Comparing the Effectiveness of Coping Skills and Mindfulness-Based Training on Pain Perception in Patients with Renal Failure

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A B S T R A C T

Aims: The purpose of this study was to compare the effectiveness of coping skills group training and mindfulness-based group training on pain perception in patients with kidney failure with follow up.
Method and Materials: The method of the study was semi-experimental in nature with a pretest-posttest design. The statistical population of this research included all kidney failure patients who visited Kosar Hospital in 2021-2022 (from October to November). Based on this, 45 renal failure patients were divided into two experimental groups and one control group using the matching method, and all three groups were administered the McGill Pain Questionnaire (1997) in the pretest, posttest and follow-up. Data were analyzed with SPSS-26.
Findings: The findings showed; there was no significant difference between the effectiveness of coping skills group training and mindfulness-based group training on pain perception in patients with kidney failure. But both intervention groups were significantly different from the control group (P<0.01). Both treatments had a lasting effect in follow-up stage.
Conclusion: According the findings of this syudy, it can be said that group training of coping skills and group training based on mindfulness can affect pain perception, in patients with renal failure, and this effect continues over time.

Keywords: Pain Perception, Group Training ,Coping Skills, Mindfulness, Renal Failure..

Introduction

Pain is a psychological factor that is related to the demographic characteristics of each patient [1] and the Quality of Life (QoL) [2,3] and is related to various psychological factors such as anxiety [4], psychological flexibility [5] and depression [6]. On the other hand, since chronic disease and pain are internal, they are more likely to be expressed with metaphors [7,8]. Chronic kidney diseases or renal failure are a group of diseases with a slow but progressive loss of kidney function over several years. Finally, these diseases cause permanent kidney failure [9].

One of the skills that every kidney patient needs to challenge his/her illness is coping skills [10]. Coping skills refers to the cognitive and behavioral efforts through which people respond to the needs of the environment in relation to the person. The resources that are available to people, the styles and strategies used later, are influential in the coping process. Coping skills are techniques that people use when facing stressful events [11]. Another new cognitive skill that controls the cognitive and emotional aspects of chronic diseases and their complications, is training based on mindfulness. Mindfulness is defined as moment-to-moment awareness of one's experience without judgment [12]. Pain regulation during mindfulness is effective in pain regulating pain [13].

A previous study showed that the emotional and cognitive characteristics of mindfulness have an effect on the emotional aspect of pain and can distort the cognitive level of pain [14]. In another study, the effectiveness

of mindfulness on perceived pain intensity and QoL of patients with a history of headache was investigated and it was shown that this intervention increased the QoL of patients and decreased the perceived pain intensity [15]. Sobhani et al. [16] in a study investigated the effectiveness of Mindfulness-Based Stress Reduction Treatment (MBSRT)on the perception of pain reduction in women with chronic back pain after childbirth. A study showed that Cognitive-Behavioral Therapy (CBT) and Mindfulness-Based Cognitive Therapy (MBCT) were effective on pain experience [17]. A study showed that the mindfulness-based intervention of aromatherapy massage has significantly improved the perception of pain and its components in the elderly women with chronic pain [18].

In most of the researches conducted both inside the country and abroad, the perception of pain has been emphasized with the effectiveness of different educational protocols separately and less has been investigated in line with each other without considering these recent components for training effectiveness. Considering the sensitivity of the subject and according to the mentioned materials, the researcher seek to answer the following basic question that if group training on coping skills and group training based on mindfulness on pain perception in kidney failure patients with a follow-up Effective.

Method and Materials

The method of the current research was applied in terms of its purpose. Thus, semi-experimental in nature with a pretest-posttest design with an unequal control group, was carried out in 2022. The statistical population of this research included all kidney failure patients who visited Kosar Hospital in 2021-2022 (from October to November). In this study, due to the intervention nature of the study, the sample included 45 patients with kidney failure. Due to the interventional nature of the work, 15 patients were set in equal groups. In this regard, qualified people were randomly divided into three groups (two experimental groups and one control group) with 15 patients in each group. To calculate the sample size in interventional studies, based on Cohen's formula [19] and taking into account the first type error, the second type error and the expected mean difference in the study groups, the sample size was calculated equal to 12 people in each group. Including 3 groups, a total of 36 people should be examined in this study in the form of three groups. Therefore, in order to prevent subjects from dropping out during the intervention, 15 people were considered for each group. Due to inclusion/exclusion criteria/suffering from any of the psychiatric and medical disorders, suffering from   other physical issues and taking medication for any disease were exclusion criteria. However, people suffering from one of the chronic diseases of kidney failure with various grades and being in the age range of 25 to 55 years were included in the study..

In this study, the following tools were used in the present study:

Demographic Information Questionnaire: This questionnaire was prepared to collect individual information of the participants, including age, level of education, marital status, history and type of illness.

McGill Pain Questionnaire: This questionnaire has 20 sets of items and its purpose is to measure people's perception of pain from different dimensions (three dimensions of sensory perception of pain, emotional perception of pain, perception of pain evaluation, and various pains). The McGill Pain Questionnaire is one of the most prominent pain measurement tools, which was first used by Melzak on 297 patients suffering from

various types of pain. This questionnaire includes two independent factors: one called sensory pain, which describes the pain experience in the individual, and the other emotional pain, which describes the emotional impact of the pain experience. In the revised form, 15 items from the previous issue, which provided the ability to adapt to the literature and provide a comprehensive and comprehensive diagnosis regarding the sensory and emotional descriptions of non-neuropathic pain, were retained, and based on the results of neuropathic pain research and other clinical experiences, seven items were added to SF- Added MPQ. These items have been added to 15 items describing sensory and emotional pain and by modifying the response framework and converting it into a scale with a range of 0 to 10, they have increased the response rate in longitudinal studies. After obtaining the scores of each row, the subscales are calculated in the following order: 1) Sensory pain: collections 1 to 10, 2) Emotional pain: collections 11 to 15, 3) Pain assessment: collection 16, and 4) Various kinds of pain: collections 16 to 20. If the respondent does not know any of the expressions according to the description of her/his pain, then a score of zero is assigned to that group. A higher score indicates a higher level of pain perception in the respondent and vice versa. Research findings showed high reliability and validity for this questionnaire [20]. The results of exploratory and confirmatory factor analysis indicated the existence of four subscales of continuous pain, varied pain, neuropathic pain, and emotional pain. Cronbach's alpha coefficient was reported as 0.87, 0.87, 0.83, 0.86 respectively. This questionnaire has been investigated in Iran and its validity and reliability have been reported as favorable. For example, Khosravi, et al. [21] in their research reported the overall Cronbach's alpha of this questionnaire as

0.85 and the Cronbach's alpha of all four components above 0.80. In order to test the assumption of normality of data distribution, the Shapiro-Wilk values of the components and the total score of pain perception in each three groups were examined in three stages: pre-test, post-test and follow-up.

Findings

In the present study, 45 participants were in three groups of coping skills group training (6 women and 9 men), also group training based on mindfulness included (8 women and 7 men) and the control group included (7 women and 8 men). In group of coping skills training 5 participants were less than 25 years old, 4 people 30 to 35 years old, 4 people 40 to 45 years old and 2 people were more than 45 years old. In the mindfulness-based training group, 2 participants were less than 25 years, 6 participants were 30 to 35 years old, 4 participants were 40 to 45 years old, and 3 people were more than 45 years old. In the control group, 5 participants were less than 25 years old, 6 participants were 30 to 35 years old, 3 participants were 40 to 45 years old, and 1 participants was more than 45 years old. Furthermore, in the coping skills training group, the level of education of 3 of the participants was below diploma, 4 participants was diploma, 5 participants had bachelor's degree and 3 participants had higher than bachelor's degree. Moreover, in the coping skills training group, the level of education of 3 of the participants was below diploma, 4 participants had diploma, 5 participants had bachelor's degree and 3 participants were educated higher than bachelor's degree. In the control group, the level of education of 4 of the participants was less than a diploma, 5 participants had a diploma, 4 participants had a bachelor's degree, and 2 participants were educated higher than a bachelor's degree.

Table 1 shows the mean (standard deviation) and the components as well as the total score of pain perception in three phases: pre-test, post-test and follow-up. This table showed that in both experimental groups, the mean scores of the components of pain perception in the post-test stages and follow-up were reduced. On the other hand, no similar changes were observed in the mentioned stages in the control group. in this research.

According the results, the value Shapiro Wilk related to the cognitive assessment component in the coping skills training group in the post-test phase (p = 0.030) was significant. Although this study showed that non-normal distribution of that component in the mentioned group and stage, with due to the equality of the sample size in the groups, the significance level obtained for the Shapiro-Wilk index and resistance of statistical tests of analysis of variance against deviation from assumptions, we can expect that this value deviation from the assumption does not invalidate the results of the analysis.

In the continuation of other assumptions of analysis of variance with repeated measurements including the homogeneity of error variances using Leven`s test, the homogeneity of covariance matrices of dependent variables with the use of the M. Box statistic and the condition of sphericity were investigated using the Mochli`s test (Table 2).

The result of Leven's test in Table 2 showed that the difference in the error variance of the scores related to any of the components and the total score of pain perception in groups and in three stages was not significant at the level of 0.05. Therefore, the assumption of homogeneity of error variances among the data related to the research variables was maintained. Table 2 showed the index value of the M. Box statistic was not significant for any of the components and the total score of pain perception. This result showed the assumption of homogeneity of the covariance matrices of the dependent variables for the levels of the dependent variable among the data was well established. In addition, the chi-square value obtained from Mochli's test for the sensory pain component was significant. This finding showed that the assumption of sphericity was not established for that component and therefore the degrees of the relative freedom of that component was corrected using Geisser-Greenhaus method. Table 3 showed the results of multivariate analysis comparing the effect of group training of coping skills and group training based on mindfulness on the components and the total score of pain perception. Table 3 showed that the effect of implementing independent variables on sensory pain (P= 0.001, F= 5 /81), emotional pain (P= 0.006, F= 3.92), cognitive evaluation (P= 0.018, 752, F= 3.15), various pain (P=0.015, F= 3.28) and the total pain perception score (P= 0.001, F= 12.88) was significant. In the continuation of Table 3, the results of analysis of variance with size repeated taking in explaining the effect of group training on coping skills and group training based on mindfulness showed the components and total score of pain perception. In addition to the group effect and time effect, the interaction effect of group (P= 0.001, F= 7.55), emotional pain (P= 0.001, F= 4. 54), cognitive assessment (P= 0.015, F= 3.31) pain variety (P= 0.004, F= 4.18) and total score of pain perception (P= 0.001, F=18.16) was significant. These findings indicate that implementation the independent variables have significantly influenced the components and the total score of pain perception (Table 3).

Discussion

The purpose of this study was to compare the effectiveness of coping skills group

Table 1) Mean and standard deviation of pain perception in three stages.

Component	Groups	Pre-test M(SD)	Post-test M(SD)	Follow-up M(SD)
Pain sensory	Coping skills	25.27(5.23)	18.93(3.51)	18.47(2.83)
	Mindfulness	25.47(4.90)	21.00(4.52)	18.40(3.64)
	Control	24.93(5.10)	24.47(4.94)	26.27(5.09)
Emotional pain	Coping skills	11.33(2.87)	6.93(1.94)	7.33(2.09)
	Mindfulness	11.32(2.88)	7.80(1.86)	7.73(2.05)
	Control	11.27(2.43)	11.40(2.92)	10.93(2.49)
Pain assessment	Coping skills	3.53(1.19)	1.73(0.96)	1.67(1.18)
	Mindfulness	10.47(3.04)	5.93(2.22)	2.00(1.13)
	Control	3.40(1.30)	3.47(1.30)	3.20(1.21)
Pain variety	Coping skills	10.47(3.04)	6.93(2.22)	5.60 (1.99)
	Mindfulness	10.40(3.60)	6.93(2.43)	6.07(1.94)
	Control	48.47(6.27)	48.40(6.06)	50.07(6.72)
Total	Coping skills	50.60(5.99)	33.53(5.09)	33.07(3.92)
	Mindfulness	50.67(7.34)	38.07(6.05)	34.20(4.21)
	Control	48.47(6.27)	48.40(6.06)	50.07(6.72)

M(SD): Mean(Standard Deviation)

Table 2) Multivariate analysis test in evaluating the effect of independent variables on the components and the total score of pain perception

Dependent variable	Wilks Lambda	F	DF	P	η^2	Test power
Sensory pain	0.607	5.81	4, 82	<0.001	0.221	0.977
Emotional pain	0.705	3.92	4, 82	0.006	0.160	0.886
Pain assessment	0.752	3.15	4, 82	0.018	0.133	0.798
Pain variety	0.743	3.28	4, 82	0.015	0.138	0.816
Total	0.377	12.88	4, 82	<0.001	0.386	1.00

training and mindfulness-based group training on pain perception in patients with kidney failure with follow up. The findings for the hypothesis of the research showed there is no significant difference between the effectiveness of coping skills group training and mindfulness-based group training on pain perception in patients with kidney failure. But both intervention groups are significantly different from the control group. Therefore, the evidence is sufficient to confirm this hypothesis.

The results obtained in this study are almost consistent with the study of Sobhani et al. [16] who show that the stress reduction treatment based on mindfulness on reducing pain perception has been effective in women with chronic back pain after childbirth, with the study of Guderzi et al. [17] who show that cognitive therapy based on mindfulness is

Table 3) Analysis of variance with repeated measurement in explaining the effect of independent variables on the components and the total score of pain perception.

Variables	Effects	MM	$\sum$M	F	P	η^2
Sensory pain	Group effect	417.88	1341.16	6.54	0.003	0.238
	Time effect	340.28	740.87	19.29	<0.001	0.315
	Group × time interaction effect	447.97	1245.38	7.55	<0.001	0.264
Emotional pain	Group effect	184.90	235.64	16.48	<0.001	0.440
	Time effect	157.34	212.47	31.10	<0.001	0.425
	Group × time interaction effect	100.25	464.09	4.54	0.002	0.178
Pain assessment	Group effect	26.18	72.76	7.56	0.002	0.265
	Time effect	31.21	49.93	26.25	<0.001	0.385
	Group × time interaction effect	16.71	106.04	3.31	0.015	0.136
Pain variety	Group effect	115.75	270.44	8.99	<0.001	0.300
	Time effect	214.68	337.00	26.76	<0.001	0.389
	Group × time interaction effect	114.61	576.49	4.18	0.004	0.166
Total	Group effect	2488.24	1967.42	26.56	<0.001	0.558
	Time effect	2624.40	1298.53	84.88	<0.001	0.669
	Group × time interaction effect	2010.65	2325.78	18.16	<0.001	0.464

effective on the experience and level of pain, with the study of Alami, et al. [18] who show that the intervention based on mindfulness is effective on pain perception, and with the research of Sepanta, et al. [22] who show that stress reduction treatment based on mindfulness has reduced pain perception in teenagers with leukemia, with the study of Poletti, et al. [13] who show that learning mindfulness is effective in pain regulation, with the study of Schultz and Ryan's [23] who show that mindfulness has an effect on the emotional aspect of pain, and with the research of Bakhshani, et al. [15] who show that mindfulness has reduced the intensity of pain in patients with a history of headache,. In explaining the finding of this study, it can be said that training coping skills has an effect on the structures that cause pain and negative emotions caused by it. Coping skills training

affects the systems responsible for responding to the emotional experience of pain (such as the psycho-physical system), the perception of muscle tension and emotions caused by cognitive systems (rumination, catastrophizing and overgeneralization) and the motor system (such as pain behavior) and it reduces pain. The destructive cognitive beliefs of the patient mean ineffective and irrational beliefs such as fear of movement, catastrophizing and the use of emotion-oriented and often incompatible coping strategies lead to avoidance behaviors and as a result the feeling of inefficiency and helplessness when facing pain, the pain experience increases [24]. According to the gate control theory of pain, it is possible that pain affects the mental processes related to feeling, cognition, emotion and behavior, so that it becomes the gate, but also with the peripheral inputs of stimulating the higher brain centers, which are also responsible for controlling it with the help of thoughts, emotions and behaviors [25]. In other words, teaching coping skills through problem-oriented strategies helps to reduce faulty strategies by correcting misplaced interpretations, guiding negative self-talk, reconstructing irrational thinking and dysfunctional cognitions. This same cognitive reconstruction and reinterpretation of pain and the existing situation causes less sensory-motor information transmission of pain, and finally the perceived pain decreases and problem-oriented coping skills expand as a result. Considering that the core of mindfulness-based therapies is accept, teaching these techniques over time will lead to acceptance of pain tolerance in patients with chronic pain. It can also be explained that because mindfulness improves mood and, according to the research of Sarafino and Smith [26], it increases serotonin and dopamine levels. It can affect and be effective on the component of feeling pain, because the feeling of pain always has an emotional component and it is a process in which physiological and psychological processes play a mutual role. Mindfulness increases metacognitive awareness. A component that expresses the ability to re-perceive or defocus thoughts and emotions and see them as passing mental events. It is assumed that increased metacognitive awareness leads to a reduction in rumination about pain in people suffering from chronic pain, and the intensity of pain decreases as a result.

Although this study has its' own strength points, but self - reporting of pain perception might be a limitation of this research. Thus, we hope in future studies this weakness would be considered.

Conclusion

According to the results of this research, both coping skills group training and mindfulness -based group training could be applied for decreasing pain perception in patients with kidney failure.

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