

# Effect of Skin Massage using clove oil on Uremic Pruritus and Sleep Disturbance for End Stage Renal Disease Patients undergoing Maintenance Hemodialysis

(1) Heba A Etman, (2) Sherein M Gad, (3) Kamal M Okasha and (4) Afaf A Basal.

(1) Demonstrator, Medical & Surgical Nursing, Tanta University,

(2) Lecturer of Critical Care Nursing, critical nursing, Faculty of nursing, Tanta University, Egypt,

(3) prof of internal medicine, faculty of medicine, Tanta university, Egypt

(4) Professor, Medical & Surgical Nursing, Faculty of Nursing, Tanta University, Egypt

**Corresponding Author: Heba A Etman**

---

**Abstract:** **Background:** Uremic pruritus (UP) is one of the skin symptoms encountered in patients with ESRD and affects their sleep and quality of life. It is seen in nearly 20-90% of the patients who receive hemodialysis. Aim of the present study was to evaluate the effect of skin massage using clove oil on uremic pruritus and sleep disturbance for ESRD patients undergoing maintenance hemodialysis. **Subjects and method;** A quasi-experimental study was conducted in the Dialysis Unit of student hospital affiliated to Tanta University Hospital. A convenience sampling of (60) patients receiving hemodialysis and complain from UP, were divided into two equal groups. **Tools:** three tools were used for data collection as follow; Tool (I) Structured interview schedule, Tool (II) Five domain pruritus scale, Tool (III) The Pittsburgh Sleep Quality Index. **Results;** the main results revealed that there was a highly significant improvement in the total pruritus level and sleep disturbance in the study group where (60%) had moderate pruritus pre intervention and (46.6%) had mild pruritus post completion of the nursing intervention, regarding sleep disturbance;(100%) of the two groups had sleep disturbance pre intervention, while there was (30%) of study group had good sleep compared to (3.3%) of the control group patients who had good sleep. **Conclusion and recommendations:** The skin massage using clove oil has an effect on minimizing severity of pruritus and improving sleep quality among hemodialysis patients, encourages patient compliance with all prescribed medication and skin massage using clove oil & further studies to be conducted on a larger sample size.

**Keywords:** Maintenance hemodialysis, Uremic pruritus, clove oil.

---

## 1. INTRODUCTION

End-stage renal disease (ESRD) is the last stage of chronic kidney disease (CKD), which is the gradual decrease of kidney function over time. Individuals with ESRD have substantial and permanent loss of kidney function, and require a regular course of dialysis or a kidney transplant to survive. End-stage renal disease has become a public health concern worldwide, and the total number of end stage renal disease patients requiring renal replacement therapy has been growing drastically<sup>(1,2)</sup>.

According the United States Renal Data System coding guidelines 2018, the highest prevalence of CKD was found in Taiwan, with 2447 patients per million (pmp) , and the lowest prevalence was in Philippines, at 110 patient per million, while the USA in 2017, there were 124,675 newly reported cases of ESRD; the unadjusted (crude) incidence rate was

373.4 (per million/year), 87.3% of incident individuals began renal replacement therapy with hemodialysis (HD), 9.7% started with peritoneal dialysis (PD), and 2.8% received a preemptive kidney transplant<sup>(3,4)</sup>.

In Egypt, the national information center for health and population, 2017 had stated that the incidence of ESRD was about 483 patient per million (pmp). Renal

Uremic pruritus (UP) is one of the skin symptoms faced in patients with chronic failure and affects the quality of life. It is seen in nearly 20-90% of the patients who receive hemodialysis<sup>(5)</sup>. The exact cause of uremic pruritus is not known<sup>(6)</sup>. Uremic pruritus results from dryness of the skin, secondary hyperparathyroidism, peripheral neuropathy, allergic reactions, hypersensitivity, histamine and atrophy of sweat glands. It is emphasized that age is an important factor of pruritus among the patients who receive hemodialysis treatment, and the intensity and severity of pruritus increase with age<sup>(7,8)</sup>.

Intensity and spatial distribution of pruritus in patients with chronic renal insufficiency may vary significantly over time. The degree of UP range from sporadic discomfort to complete restlessness during day- and nighttime strongly reducing the patient's quality of life. Up to 50% of patients with UP complain about generalized pruritus.<sup>(9,10)</sup> In the remaining patients, UP seems to affect predominantly back, face, and shunt arm, respectively. In about 25% of patients pruritus is reported most severe during or immediately after dialysis. Once patients have developed UP, this symptom will in most cases last for month or years<sup>(11)</sup>. In patients with generalized pruritus, other causes such as, hepatobiliary, hematological, endocrinological, neurological and, drug intake as well as solid tumors need to be ruled out<sup>(12)</sup>.

Regarding the fact that nurses as health care providers have always tried to eliminate the patients' illnesses and physical and psychological problems, pruritus as a common skin complaint in patients undergoing hemodialysis requires nursing intervention<sup>(13)</sup>. Non-pharmacological treatments don't require the physician to prescribe to relieve hemodialysis itching. Moreover, most of these interventions are accompanied by the patients' favorable compliance<sup>(14)</sup>. Many medical personnel have no knowledge of non-pharmacological treatments of itching during hemodialysis or itchy stroke due to chronic renal disease. Currently, different methods of non-pharmacological treatments, included phototherapy, aromatherapy, skin massage, high flux dialyzer, acupuncture, and cold dialysis are not used enough<sup>(15)</sup>.

Skin massage is one of non-pharmacological methods to relieve pruritus. It is one of the most popular therapies. Skin massage is noninvasive nursing intervention to alleviate pruritus in patients undergoing hemodialysis. It is more clinically relevant and cost effective approach<sup>(16)</sup>.

Different oils such as clove oil can be used in skin massage. Cloves have a strong, kind, pleasant odors, similar to the flower of the same name, Carnations not only consist of volatile oil. They also contain 12-14% of tannin, mucous compounds, caryophyllene, oleanolic acid and eugenin<sup>(17)</sup>. Nowadays, the clove oil is an important natural antibacterial drug, is used in many fields, including dentistry, pharmaceuticals, and skin massage. It is used as an analgesic, antiseptic, warming, disinfectant, and antibacterial because it inhibits the growth or kills most pathogens<sup>(18)</sup>.

A multidisciplinary approach is necessary to carry out the management of uremic pruritus for patients undergoing hemodialysis. Nurses have an important and unique role in the treatment and follow-up of dialysis patients. Awareness of nurses about the factors that increase pruritus will help the nurse to plan appropriate nursing activities to minimize the negative effects of pruritus on patients and will enable the nurses to direct patients how to manage pruritus<sup>(19)</sup>. Nurses should incorporating aromatherapy into nursing practices.

#### **Significance of the study:**

Uremic pruritus has a substantial effect on quality of life, as it causes serious discomfort or even pain, anxiety, depression and sleep disorders. Poor quality of sleep and lack of sleep reduces overall quality of life and may lead to a host of other complications including impaired immune system and risk for cardiovascular disease<sup>(29)</sup>. Hence there is an urgent need to design proper nursing intervention to eliminate pruritus and enhance sleeping pattern among hemodialysis patients.

#### **Aim of the study:**

Evaluate the effect of nursing intervention on uremic pruritus and sleep disturbance for end stage renal disease patients undergoing maintenance hemodialysis.

## 2. SUBJECT AND METHOD

### Research hypothesis:

Patients with uremic pruritus and sleep disturbance who will receive the designed nursing intervention are expected to have better improvement.

### Research Design:

A quasi-experimental research design will be used in the present study.

### Setting:

The study will be conducted at:

- Dialysis Unit of student hospital affiliated to Tanta University Hospital.
- Dialysis Unit at Tanta International Educational Hospital

### Subjects:

A convenience sampling (60) Patients who have the inclusion criteria assigned with uremic pruritus will be collected from the above previously mentioned setting. They will be selected and divided randomly into two groups:

**1-Group I: Control group**, it consists of (30) patients who will receive routine care by hospital nursing staff.

**2-GroupII: Study group**, it consists of (30) patients will be exposed to the designed nursing care that will be implemented by researcher.

### Inclusion criteria:

- 1-Have uremic pruritus and sleep disturbance
- 2- Being under hemodialysis for more than 6 months.
- 3- Receiving hemodialysis 3 times per week, for 3 or 4 hrs.

### Exclusion criteria:

- 1 - Skin disease that cause pruritus
- 2 -patients with allergy to clove oil
- 3-Active hepatobiliary disease
- 4 -Systemic lupus erythematosus patient

### Tools of data collection:

Four tools will be used to collect data of this study:

**Tool I: Structured interview schedule** will be developed by the researcher depending on the related literature <sup>(20,21,22)</sup>.

This tool consists of two parts: **Part (1): Socio- demographic data of the patients** includes: patient's code, age, sex, and marital status, level of education, occupation, residence and smoking

**Part (2): Patients' medical and clinical data:** this includes data about duration of kidney problem, the duration since beginning hemodialysis, number of hemodialysis sessions per week, the duration of each session, patient complaints during session, allergy to any types of cosmetics, allergy to drugs, serum potassium and phosphate levels.

### Tool II: Patients' Knowledge Assessment Sheet:

- this tool will be developed by the researcher after reviewing the related literatures <sup>(16)</sup> to collect patients' knowledge that include definition, causes, signs and symptoms and measures to minimize uremic pruritus .

### Total scoring system of knowledge:

Correct and complete answer scored (2)

Correct and incomplete answer scored (1)

Don't know or incorrect answer (0)

The total scoring system of patients' knowledge will be calculated and classified as the following:

-Good → > 75% of the total score

-Fair → ≥ 60% - 75% of the total score

- Poor → < 60% of the total score

**Tool III: Five domain pruritus scale:** this scale was developed by Elman S, Hynan L, Gabriel B 2010<sup>(23)</sup> and will be adopted by the researcher to determine level of pruritus. It consists of 5 domains (Duration, Degree, Direction, Disability and Distribution). The duration, degree and direction domains each included one item, while the disability domain had four items (sleep, leisure/social, housework and work/school). All items of the first four domains were measured on a five-point Likert scale. The fifth domain including 15 body part item.

**Total scoring system:**

(0-5) indicates no pruritus

(6-14) indicates mild pruritus

(15-24) indicates moderate pruritus

(25-35) indicates severe pruritus.

**Tool IV: The Pittsburgh Sleep Quality Index (PSQI):** this scale was developed by Buysse DJ, Reynolds CF, Monk TH, Berman SR and Kupfer DJ 1989<sup>(24)</sup> and revised by MacFarlane and Moldofsky 2011<sup>(25)</sup> and will be adopted by the researcher to assess sleep quality, and the type and severity of sleep disorder of an individual within the last month. The scale consists of 24 questions in total, 19 of which are answered by the patient and five by his/her spouse or roommate. With the 19 questions answered by the patient, seven sub-dimensions are assessed, which are: (i) sleep quality; (ii) sleep latency; (iii) sleep duration; (iv) habitual sleep efficiency; (v) sleep disturbances; (vi) use of sleeping medications; and (vii) daytime dysfunction. Each item in the scale assumes a value between 0 (no disturbance) and 3 (serious disturbance), and the score of each sub-dimension ranges 0–3.

The sum of these seven sub-dimension scores gives the overall PSQI score. The overall PSQI score varies between 0 and 21. Those having an overall score of 5 or less are considered to have a “good” sleep quality. Those who have score more than 5 considered to have sleep disturbance.

**Ethical considerations:**

- a- Nature of the study did not carry any harm or pain to all subjects
- b- The necessary official permission from the faculty of nursing was sent to authorities at the two selected units to conduct the study.
- c- An informed consent was taken from every participant patient after complete explanation about the aim of the study.
- d- Complete confidentiality and privacy was considered regarding data collection and results. A code number was used rather than names.
- e- The patient was told about his right to withdraw from the study at any time and without any reason.

**Methods of data collection:**

**1-Tool (I, II):** were developed by the researcher to collect the data after extensive review of literature<sup>(26,27,28)</sup>.

**Tool III: Five domain pruritus scale:** this scale was developed by (Elman S, Haynan L, Gabriel V, Mayo M 2010)<sup>(23)</sup>.

**Tool IV: The Pittsburgh Sleep Quality Index (PSQI):** this scale was developed by (Buysse DJ, Reynolds CF, Monk TH, Berman SR and Kupfer DJ 1989)<sup>(24)</sup> and revised by MacFarlane and Moldofsky 2011<sup>(25)</sup>.

2- All tools of the study were reviewed for content validity by a panel of (5) expertise in the field of Medical Surgical Nursing, and nephrology field physician, Their opinions were elicited regarding tools format and consistency, it was calculated and found to be = (98%). The reliability for the study tools was calculated by Cronbach's alpha test; it was 0.745 for tool (I) Part (I) and 0.628 for tool (I) part (II), 0.804 for tool (II).

3- Pilot study was conducted on sex (10%) hemodialysis patients to test the clarity, feasibility and the applicability of the different items of the determinant tools to detect any obstacles. The needed modification was done by the researcher before study according to the experience gained from this pilot. The pilot study excluded from the study subjects.

4- The present study was conducted through four main phases for **every patient individually** until the end of the study which are (Assessment, planning, implementation and evaluation).

#### 1-Assessment phase:

Assessment of the patient baseline data by the using tool I part (1) and (2), tool II to assess patients' knowledge, using tool (III) to determine level of pruritus and tool (IV) to determine type and severity of sleep disorder of an individual within the last month groups before implementing skin massage and aromatherapy. Those four tools were used for both study and control groups.

#### 2-planning phase:

Objectives of the study were prepared based on the needs of the patients. A designed nursing intervention (knowledge part followed by skin massage using clove oil) was developed after reviewing of the related literature<sup>(29,30)</sup>. The intervention was carried on (12) sessions as following: (session 1): for theoretical knowledge, take about 30: 45 minutes. (Session 2:12): for the practical part was carried out within nearly an hour.

#### 3-Implementation phase:

The nursing intervention was carried out by the researcher throughout 6 basic sessions as the following; **the first session** was given to the patient regarding knowledge about; principles of special diet for renal patient, examples of food rich in potassium, examples of food rich in phosphorus and examples of food rich in sodium. Uremic pruritus definition, risk factors, factors that aggravate uremic pruritus, areas most commonly affected, medical management and the non-pharmacological management of UP including life style modification. **The second session** the researcher started the session by performing clove oil sensitivity test and the patient who didn't develop any sensitivity reaction to clove oil in the form of (edema, itching, redness and rash) was included. Skin massage therapy using clove oil was implemented by the researchers to all participants involved in the study group three times per week for one weeks (6sessions). **From the third to twelve session** the researcher provided skin massage therapy using clove oil. The researcher made proper follow up to patient adherence to the topical aromatherapy at home every session.

-**control group** received the routine nursing care provided by the dialysis nurses

#### 4-Evaluation phase:

- Every patient in both groups (study and control) was assessed 3 times:--**First time:** before implementing skin massage using Tool I, II, III and IV

**Second time:** two weeks after implementing skin massage using Tool II, III, and IV.

**Third time:** four weeks after implementing skin massage using Tool II, III and IV.

#### Methods of data analysis

All data were collected, coded, tabulated and subjected to statistical analysis. Statistical analysis was performed by statistical package SPSS

In general (version 20), also Microsoft office excel was used to handle data also for graphical presentation. Data was expressed as numbers and percentage. Significance for numeric variable was determined using t-test. A probability level of p-value level  $P < 0.01$  was the level of significance for testing the research hypothesis.

### 3. RESULTS

**Table (1): distribution of the studied groups according to their socio-demographic characteristics**

Characteristics	The studied patients (n=60)				$\chi^2$ P
	Control group (n=30)		Study group (n=30)		
	N	%	N	%	
<b>Age (in years)</b>					
▪ (20-<30)	0	0.0	5	16.7	5.620 0.132
▪ (30-<40)	9	30.0	7	23.3	
▪ (40-<50)	7	23.3	5	16.7	
▪ (50-60)	14	46.7	13	43.3	
<b>Gender</b>					
▪ Male	16	53.3	11	36.7	FE 0.299
▪ Female	14	46.7	19	63.3	
<b>Marital status</b>					
▪ Single	1	3.3	4	13.3	2.224 0.527
▪ Married	23	76.7	21	70.0	
▪ Divorced	2	6.7	1	3.3	
▪ Widow	4	13.3	4	13.3	
<b>Level of education</b>					
▪ Illiterate	9	30.0	10	33.3	3.992 0.262
▪ Primary education	11	36.7	8	26.7	
▪ Secondary education	7	23.3	10	33.3	
▪ Higher education	3	10.0	2	6.7	
<b>Place of residence</b>					
▪ Rural	21	70.0	24	80.0	FE 0.552
▪ City	9	30.0	6	20.0	

FE: Fisher' Exact test

**Table (1)** illustrated Percent distribution of the studied groups according to their socio-demographic characteristics, it was found that (43.3%, 46.7%) of study and control group patient respectively were aged (50-60) years. Also the table revealed that approximately (63%, 53%) of study and control group patient were females and males respectively. **Also**, it was found that more than three quarters (76.7%) and (70%) of the study and control groups respectively were married. **Additionally**, the table revealed that nearly one third (33.3%) of the study group patients were illiterate and secondary educated and more than one third (36.7%) of control group patients were primary educated, while more than three quarters (80%) and (70%) from them were from rural areas.

**Table (2): Mean scores of both serum potassium and serum phosphate levels among the studied groups throughout periods of study.**

	The studied patients (n=60)							F P
	Control group (n=30)			F P	Study group (n=30)			
	Pre	Immediate y 2 weeks	Post 1 month		Pre	Immediate ly 2week	Post one month	
<b>Serum potassium Level</b>	(3.7-5.4) 4.503±0.561	(3.7-5.3) 4.517±0.538	(3.7-5.3) 4.707±0.509	1.348 0.265	(3.0-5.3) 4.590±0.5 41	(3.5-5.3) 4.570±0.46 5	(3.6-5.3) 4.580±0.42 9	0.498 0.609

Control Vs Study t, P	1.093 , 0.279	1.124 , 0.266	1.032 , 0.306					
Serum phosphate Level	(3.5-6.3) 4.577±0.654	(3.3-6.3) 4.550±0.721	(3.5-6.0) 4.60±0.696	0.039 0.961	(3.3-6.3) 4.577±0.654	(3.5-6) 4.60±0.696	(2.9-6.1) 6.617±10.683	<b>9.987</b> <b>0.013*</b>
Control Vs Study t, P	0.609 , 0.545	<b>4.411</b> , <b>0.015*</b>	1.042 , 0.302					

\* Significant at level P<0.05.

Table (2) illustrated Mean scores of both serum potassium and serum phosphate. Concerning serum phosphate the table revealed that there was a statistical significant improvement among patients of study group throughout all intervention periods with p = (0.013). while there was no statistical significant among patients of control group with p= (0.961).

Figure (1) Percent distribution of the studied groups according to their total knowledge level throughout the periods of the study.

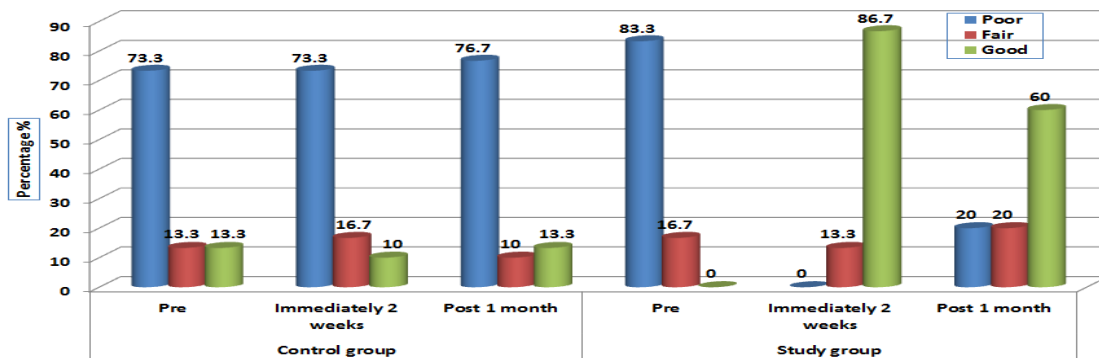
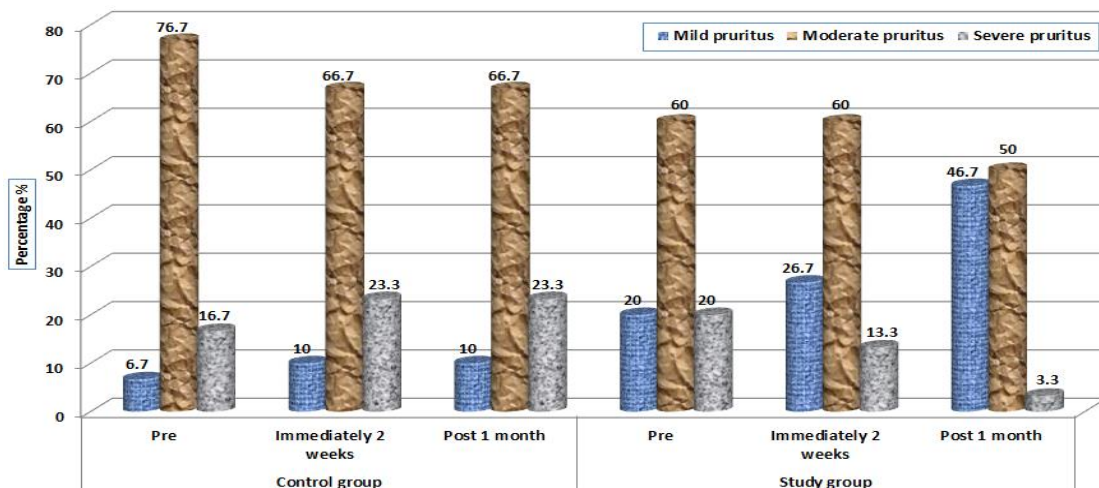


Figure (1) showed percent distribution of the studied groups according to their total knowledge level throughout the periods of the study, concerning the study group, there was a highly statistical significant improvement in the patients' total knowledge level, where more than three quarters (83.3%) had poor level of knowledge pre implementing the designed nursing intervention whereas (86.7%, 60.5%) had scored good levels of knowledge after two weeks and upon the completion of the designed nursing intervention respectively. Concerning the control group; there was no statistical significant improvement in the patients' total knowledge level.

Figure (2): Percent distribution of the studied groups according to the total level of pruritus scale throughout periods of study.



**Figure (2)** illustrated Percent distribution of the studied groups according to the total level of pruritus scale throughout periods of study. **Concerning the study group there was** a highly statistical significant improvement in the total level of pruritus scale throughout periods of study; where more than half (60%) had moderate pruritus pre and post two weeks respectively and (50.0%, 46.6%) of patients had moderate and mild pruritus respectively post completion of skin massage using clove oil with p=0,001. **Regarding the control group**, there was no statistical significant improvement in the total level of pruritus scale throughout periods of study.

**Table (3): Percent distribution of the studied groups according to mean total level of pruritus scale throughout periods of study.**

Total Pruritus Level	The studied patients (n=60)							
	Control group (n=30)			$\chi^2$ P	Study group (n=30)			$\chi^2$ P
	Pre	Immediately 2 weeks	Post One month		Pre	Immediately 2 weeks	Post One month	
Range Mean $\pm$ SD	(13-32) 21.10 $\pm$ 4.452	(13-30) 21.07 $\pm$ 4.586	(12-32) 21.10 $\pm$ 4.866	F=0.001 P=0.999	(14-31) 20.77 $\pm$ 5.341	(12-28) 18.13 $\pm$ 4.946	(7-25) 15.53 $\pm$ 4.718	F=8.189 P=0.001*
Control Vs Study t P	0.263 0.749	2.382 0.021*	4.499 0.000*					

\* Significant at level P<0.05.

**Table (3) illustrated, Concerning the study group** there was a highly statistical significant improvement in the average total pruritus level pre implementing the designed nursing intervention was (20.77 $\pm$ 5.341) whereas it was (18.13 $\pm$ 4.946, 15.53 $\pm$ 4.718) post two weeks and upon completion of skin massage using clove oil with p = 0.001. **Comparing to the control group** there was no statistical significant improvement in the average total pruritus level was (21.10 $\pm$ 4.452) pre implantation of the routine care whereas it was (21.10 $\pm$ 4.866) upon completion of the routine nursing care with p = 0.999.

**Table (4): Percent distribution of the studied groups according to the mean scores of Pittsburgh Sleep Quality Index (PSQI) throughout periods of study.**

Total PSQI score	The studied patients (n=60)													
	Control group (n=30)						$\chi^2$ P	Study group (n=30)						$\chi^2$ P
	Pre		Immediately 2 week		Post One month			Pre		Immediately 2 weeks		Post One month		
	N	%	N	%	N	%		N	%	N	%	N	%	
▪ Good sleep	0	0.0	1	3.3	1	3.3	1.023	0	0.0	2	6.7	9	30.0	13.878 0.001*
▪ Sleep disturbance	30	100.0	29	96.7	29	96.7	0.600	30	100.0	28	93.3	21	70.0	
Range Mean $\pm$ SD	(7-16) 11.63 $\pm$ 2.918		(5-17) 11.53 $\pm$ 3.003		(2-16) 11.47 $\pm$ 3.309		F=0.022 P=0.978	(7-16) 10.37 $\pm$ 2.606		(2-15) 8.67 $\pm$ 3.10		(1-14) 6.77 $\pm$ 3.17		F=11.037 P=0.000*
Control Vs Study $\chi^2$ P	-		FE 1.00		FE 0.012*									

$\leq$ 5 Good sleep                       $>$ 5 Sleep disturbance

\* Significant at level P<0.05.

**Table (4)** showed Percent distribution of the studied groups according to the mean scores of Pittsburgh Sleep Quality Index (PSQI) throughout periods of study. There was (100%) all of studied patients had sleep disturbance with mean scores = (10.37 $\pm$ 2.606), (11.63 $\pm$ 2.918) for both study and control groups respectively pre any nursing intervention. **Concerning after one month**, There was a statistical significant improvement in sleep quality for the study group patients after completion of the designed nursing intervention where p value =0.012.



**Table(5): Correlation between Patient knowledge about hemodialysis and both serum potassium and serum phosphate levels among the studied groups throughout periods of study.**

		The studied patients (n=60)					
		Patient knowledge assessment					
		Control group			Study group		
		Pre	Immediately 2 weeks	Post 1 month	Pre	Immediately 2 weeks	Post 1 month
Serum potassium Level	R	0.124	-0.172	-0.263	-0.184	-0.173	0.034
	P	0.512	0.362	0.161	0.332	0.360	0.859
Serum phosphate Level	R	-0.056	0.353	-0.062	-0.150	<b>-0.386</b>	-0.375
	P	0.768	0.056	0.745	0.429	<b>0.035*</b>	<b>0.035*</b>

\* Significant at level  $P < 0.05$  . \*\* Highly significant at level  $P < 0.01$  .

**Table (5)** illustrated Correlation between Patient knowledge and both serum potassium and serum phosphate levels. **concerning serum phosphate level**, the table revealed that post completion of the designed nursing intervention; there was a significant negative correlation between Patient knowledge and serum phosphate **among study group patients** with  $p = (0.035)$ , while there was a non-significant negative correlation between Patient knowledge and serum Phosphate **among control group patients** with  $p = (0.745)$ .

**Table (6): Correlation of serum potassium, serum phosphate levels and total pruritus score among the studied groups throughout periods of study.**

		The studied patients (n=60)					
		Total pruritus scale score					
		Control group			Study group		
		Pre	Immediately 2 weeks	Post 1 month	Pre	Immediately 2 weeks	Post 1 month
Serum potassium Level	R	-0.159	-0.245	-0.256	-0.103	0.122	-0.001
	P	0.402	0.191	0.171	0.587	0.520	0.994
Serum phosphate Level	R	0.024	0.260	0.250	0.313	<b>0.599</b>	<b>0.467</b>
	P	0.898	0.165	0.183	0.092	<b>0.000**</b>	<b>0.009**</b>

\* Significant at level  $P < 0.05$  .

\*\* Highly significant at level  $P < 0.01$  .

**Table (6)** showed the Correlation of serum potassium, serum phosphate levels and total pruritus score among the studied groups throughout periods of study. **Concerning serum phosphate level**, the table revealed that there was a highly statistical significant positive correlation between serum phosphate levels and total pruritus score **among study group patients** with  $p = (0.00, 0.009)$  two weeks and post completion of the designed nursing intervention respectively.

#### 4. DISCUSSION

Uremic pruritus (UP) is such a common symptom that endangers end-stage renal disease patients receiving hemodialysis <sup>(6)</sup>. Uremic pruritus characterized by itching on the skin, it significantly influence quality of life comfort with potential psychological, functional and social impacts, and increased morbidity <sup>(31)</sup>. Nurses have an important and unique role in the treatment and follow-up of dialysis patients. Nurses should incorporate aromatherapy and skin massage into nursing practice. So the aim of this study was to implement nursing intervention to provide an effective non-pharmacological uremic pruritus and sleep disturbance for end stage renal disease patients undergoing maintenance hemodialysis <sup>(29)</sup>.

Concerning to socio demographic data the current study revealed that that about half of study and control group patient respectively were aged (50-60) years and more than half (63%, 53%) of study and control group patient were females and males respectively. Also, one third of the study group patients were illiterate and secondary educated and more than one third of control group patients were primary educated, while more than three quarters of them were from rural areas

This result was in agreement with **Mostafa et .al, (2015)** <sup>(32)</sup> who reported that about half of the patients who were receiving hemodialysis at hemodialysis centers in Mashhad, Iran were aged (50-60) years and (60%, 50%) of the studied patient were females and males respectively. **Also**, This result was consistent with **yaw et.al,(2018)** <sup>(33)</sup> who reported that one third of the studied patients with ESRD in a tertiary facility in Ghana are secondary educated. Moreover, This finding was in harmony with **Belayneh et.al,(2019)** <sup>(34)</sup> who reported that about three quadrants (73.9%) of the studied patients in his study were married.

**Concerning to mean scores of serum potassium and serum phosphate, Concerning serum phosphate** the study result revealed that there was a statistical significant improvement throughout all intervention periods **comparing to control group** there was no statistical significant improvement .the improvement may be attributed to the effectiveness of the designed knowledge part about food that rich in phosphorus which patient have to avoid or minimize as much as possible.

This result was consistent **Eniva et.al,(2016)** <sup>(35)</sup> the study result revealed that there was a statistical significant improvement in the mean scores of phosphate level and itching reduction among patients of study group.

Also, the result was in the same line with **Yuka et.al,(2018)** <sup>(36)</sup> who documented that diet therapy for hyperphosphatemia in hemodialysis patient is as integral to maintaining patient health. Moreover, **Louise et.al,(2018)** <sup>(37)</sup> who reported that there was a significant improvement in serum phosphorus levels in this study upon dietary phosphorus restriction

**On the other hand**, the finding was in contrast with **Nigel et.al,(2017)** <sup>(38)</sup> who reported that The relationship between dietary phosphate intake and adverse outcomes in patients with ESRD is also unclear. In addition, the association between dietary phosphate and serum phosphate is modest at best.

**Regarding the total knowledge level throughout the periods of the study**, the study result revealed that there was a high significant improvement in the level of knowledge among **study group patients** throughout all the intervention period **comparing to the control group** there was no significant improvement in their total knowledge level throughout all period of routine care. This may be attributed to the lack teaching or educational sessions provided to the patients.

This findings was supported by **Hala et.al,(2015)** <sup>(39)</sup> who documented that there was a significant improvement in patient knowledge in his study on 99 patients at the Imam Hossein Hospital in Shahroud, Semnan Province, Iran. **Also**, this result was consistent with **serwan et.al,(2018)** <sup>(40)</sup> and **Hossein et.al,(2016)** <sup>(41)</sup> who reported that special education for patient regarding hemodialysis ,food rich in sodium, potassium and phosphorus should be given to decrease associated complications.

**Concerning to total level of pruritus** throughout the periods of the study, the study result revealed that there was a high significant improvement in the level of pruritus among **study group patients** throughout all the intervention period **comparing to the control group** there was no significant improvement in their total pruritus level throughout all period of routine care. This improvement can be attributed the effectiveness of the designed nursing intervention that helped to relieve pruritus which started with proper health teaching given individually to study group patients. Also, to the effectiveness of both skin massage and local aromatherapy and the accurate selection of oil (clove oil).

This finding was congruent with **Shahgholian et.al,(2013)** <sup>(42)</sup> who concluded that use of massage regardless to be with or without aromatic substances can significantly alleviate pruritus in hemodialyzed patients . Also, the results were consistent with **Shadia et.al,(2017)** <sup>(43)</sup> who reported that two third of the study participants had severe pruritus and about one third had moderate pruritus before aromatherapy use. While after aromatherapy revealed that one third had mild pruritus and more than half hadn't pruritus. Additionally, **FA phan, et.al,(2018)** <sup>(44)</sup> reported that there significant improvement in the average total pruritus level among the study group patients. Moreover, this result was in agreement **Risyda et.al,(2019)** <sup>(45)</sup> who reported that there was significant improvement in total pruritus level among the study group patients after the topical aromatherapy.

**Regarding to sleep disturbance the study result reveled that** there was a high significant improvement in sleep disturbance among **study group patients** throughout all the intervention period **comparing to the control group** there was no significant improvement in their sleep disturbance throughout all period of routine care. This improvement may be attributed to the decreased levels of itching (pruritus) which is generally triggered at night, this affect enormously sleeping pattern. **Also**, it can be attributed to the relaxant, soothing and sedative effect of clove oil which the patient had reported using it several times at night.

This finding was in agreement with **Ezgi hu et.al,(2014)**<sup>(46)</sup> who documented there was significant improvement in the average total level of PSQI among the study group patients after administration of baby oil over the uremic pruritus. **Also**, **Tinghaet.al,(2017)**<sup>(47)</sup> and **Andreas et.al,(2011)**<sup>(48)</sup> reported that there was significant improvement in the average total level of PSQI among the study group patients after aroma massage. Moreover, the result was in harmony with **Haleh et.al,(2019)**<sup>(49)</sup> who found that there significant improvement in the total level of PSQI among the study group patients after hot massage therapy.

**Regarding Correlation of serum potassium, serum phosphate levels and total pruritus score among the studied patients** pre and post the designed nursing intervention. The study result revealed that there was a significant negative correlation between Patient knowledge and serum phosphate. **Comparing to the control group** there was non-significant negative correlation between Patient knowledge and serum Phosphate.

This result was consistent with **Gebril H.et.al,(2019)**<sup>(50)</sup> the study result revealed that there was significant negative correlation between Patient knowledge about principles of diet for hemodialysis patient and serum phosphate. Also, **Louise Set.al,(2018)**<sup>(51)</sup> documented that there was a significant negative correlation between applied knowledge about diet rich in phosphorus and serum phosphate. Also, the study was in harmony with **On the other**, the study result was inconsistent with **Michicho S et.al,(2019)**<sup>(52)</sup> who reported that The relationship between dietary phosphate intake and adverse outcomes including hyperphosphatemia in patients with ESRD is also unclear.

**In relation Correlation of serum potassium, serum phosphate levels and total pruritus score among the studied patients** pre and post the designed nursing intervention. The study result revealed that there was a highly statistical significant positive correlation between serum phosphate levels and total pruritus score. **Comparing to the control group**, there was a non-significant positive correlation between serum phosphate levels and total pruritus score. This finding was in the same line with **Shaman et.al,(2016)**<sup>(53)</sup> who reported that there was a highly significant positive correlation between serum phosphate levels and total pruritus score among study group patients. **Also**, the result was supported by **Eniva et.al,(2016)**<sup>(35)</sup> the study result revealed that was a highly significant positive correlation between reduction in serum phosphate levels and the improvement in total pruritus score.

## 5. CONCLUSION

**In the light of the current study, it can be concluded that** skin massage using clove oil had a significant effect in reducing uremic pruritus level and enhancing sleep pattern among end stage renal disease Patients undergoing maintenance hemodialysis.

## 6. RECOMMENDATIONS

Based on the result of the current study recommendation are suggested that;

- 1- Hemodialysis patients should be encouraged to attend teaching programs about UP and its treatment.
- 2- Encourage patient compliance with skin massage using clove oil at home
- 3- Further studies to be conducted on a larger sample size.

## REFERENCES

- [1] Ebrahim A, Hassan M, Mohamed N. Nurses' knowledge and practice regarding care for the patients during hemodialysis. Medical Journal. 2016; 84(1): 1135-1141.
- [2] Zain N, Omar T, Younis J. Effect of self-care model intervention on quality of life of patients undergoing hemodialysis. Research and Review Health Care Journal.2018; 2(2):1-9.
- [3] Saran R, Robinson B. United States Renal Data System 2019 annual data report: Epidemiology of kidney disease in the United States. American Journal of Kidney Disease.2020; 66(1):501- 505.

- [4] The eighth Annual Report of End Stage Renal Disease from united states renal data system, National Institute Of Kidney Disease,2019.
- [5] Clave R., Boucekine M, Ranchin B. Quality of life in adults with chronic kidney disease who initiate hemodialysis treatment. *BMC Nephrology*. 2019; 20(2):1-10.
- [6] Michelle A., Taylor C. Psychosocial considerations and recommendations for care of End stage Renal Disease patients on dialysis *Nephrology Journal*. 2019; 10(2):2-3.
- [7] Kaspar C, Bholah R, Bunchman T. A review of chronic kidney disease. *Blood Purification Journal*. 2016; 41(1):211-217.
- [8] Bonnie J and Stevens D. Pain assessment and intensity in hospitalized children. *Journal of Pain*. 2018; 13 (9):857-65.
- [9] Jain J. Handbook of pruritus management. New Delhi: Jaypee Brothers Medical publisher Co., 2018; ch.3:18-50.
- [10] Jacobsen R, Fønnebø V, Kristoffersen A. Use of complementary and alternative medicine within Norwegian hospitals. *BMC Complement Alternative Medicine Journal*. 2017; 15(3): 275.
- [11] Nadarajah s, Ramya A, Eric D. Uremic Pruritus. *Journal of Physiology*. 2018; 596(4):561-62.
- [12] Pointon M, Duffiie D, Canon J. Multiple pathway for itch and their interaction with pain. *European Journal Applying Physiology*. 2011; 111(12):2977-2986.
- [13] Buckle J. *Clinical Aromatherapy: Essential Oils in Health Care*. 3<sup>rd</sup> ed., St.louis: Elsevier Co, 2015; 250-260.
- [14] Banavasi S, Tonita M, Ashok M. Cutaneous manifestations in patients with end stage renal disease on hemodialysis. *International Journal of Contemporary Medical Research*. 2016; 3 (5):1386-1388.
- [15] Sajid NK, Ahmad S, Sarwar I. Chronic renal failure in Adults; etiology and clinical presentation. *Professional Medical Journal*. 2014; 21(2): 280-289.
- [16] Al-Mawsheki E, Ibrahim M, Taha N. Nurses' knowledge and practice regarding care for the patients during hemodialysis. *Medical Journal of Cairo University*. 2016; 84(1): 1135-1141.
- [17] James S, Ashwil J, Nelson K. *Patients undergoing hemodialysis nursing care: principles and Practice*. 4<sup>th</sup> ed. China: Elsevier Co.2017; 130-154.
- [18] Jennifer M, Oliver M, Dipchand C. Electrical needle therapy of uremic pruritus. *Canadian Journal of Kidney Health and Disease*. 2016; 3(1): 1-13.
- [19] Vittinghoff M, Atashpeikar S, Jalilazar T. Effect of skin massage on uremic pruritus in hemodialysis patients. *Journal of Caring Sciences*. 2012; 1(1): 31-5.
- [20] Singh D and Harita C. Clove Oil - Properties and Applications. *Science technigue*. 2019; 6(2):127-132.
- [21] Ota K, Fukuda M, Wakamatsu T. The effect of clove and benzocaine versus placebo as topical anesthetics. *Journal of Clinical nephrology*. 2019; 4(2): 2299-303.
- [22] Almasri J, Alsawas M, Mainou M. Outcomes of nursing intervention for uremic pruritus among hemodialysis patients: A systematic review and meta-analysis. *Nursing Science Journal*. 2016; 64(1):236-43.
- [23] Elman S, Hynan L, Gabriel V. The 5-D pruritus scale: a new measure of pruritus. *British Journal of Dermatology*. 2010 ; 162(3): 587-593.
- [24] Buysse DJ, Reynolds CF, Monk TH, Berman SR and Kupfer DJ. Development of sleep assessment tool (Pittsburg sleep quality index). *J Gerontol A Biol Sci Med Sci*.1989; 67(4):433-439.
- [25] MacFarlane, Moldofsky. Reliability and validity of the Pittsburgh Sleep Quality Index scale in older men. 2011;43(3): 234-241.

**International Journal of Novel Research in Healthcare and Nursing**

 Vol. 7, Issue 3, pp: (28-41), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [26] Almasri J, Alsawas M, Mainou M. Outcomes of nursing intervention for uremic pruritus among hemodialysis patients: A systematic review and meta-analysis. *Nursing Science Journal*. 2016; 64(1):236-43.
- [27] Becherucci F, Roperto R, Materassi M. Chronic kidney disease among adults. *Clinical Kidney Journal*. 2016; 9(4):583-591.
- [28] El-Abbassy A, Atia M, Alam F. Effectiveness of practical guides on burden's coping strategies among caregiver of patients undergoing hemodialysis. *International journal of nursing*. 2015; 2(2): 128-42.
- [29] Debono D, Hoeksema L, Hobbs RD. Caring for patients with chronic pruritus. *Journal of American Osteopathic Association*. 2013; 113(4): 620-627.
- [30] Witt N, Coynor S, Edwards C. Symptom burden in patients with chronic kidney disease not requiring renal replacement therap. *Current Emergency and Hospital Medical Reports*. 2016; 4(1): 1-10.
- [31] Kaheni S, Bagheri M, Goudarzian A. Symptom burden in chronic kidney disease; a population based cross sectional study. *International Kidney Journal* . 2016; 4(5): 1795-800.
- [32] Mostafa R, Elahe J, Farzaneh S, Mohammad H. The Effects of Cool Dialysate on Pruritus Status During Hemodialysis of Patients With Chronic Renal Failure. *Iran Red Crescent Med*. 2017; 19(1): 448-450.
- [33] Yaw A, Dennis O, George B, Henry A Yaw A. Clinical and demographic characteristics of chronic kidney disease patients in a tertiary facility in Ghana. *Pan African Medical Journal*. 2018; 51(2):132-137.
- [34] Belayneh K, Minyahil A, Yewondwossen T and Ephrem E. Quality of life and its predictors among patients with chronic kidney disease: A hospital-based cross sectional study. *PLOS journal*. 2019; 14(2): 579-583.
- [35] Eniva M, Rosane M, Azevedo L, Raquel E, Angélica G, Ricardo C, Dulce A. Educational nursing intervention to reduce the hyperphosphatemia in patients on hemodialysis. *Revista Braselleria Journal*. 2016; 70(1):26-33.
- [36] Yuka K, Hitomi M. The importance of nutritional intervention by dietitians for hyperphosphatemia in maintained hemodialysis patients. *Kawate and Miyata Renal Replacement Therapy*. 2017; 19(3): 11-18.
- [37] Louise S, Marianne R, Anne L, Jesper Q , Jens J, Arne A. Short-term effect of the New Nordic Renal Diet on phosphorus homoeostasis in chronic kidney disease Stages 3 and 4. *Nephrology Dialysis Transplantation*. 2018; 34(10): 1691–1699.
- [38] Nigel D, Stephen G. Is serum phosphate a useful target in patients with chronic kidney disease and what is the role for dietary phosphate restriction? *Nephrology Journal*. 2017; 22(2): 36–41.
- [39] Abo Deif H, Elsayi kh, Selim M, NasrAllah M. Effect of an Educational Program on Adherence to Therapeutic Regimen among Chronic Kidney Disease Stage 5 (CKD5) Patients under Maintenance Hemodialysis. *Journal of Education and Practice*. 2015; 6(5): 222-228.
- [40] Serwan B, Khalida M. Effectiveness of an education program on hemodialysis patients, knowledge towards dietary regimen at Al-Hussein Teaching Hospital in Al-Nasiriyha City. *Indian Journal of Public Health Research and Development*. 2018; 9(2): 245-249.
- [41] Hossein E, Mahdi S, Farzaneh A, Ali D. Influence of Nutritional Education on Hemodialysis Patients' Knowledge and Quality of Life. *Saudi Journal Kidney Disease and Transplantation*. 2016; 27(2):250-255
- [42] Shahgholian N, Mojgan M, Mahlegha D, Farzaneh G. Effect of aromatherapy on pruritus relief in hemodialysis patients. *Iranian journal of nursing and midwifery research*. 2014; 15 (2):955-957.
- [43] Zaghlol S, Ahmed H, Mohamed S and Ahmed A. Effect of Aromatherapy on Uremic Pruritus among patients Undergoing Hemodialysis. *Journal of Nursing and Health Science*. 2017;6(2): 26-28.
- [44] FA Phan A, Mihardja H, Marbun M. Effects of acupuncture on uremic pruritus in patients undergoing hemodialysis. *The 2nd Physics and Technologies in Medicine and Dentistry Symposium; Jakarta University; 2018*.

**International Journal of Novel Research in Healthcare and Nursing**Vol. 7, Issue 3, pp: (28-41), Month: September - December 2020, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [45] Risyda M, Kusnanto S. Effect of Topical Aromatherapy Turmeric Oil to Pruritus Scale on Chronic Kidney Disease Patients. *JNK Journal for Nursing Science*. 2019; 6(3): 396–400.
- [46] Ezgi K, Serap K, Gülnaz K, Ozgur M. Effect of baby oil on pruritus, sleep quality, and quality of life in hemodialysis patients. *Japan Journal of Nursing Science*. 2014; 11 (2): 183–188.
- [47] Tinghai H, WangANG B, X iaohuiliao A, Shuxiang W. Clinical features and risk factors of pruritus in patients with chronic renal failure. *Experimental and Therapeutic Medicine*. 2017; 18 (3): 964-971.
- [48] Andrew S, Jenna M, Ebony B. Educating Patients about CKD: The Path to self-Management and Patient-Centered Care. *Clinical Journal of the American Society of Nephrology*. 2016;11 (2):694 -698.
- [49] Ghavami H, Shams Aldin S, Abdollahpoor B, Moloud R, Hamid S. Impact of hot stone massage therapy on sleep quality in patients on maintenance hemodialysis. *Journal of Research in Medical Sciences*. 2019; 45(16): 376-384.
- [50] Gebril H, Khalil M. Effect of Aromatherapy on Sleep Quality, Fatigue and Anxiety among Patients Undergoing Hemodialysis. *IOSR Journal of Nursing and Health Science*. 2019; 8(5):18-23.
- [51] Louise S, Marianne R, Anne L, Jesper Q , Jens J, Arne A. Short-term effect of the New Nordic Renal Diet on phosphorus homoeostasis in chronic kidney disease Stages 3 and 4. *Nephrology Dialysis Transplantation*. 2018; 34(10): 1691–1699.
- [52] Michicho S, Yoshiko S, Hideaki Y. Lack of Awareness of Dietary Sources of Phosphorus is a Clinical Concern. *In Vivo Journal*. 2019; 33(2):11-16.
- [53] Shaman A and Stefan R, Hyperphosphatemia Management in Patients with Chronic Kidney Disease. *Saudi Pharmaceutical Journal*, 2016; 24 (2):494–505.