



Evaluating the Effectiveness of Integrated Intervention Program in Improving on Quality of Life and Personality Type in Heart Disease Patients

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Abstract

Background: Non-communicable diseases such as cardiovascular diseases (CVDs) are the main cause of death worldwide. Besides, major risk factors such as age, gender, race, and modifiable or psychological risk factors have a significant role in the incidence of CVDs. This study established an integrated intervention program based on psychological risk factors for Iranian cardiovascular patients, and tried to validate its effectiveness in improving quality of life and personality type.

Objectives: Therefore, the aim of this study was to evaluate the efficiency of integrated intervention program in type D personality and quality of life among the cardiovascular patients.

Methods: In an experimental randomized controlled trial, a total of 60 patients (29 - 42 years old, 67% males and 33% females, and all married) were assigned randomly either to the experimental (30 patients) or the control group (30 patients). The patients in the experimental group participated in the intervention program for one month. The content of the integrated intervention program included understanding the role of psychological factors on cardiovascular diseases, understanding personality types, understanding hardiness and resiliency, healthy heart lifestyle, thoughts and behavior, understanding coping styles and emotion regulation, understanding spirituality and personal growth, understanding social support, and learning relaxation techniques. Quality of life and personality type in two groups were measured through WHOQOL and type D personality questionnaire before and after the intervention. All analyses were conducted using SPSS version 20.

Results: The patients in the experimental group had significantly more quality of life ($P < 0.001$) and less type D personality traits ($P < 0.001$), which support the effectiveness of the cardiac integrated intervention program.

Conclusions: The results from meta-analyses indicated the role of psychological risk factors in the development of CVDs. The findings of the current study suggested that cardiac integrated intervention program increases the quality of life and reduces the type D personality traits in cardiovascular patients. Furthermore, it is recommended that cardiac care professionals use this effective treatment to improve the recovery of cardiac patients.

Keywords: Quality of Life, Personality, Cardiovascular Diseases, Psychotherapy

1. Background

Non-communicable diseases are health conditions that last for a long period, and they usually have slow progression. Cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes are the four main types of these diseases. Around 80% of deaths due to non-communicable diseases occurs in developing countries (1). Cardiovascular diseases (CVDs) are the main non-communicable diseases, which are responsible for over 12% of the worldwide disease burden (2). CVDs currently are the most epidemic diseases, and they are becoming the main cause of death,

debility and disease burden worldwide (3). The number of people suffering from cardiovascular diseases will be increased in the future (4). This increasing trend is occurring in low, middle and high-income nations (5, 6). The incidence and prevalence of cardiovascular diseases differ from area to area. The Middle East possibly have the maximum cardiovascular death rates in the world, and Iran probably has a greater burden than other countries in this region. Iran is a middle-income country with high cardiovascular diseases rate, and recently, cardiovascular diseases have become the leading cause of death in Iran (5). Unfortunately, in Iran, like other low and middle-income

countries, a great ratio of deaths due to cardiovascular diseases occurs because of risk factors such as wrong diet style, inadequate physical activity, and smoking, as well as demographic transitions (6).

Based on previous studies, CVDs kill 12 million persons yearly worldwide, and they are responsible for 58% of disability adjusted life years (DALYs), 50% of all deaths per year, and 79% of deaths due to chronic diseases in Iran (7, 8). One Iranian study stated that in all ages, the rate of stroke among men is 144 strokes per 10000, and among women is 113 per 10000 (6). Researchers reported that in Tehran, more than 40% of deaths has been due to cardiovascular diseases. They also stated that nearly 20% of people aged 30 or older have symptoms of cardiovascular diseases, and above 70% of them had at least one cardiovascular diseases risk factors (9). Previous studies discovered that the prevalence of hypertension among Iranian people was 25.2% in 2005, and this amount increased to 26.6% in 2007 (10). The results of one study showed that 78% of Iranian men and 80% of Iranian women have at least one CVDs risk factor (4). Based on this study only 4% of individuals aged 15 - 44 years and 1% of individuals aged 45 - 64 years had no CVDs risk factors (11). Based on one Iranian study, from 2006 to 2010, the number of deaths in Iran was 1172278, which 46.04 percent of them (539679 cases) were due to cardiovascular disease (12). The result of another study showed that 39.3 percent of deaths in Iran are due to CVDs, while over 80% of CVDs are avoidable and preventable (10, 13). There is no definite cause for heart disease, but there are some modifiable and non-modifiable risk factors of CVDs. Several unchangeable risk factors include heredity (such as race), family history, gender, organic heart diseases, preeclampsia, and age (14). However, some studies have claimed that psychosocial risk factors are significant risk factors of CVDs (15). The most significant psychosocial factors are mental health and heart-healthy lifestyle, depression, anxiety, stress, quality of life, and inappropriate personality types. These psychosocial risk factors of CVDs have a significant role in the onset and duration of disease, as well as survival, and recovery of patients (16, 17). Based on the health model, a desirable quality of life should encompass physical, emotional, mental, social, spiritual, and occupational dimensions (18). Quality of life is the subjective general well-being, which WHO defines it as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their objectives, beliefs, values, and concerns (19). Today, specialists use the quality of life as an index to evaluate the general health (20).

Moreover, personality traits have been associated with physical and psychological health in cardiovascular pa-

tients. It seems that personality traits have significant effects on the incidence and prevalence of CVDs (21). Defining predisposing factors of diseases requires the study of personality traits (22).

Regarding the personality structure, individuals show different behavior and emotions while dealing with stress (23). Therefore, type D personality is one of the mediating factors in the relationship between health and stress (18). Researchers described two components of type D personality: Negative affect (such as sadness, apprehension, and hostility) and social inhibition (avoidance from potential dangers in social interactions such as disconfirming by others) (24). Emotional inhibition in type D personality predisposes people to health problems, including high tension, cardiovascular disease, and mental disorders. Individuals with type D personality are susceptible to unhealthy behaviors such as smoking, alcoholism, physical inactivation, and emotional stresses such as anxiety, depression, and anger (25).

Previous studies have stated that improving the patients' quality of life and treating the pathological personality traits reduces the cardiac disease symptoms, and decreases the mortality and disabilities among patients (18, 22, 23). In addition, there is no comprehensive psychological intervention for cardiovascular patients. Furthermore, we need to have a comprehensive and multidimensional approach to CVDs, and we have to know a specific treatment, which is significantly effective for this disease. Therefore, we assume that the multidimensional intervention, which targets all risk factors of CVDs can be appropriate and effective.

2. Objectives

The purpose of this study was to establish the cardiac integrated intervention program and assessing its effectiveness on quality of life and type D personality traits.

3. Methods

3.1. Participants

In This semi-experimental study, the design of pre-test and post-test with control group was used. Based on the inclusion criteria, all patients with CVDs from Rasol E Akram Hospital in Rasht were invited to participate in this study. The inclusion criteria included: Age of 25 - 45 years, cardiologist diagnosis, having a history of heart failure for at least 6 months, consenting to participate, Persian reading and writing ability, and the existence of psychiatric disorders and chronic diseases. Exclusion criteria were the history

of a psychological disorder, the history of receiving psychotherapy and psychiatric treatment, and substance dependence. This quasi-experimental study was conducted on thirty patients, who randomly and equally divided into the experimental and the control groups. Just the cardiovascular patients of the experimental group received the treatment for two months. Based on Gpower software: [Effect size $f^2 [V] = 0.7$, α err prop = 0.05, Power [$1-\beta$ err prop] = 0.95, Number of groups = 2, Response variables = 2, Total sample size = 30] Sample size was determined (26). After two months, these thirty patients completed the scales.

3.2. Instruments

Age, gender and marital status were recorded by a short demographic questionnaire. Two other questionnaires were the WHOQOL-BREF and the type D personality.

3.3. Measures

3.3.1. WHOQOL-BREF

This questionnaire was standardized for the Iranian population in order to assess the quality of life. This scale provides a subjective assessment of somatic, psychological, social, spiritual, and environmental dimensions of quality of life. The internal consistency of the WHOQOL-BREF was 0.8 that shows its appropriate psychometric properties (27, 28).

3.3.2. Type D Personality Scale

This scale had been standardized for the Iranian population. It had been developed by Denollet in 1998. This scale consists of fourteen questions assessing negative affect and social inhibition (29). Scores range from 14 to 56. Cronbach's α for negative affectivity and social inhibition subscales were reported about 0.80 and 0.88, respectively. Test-retest stability of subscales were 0.86 and 0.77, respectively during two months (29, 30). Cronbach's alpha for two questionnaires was calculated about 0.68 and 0.82, respectively, which are adequate values.

All data appeared normally distributed, with no outliers. Univariate analysis of covariance (ANCOVA) and multivariate analysis of variance (MANCOVA) were used in order to examine the effects of intervention. All analyses were conducted using SPSS version 20.

3.3.3. Ethical Considerations

The procedures of intervention were in accordance with the ethical standards of the University of Guilan for Research Involving Human Participants. Regarding ethical concerns, there was no deception in this study. After a complete clarification of the research procedures, patients were given the written informed consent. All data

obtained from the patients remained confidential. Group therapy was conducted in eighteen sessions and twice-weekly.

3.3.4. Intervention

In the present study, all of the psychological risk factors of CVDs were extracted from Iranian publications by the systematical review. These psychological risk factors were extracted based on cognitive behavioral therapy instructions, author experience as a psychotherapist, psychometric indices such as the effect size of each risk factor, and the comments of several experienced psychologists. A systematical review was performed to search the related keywords in all of the famous Persian and English academic search engines to find the relevant published articles. All related publications were reviewed. Then, the reviewer reevaluated 213 appropriate full articles. Finally, 88 articles were selected based on the psychometric properties, and the cardiac integrated intervention program was established. The content of the program include the following: Session 1: Teaching cardiac symptomatology, self-introducing; understanding the psychosocial risk factors of CVDs; introducing the objectives of the program, discussing about treatment commitment. Sessions 2-3: Understanding type A and D personality, the relation between personality traits and CVDs. Sessions 4-5: Explaining resiliency and psychological hardiness; effective coping strategies, and importance of achieving social support. Sessions 6-7: Teaching healthy lifestyle, including exercise, healthy nutrition, alcohol consumption, and smoking. Sessions 8-9: Teaching cognitive processing, positive perspective taking, and explaining the irrational beliefs. Sessions 10-11: Explaining emotion management; problem solving methods, and assertiveness methods. Sessions 12-13: Discussing about religiousness, individual growth, and humanity. Sessions 14-15: Explaining about social communication skills such as active listening, empathy, emotional and cognitive feedback, and unconditional positive attention. Sessions 16-17: Teaching the relaxation techniques.

3.3.5. Sessions 18

Conclusion and reviewing the contents. The program had been developed based on the cognitive-behavioral therapy. The Cardiac integrated intervention program consisted of 18 sessions, and each session lasted two hours.

4. Results

Demographic Data of Patients in experimental and control groups are presented in Table 1. The findings showed that the participants aged between 29 and 42 years

Table 1. Demographic Data of Patients in Experimental and Control Groups

Parameters	Experimental Group	Control Group
Age, mean ± SD	31.09 ± 1.25	33.75 ± 3.16
Marital status, F. (%)		
Married	15 (100)	15 (100)
Single	0 (0)	0 (0)
Gender, F. (%)		
Female	5 (33)	8 (54)
Male	10 (67)	7 (46)

old with the mean of 33.42 ± 2.20 years old. About 56% of participants were males, and 46% were females, and all of them were married.

Table 1 shows that in experimental group, all of the participants were married, mean and standard deviation of age were 31.09 and 1.25, respectively. Thirty-three percent of the participants were female and 67% of them were male. In the control group, all participants were married, mean and standard deviation of age were 33.75 and 3.16, respectively. Fifty-four percent of the participants were female and 46% of them were male.

Table 2 shows the Mean ± SD of the score of type D personality and QOL and its subscales in both groups at pre-test and post-test.

Since the pre-test was covariant and the post-test was the dependent variable, and grouping was the independent variable, The MANCOVA was administered to compare the post-test of two variables with covariation of pretests of two groups at two variables. The output of analyzed data showed that there is a significant difference in QOL' subscales means between two groups after the intervention [Box's Test of Equality of Covariance Matrices = 7.188, P = 0.835, Pillai's Trace = 0.744, F = 10.89, P = 0.00, Partial Eta Squared = 0.744].

However, according to Table 3, after carrying out the cardiac integrated intervention program, the mean score of experimental group for physical [F = 7.44, P = 0.014, $\eta = 0.293$], psychological [F = 7.94, P = 0.011, $\eta = 0.306$], Social [F = 15.26, P = 0.001, $\eta = 0.459$], and environment [F = 4.95, P = 0.039, $\eta = 0.216$] subscales were significantly higher than the control group [P < 0.05]. Findings show that the cardiac integrated intervention program has significant effects on the type D personality traits and QOL' subscales among cardiovascular patients.

However, according to Table 4, after conducting the cardiac integrated intervention program the mean score for total QOL [F = 18.271, P = 0.465] was significantly higher in the experimental group. Besides, the mean score of type

Table 2. Mean ± SD of D Personality Type and QOL and Its Subscales in Experimental and Control Groups^a

Stage	Experiment	Control
D personality type		
Pre-test	21.67 ± 2.10	18.25 ± 2.67
Post-test	15.33 ± 2.84	17.67 ± 3.06
Physical		
Pre-test	8.83 ± 2.41	8.08 ± 1.24
Post-test	10.67 ± 1.67	9.33 ± 1.15
Psychological		
Pre-test	8.67 ± 2.19	10.75 ± 1.60
Post-test	13.50 ± 1.17	11.75 ± 1.60
Social		
Pre-test	12.50 ± 2.15	12.50 ± 1.68
Post-test	14.33 ± 1.50	12.42 ± 1.51
Environment		
Pre-test	10.58 ± 1.62	11.17 ± 1.19
Post-test	13 ± 1.28	13.58 ± 1.16
Total QOL		
Pre-test	40.50 ± 6.30	43.75 ± 5.33
Post-test	52.17 ± 4.65	46.08 ± 5.76

^a Values are expressed as mean ± SD.

D personality [F = 7.097, P = 0.253] was significantly lower in the experimental group [P < 0.05]. Based on these results, it can be concluded that the cardiac integrated intervention program has a significant effect on the quality of life and type D personality among the participants. According to table 3 and table 4, the cardiac integrated intervention program had significant effects on post-test scores (P < 0.05). Considering the beta coefficients, it could be concluded that 29%, 30%, 45%, 21%, 46%, and 25% of changes of physical, psychological, social, and environmental factors, as well as total score of QOL and type D personality type are due to the effect of cardiac integrated intervention program, respectively.

5. Discussion

The goal of the current study was to study the effect of cardiac integrated intervention program (CIIP) on the quality of life and type D personality in the cardiovascular patients. The results showed that the cardiac integrated intervention program significantly improved the quality of life, and reduced the type D personality in the intervention group. The results are consistent with the findings of previous studies (31-35) that confirmed the significant effect

Table 3. The Results of MANCOVA on the QOL' Subscales

Variable	SS	df	MS	F	Sig	Eta
Physical	9.517	1	9.517	7.446	0.014	0.293
Psychological	21.706	1	21.706	7.940	0.011	0.306
Social	29.396	1	29.396	15.260	0.001	0.459
Environment	4.827	1	4.827	4.953	0.039	0.216

Table 4. The Results of ANCOVA on the Total Scores of Quality of Life and Type D Personality in the Post-Test

Variable	Sum of Squares	df	Mean of Squares	F	Sig	Eta
Total QOL	213.814	1	213.814	18.271	0.003	0.465
D personality type	56.505	1	56.505	7.097	0.015	0.253

of psychological interventions in decreasing the psychosocial risk factors among cardiac patients. This program focuses on irrational beliefs, emotion regulation styles, behavioral coping strategies, and the context, which the patient lives and works in it. This new treatment had been developed based on the bio-psychosocial approach, which considers biological, psychological, and social aspects and their complicated interactions in understanding the illness and the health care.

According to this program, distorted interpretations of body symptoms are the cause of the development of mood disorders. Hence, the cardiac patients need to change their perspective about the world, their present, and future life. Based on the cognitive approach, the dysfunctional or negative cognitive triangle leads to psychological disorders. Thus, establishing the positive cognitive triangle is very important, because it leads to shape the positive thought, behavior, and emotion. All of these three components have complicated interactions, and changing one component can effectively change another one. In addition, changing each of these three components of the cognitive triangle can affect the physiological dimension (33). Attribution Styles are the ways, which patients explain the causes of events were another important cognitive element of this treatment. Based on previous studies, stable vs. unstable, overall vs. specific, and internal vs. external attribution styles can lead to psychological wellness or illness. Therefore, developing healthy attribution styles was one of the main goals. As other researchers showed, stable, overall and internal attribution styles of negative events lead to mood disorders (34). patients who have rational attribution Styles have a tendency to attribute positive happenings to unchangeable, general, and intrinsic reasons (35). Therefore, developing the unstable, specific, and external attribution style of negative events was one of the main task of participants. It is obvious that rational

thinking buffers against the dysfunctional attributional style and can decrease its destructive influences. The cognitive triad, as another important cognitive factor is the patients' appraisals of themselves, the world, and the future. The negative cognitive triad can make serious psychological problems for patients, because it leads to a negative assessment of their abilities and aptitudes, low self-esteem, and negative self-confidence (36). These negative self-perceptions decrease patients' motivation for recovery and medical adherence.

Thus, sessions 2 - 3 included understanding the type A and D personality, and the relationship between personality traits and CVDs. In these two sessions, the main educational contents were about the characteristics of type A and D personality, which includes the trait of being competitive, highly organized, ambitious, impatient and highly aware of time management, and negative affectivity such as worry, irritability, gloom, and social inhibition such as reticence and a lack of self-assurance (37). These personality characteristics are linked to dysfunctional, irrational, and negative cognitive processing (37, 38). Thus, it was so important to educate the patients some positive psychological skills in order to help them to cope with these negative cognitive processing. In this regard, the sessions 4 - 5 were planned. In these treatment sessions, psychotherapist explained resiliency, psychological hardiness, and effective coping styles. Previous studies showed that resiliency and psychological hardiness have a positive cognitive effect that leads to powerful health coping style with stress and challenges events (39, 40). In the sessions 8 - 9, psychotherapist educated the cognitive processing, positive perspective taking and explaining the irrational beliefs that lead to psychological and physiological disorders. In constant with our assumptions, as some researchers showed, many dysfunctional cognitive processes such as misinterpretations, negative automatic

thoughts, and immature cognitive defense mechanisms such as catastrophizing and personalization can lead to impulsive reactions to external environmental events. This increases the heart rate and the level of cortisol in the blood and then finally leads to heart disease (33). However, positive thinking calm down the patients, and help them to control their reactions to external stressors. This behavioral management that is related to rational and healthy cognitive processing leads to adequate physiological responses that help the heart to work healthy and normal (32-34).

Beside the cognitive elements of this program, based on the mentioned comprehensive approach, the behavioral elements added to the treatment. Thus, in the Sessions 6 - 7 and 16 - 17 the psychotherapist educated patients about healthy lifestyle including exercise, healthy nutrition, alcohol consumption, smoking, and relaxation. Studies have suggested that healthy lifestyle impacts the brain function, and leads to better and efficient executive functions, problem solving, decision making, cognitive-emotional regulation, and cognitive processing (41). Previous studies claimed that high function of the brain is related to rational decision-making (42). Behavioral techniques such as relaxation reduce the blood pressure and improve heart function. Hence, they lead to the high quality of life (43).

In the sessions 10 - 11, the psychotherapist explained about emotion management, problem solving methods, and assertiveness methods. Based on recent studies, emotion regulation and emotional intelligence significantly affect the cognitive, behavioral, and biological functions (44). Consistent with our findings, previous studies showed that depressed patients remember negative memories more than non-depressed patients (45). It is so interesting that the patients' mood has affects their cognitive processing. Therefore, in this program, the psychotherapist explained the relation between mood, emotion regulation, and cognition. Thus, emotion regulation has a mediating role between cognition and biological reactions of the body such as elevated heart rate, breathing pattern disorder, the nervous system arousal, changes in blood flow, and abnormalities of brain, stomach, and digestive functions (44, 45).

Reconceptualization was another cognitive task of patients in CIIP. Recent studies showed that reframing and reconceptualization of events and stressors can help patients to reduce their attention to negative aspects of events, and replace them with positive and realistic perspectives (32). This replacement activates efficient emotion regulation and normal physiological body reactions such as decreasing the cortisol secretion (33), which leads

to healthy heart function (46). Reconceptualization can reduce psycho-biological activation that is connected to better cardiovascular functions. In the sessions 12 - 13, beliefs about religiousness, individual growth, and humanity added to the program. Based on previous findings and world health organization' definition of health, the health includes everyone's' view of their status in life in the context of their culture and value systems (46). Therefore, as mentioned before, value systems, culture, and spirituality can affect the physiological reactions of patients to external events.

In the sessions 14 - 15, the psychotherapist explained the social communication skills such as active listening, empathy, emotional and cognitive feedback, and unconditional positive attention. Studies showed that interpersonal skills could play important role in the management of stressful events (46). The social support, positive family atmosphere, and mature social communication skills can help people to properly manage their psychological stresses. Learning the skills that help people to find social support are essential. Social support could be emotional or informational. Informational social support means providing data to help someone for making him/her life meaningful and worthy. These social communications that need social skills, has been shown to decrease the psychosomatic consequences of stress, and they could positively change individuals' perceptions about the world, themselves, and others. Hence, social communication could finally change people's emotions and physiological reactions to external stresses. Researchers found that changing the patients' perception about themselves lead to positive treatment results. Many researchers have revealed that cognitive-based psychological interventions are significant interventions for improving self-efficacy because motivate patients to develop the perception that they are able to successfully manage the stressful situations.

Previous studies found that the patients with high self-efficacy are more likely to recover (36). Similarly, cognitive flexibility can help patients to change their negative perceptions and take more positive psychological perceptions about their abilities, while, some studies showed that individuals' positive perceptions about themselves are significantly correlated with the quality of life, healthy lifestyle, and the perspective about the future.

Totally, the cardiac integrated intervention program declines dysfunctional beliefs in participants and replaces them with rational and functional beliefs. Many studies have revealed that cognitive factors are correlated with mood and anxiety disorders (34, 35). In this regard, we introduced cardiac integrated intervention program to health psychologists to use it in the clinical settings for car-

diovascular patients. The present research had some limitations; using self-reporting tools was one of the limitations of the current study. We suggest that future studies use behavioral objective indicators and semi-structural interviews. The goal of this treatment was to modify the styles of thinking, feeling, or behaving that had led to the patient's problems.

5.1. Conclusions

The outcomes of the current study proved that quality of life and type D personality both change by conducting the. These findings propose that CIIP has a significant effect on quality of life and type D personality traits. These two variables have a significant influence on the cardiovascular functions. The outcomes of the current study suggested the benefits of cognitive behavioral therapy. We applied cognitive behavioral therapy techniques in the cardiac integrated intervention program to impact the psychological risk factors of cardiovascular diseases. Nowadays, psychosocial risk factors are not completely recognized in the treatment of CVDs. In addition, the side effects of pharmacological and psychopharmacological therapies should be considered as important factors that lead to treatment nonadherence (38). Therefore, the psychological factors have direct and indirect effects on the improvement of CVDs. Taking a comprehensive approach, which considers all psychological risk factors is essential for an effective and long-lasting improvement. As mentioned above, 80% of psychological risk factors are preventable and controllable. In this regard, developing and applying a treatment, which affects the psychological risk factors is so important. The cardiac integrated intervention program encompass all psychological risk factors and could be useful for clinical settings.

5.2. Limitations

This research had some limitations that need to be considered. Using the self-report scales was one of the limitations of this study. Because of the small sample size, we could not generalize the results of this study to other populations. More researches is needed to approve the effectiveness of this program on the patients with CVDs. We suggest that future researchers study the effectiveness of cardiac integrated intervention program for the patients with CVDs in other cities, because the current study had been conducted in Rasht, which can impact the generalizability of the outcomes. In addition, applying follow up measures could show the progress of patients over time

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Footnotes

Conflict of Interests: There were no conflicts of interests.

Ethical Considerations: The procedures of intervention were in accordance with the ethical standards of the University of Guilan for Research Involving Human Participants. Ethical issues (Including plagiarism, data fabrication and falsification, double publication or submission, etc.) have been completely observed. There was no deception in this study. After explaining the research procedures to the patients, patients were given written informed consent. All data obtained from the patients remained confidential.

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References

- Weiner DE, Scott TM, Giang LM, Agganis BT, Sorensen EP, Tighiouart H, et al. Cardiovascular disease and cognitive function in maintenance hemodialysis patients. *Am J Kidney Dis.* 2011;**58**(5):773-81. doi: [10.1053/j.ajkd.2011.03.034](https://doi.org/10.1053/j.ajkd.2011.03.034). [PubMed: [21778003](https://pubmed.ncbi.nlm.nih.gov/21778003/)]. [PubMed Central: [PMC3199371](https://pubmed.ncbi.nlm.nih.gov/PMC3199371/)].
- Loprinzi PD, Crush E, Joyner C. Cardiovascular disease biomarkers on cognitive function in older adults: Joint effects of cardiovascular disease biomarkers and cognitive function on mortality risk. *Prev Med.* 2017;**94**:27-30. doi: [10.1016/j.ypmed.2016.11.011](https://doi.org/10.1016/j.ypmed.2016.11.011). [PubMed: [27863954](https://pubmed.ncbi.nlm.nih.gov/27863954/)].
- Imani A, Gharibi F, Dadashi O, Najafi M, Mirbagheri SM. Analysis of cardiovascular diseases costs and their effective factors in Tabriz hospitalized patients, 2015. *Jundishapur J Health Sci.* 2016.
- Soltani Shal R, Aghamohammadian Sharbaf HR. [The role of psychological factors in psychotherapy of coronary heart disease patients]. *J Zanzan Univ Med Sci.* 2015;**23**(96):109-21. Persian.
- Abete P, Della-Morte D, Gargiulo G, Basile C, Langellotto A, Galizia G, et al. Cognitive impairment and cardiovascular diseases in the elderly. A heart-brain continuum hypothesis. *Ageing Res Rev.* 2014;**18**:41-52. doi: [10.1016/j.arr.2014.07.003](https://doi.org/10.1016/j.arr.2014.07.003). [PubMed: [25107566](https://pubmed.ncbi.nlm.nih.gov/25107566/)].
- Fakhrzadeh H, Bandarian F, Adibi H, Samavat T, Malekafzali H, Hodjatzadeh E, et al. Coronary heart disease and associated risk factors in Qazvin: A population-based study. *East Mediterr Health J.* 2008;**14**(1):33-41. [PubMed: [18557450](https://pubmed.ncbi.nlm.nih.gov/18557450/)].
- Aboyans V, Criqui MH, Abraham P, Allison MA, Creager MA, Diehm C, et al. Measurement and interpretation of the ankle-brachial index: A scientific statement from the American Heart Association. *Circulation.* 2012;**126**(24):2890-909. doi: [10.1161/CIR.0b013e318276fbc6](https://doi.org/10.1161/CIR.0b013e318276fbc6). [PubMed: [23159553](https://pubmed.ncbi.nlm.nih.gov/23159553/)].
- Hatmi ZN, Tahvildari S, Gafarzadeh Motlag A, Sabouri Kashani A. Prevalence of coronary artery disease risk factors in Iran: A population-based survey. *BMC Cardiovasc Disord.* 2007;**7**:32. doi: [10.1186/1471-2261-7-32](https://doi.org/10.1186/1471-2261-7-32). [PubMed: [17971195](https://pubmed.ncbi.nlm.nih.gov/17971195/)]. [PubMed Central: [PMC2200651](https://pubmed.ncbi.nlm.nih.gov/PMC2200651/)].

9. Khalili D, Sheikholeslami FH, Bakhtiyari M, Azizi F, Momenan AA, Hadaegh F. The incidence of coronary heart disease and the population attributable fraction of its risk factors in Tehran: A 10-year population-based cohort study. *PLoS One*. 2014;**9**(8): e105804. doi: [10.1371/journal.pone.0105804](https://doi.org/10.1371/journal.pone.0105804). [PubMed: [25162590](https://pubmed.ncbi.nlm.nih.gov/25162590/)]. [PubMed Central: [PMC4146560](https://pubmed.ncbi.nlm.nih.gov/PMC4146560/)].
10. Sadeghi M, Haghdoost AA, Bahrapour A, Dehghani M. Modeling the burden of cardiovascular diseases in Iran from 2005 to 2025: The impact of demographic changes. *Iran J Public Health*. 2017;**46**(4):506-16. [PubMed: [28540267](https://pubmed.ncbi.nlm.nih.gov/28540267/)]. [PubMed Central: [PMC5439040](https://pubmed.ncbi.nlm.nih.gov/PMC5439040/)].
11. Ahmadi A, Mobasheri M, Soori H. Prevalence of major coronary heart disease risk factors in Iran. *Int J Epidemiol Res*. 2014;**1**(1):3-8.
12. Kohi F, Salehinia H, Mohammadian-Hafshejani A. [Trends in mortality from cardiovascular disease in Iran from 2006-2010]. *J Sabzevar Univ Med Sci*. 2015;**22**(4):630-8. Persian.
13. Maziak W, Critchley J, Zaman S, Unwin N, Capewell S, Bennett K, et al. Mediterranean studies of cardiovascular disease and hyperglycemia: Analytical modeling of population socio-economic transitions (MedCHAMPS)-rationale and methods. *Int J Public Health*. 2013;**58**(4):547-53. doi: [10.1007/s00038-012-0423-4](https://doi.org/10.1007/s00038-012-0423-4). [PubMed: [2311372](https://pubmed.ncbi.nlm.nih.gov/2311372/)].
14. Baygi F, Jensen OC, Qorbani M, Farshad A, Salehi SA, Mohammadi F, et al. Pattern of some risk factors of cardiovascular diseases and liver enzymes among Iranian seafarers. *Med J Islam Repub Iran*. 2017;**31**(1):130-5. doi: [10.18869/mjiri.31.23](https://doi.org/10.18869/mjiri.31.23). [PubMed: [29445652](https://pubmed.ncbi.nlm.nih.gov/29445652/)]. [PubMed Central: [PMC5804442](https://pubmed.ncbi.nlm.nih.gov/PMC5804442/)].
15. Weinstein G, Lutski M, Goldbourt U, Tanne D. Physical frailty and cognitive function among men with cardiovascular disease. *Arch Gerontol Geriatr*. 2018;**78**:1-6. doi: [10.1016/j.archger.2018.05.013](https://doi.org/10.1016/j.archger.2018.05.013). [PubMed: [29864738](https://pubmed.ncbi.nlm.nih.gov/29864738/)].
16. Kubzansky LD, Huffman JC, Boehm JK, Hernandez R, Kim ES, Koga HK, et al. Positive psychological well-being and cardiovascular disease: JACC health promotion series. *J Am Coll Cardiol*. 2018;**72**(12):1382-96. doi: [10.1016/j.jacc.2018.07.042](https://doi.org/10.1016/j.jacc.2018.07.042). [PubMed: [30213332](https://pubmed.ncbi.nlm.nih.gov/30213332/)]. [PubMed Central: [PMC6289282](https://pubmed.ncbi.nlm.nih.gov/PMC6289282/)].
17. Woody A, Hooker ED, Zoccola PM, Dickerson SS. Social-evaluative threat, cognitive load, and the cortisol and cardiovascular stress response. *Psychoneuroendocrinology*. 2018;**97**:149-55. doi: [10.1016/j.psyneuen.2018.07.009](https://doi.org/10.1016/j.psyneuen.2018.07.009). [PubMed: [30029158](https://pubmed.ncbi.nlm.nih.gov/30029158/)].
18. Diaz-Gutierrez J, Ruiz-Canela M, Gea A, Fernandez-Montero A, Martinez-Gonzalez MA. Association between a healthy lifestyle score and the risk of cardiovascular disease in the SUN cohort. *Rev Esp Cardiol (Engl Ed)*. 2018;**71**(12):1001-9. doi: [10.1016/j.rec.2017.10.038](https://doi.org/10.1016/j.rec.2017.10.038). [PubMed: [29287797](https://pubmed.ncbi.nlm.nih.gov/29287797/)].
19. Prata J, Quelhas Martins A, Ramos S, Rocha-Gonçalves F, Coelho R. Gender differences in quality of life perception and cardiovascular risk in a community sample. *Portuguese J Cardiol (English Edition)*. 2016;**35**(3):153-60. doi: [10.1016/j.repce.2015.09.015](https://doi.org/10.1016/j.repce.2015.09.015).
20. Sun YQ, Jiang AL, Chen SM, Li H, Xing HY, Wang F. Quality of life and self-care in elderly patients with cardiovascular diseases: The effect of a traditional Chinese medicine health educational intervention. *Appl Nurs Res*. 2017;**38**:134-40. doi: [10.1016/j.apnr.2017.10.003](https://doi.org/10.1016/j.apnr.2017.10.003). [PubMed: [29241506](https://pubmed.ncbi.nlm.nih.gov/29241506/)].
21. Bekendam MT, Kop WJ, Barzilay S, Widdershoven JW, Aarnoudse W, Denollet J, et al. The predictive value of positive affect and Type D personality for adverse cardiovascular clinical outcomes in patients with non-obstructive coronary artery disease. *J Psychosom Res*. 2018;**104**:108-14. doi: [10.1016/j.jpsychores.2017.11.003](https://doi.org/10.1016/j.jpsychores.2017.11.003). [PubMed: [29275779](https://pubmed.ncbi.nlm.nih.gov/29275779/)].
22. Cheng F, Lin P, Wang Y, Liu G, Li L, Yu H, et al. Type D personality and coronary atherosclerotic plaque vulnerability: The potential mediating effect of health behavior. *J Psychosom Res*. 2018;**108**:54-60. doi: [10.1016/j.jpsychores.2018.02.007](https://doi.org/10.1016/j.jpsychores.2018.02.007). [PubMed: [29602326](https://pubmed.ncbi.nlm.nih.gov/29602326/)].
23. Gramer M, Haar J, Mitteregger M. Type D personality and cardiovascular reactivity in active performance situations: Gender and task-specific influences. *Person Indiv Differ*. 2018;**132**:74-8. doi: [10.1016/j.paid.2018.05.027](https://doi.org/10.1016/j.paid.2018.05.027).
24. O'Dell KR, Masters KS, Spielman GI, Maisto SA. Does type-D personality predict outcomes among patients with cardiovascular disease? A meta-analytic review. *J Psychosom Res*. 2011;**71**(4):199-206. doi: [10.1016/j.jpsychores.2011.01.009](https://doi.org/10.1016/j.jpsychores.2011.01.009). [PubMed: [21911096](https://pubmed.ncbi.nlm.nih.gov/21911096/)].
25. Kupper N, Denollet J. Explaining heterogeneity in the predictive value of type D personality for cardiac events and mortality. *Int J Cardiol*. 2016;**224**:119-24. doi: [10.1016/j.ijcard.2016.09.006](https://doi.org/10.1016/j.ijcard.2016.09.006). [PubMed: [27648980](https://pubmed.ncbi.nlm.nih.gov/27648980/)].
26. Faul F, Erdfelder E, Lang AG, Buchner A. G*power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007;**39**(2):175-91. [PubMed: [17695343](https://pubmed.ncbi.nlm.nih.gov/17695343/)].
27. Gholami A, Araghi MT, Shamsabadi F, Bayat M, Dabirkhani F, Moradpour F, et al. Application of the World Health Organization quality of life instrument, short form (WHOQOL-BREF) to patients with cataract. *Epidemiol Health*. 2016;**38**: e2016005. doi: [10.4178/epih/e2016005](https://doi.org/10.4178/epih/e2016005). [PubMed: [26883738](https://pubmed.ncbi.nlm.nih.gov/26883738/)]. [PubMed Central: [PMC4877517](https://pubmed.ncbi.nlm.nih.gov/PMC4877517/)].
28. Nedjat S, Montazeri A, Holakouie K, Mohammad K, Majdzadeh R. Psychometric properties of the Iranian interview-administered version of the World Health Organization's Quality of Life Questionnaire (WHOQOL-BREF): A population-based study. *BMC Health Serv Res*. 2008;**8**:61. doi: [10.1186/1472-6963-8-61](https://doi.org/10.1186/1472-6963-8-61). [PubMed: [18366715](https://pubmed.ncbi.nlm.nih.gov/18366715/)]. [PubMed Central: [PMC2287168](https://pubmed.ncbi.nlm.nih.gov/PMC2287168/)].
29. Bagherian R, Bahrami Ehsan H. Psychometric properties of the Persian version of type D personality scale (DS14). *Iran J Psychiatry Behav Sci*. 2011;**5**(2):12-7. [PubMed: [24644442](https://pubmed.ncbi.nlm.nih.gov/24644442/)]. [PubMed Central: [PMC3939967](https://pubmed.ncbi.nlm.nih.gov/PMC3939967/)].
30. Sararoudi RB, Sanei H, Baghbanian A. The relationship between type D personality and perceived social support in myocardial infarction patients. *J Res Med Sci*. 2011;**16**(5):627-33. [PubMed: [22091285](https://pubmed.ncbi.nlm.nih.gov/22091285/)]. [PubMed Central: [PMC3214374](https://pubmed.ncbi.nlm.nih.gov/PMC3214374/)].
31. Larsen BA, Christenfeld NJS. Cognitive distancing, cognitive restructuring, and cardiovascular recovery from stress. *Biolog Psychol*. 2011;**86**(2):143-8.
32. Hinton DE, Patel A. Cultural adaptations of cognitive behavioral therapy. *Psychiatr Clin North Am*. 2017;**40**(4):701-14. doi: [10.1016/j.psc.2017.08.006](https://doi.org/10.1016/j.psc.2017.08.006). [PubMed: [29080595](https://pubmed.ncbi.nlm.nih.gov/29080595/)].
33. Powers MB, de Kleine RA, Smits JA. Core mechanisms of cognitive behavioral therapy for anxiety and depression: A review. *Psychiatr Clin North Am*. 2017;**40**(4):611-23. doi: [10.1016/j.psc.2017.08.010](https://doi.org/10.1016/j.psc.2017.08.010). [PubMed: [29080589](https://pubmed.ncbi.nlm.nih.gov/29080589/)].
34. Houston DM. Revisiting the relationship between attributional style and academic performance. *J Appl Soc Psychol*. 2016;**46**(3):192-200. doi: [10.1111/jasp.12356](https://doi.org/10.1111/jasp.12356). [PubMed: [27594711](https://pubmed.ncbi.nlm.nih.gov/27594711/)]. [PubMed Central: [PMC4989416](https://pubmed.ncbi.nlm.nih.gov/PMC4989416/)].
35. Jeon IH, Kim KR, Kim HH, Park JY, Lee M, Jo HH, et al. Attributional style in healthy persons: Its association with 'theory of mind' skills. *Psychiatry Investig*. 2013;**10**(1):34-40. doi: [10.4306/pi.2013.10.1.34](https://doi.org/10.4306/pi.2013.10.1.34). [PubMed: [23482524](https://pubmed.ncbi.nlm.nih.gov/23482524/)]. [PubMed Central: [PMC3590428](https://pubmed.ncbi.nlm.nih.gov/PMC3590428/)].
36. Wang SB, Wang YY, Zhang QE, Wu SL, Ng CH, Ungvari GS, et al. Cognitive behavioral therapy for post-stroke depression: A meta-analysis. *J Affect Disord*. 2018;**235**:589-96. doi: [10.1016/j.jad.2018.04.011](https://doi.org/10.1016/j.jad.2018.04.011). [PubMed: [29704854](https://pubmed.ncbi.nlm.nih.gov/29704854/)].
37. Yoon DH, Kim SJ, Lee JH, Kim PM, Park DH, Ryu SH, et al. The Relationship between Type D personality and suicidality in low-income, middle-aged adults. *Psychiatry Investig*. 2015;**12**(1):16-22. doi: [10.4306/pi.2015.12.1.16](https://doi.org/10.4306/pi.2015.12.1.16). [PubMed: [25670941](https://pubmed.ncbi.nlm.nih.gov/25670941/)]. [PubMed Central: [PMC4310916](https://pubmed.ncbi.nlm.nih.gov/PMC4310916/)].
38. Mols F, Denollet J, Kaptein AA, Reemst PH, Thong MS. The association between Type D personality and illness perceptions in colorectal cancer survivors: A study from the population-based PROFILES registry. *J Psychosom Res*. 2012;**73**(3):232-9. doi: [10.1016/j.jpsychores.2012.07.004](https://doi.org/10.1016/j.jpsychores.2012.07.004). [PubMed: [22850265](https://pubmed.ncbi.nlm.nih.gov/22850265/)].

39. Wu G, Feder A, Cohen H, Kim JJ, Calderon S, Charney DS, et al. Understanding resilience. *Front Behav Neurosci*. 2013;7:10. doi: [10.3389/fnbeh.2013.00010](https://doi.org/10.3389/fnbeh.2013.00010). [PubMed: [23422934](https://pubmed.ncbi.nlm.nih.gov/23422934/)]. [PubMed Central: [PMC3573269](https://pubmed.ncbi.nlm.nih.gov/PMC3573269/)].
40. Southwick SM, Bonanno GA, Masten AS, Panter-Brick C, Yehuda R. Resilience definitions, theory, and challenges: Interdisciplinary perspectives. *Eur J Psychotraumatol*. 2014;5. doi: [10.3402/ejpt.v5.25338](https://doi.org/10.3402/ejpt.v5.25338). [PubMed: [25317257](https://pubmed.ncbi.nlm.nih.gov/25317257/)]. [PubMed Central: [PMC4185134](https://pubmed.ncbi.nlm.nih.gov/PMC4185134/)].
41. Gardiner P, Sadikova E, Filippelli AC, Mitchell S, White LF, Saper R, et al. Stress management and relaxation techniques use among underserved inpatients in an inner city hospital. *Complement Ther Med*. 2015;23(3):405-12. doi: [10.1016/j.ctim.2015.03.006](https://doi.org/10.1016/j.ctim.2015.03.006). [PubMed: [26051576](https://pubmed.ncbi.nlm.nih.gov/26051576/)]. [PubMed Central: [PMC4460566](https://pubmed.ncbi.nlm.nih.gov/PMC4460566/)].
42. Weekly T, Walker N, Beck J, Akers S, Weaver M. A review of apps for calming, relaxation, and mindfulness interventions for pediatric palliative care patients. *Children (Basel)*. 2018;5(2). doi: [10.3390/children5020016](https://doi.org/10.3390/children5020016). [PubMed: [29373515](https://pubmed.ncbi.nlm.nih.gov/29373515/)]. [PubMed Central: [PMC5835985](https://pubmed.ncbi.nlm.nih.gov/PMC5835985/)].
43. Abbasi B, Mirzakhany N, Angooti Oshnari L, Irani A, Hosseinzadeh S, Tabatabaei SM, et al. The effect of relaxation techniques on edema, anxiety and depression in post-mastectomy lymphedema patients undergoing comprehensive decongestive therapy: A clinical trial. *PLoS One*. 2018;13(1). e0190231. doi: [10.1371/journal.pone.0190231](https://doi.org/10.1371/journal.pone.0190231). [PubMed: [29304095](https://pubmed.ncbi.nlm.nih.gov/29304095/)]. [PubMed Central: [PMC5755759](https://pubmed.ncbi.nlm.nih.gov/PMC5755759/)].
44. Hodel B, Kern RS, Brenner HD. Emotion Management Training (EMT) in persons with treatment-resistant schizophrenia: First results. *Schizophr Res*. 2004;68(1):107-8. doi: [10.1016/S0920-9964\(03\)00119-1](https://doi.org/10.1016/S0920-9964(03)00119-1). [PubMed: [15037346](https://pubmed.ncbi.nlm.nih.gov/15037346/)].
45. Won MR, Lee KJ, Lee JH, Choi YJ. Effects of an emotion management nursing program for patients with schizophrenia. *Arch Psychiatr Nurs*. 2012;26(1):54-62. doi: [10.1016/j.apnu.2011.02.006](https://doi.org/10.1016/j.apnu.2011.02.006). [PubMed: [22284080](https://pubmed.ncbi.nlm.nih.gov/22284080/)].
46. Muller R, Peter C, Cieza A, Geyh S. The role of social support and social skills in people with spinal cord injury—A systematic review of the literature. *Spinal Cord*. 2012;50(2):94-106. doi: [10.1038/sc.2011.116](https://doi.org/10.1038/sc.2011.116). [PubMed: [22006079](https://pubmed.ncbi.nlm.nih.gov/22006079/)].