



Comparing the Effects of Mindfulness-Based Stress Reduction and Cognitive Behavioral Therapy on the Quality of Life of Patients with Cardiovascular Disease

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Quantitative Study

Abstract

Background: Cardiovascular disease (CVD) is a leading cause of death and disability worldwide which is still highly prevalent despite dramatic medical advances. According to the statistics provided by the World Health Organization (WHO) in 2014, CVD-related mortality rate in Iran is 46%. This study aimed to compare the effectiveness of Mindfulness-based stress reduction (MBSR) and cognitive behavioral therapy (CBT) on quality of life (QOL) in patients with CVDs.

Methods: This was a single-blind randomized controlled trial. In total, 60 patients with CVDs were recruited. Patients were allocated to the MBSR and CBT groups. Patients in the MBSR and CBT groups received intervention in 8, 2.5-hour sessions. The main outcome was QOL which was measured by the MacNew Quality of Life after Myocardial Infarction (QLMI) questionnaire. Data were analyzed using analysis of covariance (ANCOVA) in SPSS software.

Results: ANCOVA revealed a significant difference between the MBSR group and CBT group regarding the post-test values of QOL ($P = 0.001$).

Conclusion: This study revealed that MBSR and CBT are effective in reducing the QOL of patients with CVDs.

Keywords: Mindfulness-based stress reduction, Cognitive behavior therapy, Quality of life, Cardiovascular disease

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Introduction

Cardiovascular diseases (CVDs) are among the most important public health issues

(Al-Mallah et al., 2016) and are the main causes of disability and mortality in different countries (Gasirowski & Dutkiewicz, 2013). Today, these diseases account for approximately 30% of the rate of mortality in the world (Longo, Fauci, Kasper, Hauser, Jameson, & Loscalzo, 2011). According to the

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statistics published by the World Health Organization (WHO) in 2014, mortality caused by CVDs in Iran explains 46% of the total mortality rate (World Health Organization, 2014).

Various factors such as high cholesterol, nutrition, family history, hypertension, obesity, physical inactivity, stress, and smoking are involved in the incidence of CVDs (Mackay, Mensah, Mendis, & Greenlund, 2004). The findings from various studies suggest that psychological factors, the most important of which are depression, anxiety, hostility, anger, social isolation, and chronic stress, significantly contribute to the incidence of CVDs (Booth-Kewley & Friedman, 1987; Williams, 1987; Rozanski, Blumenthal, & Kaplan, 1999).

Patients with CVDs often display physical and psychological symptoms and their quality of life (QOL) is normally compromised by depression, anxiety, anger, and stress (Sperry, 2009). Different aspects of the QOL of patients with chronic diseases, especially the duration and severity of the disease, change the physical, mental, social, and economic dimensions of their QOL (Park, 2002). A more precise assessment of the QOL of patients with CVDs indicated that a lower QOL is associated with medical variables, especially cognitive complaints, anxiety/depression, post-traumatic stress disorder (PTSD), and difficulties performing everyday activities (Stiell et al., 2003; Moulart, Wachelder, Verbunt, Wade, & van Heugten, 2010). The WHO has defined the four dimensions of QOL as physical health (which includes pain, distress, sleep, rest, and the ability to perform daily activities and tasks), psychological dimension (which includes appearance, positive and negative feelings, memory, concentration, and self-confidence), social relationships (including personal relationships, social support, and sexual activity), and social environment (including financing, home environment, access to information, participation in social activities, and commuting facilities) (The World Health Organization Quality of Life

assessment (WHOQOL), 1995). The traditional approaches to the assessment of treatment outcomes or effectiveness are mainly centered on the disease signs and symptoms, and thus, undervalue QOL and the relevant notions (Maremmani, Pani, Pacini, & Perugi, 2007).

Psychological interventions have been found to be useful and are increasingly recommended for these patients (Sotile, 2005) and are utilized to reduce multifaceted and socio-psychological risk factors (Rozanski, Blumenthal, Davidson, Saab, & Kubzansky, 2005). The psychological needs of patients with CVDs can be met through psychological treatment. One of the new treatments proposed for this purpose is the Mindfulness-based stress reduction (MBSR) method, which was developed in the Center for Spirituality and Healing of the University of Minnesota in 1979 (Baer, 2005). MBSR is a standard 8-week group stress reduction treatment that can be used as a means of reducing anger and stress in patients. MBSR is a structural treatment program widely used to reduce the psychological complications associated with chronic diseases and emotional and behavioral disorders (Bishop et al., 2006). Kabat-Zinn, as a pioneer, defined mindfulness as follows: "Mindfulness is the awareness that arises through paying attention, on purpose, in the present moment, non-judgmentally" (Miller, Fletcher, & Kabat-Zinn, 1995). Mindfulness-based interventions provide potential confidence as an effective intervention for medical care. According to research results, these interventions reduce the pain of physical diseases, psychosomatic disorders, and psychological disorders and improve QOL (Grossman, Niemann, Schmidt, & Walach, 2004).

Another common psychological treatment, which is known as one of the most effective psychotherapeutic interventions, is cognitive behavioral therapy (CBT). This therapeutic method is either administered alone or in combination with other medical treatments

and psychotherapeutic methods (Sperry, 2009, White, 2011). CBT is particularly suitable for changing the cognitions and behaviors that are contradictory to good health, and it involves the correction of illness representations that interfere with the treatments, increased acceptance of the disease, and confrontation with adjustment disorders (Sperry, 2009). CBT is a multi-component treatment that can be administered to individuals and groups (Blom et al., 2012). This treatment is introduced as one of the most effective psychological treatments for chronic diseases, and thus, it could be used as a golden standard for the assessment of other treatments (Sperry, 2009). Similar to CBT, MBSR is a multi-component group therapy method (Kabat-Zinn & Hanh, 2013). While CBT is often considered an acute treatment option, MBSR serves as an acute and preventive treatment. MBSR offers participants a strategy which enables them to confront stressful events and challenges. MBSR teaches the participants to use mindfulness as a coping strategy to cope with stress, pain, and diseases (Praisman, 2008). Therefore, it could be both administered as a preventive treatment to people at risk of CVDs and an acute treatment for patients with CVDs. The other advantage of MBSR over CBT is that, in MBSR, over 30 participants can enroll in each class. In addition, instead of classifying the participants by diagnosis or disease, it is possible to use participants with a wide range of diseases emphasizing that all participants can experience a continuous variation of the inner states regardless of their disease and acquire the ability to increase momentary awareness using mindfulness skills (Kabat-Zinn & Hanh, 2013).

In general, various studies have been reflective of the positive contribution of MBSR and CBT to the increased QOL of chronic clinical cases including patients with CVDs. However, no study has compared the effectiveness of these two treatments.

Therefore, the goal of the present research was to determine whether there is a difference between the effectiveness of teaching MBSR and CBT on the QOL of patients with CVDs.

Methods

Moral principles: This research project was approved by the ethics committee of Kashan University of Medical Sciences, Kashan, Iran, (code: 4912), and the informed consent of all of the participants was obtained in writing. This research was part of a research project, and another part of it was published in the Journal of the American Society of Hypertension (Momeni, Omidi, Raygan, & Akbari, 2016) and the Journal of Andisheh va Raftar (Applied Psychology) (Omidi, Momeni, Raygan, Akbari, & Talighi, 2017).

Design: This research was a single-blind randomized controlled trial with an intervention and a control group. First, 103 participants were assessed in terms of the inclusion criteria, and 60 participants who met the inclusion criteria were divided into the MBSR and CBT groups. The research variables were examined before and after the intervention. The participants were selected from among all patients with CVDs visiting the cardiology clinic of Kashan City from April 2015 to June 2015.

Inclusion criteria: The study inclusion criteria consisted of presence of CVDs and hypertension, receiving medicine, no new cardiovascular event or any sign of a new cardiac disease in the past 6 months, age of 35-60 years, Willingness to participate in the project, and education level of at least a high school degree.

Exclusion criteria: The exclusion criteria consisted of renal diseases, diabetes mellitus (DM), malignant diseases such as cancer, history of epilepsy and epileptic seizure in the past 6 months, pregnancy or breastfeeding, history of drug abuse, history of using psychological interventions in the past month, and history of doing exercises such as yoga, meditation, and Zen.

In the first session, the medical history, the current symptoms, the prescribed medicine (and their period of use), and the time of the last medicinal changes and physical examination were checked by a cardiovascular expert to approve the qualification of the participants. Patients who met the inclusion criteria completed the informed consent form, and a pretest was conducted. The patients were assigned randomly by a person not involved in the research, and it was carried out by a computer-generated randomization program with 4 blocks to ensure the researchers were blind to the random assignment of the patients. Given the nature of the research, the researcher administering the MBSR and CBT interventions was aware of the group types. The anonymous data was collected and analyzed by an assistant blind to the assignment of the patients and the interventions. The flowchart depicted in figure 1 illustrates the research procedure.

Study Instruments: The MacNew Quality of Life after Myocardial Infarction (QLMI)

questionnaire is a valuable measure of QOL of patients CVDs. The MacNew QLMI questionnaire was developed by Oldridge and Lim in the United States in English and was revised by Valenti. It is, therefore, the modified and completed version of the QLMI questionnaire. This questionnaire was designed to assess the effects of CVDs, especially coronary heart disease (CHD), and their treatments on patients’ physical, emotional, and social activities. This questionnaire is sensitive to the health-related changes in QOL that result from different medical interventions for patients with myocardial infarction or heart failure or patients with angina pectoris (Khayam Nekouei, Yousefy, Manshaee, 2010).

This questionnaire consists of 27 questions with an average response time of 10 minutes. The questionnaire items cover emotional performance, physical performance, and social performance. The QLMI Questionnaire questions the past 2 weeks of the patient’s life and each question is scored based on a 7-point Likert scale (ranging from “always” to “never”).

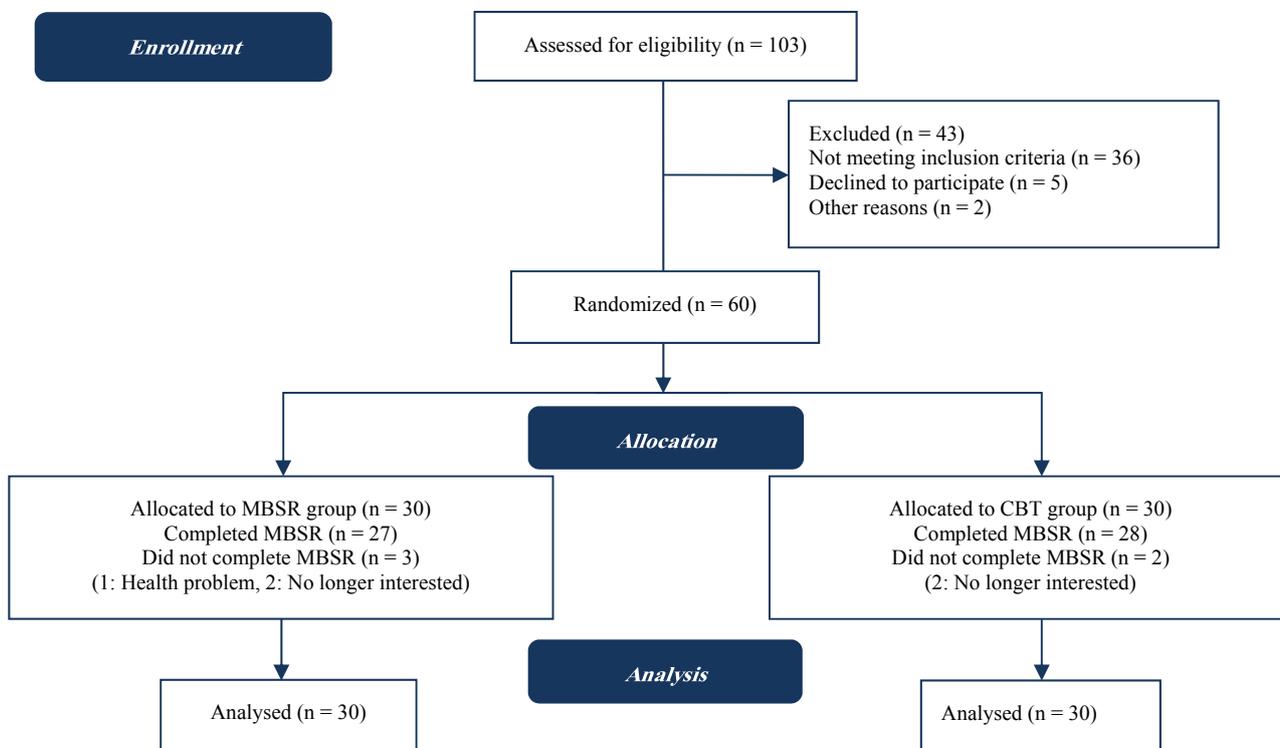


Figure 1. Flowchart of the Study
MBSR: Mindfulness-based stress reduction; CBT: Cognitive behavioral therapy

Table 1. Baseline characteristics of demographic variables (n = 60)

Variables	Conditions	Groups		P-value
		MBSR (n = 30)	CBT (n = 30)	
Age (year) (Mean ± SD)		49.16 ± 6.31)	46.16 ± 6.27)	0.07
		n (%)	n (%)	
Age	< 49	13 (43.3)	22 (73.3)	0.035
	> 50	17 (56.7)	8 (26.7)	
Sex	Male	17 (56.7)	18 (60)	1.000
	Female	13 (43.3)	12 (40)	
Education	Diploma	26 (86.7)	24 (80)	0.731
	Bachelor's degree	4 (13.3)	6 (20)	
Disease	Cardiovascular disease	21 (70)	18 (60)	0.748
	Mitral valve replacement	6 (20)	7 (23)	
	Other	3 (10)	5 (16)	

MBSR: Mindfulness-based stress reduction; CBT: Cognitive behavioral therapy

The highest score that can be obtained in each area is 7 and the lowest score is 1, reflecting a high QOL and a low QOL, respectively (Jafari, 2004). According to the existing reference, the QLMI questionnaire has acceptable reliability and validity as compared to the other health-related quality of life (HRQOL) scales (Hofer, Lim, Guyatt, & Oldridge, 2004). This questionnaire was modified by Yousefi and Jaafari in 2003 for the cardiac diseases in Isfahan Province, and its reported reliability was 0.94 based on Cronbach's alpha coefficient (Jafari, 2004).

Sample size: The Cohen formula was used to calculate the sample size and the minimum number of respondents required to assess the effectiveness of the intervention. According to the calculations, 10 participants were required for this research [significance level: $\alpha = 0.5$; effect size: $d = 0.80$ (Parswani, M. Sharma, & Iyengar, 2013); and power: 90%]. The calculated sample size required for each group was 30 individuals considering 10% attrition.

Data analysis: The data were analyzed in SPSS software (version 16, SPSS Inc., Chicago, IL, USA). To compare the baseline

demographic and clinical variables, independent t-test was used. Moreover, the analysis of covariance (ANCOVA) was used to compare the MBSR and CBT scores, and the baseline scores were considered covariates to rule out the pretest effects.

Results

A total of 60 patients were randomly allocated to the MBSR (n = 30) and CBT (n = 30) groups, and 58 patients took the posttest at the end of the intervention. The average age of the participants in the MBSR and CBT groups was 49.16 ± 6.31 years and 46.16 ± 6.27 years, respectively.

Baseline: The difference between the physical performance scores and the total scores of the two groups at the baseline was significant. There was no statistically significant difference between the MBSR and CBT groups at the baseline in terms of the demographic variables (including gender, age, education, and type of CVD) and the outcome variables (including emotional performance and social performance) (Tables 1 and 2).

Table 2. Baseline characteristics of outcome variables (n = 60)

Variables	Conditions	Groups		P-value
		MBSR (n = 30) (Mean ± SD)	CBT (n = 30) (Mean ± SD)	
QOL	Emotional Performance	2.90 ± 1.04	2.50 ± 1.23	0.184
	Physical Performance	5.24 ± 1.14	3.96 ± 1.05	0.000*
	Social Performance	3.23 ± 1.24	2.93 ± 1.32	0.351
	Total	3.79 ± 1.05	3.13 ± 1.12	0.023*

*P < 0.05

QOL: Quality of life; MBSR: Mindfulness-based stress reduction; CBT: Cognitive behavioral therapy

Table 3. Pre and Post comparison of MBSR and CBT Group based on analyzed using analysis of covariance (ANCOVA)

Variable	Subscale	Groups				F	P-value	Observed power
		MBSR (n = 30)		CBT (n = 30)				
		(Pre-mean±SD)	(Post-mean±SD)	(Pre-mean±SD)	(Post-mean±SD)			
QOL	Emotional performance	2.90 ± 1.04	5.44 ± 0.91	2.50 ± 1.23	4.21 ± 0.87	25.97	0.000*	0.999
	Physical performance	5.24 ± 1.14	6.32 ± 0.34	3.96 ± 1.05	5.76 ± 0.91	14.03	0.000*	0.957
	Social performance	3.23 ± 1.24	5.77 ± 1.13	2.93 ± 1.32	5.51 ± 1.01	1.23	0.272	0.193
	Total	3.79 ± 1.05	5.85 ± 0.70	3.13 ± 1.12	5.16 ± 0.73	16.60	0.000*	0.979

*P < 0.05

QOL: Quality of life; MBSR: Mindfulness -Based Stress Reduction; CBT: Cognitive behavioral therapy

Regarding QOL, at the end of the intervention there was a significant difference between the MBSR and CBT groups in terms of the scores of emotional performance and social performance as well as the total score. However, there was no significant difference between the two groups in terms of social performance (Table 3).

Discussion

Key findings: The results of ANCOVA revealed a significant difference between the MBSR and CBT groups in terms of emotional performance, physical performance, and total scores, but there was no difference between the social performance scores of the two groups.

Comparison with relevant findings from other published studies: The present study results were in line with the findings reported by Reibel, Greeson, Brainard, and Rosenzweig (2001), Nyklicek and Kuijpers (2008), and Witek-Janusek, Albuquerque, Chroniak, Chroniak, Durazo-Arvizu, and Mathews (2008), suggesting that MBSR has a positive effect on the QOL of different patients. In a study by Reibel et al. (2001), the effect of MBSR on the QOL and physical and psychological symptoms of different patients was studied. A total of 136 patients participated in an 8-week MBSR program, which required them to meditate for 20 minutes. The required data were obtained from the pretest and posttest using the 36-Item Short Form (SF-36), medical symptoms checklists, and the Symptom Checklist-90-Revised (SCL-90-R)

questionnaire. In this research, the improvement in the QOL manifested through an improvement in all of the SF-36 indices including joy, physical pain, role limitations caused by physical problems, and social performance. In addition, the physical symptoms were alleviated by 28% in the Medical Symptom Checklist (MSCL) test (P = 0.0001), and the decrease in all of the indices was persistent during the 1-year follow-up. The results of the present study were in line with the results of a research on the positive effect of MBSR treatment on the QOL of patients with chronic back pain in Iran (Masumian, Shairi, & Hashemi, 2013). The results of this research on 18 patients with chronic back pain revealed that MBSR was effective in increasing the QOL of patients with chronic back pain (Masumian et al., 2013).

To our knowledge, no study has been conducted on the effects of MBSR on the QOL of patients with CVDs. However, Curiati et al. (2005) examined elderly patients with heart failure and found that participation in a meditation program significantly increases the QOL of these patients (Curiati et al., 2005).

Mechanisms and explanations: CBT is focused on deficiencies and flaws based on personal maturity, the complexity of the person's condition, and the person's ways of expressing their emotions. It also examines cognitive distortions in connection with inefficient thinking and wrong hypotheses.

The theoretical model used in CBT is composed of the existing theories of human emotions. In other words, it holds that it is necessary to become aware of the emotional condition of a person and their reactions to different emotions, and it is necessary to be sensitive to people's feelings (Ekman, 2003). CBT, for chronic medical conditions, consists of the following 6 components: assessing the severity and nature of diseases; efficient training; cognitive restoration; stress management; self-reflection; and a precise plan that enables the individual to acquire new cognitive skills (Ekman, 2003).

Very few experimental studies have argued that improvement in the spiritual experience and mindfulness can determine a higher QOL. The findings from a large number of studies on healthy stressed individuals indicated that an increase in daily spiritual experience directly influences mindfulness, which is associated with an improvement in the post-MBSR QOL (Shapiro, Schwartz, & Bonner, 1998; Birnie, Speca, & Carlson, 2010).

Theoretically, patients with chronic diseases such as CVDs can benefit from mindfulness exercises in various ways. Similar to CBT, the goal of mindfulness is to reduce responses to distressing emotions and thoughts as well as pain (Baer, 2006). Research results indicated that mindfulness reduces psychological symptoms such as anxiety and depression in patients (Brown, Ryan, & Creswell, 2007). Mindfulness also increases physical self-regulation and consciousness, leading to an improvement in the physical mechanisms and self-care. Similar to conventional relaxation, mindfulness meditation increases parasympathetic activity, which may result in deep muscular relaxation, decreased stress and excitation, mitigation of pain, and increased QOL (Ditto, Eclache, & Goldman, 2006; Greeson, 2009). Moreover, mindfulness may protect the individual from stress-related mood malfunctions by enhancing cognitive coping processes such as positive reappraisal

(Garland, Gaylord, & Park, 2009) and reinforcing emotion regulation skills such as distress tolerance skill (Linehan, 1993).

Considering the contents of the MBSR sessions, this program stresses the use of techniques for reducing stress, coping with pain, and gaining self-awareness. The fundamental goal of the MBSR program is to enable individuals to let go of conflicts and accept the existing situations non-judgmentally (Flugel Colle, Vincent, Cha, Loehrer, Bauer, & Wahner-Roedler, 2010). In fact, a shift to non-judgmental acceptance is associated with improved QOL (Nyklicek, & Kuijpers, 2008).

Conclusion

MBSR is aimed at increasing momentary awareness. It offers a new personal way of coping with stress. Moreover, external stressors are a part of the human life and are unchangeable, yet the methods of coping with stress and responding to stressors may change (Flugel Colle, Vincent, Cha, Loehrer, Bauer, & Wahner-Roedler, 2010). Therefore, since QOL is significantly correlated with psychological variables, mindfulness exercises are expected to cause positive changes in some psychological functions and eventually improve the QOL of patients with CVDs.

Limitations: The major limitation of this study was the lack of a follow-up monitoring. Moreover, the participating patients were not blind to the study groups. Given the attributes of psychological researches, blinding of participants is impossible.

Generalizability: The findings of this study can be generalized only to patients with CVDs who are 35–60 years of age and hold a high school diploma or higher degrees.

Registration: This study was registered in the Iranian Registry of Clinical Trials with the code of IRCT2015012520794N1.

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Conflict of Interests

Authors have no conflict of interests.

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