

## The Effect of Acupressure Technique on Sleep Quality among Patients Undergoing Hemodialysis

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### Abstract:

**Background:** Poor quality of sleep is most commonly reported problem among patients undergoing Hemodialysis. Acupressure is a traditional treatment to reestablish a healthy status by engaging the body's natural healing abilities. This study aimed to determine the effect of acupressure technique on sleep quality among patients undergoing hemodialysis. **Materials and Methods:** A quasi-experimental research design was used. The study was carried out at hemodialysis unit (HD), Al Mouwasat University Hospital in Alexandria. A convenient sample of forty patients was included from the previously mentioned setting. Every patient was assigned into two groups (20 patients in each group) as Group (A): Subjected to routine daily unit care (control group) and Group (B) subjected to acupressure technique (study group). Data of the study was collected using two tools titled; Tool I: Socio-demographic, sleep and health history of patients undergoing hemodialysis, using structured interview schedule. Tool II: Sleep Quality Scale (SQS). **Results:** The study revealed that half of patients were had diabetes mellitus while more quarter having hepatitis C. Insomnia percentage was the most sleep-related problems in the control and study groups. Considering control group, it is obvious that the percentage had slightly decreased from 85% to 75%. This is different to the study group, as the percentage had significant decreased from 90% to 20% following acupressure sessions. These changes were statistically significant ( $P= 0.003^*$ ). Systolic blood pressure category and the sleep quality scale domains scores in both groups were lower after intervention with high significance for the study group. **Conclusion:** acupressure technique has a beneficial effect on improving sleep quality in hemodialysis patients. **Recommendation:** Acupressure technique should be incorporated into routine clinical practice.

**Key Word:** Acupressure, Sleep Quality, Hemodialysis patients, End stage renal disease.

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### I. Introduction

Obtaining healthy sleep is important for both physical and mental health. It can also improve productivity and overall quality of life. Everyone, from children to older adults, can benefit from practicing good sleep habits. Subjective sleep quality (SSQ) is considered a key aspect of healthy sleep<sup>[1, 2]</sup>. Sleep quality is defined as one's satisfaction of the sleep experience, integrating aspects of sleep initiation, sleep maintenance, sleep quantity, and refreshment upon awakening. Usually sleepers pass through four stages; Non-Rapid Eye Movement (NREM) sleep (stages 1, 2 & 3) and Rapid Eye Movement (REM) sleep (stage 4)<sup>[3]</sup>.

Sleep disorders are the most prevalent complaints in hemodialysis patients. It was reported that about 45%–84.5% of dialysis patients experienced sleep disorders, and this problem was associated with decreased health-related quality of life<sup>[4]</sup>.

Chronic Kidney Disease (CKD), especially those who are on hemodialysis, frequently suffer from sleep disorders; which are under recognized in patients at all stages of chronic kidney disease. They can be related to underlying uremia or comorbidities<sup>[5]</sup>. Furthermore, CKD patients show disturbances of the melatonin rhythm which in turn cause sleep disturbances. Melatonin's main job in the body is to regulate night and day cycles or sleep-wake cycles. Darkness causes the body to produce more melatonin, which signals the body to prepare for sleep. Light decreases melatonin production and signals the body to prepare for being awake<sup>[6]</sup>.

The end stage renal disease (ESRD) affects patients physically and psychologically. Physically associated with various complications, the most common of which is anemia. The prevalence of anemia was 50% in patients with chronic renal failure and 75% among dialysis patients<sup>[7]</sup>. Poor sleep quality was associated with anemia for dialysis patients consequently; strategies are needed to improve sleep quality in these patients<sup>[8]</sup>.

As well, patients with CKD often exhibit sympatho-vagal imbalance due to baroreceptor reflex function impairment in which there is hyperactivity of the sympathetic nervous system and decreased vagal tone. In healthy individuals, sleep is accompanied by a decrease in sympathetic activity and an increase in vagal tone that leads to a nocturnal dipping of blood pressure. However, patients who have sleep disorders resulting in

hypoxemia and sleep fragmentation have been shown to have increased sympathetic nervous system stimulation and decreased parasympathetic activity, which results in a reduced fall in nocturnal blood pressure [9].

Sleep disturbances are extremely common in end stage renal disease (ESRD). Subjective sleep complaints are reported in up to 80% of those surveyed [9]. Sleep disorders among those patients, including insomnia, restless leg syndrome (RLS), obstructive sleep apnea syndrome (OSAS), excessive daytime sleepiness (EDS), possible, sleepwalking, nightmares and possible rapid eye movement behavior disorders (RBD). Due to complications of hypnotic medications, considering effective sleep hygiene to improve sleep quality is important [10].

Sleep hygiene (SH) refers to variety of different practices that are necessary to have normal, quality nighttime sleep. These practices include a list of behaviors, techniques, environmental conditions, and other sleep-related factors that can be adjusted by multimodal management including medical and nursing interventions for patients with sleep disorders [11-12].

Multiple nursing modalities have been used in treating sleep disorders, such as, heat therapy, relaxation techniques, classical massage, and acupressure (micro massage) [4]. Patient with ESRD often have trouble falling asleep and staying asleep [4]. Several sleep disturbances may potentially be treated but, if left untreated, may impair health status and increase the risk of mortality. However, literature and personal data suggest that under treatment is common, calling to higher awareness of sleep disturbances among nephrologists [13].

Sleep problems were rated one of the five most common conditions in people seeking complementary and alternative medicine (CAM) treatments such as herbal products, various types of exercise, mind-body therapies, music therapy, reflexology, acupuncture, and acupressure. Acupressure is a non-invasive method from traditional Chinese medicine. The effectiveness of this method in treatment of sleep disorders has been proved in different studies [14,15].

So, monitoring the sleep disorders in these patients must be seen as an emergent and successful treatment must be administered to promote the quality of their life. Today's complimentary treatments such as cognitive behavioral therapy (CBT), physical exercise, acupuncture and acupressure which confirmed by Food and Drug Organization in 1997 are used in curing different disturbances and change of dialysis modality [14].

Acupressure is a gentle but firm, deep, pressing, stimulating message by fingers over meridians and acupoints, which are the doorways leading in and out of the body and act as monitoring points for the functioning of human organs [16]. Each acupoint represents a particular tissue, organ, or system and reflects the body's physical conditions; therefore, stimulating these acupoints influences the body's ability to function regarding the respective tissues or organs. Acupressure can access nearly all acupoints, and is absolutely safe with no side effects [17,18].

Sleep problems are common in people with chronic kidney disease, and impact negatively on functioning and wellbeing [9]. The complex and dynamic promoting sleep quality among patients undergoing hemodialysis patients remain relatively little investigated. So this study aimed to determine effect of acupressure technique on sleep quality among patients undergoing hemodialysis.

#### **Aim of the Study:**

The aim of this study was to determine the effect of acupressure technique on sleep quality among patients undergoing hemodialysis.

#### **Research hypothesis**

Hemodialysis patients who perform acupressure technique will experience better sleep quality than who don't perform such intervention.

## **II. Material And Method**

#### **Study Design:**

A quasi-experimental research design was used in this research.

#### **Study Setting:**

This study was conducted at Hemodialysis unit (HD), Al Mouwasat University Hospital in Alexandria.

#### **Sample size:**

A convenient sample of 40 adult patients with end stage renal disease and underwent hemodialysis were included in this study.

#### **Subjects & selection method:**

A convenient sample of 40 adult patients with end stage renal disease and underwent hemodialysis were included in this study. Patients were selected according to the following criteria:

### **Inclusion criteria**

1. Adult aged from 21- 60 years old.
2. Gender: male and female
3. Scheduled for hemodialysis sessions three times per week at a rate four hours per day since at least 6 months.
4. Free from heart diseases, malignant arterial hypertension.
5. Accepted to participate in the study.

Every patient was assigned into one of two groups (20 patients in each group) as following:

Group (A): Subjected to routine daily unit care (control group)

Group (B): Subjected to acupressure technique (study group).

### **Tools:**

Two tools were used for data collection:

**Tool I:** Socio-demographic, sleep and health history of patients undergoing hemodialysis using structured interview schedule. This tool was developed by the researchers after review of related literatures<sup>[5,9,10]</sup> to identify characteristics of patients and baseline sleep and health-related data, it was included of two parts:

Part I: Socio demographic data as: age, gender, residence, level of education, occupation.

Part II: Sleep and health-related data:

1. Sleep- related problems by yes or no questions:
  - 1) Insomnia,
  - 2) Excessive daytime sleepiness (EDS)
  - 3) Restless leg syndrome (RLS)
  - 4) Obstructive sleep apnea syndrome (OSAS)
  - 5) Narcolepsy
  - 6) Sleep walking
2. Health-related data: including; associated diseases, starting time for hemodialysis, and blood pressure reading

**Tool II;** Sleep Quality Scale (SQS): This tool was developed by Hyeryeon et al 2006<sup>[19]</sup>. It used for data collection to assess quality of sleep before and after acupressure technique, consisting of 28 items, the SQS evaluates six domains of sleep quality: daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction. Using a four-point, Likert-type scale, patients indicate how frequently they exhibit certain sleep behaviors (0 = “few,” 1 = “sometimes,” 2 = “often,” and 3 = “almost always”). Scores on items belong to domains 2 and 5 (restoration after sleep and satisfaction with sleep) are reversed before being tallied. Total scores can range from 0 to 84, with higher scores demoting more acute sleep problems.

### **Method:**

Approval from the ethical committee of Nursing faculty, Alexandria University was obtained. And approval to conduct this study was obtained from hospitals responsible authorities after explanation of its purpose.

### **Tool development**

The developed tools (I, II) were translated into Arabic language and tested for content validity by five experts in the study field. The reliability of the tools was assessed using test-retest reliability Cronbach alpha (Tool-I  $\alpha=$  0.87, Tool- II  $\alpha=$  0.81)

### **Patient's consent:**

The researcher introduced herself to every patient included in the study, explained the purpose of the study. Patient's verbal approval to participate in the study was obtained.

### **Pilot study:**

A pilot study was carried out on 5 patients after obtaining their oral approvals (Not included in the study sample) to assess the clarity and applicability of the tool. No modifications were done.

**Acupressure program development:** The researchers developed an acupressure program based on the literatures reviewed<sup>(15-17)</sup>. This program's principles were as follows:

- Frequency of the sessions which was 3 days per week (one session each day). The acupressure was carried out over four consecutive weeks.

- Administration time of acupressure was 1 hour after beginning of hemodialysis, because patients were in better physiological and emotional status at this time.
- Selection of acupressure points which were 8 acupoints massages (3-5 min per acupoint). Each session took around 25-45 minutes.
- Acupressure technique was done using finger micro-message in a circular movement, in clockwise direction; at specified acupoints bilaterally to improve sleep quality.
- Patient assessment during session as the patient reported a deep, numbing sensation. Acupoints were allocated using the finger measurement method.

#### **Data collection**

- Forty adult patients on hemodialysis were sequentially enrolled to the two groups, according to the previously mentioned criteria. Total number of each group divided into (20 control group and 20 study group). Both groups (control and study) were selected from morning shift to fix the patients sleeping time.
- An initial assessment was carried out using tool I and tool II for all patients.
- The control group only received routine care which included taking blood pressure twice per hemodialysis session, respond to patients' complain and carryout prescribed medications if ordered.
- The study group: received the routine care in addition to the acupressure technique:
  - Preparation of the environment was done by maintaining a quiet, warm, well ventilated room, free from noise as possible. (The patients adapted into alarming of dialysis machine).
  - Preparation of the study patients was done by using Modified Progressive Relaxation (MPR) technique before each session. Modified Progressive Relaxation technique is a passive technique of relaxation, as the patient's muscles was not tensed, instead, the patients was learned to relax their muscles by concentrating on the feeling of relaxation within the muscles. Using calm, whispering tone of voice, slow manner of speech, and smiley face, each patient was instructed to assume a comfortable position (sitting), close eyes, and to concentrate on relaxing their muscles, while the researcher start to massage each group of muscles sequentially, starting with muscles of the face, shoulders, and continuing downward to arm, forearms, hands, back, abdomen, thighs, calves, and feet. It takes two minutes.
  - The study group received acupressure session according to acupressure protocol as mentioned before.
- The evaluation for both control and study groups were done after 4 weeks by using part-2 in Tool-1 and Tool-II.

#### **Ethical considerations**

An oral approval was obtained from the participants. The anonymity, confidentiality and privacy of responses have been asserted, voluntary participation and right to withdraw from the study were emphasized before inclusion in the study sample.

#### **Statistical analysis**

SPSS package version 20 was used for statistical analysis. Descriptive statistical analysis for all study variables was conducted. Qualitative data were described using number and percent. Quantitative data were described using minimum and maximum, mean and standard deviation (SD). Comparison between two independent populations was done using independent t-test. The level of significance selected for this study was P equal to or less than 0.05.

### **III. Result**

**Table (1)** revealed Frequency distribution of socio-demographic characteristics of hemodialysis patients in both groups (control and study group). With reference to age distribution it was found that the majority of participants in both groups were among age group 35 to less than 45 years old. Around one third (30%) of patients in both the control and study groups was in age between 45-60 years. As regards gender, male patients were equal or nearly to equal in the control group and study group (50% and 55% respectively).

Regarding marital status, more than half (60% and 65% respectively) of patients in the control and study groups were married while single patients were represented 25% in both of the control and study groups. The divorced patients were represented the least (5%) in the control group. In relation to patients' education, it was found that 30% and 20% respectively of patients in both the control and study groups were illiterate. University education was equally in the control and study groups (20% each).

Concerning occupation, it was found that 30% and 35% respectively of patients in the control and study groups were not work. Forty percent of patients in the control group were Housewives comparing to 10% of patients in the study group. Regarding, residence, it was found that more than half (60% and 55% respectively) of patients in both the control and study groups were from rural areas.

**Table (1)** Frequency distribution of socio-demographic characteristics of hemodialysis patients in both groups (control and study group)

Socio demographic data	Control group (n=20)		Study group (n=20)	
	No	%	No	%
<b>Age (years)</b>				
▪ 21-	5	25	4	20
▪ 35-	9	45	10	50
▪ 45-60	6	30	6	30
<b>Gender</b>				
▪ Male	10	50	11	55
▪ Female	10	50	9	45
<b>Marital status</b>				
● Single	5	25	5	25
● Married	12	60	13	65
● Divorced	1	5	0	0
● Widow	2	10	2	10
<b>Education</b>				
▪ Illiterate	6	30	4	20
▪ Primary	5	25	4	20
▪ Preparatory	1	5	2	10
▪ Secondary	2	10	4	20
▪ Diploma	2	10	2	10
▪ University	4	20	4	20
<b>Occupation</b>				
● Manual	2	10	5	25
● Employee	3	15	4	20
● Housewife	8	40	2	10
● Not work	6	30	7	35
● Retired	1	5	2	10
<b>Residence</b>				
▪ Urban	8	40	9	45
▪ Rural	12	60	11	55

**Table (2)** showed that half (50% and 55% respectively) of patients in the control and study groups were diabetes mellitus while more quarter (40% and 35% respectively) of patients in the control and study groups were having hepatitis C. Bronchial asthma was representing the least (15%) in the control group while in the study group were representing (10%). The table revealed that starting time of hemodialysis; it was found that more than one third (40.0% and 37.5% respectively) of patients in the control and study groups was starting hemodialysis since more than 10 years. Regarding hemoglobin level, the majority (80% and 75% respectively) of patients in the control and study groups were having hemoglobin level from 10 to less than 12g /dl.

**Table (3)** presented that the majority of patients were reported decrease percentage in sleep disturbance types with high significance in study group than control group. Regarding **insomnia** percentage was (85%, 90% respectively) in the control and study groups. Considering control group, it is obvious that the percentage had slightly decreased from 85% to 75%. This is different to the study groups, as the percentage had significant decreased from 90% to 20% following acupressure sessions. These changes were statistically significant (P= 0.003\*). Also, the percentage of **restless leg syndrome** was decreased from 55% to 40% in control group although; it changed from 60% to 30% post acupressure session in study group. These changes were statistically significant (P= 0.008\*).

**Table (4)** revealed that the systolic blood pressure category 130 to less than 140 mmHg had decreased from 60% to 45% among patients in control group. This is different to the study groups, as the percentage had significant decreased from 65% to 15% following acupressure sessions. These changes were statistically significant (P= 0.0001\*). Diastolic blood pressure reading of 70 to less than 80 mmHg was decreased from 55% to 40 % among patients in control group while it decreased from 65% to 50% among patients in study group and differences statistically significant (P= 0.030\*).

**Table (2)** Frequency distribution of sleep and health history of hemodialysis patients in both groups (control and study group)

Health – related data	Control group n=20		Study group n=20	
	No	%	No	%
<b>Presence of associated diseases</b>				
▪ Diabetes Millets	10	50	11	55
▪ Hepatitis C	8	40	7	35
▪ Hepatitis B	4	20	5	25
▪ Bronchial asthma	3	15	2	10
<b>Starting time hemodialysis (years)</b>				
▪ < 1	2	10	2	10
▪ 1 < 5	5	25	6	30
▪ 5<10	5	25	5	25
▪ ≥ 10	8	40	7	35
<b>Hemoglobin level (g/dl)</b>				
▪ 10 <12	16	80	15	75
▪ 12< 14	4	20	5	25

**Table (3)** Pre and post sleep-related problems types among hemodialysis patients in the control and study groups

Sleep-related problems	Control group (n=20)				Study group (n=20)				X <sup>2</sup> (P value)	
	Pre		Post		Pre		Post		Pre	Post
	No	%	No	%	No	%	No	%		
▪ Insomnia	17	85	15	75	18	90	4	20	FET= 0.432 P =1.000	FET=1.346 P = 0.003*
▪ Excessive daytime sleepiness (EDS)	9	45	9	45	8	40	2	10	FET = 2.826 P = 0. 652	FET = 8.139 P = 0.024*
▪ Restless leg syndrome (RLS)	11	55	8	40	12	60	6	30	FET = 4.342 P = 0.990	FET= 6.218 P = 0.008*
▪ Obstructive sleep apnea syndrome (OSAS)	1	5	1	5	0	100	0	100	FET = 0.432 P =1.000	FET = 0.486 P =1.586
▪ Narcolepsy	3	15	2	10	3	15	1	5	FET= 6.012 P =0.191	FET= 6.732 P =0.041*
▪ Sleep walking	0	100	0	100	0	100	0	100	0	0

X<sup>2</sup>: chi square test

**Table (4)** Pre and post blood pressure reading among hemodialysis patients in the control and study groups

Blood pressure reading (mmHg)	Control group (n=20)				Study group (n=20)				X <sup>2</sup> (P value)	
	Pre		Post		Pre		Post		Pre	Post
	No	%	No	%	No	%	No	%		
▪ SBP: 120<130	3	15	2	10	4	20	1	5	FET = 0.862 P =1.89	FET=1.546 P = 0.023*
▪ SBP: 130<140	12	60	9	45	13	65	3	15	FET = 2.351 P = 0. 652	FET = 6.139 P = 0.0001*
▪ SBP: 140≤150	5	25	4	20	3	15	2	10	FET = 3.342 P = 0.560	FET= 7.218 P = 0.068
▪ DBP: 70<80	11	55	8	40	13	65	10	50	FET = 1.542 P =0.471	FET = 2.357 P =0.030*
▪ DBP: 80<90	4	20	4	20	3	15	1	5	FET= 6.012 P =0.191	FET= 5.215 P =0.041*
▪ DBP: 90≤100	5	25	3	15	4	20	2	10	FET = 3.001 P = 0.589	FET= 7.540 P =0.001*

X<sup>2</sup>: chi square test, SBP = systolic blood pressure; DBP = diastolic blood pressure

**Figure (1)** showed that compared to pre-intervention, the sleep quality scale domains scores in both groups were lower after intervention. However, the study group reduced significantly more than the control group (Figure 1). In relation to **daytime symptoms** domain, mean and standard deviation in the control group pre routine daily care was 2.137 comparing to 2.147 post that care. On the other hand, mean and standard

deviation was  $2.881 \pm 0.641$  in the study group before acupressure technique while it was  $0.600 \pm 0.754$  post applying acupressure. No statistical significant difference was found between both the control and study groups pre applying care ( $p=0.514$ ). Post acupressure a highly statistically significant difference was found between control and study groups ( $p=0.0001^*$ ).

As for **restoration of sleep** domain, it was found that had slightly decreased in the control group from 1.127 to 1.100, the mean score of restoration of sleep had decreased from 2.788 to 1.025 in the acupressure group. These changes were statistically significant ( $P=0.012^*$ ). Considering **problems initiating with sleep disorders** domain, it is obvious that the mean score had decreased from 2.002 to 1.889 in the control group. This is different to the study groups, as the mean score had significant decreased from 2.895 to 0.800 following acupressure sessions. These changes were statistically significant ( $P= 0.0002^*$ ).

As regards **maintain sleep** domain, the results indicated that mean score had decreased from 2.436 to 1.321 in the control group, while the mean score had decreased from 2.546 to 1.204 in the acupressure group. These changes were statistically significant ( $P= 0.020^*$ ). Regarding **difficulty waking** domain, mean score was decreased from 2.368 to 2.089 in the control group, whereas mean and standard deviation had decreased from 3.000 to 0.881 in the acupressure group. These changes were statistically significant ( $P= 0.0001^*$ ). As for **sleep satisfaction** domain, it was found that mean was reduced from 2.779 to 2.661 in the control group comparing to acupressure group the mean was changed from 2.981 to 0.780 ( $p=0.0001^*$ ).

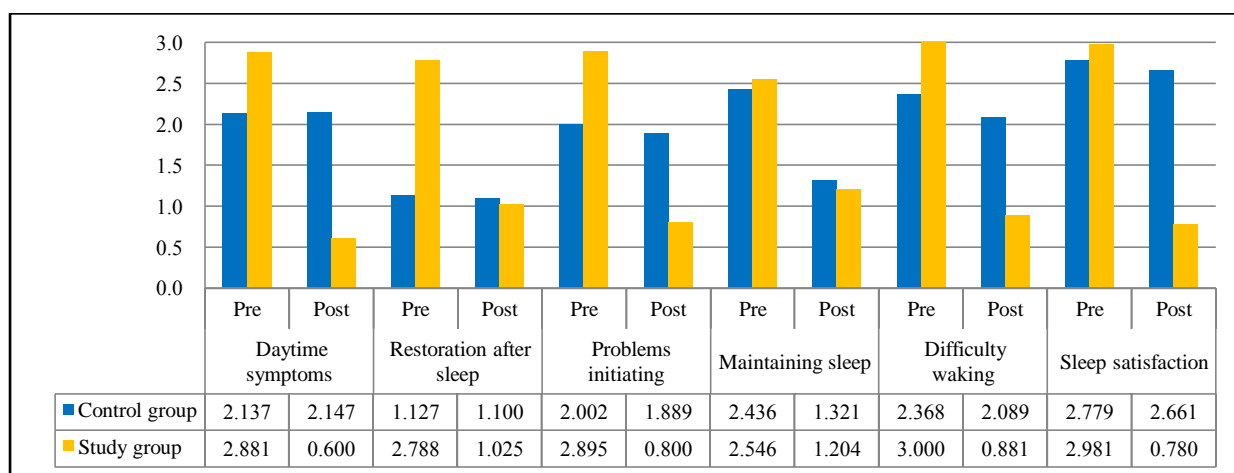


Figure (1) Mean Sleep Quality Scale (SQS) score of hemodialysis patients in the control and study groups.

#### IV. Discussion

Sleep disorders have a profound and well-documented impact on overall health and quality of life in the general population. In patients with chronic diseases, sleep disorders are more prevalent, with an additional morbidity and mortality burden. The prevalence of sleep disorders is higher in patients with CKD than the general population<sup>[20]</sup>. Sleep disorders is neglected and unrecognized problem for majority of nurses working in hemodialysis unit. Because the patients expected that its nature part of their illness. Thus; the nurse should have an essential role for assessment of sleep disorders and performing nursing measures that improve sleep pattern among hemodialysis patients.

Therefore, nurses have a role in the identifying and different modalities in management of the sleep disturbances among patients undergoing hemodialysis. This study aimed to determine effect of acupressure technique on sleep quality among patients undergoing hemodialysis.

The present study showed that; the gender ratio of both control group and study group were equal. These findings were disagreed with Hans (2008)<sup>[21]</sup> and Dawod (2011)<sup>[22]</sup> who reported that End Stage Renal Disease predominantly affect adult males more than females. Furthermore, although most of the study patients were from rural areas; but they had limited educational level. This gave them the liability to neglect certain manifestations which may intensify sleep disturbances and also neglect periodic checkup of measuring blood pressure as they considered it as a part of their disease.

Regarding hemodialysis sessions and duration, the study patients were on hemodialysis three sessions per week at a rate four hours per day. Hemodialysis per day most of them were taking. This is a typical presentation for patients on maintenance hemodialysis should be three sessions per week. This allow to the majority of the patients sleep at this time, which may increase one of night sleep disorders' "insomnia".

Shariati et al (2012)<sup>[23]</sup> reported that diabetes was the most frequent etiology of ESRD in his study. This is in congruent with the results of the present study which revealed that about half of the patients were had diabetes mellitus. On the other hand, in the study the history of hemodialysis was more than 2-5 years while in this research the majority of patients started hemodialysis since ten years.

According to National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) 2014<sup>[24]</sup>, anemia commonly occurs in people with chronic kidney disease (CKD)-the permanent, partial loss of kidney function. Anemia might begin to develop in the early stages of CKD, when someone has 20 to 50 percent of normal kidney function. Anemia tends to worsen as CKD progresses. Most people, who have total loss of kidney function, or kidney failure, have anemia. A person has kidney failure when he or she needs a kidney transplant or dialysis in order to live. This supported by the results of current study which showed that more than three quarters of the patients were with low hemoglobin level. Indrarini et al(2019)<sup>[25]</sup> stated that; one of the predictors of poor sleepers in hemodialysis patients is low hemoglobin level. Therefore; raising the hemoglobin levels, may improve the sleep quality of poor sleepers.

Also, the finding of this study revealed that the majority of the subjects had hypertension. This is agreed with Khan et al (2019)<sup>[26]</sup> who stated that; hypertension is common and often poorly controlled among hemodialysis (HD) patients. In fact, volume overload is considered as an important cause of hypertension where patients may remain hypertensive even after three weekly HD sessions. Moreover, the study shown more than quarter of the subjects had systolic hypertension. This is in line with Khan et al (2016)<sup>[27]</sup> who stated that in HD patients, while there is an elevation of systolic blood pressure (BP), diastolic BP seems to decrease. Hypertension affected sleep quality in HD; as Blood Pressure (BP) decreases during sleep, and reduced dipping of BP during sleep increases cardiovascular risk. Habitual short sleep duration is associated with hypertension, especially during middle age<sup>[28]</sup>.

Furthermore, the present study illustrated that the main sleep-related problems was insomnia which is risky for hemodialysis patient as stated by Calhoun DA et al; who describe insomnia with objective short sleep duration also is associated with increased hypertension risk<sup>[28]</sup>. In this study; insomnia is the first sleep disturbance followed by RLS and sleep apnea is the least one. Which contradicting with many researches which confirmed that; sleep apnea is the most common complaint in HD patients<sup>[29-31]</sup>.

In patients on dialysis, the etiology of insomnia is often multifactorial: biochemical and metabolic changes, lifestyle factors, depression, anxiety, and other underlying sleep disorders can all have an effect on the development and persistence of sleep disruption, leading to insomnia.

Noda et al (20116)<sup>[32]</sup> clarified in their study that; both RLS and sleep-disordered breathing may contribute to sleep disturbance in hemodialysis patients. RLS in particular may be an important factor in insomnia, which in turn is likely responsible for the high prevalence of hypnotic drug use in hemodialysis patients. Epidemiological studies<sup>[33]</sup> reveal that hemodialysis patients experience poor subjective sleep quality and insomnia and, in comparison to healthy persons, are more likely to show shorter sleep duration and lower sleep efficiency. Sleep apnea may be present and is usually investigated in these patients; however, the prevalence of restless legs syndrome (RLS), which is high in dialysis patients. This play a role in the pathogenesis of sleep-time hypertension in renal patients.

Research evidence<sup>[23]</sup> provides support for the efficacy of acupressure in the improvement of sleep quality from a variety of causes. This evidence was in line with many studies which are investigating acupressure effect on sleep quality in cancer patients, institutionalized residents, older adults, postmenopausal women, Iranian elderly nursing home residents. By way of manual performance, acupressure produces physiological effects in the form of enhances the feeling of well-being, and improves sleep. Acupressure may also improve the circulation of blood and chi (internal energy), and secretion of neurotransmitters, thus maintaining normal functions of the human body and providing comfort. All mentioned effects of acupressure may increase the quality of sleep<sup>[23-34]</sup>.

The current study showed that the acupressure is an effective technique for promoting the sleep quality in hemodialysis patients and its effects begins in overall sessions. As post acupressure technique the all sleep-related problems decreased significantly in study group. This may be the accumulative effect of acupressure for improving sleep disorders in hemodialysis patients; especially those patients cannot take medications without restrictions.

After implementation of twelve sessions of acupressure technique there were statistically significant differences between the study and control groups. This was confirmed by the comparison of three quarters of patients in the control group were complaining of severe insomnia comparing to less than one fifth of patients in the study group. This might be attributed to the effect of mechanical pressure; acupressure has been known to decrease tissue adhesion, promote relaxation, increase regional blood circulation, increase parasympathetic nervous activity, increase intramuscular temperature, and decrease neuromuscular excitability<sup>[17, 18]</sup>. These findings suggested a good, safe, a noninvasive therapy and low expense method for treatment of sleep disorders in hemodialysis patients. Training of this method is easy and it is applicable by nurses and even by patients.



Correspondingly; in the present study, the sleep quality is improved in studied group than in control group. The improvement was in all domains of sleep quality; daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction. This is with line of many researches which illustrated that; selection acupoints; stimulation increases the microcirculation around the nerve root, speed up the absorption of inflammatory products, restores the neurophysiological function and alleviates muscle spasm<sup>[16]</sup>. This improves sleep pattern and reduces muscle tension and thereby decreasing the sleep disorders.

Also, this study showed significant changes post acupressure technique mainly in daytime symptoms, problems initiating and maintaining sleep and sleep satisfaction. These symptoms actually present in sleep quality for those patients according to Merlino et al (2008)<sup>[13]</sup> who stated that; excessive daytime sleepiness (EDS) is often reported by the dialyzed population. Direct effects of uremic encephalopathy and of somnogenic cytokines have been suggested as the cause of EDS, in addition to the sleep disturbances that increase daytime sleepiness by impairing nocturnal sleep efficiency.

In the present study, the blood pressure (both systolic and diastolic) decreased in studied group than in control group. Research evidence provides support for efficacy of acupressure in the management of hypertension. This evidence was in line with Lin et al (2016)<sup>[35]</sup> who stated that, acupressure technique can lower blood pressure in hypertensive patients and may be included in the nursing care plan for hypertension.

Poor quality of sleep in hemodialysis patients can disturb motivation, thoughts, and emotions. Patients with decreased quality of sleep show many physical and psychological symptoms. Furthermore, by overall, previous study of acupressure on sleep quality among hemodialysis patients showed positive impact on improving the sleep quality. Clinicians should consider providing acupressure as an alternative method to improving dialysis patients' quality of sleep. Nurses, patients, and their families could be easily trained to administer acupressure to those who have sleep disturbance.

## V. Conclusion

From the present study results it can be concluded that, acupressure technique has a beneficial effect on improving sleep quality in hemodialysis patients.

## VI. Recommendations

Based on the results of the present study the following recommendations are derived and suggested.

- All dialysis nephrologists and nurses should be regularly encouraging hemodialysis patients to perform acupressure technique daily.
- Acupressure technique should be incorporated into routine nursing clinical practice.
- A simple manual of guidelines of acupressure technique should be available for all nurses working at hemodialysis unit and for hemodialysis patients especially newly admitted.

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