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Effect of Acupressure on Severity and Outcome of Uremic Pruritus in Hemodialysis Patients: A Three-group Parallel Randomized Clinical Trial

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Abstract

Background: *One of the troublesome problems of patients in the end stages of renal disease (ESRD) is uremic pruritus (UP), which can adversely affect the quality of life, treatment process, and longevity of patients. The present study investigated the effect of acupressure on the severity and outcome of UP in hemodialysis patients.*
Methods: *In this three-group parallel randomized clinical trial, 105 patients undergoing hemodialysis for the last six months and having uremic Pruritus were included with convenience sampling. Exclusion criteria included having diseases that caused pruritus skin such as allergies, and neurological and, vascular disorders. Patients were randomly assigned to acupressure (n=35), sham (n=35), and control (n=35) groups. The acupressure group received acupressure in SP 6, SP 10, ST 36, and L I11 points, while the sham group received acupressure in non-real points. The severity and outcome of UP were evaluated before, 4, and 12 weeks after the intervention using a Visual Analog Scale (VAS) and a 5-D itch scale, respectively. Finally, data collected from 105 participants were analyzed using SPSS version 25 software. Kruskal Wallis and Friedman tests were used to compare the severity and outcome of UP between and within groups, respectively.*
Results: *UP's severity and outcome after the intervention in the acupressure group had significantly improved compared to sham and control groups 4 and 12 weeks after the intervention (P-value<0.05).*
Conclusions: *The use of acupressure can improve the severity and outcome of UP in hemodialysis patients and training this method to nurses and patients is recommended as a safe and accessible way to heal their pruritus.*

Keywords: Acupressure, Hemodialysis, Uremic Pruritus.
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Introduction

Today the best treatment for chronic kidney disease patients is dialysis which reduces many of the complications of kidney failure and is essential for the survival of patients but may be associated with side effects that are difficult for the patient to tolerate and lead to the abandonment of it [1]. For example one of the complications of renal failure is uremic pruritus. UP is not completely relieved with the start of dialysis [2] and even with dialysis, about 20%-90% of patients experience this troublesome symptom [3].

Pruritus is an unpleasant and annoying feeling that is associated with skin damage and the loss of the body's first defense barrier [1]. It can hurt the different domains of patients' lives, including mental health, social functioning, and sleep quality, and, ultimately cause a decrease in the quality of life [4,5]. Also, according to the international results from the Dialysis Outcomes and Practice Patterns Study (DOPPS), the probability of death among 18,000 dialysis patients experiencing pruritus, is reported to be more than 17% [6].

The cause of UP is not known exactly and it has been shown that various factors such as uremia, anemia, phosphorus imbalance, inadequate dialysis, etc., play a role in its occurrence [7]. As well as the role of opioid μ-receptors has been taken into consideration [8]. UP can occur all over the body or locally in a specific area, continuous or intermittent [9]. Due to the widespread impact of these symptoms on the lives of dialysis patients, appropriate intervention to manage them is of the utmost importance [10]. Various treatments such as topical and oral medications are used to improve patients' pruritus, but it is not possible to use topical medications on a large area of the skin, and, oral medications are either associated with side effects or are not effective enough for chronic pruritus [11]. As well as causing a financial burden and ongoing costs for patients, using alternative therapies with the least side effects and affordable is crucial [12,13].

In previous studies, various complementary medicine methods have been used to reduce pruritus in hemodialysis patients, such as aromatherapy, yoga, acupuncture, and acupressure [14]. However, some of them are invasive and have side effects. On the other hand, it must be done under the supervision of a trained person and it is not possible to do it by the patients or even the nurses [15]. On the contrary, acupressure is a non-invasive, simple, and cost-effective method to manage and treat many symptoms, adverse side effects, and various diseases [16]. Acupressure as one of the complementary medicine methods in which the points carrying energy are stimulated and balanced energy within the body by touching is one of the interventions that even patients can do it alone and benefit at any time [17]. On the other hand, likely it stimulates the opioid receptor to relieve pruritus [9]. Previous studies have reported the effectiveness of acupressure in LI-11 points [18,19] and SP6,

SP10, ST36, and LI11 points on the severity of pruritus [9]. Also, in a systematic review study, the use of acupressure to reduce pruritus was approved in hemodialysis patients, but researchers recommended that further studies be performed due to insufficient evidence [20]. One of the limitations of the existing research is not using acupressure in non-actual places to consider the combined effects and placebo effects on patients [21]. Current evidence emphasizes that in addition to the need to design more detailed studies, it is necessary not only to evaluate the severity of itching but also to evaluate other dimensions of itching [22]. Therefore the present study was performed to investigate the effect of acupressure in SP6, SP10, ST36, and LI11 points on the severity as well as dimensions of UP in hemodialysis patients.

Materials and Methods

Study design and setting: A three-group randomized controlled clinical trial design was used in this study. Hemodialysis patients in two hemodialysis wards of public hospitals affiliated with Shahroud University of Medical Sciences from September 2019 to January 2020 participated in the study.

Participants and Sampling: The study population included hemodialysis patients with inclusion criteria including being 20 to 65 years old, receiving hemodialysis for the last six months, having hemodialysis three times per week, having a duration of dialysis of 3 to 4 hours each time, having uremic Pruritus for at least one month, and minimum severity of 3 based on the VAS of pruritus. Exclusion criteria included having diseases that caused pruritus skin such as allergies, and neurological and, vascular disorders based on the medical records. Besides, if participants were hospitalized during the intervention or a change happened in their drugs that could affect their pruritus, it was considered sample attrition.

Allocation technique: After obtaining permission from the university and hospital officials, the researcher presented to the relevant centers. Sampling was performed through consecutive sampling among hemodialysis patients. The researcher introduced the research goals and, stages of the research for those who were eligible to participate in the study. Before assigning patients to the study's target groups, informed oral and written consent was obtained.

The eligible hemodialysis patients were assigned to the control, sham, and acupressure groups using a random allocation sequence generated based on the block randomization method with a block size of 6 and using the following card or envelope shuffling methods [23]. First, code "A" was given to the acupressure group, code "B" was given to the sham group, and code "C" was given to the control group. Next, cards with three group assignments (A, B and C), placed in sequentially numbered, opaque, and sealed envelopes. This process ensures that the person enrolling participants doesn't know which assignment is next. Then, each of the enrolled participants was requested to pick one of the envelopes. The participants who picked A, B, or C entered the acupressure, sham, or control groups, respectively (Figure 1).

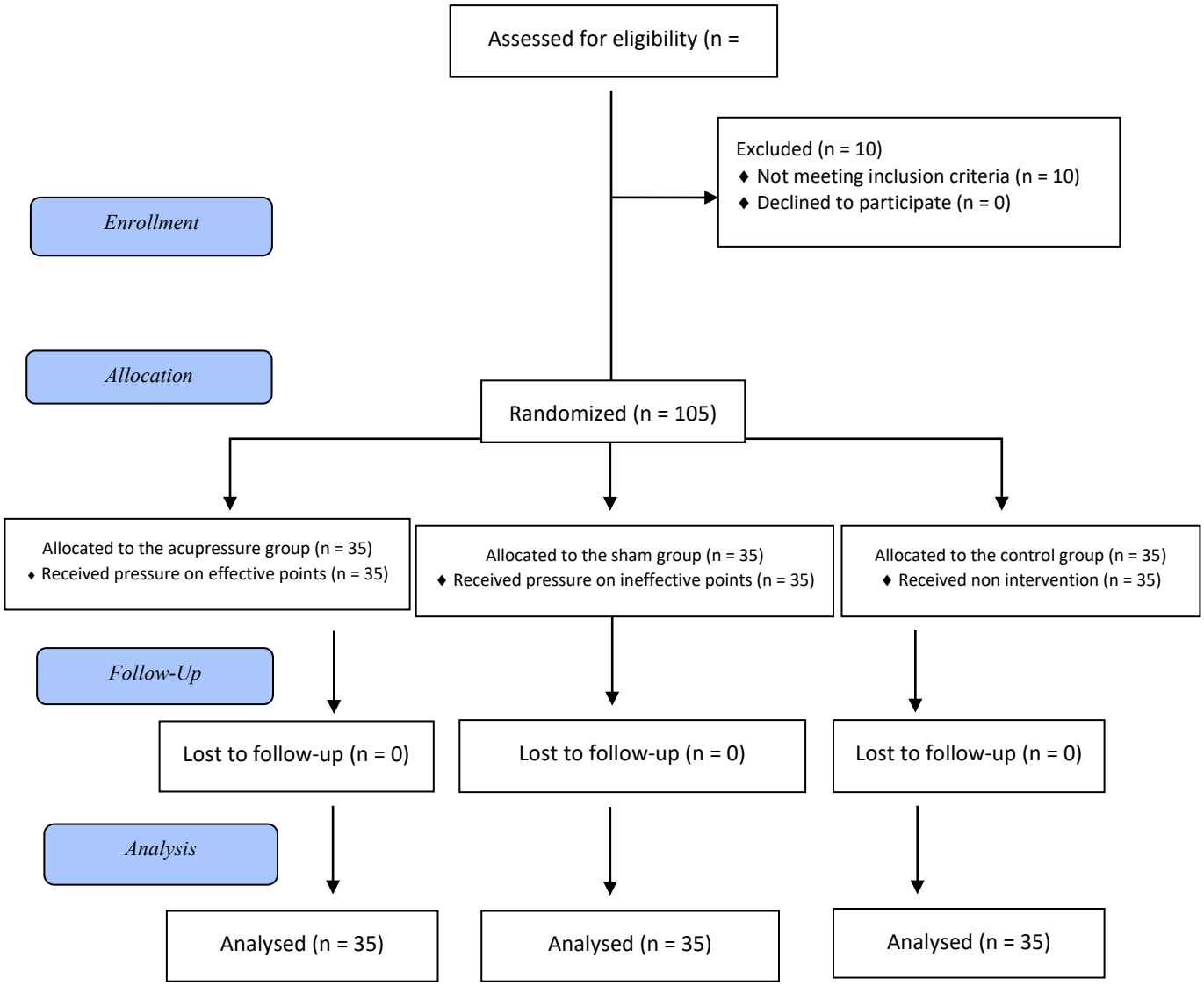

Figure 1. The process of the study is according to the CONSORT flow diagram

It should be noted that in the present study, due to the nature of the intervention, it was not possible to blind the participants. Nonetheless, an effort was made to make the sham group not realize that the acupressure points were unreal. In this study, outcome assessors was different from who administering intervention as well as data collector were unaware of the assigned groups.

Sample size: Based on previous studies [16,19] considering the probability of the type I error of 0.05 and the power of 90%, the number of samples for each group was estimated to be 28 people. However, considering the possible loss, 35 people were assigned to each group.

$$n = \frac{(z_{(1-\alpha/2)} + z_{(1-\beta)})^2(\sigma_1^2 + \sigma_2^2)}{d^2} = \frac{(1.96 + 1.28)^2(1.6^2 + 2.2^2)}{(3.8 - 5.5)^2} = 28$$

Data collection: For Data collection, three tools including a demographic questionnaire, VAS scale, and, Five-Dimensional Itching Scale were used.

Demographic questionnaire: A demographic questionnaire included age, sex, marital status, education level, job status, duration of dialysis treatment, history of receiving erythropoietin, type of dialyzer (filter), blood phosphorus levels, and consumption of foods containing phosphorus in a recent month. The questionnaire was completed by the participants before intervention in the hemodialysis ward.

VAS scale: The VAS scale was used to determine the severity of pruritus. This scale is 10 cm, the left side of which is zero, which indicates no pruritus and the right side shows a maximum of 10, which indicates unbearable pruritus. A >0–<4 points indicates mild pruritus, ≥4–<7 points indicates moderate pruritus, ≥7–<9 points indicates severe pruritus, and ≥9 points

indicates very severe pruritus. In Reich et al. (2012) VAS showed a suitable intraclass coefficient (ICC)>0.8 and, a high correlation with Verbal Rating Scale (R=0.74, P-value<0.001) [24].

In this study, the severity of pruritus was measured using the VAS scale before, 4, and 12 weeks after the intervention in the hemodialysis ward.

Five-Dimensional Itching Scale: This five-dimensional scale assesses itching based on the five dimensions of degree, duration, direction, associated disability, and distribution of it. Each of the dimensions of duration, degree, and direction consists of one question. Associated disability consists of four questions including the degree of disability in sleep, leisure/social, housework/errands, and work/school. The last dimension assesses the distribution of pruritus in 16 points of the body, which is scored based on the number of areas with pruritus. Zero to two areas get a score of one, three to five areas get a score of two, six to 10 areas get a score of three, 11 to 13 areas get a score of four, and 14 to 16 areas get a score of five. Each question is scored on a 5-point Likert scale. After calculating the score obtained from each question, the scores are added together and the final score is between 5 (no pruritus) to 25 (most severe pruritus). A score of 6–10 points indicated mild itching, 11–20 points marked moderate itching, and 21–25 points indicated severe Itching. Diagnosis of uremia pruritus was based on the following conditions: 1. the total score of pruritus, according to 5-D is between 6–25 points. 2. Meet the international diagnostic criteria for uremic pruritus and. 3. Meet the exclusion criteria [25]. In Elman et al. (2012) the score of this instrument was correlated strongly with the visual analog score (r=0·727, P-value<0.0001). Cronbach's alpha (internal consistency) of the 5-D determined 0.734; as well as, and the Bland–Altman plot demonstrated an excellent association (reliability) between repeated measures [26]. Also, the validity and reliability of the Persian version of the 5-D itching scale have been examined in Iran. The results of the internal consistency and test-retest by Cronbach's alpha 0.99, and ICC (ICC=0.98) were appropriately reported. In addition, construct validity was confirmed through correlation with numerical scoring tools (r=0.67), pruritus-related quality of life questionnaire (r=0.59) as well as exploratory factor analysis with 2 factors [27]. In this study, the dimension of pruritus was measured using the 5-D itch questionnaire before, 4, and 12 after the intervention in the hemodialysis ward.

Intervention: Patients usually arrive at the hemodialysis ward one hour before dialysis. After the start of dialysis and in the first half of each dialysis in the acupressure group, the pressure was performed on SP6, SP10, ST36, and LI11 points by trained acupressure researchers. The exact location of the points is as follows: SP6 is located on 3 cun or three finger-widths away from the Wrist, roughly in the middle of the Forearm. SP10 is located under the extended Knee posture, 2 cun superior to the medial border of the Patella on the bulge of the medial portion of the vastus medialis. ST36 is located on 3 cun inferior to ST35, one finger width lateral to the anterior crest of the Tibia, in the Tibialis anterior, and LI11 is located on the lateral end of the transverse cubital crease, at the midpoint between LU5 and the lateral epicondyle of the Humerus [9]. Body distances were measured using a unit called the Chinese anatomical inch or cun. This traditional Chinese unit of length was originally the width of a person's thumb at the knuckle, whereas the width of the two forefingers denotes 1.5 cun and the width of four fingers is three cuns. The size of the cun measurement must be adjusted according to the size of the person receiving acupressure. If the patient's hand is large, the cun will be larger; if the patient's hand is small, the cun will be smaller [28].

The acupressure group participants received muscle symmetrical pressure using the thumb pressure of the acupressure provider at the mentioned points in the order of 2 minutes of massage for each point, with a sequence of 5 seconds of massage and one second of rest. The finger's rotation speed was two times per second with an approximate pressure of 4 kg by the thumb. The amount of this pressure was adjusted and practiced on a pressure gauge before the intervention. Since these patients received acupressure bilaterally, in both upper and lower limbs, acupressure was performed in a total of 8 points for 16 minutes per person. According to Che-Yi et al. (2005), the Acupressure group received the intervention thrice weekly for a month 19. By applying the true pressure to the relevant points, a feeling of numbness, swelling, heaviness, or warmth is achieved at the desired point 29. The sham group received acupressure in non-real points (distance 1 to 1.5 cm from the real points) 30 three times a week in hemodialysis sessions for 4 weeks. In the present study, participants in the acupressure and sham groups did not report any adverse effects such as localized pain, bruising, or any other unintended effects from acupressure. In the control group, patients underwent routine hemodialysis without acupressure intervention. It is necessary to explain that using the curtains installed around each hemodialysis bed, a private environment was provided for the intervention.

Ethical consideration: This research was supported and approved under the ethical code of IR.SHMU.REC.1398.026 by Shahroud University of Medical Sciences and was registered in the clinical trial system by the code IRCT20190626044029N1. Before the study, permission to attend the study was obtained from the relevant authorities. Participants were informed of their right to leave the study without consequences and were assured that their information was confidential. The written consent form was obtained from the applicant participants.

Data analysis: Analysis was performed by a statistician who was blinded to the allocation of patients by SPSS v.25 software. Descriptive statistics including mean, standard deviation, frequency, and, percentage were used to summarize the data. The normality of the data was checked using the Shapiro–Wilk test and histogram plot and the data's distribution were not normal. Demographic characteristics were compared between the acupressure, sham, and control groups using the Mann-Whitney test, Chi-Square Test, and, Fisher's Exact Test. The Kruskal-Wallis test was used to compare median severity, the outcome of uremic pruritus, and dimensions in the acupressure, sham, and control groups before intervention and after 4 and 12-week intervention. The Bonferroni post hoc test was also used to compare the two groups. The significance level was considered P-value <0.05.

Results

In the present study, the number of patients referred to the hemodialysis ward was 115, of which 5 patients did not enter the study due to a lack of inclusion criteria (3 due to hemodialysis less than 6 months and 2 due to age over 65 years) and 5 patients (1 patient with a history of allergies and 4 patients with vascular problems) were excluded from the study. Therefore, 105 patients were randomly allocated to the acupressure (n=35), sham (n=35), and, control (n=35) groups. During the intervention, no patient dropped out, and data collected from all participants were analyzed.

Demographic characteristics and homogeneity comparisons: The median (first quarter-third quarter) age of participants in the acupressure, sham, and, control groups were 59 (51-65), 60 (49-65), and 63 (52-65) years old, respectively. The median duration of hemodialysis treatment in all patients was 24 months. The median (first quarter-third quarter) Blood phosphorus levels of participants in the acupressure, sham, and control groups were 4.2 (3.9-5.8), 4.1 (3.6-5.1), and 4.4 (3.5-5.3) mg, respectively. In terms of gender, most participants in all three groups were male. Other demographic characteristics are reported in Table 1. There were no significant differences in terms of demographic characteristics between the three groups (P-value>0.05).

Table 1. Comparison of demographic characteristics between groups

Variable	Groups N (%)			P-value
	Acupressure	Sham	Control	
Age; Median (First quartile-Third quartile), year	59 (51-65)	60 (49-65)	63 (52-65)	0.875[a]
Duration of hemodialysis treatment; Median (First quarter-Third quarter), month	24 (12-48)	24 (12-36)	24 (7-48)	0.867[a]
Blood phosphorus levels; Median (First quarter-Third quarter), mg	4.2 (3.9-5.8)	4.1 (3.6-5.1)	4.4 (3.5-5.3)	0.874[a]
Sex				
Male	22 (62.9)	19 (54.3)	20 (58.1)	0.760[b]
Female	13 (37.1)	16 (45.7)	15 (41.9)	
Marital status				
Single	5 (14.3)	8 (22.9)	6 (17.1)	0.638[c]
Married	30 (85.7)	27 (77.1)	29 (82.9)	
Education level				
Illiterate	5 (14/3)	7 (20)	10 (28.6)	
Primary	14 (40)	9 (25.7)	16 (45.7)	0.170[b]
Cycle	7 (20)	6 (17.1)	6 (17.1)	
Diploma and above	9 (25.7)	13 (37.2)	3 (8.6)	
Job-status				
Retired	9 (25.7)	9 (25.7)	8 (22.9)	
Manual worker	1 (2.9)	4 (11.4)	4 (11.4)	
Employee	2 (5.7)	1 (2.9)	3 (8.6)	0.762[c]
Housewife	11 (31.4)	14 (40)	10 (28.6)	
Free	12 (34.3)	7 (20)	10 (28.6)	
History of receiving erythropoietin				
Yes	27 (77.1)	28 (80)	26 (74.3)	0.850[b]
No	8 (22.9)	7 (20)	9 (25.7)	
Type of dialyzer (filter)				
PS	29 (82.9)	33 (94.3)	34 (97.1)	0.141[c]
Other dialyzers	6 (17.1)	2 (5.7)	1 (2.9)	
Consumption of foods containing phosphorus in a recent month				
Yes	20 (57.1)	17 (48.6)	13 (37.1)	0.243[b]
No	15 (42.9)	18 (51.4)	22 (32.9)	

[c] Fisher exact test
[a] Kruskal Wallis test
[b] Chi-square test

Severity of pruritus: As presented in Table 2, the between-groups comparison determined that the severity of pruritus significantly decreased 4 weeks and 12 weeks after the intervention (P-value<0.001). Pairwise comparisons were performed using Bonferroni post hoc test and a significant difference was observed between the severity of pruritus between acupressure and sham groups (P-value<0.001) and between acupressure and control groups (P-value<0.001) 4 weeks and 12 weeks after the intervention. However, no significant difference was reported between sham and control groups 4 weeks and 12 weeks after the intervention (P-value>0.999).

Table 2. Median (interquartile range) severity of pruritus before and after intervention in the study groups

Variable	Time	Groups Median (First quartile-Third quartile)			Effect size (Median differences between two groups)			Between-group comparison P-valuea
		Acupressure	Sham	Control	Acupressure and Sham	Acupressure and Control	Sham and Control	
Severity of pruritus	Before intervention	6 (5-7)	6 (5-7)	5 (4-7)	0	1	1	0.773
	4 weeks after the intervention	3 (2-4)	5(4-5)	5 (4-7)	-2	-2	0	<0.001
	12 weeks after intervention	2 (0-3)	5 (3-7)	5 (4-7)	-3	-3	0	<0.001

[a] Kruskal Wallis test

The outcome of Uremic Pruritus: According to Table 3, the between-groups comparison determined that the Outcome of pruritus significantly decreased 4 weeks and 12 weeks after the intervention (P-value<0.001). Pairwise comparisons were performed using Bonferroni post hoc test and a significant difference was observed between the Outcome of pruritus between acupressure and sham groups only 12 weeks after the intervention (P-value<0.001) and between acupressure and control 4 and 12 weeks after the intervention (P-value<0.001). Also, a significant difference was reported between sham and control groups 4 and 12 weeks after intervention (P-value<0.001).

Table 3. Median (interquartile range) outcome of pruritus before and after intervention in the study groups

Variable	Time	Groups Median (First quartile-Third quartile)	Effect size (Median differences between two groups)	Between-group comparison P-valuea

		Acupressure	Sham	Control	Acupressure and Sham	Acupressure and Control	Sham and Control	
Outcome of pruritus	Before intervention	15 (14-17)	14 (13-16)	15(13-18)	1	0	-1	0.542
	4 weeks after the intervention	13 (7-10)	13 (11-13)	15(12-14)	0	-2	-2	<0.001
	12 weeks after intervention	7 (4-9)	11(3-9)	13(10-15)	-4	-6	-2	<0.001

[a] Kruskal Wallis test

Outcome uremic pruritus domains: Median (first quartile-third quartile) Outcome of uremic pruritus domains before intervention and 4 and 12 weeks after the intervention in the three groups are shown in Table 4. The between-groups comparison determined that the Outcome of uremic pruritus in all domains significantly improved 4 and 12 weeks after the intervention (P-value<0.05).

Table 4. Median (interquartile range) of the outcome of uremic pruritus before and after intervention in the study groups

Variable	Time	Domains	Groups Median (First quartile-Third quartile)			Effect size (Median differences between two groups)			Between-group comparison P-valuea
			Acupressure	Sham	Control	Acupressure and Sham	Acupressure and Control	Sham and Control	
The outcome of uremic pruritus domains	Before intervention	Duration	3(2-4)	2(2-3)	3(2-4)	1	0	-1	0.583
		Degree	3(2-4)	3(2-4)	3(2-4)	0	0	0	0.571
		Direction	3(2-4)	3(2-4)	3(2-4)	0	0	0	0.879
		Associated disability	4(5-3)	4(5-3)	4(5-3)	0	0	0	0.748
		Distribution of pruritus	2(1-2)	2(1-3)	2(1-3)	0	0	0	0.221
	4 weeks after intervention	Duration	1(1-2)	2(1-3)	2(1-3)	-1	-1	0	0.008
		Degree	1(1-2)	2(1-4)	3(2-4)	-1	-2	-1	<0.001
		Direction	1(1-2)	2(2-4)	2(2-3)	-1	-1	0	0.005
		Associated disability	3(2-4)	4(3-4)	4(3-5)	-1	-1	0	0.010
		Distribution of pruritus	1(1-2)	1(1-2)	2(1-3)	0	-1	-1	0.039
	12 weeks after intervention	Duration	1(1-1)	1(1-3)	2(1-3)	0	-1	-1	0.002
		Degree	1(1-1)	1(1-4)	2(1-4)	0	-1	-1	<0.001
		Direction	1(1-1)	2(1-3)	2(1-3)	-1	-1	0	<0.001
		Associated disability	2(1-3)	3(2-4)	4(3-5)	-1	-2	-1	<0.001
		Distribution of pruritus	1(0-2)	1(1-2)	2(1-3)	0	-1	-1	0.005

[a] Kruskal Wallis test

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Discussion

This study was performed to determine the effect of acupressure on the severity and outcome of uremic pruritus in hemodialysis patients. The results of the present study show that the severity and quality of pruritus and related domains after the intervention in the acupressure group had significantly improved compared to sham and control groups and this effect lasted for up to 12 weeks. The result of the present revealed that the use of acupressure can reduce the severity of pruritus 4 and 12 weeks after intervention. Overall, acupoint stimulation may provide benefits to patients with dermatological problems [31]. Consistent with our findings, recent studies reported that applying acupressure can reduce the severity of pruritus in hemodialysis patients [9,14,32]. In addition, in the study of Akça and Taşcı two methods of acupressure and electrical stimulation were compared in terms of effectiveness on the severity of uremic pruritus and both methods were equally effective in reducing the severity of pruritus [16].

The cause of pruritus in these patients is not completely known, but there are probably factors such as activation of the inflammatory system, increased levels of histamine, mast cells, and eosinophils, a uremic toxin, hyperparathyroidism, internal opioid imbalance due to over-activation of the mu receptor and blockage of the kappa receptor, etc. are involved in creating this unpleasant feeling [3].

According to Chinese medicine, pruritus is caused by an imbalance and activation of mu receptors and blockage of kappa receptors, and acupressure by stimulating specific points can activate kappa receptors [33] Also the anticoagulant effects of acupressure can also activate opioid alpha receptors, which decrease effect uremic pruritus [9].

As well as, previous studies reported that stimulation of acupressure points reduces pruritus symptoms by reducing histamine levels [34], inhibiting mast cells, induction of anti-inflammatory effects [35-37], and reducing phosphorus and parathyroid hormone levels [9,38,39]. Acupuncture has an anti-inflammatory role by activating the hypothalamic-pituitary axis and changing the inflammatory response by increasing the secretion of adrenocorticotropic hormone and cortisol, preventing the use of corticosteroids and their side effects [40,41].

Other results of the present study show that 4 weeks after the intervention patients in the acupressure group reported a decrease in the outcome of UP, however, it is not very clear and the improvement of outcome of UP results from acupressure intervention in the 12th week is better shown. Elman etc. stated that the use of the 5-D itch scale can study the changes caused by itching in these patients over time and suggested that this tool is useful in investigating the outcome caused by itching that can be used in clinical trials [26]. This is the first study that used this tool to investigate the effect of acupressure intervention.

The results of the study show that uremic pruritus has a negative outcome on all dimensions, including duration, degree, direction, disability, and distribution and the intervention of acupressure can improve all dimensions affected by uremic pruritus. Of course, a decrease in the final score and all dimensions was observed in the sham and control groups, but it was more noticeable in the acupressure group. It should be mentioned that uremic pruritus in these patients changes drastically over time [42] and may be improved or reduced substantially in the other group [3].

In the study of Altınok Ersoy and Akyar, uremic pruritus leads to patient suffering in all the above-mentioned dimensions and it is emphasized to deal with the dimensions affected by pruritus to carry out effective interventions in this field [43]. On the other hand, in addition to the negative effect on various aspects of life, since UP indicates systemic inflammation and inflammation can increase the risk of cardiovascular diseases; in Weng et al studies, this symptom is known as a predictor of death due to cardiovascular complications within 24 months [44]. Addressing this issue is one of the priorities, and considering the various treatment methods that exist for this great suffering, the most economical and safest method that can be used for these patients should be identified [45]. Drug treatments such as gabapentin, antihistamines, etc. are effective in itching, but due to renal excretion of these drugs and impaired glomerular filtration, these patients should be carefully prescribed and be careful of drug side effects such as dizziness and drowsiness [46].

In some cases when the management of this symptom fails, if the patients have suitable medical conditions, they may be placed at the top of the transplant list to get rid of this symptom with a kidney transplant [42].

Conclusion: Overall, the present study's findings showed that acupressure in SP 6, SP 10, ST 36, and L I11 points significantly reduced the severity of pruritus and improved pruritus quality in hemodialysis patients. Given the simplicity of this intervention and its safety and security, it seems that acupressure can be used as a complementary treatment to reduce uremic itching in hemodialysis patients, by the patient or another person. On the other hand, it does not require any special equipment and does not cost anything.

Strengths and Limitations: Although positive results were obtained from the present study, there were some limitations in implementing this plan, including the fact that itching can be affected by various physical, psychological, and environmental factors, which cannot be controlled completely by the researcher. However, the researcher tried to control these factors by having a sham and control group and creating special entry and exit criteria. Due to patients' unwillingness and lack of time, this study's limitation is its short intervention period. It is recommended to increase the duration of interventions in future studies. Despite not training the patients or their family members, they might attempt to perform the massage and pressure correctly or incorrectly, which the researcher could not control. In this study, the effect of acupressure on one of the complications of hemodialysis was only discussed. Therefore, it is suggested to investigate acupressure's effect on other complications of hemodialysis in similar studies.

Implications for Practice: Acupressure is an easy and safe technique and can be easily performed by patients and their

families at home. Nurses can also easily learn this technique in patients' clinics to teach it to patients and their families.

Ethical Considerations

The research was approved by a university ethics committee (Medical Ethics). Ethics Committee of Shahroud University of Medical Sciences Reference number IR.SHMU.REC.1398.026 and all respondents permitted by a signed letter of informed consent.

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Conflict of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results**.**

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