Effect of Foot Reflexology on Hemodialysis School Age Children on Fatigue and Sleep Quality

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Abstract

Background: Hemodialysis clients experience exhaustions for many reasons, including toxic components in the blood stream, fluid - electrolyte disturbances, irregular power consumption, anemia and distress. Even after rest, this feeling of exhaustion continues and it is difficult and sleeplessness is prevented. **The aims of this research was to:** Evaluate the effect of foot reflexology on hemodialysis school age children on fatigue and sleep quality. **Design**: To meet the study's objective, quasi-experimental research design was used. **Sample:** A purposive sample of children on school age on maintenance hemodialysis (n=30), those who received regular hemodialysis more than two times a week within at least three months, had no communication problems and had no other medical conditions, such as juvenile diabetes, cancer. **Setting:** this study was conducted at pediatric nephrology outpatient clinic in waiting room before the child take hemodialysis session and pediatric hemodialysis center at Minia city General Hospital. **Data collection tools: Three tools have been used (1)**; Pre / post - test questionnaire. **(2)** The second tool; Pittsburgh Sleep Quality Index. **(3)** Third tool Inventory symptoms of fatigue. **Results:** The research findings demonstrates that fifty percent of the participants had excessive fatigue, while the minority had moderate fatigue before intervention and improved to a higher level of study sample, which had moderate fatigue after post - testing. While most of the study samples have sleep disorder before foot reflexology is used in pre - test and in post - test, it was found that after intervention, many of the subjects studied reported fairly good sleep quality. **Conclusion:** The application of foot reflexology to school - age children with hemodialysis shows an improvement in sleep quality and a decrease in fatigue level. **Recommendation:** Continuous evaluation of the presence or development of fatigue or sleep problems in patients with hemodialysis. Researchers are also required to compare reflexology with other alternative / complementary therapies (e.g. massage, healing touch, response to relaxation).

Keywords: Foot reflexology, Hemodialysis, school age children, Fatigue, sleep quality.

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Introduction

Children with end-stage renal disease (ESRD) are a debilitating illness characterized by increased cardio - vascular mortality rates. Student's experience great challenge, such as slow development and psychosocial modification, both of which have a significant effect on the quality of life. **(Unal and Akpinar, 2016).** Chronic Renal Failure children are at higher risks for behavioral and emotional problems than healthy children. In addition, this hemodialysis treated children feel that life has no meaning and that pain never end. There is no cure or treatment and uncertainty about the future is a constant

challenge to achieving normal life. During their treatment, these children also face multiple and frequent dietary manipulation **(Sabouhi, 2013)**.

American Nephrology Nurses ' Association (2013) stated that hemodialysis (HD) is a commonly used renal replacement therapy method. It is a treatment that removes excess fluid and waste products from the blood. Excess water and waste is removed by means of diffusion and osmosis through the semi - permeable membrane. The child must have access to the blood vessel to remove and return the blood**.** Modality of dialysis treatment can affect sleep dysfunction. People treated with automatic Peritoneal Dialysis (PD) seem to have less serious sleep related respiratory disorders (SBD) than those of continuous outpatients with PD **(Roumelioti, 2016).** Renal transplantation is precipitated by a low sleep disorder **(Mavanur, 2010).** Sleep abnormalities have been associated with impaired neurocognition among people with chronic kidneys diseases (CKD), including inattention, lower school performance or work productivity, and driving accidents **(Stabouli 2016 and Ezzat 2015).**

Renal healthcare providers appear to under-recognize sleep disorders **(Dement, 2012).** Sufficient sleep quality and quantity are necessary for proper growth, development, and overall children's health. Sleep disorder can negatively impact the daytime function of a child, leading to behavioral and emotional problems and decreases daytime alertness and cognitive performance **(Chavoshi, 2015).**

Fatigue is a weakening syndrome or a reaction of long- term dialysis in almost all clients. It has a significant health impact on clients ' wellbeing. In long-term kidney substitute intervention clients, the incidence of fatigue varies from 60 % to 97 %. Fatigue is characterized as a state of self-recognition in which an individual has an excessive, persistent deep sense of tiredness and reduced ability to work physically and mentally and not relieved with rest **(Shaer, et al., 2016).** The capacity for self-care and wellness of clients and caregivers may be adversely impacted by fatigue. clients will also not conduct their everyday tasks such as feeding, washing, dressing, toileting, moving , depending on the degree of exhaustion, or may do so to a slightly lower degree **(Aliasgharpour et al.; 2014).**

Reflexology is one of the complementary therapies most commonly used. It includes physical action require using specific finger and hand methods, presenting pressure to each of these limbs, organ systems and reflexes in the limbs corresponding to the endocrine glands. This approach offers physiological comfort, accelerates blood circulation, allow the body sustain equilibrium and promotes the healthy release of energy in various organs and cells connected to pressure mark. This technique provides physiological relaxation, speeds up flow of blood, helps the body sustain equilibrium, and facilitates healthy exchange of power in different pressure point-related organs and cells, throughout the whole body, and promote the body heal it self. **(Song, et al., 2015).**

Nurses are directly responsible for a child with hemodialysis and the complications are reduced with care. The clients and the dialysis machine should be monitored consistently by nurses in order to detect different possible complications. Nurses who works in dialysis should have competencies in their information and practices because essential aspects of quality hemodialysis nursing care have

been considered **(Kananim, et al., 2011).** In addition, the community health nurse plays an important role in foot reflexology as rehabilitation for hemodialysis clients in improving the life quality, physical functioning, level of sleep total score and management of clients in accordance with a holistic or bio-psycho-social approach in order to facilitate an individual's independent living and autonomy. Encourage interaction and discussion with clients and their families about care priorities since these people can complain of specific physical impairments that need specialized care and unique rehabilitation therapy (**van Blijderveen et al., 2014).**

justification of research

Annual incidence of participants with last state kidneys disorders in Turkey, Egypt was 52 per million and 200, respectively **(El-Taib, et al., 2011**). Additionally retrospective survey, conducted via **Safouh, et al., (2015)** records of 1018 Egyptian children (1 to 19 years of age, 56.7 percent) suffering from all stages of chronic kidney disease and follow - up at 11 universities units of Pediatric Nephrology (outpatient clinics and dialysis centers) were reviewed throughout the duration 2012-2013, children from all the Cities and villages of Egypt were provided tertiary medical treatment. The 587 participants who reached the End Stage of Renal Disease. In different university hospitals, 549 (93.5 percent) were cured with hemodialysis and only 38 (6.5 percent) were cured with peritoneal dialysis.

School age children who have hemodialysis suffer from many problems as sleep and fatigue problem which affect daily life so we use reflexology as complementary therapies to decrease fatigue and maintain normal sleep.

The aims of the study:

To evaluate the effect of foot reflexology on hemodialysis school age children on fatigue and sleep quality

Research hypotheses:

The following research hypotheses were formulated to fulfill the purpose of the present research:

1-There will be a decrease in mean score of fatigue by the end of four weeks of implementation of foot reflexology.

2-There will be an improvement in mean sleep quality index scores by the end of four weeks of implementation of foot reflexology.

Methodology

Design:

For the current research, quasi-experimental study design (pre/posttest) was used; this design specific to the nature of the problem under review includes one group of subjects studied before and after the introduction of an intervention (**Creswell, 2012).**

Setting

The research was performed at outpatient clinic, in waiting room for pediatric nephrology before the child take hemodialysis session and hemodialysis center at Minia general hospital, the unit provides free hemodialysis sessions for children from Minia governorate.

Sample

A purposive sample of 30 school age children their age ranges from 6 to 12 years old, from outpatients, those who received regular hemodialysis more than

two times a week within at least three months, who had no communication problems, both sexes, and free of other medical diseases such as Juvenile diabetes, cancer.

Exclusion criteria: The study excluded children undergoing renal transplantation, participants suffering from skin disorders, gaping feet trauma, cancerous lesions, conditions of thrombosis or bleeding

Tools:

To collect the information from children, families, parents or caregiver a standardized questionnaire sheet was created.

Tool(1): Demographic data of child as, child's age, sex, level of education, and past history, duration of dialysis, weight, ….

Tool (2)

Pittsburgh Sleep Quality Index: (Pre/posttest)

This questionnaire adopted via Buysse (1989) and colleagues to give regular sleep quality indicator and variables directly affect the quality of previous month.. The objectives of the researchers were to provide a strong, accurate and validated quality of sleep measurement, an composite guide which could be easily used and interpreted by subjects; a relatively concise, clinically helpful evaluation of great sleep choice disorders, differentiation between ' better ' and ' bad ' sleepers. PSQI is concentrated upon 18 specific questions self recorded or caregiver recorded if the child unable to report regarding actual sleep quality.

Seven graded elements, comprising subjective quality of sleep, latency, normal sleep performance, sleep length, use of sleep medication, sleep disruption, and daytime disruption, are focused on the 18 queries.

The question of how good sleep was in the previous month determines the subjective standard of sleep. Sleep latency is characterized by the length of sleep. The habitual efficiency of sleep is attributed to the ratio of bedtime vs. time in bed. Sleep length is estimated by the following number of hours of sleep each night. The usage of medicine products is obtained by inquire if medicines were used to assist sleep in last month. Sleep disruption components are depends on a set of things which can interfere with sleep, such as night terrors and hurts. Daytime disruption is conducted to know queries such as whether the behaviours will remain awake and be enthusiastic.

Scoring system: A score from 0 to 3 is assigned for each question. The grades are obtained to calculate the seven elements grades included to generate overall scoring. The over all scoring should be 0-21. Every overall scoring higher than 5 indicates a significant sleeping disorder.

Tool (3): Inventory symptoms of fatigue: is a device of self-reporting or caregiver reported if the child was unable to fill the questionnaire. it developed by means of **Piper** (**1989**), adjusted and interpreted by the researcher through Arabic (back translation) to evaluate the amount of exhaustion in clients go through hemodialysis process by means of asking 14 fatigue- associated inquiries to the affected children. Respondents were asked to rate every element with an 11-point Likert - type reply that vary by one extreme to other fatigue-related response over the past seven days. With overall rating of 131, each query was rated between 0 and 10, and the overall

scoring score was represented as: (0-35: no fatigue), (36-64: mild fatigue), (65-84: moderate fatigue), (85-109: extreme fatigue) and (65-84: moderate fatigue) (110-131: excessive fatigue).

This research was done out in two stages:

1st stage: preparation

Assessment of existing locally and globally information, utilizing textbooks, papers, journals and magazines, on particular issue. For the variety of participants affected by fatigue and sleep disruptions, the suggested research settings were tested and this process ended by performing the clinical trial.

Rearch pilot:

It's been accomplished in january 2018 for checking tools clarity, completeness, validity, practicability, it covered (6) sufferers to decide the time required to fill the tools. It was also accomplished to examine the possibility and efficiency of the instruments. Therefore, important modifications were made. Questions have been tested to look whether they are applicable and whether they attain the sort of knowledge required, which is modified according to participants ' solutions and feedback. Additionally to illustrate the opportunity and efficacy of using the study tools with regard to hospital policy so that participants involved in clinical trails were isolated from real analysis.

Constant validity:

expertise team tested instuments for readability, consistete, complete knowledge, appropriatenes and simplicity**.**

Reliability of tools

Sleep Quality index PSQI consistency was (0.83). The Fatigue symptoms Inventory was (0.94). Both had a significant level of internal stability as tested by Cronbach's alpha.

2nd stage: Intervention

A report was sent to top branch of Pediatric Nephrology and Hemodialysis Minia General Hospital from the Dean of the Faculty of Nursing at Minia University. As soon as permission becomes assumed to continue the suggested research, authors began gathering information. The researcher visits the out patients nephrology pediatric clinic and pediatric hemodialysis unit at general hospital on Saturday, Tuesday and Thursday per week from 9. 00 am until 2.00 pm. The researcher met two or three children per day, three days per week. By means of a direct observation process, each participant is interviewed for 30 - 45 minutes, over a period of 12 months, information was collected. The researcher introduced herself during the first interview to establish a line of communication with both the participants and the parents or caregivers, the character & cause of the study have been defined before responding the inquiries to obtain their acceptance & involvement, and to complete research instruments. Measuring sleep quality index and Fatigue Symptoms Inventory had been performed before utilization of the foot reflexology. Pretest was administered to all hemodialysis children and information becomes gathered via the use of formerly stated study tools. Pretest was performed to all participants immediately before they were taken to hemodialysis. Pre-test was accomplished in the duration from first of January 2018 till its end. Intervention and evaluation phase took 11

months from first of February 2018 till the end of December 2018.

The researcher meet children and their parents or care giver in out patient's nephrology clinic at waiting room before the child take hemodialysis session and perform foot reflexology program in the waiting room. Foot reflexology massage was implemented by the first author, for 12 sessions (three times each week for four weeks) with 30 minutes duration in each session (15 minutes each leg) for every client. Before continuing to foot reflexology administration, the clients were first asked to get rid of their socks (if any) and then put in either a sitting or lying position. To promote the massage, three to five drops of child oil were applied at room temperature (**Bhojraj, 2014).**

Foot reflexology massage was administered before the sufferers had been taken to hemodialysis in a quiet room (**Unal and Akpinar**, **2016**).Foot reflexology starts with relaxation exercises, which include thumb, finger and squeezing actions and rubbing and patting movements. Utility of foot reflexology is carried out in a top-down way in which the actual massage begins on the big toe of the pituitary gland, hypothalamus, brain and pineal body points, accompanied by massage on the body point of the medulla spinalis, which is positioned on the area stretching from the big toe to the center of the back side of the heel. Pressure is carried out to the solar plexus, after which reflexology techniques are applied to all regions that correspond to the nerve projections on the feet. Foot reflexology finishes with the performance overall of the above-mentioned relaxation exercises (**Embong et al.; 2015).** After finishing the foot reflexology program the child go to hemodialysis session.

Inventory Symptom Fatigue and the Pittsburgh Sleep Quality Index were administered as a post-test to participants at the end of the fourth week after completion of foot reflexology sessions.

Ethical consideration:

Ethical clearance was created by the ethics and research committee of the Faculty of Nursing, Minia University. Verbal agreement received after describing the purpose of the research to maintain their power from each participant and care giver. For the purposes of privacy and confidentiality, each part of sheet was labeled and identities of participants never seems on the sheets. Such participants were easy to withdraw at any point research paper at any time.

Statistical design:

For analysis of data, SPSS-21 was used. The researchers analysed, classified and configured each instrument. The demonstration of information is carried out using descriptive data in the form of descriptive frequencies for qualitative variables and means and standard deviations for quantitative variables. For two groups, the paired T-test was used. Chi square is used in relationship evaluations. To evaluate the interrelationships between quantitative variables, Pearson correlation analysis is used. At P. value <0,05, statistical significance is considered.

Results

Table (1) Show that 60% of participants ages ranging between 9 to 12 years old with mean age was 11years (Mean ± SD =11.2 ± 3.6). Regarding their sex 60 % of them were males. As respect to their level of education 60%

have primary school. The same table showed that 70% of the study subjects were on hemodialysis from 6 year to 10 year. The mean duration of dialysis was 6 years. Regarding weight 50 % of the study subjects' their weight ranged from 31 to 40 kilograms. Regarding the past history 50% of study subjects reported that they had one kidney since birth.

Table (2) indicates that 100% of the participants have disordered sleepers and sleep less than 7houres at night. Fifty percent of participants take more than 60 minute to fall asleep, live a wakeful and have enthusiasm for activities three or more times a week and suggested very bad sleep quality. Compared with posttest it is noticed that 56.7% participants have regular sleepers and take less than 15 minute to fall asleep. Fifty percent of participant's percent of time asleep vs. time in bed more than 85% stay awake and have enthusiasm for activities not during the past month and 80% reported fairly good sleep quality. There is highly statistical significance among pre and post test P-value = (0.000**).**

Table (3) suggests the sleep disturbance frequencies that influenced the participants depending on number of times over the "past month". The much more popular disorders recorded were "having pain three or more times a week, 70 % and 60 % unable to sleep within 30 minutes." getting up during nighttime or early morning, cannot breathe easily within 3 or more times every week while in posttest, it is observed that 50% have ache and cough or snore loudly not all during the past month. With highly statistically significant difference p=0.000

Table (4): illustrates the degree of fatigue among participants in pre and after intervention. Fifty percent of the participants in the sample have excessive fatigue, while 10 % have moderate fatigue before intervention comparing to 50% and 23.3% with moderate and mild fatigue respectively after intervention. With highly statistically significant difference p=0.000.

Table (5) suggests that posttest have the lowest mean score associated with sleep quality with mean scores 6.4 ±3.0 while it is high in pretest, 18.9 ±4.9. Similarly this table exhibits that was highly statistically significant difference p=0.000.

Table (6) shows that posttest have the lowest mean score related fatigue with mean scores 64.10 ±17.9 while it is high in pretest 105.70 ±16.5 with statistically significant difference p=0.000.

Table (7) clears that there is a positive significant correlation between sleep quality and fatigue among participants pre intervention with a total score r = .828, at P= 0.000**

Table (8) suggests that there is a positive significant correlation between sleep quality and fatigue among participants after intervention with a total score r = .631, at P= 0.000**

Table (9) notes that there is a highly significant relation between degree of fatigue and duration of hemodialysis among participants with a total score chi = .0855, at P= 0.000

Table (1): Percentage Distribution of the Study Subjects Regarding to Demographic Data (n=30)

Demographic Data		**N**	**%**
Age:			
6-8 years		12	40.0
9-12 years		18	60.0
	Mean ± SD	11.2 ± 3.6	
Gender:			
Male		18	60.0
Female		12	40.0
Educational level:			
Illiterate		9	30.0
Read & write		3	10.0
Primary school		18	60.0
Duration of each cycle:			
4 hours		30	100.0
Frequency of session per week			
3 session/week		30	100.0
Duration of hemodialysis			
1 – 5 years		6	20.0
6-10 years		21	70.0
>10 years		3	10.0
	Mean ± SD	6.8 ±2.6	
Weight			
< 20 kilogram		3	10.0
21-30 kilogram		9	30.0
31-40 kilogram		15	50.0
> 40 kilogram		3	10.0
Past history			
Congenital anomalies		9	30.0
One kidney		15	50.0
Persistent pus on kidney		3	10.0
Narrow ureters		3	10.0

Table (2): Percentage Distribution of Study Subjects Regarding to the Reported Sleep Quality Index Components at Pre-and Post Test (n=30)

Sleep Quality Index Components	**Pretest**		**Posttest**		**T. test**	**P. value**
	N	**%**	**N**	**%**		
Global Sleep Score					4.137	0.000**
Normal Sleepers	00	00.0	17	56.7		
Disordered Sleepers	30	100.0	13	43.3		
Sleep latency (length of time to fall asleep)					10.933	0.000**
<15min	3	10.0	12	40.0		
16-30	6	20.0	12	40.0		
31-60	6	20.0	6	20.0		
>60min	15	50.0	0	00.0		
Habitual sleep efficiency: percent of time a sleep vs. time in bed					15.832	0.000**
>85%	0	00.0	15	50.0		
75%-84%	0	00.0	9	30.0		
65%-74%	3	10.0	6	20.0		
<65%	27	90.0	0	00.0		
Sleep Duration (hours) number of hours of sleep per night.					-4.826	0.000**
Short Sleepers (<7 hours)	30	100.0	15	50.0		
Normal Sleepers (7-9 hours)	00	00.0	9	30.0		
Long Sleepers (>9 hours)	00	00.0	6	20.0		
Use of medication					2.523	0.017*
Not during the past month	21	70.0	21	70.0		
Less than once a week	3	10.0	6	20.0		
Once or twice a week	0	00.0	3	10.0		
Three or more times a week	6	20.0	0	00.0		
Daytime dysfunction: ability to stay awake and to have enthusiasm for activities**).**					24.233	0.000**
Not during the past month	0	00.0	15	50.0		
Less than once a week	3	10.0	12	40.0		
Once or twice a week	12	40.0	3	10.0		
Three or more times a week	15	50.0	0	00.0		
Subjective sleep quality					12.042	0.000**
Very good	3	10.0	6	20.0		
Fairly good	0	00.0	24	80.0		
Fairly bad	12	40.0	0	00.0		
Very bad	15	50.0	0	00.0		

P<0.05significant

Table 3: Percentage Distribution of Study Subjects Regarding the Reported Sleep Disturbances at Pre and Post-Test (n=30)

Sleep Disturbances	Pretest		Posttest		T. test	P. value
	N	%	N	%		
Cannot get to sleep within 30 minutes					22.88	0.000**
Not during the past month	0	00.0	6	20.0		
Less than once a week	6	20.0	6	20.0		
Once or twice a week	6	20.0	18	60.0		
Three or more times a week	18	60.0	0	00.0		
Wake up in the middle of the night or early morning					15.277	0.000**
Not during the past month	0	00.0	0	00.0		
Less than once a week	0	00.0	21	70.0		
Once or twice a week	12	40.0	9	30.0		
Three or more times a week	18	60.0	0	00.0		
Have to get up to use the bathroom					4.014	0.000**
Not during the past month	18	60.0	21	70.0		
Less than once a week	3	10.0	6	20.0		
Once or twice a week	3	10.0	3	10.0		
Three or more times a week	6	20.0	0	00.0		
Cannot breathe comfortably					16.155	0.000**
Not during the past month	3	10.0	9	30.0		
Less than once a week	6	20.0	3	10.0		
Once or twice a week	3	10.0	18	60.0		
Three or more times a week	18	60.0	0	00.0		
Cough or snore loudly					6.924	0.000**
Not during the past month	9	30.0	15	50.0		
Less than once a week	3	10.0	3	10.0		
Once or twice a week	3	10.0	12	40.0		
Three or more times a Week	15	50.0	0	00.0		
Feel too cold					7.131	0.000**
Not during the past month	9	30.0	15	50.0		
Less than once a week	0	00.0	12	40.0		
Once or twice a week	12	40.0	3	10.0		
Three or more times a week	9	30.0	0	00.0		

P<0.05significant

Cont, Table (3): Percentage Distribution of Study Subjects Regarding the Reported Sleep Disturbances at Pre and Post-Test (n=30)

Sleep Disturbances	Pretest		Posttest		T. test	P. value
	N	%	N	%		
Feel too hot					9.011	0.000**
Not during the past month	6	20.0	15	50.0		
Less than once a week	6	20.0	6	20.0		
Once or twice a week	6	20.0	9	30.0		
Three or more times a week	12	40.0	0	00.0		
Have bad dreams					7.059	0.000**
Not during the past month	9	30.0	15	50.0		
Less than once a week	0	00.0	12	40.0		
Once or twice a week	9	30.0	3	10.0		
Three or more times a week	12	40.0	0	00.0		
Have pain					10.780	0.000**
Not during the past month	3	10.0	15	50.0		
Less than once a week	0	00.0	9	30.0		
Once or twice a week	6	20.0	6	20.0		
Three or more times a week	21	70.0	0	00.0		

P<0.05significant

Table (4): Percentage Distribution of Study Subjects Regarding Degree of Fatigue Pre and Post-Test (n= 30)

Degree of Fatigue	Pretest		Posttest		T. test	P. value
	N	%	N	%		
No fatigue	0	00.0	6	20.0	8.80	0.000**
Mild fatigue	0	00.0	7	23.3		
Moderate fatigue	3	10.0	15	50.0		
Sever fatigue	12	40.0	2	6.7		
Excessive fatigue	15	50.0	0	00.0		
Mean± SD	105.7± 16.5		64.10±17.9			

P<0.05significant

Table (5) Comparison between mean scores of Sleep Quality Index scores among study subjects before and after intervention (posttest) n=30

Total Sleep Quality Index score	**Pre –test**	**Post- test**
Mean± SD	18.9 ±4.9	6.4±3.0
Degree of freedom	29	
T-value	10.6	
p-value	.000**	

P<0.05significant

Table (6) Comparison between mean scores of Degree of Fatigue among study subjects before and after intervention (posttest) n=30

Total fatigue score	**Pre –test**	**Post- test**
Mean± SD	105.70 ±16.5	64.10±17.9
Degree of freedom	29	
T-value	8.08	
p-value	.000**	

P<0.05significant

Table (7): Correlation between total sleep quality index and total fatigue scores of The Study Subjects pre intervention.

	Total sleep quality	
	Correlation Coefficient (r)	**P-value**
Total fatigue score	.828	0.000**

P<0.05significant

Table (8): Correlation between total sleep quality index and total fatigue scores of The Study Subjects post intervention

	Total sleep quality	
	Correlation Coefficient (r)	**P-value**
Total fatigue score	.631	0.000**

P<0.05significant

Table (9): Relation between Degree of fatigue and Duration of hemodialysis among study Subjects (n=30)

Duration of hemodialysis	**Degree of fatigue among study subjects(N=30)**										**P. value**
	Fatigue no		Mild		Moderate		Sever		Excess		
	N	%	N	%	N	%	N	%	N	%	X^2=0.855
1 – 5 years	0	00	0	00	0	00	3	10.0	3	10.0	.000**
6-10	0	00	0	00	3	10.0	9	30.0	9	30.0	
>10 years	0	00	0	00	0	00	0	00	3	10.0	

P<0.05significant

Discussion

Problems of fatigue and sleep are a major problem in hemodialysis clients, and range of circumstances are associated with this problem, such as the concentration of toxic materials in the blood stream, changes in blood pressure, anaemia, hemodialysis, and psychological causes. The flow of energy is retained by clearing the blocked energy pathways in the body and removing contaminants from the body relieves the symptom of exhaustion with the aid of reflexology, which is one of the techniques used to minimize this common symptom. By accomplishing the movement of energy in the body, reflexology also offers relaxation. This enables the clients to recover more energy by speeding up blood circulation and in doing so easily transferring oxygen and nutrients to the tissues **(Özdemir, et al., 2013).** Hence this research aim was to evaluate the effect of foot reflexology on hemodialysis school age children on fatigue and sleep quality.

Present study results revealed that, half of participants' age ranged from 9 to 12 years old. with mean age was 11 years (Mean ± SD =11.2 ± 3.6) and more than half of were males. Similarly **Nagy, et al., (2015),** who stated that, living style of Middle Delta hemodialysis children found that high percentages of the studied children were between age 14-16 years and average age 14.73 ± 4.56 years and over half of the children studied were girls.

In present research, the etiology of terminated phase kidney failure indicated about fifty of study participants reported that they have one kidney since birth. This finding was consistent with **Harambat**, **et al**., (**2012**), who stated that most common chronic kidney disease etiologies among children reported congenital malformation conditions, involving anomalies of the inherited kidneys, urinary tract and nephropathies..

Regarding sleep quality throughout the current research, most of study participants were disordered sleepers and sleep less than 7 hours per night. Nearly half of study subjects take more than 60 minute to fall asleep, stay awake and have enthusiasm for activities three or more times a week and reported very bad quality of sleep. In contrast to **Darwish and Abdel-Nabi** (**2016**), who reported that sleeping problems in chronic renal diseases children identified as sleep disruption among two-thirds of surveyed respondents, excessive daytime sleepiness were reported by 22% and 20.4% of responded. This contradiction could be illustrated by variation between the numbers of surveyed participants, technique of diagnostic test regarding sleeping disorder, even if dependent on questionnaires or polysomnography.

Regarding the frequencies of sleep disturbances affecting the subjects of the study, depending on the number of occasions over the " previous month". A more commonly mentioned condition was "pain three or more times a week, most subjects are unable to sleep within thirty minutes, getting up in the middle of night or early morning, inhale nicely three or more times a week." Similarly, **Darwish and Abdel-Nabi** (**2016**), who reported that sleep abnormalities in chronic kidney disease children found that resistance to bedtime, sleep delay, daytime sleep, sleep duration and parasomnia were significantly higher in children with chronic renal disease throughout hemodialysis than in children with chronic renal disease without dialysis-dependent kidney disease. The similarities within our study and other studies can be explained by children with hemodialysis showed high sleeping

distress and lesser amount of sleep than healthy children, indicating that physiological, behavioural and emotional factors in these children may lead to sleep disturbance.

Regarding fatigue levels, the existing research has shown that half of participants experiencing excessive fatigue, while minority had moderate fatigue prior to intervention. Similarly, **Bonner et al. (2013) in his study about** the impact of fatigue on daily activity in people with chronic kidney disease in Australia found that dialysis participants report significantly higher fatigue levels. In addition, a recent analyzing the visual analogue scale revealed that 81.5 percent of participants with hemodialysis had fatigue).

In latest research, there was more than one third of participants had normal sleepers and took less than 15 minutes to sleep. Half percent of the study subject's percentage of sleep time versus bedtime stayed awake by over 85 percent and were enthusiastic about activities not during the past month, and most study subjects reported relatively good sleep quality after procedure therapy. Similarly **Roshanravan et al., (2016)** noted that reflexology brought quality sleep and reduced exhaustion in Korea. This could be explained by the decrease in the subscale sleep quality and the total scale after the intervention indicated that reflexology improved the quality of sleep effectively, also some techniques that activate electrochemical impulses stimulate the nerve points, which in turn activate the related organs with the assistance of neurons and provide comfort via decrease the risk of developing pain and stress, thus improving sleep efficiency in such clients.

In that research, the decrease in post-reflexology fatigue results showed the efficacy regarding reflexology in minimizing fatigue severity. This finding was consistent with various experiments done via **Stephenson, et al. (2013)**, who said reflexology has been shown to be successful in reducing fatigue and pain in clients with cancer. This can be explained by the use of foot reflexology to help the client feel comfortable, implementing measures during reflexology to suitable trigger points and therefore maintaining power, improving blood circulation and removing waste from the body, all of which can help participants feel fewer fatigue and improve sleep quality.

In recent analysis showed that participants had a significant positive correlation between sleep quality and fatigue after intervention. Likewise, **Chen, et al., (2011)** showed promising effects on fatigue in their study of cognitive behavioural intervention for sleep disruptions in participants with hemodialysis, but significant decrease after intervention in fatigue score. Furthermore, **Yngman-Uhlin et al (2011)** who stated that sleep intervention studies revealed similar results with fatigue reductions reported in four out of nine participants. While these findings confirm the association between exhaustion and difficulty sleeping.

Furthermore, the findings exhibited a positive significant association between the level of fatigue as well as the length of hemodialysis. This finding was consistent with **Stephenson et al. (2013)**, who reported a significant association between treatment length and fatigue levels. This can be explained by the fact that the fatigue level increases with the long duration of hemodialysis treatment.

Conclusion

- The use of foot reflexology for school-age children with hemodialysis showed improved sleep quality and reduced fatigue levels.

- The quality of sleep was significantly correlated with their level of fatigue, which means that sleep problems and fatigue are related.

Recommendations:

For clients

- Continuous evaluation of the presence or development of fatigue or sleep problems of school-age children with hemodialysis.

- The nurse must provide hemodialysis school age children with data regarding healthy sleep behavior, and teach them in relaxation strategies.

For further study:

- Recombination of the present research to ensure generalizability and broader use of foot reflexology on larger samples.

- Studies are also needed to evaluate reflexology with other complementary/ alternative remedies (e.g., massage, healing touch, relaxation response).

- Further studies have to be performed with larger populations and studies outcomes need be meditated on clients car.

Conflict of interest

There were no conflicts of interest.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article

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