

The efficacy of relaxation training on stress, anxiety, and pain perception in hemodialysis patients

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ABSTRACT

Patients on dialysis experience psychological distress, which can impact pain perception. Reduction of stress and anxiety in patients provides psychological resources to cope with their physical condition. We examined the efficacy of relaxation training on stress, anxiety, and pain perception of hemodialysis (HD) patients. eighty HD patients were randomized into two groups (intervention and control). Benson relaxation training was implemented in the intervention group for 15 min twice daily during 4 weeks. Pain perception, stress, and anxiety scale were evaluated before and after intervention. There were significant differences between pain perception, stress, and anxiety levels in case group before and after intervention ($P < 0.001$) and there was a correlation between pain perception with stress and anxiety. Instructing Benson's relaxation technique is accompanied by reducing pain, stress, and anxiety level of HD patients. Reducing stress and anxiety can provide calmness for the patients so that pursuing medical therapy would be accompanied with more tranquility and low pain intensity. We suggest improving and preventing the patients' psychological problems as well as other chronic disorders through applying nonpharmacological interventions.

Key words: Anxiety, Benson's relaxation, pain perception, stress

Introduction

Chronic renal failure is a progressive and irreversible destruction of renal function.^[1] Dialysis is a stressful process and follows various psychological and social problems, which can lead to psychological disturbances. Long term hemodialysis (HD) patients suffer from physical and mental stresses and experience serious changes in lifestyle and personality.^[2] The prevalence of psychiatric hospitalization among patients who are on dialysis therapy is 1.5-3 times higher compared with other chronic diseases and adversely affects the quality of life.^[3,4] In several studies, the high prevalence of psychological disorders has been reported. For example,

Mollahadi *et al.*, have reported that 63.9% of HD patients had anxiety, 60.5% had depression, and 51.7% had stress.

A variety of conditions have been reported including suicide ideation,^[5] depression, anxiety, sexual disorders, interpersonal problems, paranoia, physical complain, compulsive disorders, psychoses, aggression, and phobia, the prevalence and intensity of these problems among HD patients is not uniform.^[5] Navidian *et al.*, revealed 10% of HD patients had a history of psychiatric disorders while this was only 2.5% in the general population.^[6]

Stress refers to the consequence of the failure of a person to cope with emotional or physical threats.^[7] Mental health is directly related to perceived stress.^[8] Inappropriate coping in HD patients decreases quality-of-life^[9] and lead to physical, mental, economic, social, and emotional problems.^[10] On the other hand, these patients suffering from considerable pain. The potential sources of pain are numerous and varied, including such things as diabetic neuropathy, vascular access surgery, and degenerative joint disease associated with age. These sources also range from being chronic to acute conditions. It is known that the presence of chronic pain impacts upon the quality-of-life and can play a major role in the comorbidity of anxiety and depression.^[11] Pharmacological methods are costly and may lead to complications. Nonpharmacological techniques as complementary methods can lead to

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improvement in a shorter time.^[12] Relaxation is one of the most useful nonpharmacological techniques,^[13,14] which reduce stress through impact on mental and physical conditions, depression, mood, anxiety, and self-esteem.^[15] Among relaxation methods Benson's relaxation method (1970) is one of the easiest to learn and administer.^[16] Despite the importance of reduction of stress and anxiety among HD patients, there is no data on the impact of nonpharmacological methods on pain especially relaxation in HD patients in Iran. This study was designed to evaluate the impact of Benson's relaxation method of stress reduction of HD patients in Iran.

Materials and Methods

Sampling

The present research was a randomized trial. The study population included all HD patients from Imam Khomeini and Fatemeh Zahra Hospitals in the Mazandaran city during 2011, which meet the inclusion criteria ($N = 138$). This study was approved by the Ethics Committees of Mazandaran Medical Science Universities. Eighty eight patients were selected randomly out of 138 patients based on a random number table. The samples divided into two groups: Experimental ($N = 44$) and control ($N = 44$) randomly through numbered table. Sampling was parallel the first eligible patients assigned randomly in the intervention group and the next one in the control group. This process applied to all samples. All samples who met inclusion criteria were selected and assigned randomly and had the same chance of participation. Sample selection was done during the week at 3 times, morning, afternoon, and evening.

The inclusion criteria were: Age range between 18 and 65; dialysis history at least 2 months; no comorbidity with other chronic disease such as cancer, heart disease, etc., (diabetes and hypertension were included). Exclusion criteria were unwillingness of a patient, physical disability, regular tranquillizer or sedative drugs; had a previous history of psychiatric disorders, suffered from stress other than dialysis in the past 6 months, incomplete training (below 55 sessions) and peritoneal dialysis or a kidney transplant. Sample size calculation was based on the pilot study as follows:

$$n = \frac{(Z_1 - \frac{\alpha}{2} + Z_1 - \beta)^2 \times (\delta_1^2 + \delta_2^2)}{(\bar{X}_1 - \bar{X}_2)^2}$$

Assuming a mean and standard deviation before (16.5 ± 6.9) and after (13.13 ± 2.27) with 95% confidence level, sample size was calculated at $N = 37$ regarding prediction of a 10% drop during intervention $N = 44$ was final sample size.

Tools

The following demographic characteristics were included: Age, gender, marital status, income level, education level, dialysis time and duration, shelter status, medicine usage, other disease, etc.,

The stress and anxiety were assessed by depression anxiety stress scale (DASS21). The DASS is a quantitative measure of distress along the three axes of depression, anxiety, and stress. It is not a categorical measure of clinical diagnoses. Individual DASS scores do not define appropriate interventions.

This questionnaire had been presented for the first time by Lovibond in 1995^[17] which included three subscales and every subscale included seven questions. In translated version each item has choices of never, little, moderate, and many. The lowest score is related to every zero question and the most score is three.^[18] In this questionnaire, the questions 2, 4, 7, 9, 15, 19, and 20 are related to anxiety; the questions 3, 5, 10, 13, 16, 17, and 21 are related to depression, and the questions 1, 6, 8, 11, 12, 14, and 18 assess the stress. Based on the aims of this study, we have used anxiety and stress sections. Defined cut-off points are as follows:

Stress: Scores 0-7 is normal, 8-9 mild, 10-12 average, 13-16 severe, and higher than 17 is very serious

Anxiety: 0-3 is normal, 4-5 is mild, 6-7 is average, 8-9 severe, and higher than 10 is very severe.^[19]

Validity and reliability of this questionnaire were fair in Iran. For instance in a study done by Sahebi *et al.*, on 970 students and armies, the authors reported the translated questionnaire is comparable with the original one with high internal correlation 0.77, 0.79, and 0.78 for depression, anxiety, and stress, respectively.^[20] Another study, in Iran, also been reported the Cronbach alpha of 0.94 for depression, 0.92 for anxiety, and 0.82 for stress.^[21]

Pain was assessed using the short form McGill Pain Questionnaire (MPQ - McGill, Melzack, 1987). This three part questionnaire was self-administered with research staff support. Instructions were read out loud to participants by the research staff to make sure that they are fully understood and that participants understand the meaning of the adjective list words.

The main component consisted of 15 descriptive adjectives, 11 sensory including: Throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, splitting, and four affective including: Tiring-exhausting, sickening, fearful, punishing-cruel,

which are rated by the patients according to their severity on a four point scale (0 = none, 1 = mild, 2 = moderate, 3 = severe), yielding three scores. The sensory and affective scores are calculated by adding sensory and affective item values separately, and the total score is the sum of the two above-mentioned scores. In this study, we just used pain rating index with total scores.

Adelmanesh *et al.*, (2011) conducted a study in Iran to examine the validity and reliability of McGill's pain questionnaire. The internal consistency was found to be 0.951, 0.832, and 0.840 for sensory, affective, and total scores, respectively by Cronbach's alpha. Item to subscale score correlations supported the convergent validity of each item to its hypothesized subscale. Correlations were observed to range from $r^2 = 0.202$ to $r^2 = 0.739$.^[22]

Intervention

Depression anxiety stress scale-21 questionnaire was administrated by nurses blindly before and after intervention by self-reporting method or nurses recorded data in case they were illiterate or have visual disorders. After patients signed consent to participate, we used video exhibition to train the Benson relaxation method to patients and their caregivers in the dialysis center. In first step, the patients and their caregivers learned relaxation through the exhibition in HD center. Caregiver were instructed to guide patients to practice correctly a time twice a day morning and evening for 15 min during 4 weeks.^[23] Relaxation was practiced whenever they attended center. They were also or contacted by phone daily to remind on timed practice. The instruction of the Benson relaxation technique included the following steps:

- Stay in confidence position
- Close your eyes
- Calm down and relax your body, relax from your toes to top of your head
- Take a breath from your nose and keep your awareness. Exhale from the mouth whenever exhaling repeat one word or number inhale and exhale comfort and confidence
- Do this for 15 min try to keep your body and muscles relax. Then open your eyes slowly and don't move for some minutes
- Don't worry it is not important to which level of relaxation you have reached leave your body and let it happen itself. Don't care about interfering thoughts and let them go.^[24]

Data analysis

Data were analyzed using the Statistical Package for the Social Sciences software (SPSS, version 16.0, SPSS Inc., Chicago, IL, USA). Descriptive statistics such as central and dispersion indexes were first run and independent sample

t-test was applied to compare the two groups. Demographic data was categorized into quantities K squared used to analysis the obtained data. Pre- and post-intervention scores in each group were compared using the paired *t*-test. The Chi-square test was used to compare qualitative variables. The level of significance was defined as 0.05.

Results

Out of 88 patients, 80 completed at least 55 sessions and were included in analysis. The samples comprised 44 male (55%) and 36 females (45%) and age mean was 47.98 ± 12.53 . The maximum age was 65 and minimum 18. Seventy-one people were married (88.8%), eight were single (10%), and one was (1.2%) [Table 1].

There was no significant difference in demographic characters between two groups. The comparison of two mean scores before and after intervention in terms of pain, stress, and anxiety showed a significant difference ($P < 0.001$). Amongst the control group, there was no significant difference in two time frame scores ($P > 0.28$, $P > 0.11$, and $P > 0.18$) [Table 2]. There

Table 1: Distribution of patients according demographic characters

Variables	Groups	Intervention	Control	χ^2	P
Gender	Male	19	25	1.818	0.178
	Female	21	15		
Education	Illiterate	6	9	7.22	0.205
	Plus 10	23	17		
	Undergraduate	8	12		
Disease	Graduate	3	4	4.39	0.222
	Renal failure	13	9		
	Renal failure+ hypertension+ diabetes	27	31		
Disease duration	Below 5 years	31	36	4.48	0.214
	Above 5 years	9	4		
Dialysis hours	3	11	7	1.14	0.422
	4	29	33		
Shelter status	Owner	36	37	0.157	1
	Rented	4	3		
Medicine usage	Yes	22	30	3.51	0.061
	No	18	10		
Accusation	Employed	2	1	0.877	0.831
	Self employed	3	4		
	Retired	7	5		
	Unemployed	28	30		
Income	Low (below 5,000,000)*	23	25	3.1	0.21
	Medium (5,000,000; 1000,000)	14	10		
	High (above 10,000,000)	3	5		
	Number of children	Below 2	16		
2-5	15	21			
Above 5	9	3			

*10,000 Rials=1 US dollar in 2011

was a correlation between pain and stress ($r = 0.563$), anxiety and pain ($r = 0.489$), age and pain ($r = 0.268$), anxiety and stress ($r = 0.919$), anxiety and age ($r = 0.505$), anxiety and dialysis duration ($r = -0.279$), anxiety and income ($r = -0.299$), stress and age ($r = 0.393$), stress and dialysis duration ($r = -0.198$), stress and income ($r = -0.277$) [Table 3].

Discussion

We found a high prevalence of stress, anxiety, and depression among patients on HD. There was significant differences in mean and standard deviation of control and intervention groups for stress and anxiety scores. Furthermore, there were significant correlation between anxiety, stress, and pain with age, duration, and income level ($P > 0.05$).

Same results have been reported by Dumitrescu,^[24] Mollahadi,^[25] Shafipour,^[13] Eghbali,^[26] and Rajamanicam^[27] studies. They also suggested stress reduction influences the quality-of-life among the patients under HD through regular psychotherapy.

Table 2: The mean comparison between two groups stress, anxiety, and pain

Variables	Groups	Pre-intervention	Post-intervention	T	P
Stress	Experimental	11.52±2.75	10.22±2.13	-1.89	0.001*
	Control	11.18±2.38	10.94±2.26		0.18
Anxiety	Experimental	8.4±3.1	7.1±2.66	-1.19	0.001*
	Control	7.85±3.43	8.2±3.11		0.11
Pain	Experimental	16.10±4.0	13.11±4.22	-2.01	0.001*
	Control	15.62±4.6	16.01±3.44		0.28

* $P > 0.05$

Table 3: Correlation of pain, anxiety, stress, age, duration, and income

Variables	Pain	Stress	Anxiety	Age	Duration	Income
Pain						
Pearson correlation	1					
P value (2-tailed)	0.000					
Stress						
Pearson correlation	0.563**	1				
P value (two-tailed)	0.000					
Anxiety						
Pearson correlation	0.489**	0.919**	1			
P value (two-tailed)	0.000	0.000				
Age						
Pearson correlation	0.268*	0.393**	0.505**	1		
P value (two-tailed)	0.006	0.000	0.000			
Duration						
Pearson correlation	0.092	-0.198	-0.279*	-0.241*	1	
P value (two-tailed)	0.415	0.078	0.012	0.032		
Income						
Pearson correlation	0.024	-0.277*	-0.299**	0.271*	-0.823**	1
P value (two-tailed)	0.834	0.013	0.007	0.016	0.000	

** $P > 0.001$, * $P > 0.05$

The results of this study highlighted Benson relaxation helped patients compared to those who did not receive any intervention. Meanwhile, the changes in stress scores were significant. There is growing evidence to evaluation of the influence of Benson relaxation as a cost-effective and safe technique on different chronic disease.^[3,14,17,28-33] Hosseini *et al.*, confirmed that psychological training based on the standard protocols and the use of medicine resulted in comparable decreases in the severity of depressive and anxiety symptoms of HD patients.^[34]

In another study, Rahimi *et al.*, evaluated palliative care effects during 4-6 months on stress, anxiety and depression and the results showed positive effects of care on HD patients.^[35] Kim *et al.*, also explored the effect of music therapy on stress, anxiety and depression in HD patients and confirmed significant stress reduction in HD patients after music therapy.^[36] Carroll and Seers (1998) and Kwekkeboom and Gretarsdottir (2006) conducted a systematic review of the efficacy of relaxation techniques in both acute and chronic pain. Overall relaxation was found to have a significant effect on pain outcomes. Progressive muscle relaxation was found effective in reduction of pain sensation in several chronic pain conditions.^[37,38]

The findings of this study also showed that there is a relationship between pain and stress ($r = 0.563$), anxiety and pain ($r = 0.489$), age and pain ($r = 0.268$), anxiety and stress ($r = 0.919$), anxiety and age ($r = 0.505$), anxiety and dialysis duration ($r = -0.279$), anxiety and income ($r = -0.299$), stress and age ($r = 0.393$), stress and dialysis duration ($r = -0.198$), stress and income ($r = -0.277$). As it is obvious from results correlation between pain with stress and anxiety is positive. The high

estimation of anxiety among patients with chronic disease is explainable with fear anxiety avoidance model.^[39] While anxiety can cause pain, pain can also cause anxiety. Current fear-anxiety-avoidance models of chronic pain emphasize pain-related anxiety as a key diathesis for the development and maintenance of chronic pain. Several studies have shown those that live with chronic or recurring pain often develop anxiety disorders because of the constant stress which the pain puts on their body.^[40]

Age and income were also correlated with pain, stress and anxiety. Takaki *et al.*, (2005) showed that anxiety levels decreased when patients had both high income and demonstrated a range of task-oriented stress coping mechanisms. For patients undergoing HD for long duration or with a relatively high income, decreased anxiety accompanying a decrease of emotion-oriented stress, coping was greater as compared with other patients.^[41]

The results of this study and other related studies in this context showed that using cost-effective, low risk and easy methods by patients could help the patients to reduce the stress and leads to several benefits if practiced daily beside the palliative cares and alternative treatments in HD patients. Regarding some limitation of this study, we could not observe all sessions there can be some inaccurate reporting from patients or caregivers. On the other hand, DASS21 is not a categorical measure of clinical diagnoses. The individual DASS scores do not define appropriate interventions. Therefore, using complementary tools is recommended for future studies.

Conclusion

Our findings confirmed the effect of relaxation on stress and anxiety which was reported in several studies. In the most of studies, the recommendations emphasize on long and regular practice. Thus, with education of nurses and patients can benefit them with the low cost and prevent from extra problems as it is easy to use and teach to all of patients.

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