

The effects of acupressure on severity of depression in hemodialysis patients: a randomized controlled Trial

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ABSTRACT

Background: Depression is the most common mental health problem in hemodialysis patients that can have a negative impact on patients' quality of life. This study aimed to determine the effect of acupressure on severity of depression in hemodialysis patients. **Materials and methods:** This study is a randomized clinical trial. 96 hemodialysis patients in hemodialysis wards of Noor, Shariati, and Al-Zahra Hospitals were selected by convenient sampling method and After random assignment with minimization method, 32 patients were included in each group (intervention, placebo, and control). Data collection tools included a demographic questionnaire and Beck Depression Scale. Acupressure in the intervention and placebo groups was performed over 4 consecutive weeks, 3 times a week, each session lasting 20 minutes during the first 2 hours of dialysis at 6 acupressure points (SP6, ST36 GB34, K1, BL23 and HT7) with this difference that in the placebo group intervention was performed with one centimeter distance away from the true points. The control group received usual care. For data analysis, descriptive statistics, inferential (Analysis of covariance and LSD) and SPSS software version 21 was used. **Results:** ANCOVA showed a significant difference in the mean score of depression's severity in the intervention group ($P=0.001$), but no significant difference in the mean score of depression's severity in placebo and control groups ($P=0.22$). **Conclusions:** This study showed that acupressure reduced the severity of depression in hemodialysis patients and the use of this drug-free approach is suggested to hemodialysis nurses.

Keywords: Acupressure, depression, renal dialysis, iran, nursing

Introduction

End stage renal disease (ESRD) is a stage of chronic renal failure that can be fatal without renal replacement therapies. Incidence of ESRD is reported 330 in the United States and 253 cases per one million people per year in Iran. ^[1] The most common treatment for kidney failure is hemodialysis.^[2] Although

hemodialysis, as treatment of chronic renal failure, increases the patients' lifetime, it also creates many psycho-social problems in them.^[3] Once ESRD patients realize that they need to undergo hemodialysis for a long time, they start facing emotions such as denial, anxiety, depression, and suicidal tendencies.^[4] Depression is the most common psychological complication in patients undergoing dialysis, which is usually an imaginary reaction or real lacks, such as the loss of jobs, income, energy, sexual abilities, freedom, and life expectancy.^[5] Depression can negatively affect quality of life, treatment compliance, and the disease process.^[6] It also increases mortality rate and worsens the prognosis and increases risk of hospitalization in patients.^[7] The prevalence of depression among patients in Iran is between 50 to 80 percent.^[8] The prevalence of hemodialysis patients experiencing depression in Brazil 9.9%, New York 20%, Burkina Faso 86.4%, Poland 46%, Taiwan 35%, Turkey 10%, Senegal 57.8%, Australia 20%, Canada 34.1%,

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Lebanon 50% , Hungary 46% and india 72.3%^[9-20] have been reported. Antidepressant drugs and shock wave therapy are commonly used for the treatment of depression, but these drugs and methods have unpleasant adverse effects .Electroconvulsive therapy leads to risks such as seizures and amnesia during the treatment period.^[21] It is presumed that acupuncture and acupressure therapy are more tolerable for the treatment of depression than antidepressant drugs.^[22] Depression is one of the indications for using complementary medicine. Patients are turning to complementary medicine due to the low adverse effects, high efficacy, and dissatisfaction with conventional treatments.^[23] Acupressure is derived from acupuncture and the same acupuncture points are pressed with fingers.^[24] Acupressure is a safe procedure with no side effects and can be done by the nurse, patient or another person; it neither required specific equipment nor incurs additional cost and only requires trained hands and good skills with fingers.^[4] A systematic review and meta-analysis by Stub and colleagues showed that acupuncture reduces the severity of depression and emphasized the need for more precise trials for using acupuncture in clinics.^[24] Also, the meta-analysis study by Smith et al., suggested that there is insufficient evidence on the use of acupressure and acupuncture and to prove that they are more effective than the placebo and routine care; more studies with high quality methodology are required.^[25] The results of the pilot study by Chang and colleagues provided initial support for the effects of electrical stimulation of acupuncture points on the severity of depression, but future studies with large sample size, long-term intervention, biological measurements, and a stronger research design is needed.^[26] This study is aimed to investigate the effects of acupressure on the severity of depression in patients undergoing long-term hemodialysis.

Materials and Methods

This study is a clinical trial registered in Iran's Clinical Trials Registration System (IRCT2015070523044N2). The current study is a randomized clinical trial and double blind (participants, those assessing outcomes), which recruited all those patients with end stage renal failure who were undergoing long-term hemodialysis in three hemodialysis centers at Noor, Al-Zahra, and Shariati hospitals in 1 november until 28 november 2011. The patients were selected based on convenient sampling method according to the inclusion criteria. Details of the research protocol, objectives, and conditions were explained to patients and those who were willing to participate were enrolled into the study. The inclusion criteria included patients over 18 years of age, diagnosed with ESRD, undergoing hemodialysis for at least three months, had no wounds or fractures at the acupressure points, patients with a Beck Depression score of higher than 10, mental and psychological ability to participate in research and respond to the questionnaire, and did not use any complementary medicine during the last three months. The non-inclusion criteria comprised patients with lower extremity amputation, Patients with unstable physiological symptoms, high creatinine and high

urea, patients with suffering from acute mental and psychological problems for the past six months. The exclusion criteria consisted of the absence of patient during two sessions and the unwillingness to continue participation in the study. Enrolling 96 patients into the three groups – intervention, placebo, and control – was randomly performed using the minimization method. The sample size estimated for each group 32 patients by this Formula $n = \frac{(Z_1 + Z_2)^2 (2S^2)}{D^2}$ and The power was 80%, alpha = 0.05 and d = 0.7s.

For After random assignment, 32 patients were included in each group - intervention, placebo, and control [figure 1]. To gather the data, a two-part checklist was used; the first part included the demographic information, such as age, sex, education level, marital status, employment status, and cause of the disease and the second part included the Beck Depression Score. This scale was given to all patients before and after the intervention to determine the severity of depression.^[4] The Beck Depression questionnaire consists of 21 questions that review severity of depression and participants should mark a score to each question from zero to three based on a four-point Likert scale. Adding up the individual's scores in each category, the person's total Beck Depression score will be directly obtained. In this test, the minimum score is zero and the maximum is 63. Depression severity is defined based on the obtained points: (1–10) normal, (11–16) mild depression, (17–20) mild depression needing counseling, (21–30) moderate depression, (31–40) severe depression, and (41–63) excessive depression.^[27] validity of the Beck Depression questionnaire was 0.72 and Reliability was 0.83. The acupressure was applied to intervention and placebo groups in the first two hours of hemodialysis^[28] to both the legs, both the arms, and the back in patients who underwent hemodialysis regularly three times a week for continuously for 4 weeks by male (for manipulating male patients) and female (for manipulating female patients) researcher.^[4] In the intervention group, the main acupressure points included SP6, ST36 GB34, K1, BL23 and HT7.^[28] Each session lasted 20 minutes; 2 minutes for the primary surface stroke to relax the solidity^[4] and the remaining 18 minutes for pressing the six points (3 minutes for each point).^[28] The intervention in the placebo group was applied within one cm of the original acupressure points.^[4] The researcher and his colleagues were trained under the supervision of the project's mentor. The research was started only after the approval by a qualified and trained acupuncturist. Determining the acupressure points was approved by the acupuncturist and the amount of pressure at each point was based on a standard scale of 20 g to 6 kg. The reliability of the pressure applied by both hands of the researchers was confirmed to be 100% accurate repeating the pressure 40 times repetition, with an average of 3–4 kg on the standard scale. Statistical analysis of data was performed using the SPSS software (Statistical Package for the Social Sciences, version 21.0, SPSS (Inc., Chicago, Illinois, USA). To evaluate normal distribution of the variables in the study, we applied the Kolmogorov-Smirnov test. The data of this study were quantitative (discrete–continuous) and qualitative (name–rank) and for analysis descriptive statistics (frequency,

percentage, and standard deviation), inferential analysis (covariance analysis and LSD).

Ethical considerations

This study was conducted in full compliance with the requirements of the Declaration of Helsinki regarding the use of human subjects. At all stages of the study, the researchers precisely observed ethical principles. After explaining the goals and importance of the study and lack of complications for the patients under intervention, written informed consent was obtained from all patients. They were also informed that they could leave at any stage of the study. Also, after the completion of the research, the participants in the control group were provided with acupressure intervention. The research protocol was approved by the research ethics committee of Isfahan University of Medical Sciences (ethical code: IR.MUI.REC.1390.3.303).

Results

96 patients were enrolled in the study. The mean age of patients in the intervention group was 53.4 ± 13.9 , in the placebo group 55.4 ± 11.5 , and in the control group 54.3 ± 13.4 . In the three groups, 14 (43.75%) were female and 18 (56.25%) male. The highest percentage of unemployment (50%) and retirement (40.6%) was in the control group and the highest rate of illiteracy (31.3%) was in the intervention group. Most married patients were in placebo and control groups (87.5%) and the most common cause of illness in the intervention group was diabetes in 11 patients (34.4%), hypertension in 14 patients (43.8%) in the placebo group, and diabetes in 12 patients (37.5%) in the control group. There were no significant differences between baseline demographic characteristics between the three groups. As the results of (Table 1) shows, the pre-test mean scores of depression's severity in the intervention group (27.5), in the placebo group (25.7), and in the control group (24.6) were not significantly different. But there was a significant difference in the post-test scores of depression severity between intervention (20.6), the placebo (25.5) and the control groups (24.9), but no significant difference was observed in the score of depression severity between the placebo (25.5) and control groups (24.9). The F value of Levene test was not significant at 0.05 for all variables. Thus the null hypothesis is not rejected and the test is not valid and a significant difference was observed between the pre-test variances of the intervention, placebo, and control groups. Then, equality assumption of variances of scores of in the intervention, placebo, and control groups in the studied variables was confirmed and the homogeneity of variances was met. Thereby, we were permitted to continue analysis and perform the analysis of covariance. In order to compare the distribution of the resulting data of the research with normal distribution, Kolmogorov–Smirnov test was used. According to data from the table above, with an emphasis on the obtained z, it was not significant for the variables at 0.05. So it can be concluded that the distribution of the data related to research

questions was normal. The normal assumption of data was met and we used the ANCOVA. The F value of the pre-test score of the severity of depression in patients undergoing hemodialysis was 2916.305, which is statistically significant at 0.01. This shows that if the mean was not adjusted, there is still a significant difference between them. Also, after adjustment, this difference is significant. So, difference of means is significant without and with adjustment. That means that another assumption, the correlation of control and independent variable, is considered. Also, the between-group F value with pre-test control was 227.717, which is statistically significant. In other words, there is a significant difference between the group that received acupressure treatment (intervention group) and the group that did not receive acupressure treatment (control group) or has received treatment at a location away from the main acupressure points (placebo) (post-test $F=227.717$ with significance level of $p=0.001$). Also, Eta square (η^2) shows that the amount of shared variance or Eta square is calculated at 0.832; in other words, by removing the effect of pre-test from post-test scores, 83% of the reduction in the severity of depression in patients undergoing hemodialysis was related to the effectiveness of acupressure (performance and effect of the independent variable) and the difference between them. Statistical power (Observed Power) is also calculated at 1, meaning that there is no possibility of a Type II error or probably there was an error of judgment in the null hypothesis. So, it can be concluded that there was significant difference between scores of severity of depression severity in patients undergoing hemodialysis in the intervention, placebo, and control groups with 99% confidence. This difference is in favor of the intervention group as the depression scores decreased after the acupressure treatment. Based on the above findings, the research hypothesis (acupressure is effective on the severity of depression in patients undergoing hemodialysis) is confirmed.

As (Table 2) shows, Mean difference in scores of severity of depression in patients undergoing hemodialysis in the intervention group compared with placebo and control groups was at significance level of 0.01, which was in favor of the intervention group in decreasing the severity of depression after acupressure treatment. So it can be concluded that there was a significant difference in the severity of depression scores between patients undergoing hemodialysis in the intervention, placebo, and control groups with 99% confidence. This means that acupressure could have a significant impact on the severity of depression score in patients undergoing hemodialysis.

Discussion

The results of this study showed that acupressure significantly reduces the scores of severity of depression of patients in the intervention group, but no significant difference was observed in placebo and control groups. These positive results may be related to the regulation of neurotransmitters, function of hormones, and the nervous system by the continuous fingertip pressure on the acupressure points that has improved

depression score.^[29] The effect of acupressure treatment is due to imitation effects of serotonin and opiates which balance the performance of the physical and mental status.^[30] Acupressure may play an important role in improving the mental health of patients. Improving the mental health will improve the quality of life and reduce the adverse effects associated with mental illness and the distress experienced by patients undergoing hemodialysis.^[31] The results of the study by Zadkhosh and colleagues showed that massage in young wrestlers reduces the severity of depression, stress, and anxiety after the intervention compared to before the intervention, which is consistent with the current study.^[32] The results of Bragmann and colleagues showed that acupressure treatment to patients with ischemic heart disease reduced the depression score compared to the group undergoing normal routine care, which is consistent with the present study.^[33] The study by and Valiee et al. showed that acupressure and placebo similarly reduced patients' stress before surgery, which is consistent with the results of the current study, but is inconsistent with the effect of acupressure in placebo group. The choice of points, the implementation method, and the amount of pressure applied, and the number of times acupressure is applied can change the effects of treatment. There is a possibility that the placebo group can change the acupressure points while undergoing self-treatment at home and cause positive effects on the study results.^[34]

Molassiotis and colleagues assessed the effect of acupressure on mental fatigue, in which improvement in the severity of mental fatigue was observed in all groups of undergoing acupuncture, acupressure, and the placebo group, but the difference was not statistically significant between the three groups. These findings are inconsistent with the results of the current study. The reason for this difference may be the impact of psychological factors that made a difference, even in the control group.^[35] In the study by Zick and colleagues on the effect of acupressure on fatigue in patients suffering from cancer, the results showed no significant difference in fatigue scores between active acupressure treatment group and the placebo group, which is incompatible with the current study. This is possibly due to differences in the acupressure points, the number of intervention days, psychological effects of examiner, and the scale used.^[36] The results of Lan et al showed that acupressure can reduce fatigue in patients suffering from cancer of the liver in the real group than in the control group, but there was no significant difference in reduction of the score of severity of depression between the two groups, which is incompatible with the present study.^[37]

Conclusions

The results of this research showed that considering the problem of depression in patients undergoing hemodialysis, this non-invasive, inexpensive, trainable, free of adverse effects method can be used to reduce patients' depression. Thus, this method of alternative medicine is recommended to hemodialysis nurses in order to reduce the severity of depression in these patients.

Limitations of the study

Lack of long-term follow-up of patients, the possibility of manipulating the acupressure points at home by the patients

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Table 1: Central and distribution index of depression scores of hemodialysis patients before and after intervention in three groups of intervention, placebo, and control

Group	number	Before intervention		After intervention	
		Mean	Standard deviation	Mean	Standard deviation
Intervention group	32	27.5	9.1	20.6	8.6
Placebo group	32	25.7	7.7	25.5	7.6
Control group	32	24.6	8.6	24.9	8.4

Table 2: Tukey's follow-up test to further evaluate the difference in mean scores of severity of depression in patients undergoing hemodialysis patients in the intervention, placebo and control group

Group			Mean difference	Standard error	P value
			Intervention	Placebo group	-6.539
	Control group	-6.989	1.551	0.001	
Placebo	Intervention group	6.539	1.551	0.001	
	Control group	-0.45	1.551	0.220	
Control	Intervention group	6.989	1.551	0.001	
	Placebo group	0.45	1.551	0.220	

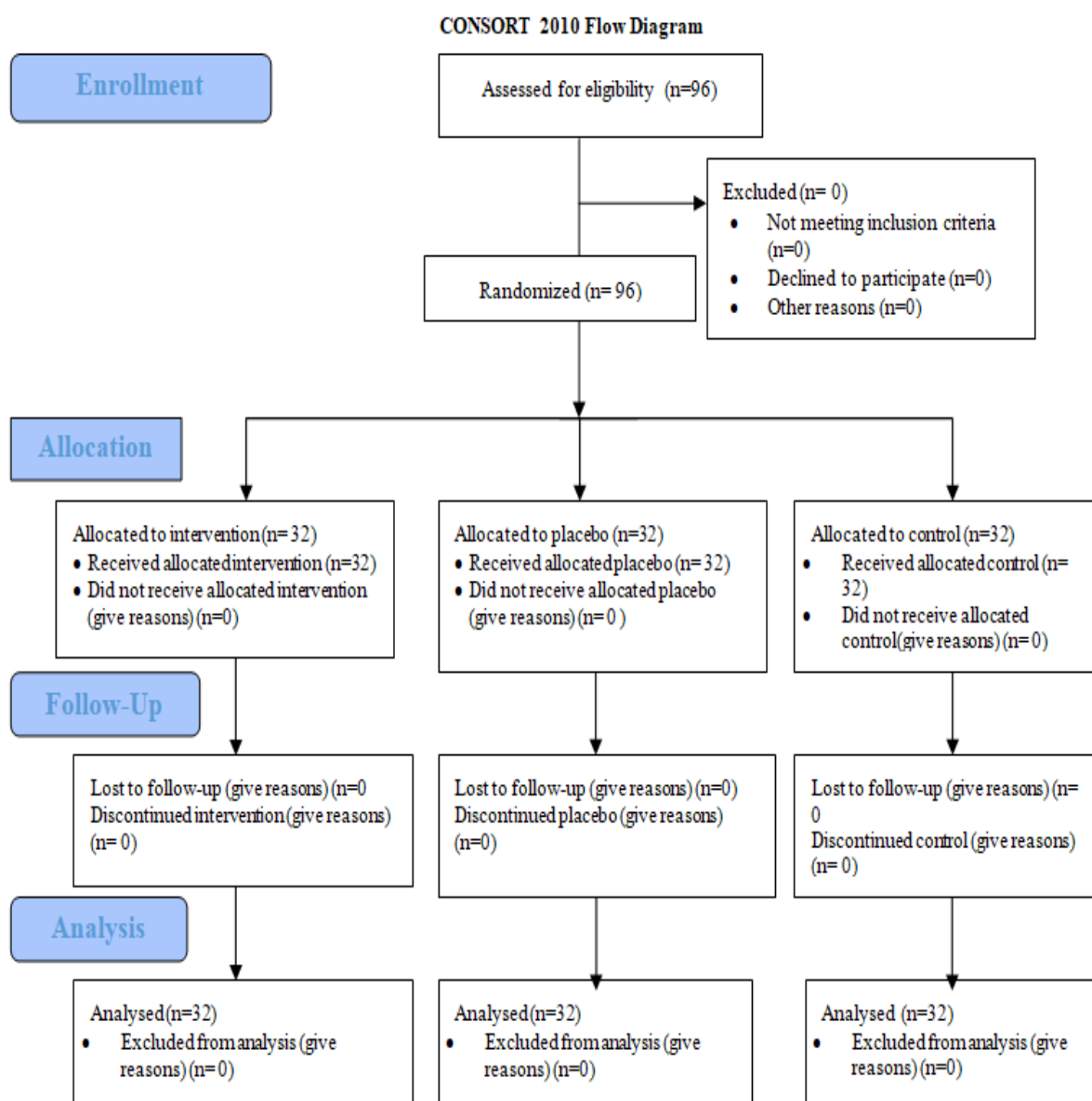


Figure 1: Patient groups