Conference Paper

Application of Acupressure in Reducing Pruritus Scale in Hemodialysis Patients

Yuanita Panma[1], Krisna Yetti[2], and Lestari Sukmarini[3]

[1]Medical-Surgical Nursing Department, Akademi Keperawatan Pasar Rebo Jl. Tanah Merdeka, no.16,17,18 Pasar Rebo, Jakarta Timur 13750, Indonesia
[2]Basic Science and Fundamental of Nursing, Faculty of Nursing, Universitas Indonesia
[3]Medical-Surgical Nursing Department, Faculty of Nursing, Universitas Indonesia

ORCID:
Yuanita Panma: https://orcid.org/0000-0001-6416-6091

Abstract

Pruritus is a common problem in patients with chronic kidney disease who undergo dialysis. It is characterized by an uncomfortable sensation that leads to scratching. Acupressure is a complementary method used to manage various symptoms and health problems, including pruritus. This study aims to identify the effect of acupressure at the LI-11 point in reducing pruritus in a hemodialysis patient. This study used pre-experimental research with pre- and post-test without control. This study occurs in a hemodialysis unit in Central Jakarta, Indonesia. The sample was comprised of 19 respondents in the hemodialysis unit who met the inclusion criteria and completed the study. Respondents received acupressure in the LI-11 point two times per week for four weeks for a total of eight sessions. Data were collected using individual characteristics questionnaire, pruritus characteristics, and Visual Analog Scale (VAS) for pruritus. The data analysis used was a dependent t-test. The majority of respondents were male with duration of hemodialysis 5 hours, mean of age 53 years, mean of length of HD is 53 months, mean of Hb level is 9.67 gr/dl, mean of urea level is 117.05 mg/dl, mean of creatinine is 10.26 mg/dl. The results indicate that acupressure has a significant effect in reducing of pruritus scale (*p*-value 0,000). This study recommends nurses to be able to use acupressure therapy to reduce the scale of pruritus experienced by hemodialysis patients.

Keywords: acupressure, pruritus, hemodialysis

Corresponding Author:
Yuanita Panma
nersyuan@gmail.com

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1. Introduction

Dialysis is a therapy for chronic renal failure patients where the diffusion of molecules in solution through a semipermeable membrane occurs along the electrochemical concentration gradient [1]. In Indonesia, the number of patients with hemodialysis has increased every year. At the end of 2016 there were 25,226 new hemodialysis patients, and 52,835 active patients. In 2017 there were 30,831 new hemodialysis patients, and 77,892 active patients. This figure continues to increase in 2018 where there were

66,433 new hemodialysis patients, and 132,142 active patients [2]. Pruritus is commonly seen in hemodialysis patient. The prevalence of pruritus was quite high where 83.4% of Hemodialysis (HD) patients experienced pruritus with a pruritus Visual Analog Scales (VAS) score of 4.86 $\pm$ 3.01[3]. In Indonesia, pruritus incidence during hemodialysis in 2017 reached 9,448 cases and increased in 2018 to 10,807 cases [2].

The cause of pruritus itself is still unclear and controversial, pruritus is also believed to be caused by a multifactor. According to previous studies, pruritus can be caused by anemia, uremia, disorders of the balance of phosphorus, calcium, and magnesium ions, secondary hyperparathyroidism, inadequate dialysis, the tools used during HD and sensitivity to dialysate [4, 5]. In a study by Ozen *et al* [6] regarding the factors that influence pruritus, it was found that patients with high levels of leukocytes and dry skin types experienced severe pruritus. Oliviera *et al* [7] found that pruritus has a high prevalence in high creatinine levels and low hemoglobin levels. Oliviera *et al* [7] also mention that high pruritus intensity can be affected by dyslipidemia, obesity, and high C-Reactive Protein (CRP) levels. In contrast, the low intensity of pruritus is associated with the use of a high flow dialyzer.

Pruritus dramatically affects the life of hemodialysis patients. Pruritus can reduce the quality of life, cause sleep disturbances, emotional disorders such as anxiety and depression, and social relationship disorders [4, 5, 8, 9]. Apart from that, pruritus also contributes to the development of skin and soft tissue lesions [10]. Pruritus is associated with increased morbidity and mortality and affects nearly 90% of dialysis patients [11]. Data from International Dialysis Outcome and Practice Study (DOPPS) indicate that the risk of death in patients with pruritus was > 17% in 18,000 HD patients [12].

The severity of pruritus can vary from time to time, from the unseen to the itching that causes permanent discomfort, and these symptoms can occasionally or persistently [13]. The distribution of itching is often equally symmetrical but can also occur locally on the back, face, and arms or throughout the body [4]. The most affected pruritus areas are the back, but the head, abdomen, and arms are also frequently affected. Diabetes mellitus patients with CKD often present keratotic nodules representing prurigo nodules and are a marker of severe long-term pruritus[13]. Various treatments have been carried out to treat pruritus, divided into pharmacological and non-pharmacological therapy. The pharmacological therapy that is often used is oral antihistamines (such as cetirizine, hydroxyzine,loratadine, desloratadine), ondansentron, gabapentin, naltrexone / nalbufine, thalidomide, topical tacrolimus, and UV light [14]. The non-pharmacological therapies for pruritus are phototherapy, acupuncture, nerve stimulation therapy, meditation, cryotherapy, psychotherapy, textiles, and acupressure [15–17]

Acupressure is one of the therapeutic options for dealing with pruritus complaints experienced by patients. Acupressure is a complementary method that uses pressure and massage on acupoints, using the tips of the fingers, palms, small beads, or devices [18]. Acupressure is non-invasive, simple, safe, and cost-effective, so it is widely recommended to treat symptoms and health problems [19]. Song et al. [20] conducted a systematic review of ten studies consisting of eight Randomized Controlled Trials (RCTs), and two quasi-RCTs reported positive effects and effective symptom management on nausea and vomiting in cancer, allergies, respiratory diseases, stress/fatigue, sleep disturbances and pain in dysmenorrhea. Research conducted by Akca and Tasci [21] shows that acupressure and Transcutaneous Electric Acupuncture point Stimulation (TEAS) effectively reduces uremic pruritus hemodialysis patients. The systematic review and meta-analysis study conducted by Aval et al [18] shows that acupuncture or acupressure effectively manages uremic pruritus.

The Randomized Controlled Trial study was conducted by Akca & Tasci [21] in Turkey to determine its effectiveness of acupressure and transcutaneous electric acupuncture point stimulation (TEAS) in reducing pruritus. Respondents were divided into three groups into the acupressure group, TEAS group, and control group. The intervention group received acupressure therapy or TEAS 3 times/week for four weeks for a total of 12 sessions. The acupuncture point used is the LI-11 point on the arm. This study was followed by 75 respondents. The results showed that patients who received acupressure intervention and TEAS experienced a significant reduction in pruritus than patients in the control group. And, there was no difference in results between the acupressure groups and the TEAS group.

Acupressure promotes health by increasing blood circulation, the secretion of neurotransmitters [19]. The mechanism of action of acupressure in reducing pruritus is still unknown. Still, there have been many studies on acupressure's mechanism in reducing pruritus that is suspected mainly through the mechanism of immunological action. Acupuncture can work through the equilibrium of μ and κ opioid receptors and works through the effect of acupuncture on neuropathy [20, 21].

Research on the effectiveness of acupressure for symptom management has been researched over the last few years, at various acupressure points such as SP6, ST36, SP10, LI-11, and auricular points such as CO10, CO14, CO15, C018, TF4, and AT4 [16, 17, 21]. The purpose of this study is to identify the effectiveness of acupressure at point LI-11 in reducing pruritus.

Figure 1: LI-11 acupressure point (Akca & Tasci, 2016)

2. Methods and Equipment

2.1. Methods

2.1.1. Design

This study was carried out in the form of pre-experimental research with pre and post-test without control. This study conduvted in one of the hemodialysis units in Central Jakarta in April-May 2018.

2.1.2. Sample

Sampling was carried out by the total sampling technique of hemodialysis patients who experienced pruritus. The pruritus level was identified using the Visual Analog Scale (VAS) for pruritus [24]. There were 19 respondents who met the inclusion criteria. The inclusion criteria of this study were outpatients undergoing hemodialysis for at least six months, VAS pruritus $\geq$ 3, able to communicate verbally in Indonesian, willing to be a respondent, not having a skin disease, liver disease, cancer, soft tissue disease, or blood vessels in limb, not undergoing surgery, limb amputation.

2.1.3. Instrument

Data collection instruments used were respondent characteristic sheets, pruritus Visual Analog Scale (VAS) to assess the pruritus scale in hemodialysis patients, and characteristic pruritus sheets. The respondent characteristic sheet contains gender, education level, occupation, marital status, duration of HD, age, length of HD, hemoglobin level, ureum pre HD, and creatinine pre HD. The pruritus characteristic sheet contains several parameters, namely: pruritus area (local or systemic), time of pruritus (the day before HD, when HD, all the time, the day after HD), pruritus status (intermittent, insistent, and severe pruritus). The scoring system for uremic pruritus severity was The Visual Analog

Scale (VAS) for pruritus. VAS was used to convert values that cannot be measured numerically into numerical values consisted of a 10-point scale ranges from 0 to 10, with 0 = no pruritus and 10 = severe pruritus [25]. Severity pruritus was measured using VAS at baseline and post-intervention

2.1.4. Protocols

Data was collected in the first two hours of the hemodialysis session. The researcher informed the purpose of the study and asked the respondent for approval. After that, the respondent was guided to fill in the respondent characteristics sheet and pruritus characteristics. The time needed to complete the form is 5-10 minutes. After the respondent completed the questionnaire, the researcher intervened with acupressure. The acupressure point was determined used the participant's fingers and marked with a pen, after that the participant set a sitting position and ensures patient comfort and privacy. Intervention time was limited to six until ten minutes at one acupressure point. Before acupressure, a massage was performed for three minutes to relax the patient. After that, the researcher placed hand at the acupressure point to determine if the participant had felt the pressure. Do acupressure for six minutes at one point. Researcher did acupressure symmetrically at point LI-11 using the finger in the second hours of hemodialysis. Acupressure was done two times per week for four weeks.

Before this research was conducted, researcher have practiced acupressure with certified therapist. After a consultation, and based on several previous studies, an acupressure protocol was developed. Researchers performed acupressure twice a week for 4 weeks, for a total of 8 sessions. In the first week, the researcher gave respondent patient characteristics, pruritus characteristics form and Visual Analog Scale (VAS) for pruritus. Researchers collect additional data of participants by repeating the VAS measurement and reassessing pruritus scores in the eight weeks.

3. Results

The majority of respondents in this study were male, 15 people (78.9%), most of the respondents had 5 hours of HD duration (36.8%), and high school educated (Table 1). Based on table 2, the respondents' average age is 54 years, with a minimum age of 29 years and a maximum age of 73 years. The average length of HD is 53 months, with the shortest time is six months and the longest is 180 months. The mean Hb level is 9.67 gr/dl, with a minimum Hb of 6.6 gr/dl and a maximum of 13 gr/dl. The mean of urea levels

is 117.05 mg/dl, with a minimum value of 60 mg/dl and a maximum of 216 mg/dl. The mean of creatinine is 10.26 mg/dl with a minimum value of 6.3 mg/dl and a maximum of 17.6 mg/dl

Table 1: Characteristics of Respondents (N=19)

Variable	Frequency	Percentage
Gender		
Female	4	21.1
Male	15	78.9
Duration of HD		
4 hour	6	31.6
4,5 hour	6	31.6
5 hour	7	36.8

Table 2: Distribution of Respondents by Age, Length of Hemodialysis, Hb, Ureum and Creatinin (N=19)

Variable	Mean	Median	SD	Min-Maks	95% CI
Age	54.0	55	11.86	29-73	48.28-59.72
Length of HD	53	48.56	45.43	6-180	31.1-74.9
Hb	9.67	9	1.98	6.6-13	8.72-10.63
Ureum	117.05	112	46.52	60-216	94.63-139.48
Creatinin	10.26	9.4	3.12	6.3-17.3	8.76-11.77

Table 3: Distribution of Respondents by Pruritus Area, Time of Pruritus, and Pruritus Status (N=19)

Variable	Frequency	Precentage
Prutitus Area		
Local	9	47.4
Systemic	10	52.6
Time of pruritus		
The day before HD	2	10.5
When HD	0	0
All the time	14	73.7
The day after HD	3	15.8
Pruritus Status		
Intermittent	10	52.6
Insistent	6	31.6
Severe pruritus with excoriation	3	15.8

Based on table 3 the data obtained by the number of respondents with systemic pruritus area is 10 people (52.6%), pruritus occurs all the time as many as 14 people (73.7%), intermittent pruritus status is 10 people (52.6%). Table 4 shows the average pruritus score in patients who undergo hemodialysis before the intervention was 7.95

with a standard deviation of 1.9 and a minimum score of 4 and a maximum score of 10. After the acupressure intervention, the average pruritus score obtained by the respondent decreased by 3.95 points to 4.00 by the standard deviation of 2.00 and a minimum score of 0 and a maximum score of 8. Further analysis obtained p values of less than 0.05 which means there is an effect of acupressure on pruritus scores in hemodialysis patients.

Table 4: Pruritus VAS Score Before and After Acupressure (N=19)

Variable	Mean	The difference in mean	Median	t	*p*-value
Score pre-intervention	7.95	3.95	8	13.57	0.000*
Score post-intervention	4.00		4		

**p*-value<0.05

Table 5: Change in VAS Score Before and After Intervention (N=19)

Change in VAS score	Total	Percentage (%)
≥25% or more increase (worse)	0	0
0-25% change	2	10.53
≥25% or more derease (better)	17	89.47
Total	**19**	**100**

Based on table 5, Most of the respondents experienced a decrease in pruritus VAS score> 25%. Respondents who experienced a decrease in pruritus VAS scores from 0-25% were two people (10.5%), while respondents who experienced a decrease in pruritus VAS scores of more than 25% were 17 people (89.5%). Another study conducted by Lee et al [26](2012) showed the same thing, where most patients experienced a decrease in pruritus VAS score> 25% as much as 57.2%.

4. Discussion

From the results of the study, the majority of respondents who experienced pruritus were male. This is in line with research conducted by Yan et al.[17]. Different results were stated by Akca & Tasci [21] where the female sex experienced pruritus more. The respondents' duration doing hemodialysis was almost the same, but most of the respondents did hemodialysis for 5 hours, and the rest for 4 hours and 4.5 hours. The reason respondents did dialysis with a shorter duration was that they experienced cramps and dizziness. This study's average age is 54 years; the same thing is shown by research conducted by Yan, et al [17] and Akca & Tasci [21]. Akca & Tasci [16] show

different things, where the respondents' average age is 47.5 years. The same thing is established by Lee et al [26] where the respondents' average age is <40 years. The length of undergoing hemodialysis in this study was 53 months, which is the same as that shown by Akca & Tasci's research [16], which is 49.9 months, and also by Akca & Tasci [21] 48.92 months.

In this study, pruritus occurred both whole body and locally. According to respondents, the body parts that often experience pruritus are the head, face, hands, and body. Respondents experience pruritus whole body, all the time; only a small proportion of respondents experience pruritus before HD or after HD, and intermittent. Different results were stated by Akca & Tasci [21], where most respondents experienced pruritus all over the body, and pruritus experienced the day after HD. The majority of respondents experienced severe pruritus, excoriation, and irritation. The study conducted by Kavurmaci [3] also shown, most HD patients experience localized pruritus in the back, and the legs and pruritus go on continuously in 66.2% of patients. Another study conducted by Mathur et al [4] also mentions that most often experience pruritus are the back, legs, and scalp.

Evaluation of the pruritus level experienced by patients used VAS (Visual Analog Scale) for pruritus scale before and after the intervention. The average VAS score decreased 3.95 point become 4.00 after the fourth week of acupressure This is followed by Akca & Tasci [21] where the average VAS score before the intervention was 7.37, and after the intervention was 2.66. This study inline with previous research conducted by Kavurmaci [3] score of pruritus 4.86The decrease in pruritus levels is caused by acupressure interventions at point LI-11 that launch blood flow, generate energy, increase energy and stamina, and stimulate strength, releasing hormones that provide a comfortable and relaxed sensation [27]. The effect of scratching in reducing itching of pruritus suggests that acupuncture's peripheral mechanism can also help reduce pruritus. Pruritus causes a heat or tingling feeling, which may have the same pathway as pain, involving the receptors prostaglandins, bradykinin, serotonin, opioids, and capsaicin (vanilloid receptors). So it can be assumed that pruritus's sensory transmission can also be targeted acupuncture and acupressure [21].

In this study, an assessment of pruritus level was before and after eight times interventions. Most respondents experienced a decrease in pruritus VAS score> 25%. Respondents who experienced a reduction in pruritus VAS score from 0-25% were two people (10.5%), while respondents who experienced a decline in pruritus VAS score by more than 25% were 17 people (89.5%). Another study conducted by Lee et al [26] showed the same thing, where most patients experienced a decrease in pruritus VAS

score> 25% by 57.2%. This is consistent with previous studies conducted by Akca & Tasci [21] where pruritus VAS scores decreased significantly after acupressure intervention.

From the results of this study, the decrease in pruritus VAS scores was optimal. Acupressure had been carried out for four weeks with a frequency of twice a week according to the HD schedule of patients in the first two hours of hemodialysis. These results are in accordance with Akca & Tasci [21], that acupressure must be done regularly to be more effective. Based on the researcher's experience in implementing acupressure, a conclusion can be made that acupressure can reduce pruritus complaints in HD patients. During the application of this intervention, the researcher did not encounter any complaints from patients regarding the implementation of acupressure, and also there were no significant obstacles.

5. Conclusion

This pre-experimental study illustrates that acupressure therapy can reduce the scale of pruritus in hemodialysis patients. Besides, this study can also be a reference for nursing students related to complementary interventions to reduce the scale of pruritus in hemodialysis patients. Through this research, nurses are expected to be able to teach patients acupressure therapy, so that patients and families can do it independently at home.

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Conflict of Interest

The authors have no conflict of interest to declare.

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