD in developing countries including Jordan.[10,13] Furthermore, the majority of studies examining the relationship between IPs and mental well-being have primarily been conducted in Western countries. In Arabic and Islamic culture, which are dominant in Jordanian society, patients have strong beliefs in God's will and the faith in controlling their lives.[13] Cultural differences may influence CHD patients' IPs differently.[7] Hence, examining Jordanian patients' IPs and their associations with anxiety and depressive symptoms will expand our understanding of illness perceptions and provide insight to design culturally centered interventions to promote health in patients with CHD. Therefore, the aims of this study were to: (1) describe IPs among Jordanian patients with CHD; (2) examine the role of IPs domains in predicting anxiety and depressive symptoms in Jordanian patients with CHD.

2. MATERIALS AND METHODS

DESIGN

A descriptive cross-sectional design was used to describe IPs and to identify IPs domains that predict anxiety and depressive symptoms in patients with CHD. Data were collected from the patients with CHD who attended the out patients' cardiac clinics in an educational hospital between April 2023 and August 2023.

SAMPLE AND SAMPLE SIZE CALCULATION

Convenience sampling approach was used to recruit participants according to following eligibility criteria: (1) 18 years or older; (2) have a confirmed diagnosis of CHD by cardiologists and documented in medical records; (3) able to understand Arabic. Patients excluded if they have (1) terminal illnesses; (2) cognitive impairments; (3) and psychiatric disorder that requires clinical treatment.

The G* power 3.0.10, software was used to calculate the sample size.[14] The assumptions were a medium effect size of 0.15 for multiple linear regression with 8 predictors, a power level of 0.95, and an alpha level of 0.05. The required sample size was 160 participants. To handle the problem of missing data and to increase the generalizability of the results 20% was added. Thus, a total of 192 patients with CHD was required.

INSTRUMENTS

Medical records were reviewed to collect participants' sociodemographic and clinical data including (age, gender, marital status, level of education, employment status, medications taken, and presence of co-morbidities). Data regarding IPs, anxiety and depression were collected using self-administered questionnaires.

Illness perceptions were assessed using the Brief IP Questionnaire (Brief-IPQ).[15] Brief-IPQ is a nine-item scale; each scale assesses one aspect of IP. The Brief-IPQ items includes 1) consequences; beliefs about how much does the illness affect the participant's life, 2) timeline, beliefs about the length that the illness will continue, 3) personal control, beliefs about how much control do the participant feel he/she has over illness, 4) treatment control, beliefs about how much treatment can help control illness, 5) identity, beliefs about how much do the participant experience symptoms from illness, 6) concern, beliefs about how concerned is the participant about his/her illness 7) illness comprehensibility, beliefs about how well do the participant feel he/she understand the illness, 8) emotional representation, beliefs about how much does the illness affect the participant emotionally, and 9) an open ended question that asked participant to list the three most important causes of illness.[15] The items from 1-8 are rated on a scale ranged between 0 (less threatening view of the illness) to 10 (high threatening view of the illness). Total scoring is computed by reversing the scores for items 3, 4, and 7 then adding them to items 1, 2, 5, 6, and 8. The total score ranges from 0 to 80, with a higher score reflects a more threatening view of the illness. The Arabic version of the Brief-IPQ has good reliability ($\alpha = 0.717$) and the discriminant validity has been empirically demonstrated among patients with cardiac diseases.[16]

Anxiety and depressive symptoms were assessed using the Hospital Anxiety and Depression Scale (HADS).[17] The HADS is a seven- item anxiety and a seven- item depression subscales. Each item is scored on a four-point Likert scale ranging from 0 (not at all) to 3 (very often), the total score for each HADS subscale ranges from 0 to 21. Participants are classified according to their results on HADS as follows; normal (0–7), mild anxiety/depression (8–10), moderate anxiety/ depression (11–15), and severe anxiety/ depression $\geqslant 16$.[18] The Arabic version of the HADS has been demonstrated to be reliable; Cronbach's alpha coefficient was (0.75) for anxiety subscale and (0.82) for depression subscale.[19] Construct validity of the Arabic HADS was supported by testing its correlation with the Quality of Life Index ($r = -0.518$).[19]

STATISTICAL ANALYSIS

Data analyses were conducted using IBM SPSS software version 22 (IBM Corp., Armonk, NY, USA). The data were screened for missing values, outliers, and inconsistencies to ensure the accuracy and reliability of the subsequent analyses. Descriptive statistics were used to present participants' demographic and clinical characteristics. Continuous variables were presented as means with the standard deviations (SD) and categorical variables were expressed as frequencies with percentages. Before analysis, normality of the data were checked using Kolmogorov-Smirnov, the results showed that the data were normally distributed ($P > 0.05$). Therefore, Pearson correlation analysis was used to evaluate the strength and direction of the association between the variables. Furthermore, multiple linear regression was conducted to identify the IPs domains that predict the anxiety and depressive symptoms.

ETHICAL CONSIDERATION

The study was approved by the Academic Research Committee at the School of Nursing (XX 6-X-2XX3) and the Institutional Review Board of the participating hospital (XXX-3-XXX-20X3). Prior participation, the participants signed written informed consents after a full disclosure about; research purposes, participation is anonymous, the participant's right to refuse the participation, and the right to withdraw at any time.

3. RESULTS

Among 200 eligible participants with CHD who were approached, eight participants refused to participate due to lack of interest, with response rate 96.5% and 193 participants completed the study's questionnaires. The age of the participants ranged between 27 and 82 years, with mean age 60.37 ±10.61 years. Out of the study participants, 139 were men comprising 72.0% of the participants, while 54 (28.0%) were women. Secondary education was the predominant educational background (n=81, 42.0%). More than half of the participants (n=149, 52.4%) were unemployed. About two thirds of the participants were non-smokers (n=152, 73.6%) with hypertension (n=138, 71.5%). The mean duration of CHD was 6.27 ± 6.51 years.

ILLNESS PERCEPTIONS, ANXIETY AND DEPRESSIVE SYMPTOMS

The overall Brief IP score reported by the participants was 52.13 ±9.89, the scores ranged between 22–77. The mean score of the Brief IPQ dimensions ranged between 4.63 and 7.67. The highest mean score was noted on treatment control 7.67 ±2.28, which indicates that participants believe that CHD could be controlled by treatment. While the lowest mean score was noted on emotional representation 4.63 ±3.84, which reveals that CHD has low effect on patients' emotional well-being.

The mean score of depressive symptoms was 7.4 ± 4.51, more than half of the participants reported no depressive symptoms (n= 107, 55.4%), while 43 participants (22.3%) reported severe depressive symptoms. The mean score for the anxiety symptoms was 6.21 ± 4.49, 122 of the participants (63.2%) reported no anxiety symptoms and 37 participants (19.2%) reported sever anxiety symptoms.

RELATIONSHIPS BETWEEN ILLNESS PERCEPTIONS AND ANXIETY AND DEPRESSIVE SYMPTOMS

Results reveled that almost all the Brief IP dimensions were significantly correlated with depressive symptom. A high level of depressive symptoms was positively associated with the belief that CHD would have negative consequences (r=.35, p <.001), CHD would be more chronic (r=.14, p=.041), CHD symptoms would occur more often (r=.37, p <.001), and CHD caused high distress (r=.35, p <.001). On the other hand, depressive symptoms was negatively associated with the perception of high personal control (r=-.42, p <.001), high treatment control (r=-.39, p <.001), and a high understanding of the CHD (r=-.17, p=.015).

Regarding the associations with anxiety, results showed that all IP dimensions, except illness concern, were significantly correlated with anxiety symptoms level. High anxiety symptoms were positively associated with the belief that CHD would have negative consequences (r=.38, p <.001), would be more chronic (r=.15, p=.40), CHD symptoms would occur more often (r=.35, p <.001), and CHD caused high distress (r=.39, p <.001). On the other hand, anxiety symptoms was negatively associated with the perception of high personal control (r=-.44, p <.001), high treatment control (r=-.34, p <.001), and high understanding of the CHD (r=-.15, p=.033).

ILLNESS PERCEPTION DOMAINS THAT PREDICT ANXIETY AND DEPRESSIVE SYMPTOMS

To examine the domains of IPs that significantly predict anxiety and depressive symptoms, multiple linear regression analyses were conducted. Before running the regression analysis, the assumptions of independence, normality, linearity, and homoscedasticity were evaluated. Separate multiple linear regression analyses were used to determine the predictors of depressive and anxiety symptoms. All IP domains were entered in each model as the independent variables and depressive and anxiety symptoms were entered as the dependent variables.

The results of the regression analysis showed that personal control, treatment control, and disease identity were significant predictors of depressive symptoms. The model explained 30.2% of the variance in the depressive symptoms F (8, 184) = 9.97, P < .001. In regard to the predictors of anxiety symptoms, the Brief IPQ domains that found to be significant predictors of anxiety symptoms were personal control and emotional representation. The overall model was significant, the total variance explained by the model was 31.0%, F (8, 184) = 10.11, P < .001, indicated that personal control and emotional representation explain 31.0% of the variance in anxiety symptoms.

4. DISCUSSION

This study examined the associations between IPs and depressive and anxiety symptoms in patients with CHD. Findings showed that overall CHD perceived as a moderately threatening condition. Participants perceived CHD as a chronic condition with moderate negative consequences and they were highly concerned about their illness. Despite negative IPs about the duration and the consequences of illness, participants had a moderate level of belief in their ability to control the CHD and expressed a higher confidence in treatment to control the CHD. Participants also reported a relatively high scores on illness comprehensibility, suggesting high understanding of their illness. Similarly, Thagizadeh and colleagues (2022) observed a high overall score of IP among patients newly diagnosed with myocardial infarction.[20] In line with our results, they reported that these patients viewed their condition as chronic, with high

consequences that is controllable by treatment. However, unlike our participants, Thagizadeh et al.'s patients demonstrated a lower understanding of their disease, potentially due to the recent diagnosis.[20] In contrast, our study included individuals with CHD for at least eight months, which may have contributed to a greater understanding of their condition.

In the current study, 44.6% of the participants had depressive symptoms, and 36.6% had anxiety symptoms. These findings are higher than those reported in a recent meta-analysis, which showed that the prevalence of depression and anxiety were 31.3% and 25.4% respectively among patients with cardiac conditions globally.[9] The higher prevalence of anxiety and depressive symptoms in the current study may be due to lack of counseling and inadequate mental health services provided for patients with CHD in Jordanian health care system. Anxiety and depression were associated with higher frequency of complications among patients with cardiac illnesses.[21] On the other hand, evidences showed that treatment of anxiety and depression reduced all-cause mortality, emergency department visits, and hospital readmissions.[22] Thus, routine screening and early treatment of anxiety and depression are essentials in management of patients with CHD.

ASSOCIATIONS BETWEEN ILLNESS PERCEPTIONS AND ANXIETY AND DEPRESSIVE SYMPTOMS

The findings of this study showed that more negative beliefs in the IPs dimensions were associated with higher levels of anxiety and depressive symptoms. These findings correspond to those obtained by Jennings et al. (2023), who found that more threatening IPs were significantly associated with higher levels of anxiety and depression.[23]

The strongest association was found between personal control and depressive and anxiety symptoms; this indicates that the more positive beliefs of own abilities to control the CHD the less the level of anxiety and depression. Similarly, Jaltuszewska et al. (2023) found that the perceived control over the illness was significantly and negatively associated with anxiety and depression.[24] As the results of this study indicated, personal control may be an important target in future intervention studies to improve patients' levels of anxiety and depression in patients with CHD.

PREDICTORS OF ANXIETY AND DEPRESSIVE SYMPTOMS

In line with previous literature that has reported a negative relationship between individuals' perceptions of their abilities to overcome health problems and depression and anxiety,[25,26] the current study findings provided evidence that higher perceived control was a significant predictor of low levels of anxiety and depressive symptoms in patients with CHD. However, contrary to our findings, Priorello and Arbona (2024) reported that patients' beliefs of personal control were not significantly associated with anxiety in patients with heart failure.[27] The authors attributed this to participants' beliefs of low controllability of their illness. However, participants in our study reported high controllability of their illness, suggesting that the relationship between personal control and mental distress might be stronger for perceived controllable conditions, as previously suggested.[28] These results, along with our findings, suggest that perceived personal control significantly impacts anxiety and depression; therefore, interventions promoting patient's perceived personal control may be important to mitigate patients' anxiety and depression.

Perceived treatment control found to be a significant predictor of depressive symptoms. In other words, having an optimistic perception of the treatment efficacy in controlling the CHD, perceptibly predicted lower levels of depression. Similarly, Kukić and Pokrajac-Bulian (2022) found that patients' beliefs of inability to control their illness by therapy increased their anxiety and depression, further, they found that beliefs in treatment control significantly influenced patients' avoidance of activities they perceived as triggering of heart illness symptoms.[29] This suggests that psychological therapies focusing on increasing patients' trust in their medical management could be effective in decreasing their depression. However, given the complexity of treatment options, further research is needed to understand the impact of treatment modalities on patients' cognition, to clarify misconception regarding various treatment modalities.

Perception of illness identity was found to be a significant predictor of depressive symptom, that is, patients who experienced more severe CHD symptoms had higher levels of depression. Previous studies have also reported a similar relationship between CHD symptoms and depression.[30, 31] In a longitudinal study, CHD patients who experienced more frequent chest pain at baseline and after 30 months of follow-up were more depressed and more anxious compared to patients with less frequent chest pain.[30] As perception of symptoms plays an important role in depression, health care providers should equip patients with knowledge and skills required to self-manage their symptoms and to develop effective coping strategies through counseling, education, and cognitive and behavioral therapy.[32]

The results of the current study showed that emotional representation was a significant predictor of anxiety. The effect of negative emotions such as fear of recurrence, distress, anger, and hostility does not only increase the level of anxiety but also reduces patients' ability to cope with CHD, increases risk for cardiovascular events, decreases patients' attendance at cardiac rehabilitation, increases mortality rates, and negatively influences their quality of life.[33-35] As negative emotions are inevitable in many patients following the diagnosis of CHD,[36] our findings underscored the need for psychological counseling as a fundamental component of rehabilitation programs and tailored interventions that might change patients' perception of CHD to reduce the effects of negative emotions on CHD patients' cognition.

LIMITATIONS

This study has limitations that should be acknowledged. Firstly, the use of cross-sectional design cannot determine the cause and effect relationships. Secondly, utilizing self-

report questionnaires can be influenced by participant's subjective interpretation and social bias. However, we used validated instruments and ensured participants confidentiality and anonymity to overcome this limitation. Incorporating a multi-method assessment is recommended in future research to acquire more precise information and minimize social desirability.

An important factor that may influence the observed relationship between IPs and mental health is educational level. One limitation of this study is that it did not account for educational level, which may have a significant impact on mental health outcomes. Future research should consider including educational level as a variable to better understand its role in these relationships.

5. CONCLUSION

Patients perceived CHD as a moderately threatening condition, that is chronic with moderate negative consequences and they were highly concerned about their illness. Despite negative IPs about the duration and the consequences of illness, participants had a moderate belief in their ability to control CHD and a slightly stronger belief in managing their illness through treatment. More than one third of the participants had anxiety symptoms and almost half of them had depressive symptoms. More pessimistic IPs were associated with higher levels of anxiety and depressive symptoms. Lower perceived personal control, lower perceived treatment control, and experience more symptoms were significant predictors for depressive symptoms. While perceived lower personal control and higher emotional representation were the significant predictors of higher anxiety symptoms.

IMPLICATION FOR PRACTICE

Given the demonstrated role of IPs on anxiety and depressive symptoms among patients with CHD, it is important to implement psychotherapeutic interventions to modify negative IPs which consequently may mitigate anxiety and depression. As anxiety and depression are prevalent among patients with CHD, frequent assessment using validated tools is crucial for identifying at-risk individuals and to implementing programs to improve their mental well-being.

ACKNOWLEDGEMENTS

The authors would like to thank the participants for assistance with data collection.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUNDING

No funding for this study.

Submitted: October 29, 2024 EDT. Accepted: February 05, 2025 EDT. Published: April 05, 2025 EDT.

Table 1. Sociodemographic and Clinical Characteristics of the Participants (N=193)

Characteristic	M ±SD	N	%
Age	60.37 ± 10.61		
Gender			
Men		139	72.0
Women		54	28.0
Marital status			
Single		5	2.6
Married		168	87.0
Divorced		2	1.0
Widow		18	9.4
Occupation status			
Employed		44	22.8
Unemployed		149	77.2
Educational level			
Primary		50	26.0
Secondary		81	42.0
Bachelor		45	23.3
Higher education		17	8.7
Co-morbidity			
Hypertension Yes No		138 55	71.5 28.5
Diabetes Yes No		111 82	57.5 42.5
Smoking status Yes No		51 142	26.4 73.6
Duration of CHD	6.27 ±6.51		

M = mean; SD =standard deviation; CHD: coronary heart disease

Table 2. Illness Perception, Anxiety and Depressive Symptoms (N=193)

Variable	Mean ±SD
Consequences	4.76 ± 3.81
Timeline	7.25 ± 3.18
Personal control	7.03 ± 2.64
Treatment control	7.67 ± 2.28
Identity	5.21 ± 3.22
Illness concern	7.17 ± 3.04
Illness comprehensibility	7.48 ± 2.22
Emotional representation	4.63 ± 3.84
Total sum Brief IP score	52.23 ± 9.89
Total mean score	5.21 ± 0.98
HADS-anxiety	6.21 ± 4.49
0-7	122 (63.2)
8-10	34 (17.6)
11-21	37 (19.2)
HADS-depression	7.40 ± 4.51
0-7	107 (55.4)
8-10	43 (22.3)
11-21	43 (22.3)

SD =standard deviation; Brief IP=brief illness perception; HADS= hospital anxiety and depression scale.

Table 3. Associations between Illness Perceptions and Depressive and Anxiety Symptom (N=193)

Variable	Depressive Symptoms	Anxiety Symptoms
Consequences	r= .35**	r= .38**
Timeline	r= .14*	r=.15*
Personal control	r= -.42**	r=-.44**
Treatment control	r=-.39**	r=-.34**
Identity	r= .37**	r= .35**
Illness concern	r= .05	r= .02
Illness comprehensibility	r= -.17**	r=-.15*
Emotional representation	r= .35**	r= .39**

*$p < .05$; **$p < .01$.

Table 4. Regression Analyses for Predictors of Anxiety and Depressive Symptoms (N=193)

Variable	Brief IP Domains	B	SE	Beta (β)	t	*p*
Depressive symptoms	Consequences	0.073	0.10	0.06	.72	.471
	Timeline	0.08	0.09	0.06	.89	.380
	Personal control	-0.34	0.13	-0.19	-2.62	.010
	Treatment control	-0.29	0.15	-0.15	-2.05	.042
	Identity	0.24	0.10	0.17	2.37	.019
	Illness concern	-0.08	0.09	-0.06	-.83	.409
	Illness comprehensibility	-0.13	0.14	-0.06	-.89	.371
	Emotional representation	0.19	0.09	0.16	1.96	.052
Anxiety symptoms	Consequences	0.13	0.10	0.11	1.27	.206
	Timeline	0.08	0.09	0.06	.87	.388
	Personal control	-0.44	0.13	-0.25	-3.36	<.001
	Treatment control	-0.15	0.15	-0.07	-1.00	.317
	Identity	0.19	0.10	0.13	1.89	.061
	Illness concern	0.03	0.10	0.02	.03	.975
	Illness comprehensibility	-0.13	0.14	-0.06	-.93	.354
	Emotional representation	0.20	0.10	0.17	2.04	.043

IP: illness perception.

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