

Original Article

The Effect of Humor on Anxiety in Patients Receiving Hemodialysis: An Open-label, Randomized Trial

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ABSTRACT **Background:** Patients receiving hemodialysis experience high levels of anxiety and stress. **Objectives:** This study aimed to examine the effect of humor on anxiety in patients receiving hemodialysis. **Methods:** This open-label, randomized, controlled trial was conducted in 2018, on 63 patients receiving hemodialysis in Sabzevar, Iran. The participants were randomly assigned to an intervention and a control group using a permuted block randomization method. The intervention group participated in humor therapy sessions twice a week for 3 weeks. The control group received no intervention. Data were collected using Spielberger's State-Trait Anxiety Inventory (STAI) before and 3 weeks after the intervention. Data were analyzed using the independent samples and the paired *t* tests. **Results:** The mean age of the participants was 61.85 ± 7.93 and 54.61 ± 5.89 in the intervention and control groups, respectively ($P = 0.217$). The mean baseline and posttest trait anxiety (TA) scores were not significantly different between the two groups ($P = 0.152$ and 0.170 , respectively). Also, the mean baseline scores of state anxiety (SA) in the intervention and the control groups were 48.45 ± 14.21 and 47.28 ± 15.12 , respectively ($P = 0.133$). However, after the intervention, the mean score of SA decreased to 27.45 ± 16.65 in the intervention group ($P < 0.001$), but this score increased to 49.43 ± 15.42 in the control group ($P = 0.227$). **Conclusion:** Humor therapy was effective in reducing SA. Hence, nurses working in hemodialysis departments are advised to use humor therapy as an easy, low-cost, and effective complementary therapy to reduce patients' anxiety during a hemodialysis session.

KEYWORDS: Anxiety, Hemodialysis, Humor therapy

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INTRODUCTION

Patients with chronic kidney disease (CKD) face high levels of psychological stress due to long-term and sometimes lifelong need for dialysis, treatment costs, dietary restrictions, physical activity limitations, fatigue, body image distortion, and medication restrictions.^[1] Patients receiving hemodialysis often feel anxious about death, pain, complications, and the absence of family and friends during hemodialysis.^[2,3] Severe anxiety affects self-care behaviors and increases the mortality rate.^[4,5] Due to the side effects of anxiolytic medications and medication restrictions faced by hemodialysis patients, these patients prefer not to use medications for their anxiety.^[3] Nursing interventions such as humor therapy are more easily accepted by patients.

Humor-based interventions affect people's biological, cognitive, psychosocial, physical, and spiritual aspects.^[6] Studies have shown the positive effects of laughter and humor on happiness,^[7] depression, anxiety, quality of sleep,^[8] and physical and mental health.^[9] Laughing enhances respiration, blood flow, and mental function, and also reduces pain, decreases stress hormones,^[10] improves blood pressure, boosts the immune system, and eventually improves the quality of life.^[11] It also acts as a relief valve to release energy and relieve the human mind. A surge of pent-up emotions could happen in the absence of laughter which increases the risk of mental disorders.^[12] However, a study revealed laughter failed to significantly reduce stress among students.^[13] A review study also concluded that there is insufficient knowledge about the health benefits of laughter in patients receiving hemodialysis.^[14] Therefore, the question remains whether humor and laughter can reduce anxiety in patients receiving hemodialysis?

Objectives

This study examined the hypothesis that humor therapy reduces anxiety in patients receiving hemodialysis.

METHODS

Study design and participants

This open-label, randomized, parallel-group trial was conducted from March to April 2018 on 63 patients receiving hemodialysis at Mehr Hemodialysis Clinic in Sabzevar, Iran. Inclusion criteria included age between 18 and 65 years, receiving hemodialysis treatment every second day (three times a week), hemoglobin levels of at least 7 mg/dL, and having no known neurological disorders based on the patient's history and medical records. Subjects who refused to take part in the study, missed at least one humor therapy

session, had hemoglobin levels less than 6 mg/dL and creatinine levels above 5 mg/dL, underwent kidney transplantation, peritoneal dialysis, or died during the study were excluded.

The sample size was calculated based on a pilot study on 20 patients where the patients' baseline score of state anxiety (SA) was 49.00 ± 15.40 and changed to 37.90 ± 14.50 after six sessions of humor therapy. Then, using the formula for the comparison of two means, and given the type I and II errors of 0.05 and 0.80, respectively, with a μ_1 of 49.00, μ_2 of 37.90, δ_1 of 15.40, and δ_2 of 14.50, and considering a possible dropout of 10%, the sample size in each study group was estimated at 35:

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (\delta_1^2 + \delta_2^2)}{(\mu_1 - \mu_2)^2}$$

Eligible subjects were allocated to either an intervention or a control group (ratio 1:1) using permuted block randomization with blocks of size 4. A random allocation software was used by a third party (not involved in the process of the study) to generate the random sequence. As patients were informed of the intervention, blinding was not possible.

Data collection instruments

A demographic data sheet and the State-Trait Anxiety Inventory (STAI) were used to obtain data. STAI consists of two self-report subscales to measure state and trait anxiety (TA).^[15] The SA subscale consists of 20 items that measure the emotions people feel at the time of answering the questions. The TA subscale also includes 20 items that assess people's general emotions. The items are graded on a 4-point Likert scale from 1 to 4. Each subscale produces a score ranging from 20 to 80. The higher the score, the higher the anxiety level. A score of 20 was set as the cut-off point.^[15] Scores ≤ 39 , 40–45, and ≥ 46 are regarded as mild, moderate, and severe anxiety, respectively.^[16] The validity and reliability of the STAI have been confirmed in former studies.^[17,18] Its Cronbach α was calculated at 0.93 in this study.

Intervention

Baseline assessment was conducted on the first day of the trial, an hour before the hemodialysis session. Then, for a month, the intervention group received 120-min humor sessions twice a week, during the hemodialysis sessions. The sessions were held in groups rather than individually. All humor therapy sessions were led by the corresponding author who had previously been in charge of similar sessions. With the agreement of

the concerned physician and the chief nurse, patients in the humor therapy and control groups were randomly assigned to even and odd days of the week for hemodialysis treatment. Each patient received hemodialysis three times a week.

Humorous videos and stories were used in this study.^[19] Each session was divided into three parts: (a) funny images (cheerful musical illustrated slides) and video clips (60 min), (b) joyful competition rewarded with funny prizes (30 min), and (c) telling jokes (30 min). Funny games such as chair games and tooth painting (called Duchenne smile, a technique that makes the person laugh) were also included in each session. All video clips were selected from the talk shows hosted by a well-known Iranian comedian. The head of the hemodialysis ward, the nurses, and the patients were all asked to tell jokes or participate in the competitions, which created an active and friendly atmosphere between nurses and patients. In the intervention group, the humor therapy sessions were performed for 3 weeks in six sessions during hemodialysis. The control group only received routine care, such as hemodialysis and monitoring. Following 3 weeks of intervention in the presence of the researcher, the subjects were asked to complete the STAI again.

Ethical considerations

This study was approved by the ethics committee of Sabzevar University of Medical Sciences (code: IR.MEDSAB.REC.1397.063) and was registered at the Iranian Registry of Clinical Trials with the number: IRCT20131113015393N4. The participants were first briefed on the study's objectives and process. Forms of informed consent were collected. Patients were informed that their participation in the study is entirely voluntary, they could withdraw from the study at any time, and that the withdrawal would not affect their treatment. Subjects were assured of data confidentiality, and ethical considerations were contemplated. To comply with ethical concerns, after data collection and the conclusion of the study, the control group received the same humor therapy sessions as received by the intervention group.

Data analysis

Continuous and categorical data were summarized as mean \pm standard deviation (SD) and n (%), respectively. Initially, normality was checked using the Smirnov–Kolmogorov test. The independent samples t test was used to compare anxiety levels between the two groups and the paired t test was used to compare the anxiety scores before and after the intervention. Data

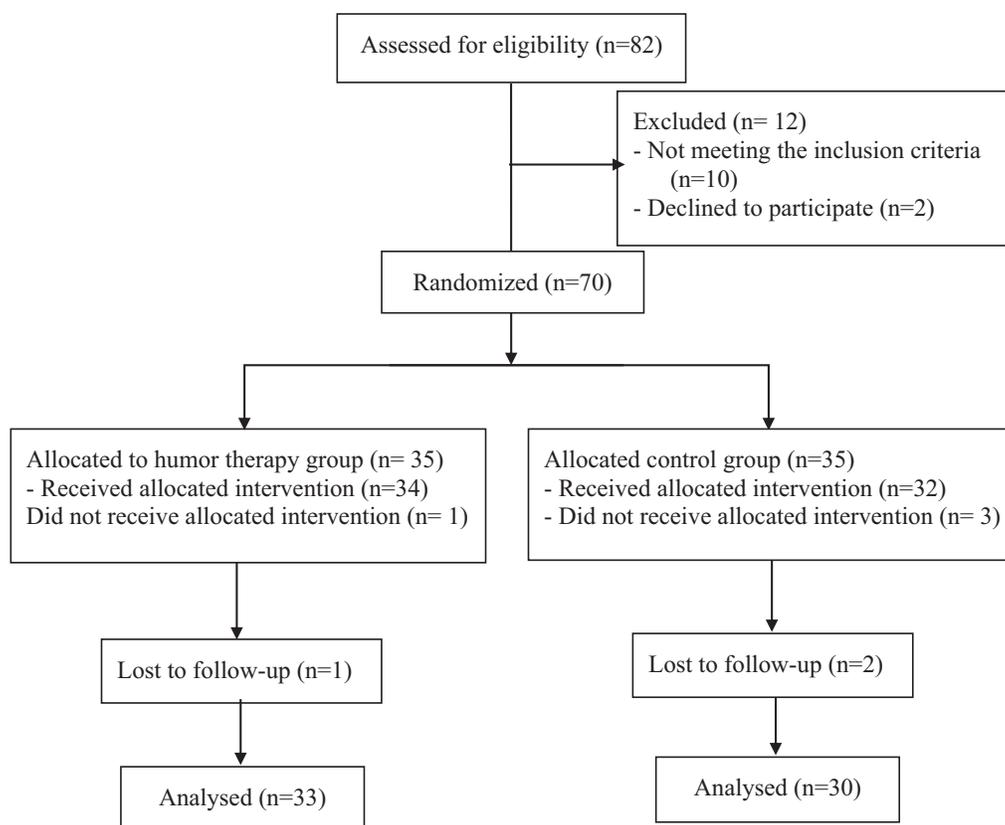


Figure 1: Flow diagram of the trial

were analyzed using Statistical Package for the Social Sciences (SPSS) software program, version 16.0 (SPSS, Chicago, Illinois), and the significance level was set at $P < 0.05$.

RESULTS

Totally, 33 subjects in the intervention group and 30 ones in the control group completed the study [Figure 1]. The mean age of the participants was 61.85 ± 7.93 and 54.61 ± 5.89 in the intervention and control groups, respectively ($P = 0.217$). Of the participants, 50.6%, and 58.4%, were men and 80.6% and 89% were married in the intervention and control group in turn. The two groups were homogenous in their baseline characteristics [Table 1].

The mean baseline and posttest TA scores were not significantly different between the two groups ($P = 0.152$ and 0.170 , respectively). Also, the mean

baseline scores of SA in the intervention and the control groups were 48.45 ± 14.21 and 47.28 ± 15.12 , respectively ($P = 0.133$). However, after the intervention, the mean score of SA decreased to 27.45 ± 16.65 in the intervention group ($P < 0.001$), but this score increased to 49.43 ± 15.42 in the control group, although this change was not statistically significant ($P = 0.272$) [Table 2].

DISCUSSION

All patients in this study suffered from severe SA before the intervention. Such anxiety might be attributable to painful injections with thick needles, check-up results, length of the treatment, chronic fatigue, decreased energy due to hemodialysis, and a variety of other factors. However, this study revealed a significant reduction in the mean SA of the intervention group following 3 weeks of humor therapy. A study also reported that 30 min, weekly laughter therapy sessions could reduce depressive symptoms in patients receiving hemodialysis, but did not significantly affect their anxiety levels.^[20] The discrepancy may be related to methodological differences, as our humor therapy sessions were more frequent, longer, and more diverse than those in the latter study. Nonetheless, a former study of 34 hemodialysis patients found that watching humorous videos increases the feelings of happiness and humor and decreases the depressive symptoms.^[19] A meta-analysis also concluded that laughter therapy can reduce patients' anxiety, regardless of the duration and frequency of sessions.^[21] A study also examined the effect of laughter yoga in patients receiving hemodialysis and reported that the patients experienced better moods and lower levels of stress and anxiety after the intervention.^[22] Although these findings are consistent with our findings, laughter yoga requires more expertise and might be more difficult to be implemented during a hemodialysis session.

Table 1: Baseline characteristics of the two groups

Parameter	Group ^a		P Value ^b
	Humor therapy	Control	
Education			0.344
Illiterate and primary	5 (15.5%)	4 (13.3)	
Secondary and high school	21 (63.6)	16 (53.3)	
University	7 (21.2)	10 (33.3)	
Age, years	61.85 ± 7.97	54.61 ± 5.89	0.217
Disease history, months	44.51 ± 29.49	35.15 ± 26.82	0.119
Dialysis history, months	40.52 ± 29.49	32.36 ± 26.98	0.451
Hemoglobin, g/dL	7.05 ± 1.49	8.22 ± 2.06	0.098
Creatinine, mg/dL	5.26 ± 1.61	4.44 ± 1.50	0.528
BUN, mg/dL	30.14 ± 8.67	26.22 ± 7.74	0.144

^aData presented as *n* (%) or mean \pm SD

^bIndependent *t* test or chi-squared test

Table 2: Comparison of the trait and state anxiety scores before and after humor therapy in the two groups

Anxiety score	Groups (mean \pm SD)		P Value ^a
	Humor therapy	Control	
Trait anxiety			
Before intervention	45.32 ± 6.22	40.33 ± 5.46	0.152
After intervention	44.45 ± 7.44	42.13 ± 5.74	0.171
P Value ^b	0.154	0.264	–
State anxiety			
Before intervention	48.45 ± 14.21	47.28 ± 15.12	0.133
After intervention	27.45 ± 16.65	49.43 ± 15.42	0.001
P Value ^b	0.001	0.272	–

^aIndependent *t* test

^bPaired *t* test

Both groups in this study showed moderate baseline TA which did not significantly change during the study. The moderate TA of the patients might be attributable to their CKD and chronic hemodialysis treatment. Inconsistent results are available about the effect of humor therapy on TA. Some studies have reported the positive effects of humor on overall anxiety scores including the SA and TA.^[23,24] However, a study reported that humor videos could significantly reduce the levels of SA but not the TA. The latter study concluded that TA is mostly associated with the type of thoughts and attitudes that might not be easily and profoundly affected by humor therapy sessions.^[25] During an anxious state, the adrenal glands release corticosteroid hormones, which are converted to cortisol. Humor therapy seems to be a relatively rapid cortisol-lowering technique that allows patients to release their immediate anxious thoughts and induce an immediate positive emotional state.^[26] Therefore, humor therapy would likely be more effective in treating SA. However, alleviation of TA might need further interventions such as psychoanalysis, counseling, and long-term environmental changes.

As a strength, this study attracted the interest and participation of both patients and nurses. The patients may have been interested in humor therapy because they felt a huge gap in Iranian culture and needed a positive change from the monotonous routine hemodialysis treatment.

One of the limitations of this study is the patients' individual differences, including their sense of humor. Furthermore, due to the nature of the intervention, it was impossible to blind the intervention group. Nurses' participation in the humor therapy sessions may also have influenced their overall performance on the days they cared for the control group. However, the lack of a significant difference in the control group indicates that the nurses' usual conduct in the control group was not actually affected.

CONCLUSION

This study showed that humor therapy as a nonpharmacological treatment was effective in reducing the SA in patients receiving hemodialysis. Therefore, nurses working in hemodialysis departments are advised to use humor therapy as an easy, low-cost, and effective complementary therapy to reduce patients' anxiety during a hemodialysis session.

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Conflicts of interest

There are no conflicts of interest.

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