

Effect of Warm Water Foot Bath on Post Dialysis Fatigue in patients on Maintenance Hemodialysis: A Quasi-Experimental Study

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ABSTRACT

Aim: To evaluate the effectiveness of warm water foot bath therapy on post dialysis fatigue.

Method: A Quasi experimental single group (pre and post-test) design was conducted in Nawaz Sharif Kidney Hospital, Swat. Single time intervention was provided to sixty (60) participants recruited through consecutive sampling technique. Demographic data were collected through self-structured interview and fatigue level was measured using Piper's Fatigue Scale before and after foot bath therapy. The data were entered and analyzed through SPSS. Paired t-test was used to find out differences in mean while chi-square test was applied for association of fatigue score on the basis demography. To evaluate the effectiveness of the intervention paired t-test was calculated.

Results: Cumulative pre-intervention fatigue score was 47.33 ± 12.8 and post intervention cumulative fatigue score was 29.9 ± 9.8 . Mean of Pre-fatigue score of different groups made on the basis of demographic characteristics were not statistically different. Pre intervention individual mean fatigue score was 5.25 ± 1.42 while the post intervention was 3.33 ± 1.09 . A significant difference (P value 0.000) was found between pre and post intervention individual mean fatigue score.

Conclusion: Result of the study suggested that warm water foot bath therapy had therapeutic effects in decreasing post dialysis fatigue. It provides relief and promotes comfort level of the patients.

Keywords: Nurses, hemodialysis, Fatigue, warm water foot bath

INTRODUCTION

Chronic kidney disease (CKD) is a condition when the kidneys lose their functions progressively, it can be defined as damage of the kidney or $< 60 \text{ ml/min/1.73 m}^2$ estimated glomerular filtration (eGFR) for 3 months or more¹. It can also be defined as the structural or functional abnormality that exists for more than three months². End stage renal disease has labeled as the leading cause of mortality and morbidity across the globe³. It has been notified as a serious issue of the public health which could lead to end-stage-renal-disease (ESRD). Kidney diseases kill 5 to 10 million people in the world annually⁴. High Prevalence of Glomerulonephritis and recurrent urinary tract infections are the leading cause of end stage renal disease (ESRD) in addition to diabetes (DM) and uncontrolled hypertension². In Pakistan, the number of patients with ESRD is continuously increasing. Lack of knowledge, poverty, unhygienic water, lack of medical facilities and unhealthy food are the predictors of increasing burden in developing countries like Pakistan. The estimated incidence of ESRD is 100/1000000 (1million) population annually⁵. Identified prevalence in Asia is ranging from 10 to 18% and in Pakistan; its estimated prevalence is 12-25%⁶.

Renal replacement therapy (dialysis) is a procedure helps to clear body from metabolic waste as an alternate to the kidneys⁷. Dialysis is of two types: hemodialysis (HD) and peritoneal dialysis (PD). Hemodialysis (HD) as renal replacement therapy is used by 92% of ESRD patients⁸. Hemodialysis is a preferred method for renal replacement after kidney transplant in ESRD patients to sustain their life⁷. Due to increased burden of predicting risk factors like diabetes, hypertension and environmental risk factors; it is estimated that patients on renal replacement therapy (hemodialysis) will increase to about 5.5 million by 2030⁹.

Fatigue is one of many perceptions associated with (HD) such as nausea, loss of appetite, muscles cramps and itching that affects quality of life⁹. All ESRD patients experience fatigue to some degree with increased reported severity on dialysis day after dialysis¹⁰. Post dialysis fatigue (PDF) is feeling of tiredness that need rest and sleep following dialysis session¹¹. Prevalence of PDF ranges from 50% to 80% as reported by studies with 20%

prevalence of severe PDF¹². Health care providers doesn't address this issue in management despite its high frequency that affect the quality of life of patients. Warm water therapy is a non-pharmacological therapy. It is a type of hydrotherapy: external or internal use of water with various temperatures in different conditions for soothing effects¹³.

It is hypothesized that, application of warm water therapy dilates and softens capillary vessels that demonstrates loss of rigidity. In addition, it causes relaxation since it induces significant increase in sympathetic activity¹⁴. Application of warm water therapy will increase white blood cells and natural killer cells in addition to improvement in blood circulation to the vital organs¹².

METHODOLOGY

Study design, sample size, and sampling technique: To evaluate the effectiveness of warm water foot bath therapy in relieving post-dialysis fatigue a quantitative Quasi-experimental pre-test and post-test study design was suitable. This interventional study was conducted in Nawaz Sharif Kidney Hospital (NSKH) Swat. The sample size was calculated through a web-based epidemiological calculator, OpenEpi. The calculated sample size was 60, while using 95% confidence level and 5% margin of error. A non-probability consecutive sampling technique was used in this study to cover the estimated sample size. It involves the recruitment of participants from all accessible population that qualify inclusion criteria, for a specified period for a specific sample size.

Inclusion and exclusion criteria: The inclusion criteria for the study were:

1. Patients who were on dialysis for at least 3 months and felt mild, moderate, or severe fatigue on piper's fatigue scale
 2. Those that were undergoing hemodialysis twice a week
 3. Age above 18 years of both genders
- While the exclusion criteria for the study was:
- 1) Unconscious patients, mentally retarded patients and all those who were unable to communicate
 - 2) Those who had a skin problem, or wound on feet
 - 3) Those who were paraplegic,
 - 4) those who were having imputation of lower limbs

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- 5) Patients with certain cancers on chemotherapy, and chronic hepatitis like (HCV and HBV positive) patients were excluded.

Data collection Procedure: Two investigators and two assistants were hired for data collection to prevent researcher bias on daily wages. The investigators were nurses and assistants were Ward Orderly (transporter), of the same hospital. They were divided into two teams. Each team consists of one nurse and one assistant. One team was assigned to the morning shift, and the other one was assigned to the evening shift. Both teams of investigators were informed about the nature of the study and were trained for data collection and intervention at the same time.

Study Instrument: The data collection tool consists of two parts. The first part includes eight (08) questions regarding demographic and clinical variables such as name, age, gender, marital status, education level, employment status, causes of ESRD, and history of dialysis. One question was regarding the potential presence of post-dialysis fatigue. The second part of the tool was adapted piper's fatigue scale developed by Piper in 1998. It was a widely used validated questionnaire for fatigue measurement with its repeatedly high reliability in different region of the world. In dialysis patients, its reliability has been reported having Cronbach's α 0.93¹⁵. In current context its reliability was calculated with Cronbach's α 0.92 although it was widely used valid questionnaire for fatigue measurement, having consistent high reliability in studies across the globe. It consists of 22 numerically rated scales that measure subjective fatigue. Each item measures on a 1-10 numerical rating scale.

Cutoff values were set for the level of fatigue, mild fatigue level (1.1-3.0), moderate fatigue level (3.1-6), severe fatigue level (6.1-10)¹⁵. The data were collected through structured interviews from the patients using the above mentioned data collection tool.

Study Intervention: Foot bath tub with top insulator cover: A special, self-designed plastic tub was used for the feet immersion. The tub was designed to prevent the frequent cooling of water in the therapeutic tub. For the stated purpose a small plastic tub of size proportional to the average size of an adult human foot was fixed within a large tub filled with hot water.

The venue selected for the interventions was a side room located inside at the dialysis unit. The room was selected because of a quiet, private place with the capacity of five patients at a time for interventions with no or minimal intrusive activities of the staff or attendants which might impede the intervention. It was a single time therapy. The patient's feet were immersed in the warm water of temperature ranging from 40°C to 43 °C in therapeutic tub of a self-designed plastic tub, up to 10cm above the ankle joint for 20 minutes in a comfortable seating position within ten minutes after dialysis completion. During interventions, the water temperature was checked frequently to ensure that water is in the therapeutic range. After completion of intervention time, the patient's feet were dried and wrapped by transporter. After the intervention of warm water foot bath therapy patient fatigue was measured by using the same scale (Piper's Fatigue Scale)¹⁵. The data collection and intervention took approximately 40 minutes total of each participant. The intervention time was 20 minutes as mentioned before and data collection took 10 minutes for pre and 10 minutes for post intervention fatigue.

Data analysis procedure: After data collection, both Pre and Post-intervention data were entered in SPSS version 22. Data were analyzed using both descriptive and analytical statistics. Descriptive data were presented in the form of frequency and percentage table. Paired t-test was applied to identify the difference among pre-test and post-test. To find out pre and post fatigue levels, fatigue score was categorized, into the mild, moderate, and severe level based on Piper's Fatigue Scale¹⁵.

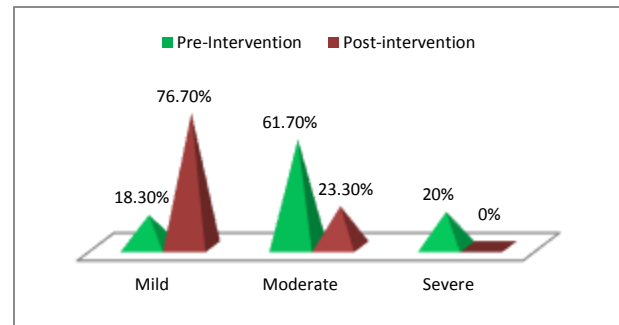
Ethical consideration: Approval was obtained from the Ethical Review Committee of KMU Peshawar. For data collection Permission was taken in written from the concerned hospital medical director through office letter. Informed written consent was taken from the participants. Participants' information sheet, having complete information about the study purpose, risks, voluntary

participation and right to withdraw from the study was provided in the Urdu language. Those who were illiterate were provided the information verbally in the local Pashto language. The data questionnaire was coded to maintain the confidentiality of information.

RESULTS

Table 1 shows the demographic characteristics of the study participant's. **Comparison of Pre-test and post-test Fatigue Scores with cutoffs:** Three levels of fatigue mild, moderate, and severe were made based on the individual mean. Figure 1 shows that majority of the pre-intervention fatigue score was moderate (61.7%), then severe (20%) and mild (18.3%). While in post-intervention score majority of the participants were suffer with mild fatigue (76.7%), followed by moderate (23.3%), while no participants suffers from severe fatigue (Figure 1).

Fig. 1: Comparison of pre and post intervention fatigue score



Comparison of pre-test and post-test score: The pre-intervention mean score of the participants were 47.3 ± 12.8 that reduced to 29.9 ± 9.8 , while the p-value shows that the intervention was highly significant (Table 2).

Table 1:

Characteristics	Categories	Frequency	%age
Gender	Male	42	70%
	Female	18	30%
AGE	18 – 35 years	23	38.8 %
	36 – 60 years	23	38.8 %
	61 years and above	14	23.3%
Marital status	Single	8	75%
	Married	45	13.3%
	Widow	7	11.7%
History of dialysis	3 to 15 months	46	78.7%
	16 to 30 months	3	5 %
	31 to 45 months	11	18.3%
Education	No education	23	38.3%
	Primary	18	30%
	Matric	17	28.3%
	Intermediate	2	3.30%
Employment	Nil	35	58.3 %
	Self-employed	10	16.7 %
	Govt-employed	4	6.7 %
	Retired	11	18.3%
Causes	HTN	28	46.7%
	DM	12	20%
	Renal calculi	5	8.3%
	Others	15	25%

Table 2: Pre-test and post-test score of the participants

	Mean \pm SD	t-value	p-value
Pre-Intervention	47.3 \pm 12.8	19.9	0.000
Post-Intervention	29.9 \pm 9.8		

Table 3: Association of fatigue with selected variables

Fatigue	Gender	Age	Marital status	Causes
	0.004	0.000	0.005	0.000

DISCUSSION

For comparing means of pre and post intervention individual fatigue score, paired t test was calculated. The Pre mean was 47.3 and Post mean score was 29.9. The Paired t- test result shows the difference between the pre and post intervention mean with (P value= 0.000) which is highly significant. Finding of the study supports the effectiveness of using warm water footbath to reduce level of fatigue among hemodialysis participants. This finding is consistent with a previous quasi experimental study conducted in Mangalore with aim of evaluating the effectiveness of footbath therapy on fatigue among chronic renal failure patients. The study has highlighted a significant difference between fatigue level in the study participants before and after administering water foot bath. Pretest piper's Fatigue score in the experimental group was 6.4 ± 0.48 and Post test score was 3.66 ± 0.37 which was significantly different at ($P < 0.05$)¹⁴. A study conducted in Egypt in dialysis patients has reported the effectiveness of the water foot bath therapy. Consistent to the result with present study the reduction from baseline to day 7th was significant ($F=42.44$, $P \leq 0.000$)¹³. Another study carried out in India by nurses to evaluate the effectiveness of water foot bath therapy on fatigue in dialysis patients. The post intervention fatigue score 32 ± 6.2 was significant lower $P < 0.05$ than Pre intervention fatigue score 49 ± 5.6 which support the finding of the present study¹⁶. A randomized control trial was conducted by nurses in India with the aim of investigating effectiveness of foot bath therapy on fatigue among elderly patients also supports the findings of the study. Consistent to the present study post intervention fatigue score 4.1 ± 1.4 was significantly $P < 0.005$ different from the Pre intervention fatigue score 7.3 ± 1.1 ¹⁷. A Quasi experimental study in Taiwan conducted in Gynecologic cancer patients has evaluated the effectiveness of the WFBT on fatigue. In this study the interventions were provided on the 1st, 2nd, 4th, 7th and 14th day of chemotherapy for four consecutive session of chemo. According to the result 33.7 ± 1.9 vs 44.1 ± 2.0 , 32.0 ± 2.3 vs 48.6 ± 2.1 , 25.8 ± 1.8 vs 46.7 ± 2.1 the experimental group fatigue was decreased ($P < 0.05$) in subsequent session in contrast to control which shows increase in fatigue score¹⁸. Another study conducted in India in cancer patients also supports the finding of the present study. According to the study result the experimental group pre 53.63 ± 7.97 and post 43.24 ± 7.68 of the past 24 hours was different at the level of significant $P < 0.05$. The same study also concluded that the immediate effect of intervention was more as compared to delayed effect. Interventional group fatigue was markedly decreased. Findings of a study conducted in Taiwan to explore the effect of warm water footbath on fatigue, sleep and quality of life in hospitalized post-stroke patients were also consistent to the present study¹⁹.

It has been established by the research after observation and analysis that significant numbers of patient were having post dialysis fatigue. A significant reduction in fatigue level after warm water foot bath therapy has been observed quantitatively. Regarding qualitative perception participants of the study were satisfied with therapy, expressed comfort and appreciated the data collection team. Another study in this regards also supports the findings¹⁶. Thus, this therapy is a simple; easy to be use, and effective technique to reduce Post dialysis fatigue in ESRD patients. It can be administered by non-technical employee in the supervision of the nurse in hospital or by patients at home themselves.

CONCLUSION

Study finding revealed that Water foot bath therapy is an effective technique in decreasing post dialysis fatigue and promoting

comfort level of the patient after hemodialysis. It causes dilation of the capillary vessels, promote circulation and increase sympathetic activity. It is an easy, cheap, and convenient method, having no side effects that can be applied in any setting.

Strengths and Limitations: This is the first study of its nature to determine the effectiveness of warm water foot bath therapy in post dialysis fatigue. This study helped in generating the evidence for effectiveness of the stated therapy in relieving post dialysis fatigue which was the main purpose of this study. So the findings of the study has generated evidence based knowledge for health care staff to integrate this therapy in their care for dialysis patient to provide relief to, and promote quality of life of this population.

On the other hand, absence of comparison/control group and lack of randomization are the factors which less likely reduce confounders and the key limitations of this study.

Conflict of interest: Nil

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