

The Effect of Acupressure on Anxiety and Depression Patients With ESRD Who are Undergoing Hemodialysis

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Abstract— Anxiety and depression are very common symptoms in End Stage Renal Disease (ESRD) and acupressure a noninvasive procedure to promote health and good impact to quality of life (QoL) in hemodialysis (HD) patients. This study aimed to investigate the effect of acupressure on the anxiety and depression patients with ESRD who underwent HD. A experimental study with single blind between two groups was conducted at dialysis center in Central Java Province, Indonesia. Subjects with ESRD who undergoing HD were randomly divided into intervention group who received acupressure at K1, ST36, and SP6 acupoint, while the control group received sham acupressure. The both of the groups received treatment three time a week during for four week dialysis. Anxiety and depression was assessed by using Hospital Anxiety and Depression Scale (HADS). For data analysis was used t-test and SPSS software version 22 was used. 96 patients were enrolled and included either in experimental or control group. Acupressure induced significant improvement in anxiety & depression in treated patients compared to control (HADS: 7.653 vs 14.968; p-value: 0.000). Intragroup analysis showed that both groups experienced improvement in only experimental group experienced marked improvement in anxiety and depression. Acupressure could significantly and independently improve anxiety & depression in ESRD patients undergoing HD.

Keywords— Hemodialysis, acupressure, anxiety, depression

I. INTRODUCTION

End Stage Renal Disease (ESRD) is a progressive and irreversible destruction of kidney function where the body's ability to maintain metabolism and water and electrolyte balance is removed [1, 2]. In the United States, as many as 16.8% of the country's population suffers from ESRD and

the number of patients suffering from ESRD is estimated at 3.346.000 or more as of the end of 2014 [3, 4]. The most common treatment method used for ESRD patients is hemodialysis [5, 6]. Patients undergoing hemodialysis suffer from the limitations of these various factors which will result in the incidence and prevalence of mental disorders in ESRD patients. According to various studies conducted, one of the common psychological symptoms in these patients is anxiety and depression whose prevalence has been reported to range from 40 to 92% [7]. Anxiety is called uncertainty in feelings, fears, and panic [7-9]. Anxiety prevents individuals from following a recommended diet and treatment and has a negative effect on self-care and the treatment results received [2].

Anxiety treatment is done in two methods pharmacology and non-pharmacology. The general method, which uses chemical drugs for hemodialysis patients, is not included as one of the nurses' responsibilities and will result in increased risk for the patient, and this calls for adopting other necessary steps [7-9]. One of the most common non-drug methods is alternative medicine [10]. Alternative treatments include acupuncture, acupressure, massage therapy, aromatherapy, yoga, energy medicines[8] Among the approaches mentioned above, acupressure is one of the most popular methods to improve a patient's mental status.

Acupressure is one of the popular methods in traditional Chinese medicine where acupuncture points are stimulated by fingers by pressing and rubbing movements [11-13]. This traditional is used without using drugs or other chemicals. In addition, acupressure is cheap, safe, and has the fewest complications. In acupressure, pressure stimulation is carried out by giving massages to specific points of meridian

energy[14]. Correcting the flow of energy will produce an appropriate response in various organs and glands. This method works by stimulating the secretion of neurotransmitters and adrenocorticotropic hormones through endorphin-mediated mechanisms [15].

Acupressure and energy balance are used to relieve pain, reduce muscle contraction, improve blood circulation status and performance of vital signs, and reduce anxiety symptoms (between 30 seconds to 5 minutes and even 20 minutes each time). Regarding its effect toward anxiety and depression, various studies have proved the effectiveness of acupressure on depression management using different acupoints. Tsay and colleagues reported that acupressure at 4 acupoints significantly improved depression in ESRD patients [16, 17]. Despite reporting improvement in psychological condition, the psychological part was assessed measurement and not using different tools. Therefore, this study aimed to investigate the efficacy of acupressure toward the level of anxiety & depression and in patients with ESRD who underwent HD.

II. RESEARCH METHOD

Study design--- Our study is the part of the larger study. This study used single-blinded two-group experimental design, involving ESRD patients who underwent regular HD. Subjects were divided into two groups namely intervention group that received acupressure in the true acupoints, while the control group received sham acupressure. All ESRD patients who underwent HD in Central Java were involved as study population. The inclusion criteria included age > 18 years old, had been on HD for at least 3 months, fatigue level ≥ 4 , the absence of wound on extremities, did not receive any complementary treatments for the past 3 months, and willing to participate by filling out questionnaires. Those with major depression or psychiatric disorders, wound or amputation on lower extremities, rheumatoid arthritis, or fracture of lower extremity were excluded.

Setting and samples---Acupressure was conducted 3 times per week for 4 weeks and a post test Patients who fulfilled the inclusion criteria were randomly assigned into two groups. Group 1, the experimental group, received acupressure at true acupoints (K1, ST36, and SP6), while group 2 (control) received acupressure at the sham acupoints. All of the acupressure in both groups were done only by the researchers. Acupressure was performed within the first 2 hours of HD by applying consistent pressure at each acupoint for 3 minutes with the rate of two rotations per second bilaterally.

Ethical considerations--- This study was approved by Jenderal Soedirman University from the purwokerto research ethics committee, through the ethics approval number: 3101 / KEPK / VII / 2019. Researchers have ensured that all participants understood the questionnaire and were able to communicate with researchers without the problem of language informed consent had been carried out for all subjects and approved. Finally, complete data from 96 patients were collected for statistical analysis.

Measurement of Anxiety and Depression.--- Hospital Anxiety and Depression Scale (HADS) is a valid, reliable, and easy tool for doctors to identify and measure anxiety and depression[18]. HADS consists of 14 items

which are divided into 2 subscales to assess anxiety (7 items) and depression (7 items). Subjects classified each item in 4 rating scales from 0 (not at all) to 3 (very often) with a higher value indicating a higher likelihood of anxiety / depression. HADS scores can be classified as follows: severe anxiety (16-21), moderate 11-15 anxiety (11-15); mild anxiety (8-10); and there is no anxiety or depression (≤ 7)[18].

Data Analysis ---- All analyses were carried out using SPSS version 22. All data were compiled and compared between experimental and control group. Independent t-test was used to compare numerical data and chi-square was used to compare nominal data. Intragroup analysis was also conducted (using paired sample t-test) to visualize the improvement between pre- and post-intervention within each group. A P-value of <0.05 was considered statistically significant.

III. FINDING AND DISCUSSION

Initially, 106 participants were selected according to the sampling criteria but 10 participants were excluded due to the following reasons: 3 respondents disagreed in the intervention for 1 week (changed in schedule), 3 patients were accepted, 1 patient refused to complete in the entire program, and 3 respondents issued HIV / AIDS. Finally, 96 study subjects were divided into experimental (n = 49) and control groups (n = 47).

Then, the level of baseline data that was agreed & corrected in the groups that were approved and compared (Table 1). According to HADS, it seems that this group has moderate HADS control, both groups have resolution and moderate (HADS: control vs experimental: 14.681 vs 13.592; p-value: 0.094). All measurements and subcomponents are comparable between the two groups.

TABLE I. THE INDEPENDENT T-TEST ANALYSIS OF THE ANXIETY & DEPRESSION A SCORE BETWEEN THE GROUPS AT BASELINE IN THE PRE INTERVENTION (N=96)

Table 1 The Independent t-test analysis of the, Anxiety & depression a score between the groups at baseline in the Pre intervention (n=96)

Variables	Experimental Group (N=49)		Control Group (N=47)		t	p value
	Mean	SD	Mean	SD		
Pre Anxiety	13.980	2.940	14.936	5.227	-1.099	0.275
Pre Depression	13.204	2.264	14.426	3.894	-1.869	0.066
Pre HADS Score	13.592	1.850	14.681	4.006	-1.698	0.094

* HADS: Hospital Anxiety and Depression Scale

After 4 weeks of acupressure treatment, HADS scores returned and compared between groups (Table 2). Overall, the experimental group had a significantly lower HADS value compared to the control group. However, changes in HADS scores are clearer. The average of the two control variables was significantly lower and higher than HADS: trial vs control: 7.653 vs 14.968; p-value: 0.000).

TABLE II. THE INDEPENDENT T-TEST OF THE ANXIETY & DEPRESSION SCORE BETWEEN THE GROUPS AT BASELINE IN THE POST INTERVENTION (N=96)

Table 2 The Independent t-test analysis of the Anxiety & depression score between the groups at baseline in the Post intervention (n=96)

Variables	Experimental Group (N=49)		Control Group (N=47)		t	p value
	Mean	SD	Mean	SD		
Post Anxiety	7.449	2.777	15.000	4.974	-9.132	0.000
Post Depression	7.857	2.198	14.936	4.229	-10.226	0.000
Post HADS Score	7.653	1.910	14.968	4.276	-10.744	0.000

HADS : Hospital Anxiety and Depression Scale

This change shows that increasing the variables in the experimental group compared to controls. To visualize changes in depression / conversion in the second group, intra-group analysis by comparing the HADS score values was carried out (Table 2).

Anxiety & depression are the most common mental health problems in HD patients[19], and these issues can pose negative impacts on ESRD patients' life quality (QoI) [19, 20]. The results of our studies have found that acupressure significantly reduces the anxiety & depression score of the subjects in the intervention group compared to those in the control group (sham group). The major finding of our studies is congruent with those of previous studies testing the effectiveness of acupressure on anxiety & depression in ESRD population [16, 17, 19, 20]

The results of this study are similar to those of Mischoulon et al who assess the effectiveness and safety of acupuncture monotherapy in major depressive disorders. Assessment using the HADS score gives an acupressure response response > 50%; same as treatment with antidepressants. Qu et al[21] conducted a combination acupressure study in major depressive disorder [21, 22]. The results showed that after 6 weeks of acupressure therapy, clinical response was better in the manual acupressure group [21]. Wang et al (2016) conducted a meta-analysis of the effect of acupressure on depressive disorders [23, 24]. The meta-analysis included 8 studies with 477 depressed patients and 256 patients treated with acupressure and from the meta-analysis it was found that acupressure was proven to reduce depressive symptoms as indicated by a decrease in HADS score at the end of therapy [6, 25].

The mechanism of action of acupressure in depressive disorders is still not well known [26]. Acupressure stimulation is closely related to the increase in monoamine neurotransmitters, especially serotonin and norepinephrine [27-29]. Stimulation of acupressure both manual and electro acupuncture can facilitate the production of serotonin in the brainstem and modulate the activity of norepinephrine at the locus seruleus, hypothalamus, amygdala and prefrontal cortex to facilitate the production of serotonin in the brain stem and modulate the activity of norepinephrine, hypothalamus, amygdala and prefrontal cortex to facilitate mood regulation [27-29]. Acupressure can also increase the availability of neurotransmitters in nerve synapses thereby increasing interaction with post synapse cells [30].

Acupressure in ST36 acupoint can increase the availability of neurotransmitters such as serotonin by accelerating the synthesis and use of neurotransmitters in the

central nervous system [31]. In addition, acupressure in ST36 can also strengthen the antidepressant effect by increasing serotonergic and or nor-adrenergic activity in synapses, thereby producing a combination of acupuncture with the effect of acupuncture with the effect antidepressant medication [32]. Repeated anxiety and depression that lasts a long time will reduce the sensitivity of Cortisol Releasing Hormon (CRH) resulting in HPA axis disruption in the form of the inability of cortisol to suppress CRH secretion [33]. Several study shown acupressure significantly reduced symptoms of depression and anxiety by increasing the expression of Neuropeptide Y (NPY) in the hypothalamus, NPY is a neuropeptide in the hypothalamus which decreases the activity of the HPA axis which plays an important role in anxiety and depression [34-40].

Acupressure is synergistic with antidepressant drugs to maintain serotonin levels and nor-adrenaline activity in synaptic gaps, resulting in a relatively safer action with serotonin and nor-epinephrine reuptake inhibitors (SNRIs) [41-43].

The superiority of acupressure in ST36 compared to antidepressant drugs is that they are relatively safer with minimal side effects of acupressure with side effects [44], such as hematoma and bleeding at the massage site so that it is safe to apply [45]. The drawback is that patients must make repeated visits to undergo acupressure therapy [46]

Acupressure has been proved to be potent enough to relieve anxiety & depression in patients with various type of cancer who undergo chemotherapy [47, 48]. Tang et al., reported that acupressure significantly improved anxiety & depression in lung cancer patients with consistent improvement between chemotherapy cycles [47]. However, no effects were observed in HADS. Similar findings reported by Qu et al[21] who showed that 6 weeks of acupressure therapy was effective in alleviating depression in major depressive disorder. Finally, a meta-analysis showed that acupressure is an effective approach in relieving anxiety and depression in cancer patients[41].

However, it also noted that definitive conclusion could not be drawn due to small number of studies included, relatively small number of subjects per study and short follow up time. Physiologically, there are only limited evidences about how acupressure works. Several studies showed that acupressure primarily stimulates spino-thalamo-cortico-limbic system, inducing endorphin release which enhances comfortable feeling [16, 49-52]. Furthermore, there are also evidences of increased dopamine and serotonin release in the synaptic cleft which enhance motivation and induce muscle relaxation[53].

IV. LIMITATION

This is study was short follow up period. Future research must include longitudinal studies of acupressure on anxiety for ESRD patient in the clinical setting and continued at the home of the patients.

V. CONCLUSION

The findings from our study and previous studies demonstrate the effectiveness of acupressure on anxiety & depression management. According to the results of this

study, it can be concluded that pre-dialysis, 4 weeks acupressure therapy of at K1, ST36, and SP6 acupoints significantly reduced anxiety & depression in patients with ESRD. Therefore, we strongly recommend that health care providers and patients should be informed of the benefits of acupressure on depression management

These findings add new evidences that support the potential application of acupressure in ESRD patients as non-pharmacology alternative therapy to alleviate psychological disorders. It would also reduce renal burden and additional risk of administering pharmacological agents to patients with reduced renal function. Due to the easiness of its application, acupressure also versatile enough to be applied not only by medical personnel but also patient's family or guardian with proper training.

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