



Reflexology as an adjunctive nursing intervention for management of nausea in hemodialysis patients: A randomized clinical trial



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ABSTRACT

Introduction: Nausea is common side effect of hemodialysis. Nonpharmacological methods such as reflexology or other branches of integrative medicine can be used to control nausea. The aim of this study was to determine the effect of reflexology on nausea in hemodialysis patients.

Methods: This study was a double-blind randomized clinical trial conducted from March 2018 to June 2018 at the Arak Dialysis Center, Iran, in which 72 eligible hemodialysis patients were randomly assigned into intervention (n = 36) and control (n = 36) groups. Reflexology was performed on the solar plexus and soles of the feet once (30 min per session) per day for twelve days, one hour after the onset of hemodialysis in the area of nausea on the solar plexus and on the soles of the feet.

Results: The results showed there was no significant difference in severity of nausea (P = 0.28) between the two groups before intervention. However, after intervention the severity of nausea in the 3rd, 6th, 9th, and 12th days in the intervention group was significantly lower than the control group.

Conclusions: The results showed that reflexology had a positive effect on reducing the severity of nausea in hemodialysis patients. Therefore, reflexology is recommended as part of nursing care to reduce patient suffering. Universities can train students in reflexology and managers can use the protocols to apply this method to reduce patient discomfort during hemodialysis.

1. Introduction

Renal failure (RF) is a condition in which the kidneys are unable to perform their functions [1]. RF includes acute renal failure (ARF) and chronic renal failure (CRF) [2,3]. CRF ultimately leads to end-stage renal disease. The prevalence and incidence of end-stage renal disease (ESRD) are increasing globally, and ESRD's frequency is a heavy financial burden for healthcare services [4]. In 2012, the number of people affected globally by ESRD was estimated at 2,286,000. The percent of ESRD patients receiving dialysis was 78%. The percent of ESRD patients receiving kidney transplantation was 22% [5]. ESRD in Iran is also rising. The number of Iranian patients in 2014 was reported at 28,000, and this number is expected to reach 90,000 by 2021 [6].

Kidney disease has a progressive degradation process and there are no clear clinical signs for diagnosis. In cases lacking a clear diagnosis, kidney destruction continues and the patient need for dialysis increases (hemodialysis or peritoneal dialysis) along with the likelihood of kidney transplant [2,3].

Dialysis is a process in which liquids and metabolic waste products are removed from the body [3]. Hemodialysis is one of the most common renal replacement therapies (RRTs) for patients with end-stage renal disease. However, it is always a stressful process which has drastic effects on physical and mental aspects of a patient's life [6–10]. Common complications of hemodialysis include: hypotension, muscle cramps, nausea and vomiting, headache, chest pain, back pain, fever, and chills [11,12]. Complicated by several factors, nausea and vomiting

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occur in more than a quarter of hemodialysis cases. In most patients, nausea and vomiting are associated with a reduction in blood pressure during hemodialysis. Nausea and vomiting may also be the primary symptom of disequilibrium syndrome. High anxiety associated with dialysis is another major cause of nausea and vomiting, which occurs after hemodialysis [13]. Nausea and vomiting cause a reduction in time allowed for dialysis which makes dialysis more difficult, because not enough time is allowed for proper treatment [13]. Nausea and subsequent vomiting are side effects of hemodialysis which deteriorate patient quality of life. Patients experiencing nausea leads to reduced self-esteem and social isolation, and generally affects all aspects of quality of life. Nausea and vomiting make hemodialysis unpleasant for patients and may thus lead to the early discontinuation of hemodialysis, thereby creating an undesirable inadequacy of hemodialysis despite its high costs. Generally, resolving these problems leads to a greater longevity and a better quality of life [11,12]. One of the methods of controlling nausea during patient dialysis is the use of anti-nausea drugs, which include side effects such as dystonic reactions, extrapyramidal symptoms, dizziness, restlessness, fatigue, and drowsiness [14]. Hemodialysis complications reduce patient quality of life. Solving these problems will lead to an increase of patient quality of life.

One significant role of nurses is to provide comfortable conditions for patients, which is simple and inexpensive [13]. Application of integrative medicine is a simple and recently more popular widely-used method for treating various diseases [15–17]. In an Iranian study by Adib-Hajbagheri et al. 77.8% of health care staff showed interest in learning about integrative medicine. Also, 57.6% of participants experienced personal use of complementary and traditional therapies [18]. A branch of integrative medicine, massage therapy increases blood circulation, reduces blood pressure, reduces stress, improves digestive system function, stimulates the lymphatic system, and improves the function of the autonomic nervous system. Massage therapy also leads to the secretion of endorphins and is effective in reducing pain and insomnia [16,19,20].

Reflexology is a practice that may resemble massage, but can be defined as the science of stimulating points (usually on the palm and under feet) that are associated with internal organs of the body [21]. The history of reflexology dates back to 2000 B.C.E. in ancient China. Reflexologists believe that each internal organ has a reflection point on the palms, in the ears, and under the feet [22,23]. Recently, the tendency to apply reflexology as a treatment for pain relief has been increasing [24]. Reflexology is a beneficial and non-invasive method and is can save time and energy [17,25–27]. Reflexology is considered part of nursing care and can serve to improve the quality of the nurse-patient relationship [25,26,28–30]. Nurses serve as crucial members of clinical teams in managing complications. Furthermore, since reflexology is one of the branches of integrative medicine, reflexology can be considered an aspect of nursing care [31]. Consequently, this study was conducted to determine the effect of an integrative medicine-based nursing intervention on nausea in hemodialysis patients.

2. Methods

2.1. Study design and setting

This study is a double blind, randomized, clinical trial that was conducted on 72 hemodialysis patients referred to Arak dialysis center of Vali-e-asr Hospital (from March 2018 until June 2018).

2.2. Participants

After obtaining the informed consent form, according to CONSORT guidelines, 186 patients were first assessed for eligibility for this study. Among the 186 patients, 107 patients were excluded (Fig. 1). According to the inclusion criteria, the samples were divided into intervention (n = 36) and control (n = 36) groups using a randomized block

allocation method. To be considered for inclusion, patients were required to have no dependence on opioids, no alcohol use, no vision disorder, and no skin disease (e.g., infectious diseases on the feet). The inclusion criteria also necessitated that participants be aged 18–65 years old and suffer from nausea from hemodialysis. Those patients who freely withdrew from the study were excluded. In addition, patients of both groups received an antiemetic drug with a specified dose (Ampoule Ondansetron, 4 mg, Intravenous infusion) prescribed by physician (nephrologist) immediately after the onset of hemodialysis.

2.3. Tools

2.3.1. Demographic questionnaire

The demographic questionnaire includes: age, sex, level of education, marital status, job status, and history of hemodialysis. The second author completed the questionnaires through personal interviews and by using medical records.

2.3.2. Visual analog scale

The visual analog scale (VAS) was used to assess the severity of nausea. The VAS is a reliable tool that has been used in various studies to determine the intensity of pain, nausea, and vomiting [32,33]. The VAS validity and reliability have been investigated in Iran as well as globally [34,35]. This standard tool is scaled from 0 to 100 mm. A score of 0–20 mm indicates lack of nausea. A score of 21–40 indicates mild nausea. A score of 41–60 indicates severe nausea. A score of 61–80 indicates very severe nausea and a score of 81–100 indicates worst possible nausea.

2.4. Intervention

The Rwo Shur method of reflexology was used in this study. The Rwo Shur method is a combination of thumb-sliding and pressure techniques. The first author, who is the qualified reflexologist (trained with Malaysian reflexologist and certified in the Shahid Beheshti University of Medical Sciences in Tehran) performed the intervention. A dialysis nurse completed the nausea evaluation form. In this study the participants (allocated to intervention and control groups) and those assessing outcomes were blind to the allocations. In the intervention group, along with the standard care at the beginning of the study, researchers measured nausea severity using the VAS. Researchers then rubbed the patients' feet during hemodialysis. The dorsal and the plantar surfaces of the feet were then lubricated with natural sesame oil. Researchers then initiated the intervention. The first author carried out the reflexology intervention and a nurse assisted in collecting the data. In order to avoid bias in results, the nurse was blind to the randomization of the study and was unaware of which patient belonged to which group. Reflexology was done on the solar plexus and soles of the feet once (30 min per session) per day for 12 days, 1 hour after the onset of hemodialysis in the area of nausea on the solar plexus and on the soles of the feet [19,36–38]. Reflexology was performed with slow speed, regular rhythm and depths of one to three mm. In this study performed on hemodialysis patients, all patients were present at the same time in the dialysis unit and interacted with each other. The researchers assumed that the presence of a researcher at the patient's bedside might have affected their nausea. Therefore, in order to control the effect of the researcher's presence and in order to match the two groups, foot massage was used in the control group. Using the VAS, researchers evaluated the severity of nausea 10–15 min after intervention and daily thereafter.

2.5. Statistical analysis

Researchers used SPSS-16 to analyze the data. The normality of the variables was assessed using the Kolmogorov Smirnov (K-S) test. The Chi-square tests for assessing the similarity of both groups in terms of

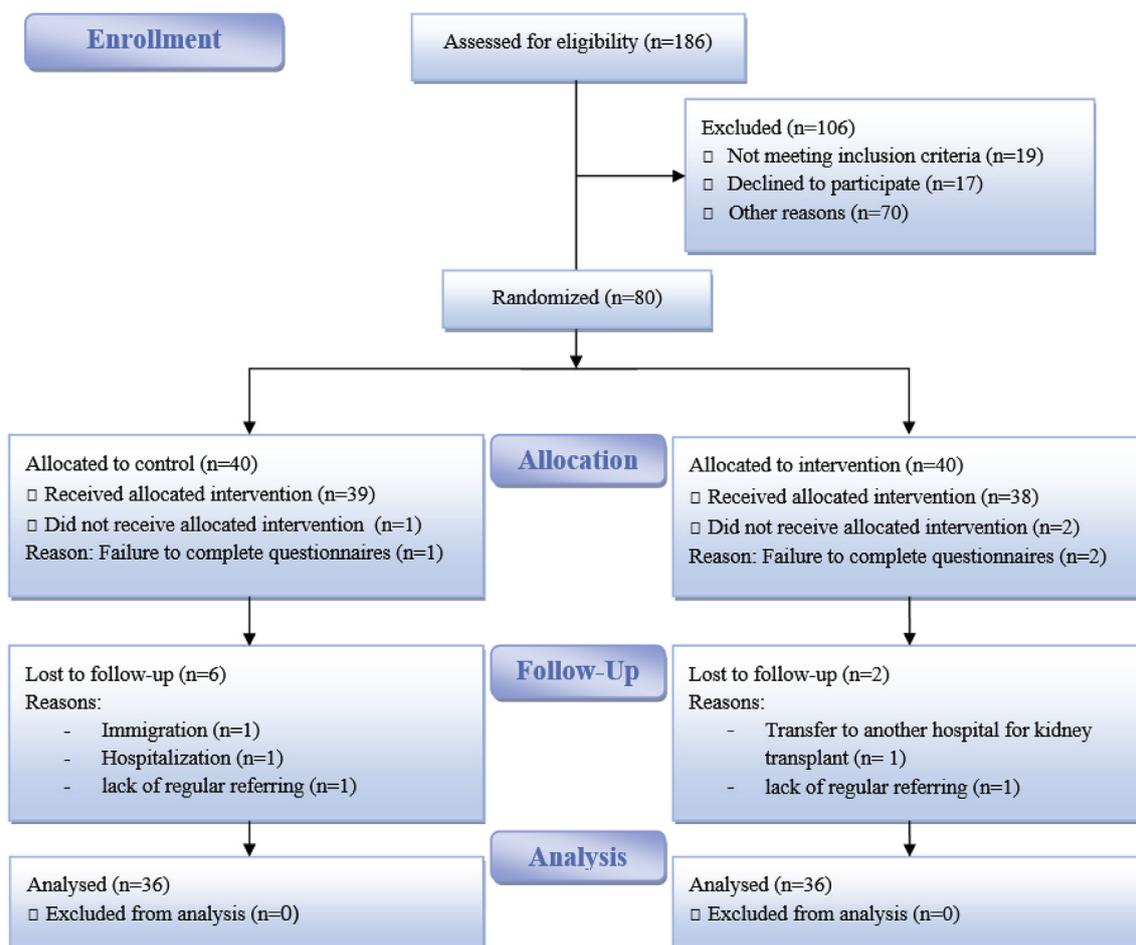


Fig. 1. CONSORT flow diagram of participants.

the demographic characteristics were used. The independent *t*-test was used to compare the mean scores between the two groups. Researchers also used the repeated measures analysis of variance to compare the scores throughout the stages in each group. The level of statistical significance was considered to be less than 0.05.

2.6. Ethical statement

This study was registered in Iranian Registry of Clinical Trials (IRCT20161210031328N7). The Ethics Committee of Arak Medical University (IR.ARAKMU.REC.1396.242) also approved the study. At the start of the study, the aims and benefits of study were explained to all families, patients and authorities. Then all participants signed written informed consent forms. Questionnaires were completed confidentially without name and were based on code. All the basic principles of the Helsinki Declaration have been respected in the study.

3. Results

This study reports the effect of the reflexology on nausea of hemodialysis patients referred to a dialysis center in Arak. In this study, 72 hemodialysis patients aged 18–65 years old participated. Of the participants, 50% of the patients were male and 50% were female. The mean age of patients was 62.87 ± 8.06 years in both groups, with an average of 61.83 ± 8.49 years for the intervention group, and 63.92 ± 9.62 years for the control group. The majority of the participants were illiterate. Furthermore, 77.78% of participants in the intervention group and 61.12% in the control group were married. The other socio-demographic characteristics of the participants are shown in Table 1

(Table 1). All patients in the intervention and control groups had government insurance. The results of the study showed that there was no significant difference ($p = 28$) before the intervention for the severity of nausea between the intervention and control groups. However, in the third ($p = 0.03$), sixth ($p = 0.01$), ninth ($p = 0.01$) and twelfth ($p = 0.001$) days after the intervention, the severity of nausea in the intervention group was significantly lower than the control group (Table 2).

4. Discussion

Nausea is common side effect of hemodialysis experienced by hemodialysis patients [11]. The aim of this study was to investigate the effect of reflexology on nausea in hemodialysis patients. The results of this study showed there was no significant difference between the intervention and control groups in terms of the demographic variables including age, sex, level of education, frequency of hemodialysis per week, and employment status. The results also showed that in the beginning of the study, hemodialysis patients had no significant difference in terms of severity of nausea in both intervention and control groups. But at the end of the study, there was a significant difference between the intervention and control groups in terms of severity of nausea. The severity of nausea in the intervention group was lower than the control group. Ozdelikara et al. showed the severity of nausea and vomiting after intervention (reflexology) were significantly reduced. In other words, the severity of nausea and the frequency of vomiting in the intervention group were significantly lower than the control group [39]. The results of this study are similar to the Ozdelikara et al. study.

Samir et al. studied the effect of foot reflexology on anxiety in

Table 1
Demographic characteristics of participants (n = 72).

Variable		Group		Statistical test	p-value
		Intervention (n = 36)	Control (n = 36)		
Age (year)	Mean ± SD	61.83 ± 8.49	63.92 ± 9.62	t-test	0.36
	Category	Number (%)	Number (%)		
Gender	Male	19 (26.39)	18 (25)	χ^2	0.19
	Female	17 (23.61)	18 (25)		
Marital status	Single	8 (11.11)	14 (19.44)	χ^2	0.53
	Married	28 (38.89)	22 (30.56)		
Educational level	Illiterate	23 (31.94)	27 (37.5)	χ^2	0.49
	Primary education	9 (12.5)	6 (8.33)		
	High school degree	3 (4.17)	3 (4.17)		
Job status	Academic education	1 (1.39)	0 (0)	χ^2	0.96
	Employee	7 (9.72)	6 (8.33)		
	Self-employment	10 (13.89)	9 (12.5)		
	Unemployed	3 (4.17)	4 (5.56)		
	Retired	16 (22.22)	17 (23.61)		

Table 2
Comparison of the mean and standard deviation of nausea, before and after the intervention in both groups.

Intervention time	Groups		p-value
	Intervention (n = 36) Mean ± SD	Control (n = 36) Mean ± SD	
Before intervention	6.49 ± 1.43	6.12 ± 1.74	0.28
3 day after intervention	4.24 ± 1.41	5.96 ± 1.62	0.01
6 day after intervention	3.46 ± 1.16	5.54 ± 1.51	0.01
9 day after intervention	2.21 ± 1.27	6.26 ± 1.49	0.001
12 day after intervention	1.31 ± 1.06	5.64 ± 1.64	0.001

patients undergoing hemodialysis. The results of their study showed there was a significant difference between the anxiety score in the intervention group before and after the study [40]. Reflexology reduced the level of anxiety in patients. It seems reflexology decreases the severity of nausea indirectly by reducing other complications of dialysis, such as anxiety (as one of the reasons for nausea). However, further studies are needed in this regard. Dashtbozorgi aimed to evaluate the effect of massage therapy on common complications of chemotherapy patients and showed that the severity of nausea and vomiting in the second, third and fourth day after the intervention between the control and intervention groups had no significant difference [32].

The results of this study are different than the Dashtbozorgi study. It is likely that the cause of this difference is the type of intervention. In the Dashtbozorgi study, back massage using stroke and nidding massage was performed [32]. Comparison of the severity of nausea in the intervention and control groups before and after the intervention showed that the severity of nausea in the third, sixth, ninth, and twelfth sessions after reflexology in the intervention group was significantly lower than the control group. The researchers compared the severity of nausea in the intervention and control groups before and after the intervention. After examining the data at four stages in the study (i.e., day 3, day 6, day 9, and day 12), the severity of the nausea post-reflexology in the intervention group was significantly lower than the control group. Miandoab et al. likewise evaluated the effect of reflexology on nausea, vomiting, and fatigue during chemotherapy for patient breast cancer. They showed that at the end of the study, the mean score of fatigue and severity of nausea and vomiting in the intervention group was significantly lower than the control group [41]. The results of our study are similar to Miandoab et al.

Research indicates that reflexology also affects other hemodialysis patient complications. Similar studies have shown that in addition to reducing the severity of patient nausea, fatigue, and pain, reflexology is

also effective in reducing anxiety and improving physiological and respiration indices in patients [42–44]. Shaer Moghadam et al. showed significant differences between fatigue mean scores in the intervention and control groups at the end of the third and fifth weeks (fatigue reduction) [45]. However, after examining the effect of foot reflexology on physiologic parameters and mechanical ventilation weaning time in patients undergoing open-heart surgery, Ebadi et al. found that foot reflexology had no effect on physiological parameters [46]. Yet researchers found no harmful or dangerous effects of reflexology according to searches using available resources and databases. Reflexology is part and parcel of therapeutic touch as well as independent nursing care. Reflexology can also be easy and practical for nurses. The main limitation of this study was the small sample size, so the present findings must be confirmed in a larger study. Another limitation of our study was the evaluation of one variable (nausea). Therefore, it is recommended to future studies assess the further variables such as fatigue, sleep quality, etc. The third limitation is that there was no follow-up after the 12-day intervention to assess whether the beneficial effects of reflexology persisted. Anxiety is one of the causes of nausea in hemodialysis patients. Therefore, evaluation of the effect of reflexology on anxiety as one of the causes of nausea in hemodialysis patients is recommended in future studies.

5. Conclusion

The study findings indicate that foot reflexology is an effective nursing intervention for reducing nausea in hemodialysis patients. Reflexology is a cost-beneficial and non-invasive procedure and is not unpleasant for patients. Reflexology does not interfere with patients' privacy and is an approach to improve the nurse-patient relationship. Reflexology provides a new strategy to satisfy patients' needs and play a part in comprehensive nursing care. Also, reflexology can be addressed as a part of therapeutic management and nursing interventions due to its simplicity.

Disclosure of interest

The authors declare that they have no any conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ctcp.2019.04.006>.

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