

Predicting Health-Related Quality of Life based on Emotion Regulation with Mediating Role of Self-Care in Patients with Coronary Artery Disease

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Abstract

Objective: Coronary Artery Disease is a chronic and complex disease requiring continuous medical care. The current study was conducted to predict Health-Related Quality of Life based on emotion regulation with mediating role of self-care in patients with Coronary Artery Disease (CAD).

Method: The research method was descriptive-correlational. The statistical population comprised all patients with CAD (N=350) referring to Shohadaye Tajrish Hospital in Tehran, Iran, in the second half of 2020. Based on the Tabachnick Fidell formula, 184 subjects were selected using a convenient sampling method. Research instruments were the Self-Care Scale (Jaarsma, Halfens, Tan et al, 2003), Emotion Regulation Questionnaire of Garnefski and Graich (2001), and HRQoL Survey (Ware, Kosinski & Keller, 1996). Data analysis was done using Structural Equation Modeling (SEM) and path analysis.

Results: The results indicated a positive and significant mediating role of self-care in the relationship between emotion regulation ($\beta = 0.175, p < 0.01$) and HRQoL of patients with CAD. Moreover, self-care and emotion regulation had a positive impact on HRQoL.

Conclusion: According to the findings, a part of the mutual effect of self-efficacy and emotion regulation on HRQoL is explained by self-care. On the other hand, high emotion regulation and self-care led to better HRQoL of CAD patients.

Keywords: Emotion Regulation, Health-Related Quality of Life, Self-Care, CAD Patients.

Introduction

Cardiovascular disease is a group of diseases that include heart and blood vessels, including coronary heart disease (CHD) and coronary artery disease, and acute coronary syndrome (ACS) among several other conditions. Although health professionals frequently use the terms CAD and ACS interchangeably and CHD, they are not the same. ACS is a subcategory of CAD, whilst CHD results in CAD (Cervellin, Mattiuzzi & Bovo,

2021). Coronary heart disease is caused by many susceptible factors with specific age and sex characteristics. Various factors also play a role in determining the type of disease (Kinsella & Phillips, 2018). Disease management reduces the death rate and increases the longevity of patients, improving their quality of life. The WHO defines the quality of life as an individual's perception of their position in life in the context of the culture and value systems in which they live and their goals, expectations, standards, and concerns. Quality of life is defined as the difference between expectations and conditions of individuals; the narrower the difference, the better the quality of life will be (Leininger, 2018). The quality of life of patients is one of the factors related to the

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considered disease. HRQoL is a concern among health experts, considering it is an index used to measure health status in studies associated with health (Ghafarzadeh Almasi, Hajializadeh & Tajeri, 2021). In the recent century, a higher quality of life has become the core issue of health context, which is influenced by the social, physical, and emotional atmosphere and our response to this atmosphere. Self-efficacy is a substantial variable because of its effective role in adjustment to diseases [Early & Maghaminejad, 2017]. Quality of life is a multifaceted and subjective concept and a holistic and flexible process that covers all life aspects of CAD patients. In other words, quality of life is a unique individual perception and a way to express feelings about health or other life aspects assessed through expressing ideas and standardized tools (Louis, 2020). It seems there is a relationship between quality of life and emotional regulation of individuals.

The researcher found a relationship between emotion regulation and health-related quality of life of CAD patients, while emotion regulation played a vital role in adaptation to life stressful events (Golestaneh, Tajeri, Borjali, et al., 2021). The study found the effect of CAD patients' capability of ineffective emotion regulation on HRQoL; they also found the low emotion regulation among CAD patients due to their inability to cope with emotions and to manage health situations effectively (Trinidad & Johnson, 2019). Undoubtedly, self-care mediates the promotion of HRQoL, better emotion regulation, lower death rate, and fewer re-hospitalizations of patients with heart failure. Self-care plays an effective role in reducing re-hospitalizations, medical costs, and death rates in patients with heart failure. In this case, self-care will reduce the direct cost of 6-month treatment and a 50% increase in the 5-year survival of patients with heart failure (Harvey, Lenaghan, & Smith, 2015).

Moreover, there is a relationship between

emotion regulation and quality of life. Risk factors exacerbating CAD are divided into traditional unchangeable (high age and family background), changeable (high blood pressure, smoking, obesity, and anxiety), and psychological-social factors. Preliminary prevention refers to creating and keeping conditions that minimize disease risk factors. Health behaviors or lifestyle-related factors are key for self-care intervention (Tavakoli, Tajeri, Radfar, et al., 2020). Self-care is a multidimensional structure that includes lifestyle management, increased self-efficacy and emotion regulation, treatment of minor ailments, long-term chronic disease management, and post-discharge care. These patients need to follow medication instructions and consumption a low sodium diet, physical exercises, preventive behaviors, and functioning monitoring in terms of signs and symptoms. Symptoms control is an important part of self-care. High-level awareness of patients is a key symptom of body, body change interpretation, suitable measures, treatment initiation, and receiving help in critical cases are strategies to cope with and adapt to chronic disease. Recognition, interpretation, and implementation of interventions based on clinical symptoms are possible through permanent exercises and periodic monitoring of the health team (Lindenfeld & Douglas, 2019).

Given the negative impact of this disease on the ability to perform normal life activities, patients have low emotional regulation. One of the major complaints mentioned frequently by them, in general, is emotional dysfunction with a variety of negative consequences including symptoms of depression and anxiety. The effective functions of emotion regulation moderate the effect of people's assessments and mental reactions in the face of stressful events and lead to appropriate cognitive, motivational, and behavioral responses needed in such situations. Also, a lack of knowledge about self-care behaviors results in inappropriate self-care behaviors and finally causes re-hospitalization

of patients (McCabe & Southard, 2020).

Self-care training increases the perception and awareness of patients about the concept of health care quality by making patients familiar with valuable health care. CAD patients with sufficient self-care could better control their emotions and have higher HRQoL than those with insufficient self-care (Aghakhani, Golmohamadi, Khademvatan & Alinehad, 2018).

The present study was conducted in a small area of a statistical population, but it can be effective in comprehensive health programs for people with cardiovascular disease. It should be noted that the growth and excellence of a country depend on conducting such small but constructive research, while there is very little empirical research on health in people with this disease and as a serious theory of health, it requires more experimental studies in people with cardiovascular disease. Therefore, based on the mentioned variable (self-efficacy, emotional regulation, self-care) as important factors in increasing the health-related quality of life in people with cardiovascular disease, the need for research on the relationship between self-efficacy and emotional regulation and health-related quality of life with the mediating role of self-care in people with cardiovascular disease seems essential. Conducting the present study seems necessary since no study was found in Iran on the relationship between the four components of self-efficacy, emotional regulation, the quality of life-related to health, and self-care in cardiovascular patients, and given the importance of the mentioned variables of self-efficacy, emotional regulation, and self-care in cardiovascular patients and its relationship with health-related quality of life in people with cardiovascular disease and get a better path in clinical areas to choose the effective treatment strategies and the use of appropriate preventive strategies for people with cardiovascular disease (Nichols, Townsend & Scarborough, 2020). It was necessary to conduct the extant study due to

the absence of Iranian studies on the relationship between three variables of emotion regulation, HRQoL, and self-care among CAD patients. On the other hand, emotion regulation variables were important for CAD patients to achieve better clinical results, select effective treatments, and apply appropriate preventive solutions. This study aimed to answer whether self-care mediated the relationship between emotion regulation and HRQoL of patients with CAD.

Method

The extant study was descriptive with correlational type and applied research in terms of objective. A statistical test of path analysis with AMOS software was used for data analysis.

The statistical population comprised all patients with CAD (N=350) referring to a Hospital in Tehran, Iran, in the second half of 2020. Based on the Tabachnick Fidell formula, 184 subjects were selected using a convenient sampling method. Inclusion criteria included consent of the person to participate in the research, minimum age of 20 years and maximum age of 35 years, attending sessions regularly, not having a psychological disorder and desire and having sufficient motivation to transfer the required information and exclusion criteria included absence from more than three sessions, unwillingness to continue cooperation and serious physical or psychological problems.

Measures

Emotion Regulation Questionnaire

This is a 36-item multidimensional and self-report questionnaire with adults and children forms designed by Garnefski & Graich (2016). This questionnaire asks one to determine their response to their recent threatening experiences and stressful life events by answering five items that evaluate a control and emotion regulation strategy. The emotion regulation questionnaire is based on a strong empirical and theoretical background,

including nine subscales. The subscales include cognitive strategies of self-blame, acceptance, rumination, positive refocusing, and refocus on planning, positive reappraisal, catastrophizing, and blaming others. The overall score of each subscale was measured by summing up the score of items; therefore, the score range of each subscale varied between 4 and 20. The higher the score of each subscale, the more use of strategy to cope with incidents will be. Minimum and maximum scores equal 36 and 180, respectively. The reliability of the questionnaire was 0.85 (at the interval of 0.71-0.81 for each subscale) based on Cronbach's alpha (Garnefski & Graich, 2016). The extant study obtained Cronbach's alpha of 0.76 for this questionnaire.

HRQoL Survey

This 12-item widely used scale was designed by Ware, Kosinski, and Keller (1996). This scale covers eight subscales. Due to the low number of items, the overall score of the respondent is considered. This scale assesses the quality of life in general self-health perception, physical functioning, physical health, emotional problems, bodily pain, social functioning, vitality, and mental health. This scale is divided into two physical and mental subscales. Physical scale covers physical functioning, role-physical, general health, and bodily pain. The mental subscale covers role-emotional, vitality, mental health, and social functioning (Naghbi, Ahadi, Tajeri & Seirafi, 2020). The highest and lowest scores on the scale equal +17 and -93, respectively. Relevant studies have shown the high validity and reliability of this scale (Nik-Azin, Naeinian & Shairi, 2017). Researchers reported Cronbach's alpha of 0.89 for this scale (Hatami, Saboonchi & Sekhavat, 2012). The present study obtained Cronbach's alpha of 0.842.

Self-Care Scale

This scale was designed to assess the self-care behavior of patients with heart failure by Jaarsma,

Halfens, and Tan (2010) this scale-covered 15 items that were scored based on a five-point Likert scale. To calculate the overall score of the scale, the overall score of items was measured. The overall score varied between 12 and 60, so that 12-28, 29-44, and 45-60 were defined as good, medium, and weak, respectively. The lower the score on the scale, the better the self-care behavior will be, and vice versa. The overall score varied between 12 and 60, i.e., lower scores indicated better self-care behaviors. Shojaei (2009) reported Cronbach's alpha of 0.68. Cronbach's alpha coefficient of self-care equaled 0.734 in the present study

Procedure

The data were collected through questionnaires. After the permission letter was obtained, some explanations were given about the research, scales, and how to fill out questionnaires before participants answered the questions. Participants were ensured confidentiality and anonymity, and then questionnaires were distributed among them. Participants first responded to the questions about their demographic characteristics, including age, gender, education level, job status, economic and health status, and then they answered the other items. Some students cooperated to implement and transcribe the questionnaires. Necessary explanations were given on how to fill out the questionnaires so that those collaborators helped in the case of patients to whom the author had no access to them. Some patients were illiterate or had low literacy.

Ethical statement

All ethical principles were considered in this study. After conducting the initial interviews with participants, they were asked to complete an informed consent form. Informed consent forms were given to the participants and all necessary information, including the aims, confidentiality, and non-disclosure of participants' information, were provided to them. It was explained that if clients were reluctant to continue, they could stop taking part in the study at any time. It was also

explained that after the end of the study, the results would be revealed to participants. The study protocol was approved by the Ethics Committee of Emirate Branch, Islamic Azad University, Emirate, Iran (IR.IAU. Emirate. REC. 1399.092).

Results

In this research, 31% of respondents were 20-25 years old, 30% were 26-30, and 29% were 31-35; 53% of respondents were men, and 47% were women. Moreover, 38% of respondents had 1-2

kurtosis values between -2 and +2 to indicate normal distribution. Furthermore, the results indicated that tolerance coefficient index and VIF equaled greater than 0.1 and less than 10, respectively. This indicates the absence of collinearity between variables. According to Meyers, Gamst, and Guarino (2006), $VIF > 10$ and tolerance ratio < 0.1 indicate the presence of collinearity. According to the results of data analysis using Mahalanobis distance (D) and respective distribution graph, there was no multivariate missing data related to participants.

Table 1. Descriptive indicators of variables' scores

Variable	N	Mean	SD	Min	Max
Emotion regulation	184	15.08	62.07	11	54
HRQoL	184	20.15	5.08	12	34
Self-care	184	26.90	5.79	15	43

Table 2. Kurtosis, skewness, tolerance coefficient, and VIF of variables

Variable	Skewness	Kurtosis	Tolerance coefficient	VIF
Emotion regulation	0.481	0.101	0.273	1.328
Self-care	0.587	0.222	0.682	1.467
HRQoL	-0.165	0.173	0.702	1.838

years of disease background, 39% had 3-4 years, and 23% had more than five years of disease background.

Table reports mean, Standard deviation, minimum, and maximum score of participants. The hypothesis was that “self-care mediates the relationship between emotion regulation and HRQoL among patients with CAD.” To test the presumption of normal univariate, the distribution of variables, skewness, and kurtosis values were observed. On the other hand, variance inflation factor (VIF) and tolerance coefficient were examined to evaluate collinearity presumption.

According to Table 2, skewness and kurtosis indicators of variables are not situated outside the ± 2 . Therefore, variables had normal univariate distribution. It must be explained that Garson (2003; quoted from Klein, 2005) considered skewness and

Therefore, the distribution of multivariate data was normal in the extant study.

To evaluate variance homogeneity (residual's variance is the same in different dependent variable levels), a distribution graph of standardized residuals' variances was plotted. As seen in Figure 1, there is variance homogeneity between research data. Evaluated fit indicators indicated that all indicators supported optimal fit of measurement model with data. For instance, the Root Mean Square Error of Approximation (RMSEA) equaled 0.073 (RMSEA less than 0.08 indicates acceptable fit, and RMSEA less than 0.05 implies excellent model fit with gathered data). The goodness of fit index (GFI) and Adjusted Goodness of fit index (AGFI) equaled 0.952 and 0.907, respectively. The comparative fit index (CFI) equaled 0.936 (CFI less than 0.90 indicates acceptable fit, and RMSEA

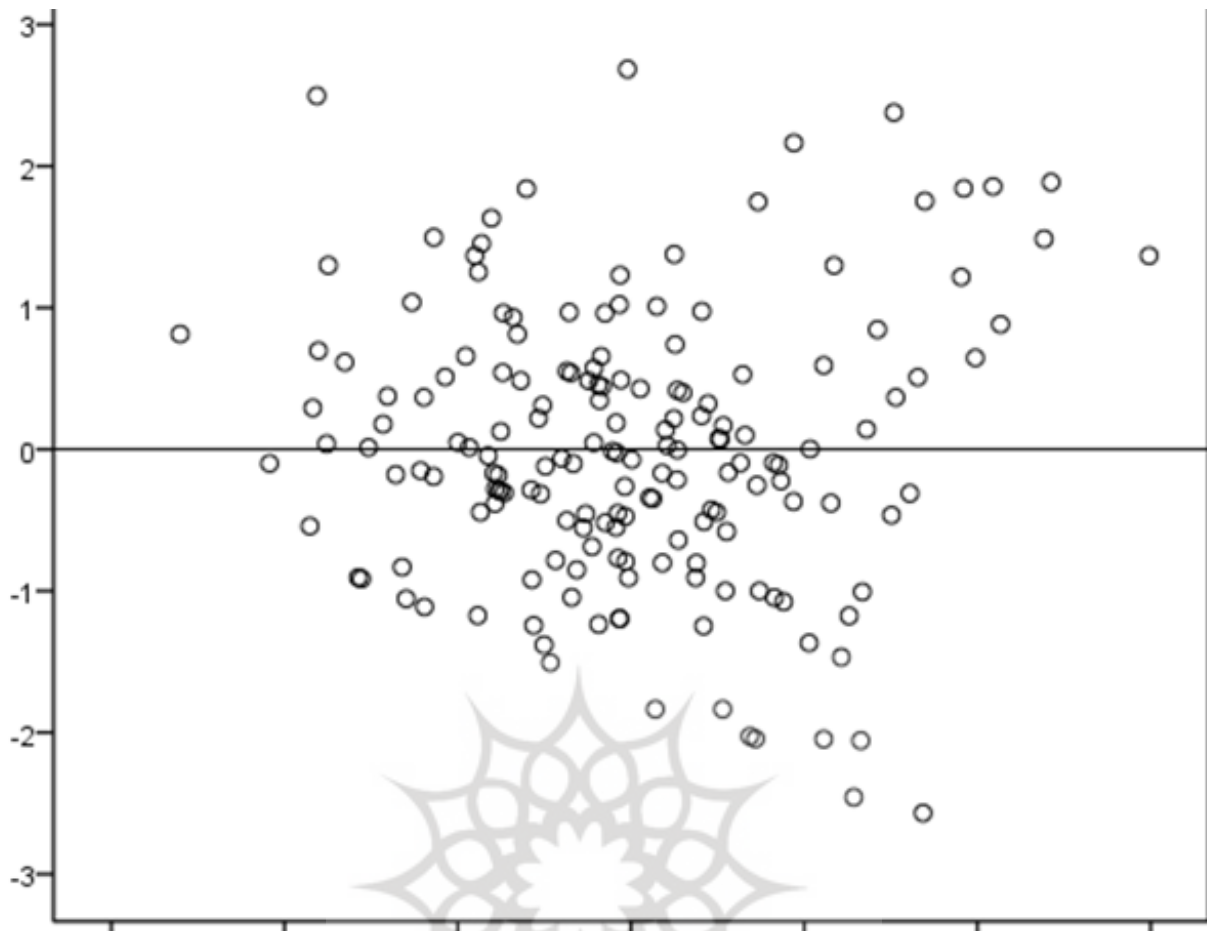


Figure 1. Distribution graph of standardized residuals' variances

Table 3. Parameters of measurement model in confirmatory factor analysis

Variable	Estimated parameter B	Standard parameter β	Standard error	Critical ratio
Emotion regulation	0.734	0.572	0.245	2.89**
HRQoL	0.748	0.628	0.211	3.55**
Self-care	0.869	0.438	0.261	4.12**

Table 4. Whole and direct path coefficients between variables in the structural model

	Paths	B	S.E	β	Sig.
Whole path	Emotion regulation - HRQoL	1.161	0.064	0.065	0.002
	Emotion regulation - self-care	1.667	0.692	0.378	0.001
Direct path	Emotion regulation - HRQoL	1.573	0.651	0.356	0.002
	Emotion regulation - self-care	1.667	0.692	0.378	0.001
Indirect path	Self-care - HRQoL	0.436	0.165	0.332	0.002
	Emotion regulation - HRQoL	0.095	0.175	0.175	0.001

greater than 0.950 implies excellent model fit with gathered data). Table 3 reports unstandardized parameters, standardized parameters, standard error, and the critical ratio of all variables.

$P < 0.05$

According to Table 3, self-care had the lowest factor load (0.438), while emotion regulation had the highest (0.572). In general, results indicate that all observed variables could measure variables acceptably and significantly.

The structural model of the extant study assumed that emotion regulation had both direct and indirect relationships with HRQoL with mediating role of self-care among patients with CAD. SEM method was used to evaluate structural model fit with gathered data, and results indicate an acceptable fit of the model with data. Although the Chi-square index was significant at the level of 0.01 ($\chi^2=46.09$, $p=0.003$), this finding indicated a lack of model fit with gathered data. However, RMSEA, GFI, AGFI, and CFI equaled 0.077, 0.945, 0.892, and 0.916, respectively. The results indicated a good fit of the structural model with gathered data in this research. As seen in Table 4, the overall path coefficient (sum of direct and indirect path coefficients) of the effect of emotion regulation on HEQoL was significant at the level of 0.05 ($\beta=0.065$, $p<0.05$). This case indicated the significant effect of emotion regulation on HRQoL at a level of 0.05. The indirect path coefficient between emotion regulation and HRQoL was positive and significant at the level of 0.01 ($\beta=0.175$, $p<0.01$). According to this finding, emotion regulation had an indirect effect on HRQoL by mediating the role of self-care. Therefore, the research hypothesis was confirmed. Accordingly, self-care positively mediated the relationship between emotion regulation and HRQoL. Self-care led to an increase in the relationship between emotion regulation and HRQoL of CAD patients.

Discussion and Conclusion

The tested hypothesis of “self-care mediates the relationship between emotion regulation and health-related quality of life of patients with CAD” was confirmed. This finding was consistent with findings reported by Nong and Min Geng (2020), Barberis, Cernaro, and Costa (2017), Afrookhteh, Arefi, and Kakabaraie (2019), Jafari (2016), and Sadeghpour, Salehi Omran, and Yaghoobi (2015). Individuals can make the relationship between the quality of life and emotion regulation through self-

care to prevent data processing bias that causes negative emotions. In this case, individuals can adjust themselves to illness more efficiently. In this case, researchers found that self-care behaviors, education, and exercise could control blood pressure, and improve patients' quality of life and emotional health-related quality of life. Different self-care capacities of individuals may lead to their key differences in helping them separate pain experiences from emotional responses (Park, Song & Kim, 2018). Others found a positive and significant relationship between emotion regulation and physical health-related quality of life in coronary heart disease patients (Nong & Min Geng (2020). In this case, Jafari (2016) concluded that self-regulation education could increase the average rate of all aspects of quality of life and reduce the average rate of all dimensions of general health in heart patients (Monirpoor, 2018).

Due to the diversity of consequences caused by chronic diseases, such as heart diseases in all life aspects, a modern approach to the health status of individuals emerged in clinical and non-clinical atmospheres. The mentioned approach is called quality of life and pays attention to various life aspects. The quality of life is evaluated based on physical health, mental health, progressive relationship with others, participation in social activities, and having emotions and feelings. As a part of treatment, the quality of life indeed indicates the quality of health care. This approach is examined in chronic diseases to give the treatment team more information about the health status of patients (Kazemi Rezaei, Moradi & Hasani, 2018). Quality of life includes physical and mental dimensions and emotion regulation limited to the patient's experiences, expectations, and perceptions. Definitive treatment is not the actual and achievable goal for patients with chronic CAD because this is a disabling illness with a progressive process influenced by many internal and external factors. Since exacerbation and improvement of

this illness are affected by various factors, it may affect the emotional regulation of the patient. Hence, emotion regulation is a significant index at the attention of medical and care centers for CAD patients. Evaluation of quality of life pays more attention to problems of patients and revises medical methods. Hence, it is essential to identify the nature of this illness, underlying factors, and causes to prevent, treat, and control CAD regarding its high death rate prevalence. It can be concluded that CAD patients' physical, somatic, mental, and environmental conditions cause a low quality of life. Moreover, emotion regulation is one of the preventive risk factors for patients with CAD, i.e., individuals with low emotion regulation are more at risk of CAD (Ramachandran, Jiang, Teo, Yeo & Wang, 2022).

The statistical population of this study was limited to patients with CAD referring to Shohadaye Tajrish Hospital in Tehran. On the other hand, the random sampling method was not used in the present paper and was the constraint. Therefore, it is suggested to do this study in other provinces, regions, and communities with different cultures to expand the generalization extent of results. It is also recommended to use random sampling to prevent confounding factors. In a practical case, it is suggested to teach self-care behaviors in workshops designed for psychologists and school consultants to help them use this training for improvement of emotion regulation and quality of life of patients in practice.

Conflict of Interest & Funding

This article was conducted at the authors' expense and this study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The first author was the main researcher who conducted the study, and the second author supervised the research and the other colleagues (third and fourth authors) also collaborated in teaching and implementing protocols. The authors claim there is no conflict of

interest in the extant study.

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