

# The Effectiveness of Intervention Based on the Transactional Model on Improving Coping Efforts and Stress Moderators in Hemodialysis Patients in Tehran

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## Research Article

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# Abstract

**Background:** Present study was conducted to determine the effect of training on coping efforts (CE) and stress moderators, based on transactional model of Lazarus and Folkman, in hemodialysis patients (HD).

**Methods:** This is a randomized controlled clinical trial on 116 hemodialysis patients referred to dialysis centers in Tehran from May to August 2018. The patients were assigned to two experimental and control groups using a simple randomization method. The intervention included 6 training sessions in the form of CE and moderators of transactional model. Data were collected before and 3 months after the intervention. Data were analyzed using SPSS 16.

**Results:** After 3 months training intervention, there was significant increase in the intervention group in the mean scores of CE ( $P < 0.001$ ), moderators and subscales of emotional regulation (ER) from  $51.18 \pm 20.42$  to  $64.87 \pm 13.18$  ( $P < 0.001$ ), dispositional coping style (DCS) from  $45.56 \pm 19.45$  to  $55.84 \pm 18.03$  and social support (SS) from  $49.61 \pm 20.14$  to  $55.55 \pm 17.35$  ( $P < 0.005$ ).

**Conclusion:** The training based on transactional model was successful in the increase of SS, DCS and ER in (HD). Therefore, Nurses and healthcare providers can use this program to help (HD) to increase their adaptation to the illness and reduce stress.

## Introduction

Chronic renal failure is a global public health problem which has raised many concerns worldwide (1). Patients with end-stage renal disease (ESRD) experience a lot of changes in their lives. These changes are due to their dependence on hemodialysis apparatus, which is associated with many difficulties such as physiological and psychological-social challenges (2). According to previous research, this disease has doubled in 1990-2010. It was also classified among 18 causes of death worldwide in 2010 (3). Dialysis is the common treatment for chronic renal failure, and this disease is unique in terms of treatment since the only way to postpone the death is tracking of this debilitating disease (4). The effects of chronic renal failure, lack of treatment, and the effect of the treatment on lifestyle and welfare are considered as a sustainable stress sources in the lives of these people (5, 6). Thus, hemodialysis can be associated with many stressors.

Lazarus and Folkman believe that stress is a relative concept of a complex and dynamic interaction between an individual and the environment. The ways or strategies that a person use in dealing with stressful situations play an essential role in their physical and mental health, and the individual's vulnerability is associated with understanding stress and its sources (7, 8). The transactional model of Lazarus and Folkman is one of the methods organizing the ways which people adapt to chronic illness (9, 10). According to Lazarus and Folkman, there are two types of coping strategies. The problem- focused coping strategy tries to eliminate or alter the source of stress, while emotional regulation coping strategy is a way to deal with a stressor focusing on altering the way one thinks or feels about a situation or something (11). During stressful situations, individuals may mostly use one of these two types of coping

styles or even use both strategies at the same time. Note that there is no good or bad coping strategy, and people will use each of the coping methods according to their situation. In coping efforts, there may also be a constructive or non-constructive mode (12). Therefore, the use of one style does not necessarily mean that one must use a constructive strategy when faced with stressors in his/her life. In the transactional model, the moderators signify the ability to search for information as well as build and maintain relationships with others, which involves information search and social support (13). The transactional model of Lazarus and Folkman is well-known as one of the most effective patterns in stress management (14). So far, there have been only a few studies examining the effectiveness of interventions based on the Lazarus and Folkman's model. The results of a study showed that both patterns reduced stress among teachers, where the transactional model of stress and adaptation was more effective compared to the usual education program (15). Another study indicated that multifaceted treatment of Lazarus had a significant effect on the general health. Also, ANCOVA test showed that multifaceted treatment significantly reduced depression, anxiety, and social function disorder (16). Another researcher reported that the educational program based on the transactional model reduces the level of stress and encourages the use of healthy coping styles in MS patients (10). Further, the role of multiple stress management interventions, based on the transactional model, in improving adaptation responses and stress score among students was confirmed in one the study (17).

Dialysis patients require special attention in terms of coping efforts, social support, and dispositional coping styles. The review of literature also revealed no studies assessing the effect of (CE) and stress moderators training in hemodialysis patients. It seems that further studies including educational programs using appropriate models are necessary to help patients in terms of mental relaxation and rational behavior when faced with stressors resulting from the disease in order to promote the health of hemodialysis patients. Accordingly, the present study was conducted to determine the effect of training on coping efforts and stress moderators, based on transactional model of Lazarus and Folkman, in hemodialysis patients in Tehran.

## **Materials And Methods**

### **Study design and setting**

This is a single-blinded, randomized controlled trial conducted from May to August of 2018 in Resalat Dialysis Center and Partian Dialysis Center in Tehran, Iran.

### **Participants**

The study population included all patients undergoing hemodialysis in Tehran. The simple randomization method was used to select two dialysis centers from Dialysis Centers of East of Tehran which were closely related in terms of social, cultural, and economic characteristics. Then, one of them was randomly assigned to the intervention group and the other to the control group. The centers were separated from each other such that the intervention group could not provide information to the control group after which the sample was randomly selected from among them.

## Sample size

In order to determine the sample size, considering the error of the first type 5%, the test power was 90% with 95% confidence with respect to the mean and standard deviation values of stress score as  $36.2 \pm 9.47$  and  $64.12 \pm 17.64$  according to previous studies (18), the sample size was  $n = 52$  in each group. Finally, with a 10% drop in the study, the sample size was set as  $n = 116$  where each of the intervention and control groups had  $n = 58$ .

$$n = \frac{\left( Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (S_1^2 + S_2^2)}{(\Delta)^2}$$

The study inclusion criteria were: chronic kidney disease, Tehran residence, hemodialysis, having a file at the dialysis center, having at least reading and writing skills, ability to attend training sessions, and having no history of chronic psychological disease. On the other hand, the study exclusion criteria included psychiatric treatment, reluctance to participate in the study, and having a history of relevant training. Flow diagram of entering subjects in the study groups has shown in Fig. 1

## Data collection

A researcher-made questionnaire was used to collect data prepared based on the transactional model of Lazarus and Folkman. The questionnaire consisted of demographic questions and 33 questions for measuring the coping efforts and moderators of the transactional model. The number of questions in each subscale included the following cases: 8 questions in Problem management (I study relevant journals to overcome the stress resulting from disease), 13 questions in the Emotional regulation (as I'm not able to do anything, I calm down myself with sedative drugs), 6 questions in the social support (I talk to my doctor about the stresses of the disease and want him/her to help me), and 6 questions in the dispositional coping style (I try to respond to the stress in the best way). The questions 1-21 were scored according to 3-point Likert scale as (1) agree, (2) no idea (3) disagree. On the other hand, questions 22-33 were scored based on 4-point Likert scale as (1) never (2) rarely (3) sometimes, (4) always. The scores ranged from zero to 100. The scoring method was as follows: higher score in the problem management and the emotion-focused coping indicated weaker problem management and emotional regulation, respectively. Similarly, higher scores in the social support and the dispositional coping style indicated less social support and no change in the dispositional coping style under different conditions.

The content validity of this questionnaire was confirmed by calculating CVR and CVI via expert panel (including 8 health education and promotion specialists, 2 psychologists and 2 kidney specialists) who examined the relevance, simplicity, and clarity of each question. Given that the number of evaluation specialists was 12. Questions whose CVR value was less than 0.56 were excluded from the test and thus scored 96 items higher than Laoshche's number (0.56). The value of Content Validity Index, 0/85, indicated acceptable instrumental validity. The reliability of the tool was measured using Cronbach's alpha method, which was as follows: problem management (0.75), emotional regulation (0.77), social support (0.86), and

dispositional coping style (0.71). The construct validity of the questionnaire was also performed and was at an acceptable level. The measurement tool was administered to both the intervention and control groups before and 3 months after the intervention through which the data were collected.

## **Intervention**

After obtaining approval from the Ethics Committee and Vice-Chancellor for Research of Yazd University of Medical science, the researcher referred to the dialysis centers

and obtained permission from their officials. The researcher then give clear explanations of the study methodology and objective for the participants and answered their concerns and questions then informed consent was obtained from them.

At the intervention center, as the patients were convenient to be trained in the center of dialysis, all of them were trained in the center, but the questionnaire was only available to the participants in the study. The intervention group was divided into several 5 or 6-individual groups who received 6 sessions of training as lecture, group discussion, and question and answer. The first session included: inauguration, expression of goals, and discussion topics, general matters about stress, and stress and illnesses. The second session covered relaxation exercises, exercises to relieve stress, stretching, contraction and expansion of muscles, exercise of self-relieving, deep breathing, progressive relaxation training, and training mental imagery exercise, where the patients were asked to do these exercises each night for 15-20 min before going to the bed. Also, 15 minutes of each session was devoted to the relaxation exercises in the subsequent sessions. The patients also received educational pamphlets with the trained subjects. The third session involved definition of coping, types of coping, definition of problem management, training problem management, training the use of problem solving to deal with stressful situations (acceptance of situation, precise definition of problem, prioritizing problems, precipitation of thoughts, decision-making, implementing and evaluating the results). The fourth session included definition of emotional regulation, training skills to control emotions, the correct way to express emotional reactions, training strategies for increasing body potential to deal with stress, and training emotional regulation methods. The fifth session worked on explaining the dispositional coping style and how it changed, definition of interpersonal relationships, importance of interpersonal relationships, definition of social support, types of social supports, asking for help from others, and coping with loneliness. Also, patients' family received educational pamphlets during this meeting which included introducing the most common stressors in dialysis patients and how to deal with mental and psychological problems in these patients to enhance the social support. Finally, the sixth session covered reviewing the presented topics, practicing the discussed topics, employing training sessions for adaptive coping, reviewing negative thoughts and how to challenge them, as well as reviewing and explaining individual patient achievements. After completing the training sessions, a booklet containing all the materials presented during the sessions was given to the patients.

## **Data analysis**

Data were analyzed using SPSS 16 software. A researcher, who was blinded to the data, conducted the analysis. Kolmogorov-Smirnov test and graphical methods were used to analyze data in terms of normalization. Paired t-test was utilized to compare the scores obtained before and three months after the intervention. Independent t-test was used to compare the scores between the two groups three months after the intervention. Comparison of the scores obtained three months after the intervention between the two groups, while adjusting them relative to the scores obtained before the intervention, and to possible intervention variables (as covariate) was performed by analysis of covariance (ANCOVA). Alpha level for all statistical tests was set at  $P < 0.05$ .

## Results

The mean age of participants in the study was 52.81 years old with standard deviation of 7.71. The minimum age was 22 years and the maximum age was 70 years old. Other demographic information of the participants is presented in Table 1. The intervention and control groups were similar in terms of demographic variables at the beginning of the study and did not have any significant difference (Table 1).

Comparing the mean scores of coping efforts and its subscales before and three months after the intervention between two groups, the mean scores of coping efforts and emotional regulation between two groups, indicated a significant increase in the intervention group ( $P < 0.001$ ). According to the results of covariance analysis, there was a significant difference in the coping efforts and the emotional regulation scores 3 months after the intervention, while these changes were not significant in the control group (Table 2).

Regarding the score of moderators and its subscales, there was a significant difference in the intervention group after the three months. Specifically, the scores of the moderators and subscales of social support and dispositional coping style showed a significant increase three months after the intervention. On the other hand, while the average scores of the moderators and its subscales had a growth in the control group, these changes were not significant (Table 3).

## Discussion

The present study is one of the few studies in which an educational program based on coping efforts and moderators of transactional model was used to enhance compatibility and reduce stress in hemodialysis patients.

In this study, there was a significant decline in emotional regulation in the experimental group after the educational intervention, indicating that the patients were able to use more healthy emotional regulation strategies after the intervention, and the use of unfavorable coping strategies had diminished in these individuals. Undesirable coping strategies can disrupt the overall performance of the patients with chronic hemodialysis. Taheri et al. found that the hemodialysis patients mostly use emotion-focused style to cope with the challenges (19). In agreement with the present study, the results of another study showed that the mean scores of emotion-focused coping in the experimental group was altered, indicating the

effectiveness of the intervention (12). Another researcher also noted to the effect of educational intervention on the reduction of emotion-focused coping score, which was carried out on women with back pain (20). In another study was observed that the hemodialysis patients mostly use emotion-focused strategies to cope with the stress (21). Many studies suggest the effectiveness of educational intervention in improving the use of coping styles in different groups and diseases, which are in line with the present study (22-25).

In the present study, the mean score of the problem-focused coping had a nominal decrease and increase in the intervention and control groups, respectively. However, the reduction in the intervention group was not significant.

Other research results showed that the patients with chronic renal disease tended to less use direct coping styles compared with their healthy counterparts and were more likely to use avoidance and relieving coping styles in dealing with stress in their lives; thus, they tend to use more the emotion-focused coping style (26). A study on MS patients showed that the problem-focused coping style is not related to mental health in patients with multiple sclerosis (27). Probably, the patients with MS disease are similar to those undergoing hemodialysis due to the burden of disease, challenge or impotence, occupational problems, and costs of treatment. Thus, it may be concluded that the patients with chronic diseases as well as prolonged and severe treatment courses consider their condition as an uncontrollable problem, where consequently the problem-focused coping loses its effectiveness. As a result, the inadequacy of the present research in improving the problem-focusing coping style may originate from the same reasons. As Lazarus and Folkman stated in their transactional model, individuals who experience uncertainty and evaluate condition uncontrollable, use emotion-focused coping styles (28). It should be reminded that there is no superiority between the emotion-focused or the problem-focused coping styles to be used, but employing a problem-focused coping style is combined with more self-control and more self-efficacy (29).

The coping efforts in the experimental group improved in comparison with the control group after the intervention, indicating the effectiveness of educational intervention in improving the use of coping efforts in the hemodialysis patients.

In the present study, the moderators included subscales of the dispositional coping style and social support.

The dispositional coping style is defined as general ways of behavior which can affect emotional response or individual performance to a stressor. In a research entitled "relationship between the positional and dispositional coping styles", defined these two styles as the following: the positional coping style is a stable strategy that one usually uses in all stressful events, while the positional coping style is a special coping strategy used by the person in a special stressful condition (30). The mean score of the dispositional coping style diminished significantly in the test group after the intervention indicating that the patients mostly used various coping styles adapted to specific stressful situations, which has been in line with the present study. A recent study suggested that personality had the greatest variance with positional and dispositional coping, but their relationship was different, where cognitive assessments gave

increased credibility to the positional coping, outside of the compatibility aspects (31). Another study stated that the dispositional coping styles in childhood may be influenced by the first childhood experience. Also, regression analysis revealed that an emotion-focused coping style can be predicted by negligence and emotional abuse during childhood (32). In another study the results indicated that project managers use coping strategies and active planning in stressful situations, and high level of organizational performance is related to greater use of planning coping strategies (33). In a study, the researchers found that people with alcohol abuse, according to the dispositional coping style, use avoidance coping styles compared to healthy coping styles. Further, in terms of gender differences in the dispositional coping style, women used coping styles more to have a positive interpretation of stressful situations, while men tended to be more religious (34).

The social support addresses individual efforts for obtaining information, tangible and emotional support, such as sharing your emotions and problems about a stressful event with others, receiving help from expert and prominent individuals, asking for a respected person's opinion and advice, accepting sympathy and others' confidence to solve the problem, and effective coping with the stressful situation (17).

The comparison of the average social support score in the test and control group before and after the intervention indicated that this score decreased significantly in the test group, suggesting that social support improved in the patients after the intervention. Participation of the families of patients and medical staff to enhance social support in the patients was one of the positive aspects of this study. Some studies are also consistent with the present study (12, 20). A previous study implied that the social support plays a major role in chronic diseases, and the individuals with more social support have higher flexibility for chronic pain (35). The role of peer support groups on self-transcendence in patients undergoing hemodialysis was emphasized in past study (36). Another study also reported that increased social support leads to enhanced psychological dimension of life quality in hemodialysis patients (37). Findings of another study pointed to a significant relationship between all areas of the social support and death anxiety in hemodialysis patients (38).

In another study, Sadoughi et al. revealed a significant relationship between perceived social support and quality of life in patients on hemodialysis. They found that there is an inverse relationship between quality of life and anxiety as well as depression in dialysis patients (39). A study demonstrated the direct relationship between social support and quality of life as well as the survival rate of hemodialysis patients (40).

Despite its robustness by including adequate sample size and random sampling, the present study had a few limitations, including the statistical population which merely involved patients on hemodialysis. This certainly limits the generalizability of findings and interpretations of the cognitive causes in other diseases which should be considered. Also, since many dialysis patients are undergoing peritoneal dialysis, it is suggested that studies on stressors and adaptation methods in patients undergoing peritoneal dialysis should also be conducted in future. Finally, the stressor factors and adaptive methods among the two groups of patients undergoing the hemodialysis and the peritoneal dialysis should also be compared.

# Conclusion

This study suggested that the educational intervention based on the transactional model is helpful in improving coping efforts and moderators in hemodialysis patients. Training using appropriate educational models can reduce the process of coping with dialysis disease and its stressors, and lead to improved quality of life as well as the physical and mental health of these patients. These training programs are more important when facing the impact of lack of effective social support, lack of appropriate coping styles in different situations, use of emotion-focused coping styles or negative problem-focused styles, or the individual's inability to use problem-focused and positive emotion-focused styles, resulting in debilitating illnesses associated with the stress of chronic illness and serious health threats.

## Declarations

### Acknowledgements

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### Authors' contributions

M GH contributed to study design, analysis and interpretation of data, provided feedback on the article. MA M conceived and designed the study and constructed the dataset and provided feedback on the article. MS J accessed the dataset, contributed to data analysis and interpretation. Y M performed the data analysis. SM performed the data analysis and interpretation, wrote the first draft of the article, and subsequent revisions, and approved the submitted version. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. The authors read and approved the final manuscript.

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### Availability of data and materials

The data support the findings of this study are available on request, with permission of the study group.

### Ethical considerations

Before starting the study, Ethics Committee of Faculty of Medical Sciences of Yazd provided the permission with ethics code of R.SSU.SPH.REC.1397.012, related references were provided by Yazd University of Medical Sciences for dialysis centers in Tehran and the study was registered at clinical trials registration center with the code of IRCT ID: IRCT20180524039814N1

## Consent for publication

Not applicable.

## Competing interests

The authors declare that there is no conflict of interests

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The authors confirm that all methods were carried out in accordance with relevant guidelines and regulations.

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## Tables

Table 1: Comparison of participants' demographic variables in the intervention and control groups (chi-square test)

P-value	control group		intervention group		group	Variable	
	Frequency	Frequency percentage	Frequency	Frequency percentage			
<b>0.42</b>	0.7	31	53.4	29	50	man	gender
		27	46.6	29	50	female	
<b>0.51</b>	1.31	44	75.9	45	82.8	Married	Marriage status
		5	8.6	5	8.6	Single	
		9	15.5	5	8.6	Widow	
<b>0.95</b>	0.32	13	22.4	12	20.7	Elementary	Education
		15	25.9	17	29.3	intermediate	
		18	31	16	27.6	High school	
		12	20.7	13	22.4	College education	
<b>0.22</b>	7.01	13	22.4	11	19	Employed	Employment status
		19	32.8	19	32.8	housewife	
		14	24.1	18	31	Retired	
		12	20.7	10	17.2	Self-employed	
<b>0.78</b>	0.008	7	12.1	10	17.2	yes	History of the disease in the family
		51	87.9	48	82.8	no	

Table 2: Comparison of mean and standard deviation of coping effort scores in the intervention and control groups before and three months after the intervention

*P-value	three months after intervention	before intervention	group	Variable
	SD± Mean	SD± Mean		
0.01	13.18 ±64.87	20.42±51.18	intervention	Emotional regulation
0.43	16.12±55.06	17.56±54.84	control	
0.001		0.3	P**	
0.01			P***	
0.22	17.66 ±56.88	20.44 ±54.41	intervention	Problem management
0.15	18.78±55.06	18.74 ±55.71	control	
0.59		0.72	P**	
0.19			P***	
0.001	13.76±60.87	19.73±52.8	intervention	Coping effort
0.92	16.30 ±55.33	17.19 ±55.28	control	
0.04		0.9	P**	
0.01			P***	

P\* : paired t-test, P\*\* : t-test , P\*\*\* : ANCOVA

Table 3: Comparison of mean and standard deviation of moderators' scores in the intervention and control groups before and three months after intervention

*P-value	three months after intervention	before intervention	group	Variable
	SD± Mean	SD± Mean		
0.005	17.35±55.55	20.14 ±49.61	intervention	Social support
0.7	18.74±48.56	21.84±48.08	control	
0.03		0.78	P**	
0.006			P***	
001.0 >	18.03±55.84	19.45±45.56	intervention	Dispositional coping style
0.37	15.75 ±47.6	17.80 ±48.85	control	
0.01		0.93	P**	
001.0 >			P***	
001.0 >	14.40±55.69	14.40 ± 49.09	intervention	moderators
0.73	13.92±48.08	17± 48.46	control	
0.004		0.83	P**	
001.0 >			P***	

P\* : paired t-test, P\*\* : t-test , P\*\*\* : ANCOVA

## Figures

CONSORT 2010 Flow Diagram

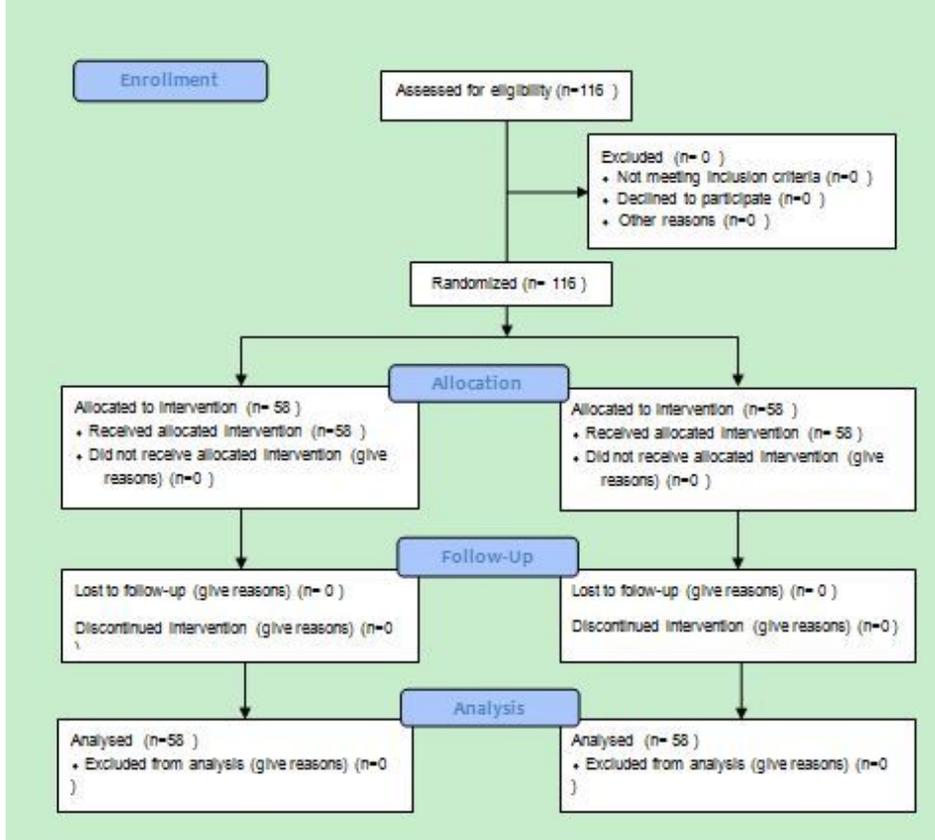


Figure 1

Research flow diagram based on Consort statement 2010

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [CONSORT2010checklist.doc](#)