

## ⇒ Research Article



# The Mediating Role of Perceived Stress in the Relationship Between Psychological Hardiness and Quality of Life in Cardiovascular Patients

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**Background:** Cardiovascular disease (CVD), a chronic and debilitating physical condition, is one of the most common causes of death. Complications of CVD, such as decreased physical and mental health along with its chronic, progressive, and irreversible nature have numerous negative consequences for patients. This study aimed to investigate the mediating role of perceived stress in the relationship between psychological hardiness and quality of life (QoL) in cardiovascular patients.

**Methods:** The present study was a descriptive-correlational and structural equation modeling. The statistical population included all patients with CVD referred to heart hospitals and cardiac rehabilitation centers in Tehran, Iran in 2019. Using purposeful sampling method, a total of 151 individuals were selected. Data collection tools included a Kobasa Psychological Hardiness Questionnaire, Cohen's Perceived Stress Questionnaire, and Quality of Life Scale (SF-36). To analyze the data, Pearson's correlation coefficient and path analysis with SPSS.22 and Amos.22 software were used.

**Results:** The results showed that negative perception of stress and positive perception of stress had a significant negative and positive relationship with dimensions of QoL, respectively ( $P < 0.001$ ). Psychological hardiness had a significant positive relationship with dimensions of QoL ( $P < 0.001$ ). Also, perceived stress had a mediating role in the relationship between psychological hardiness and QoL dimensions ( $P < 0.001$ ).

**Conclusion:** The results of the present study indicated a correlation between psychological hardiness and increased QoL and the inverse relationship between perceived stress and QoL in cardiovascular patients.

**Keywords:** Cardiovascular Disease, Resilience, Quality of Life

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**Background**

Cardiovascular disease (CVD) is one of the chronic diseases that, in addition to the high number of deaths, causes limitations in the quality of life (QoL) (1). According to the World Health Organization (WHO) in 2017, approximately 17.7 million people die annually in Europe due to CVD, which is equivalent to 31% of the world's causes of death and 48% of death in Europe (2). Also, the death rate from CVD in the same year in Iran was 27.47% of the total deaths, ranking the country 35<sup>th</sup> in the world. Therefore, figures indicate a fatal disease that poses a great threat to human life (2). Complications of CVD such as decreased physical and mental health along with its chronic, progressive, and irreversible nature have numerous negative consequences for patients, which by affecting all aspects of individual and social life, are the most important reasons for the decline in QoL (3).

QoL is a characteristic that is valuable to the patient, and the result is a feeling of comfort and a perception of being good (4). Therefore, QoL is a dynamic and subjective structure that compares the past and present, as well as all

physical, psychological, and social aspects positively and negatively; it points to the years of life that have passed along with satisfaction, happiness, and pleasure and it is at the opposite point of the quantity of life (5). The weakening of the QoL not only has a negative effect on personal, social, family, and occupational performance, but also increases the likelihood of being hospitalized, exacerbating the disease, and death (6). Accordingly, considering that QoL in cardiac patients is at risk and a low QoL is associated with several negative consequences, it is essential to identify the factors affecting the QoL. Psychological hardiness is one of the variables that can affect the QoL positively (7).

In general, the debilitating and chronic nature of CVD along with numerous physical, mental, family, occupational, and social limitations can potentially be associated with a drop in QoL (8-10). However, current studies on QoL in cardiovascular patients have mainly emphasized factors such as demographic status, severity and duration of disease, drug treatments, and adherence to the treatment regimen (11-15), and limited studies have

focused on psychological factors and their effects on QoL in these patients. Accordingly, it is essential to identify the factors that can act as a supportive and protective source against such stress conditions and reduce the severity of stress. It seems that in a chronic patient, psychological hardiness can play an important role in reducing the stresses caused by the disease and its consequences. Psychological hardiness by reducing stress can lead to an increase in the QoL in such patients.

### Objectives

Considering the importance of the issue and the fact that no study has been conducted yet, the present study aimed to investigate the mediating role of perceived stress in the relationship between psychological hardiness and QoL in cardiovascular patients.

### Material and Methods

The present study was a descriptive-correlational and structural equation modeling. The statistical population of this study were all patients with CVD referred to cardiac hospitals and cardiac rehabilitation centers in Tehran, Iran in 2019. Among this population, a total of 151 individuals were selected by convenience sampling method. CVD was diagnosed according to the patients' medical record, echocardiogram results, and the diagnosis of a cardiologist. To select the sample, a purposeful sampling method based on inclusion and exclusion criteria was used.

The inclusion criteria were as follows: suffering from CVD and passing at least two months since the diagnosis of the disease. The exclusion criteria were as follows: having medical procedures or conditions that make the participants ineligible for the study; a history of acute psychiatric disorders (such as psychotic, bipolar, major depressive, and neurological disorders); suffering from other severe medical illnesses such as cancer; and unwillingness to continue research.

It should be noted that 270 cardiovascular patients were considered to participate in the present study. Finally, we received 151 questionnaires and analyzed the related data. The response rate for the present study was 55.9%.

All participants received information about the research orally, participated in the research voluntarily, and signed an informed consent. The subjects were assured that all their information would remain confidential and used only for research purposes. In order to protect privacy, the names of the participants were not registered. To ensure the work process, all questionnaires were administered by the researcher.

### The 36-Item Short-Form Health Survey Questionnaire (SF-36)

The SF-36, constructed by Ware and Sherbourne in 1992, is a very popular instrument for evaluating health-related QoL (16). It measures eight scales including, physical

functioning (PF), role physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental health (MH). The psychometric properties of SF-36 have been approved in Iran. The sub-scales had good internal consistencies (alphas 0.70-0.85) and test-retest reliability ( $r=0.43-0.79$ ). The questionnaire can also differentiate healthy people from patients on all sub-scales (17).

### Psychological Hardiness Questionnaire

This test was prepared by Kobasa in 1979 and has 50 items and three subscales of control, commitment, and combat, each of which has 17, 16, 17 items of the test, respectively (18). The subject are required to express their opinions on a 4-degree Likert scale (not correct at all, almost correct, often correct, and completely correct). The scale scoring is from 0 to 3. In a study on the Iranian population, the reliability of the test calculated by Cronbach's alpha method for psychological hardiness scale and subscales of commitment, control, and struggle was 0.86, 0.82, 0.72, and 0.69, respectively (19).

### The Perceived Stress Scale (PSS)

The PSS is a 14-item scale (PSS-14) developed by Cohen et al (20), with seven positive items and seven negative items rated on a 5-point Likert scale. This scale measures two subscales, including the negative perception of stress and the positive perception of stress. The internal consistencies of the PSS have been reported 0.84-0.86 in a sample of students. The Cronbach's alpha value for the subscales of negative and positive perception of stress was 0.75 and 0.71, respectively (21).

The data were analyzed using the correlation coefficient, Pearson's correlation matrix, multiple regression, and structural equation modeling. Indirect path was calculated using bootstrap method. All statistical calculations were performed using Amos.22 and SPSS.22 software. The significance level was considered as 0.05.

### Results

In this study, a total of 151 (33 women and 118 men;  $M = 60.27$  years  $\pm$   $SD = 11.34$ ) CVD patients were included. The mean duration of the disease was 5.71 years  $\pm$  6.39. The results of the correlation coefficients of hardiness, perceived stress, and QoL are shown in Table 1.

Although the chi-square value for the model was significant, ( $\chi^2 = 37.29$  with  $df = 39$ ,  $P < 0.001$ ), other fit indices, such as GFI, AGFI, and CFI were all above 0.90, and RMSEA was 0.02, indicating that the model had a good fit to the data. It has been recommended that the chi-square statistic be used as a goodness of fit index, with smaller chi-square values indicating a better model fit. Thus, additional goodness of fit indices were used to demonstrate the model fit (Table 2). Figure 1 shows the mediating role of perceived stress in the relationship between hardiness and dimensions of QoL after

**Table 1.** The Correlation Coefficient Among Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1- General health	1										
2- Physical pain	0.29**	1									
3- Social function	0.39**	0.46**	1								
4- Emotional health	0.26**	0.05*	.18*	1							
5- Energy	0.21**	0.08	.23**	0.77**	1						
6- Physical function	0.35**	0.051**	0.30**	0.13	0.08	1					
7- Emotional limitations	0.26**	0.49**	0.42**	0.18*	0.12	0.33**	1				
8- Physical limitations	0.28**	0.66**	0.42**	0.08	0.05	0.48**	0.65**	1			
9- Hardiness	0.20*	0.18*	0.24**	0.02	0.02	0.12	0.23**	0.24**	1		
10- Negative perception of stress	-0.35**	-0.24**	-0.23**	-0.12	-0.02	-0.28**	-0.28**	-0.32**	-0.31**	1	
11- Positive perception of stress	0.37**	0.27**	0.36**	0.13	0.09	0.24**	0.26**	0.23**	0.24**	0.29**	1

**Table 2.** Fit indices of the hypothetical model

$\chi^2$	df	P	$\chi^2/df$	RMSEA	GFI	AGFI	CFI	TLI	IFI	NFI
52.14	39	>0.05	1.33	0.05	0.86	0.98	0.91	0.90	0.89	0.97

GFI: goodness-of-fit index; AGFI: adjusted goodness-of-fit index; NFI: normed fit index; CFI: comparative fit index; RMSEA: root-mean-square error of approximation; IF, incremental fit index; TLI, Tucker-Lewis index.

modification.

Based on the significance level of 0.05 and the critical ratio >1.96 or <1.96, Table 3 indicates a significant difference for regression weights. Therefore, all of the paths reported in Table 4 are significant at least at 0.05, except the direct effect of positive perception of stress on physical function.

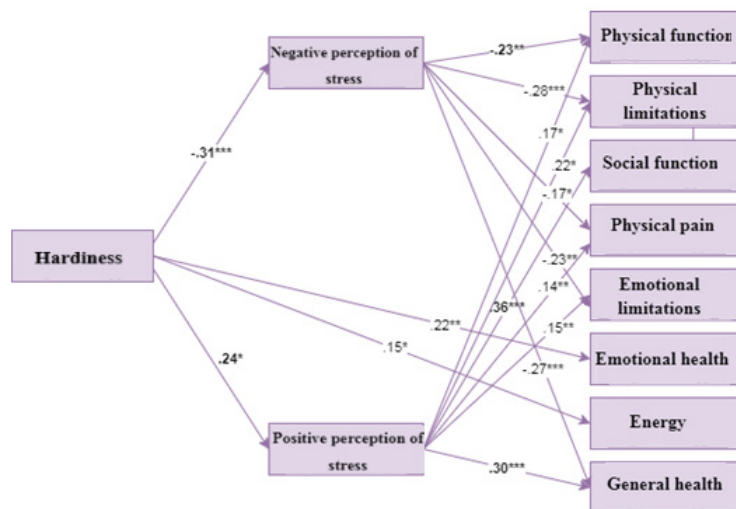
The evaluation of indirect effects using the bootstrap method showed that the indirect effects of hardiness on QoL are significant (Table 4). Because the upper and lower limits did not include zero score, the indirect effects are mediated by perceived stress. Thus, the mediating role of perceived stress in the relationship between hardiness and dimensions of QoL was confirmed.

**Discussion**

This study aimed to investigate the mediating role of

perceived stress in the relationship between psychological hardiness and QoL in CVD patients. The results showed that negative perception of stress and positive perception of stress with dimensions of QoL had a significant negative and positive relationship. Psychological hardiness with significant dimensions of QoL had a significant positive relationship. Perceived stress also had a mediating role in the relationship between psychological hardiness and QoL dimensions. These results are consistent with those reported by Pourakbari et al (22) and Souri and Ashoori (23).

In explaining these finding it can be said that QoL is a concept with a wide range and multiple dimensions complexly influenced by physical health and psychological status. The presence of stress and its experience in the long term and lack of sense of internal control and ineffective coping with stressful situations, with numerous negative



**Figure 1.** The Modified Model of the Mediating Role of Perceived Stress in the Relationship Between Perceived Hardiness and Quality of Life

**Table 3.** Standard and Non-standard Regression Coefficients of Direct Paths of the Hypothetical Model

Path	B	$\beta$	Standard Error	Critical Ratio	P
Direct effect of hardiness on negative perception of stress	-0.17	-0.31	0.027	-6.34	0.000
Direct effect of hardiness on positive perception of stress	0.04	0.24	0.021	-2.00	0.045
Direct effect of negative perception of stress on emotional limitation	-1.62	-0.23	0.546	-2.97	0.003
Direct effect of negative perception of stress on physical limitation	-1.79	-0.28	0.493	-3.63	0.000
Direct effect of negative perception of stress on physical pain	-.91	-0.17	0.402	-2.26	0.021
Direct effect of negative perception of stress on general health	-0.74	-0.27	0.198	-3.71	0.000
Direct effect of negative perception of stress on physical function	-0.98	-0.23	0.331	-2.96	0.003
Direct effect of positive perception of stress on physical limitation	1.31	0.14	0.694	1.89	0.050
Direct effect of positive perception of stress on social function	2.30	0.36	0.482	4.79	0.000
Direct effect of positive perception of stress on physical pain	1.61	.22	0.566	2.85	0.004
Direct effect of positive perception of stress on general health	1.31	0.30	0.279	4.05	0.000
Direct effect of positive perception of stress on physical function	1.00	0.17	0.465	2.16	0.304

**Table 4.** Standard and Non-standard Regression Coefficients of Indirect Paths of the Hypothetical Model

Path	B	$\beta$	LLCI	ULCI
Indirect effect of hardiness on physical function	0.21	0.13	0.137	0.169
Indirect effect of hardiness on social function	0.10	0.06	-0.018	0.056
Indirect effect of hardiness on general health	0.18	0.17	0.271	0.307
Indirect effect of hardiness on physical pain	0.22	0.11	-0.083	-0.028
Indirect effect of hardiness on physical limitation	0.36	0.15	0.053	0.095
Indirect effect of hardiness on emotional limitation	0.13	0.13	-0.074	-0.029

LLCI, lower limits confidence interval; ULCI, upper limits confidence interval

consequences in different aspects of life, ultimately leads to decreased QoL (19). The mechanism that can explain the relationship between stress and coronary heart disease and reduce the QoL in these patients is that stress as a risk factor for heart disease has a positive relationship with unhealthy behaviors, such as physical inactivity, unhealthy diet, smoking, and an unhealthy lifestyle (15). More specifically, stress and anxiety experienced with heart disease are associated with social isolation, feelings of disability, lack of control, and poor reception of medical advice, including stopping smoking (11). It has also been shown that chronic and continuous stress causes hypothalamus-hypophysial-adrenal axis over-activity, the sympathetic system, and epinephrine release (12), which causes premature aging and irregularity in the heart system through increased glucocorticoids (e.g., cortisol) (14). In general, stress is a destructive process that causes changes in the autonomic nervous system. Severe and chronic stress may lead to physical and mental disorders (16-18), and negatively affect the QoL in terms of physical and emotional health dimensions.

Also, psychological hardiness had a significant positive relationship with QoL dimensions. This finding

was consistent with the results of studies carried out by Shahbazirad et al (24) and Alipour Hamze Kandi and Zeinali (25). Also, perceived stress mediated the relationship between psychological hardiness and QoL dimensions.

The personality trait of psychological hardiness gives a certain internal attitude that affects how people deal with different life issues (12). Kobasa (9) considered the three characteristics of commitment, control, and challenge as a characteristic of tenacity and introduced the tenacity trait as a shield against the disease. Commitment is a fundamental sense of purposefulness or a sense of togetherness, which is the most essential and comprehensive source of resistance to any kind of tension. A person who has a high commitment believes in the importance of the value and meaning of who he is and what activities he or she is doing. On this basis, he has meaning and curiosity about what he is doing. Therefore, Kobasa mentioned that commitment is the most fundamental factor in maintaining health and minimizing the perceived threat posed by difficult life events. People who are strong in the category of control consider life events to be predictable and inhibited and can influence what is happening around them by trying. In other words, persons with high control believe that they can influence the events they encounter, rather than being unable to confront foreign forces. In terms of adaptability, the feeling of having control comes down to measures aimed at turning pressing events into conditions that are in harmony with the current schedule of personal life and thus are considered less unpleasant (11).

The challenge cognitively reduces the pressure of events, which gives them the ability to threaten, especially since change is considered necessary for a person's re-adaptation (10). The component of the challenge (struggle) indicates that change is the natural aspect of life. Those who have high levels of struggle see positive and negative situations that need to be re-adapted as an opportunity to learn and grow more than a threat to their safety and comfort.

They feel more committed to themselves and their work, experience a greater sense of control about their lives, and see stressing factors as potential opportunities for change, and maintain their mental health (11). Therefore, it can be said that hard people can maintain their mental health in unexplained and unpleasant events due to having an optimistic expansive style, a sense of ability to deal with problems, problem-oriented dealing with problems, positive expectations about outcomes, and belief that the consequences are dependent on the action because such belief brings cognitive flexibility, the ability to tolerate events, and ambiguous and uncomfortable life situations.

One of the limitations of the present study is the nature of its correlation, which limits the causal conclusion. Due to the limited research of cardiovascular patients in Tehran, the generalization of results to all cardiovascular patients should be made with caution. Gathering information through a self-report questionnaire and the likelihood of bias in responding can affect the validity of the data to some extent. Therefore, it is recommended that further studies be conducted in a broader population, with causal nature and data collection in different ways. It is also suggested that similar research be conducted in other cities to compare the results. Considering the importance of confirming the efficiency of interventional approaches to develop their application, it is suggested that this research be examined with a different society and also in the form of other research projects. Since psychological factors play a role in CVD, these patients should be considered separately by psychiatrists and specialists. Providing psychological services and free counseling are other necessities in promoting the health of CVD patients.

### Conclusion

According to the results, psychological hardiness through reducing perceived stress led to improved QoL scores in cardiovascular patients. In general, the results of the present study indicated a correlation between psychological hardiness and increased QoL and an inverse relationship between perceived stress and QoL in CVD patients.

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### Authors' Contribution

Conceptualization [MJ]; Methodology [AR]; Investigation [MS]; Writing – Original Draft [MJ]; Writing – Review & Editing [all authors]; Funding Acquisition [all authors]; Resources [all authors]; Supervision [AR].

### Conflict of Interests

The authors declare that they have no conflict of interests.

### Ethical Approval

The present study was approved by the Ethics Organization in

Biomedical Research of Tehran Islamic Azad University (code: IR.IAU.TMU.REC.1399.240). All ethical principles were considered in this research. The participants were informed about the purpose of the research and its stages. Informed consent was obtained from all subjects. They were also assured of the confidentiality of their information. Moreover, the subjects were free to withdraw from the study at any stage. They were also informed that they would be provided with the results of the research.

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