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# The effect of mindfulness program on general health of patients undergoing hemodialysis

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## Abstract:

**INTRODUCTION:** Patients undergoing hemodialysis have a low level of health and mindfulness technique in mind-body medicine is used to help patients with chronic illness. Therefore, this clinical trial was conducted to determine the effect of the mindfulness program on the general health of patients undergoing treatment with hemodialysis.

**METHODS:** Sixty hemodialysis patients were selected through the convenient method and randomly divided into experimental and control groups. Both groups completed demographic information questionnaire and general health questionnaire. Then, the experimental group received 8 sessions of mindfulness training and the control group received 8 sessions of education in relation to end-stage renal disease and hemodialysis. Educational sessions were performed for both groups in the second 30 min after hemodialysis for 1 h in six individual sessions and two 1.5 h group sessions. Immediately after and 1 month after the intervention, the General Health Questionnaire was completed by both groups.

**RESULTS:** Analysis of the findings showed no significant differences between the mean score of general health disorder and its subscales before the intervention in two groups ( $P > 0.05$ ). Nevertheless, after intervention in the experimental group, the mean of general health disorder score decreased from  $44.17 \pm 12.32$  to  $21.9 \pm 6.4$  and 1 month after the intervention, the mean score of this score was  $23.6 \pm 6.2$ . The mean score of physical symptoms, anxiety and sleep disorder, social functioning deficiency, and depression were also significantly lower in the experimental group immediately after intervention and 1 month after the intervention; however, there were no significant differences between the mean of this score immediately and 1 month after the intervention. In addition, the mean score of general health disorder changes immediately and 1 month after the intervention in the experimental group was significantly more than the control group. In the control group, there was no significant difference between the mean score of general health disorder and its subscales before, immediately, and 1 month after the intervention ( $P > 0.05$ ).

**CONCLUSIONS:** The results of this research showed that mindfulness has been effective in reducing physical and anxiety symptoms, sleep disorder, social dysfunction, and depression symptoms. Therefore, the use of mindfulness as a complementary treatment can improve the general health level in these patients.

## Keywords:

General health, hemodialysis, Iran, mindfulness

## Introduction

End-stage renal disease (ESRD) is recognized as a serious health problem in all societies.<sup>[1]</sup> Nowadays, these patients are treated with alternative therapies, the

most common of which is hemodialysis so that the number of patients undergoing dialysis has been reported to be >16,000 by Iran Nephrology Association.<sup>[2]</sup> Although hemodialysis increases the longevity of these patients, it makes them face a wide range of physical, psychological, economic, and social problems that lead to changes

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in their lifestyle<sup>[3]</sup> including frequent admissions and spending a lot of money.<sup>[4]</sup> Gastrointestinal complications, neurological complications, reproductive and musculoskeletal disorders, anemia,<sup>[5]</sup> mental stress, mood changes,<sup>[6]</sup> sleep disorders, depression, anxiety, decreased physical and social function, decreased quality of life, and decreased general health can also be cited.<sup>[7-12]</sup> A study showed a significant relationship between high levels of depression, anxiety, and noncompliance of these patients with recommended diet and essential therapies, which could endanger their general health and even expedite their death.<sup>[13]</sup>

The WHO defines health as a multidimensional issue and believes that different dimensions of health and disease mutually affect each other. Thus, physical problems affects one's psyche and psychological problems affects his body, and both of these dimensions affect the health of the community and the health of the community affects the body and psyche of the patient. Therefore, the measures taken to promote health should pay attention to all aspects of health (physical, mental, and social) and consider the general health of the society.<sup>[14]</sup> In this regard, nursing and therapeutic interventions should be holistic and cover physical and psychiatric complications in these patients.<sup>[15]</sup>

In addition to conventional therapies, supplementary therapies provide patients with new therapeutic options aimed at improving the general level of health, reducing symptoms, reducing side effects, and treatment costs.<sup>[16]</sup> Additional treatments are a collection of nonpharmacological interventions.<sup>[17]</sup> One of these interventions is mind-body medicine, whose use is common in many countries to reduce the incidence of chronic diseases. The mind-body medicine is the domain that emphasizes the interaction of the brain, mind, body, and behavior, and has powerful methods that directly affect physical and mental health.<sup>[18]</sup> Mindfulness is one of the techniques of mind-body. All exercises in mindfulness consciousness are designed to increase attention to the body and emphasize the interaction of physical, cognitive, and emotional processes.<sup>[19]</sup> Mindedness-based treatments have high efficacy for the treatment of some clinical disorders and physical illnesses as they deal with both mental and physical aspects.<sup>[20]</sup> Mindfulness training also affects the depression and psychological adjustment of patients.<sup>[21]</sup> Moreover, mindfulness is known to improve the mental, physical, emotional,<sup>[22]</sup> and quality of sleep.<sup>[23]</sup>

A systematic review conducted by the Merkes Center reviewed 15 studies all of which focused on disorders such as fibroma, pain, rheumatism, and multiple chemical sensitivity. This review revealed that according to all these studies, mindfulness has no side effects and

no special negative consequences.<sup>[24]</sup> The same result was obtained in another systematic review which had examined 18 studies on different diseases including skin diseases.<sup>[25]</sup> Zare *et al.* in their research showed that mindfulness has a positive and long-lasting effect on patients with Type 2 diabetes. In addition, they suggested that the effect of mindfulness program on other types of chronic diseases should be further investigated.<sup>[26]</sup> However, it should be noted that the effect of mindfulness has not been reported positively in all studies. Investigating the effect of mindfulness training on the psychological state of students, Samouei and Ghasemi found out that mindfulness has had no positive effect on the psychological state of these students.<sup>[27]</sup>

Patients undergoing hemodialysis suffer from various health problems in various dimensions and with multiple causes. Thus, in spite of the elimination of toxins and establishing electrolyte balance and hemostasis of the blood by hemodialysis, there are still some physical, psychological and social problems. It appears to be a matter of the engagement of their minds and requires the use of ways to influence the mind and other dimensions of the health of the patient, improve the daily activities of life, and the ability to function in the family and community. Given that nurses can use complementary therapies to reduce the severity of psychological, social, and physical symptoms.<sup>[28]</sup> Although most similar studies have confirmed the significant impact of mindfulness skills on health promotion, no study has examined the effect of mindfulness on all aspects of health or, in other words, on general health. Given the fact that nurses play an important role in maintaining and improving the health of patients and as the provided nursing care should be holistic and cover all aspects (physical, mental and social) of the patients' health, and as the level of general health in patients undergoing hemodialysis is low, this researcher aimed at investigating the effect of mindfulness on the general health of patients undergoing hemodialysis.

## Methods

This study was a clinical trial (IRCT2017053134263N1) in two groups and three steps (before, immediately, and 1 month after intervention), which was conducted at Al-Zahra, Amin, and Hazrat Ali Asghar hospitals in Isfahan in February 2016 after being approved at the University's Ethics Committee. Sampling was convenient and 60 patients with chronic renal failure undergoing hemodialysis three times a week, each session for 4 h, and at least 3 months have passed from their hemodialysis were selected.<sup>[29]</sup> Other criteria to be selected for the study were a diagnosis of lack of severe depression or other mental illness during the past year and not being

treated with psychiatry and psychotherapy, completing consciousness, had acceptable listening and speaking ability to answer questions and completed the informed consent form. The samples could leave the study if they did not want to cooperate at each stage of the study. If during the study period, they were treated with peritoneal dialysis, kidney transplantation, or drugs that controlled the symptoms of depression, anxiety, insomnia, or were absent two sessions from the study sessions, they were excluded from the study. Then, the samples were randomly allocated into two groups of experimental (30 people) and control (30 people). All samples in both groups completed the study.

Information such as age, sex, marital status, cause of chronic renal failure, and duration of hemodialysis treatment were recorded in the questionnaire using the patients' records, general health questionnaire (GHQ-28) was completed for all subjects by the researcher's questioning. The GHQ has 28 questions and has four subscales and each scale has seven questions. Of the 28 items of the questionnaire, items 1–7 are related to the scale of physical symptoms, 8–14 symptoms of anxiety and sleep disorders, 15–21 the assessment of symptoms of social functional failure, and finally 22–28 are related to symptoms of depression. In scoring, zero was for never, 1 for usual level, 2 for more than usual, and 3 for much more than usual. At each scale, a score of 6 and a total score of 22 and more represent a disorder. Goldberg and Williams reported a score of 0.95 for split-half reliability of the questionnaire,<sup>[30]</sup> and in a study by Chan, internal consistency was reported by Cronbach's alpha as 0.93.<sup>[31]</sup> Moreover, in the standardization of The GHQ with 28 questions, using Cronbach's alpha, Taghavi calculated the internal consistency of the questionnaire for the subscales of physical symptoms, anxiety and insomnia symptoms, social dysfunction, and depression symptoms as 0.85, 0.87, 0.79, and 0.91, respectively. This consistency was estimated to be 0.85 for the whole scale which represents the general health. The correlation coefficient among the subscales of the questionnaire with the total score was satisfactory and ranged from 0.72 to 0.87.<sup>[32]</sup>

The experimental group underwent 8 sessions of mindfulness [Table 1] and control skills training and the control group received 8 sessions of education related to ESRD and hemodialysis. The training sessions consisted of two group sessions of 1.5 h and individual sessions (6 sessions) for both groups at the second 30 min after hemodialysis for 1 h.

Immediately, after the end of 8 sessions of intervention, 1 month later, using the questionnaire, the general health disorder score and its subscales were calculated for each person. SPSS of IBM Company, Aromak, NY, USA Version 20 and Chi-square, analysis of variance

**Table 1: Mindfulness training program**

Sessions	Content
First	<ol style="list-style-type: none"> <li>1. Recognition of excitements</li> <li>2. Compositional excitements</li> <li>3. Skill four: Describe excitement</li> <li>4. Enjoy the beauty of nature</li> </ol>
Second	<ol style="list-style-type: none"> <li>1. Skill one: Focus on a particular object</li> <li>2. Skill two: Focus on a single moment</li> <li>3. Familiarity with the concept of mindfulness at the moment</li> <li>4. See the wonders of the present moment</li> </ol>
Third	<ol style="list-style-type: none"> <li>1. Skill three: Inner and outer experience</li> <li>2. The concept of physical mindfulness</li> <li>3. Eating raisins: The great taste of mindfulness</li> <li>4. Enjoy the journey</li> </ol>
Forth	<ol style="list-style-type: none"> <li>1. What is the excitement?</li> <li>2. What is the feeling?</li> <li>3. Recognition of excitements</li> <li>4. Familiarity with some types of excitement</li> <li>5. Awareness of feelings and excitements</li> <li>6. Providing a list of main feelings sub-feelings</li> <li>7. Listening to unpleasant excitements</li> </ol>
Fifth	<ol style="list-style-type: none"> <li>1. What is the excitement?</li> <li>2. What is the feeling?</li> <li>3. Recognition of excitements</li> <li>4. Familiarity with some types of excitement</li> <li>5. Awareness of feelings and excitements</li> <li>6. Providing a list of main feelings sub-feelings</li> <li>7. Listening to unpleasant excitements</li> </ol>
Sixth	<ol style="list-style-type: none"> <li>1. Recognition of thoughts</li> <li>2. Necessity of training and identifying the difference between through and feeling</li> <li>3. The concept of thought in mindfulness</li> <li>4. Skill five: The fault of thought</li> <li>5. Skill six: Record thirty minutes of thought</li> <li>6. Keep in your mind that you are different from your thoughts</li> </ol>
Seventh	<ol style="list-style-type: none"> <li>1. Understanding the concepts of body, thought, and feeling mindfulness</li> <li>2. Skill seven: Mindful breathing</li> <li>3. Smile and smile</li> </ol>
Eighth	<ol style="list-style-type: none"> <li>1. A few key methods for a mindful life</li> <li>2. Skill eight: A mindful diet</li> <li>3. Mindfulness in mindful activities</li> </ol>

with repeated observations, and independent *t*-tests were used for analysis of data.

## Results

The findings showed that the mean age of patients was  $55.45 \pm 11.6$  and the mean length of hemodialysis for patients was  $47.47 \pm 34.6$  months. Chi-square test showed no significant differences between the frequency of distribution of age, sex, marital status, cause of chronic renal failure, and duration of treatment with hemodialysis into two groups ( $P > 0.05$ ). The results of ANOVA with repeated observations showed a significant

difference between the mean score of general health disorder and its subscales (physical symptoms, anxiety and sleep disorders, symptoms of social functioning failure, and depression) in the experimental group immediately and 1 month after intervention ( $P < 0.05$ ). Moreover, the mean score of general health disorder and its subscales in this group immediately and 1 month after intervention was significantly lower than before the intervention. However, there was no difference between the score of general health disorder and subscales immediately after the intervention and 1 month after the intervention ( $P > 0.05$ ). The nonsignificance of the difference in the score of general health disorder immediately after and 1 month after intervention in the control group means that the effect of intervention remains over time. Moreover, there was no difference between the mean score of general health disorder and its subscales in the control group before, immediately, and 1 month after intervention ( $P > 0.05$ ) [Table 2].

Moreover, the results of independent *t*-test showed that the mean of changes in general health disorder immediately and 1 month after the intervention in the experimental group was significantly higher than the control group ( $P < 0.05$ ) [Table 3].

### Discussion

The purpose of this study was to determine the effect of mindfulness on general health of patients undergoing hemodialysis. Experimental and control groups were matched in terms of age, sex, duration of hemodialysis treatment, marital status, and the cause of chronic renal failure. A review of the findings of the research shows that physical impairment of patients after intervention in the experimental group significantly reduced and 1 month after the intervention remained at the same level, but no significant changes were observed in the control group. In the same vein, the results of Carlson's study also confirmed that mindfulness training was effective in the health of people with chronic and life-threatening

diseases.<sup>[33]</sup> This result was also seen in a study that aimed to investigate the effect of mindfulness on the physical symptoms of asthma patients.<sup>[34]</sup> However, Cathcart *et al.* found that mindfulness had no effect on reducing the severe pain in patients with chronic headaches,<sup>[35]</sup> which is not consistent with the results of this study and it seems that the reason for this difference is the type of intervention of the two studies. In the above-mentioned research, in group mindfulness training has been performed, while in the present research, the focus has been more on individual mindfulness skills with more emphasis on individual characteristics of the patients.

Mindfulness skills have a significant effect on the reduction and recurrence of physical symptoms. Therefore, it seems that the training of mindfulness increases the attention of the individual toward physical emotions and its training makes the patient's mental and physical emotions organized and helps the sensation and acceptance of physical phenomena, as they happens, helps to improve the physical symptoms of patients.

Other findings of the present study indicated the effect of mindfulness immediately and 1 month after intervention on reducing the symptoms of anxiety and sleep disorders in the experimental group, which was not observed in the control group. These findings are consistent with the results of Hubbling *et al.*, who investigated the effect of eight sessions of mindfulness training on chronic insomnia<sup>[23]</sup> and Seidi *et al.*, who showed the effect bioremediation-based mindfulness on consciousness of apparent and hidden anxiety in patients with Type 1 diabetes.<sup>[36]</sup>

With this therapy method, the clients are helped to focus on the present moment and stop negative thoughts about the future and realize the fact that more than reflections of reality, these thoughts are that are false thoughts that lead to anxiety and insomnia. Mechanisms of mindfulness training, by benefiting from centralized breathing, is effective in regulating excitement and can

**Table 2: Comparison of mean general health disorder score and its subscales in the experimental and control group before, immediately, and 1 month after intervention**

Variable	Group	Mean±SD			Statistical test	
		Before the test	Immediately after the test	1 month later	F	P
Physical symptoms	Control	12.90±2.63	13±2.55	12.90±2.6	0.3	0.7
	Experiment	12.13±3.51	6.30±3.15	6.77±3.24	54.8	<0.001
Anxiety symptoms and sleep disorder	Control	12.50±3.25	12.63±3.41	12.20±3.28	2.7	0.08
	Experiment	12.8±3.35	6.7±3.57	7±3.44	31.45	<0.001
Social functioning failure	Control	11.80±3.827	11.87±4.032	11.67±3.863	0.63	0.54
	Experiment	12.13±4.3	5.67±2.9	6.20±3.02	40.1	<0.001
Signs of depression	Control	8.40±4.17	8.53±4.39	8.27±3.89	0.85	0.44
	Experiment	7.01±5.23	3.23±2.61	3.63±2.75	18.52	<0.001
General health	Control	45.60±9.93	46.03±10.128	45.03±9.747	3.6	0.04
	Experiment	44.17±12.32	21.9±6.04	23.60±6.11	70.2	<0.001

SD=Standard deviation

**Table 3: Comparison of mean changes in general health score immediately and 1 month after intervention to before the intervention in the experimental and control groups**

Group	Mean±SD		Independent t-test	
	Experimental	Control	t	P
Immediately after intervention compared to before the intervention	-22.27±10.79	0.43±1.48	11.41	<0.001
On month after intervention compared to before the intervention	-20.57±10.50	-0.57±1.87	10.27	<0.001

SD=Standard deviation

reduce anxiety and tension before sleep and lead to improved sleep conditions.

The results of this study showed that mindfulness intervention was effective in reducing the symptoms of depression in the experimental group and its sustainability. Kuyken *et al.* also found that patients who were trained in cognitive therapy skills based on mindfulness had less depression during the 60-week follow-up period than those in the control group, and interventions were more effective in patients with greater severity of depression.<sup>[37]</sup> However, in their research, Seidi *et al.* showed that bioinformational-based mindfulness had no effect on the depression of their patients,<sup>[36]</sup> and the reason for this difference seems to be the difference in the type of interventions and the use of different questionnaires.

In explaining the effectiveness of mindfulness training in reducing depression in patients, it is necessary to consider that in this method of treatment, people learn to experience positive emotions and stop negative attitudes. Mindfulness can help rid people of auto thinking, habits and unhealthy behavior patterns and thus play an important role in regulating behavior and helping reduce depression.

In the present study, mindfulness intervention showed positive effects on the subscale of the experimental group, social functioning failure, also showed a positive effect. These results are consistent with the findings of a study by Borjali where he aimed at assessing the effectiveness of cognitive-therapy based on mindfulness in parent-child conflict reduction.<sup>[38]</sup>

In general, the present study showed that 8 sessions of mindfulness intervention could improve the general level of health in patients in the experimental group and reduce the score of general health disorder. Moreover, the continuation of the effect of this technique 1 month after the intervention was proved. This is in line with

the results of Kazemian, in which the positive effect of cognitive-therapy based on mindfulness was confirmed on the improvement of the general health of drug addicts.<sup>[39]</sup> Moreover, this finding is in line with the results of research aimed at evaluating the effectiveness of mindfulness training in general health of mentally retarded patients carried out by Shirazitehrani and Gholamrezaee.<sup>[40]</sup>

Mindfulness training reduces unconscious feelings and increases awareness of psychological and physical emotions and helps to clearly see and accept the emotions and physical phenomena as they occur; thus, it can have an important role in addressing general health disorder of patients. Mindfulness training helps individuals modulate their negative attitudes and behaviors and lead to positive health-related behaviors.

## Conclusions

This study was able to reduce physical, depression, sleep disorder, impaired social function, and social relationships of the patient, especially with the family, compared to before the intervention, and improve the patient's condition using the techniques of focusing on the present moment. The findings of this study in five general health dimensions indicated the sustainability of the effect of mindfulness training and given the sustainability of its effects, this technique can be used as a useful and nonpharmacologically effective treatment.

## Research recommendations and limitation

The small size of the sample and the short duration of the follow-up are among the limitations of this research; therefore, it is recommended that future researchers conducted research on larger samples and follow-up 6 months and 1 year after the intervention.

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## Conflicts of interest

There are no conflicts of interest.

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