

Original Article

Structural Equation Modeling of the Association Between Psychological Hardiness and Quality of Life in Heart Failure Patients: The Mediating Role of Self-Efficacy

Amir Khojaste Kashani¹, Sara Sanatnegar^{1*}, Esmail Shirdel-Havar²

¹Department of Psychology and Counselling, Farhangian University, Tehran, Iran.

²Department of Psychology and Education, University of Tehran, Tehran, Iran.

Received: 14 Jan 2026; Revised: 03 Feb 2026; Accepted: 30 Feb 2026

Abstract

Background and Aim: Heart failure is a prevalent chronic condition that is frequently associated with reduced quality of life. Psychological hardiness may play a protective role in improving quality of life among patients with heart failure, potentially through mechanisms such as self-efficacy. The present study aimed to examine the relationships among psychological hardiness, self-efficacy, and quality of life in patients with heart failure.

Materials and Methods: This descriptive cross sectional study used a correlational design and structural equation modeling. The sample consisted of 298 patients with heart failure who were recruited through convenience sampling from the cardiology department of Farabi Social Security Hospital in Mashhad, Iran. Data were collected using the Minnesota Living with Heart Failure Questionnaire (MLHFQ; 21 items; Rector, 1984), the General Self Efficacy Scale (10 items; Schwarzer et al.), and the Ahvaz Hardiness Questionnaire (1998). Descriptive statistics and correlations were calculated using SPSS, and structural equation modeling was performed with LISREL. Statistical significance was set at $p < 0.05$.

Results: The results of structural equation modeling indicated that self-efficacy significantly mediated the relationship between psychological hardiness and quality of life in patients with heart failure ($\beta = 0.55$, $p < 0.05$). In addition, psychological hardiness had a direct and significant positive association with quality of life ($p < 0.05$). Model fit indices suggested an acceptable model fit (RMSEA = 0.077; GFI = 0.92).

Conclusion: Psychological hardiness contributes to improved quality of life in patients with heart failure both directly and indirectly through self-efficacy. These findings underscore the potential value of interventions aimed at strengthening hardiness and self-efficacy to enhance patient well-being.

Keywords: Psychological hardiness; Self efficacy; Quality of life; Heart failure; Structural equation modeling

***Corresponding Author:** Sara Sanatnegar, Department of Psychology and Counselling, Farhangian University, Tehran, Iran.

Email: sara.sanatnegar@gmail.com

ORCID: 0009-0009-4044-3352

Please cite this article as:

Khojaste Kashani, A, Sanatnegar, S, Shirdel-Havar, E. Structural Equation Modeling of the Association Between Psychological Hardiness and Quality of Life in Heart Failure Patients: The Mediating Role of Self-Efficacy. Int. J. Appl. Behav. Sci. 2026;13(1):31-40

Introduction

Cardiovascular diseases are among the leading causes of mortality worldwide, including in Iran (1, 2). Heart failure, one of the most common cardiovascular conditions, is associated with increased mortality, multiple comorbidities, disability, and substantial healthcare costs (3-5). Epidemiological estimates in Iran indicate that more than one million individuals—approximately 1% of the population aged over 40 years—are affected by heart failure (6, 7).

Within the biopsychosocial model of health, disease is not examined in isolation from the individual's psychological and social characteristics (8). From this holistic perspective, quality of life is considered one of the most important indicators of health outcomes. Heart failure significantly affects patients' quality of life due to its chronic nature and the limitations it imposes on daily functioning (9). Quality of life is a multidimensional concept influenced by physical, psychological, relational, and social factors (10) and is frequently regarded as a key outcome in clinical research and therapeutic interventions for patients with heart failure (11, 12).

Among the psychological factors that may influence quality of life in chronic illness, self-efficacy has received considerable attention. Self-efficacy refers to an individual's belief in their capacity to perform behaviors necessary to achieve desired outcomes. It is considered a crucial determinant of self-care behaviors and health-related outcomes, both directly and indirectly through the influence of other variables (13-17). In patients with cardiovascular diseases and heart failure, higher levels of self-efficacy have been associated with better disease management, greater adherence to treatment, and improved quality of life (18-22). Moreover, self-efficacy enhances effective self-care behaviors by strengthening individuals' confidence in their ability to cope with disease-related challenges (23-26).

Another psychological construct that may play an important role in coping with chronic illness is psychological hardiness. Hardiness is a personality disposition that reflects an individual's capacity to remain resilient and adaptive in the face of stressful life events. Originally proposed by Kobasa and

influenced by existential psychology, hardiness consists of three core components: commitment, control, and challenge (27-30). Individuals with higher levels of hardiness tend to perceive stressful situations as manageable and meaningful rather than threatening, and they are more likely to employ effective coping strategies such as problem solving (31-33).

Previous research suggests that hardiness is associated with a variety of positive health outcomes. It has been identified as a reliable predictor of psychological and physical health during stressful life events (34, 35). Studies have also shown that hardiness is related to greater illness acceptance, healthier behavioral patterns, and improved mental well-being (31-35, 37-39). Furthermore, evidence indicates that cardiac patients often demonstrate lower levels of psychological hardiness compared with healthy individuals, suggesting that interventions aimed at strengthening this trait may be beneficial (37). Some studies have also reported physiological associations, such as higher HDL levels and lower body mass index among individuals with greater hardiness (38).

Conceptually, hardiness and self-efficacy are closely related constructs. Individuals with high self-efficacy tend to demonstrate greater persistence, adaptability, and resilience when facing difficulties, characteristics that overlap with the components of hardiness. Self-efficacy may therefore contribute to the development of commitment, control, and challenge by reinforcing individuals' confidence in their ability to manage stressful situations and cope with adversity (40-42). Although numerous studies have examined psychological factors related to quality of life in patients with heart failure, the mechanisms through which these factors interact remain insufficiently explored. In particular, the potential mediating role of self-efficacy in the relationship between psychological hardiness and quality of life has received limited attention. Therefore, the present study aimed to investigate the structural relationships among psychological hardiness, self-efficacy, and quality of life in patients with heart failure (Figure 1. The hypothesized model of structural relationship between Quality of life and Hardiness through self-efficacy). Specifically, this study examined whether self-efficacy mediates the relationship between hardiness and quality of life in this population.

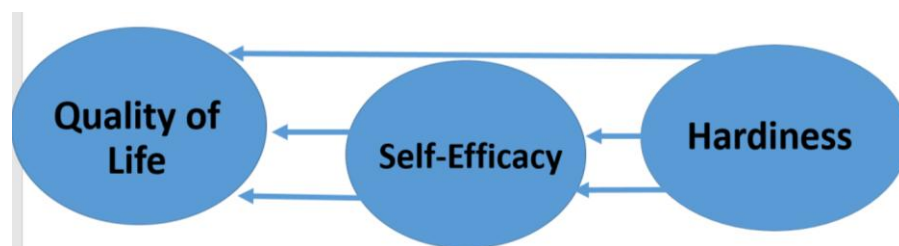


Figure 1. The hypothesized model of structural relationship between Quality of life and Hardiness through self-efficacy

Methods

This study employed a descriptive cross-sectional design to examine the structural relationships among the study variables using structural equation modeling (SEM). Participants were recruited using a convenience sampling method. The target population consisted of male patients diagnosed with heart failure who were referred to Social Security hospitals in Mashhad, Iran, during the spring of 2019. The estimated population size was approximately 1,000 individuals. Eligibility criteria included male gender, age between 49 and 65 years, residence in Mashhad, a confirmed diagnosis of heart failure, and a documented history of cardiovascular disease symptoms for at least five years. Exclusion criteria included incomplete or inaccurate completion of the research questionnaires, as well as a history of psychiatric disorders or substance use requiring pharmacological treatment during the study period. The required sample size was determined based on recommendations for structural equation modeling, which suggest including at least 15 participants for each observed variable (43). Given that the present study included a maximum of 12 observed variables, a minimum sample size of approximately 180 participants was required. To increase statistical power and account for potential missing or incomplete data, a final sample size of 300 patients was targeted. Participants were recruited from patients referred to the participating hospitals until the desired sample size was reached.

Materials

Minnesota Living with Heart Failure Questionnaire (MLHFQ)

Quality of life was assessed using the Minnesota

Living with Heart Failure Questionnaire (MLHFQ), developed by Rector in 1984. The MLHFQ is a widely used self-report instrument designed to evaluate the impact of heart failure and its treatment on patients' quality of life.

The questionnaire consists of 21 items that assess symptoms and functional limitations associated with heart failure, including shortness of breath, fatigue, peripheral edema, sleep disturbances, and psychological symptoms such as depression and anxiety. It also evaluates the effects of heart failure on social relationships, physical and sexual activities, occupational functioning, emotional well-being, and overall daily functioning. The MLHFQ includes three subscales: physical functioning (9 items; items 1–7, 12, and 13), emotional functioning (5 items; items 17–21), and socioeconomic aspects (7 items; items 8–11 and 14–16). Responses are rated on a six-point Likert scale ranging from 0 (no impact) to 5 (very much). Total scores range from 0 to 105, with lower scores indicating better quality of life and higher scores reflecting poorer quality of life (44,45).

The MLHFQ has demonstrated strong psychometric properties in previous studies. For example, Kusuma *et al.* (2019) reported a Cronbach's alpha of 0.887 and an internal consistency coefficient of 0.918 for the Indonesian version (46). Napier *et al.* (2018) found moderate correlations between MLHFQ scores and the New York Heart Association (NYHA) functional class (Spearman's rho = 0.30–0.37) as well as the 6-minute walk test (Spearman's rho = 0.23–0.38), supporting its criterion validity (47). In Iran, Eskandari *et al.* (2015) confirmed the criterion validity of the MLHFQ through a strong and significant correlation with the Short Form-36 (SF-36). They reported a Cronbach's alpha of 0.95 and test-retest reliability above 0.90 across all dimensions over a two-week interval (44). Similarly, Moghadam *et al.* (2019) validated the questionnaire in

105 patients with heart failure and reported Cronbach's alpha coefficients of 0.90 for the physical dimension, 0.84 for the emotional dimension, and 0.92 for the total score, indicating high internal consistency (48).

Self-Efficacy Questionnaire

The General Self-Efficacy Scale (GSE), developed by Schwarzer and Jerusalem in 1981, measures individuals' beliefs in their ability to manage life demands and adapt to change across different developmental stages. This self-report instrument includes 10 items rated on a 4-point Likert scale, from 1 ("not at all true") to 4 ("exactly true"). Total scores range from 10 to 40, with higher scores indicating stronger self-efficacy (49). The GSE has shown strong psychometric properties across diverse populations. Schwarzer and Jerusalem (2010) reported Cronbach's alpha coefficients ranging from 0.76 to 0.90 across different translations. Schwarzer et al. (1997) found internal consistency coefficients of 0.84 among German students, 0.81 among students in Costa Rica and Spain, and 0.91 among Chinese students (50). In a study of 358 educated Indian women, Varic and Ceci (2017) confirmed the scale's unidimensional structure through confirmatory factor analysis (CFA) and reported a Cronbach's alpha of 0.83 (51). In Serbia, Hanson and Roberts (2006) evaluated the GSE across three studies involving 3,667 students and reported Cronbach's alpha coefficients of 0.84, 0.87, and 0.90 (52). In Iran, Rajabi (2006) reported Cronbach's alpha values of 0.82 for the overall scale, 0.84 at Shahid Chamran University of Ahvaz, and 0.80 at Marvdasht Azad University. Concurrent validity was assessed using the Rosenberg Self-Esteem Scale, with correlation coefficients of 0.30 ($n = 318$), 0.20 at Shahid Chamran University, and 0.23 at Marvdasht Azad University (53). Additionally, Tahmasebi Baldachi (2022) reported a Cronbach's alpha of 0.81, further supporting the scale's reliability (54).

Ahvaz Hardiness Questionnaire

The Ahvaz Hardiness Questionnaire (AHQ), developed by Kiamarsi et al. (1998; cited in Salehian & Sarwari, 2021), is a self-report instrument designed to assess psychological hardiness. The questionnaire was developed through factor analysis conducted on a sample of 523 students and consists of 27 items

measuring three core components of hardiness: commitment, control, and challenge. Items are rated on a 4-point Likert scale ranging from 0 ("never") to 3 ("often"). Six items (6, 7, 10, 13, 17, and 21) are reverse-scored. Total scores range from 0 to 81, with higher scores indicating greater psychological hardiness. The validity of the AHQ has been examined using concurrent criterion validity with several related measures, including the General Anxiety Scale (Attari et al., 1995), the Beck Depression Inventory (1996), and the Ahvaz Self-Actualization Questionnaire (1380) (55). Correlation coefficients between the AHQ and the General Anxiety Scale were -0.55 for the total sample, -0.70 for females, and -0.70 for males, indicating a significant negative relationship. Similarly, correlations between the AHQ and the Ahvaz Depression Questionnaire were -0.62 for the total sample, -0.71 for females, and -0.57 for males. In contrast, positive correlations were observed between the AHQ and Maslow's Self-Actualization Questionnaire, with coefficients of 0.55 for the total sample and 0.65 for females.

Reliability of the AHQ was evaluated using the test-retest method over a six-week interval in a sample of 119 participants, yielding correlation coefficients of 0.84 for the total sample, 0.85 for females, and 0.84 for males. Internal consistency reliability, assessed using Cronbach's alpha in a sample of 523 students, was reported as 0.76 for the total sample as well as for female and male subgroups. Subsequent studies have further supported the reliability of the AHQ (55). For example, Rezaei et al. (2021) reported a Cronbach's alpha of 0.726 (56), while Heidari and Torkan (2022) reported a Cronbach's alpha of 0.84 (57).

Procedure

The researcher first met with the hospital support unit and subsequently with the Vice-President for Education and Research at Farabi Hospital to explain the objectives of the study and its potential importance in preventing the onset, persistence, and exacerbation of cardiovascular disorders, while emphasizing compliance with ethical principles. After obtaining approval from the National Ethics Committee of Mashhad University of Medical Sciences (Ethics Code: IR.IAU.MSHD.REC.1397.042), all ethical considerations, including confidentiality of participants' information, protection of participants'

rights, and the right to withdraw from the study at any stage, were strictly observed. Following administrative approval, the researcher visited the cardiology department of the hospital. The purpose of the study was briefly explained to the department staff, and two staff members assisted in identifying potential participants according to the inclusion criteria. Participants were recruited while the researcher was present during the periodic examinations conducted by specialist physicians, ensuring adherence to ethical standards. Participants received instructions on how to complete the questionnaires and were assured of the confidentiality of their responses. Written informed consent was obtained from all participants prior to data collection. The data collection process was conducted individually over a six-month period, and completing the questionnaires required approximately 30 minutes for each participant. Of the 300 collected questionnaires, 298 fully completed questionnaires were included in the final analysis. The data were entered into SPSS software (version 22) and analyzed using structural equation modeling (SEM) with SPSS 22 and LISREL. The Sobel test was used to examine the significance of the mediating effect.

Results

The study sample consisted of 298 male participants with a mean age of 56.84 years ($SD = 3.99$). Regarding marital status, 60 participants (20.13%) were single, 175 (58.72%) were married, and 63 (21.14%) were divorced. In terms of educational level, 98 participants (32.9%) had elementary education, 118 (39.6%) had a high school diploma, 27 (9.1%) had a post-diploma certificate, 51 (17.1%) held a bachelor's degree, and 4 (1.3%) held a master's degree. Regarding body composition, 192 participants (64.4%) were classified as obese, while 106 (35.6%) had an average weight. The Kolmogorov–Smirnov test indicated a significance level below 0.05 for quality of life ($p = 0.0478$) and hardiness ($p = 0.0311$), and above 0.05 for self-efficacy ($p = 0.938$), suggesting a normal distribution only for the self-efficacy variable. However, the skewness values for all variables fell within the acceptable range of -2 to $+2$, supporting the assumption of approximate

normality. Prior to conducting structural equation modeling (SEM), the required statistical assumptions were examined. The sample size was adequate, and no significant outliers were detected, as Mahalanobis distance values did not exceed the critical threshold. Multicollinearity was assessed using the tolerance index (> 0.10) and the variance inflation factor ($VIF < 10$), indicating no evidence of multicollinearity among the variables. Sampling adequacy was confirmed by Kaiser–Meyer–Olkin (KMO) values greater than 0.60 for all variables. In addition, Bartlett's test of sphericity was significant ($p < 0.05$), indicating that the correlation matrix was suitable for factor-based analyses.

Table 1 presents the means and standard deviations of the research variables. Table 2 reports the Pearson correlation matrix, which indicates significant positive correlations among quality of life, hardiness, and self-efficacy ($p < 0.05$). Given these significant associations, the mediating role of self-efficacy in the relationship between quality of life and hardiness was examined using structural equation modeling. Figure 2 presents the SEM results, including standardized path coefficients. The results showed significant positive relationships between quality of life and hardiness ($\beta = 0.463$, $p < 0.05$), quality of life and self-efficacy ($\beta = 0.445$, $p < 0.05$), and self-efficacy and hardiness ($\beta = 0.698$, $p < 0.05$). To evaluate the overall fit of the structural equation model (SEM) to the observed data, several goodness-of-fit indices were examined. Model fit was assessed based on commonly recommended criteria, including a chi-square to degrees of freedom ratio ($\chi^2/df \leq 3$), Incremental Fit Index (IFI) ≥ 0.90 , Goodness-of-Fit Index (GFI) ≥ 0.90 , Adjusted Goodness-of-Fit Index (AGFI) ≥ 0.90 , Tucker–Lewis Index (TLI) ≥ 0.90 , Comparative Fit Index (CFI) ≥ 0.90 , and Normed Fit Index (NFI) ≥ 0.90 . In addition, values of Root Mean Square Residual (RMR) < 0.08 and Root Mean Square Error of Approximation (RMSEA) < 0.08 were considered indicative of an acceptable model fit.

As shown in Table 3, the results indicated a satisfactory fit of the proposed model to the data ($\chi^2/df = 2.757$, GFI = 0.92, AGFI = 0.95, IFI = 0.95, TLI = 0.95, CFI = 0.94, NFI = 0.93, RMR = 0.068, RMSEA = 0.077). These indices suggest that the proposed structural model adequately represents the relationships among the study variables. This section examines the structural relationships among the latent variables based on the

estimated path coefficients obtained from the structural equation model. Descriptive statistics for all study variables are presented in Table 4. The

significance of the structural paths was evaluated using t-values, with values greater than 1.96 or less than -1.96 indicating statistical significance at the 0.05 level.

Table 1. Mean and standard deviation and distribution of research variables.

Variables	Mean	Standard deviation	Kolmogov Smirnov	.Sig	Skewness	Standard deviation of Skewness	Kurtosis	Standard deviation of Kurtosis
Self-efficacy	20.08	9.54	0.534	0.938	0.373	0.141	-0.1525	0.281
Quality of life	64.43	31.37	0.964	.0311	0.264	0.141	-0.1645	0.281
Hardiness	28.03	20.91	0.842	.0478	0.296	0.141	-0.1664	0.281

Table 2. Correlation matrix of research variables.

Variables	Quality of life	Hardiness	Self-efficacy
Quality of life	1		
Hardiness	0.463**	1	
Self-efficacy	0.445**	0.698**	1

Table 3. Fitness indices of the proposed model in the research.

Indices	χ^2/df	GFI	AGFI	IFI	TLI	CFI	NFI	RMR	RMSEA
Values	2.757	0.92	0.95	0.95	0.95	0.94	0.93	0.068	0.077
Desired level	<3	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.08	<0.08

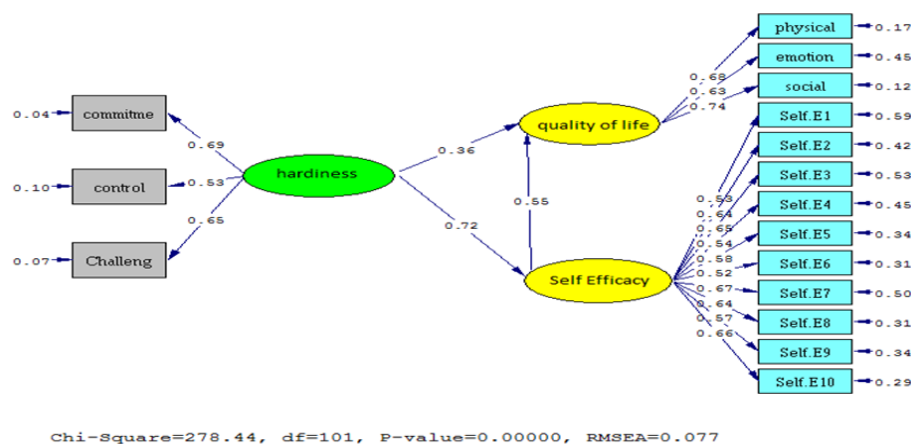


Figure 2. The examined model of the structural relationship between Quality of Life and Hardiness through self-efficacy.

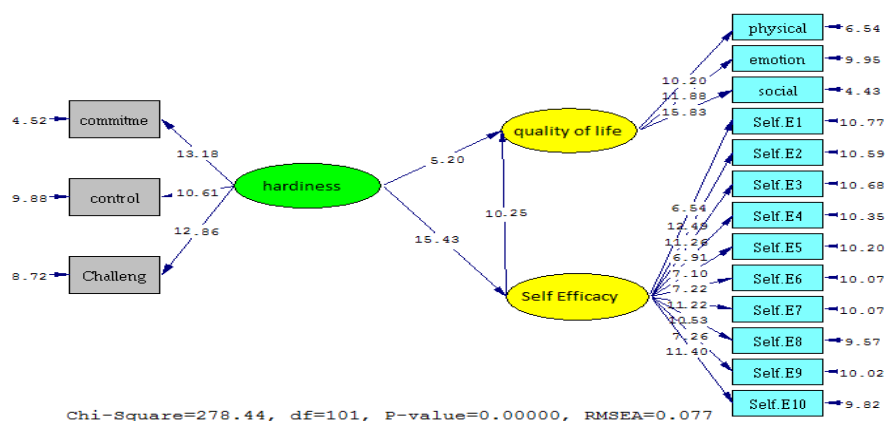


Figure 3. Results of t-tests for the model relationship between Quality of Life and Hardiness through self-efficacy.

Table 4. Standardized path coefficients and significance for the relationships among Hardiness, Self-efficacy, and Quality of Life.

Path	Standardized Path Coefficient (β)	t-value	Standard Error (SE)	Significance
Hardiness → Self-efficacy	0.72	15.43	0.047	$p < 0.001$
Self-efficacy → Quality of Life	0.55	10.25	0.054	$p < 0.001$
Hardiness → Quality of Life	0.36	5.20	0.070	$p < 0.001$

As shown in Table 4, the results support all proposed hypotheses. The first path (Hypothesis 1) yielded a standardized path coefficient of 0.72 with a t-value of 15.43, indicating that hardiness has a significant positive direct effect on self-efficacy. The second path (Hypothesis 2) showed a standardized coefficient of 0.55 with a t-value of 10.25, demonstrating that self-efficacy has a significant positive direct effect on quality of life. The third path (Hypothesis 3) yielded a standardized coefficient of 0.36 with a t-value of 5.20, indicating that hardiness also has a significant positive direct effect on quality of life. Given the confirmation of Hypotheses 1 and 2, self-efficacy mediates the relationship between hardiness and quality of life. The indirect effect was calculated as the product of the path coefficients: $0.72 \times 0.55 = 0.396$ (rounded to 0.40). The Sobel test was used to assess the significance of this mediating effect, with the z-statistic calculated as follows:

$$z = (a * b) / \sqrt{(b^2 * SE_a^2 + a^2 * SE_b^2 + SE_a^2 * SE_b^2)}$$

where $a = 0.72$ (path coefficient from hardiness to self-efficacy), $b = 0.55$ (path coefficient from self-efficacy to quality of life), $SE_a = 0.047$ (standard error of a), and $SE_b = 0.054$ (standard error of b). Substituting these values:

$$z = (0.72 * 0.55) / \sqrt{(0.55^2 * 0.047^2) + (0.72^2 * 0.054^2) + (0.047^2 * 0.054^2)} = 8.469$$

The z-value of 8.469 exceeds the critical threshold of 1.96, confirming that the mediating effect of self-efficacy is significant at $p < 0.05$. Thus, hardiness has a significant indirect positive effect on quality of life in patients with heart failure through self-efficacy.

Discussion

The present study investigated the indirect effect of hardiness on quality of life through the mediating role

of self-efficacy among patients with heart failure.

The results indicated that higher levels of hardiness were associated with greater self-efficacy, which in turn was related to improved quality of life. The indirect effect of hardiness on quality of life through self-efficacy was statistically significant, with an estimated coefficient of 0.396 (0.72×0.55). Furthermore, the Sobel test confirmed the significance of the mediating effect ($z = 8.469$), indicating that hardiness influences the quality of life of patients with heart failure through increased self-efficacy. These findings are consistent with previous studies reporting significant relationships among the main variables of the present study (1, 34, 40, 42, 58-61). For example, Arshi *et al.* (2021) reported significant associations between hardiness and self-efficacy, while Afshari *et al.* (2024) and Huang *et al.* (2024) found that self-efficacy and social support played a substantial role in explaining self-care behaviors among patients (27, 29, 60). These findings suggest that self-efficacy may function as an important psychological mediator linking personality traits to health-related outcomes. Evidence suggests that hardiness can enhance quality of life by strengthening individuals' self-efficacy beliefs. Individuals with greater self-efficacy tend to feel more capable of managing life demands and coping with stressful situations, which can positively influence their psychological well-being and overall quality of life (26). Similarly, Ng and Lee (2019) reported that hardiness mediates the relationship between perceived loneliness and depressive symptoms in adults and contributes to improvements in psychological quality of life (62). In addition, Ghorbanpourlafmajani *et al.* (2019) demonstrated the mediating role of social support in the relationship between hardiness and quality of life, suggesting that psychological and social resources can facilitate the positive effects of hardiness on well-being (29, 63). Self-efficacy appears to play a central role in this relationship by enhancing

psychological resilience and individuals' perceived ability to cope with stressors. Individuals with higher levels of hardiness are more likely to develop strong beliefs in their capacity to manage challenges, which in turn can improve their quality of life. Self-efficacy also strengthens individuals' sense of control and acceptance when dealing with health-related difficulties (20). Nevertheless, this does not imply that hardiness lacks a direct association with quality of life. Consistent with previous research, the present study also found a significant positive relationship between hardiness and quality of life (56, 57). Hardiness, characterized by the dimensions of commitment, control, and challenge, enables individuals to cope more effectively with stress and reduces the negative impact of stressors on physical and psychological health, thereby contributing to a better quality of life (30). Furthermore, previous research has highlighted the close relationship between hardiness and self-efficacy (6,25, 64–66). In particular, the control dimension of hardiness may enhance individuals' perceived mastery in various situations. Individuals with higher hardiness typically experience lower levels of psychological distress and demonstrate greater confidence in their ability to solve problems. This capacity allows them to perceive health-related challenges not as threats but as opportunities for growth, which can ultimately promote health-supportive behaviors and improve quality of life (36, 39). From this perspective, personality characteristics such as hardiness may create a form of psychological resilience that fosters the development of self-efficacy. In turn, self-efficacy strengthens individuals' confidence in managing and adhering to treatment for heart failure, encourages persistence in health-related behaviors, and enhances expectations of successful outcomes. These processes may ultimately contribute to improved quality of life among patients with heart failure. Previous studies have also reported significant associations between self-efficacy and quality of life (18,19,41,67). Therefore, self-efficacy may enhance patients' capacity to manage daily challenges, adopt healthier lifestyles, and maintain psychological well-being, thereby improving overall quality of life. One limitation of the present study is the use of convenience sampling, which is a non-probability sampling method. This approach may limit the generalizability of the findings to the broader

population and restrict the accurate estimation of population parameters. Additionally, it increases the possibility of bias resulting from uncontrolled or unmeasured confounding variables

Conclusion

Self-efficacy appears to function as a central mediator in the relationship between hardiness and quality of life (QoL). It operates as a psychological mechanism through which hardiness may exert its positive influence on QoL. Hardiness, characterized by commitment, control, and challenge, fosters resilience and enhances individuals' perception that life demands are manageable. This perception of control strengthens self-efficacy beliefs, increasing confidence in one's ability to cope effectively with stressors. Individuals with higher levels of hardiness are more likely to set meaningful and challenging personal goals, which can further reinforce self-efficacy. In turn, individuals with stronger self-efficacy beliefs tend to employ more adaptive coping strategies, demonstrate greater persistence in the face of difficulties, and engage more consistently in health-promoting behaviors. These processes collectively contribute to enhanced psychological well-being and improved quality of life. Accordingly, interventions designed to strengthen both hardiness and self-efficacy may be particularly beneficial for patients with heart failure who are exposed to chronic stress, as such interventions could ultimately contribute to better quality-of-life outcomes.

Acknowledgment

The authors thank and appreciate all the participants in the research.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

- 1- Janjani P, Nosrati P, Ziapour A, Geravand S, Moghadam RH. Does coping strategies play a mediating role in the relationship between disease management self-efficacy and mental toughness

- with the quality of life of cardiovascular patients? *Discov Ment Health*. 2025;5(1):22. [In Persian]
- 2- Zangeneh A, Najafi F, Khosravi A, Ziapour A, Molavi H, et al. Epidemiological patterns and spatiotemporal analysis of cardiovascular disease mortality in Iran: Development of public health strategies and policies. *Curr Probl Cardiol*. 2024;49(8):102675. [In Persian]
 - 3- Rezaianzadeh A, Moftakhar L, Seif M, Johari MG, Hosseini SV, et al. Incidence and risk factors of cardiovascular disease among population aged 40–70 years: a population-based cohort study in the South of Iran. *Trop Med Health*. 2023;51(1):35. [In Persian]
 - 4- Ketabi M, Andishgar A, Fereidouni Z, Sani MM, Abdollahi A, et al. Predicting the risk of mortality and rehospitalization in heart failure patients: A retrospective cohort study by machine learning approach. *Clin Cardiol*. 2024;47(2):e24239. [In Persian]
 - 5- Siddiqui SW, Ashok T, Patni N, Fatima M, Lamis A, et al. Anemia and heart failure: a narrative review. *Cureus*. 2022;14(7):e27167.
 - 6- Fedacko J, Tuppo EE, Singh RB, Elkilany GN, Hristova K. Epidemiology and mortality due to heart failure. In: *Pathophysiology, Risk Factors, and Management of Chronic Heart Failure*. Elsevier; 2024. p. 23-40.
 - 7- Zare E, Sadeghi S, Haghanejad H, Seyed Hossieni Tezerjani SM, Mirzaei M, et al. The Prevalence of Various Stages of Heart Failure in Individuals Over 40 Years Old: The Findings from Yazd Health Study. *J Iran Med Counc*. 2024;7(4):804-10. [In Persian]
 - 8- Arakelyan S, Lone N, Anand A, Mikula-Noble N, Lyall MJ, et al. Effectiveness of holistic assessment-based interventions in improving outcomes in adults with multiple long-term conditions and/or frailty: an umbrella review protocol. *JB I Evid Synth*. 2023;21(9):1863-78.
 - 9- Major K, Bodys-Pelka A, Grabowski M, Lelonek M. Quality of life in heart failure: New data, new drugs and devices. *Cardiol J*. 2024;31(1):156-67.
 - 10- Trevizan FB, Miyazaki MCdOS, Silva YLW, Roque CMW. Quality of life, depression, anxiety and coping strategies after heart transplantation. *Braz J Cardiovasc Surg*. 2017;32(1):162-70.
 - 11- Lawson CA, Benson L, Squire I, Zaccardi F, Ali M, et al. Changing health related quality of life and outcomes in heart failure by age, sex and subtype. *EClinicalMedicine*. 2023;64:101999.
 - 12- Xu J, Sun Y, Gong D, Fan Y. Association between disease-specific health-related quality of life and all-cause mortality in patients with heart failure: a meta-analysis. *Curr Probl Cardiol*. 2023;48(4):101592.
 - 13- Bandura A. Efficacy in human adaptation and change. *Adv Psychol Sci*. 1998;1(1):51-71.
 - 14- Bandura A. Health promotion by social cognitive means. *Health Educ Behav*. 2004;31(2):143-64.
 - 15- Madran DM, Jassim AH. Self-efficacy and its relationship to self-care among type II diabetic patients. *Int J Health Sci*. 2022;6(S2):15199-208.
 - 16- Ong-Artborirak P, Seangpraw K, Boonyathee S, Auttama N, Winaiprasert P. Health literacy, self-efficacy, self-care behaviors, and glycemic control among older adults with type 2 diabetes mellitus: a cross-sectional study in Thai communities. *BMC Geriatr*. 2023;23(1):297.
 - 17- Darvishpour A, Mansour-Ghanaei R, Mansouri F. The relationship between health literacy, self-efficacy, and self-care behaviors in older adults with hypertension in the north of Iran. *HLRP*. 2022;6(4):e262-9. [In Persian]
 - 18- Kristinawati B, Rosyid FN, Rizkiawan A, Handika BV, Mardana NW, Jurnal Aisyah: Jurnal Ilmu Kesehatan. *J Ilmu Kesehat*. 2023;8(1):230.
 - 19- Baradaranfard F, Babaei S, Boroumand S, Mosleh S, Jafari F, et al. The relationship between quality of life and cardiovascular self-efficacy in patients with heart failure: A descriptive correlation study. 2018;32(33):33. [In Persian]
 - 20- Religioni U, Kupisz-Urbańska M, Niegowska W, Drab A, Czapski P, et al. Self-Efficacy and Acceptance of Illness among Older Patients with Heart Failure. *Behav Sci*. 2025;15(5):679.
 - 21- Yahyavi SH, Pourrahimi M. Impact of dietary behaviors and exercise activities education on the self-efficacy of middle school students. *Med Sci J Islam Azad Univ Tehran Med Branch*. 2012;22(2):143-51. [In Persian]
 - 22- Okada A, Hayashi K, Tsuchihashi-Makaya M. Self-Care Self-Efficacy Predicts Long-Term Health-Related Quality of Life in Patients With Heart Failure. *Circulation*. 2023;148(Suppl 1):A16166.
 - 23- Dickson V, Buck HG, Vellone E, Riegel B. Multiple comorbid conditions challenge heart failure self-care by decreasing self-efficacy. *Nurs Res*. 2013;62(1):2-9.
 - 24- Farazian F, Emami Moghadam Z, Heshmati Nabavi F, Behnam Vashani H. Effect of self-care education designed based on bandura's self-efficacy model on patients with hypertension: a randomized clinical trial. *Evid Based Care*. 2019;9(2):44-52. [In Persian]
 - 25- Abbasian M, Sahragard M. The effectiveness of Complicated Grief Treatment on Rumination, Emotion Regulation and Coping Self-Efficacy in People with Prolonged Grief Disorder. *Int J Appl Behav Sci*. 2024;11(2):8-20. [In Persian]
 - 26- Shoushtari F, Kalantari M, Amiri S, Afshari A. Evaluating the Effectiveness of Attachment-based Play Therapy on Emotional Self-Regulation in Female Students with ADHD Combined Type and their Mothers' Parental Self-Efficacy: A Case Study. *Int J Appl Behav Sci*. 2025;12(2):29-37. [In Persian]
 - 27- Arshi S, Kalhorna Golkar M, Ahadi H, Sedaghat M. The Role of Self-Efficacy, Hardiness, and Coping Strategies in Predicting Self-Care Behaviors in Patients with Type 2 Diabetes. *Prev Care Nurs Midwifery J*. 2021;11(4):17-25. [In Persian]
 - 28- Rajati F, Sadeghi M, Feizi A, Sharifirad G, Hasandokht T, et al. Self-efficacy strategies to improve exercise in patients with heart failure: A systematic review. *ARYA Atheroscler*. 2014;10(6):319. [In Persian]
 - 29- Afshari S, Alipour F, Farid A. A Meta-Analysis of the Impact of School Climate on Academic Self-Efficacy Across Gender and Age Groups. *Int J Appl Behav Sci*. 2024;11(4):58-67. [In Persian]
 - 30- Jafari E, Razaghilord G, Khoshtinat V, Poormohseni F, Rahmaman M. The Role of Hardiness and Moral Intelligence in Predicting the Anxiety of Corona Disease in Students. *Int J Appl Behav Sci*. 2025;12(2):56-64. [In Persian]
 - 31- Salehian MH, Sarvari S. The relationship between psychological hardiness and resilience and its role in the actual well-being of mothers with handicapped children. *J Psychopathol*. 2021;27:163-9. [In Persian]
 - 32- Mund P, Mishra M. Hardiness: A review and research agenda. *Pers Indiv Dif*. 2025;233:112882. <https://doi.org/10.1016/j.paid.2024.112882>.
 - 33- Sharif Nia H, Froelicher ES, Hosseini L, Ashghali Farahani M. Evaluation of psychometric properties of hardiness scales: a systematic review. *Front Psychol*. 2022;13:840187.
 - 34- Desiningrum DR, Kurniawati K. Parenting Self-Efficacy, Hardiness and Psychological Well-Being of Parents of Children with ASD. 2023;4(1):328-40.
 - 35- Smith ED. The role of parental self-efficacy, hardiness, and parenting stress in predicting parenting behaviors. The University of Southern Mississippi; 2017.
 - 36- Khazew HR, Faraj RK. Illness acceptance and its relationship to health-behaviors among patients with type 2 diabetes: A mediating role of self-hardiness. *Curr Probl Cardiol*. 2024;49(8):102606.
 - 37- Vaikarmi H, Sadeghi M, Moradizadeh S. A comparative study on Type D Personality, psychological Hardiness, Frustration Tolerance, and perfectionism among patients with coronary Heart Disease and Normal people in Khoramabad over a three-month

- summer in 2017. *J Sabzevar Univ Med Sci.* 2019;26(4):477-87. [In Persian]
- 38- Bartone PT, Valdes JJ, Sandvik A. Psychological hardiness predicts cardiovascular health. *Psychol Health Med.* 2016;21(6):743-9.
- 39- Shahbazirad A, Ghazanfari F, Abbasi M, Mohammadi F. The role of psychological hardiness and spiritual health in predict of quality of life in students of kermanshah university of medical sciences. *J Educ Community Health.* 2015;2(2):20-7. [In Persian]
- 40- Hong M, Zhang R, Zhu J, Tan W. Social support and self-efficacy multiply mediate the relationship between medical coping style and resilience in patients with type A aortic dissection. *Front Psychiatry.* 2023;14:1174038.
- 41- Oktarina Y, Nurhusna N, Aryani T. Self-Efficacy and Quality of Life Among Coronary Heart Disease Patients: A Cross-Sectional Study. *JEHCP.* 2023;12(2):1-11.
- 42- Shafiq S, Shahzadi I. Mental Health and Quality of Life in Patients With Cardiovascular Diseases: Social Support As Mediator. *J Postgrad Med Inst.* 2023;37(2):114-8. [In Persian]
- 43- Memon MA, Ting H, Cheah JH, Thurasamy R, Chuah F, et al. Sample size for survey research: Review and recommendations. *J Appl Struct Eq Model.* 2020;4(2):i-xx. doi:10.47263/JASEM.4(2)01.
- 44- Eskandari SH, Rejeh N, Ebadi A. Translation and validation study of the Iranian version of Minnesota Living With Heart Failure Questionnaire. *Payesh.* 2015;14(4):475-84. [In Persian]
- 45- Rector TS, Kubo SH, Cohn JN. Validity of the Minnesota Living with Heart Failure questionnaire as a measure of therapeutic response to enalapril or placebo. *Am J Cardiol.* 1993;71(12):1106-7. [https://doi.org/10.1016/0002-9149\(93\)90582-W](https://doi.org/10.1016/0002-9149(93)90582-W).
- 46- Kusuma DY, Shatri H, Alwi I, Abdullah M. Validity and reliability studies of the Indonesian version of the minnesota living with heart failure questionnaire (mlhfq): quality of life questionnaire for patients with chronic heart failure. *Acta Med Indones.* 2019;51(1):26-33.
- 47- Napier R, McNulty SE, Eton DT, Redfield MM, AbouEzzeddine O, et al. Comparing measures to assess health-related quality of life in heart failure with preserved ejection fraction. *JACC Heart Fail.* 2018;6(7):552-60.
- 48- Moghadam BA, Tamartash H, Fereyduunia S, Ravand M. Translation and cross-cultural adaptation of the Persian version of Minnesota living with heart failure questionnaire (MLHFQ). *Acta Med Iran.* 2019. [In Persian]
- 49- Schwarzer R, Jerusalem M. The general self-efficacy scale (GSE). 2010;12:329-45.
- 50- Schwarzer R. General perceived self-efficacy in 14 cultures. 1999.
- 51- Waraich JK, Chechi VK. Validation of general Self-efficacy Scale in Indian context. *Indian J Posit Psychol.* 2017;8(4):639-44.
- 52- Henson RK, Roberts JK. Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educ Psychol Meas.* 2006;66(3):393-416.
- 53- Rajabi Q. The study of the stability and reliability of the scales of the general self-efficiency beliefs among students of psychology major at Faculty of Psychology and Education of Shahid Chamran University of Ahvaz and Islamic Azad University-Marvdasht Branch. *Mod Educ Thoughts.* 2006;2(1):111-22. [In Persian]
- 54- Tahmasebiboldaji F. Investigating the relationship between spiritual intelligence and self-efficacy with the mediating role of self-compassion in students. *J Psychol Dyn Mood Disord.* 2022;1(3):31-41. [In Persian]
- 55- Kiamarsi A, Najarian B, Mehrabizadeh Honarmand M. Construction and validation of a scale for measuring psychological hardiness. *J Educ Sci Psychol.* 1998;5(3-4):271-85. [In Persian]
- 56- Rezaei S, Zebardast A, Mousavi SV, Chamani M. The Examination of Structural Relationships Between Hardiness and Life Satisfaction in Older Adults Through Mediating Religious Commitment. *J Gerontol.* 2021;6(1):78-90. [In Persian]
- 57- Heidary HT, Hajar. Predicting the quality of life of hemodialysis patients based on alexithymia, anxiety sensitivity, and psychological hardiness. *Health Psychol.* 2024;12(48):27-36. [In Persian]
- 58- Asadi S, Vasudevan P, Abd alghani AaM. Relationship between quality of life, hardiness, self-efficacy and self-esteem amongst employed and unemployed married women in zabol. *Iran J Psychiatry.* 2006;1(3):104-11. [In Persian]
- 59- Farahbakhsh BS, Mehrinejad A, Moazedian A. Predicting self-efficacy of women with breast cancer based on quality of life, religious orientation, resilience, death anxiety, psychological hardiness and perceived social support. *Iran J Health Psychol.* 2019;2(3):65-78. [In Persian]
- 60- Huang H, Tu L, Zhang X, Zhang L, Zhang J, et al. Social support, self-efficacy, self-esteem, and self-management behaviors among people living with HIV/AIDS in China: a structural equation modeling analysis. *BMC Public Health.* 2024;24(1):3070.
- 61- Amirhosseini SE, Hasani M, Edrisi H, Siavashpour S, Hasani H. The Relationship between Hardiness and Selfefficacy with the Mediating Role of Resilience in Islamic Republic of Iran Law Enforcement Staff. *Resour Manag Police.* 2019;7(1):161-84. [In Persian]
- 62- Ng SM, Lee TM. The mediating role of hardiness in the relationship between perceived loneliness and depressive symptoms among older. *Aging Ment Health.* 2020;24(5):805-10.
- 63- Qorbanpoorlafmejani A, Yaghouti M, Rezaei S. The mediating role of social support in the relationship between mental hardiness and the sense of coherence with quality of life among staff at hospitals in Quchan. *Soc Psychol Res.* 2019;9(34):119-40. [In Persian]
- 64- Hashemi SH, Ahadi H, Azad Yekta M. Relationship between psychological hardiness and self-efficacy in patients with type 2 diabetes:(The mediating role of self-esteem and social support) using structural equation modeling. *Eur Online J Nat Soc Sci.* 2017;6(2):273-87. [In Persian]
- 65- Mirkouhi MG, Rahimian-Boogar I. Predicting diabetes management self-efficacy base on hardiness and coping strategies in patients with type 2 diabetes mellitus. *J Inflamm Dis.* 2016;20(4):43-51. [In Persian]
- 66- Mohammadi Z, Bagheri S, Salevati-Ghasemi S, Rasouli MA, Miraki A. The relationship between self-efficacy and health hardiness with the quality of work life of nurses working in the COVID-19 ward: Nurses' self-efficacy. *Chronic Dis J.* 2024;12(1):19-27. [In Persian]
- 67- RoshanGhias M, Sahebazzamani M, Farahani H, Adhami Moghadam P. Relationship between quality of life and self-efficacy in patients under coronary artery bypasses grafting surgery confined to bed in Social Security Organization Hospitals of Tehran. *Med Sci J Islam Azad Univ.* 2018;28(1):66-73. [In Persian]