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Effect of Intradialytic Leg Stretching Exercise on Fatigue among Patients Undergoing Hemodialysis

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Abstract: ***Background: Haemodialysis is a physically stressful procedure and most of the patients will have fatigue. As the number of dialysis increases, there is an increased risk of muscle wasting, and increased fatigue levels. Providing exercises during hemodialysis may increase waste removal and thereby reducing fatigue. Aim: The study was aimed to evaluate the effect of intradialytic leg stretching exercise on fatigue among patients undergoing hemodialysis in selected multi speciality hospital in Kozhikode district. Materials and Methods: Two groups pretest- posttest design was used in this study. Data were collected from 106 samples. Pre and post-test were done by using the FACIT fatigue scale. Intradialytic leg stretching exercise was given to the experimental group one hour after the initiation of hemodialysis for 10 times in each limb for 3 weeks. After completion of 6 interventions, a post-test was done. Results: Data was analysed using descriptive and inferential statistics. The findings revealed that majority of the clients undergoing hemodialysis experience moderate to severe fatigue. Intradialytic stretching exercises proven to decrease fatigue at the level of significance (p <0.05). Conclusion: The discoveries of the study exposed that patients undergoing haemodialysis had significant fatigue. Intradialytic leg stretching exercise was highly effective in reducing fatigue.***

Keywords: Hemodialysis, fatigue, intradialytic leg stretching exercise

1. Introduction

Chronic renal failure is a progressive damaging and irreversible disturbance of renal function in which the body's ability in preserving metabolism and water or electrolyte balance would decrease, uraemia is more. The stages of CKD reflect gradual adaptation to nephron loss. In the early phase, stages 1 and 2, the patient is asymptomatic, blood urea nitrogen and serum creatinine are normal or near-normal, and acid-base, fluid and electrolyte balances are maintained through an adaptive increase of function in the remaining nephrons. The final stage of kidney disease, stage 5 is defined by a GFR of less than 15 ml/min/1.73m2, is usually characterised by worsening of symptoms including fatigue, elevated serum electrolytes such as creatinine, urea, potassium, phosphorus, decreased sleep, oedema, purities may develop**.**

Fatigue is a complex, multidimensional, and multifactorial phenomenon, which has been defined as 'extreme and persistent tiredness, weakness or exhaustion- mental, physical or both.

In hemodialysis, the blood from the patient's body is been drawn out and filtered externally using a dialysis machine, in the beginning stages patients will not have fatigue or any such complications but as time passes and the number of dialysis increases there is an increased risk of muscle wasting and increased fatigue level this may directly interfere in the daily activities of the person.

Intradialytic leg stretching exercises during dialysis may increase waste removal and thereby reducing fatigue. Efficacy of dialysis was improved with exercise by increased perfusion of skeletal muscles. It was recommended that exercise during dialysis be done to maintain a normotensive state during fluid removal with dialysis and to ensure that venous and arterial pressures are maintained constant in fistula lines.

2. Methodology

Research approach
A Quantitative research approach was adopted for this study.

Research Design
The research design adopted in the present study is two group pretest post test control group design.

The setting of the study
The present study was conducted in hemodialysis units of Baby Memorial Hospital, Kozhikode, Kerala.

Variables
In this study, the dependent variable was fatigue and the independent variable is intradialytic leg stretching exercise. Extraneous variables refer to age, gender, educational qualification, marital status, occupation, monthly family income, co-morbidities, sleep, duration of CKD, duration of dialysis and clinical variables such as weight gain, serum sodium, creatinine, urea, Potassium, BP, Hb and BMI.

Population
In this study, the population includes patients undergoing hemodialysis.

Sample and sampling technique
In this study sample consists of 106 patients undergoing

hemodialysis, 53 in the experimental group and 53 in the control group, admitted in the dialysis units of Baby Memorial Hospital, Kozhikode, who had met the inclusion criteria.

Inclusion criteria

Patients undergoing haemodialysis who were:

- Able to comprehend Malayalam or English.
- Willing to participate in the study.
- Having minimum 2 cycles in a week.
- Undergoing haemodialysis for more than 6 months.

Exclusion criteria

Patients undergoing haemodialysis who were:

- Critically ill.
- Having musculoskeletal deformities.
- Diabetic foot ulcer or burns injury.
- Undergoing emergency haemodialysis
- Having femoral dialysis catheters

Tools/ instrument

Development / selection of tool

The applicability of the selected tools was discussed with experts and finally selected the Numerical fatigue rating scale and FACIT Fatigue scale and obtained standardized tools.

Description of tools

Technique

Screening test was done to assess the subjective perception of fatigue by using numerical fatigue rating scale. The interview technique was used to collect sociodemographic data. Self reporting was used to determine the severity of fatigue by using FACIT fatigue scale.

Tool 1: Numerical Fatigue rating scale

It was used as a screening tool to assess the subjective perception of fatigue. The scale ranges from 0 – 10. On this scale, 0 means "no fatigue",1-3 means "mild fatigue",4-6 means "moderate fatigue",7 – 9 means "severe fatigue" and 10 is considered as "worst possible fatigue".

Tool 2: Personal and clinical datasheet

This tool was developed to collect baseline information and divided into 2 sections.

Section A: It covered the personal data consists of age, gender, educational qualification, marital status, occupation, monthly family income, duration of CKD, duration of dialysis, comorbidities and sleep.

Section B: It covered clinical data such as weight gain, serum sodium, creatinine, urea, Potassium, BP, Hb and BMI which was collected from the haemodialysis handbook of the subjects.

Tool-3: FACIT fatigue scale (Functional Assessment of Chronic Illness Therapy)

FACIT fatigue scale is a standardized tool contains 13 items related to fatigue of patients and each response depends on the patient's feeling. The severity of fatigue is rated as Not at all, A little bit, Somewhat, Quite a bit and Very much. The total score ranges from 0- 52, with the high score indicating less fatigue.

Content validity

The tool was subjected to nine experts for content validity. Modifications were made according to their suggestions.

Reliability

The Numerical fatigue rating scale and FACIT fatigue scale were standardized tools to assess fatigue.

Intervention

Intradialytic leg stretching exercise was used as an intervention in this study. After initial screening, the researcher identified the subjects who met the inclusion criteria and obtained the written informed consent. Hundred and six patients undergoing hemodialysis were selected from the dialysis units of a multi-speciality hospital at Kozhikode. Pre-test was done for both groups by using FACIT fatigue scale. Intradialytic leg stretching exercise was given to the experimental group 1 hour after the initiation of hemodialysis and done 10 times in each limb for 3 weeks. Each subject received a total of 6 interventions, ie, 2 interventions per week whereas the control group received routine care. Intradialytic leg stretching exercise included knee flexion and extension, ankle plantar flexion, movement of toes, foot inversion and eversion and calf stretching. Post-test was done after completing 6 cycles of exercises, using the same FACIT Fatigue scale.

Data collection process

After getting permission from the Institutional ethical committee of the Baby Memorial Hospital, Kozhikode, Kerala the data collection for the main study was done from 4th January 2021 to 4th February 2021.

Plan for data analysis

- Analysis of the sample characteristics and clinical data was done by using frequency and per centage distribution.
- Effect of intradialytic leg stretching exercise on fatigue was analysed using independent t-test.
- Association between level of fatigue and selected demographic and clinical variables were analyzed using the Chi – Square test.

3. Result

Table 1: Level of fatigue among patients undergoing hemodialysis, n =116

Level of fatigue	Frequency	Percentage
No fatigue	0	0
Mild fatigue	16	13.8
Moderate fatigue	60	51.7
Severe fatigue	40	34.5
Worst possible fatigue	0	0

Table 1 shows that a total of 116 subjects were screened and out of that more than half of the subjects (51.7%) had moderate fatigue, 34.5 per cent had severe fatigue. Only the least number of subjects (13.8%) had mild fatigue.

Table 2: Comparison of the pre-test and post-test fatigue among patients undergoing hemodialysis in the experimental and control group

Grade	Experimental group				Control group			
	Pretest		Post- test		Pre test		Post test	
	f	%	f	%	f	%	f	%
Worst possible fatigue	0	0	0	0	1	1.8	2	3.8
Severe fatigue	22	41.5	2	3.8	16	30.2	23	43.4
Moderate fatigue	27	51	21	39.6	26	49.1	21	39.6
Mild Fatigue	4	7.5	30	56.6	10	18.9	7	13.2
No fatigue	0	0	0	0	0	0	0	0

Table 2 shows that, during pre-test 27(51%) of them had moderate level of fatigue and 22(41.5%) had severe fatigue and in the post-test 30(56.6%) had mild fatigue about 21(39.6%) had moderate fatigue and 2(3.8%) had severe level of fatigue in the experimental group. In control group, pre-test 26(49.1%) had moderate fatigue,16(30.2%) had severe fatigue and in the post-test 23(43.4%) had severe fatigue, 21 (39.6%) had moderate fatigue.

Table 3: Significance of difference in the mean change in fatigue score of subjects in the experimental and control group.

Group		Mean	Sd	Mean difference	t-value	p- value
Experimental group	Pre test	29.6	7.37	-8.49	6.12	0.000*
	Post test	38.09	5.71			
Control group	Pre test	31.15	8.86	2.17		
	Post test	28.98	9.19			

Table 3 shows that, in the experimental group the pre-test mean fatigue score was 29.60 with sd ± 7.37 and the post-test mean fatigue was 38.09 with sd ±5.71. The mean change in the fatigue score was -8.49. In the control group, the pre-test mean fatigue score was 31.15 with sd ± 8.86 and the post-test mean fatigue was 28.98 with sd ± 9.19. The mean change in the fatigue score was 2.17. The t value obtained was 6.12 with a p-value of 0.000 which was less than 0.05. This showed that after the intervention there was a highly significant reduction in the fatigue score of subjects in the experimental group.

Table 4: Association between fatigue among patients undergoing hemodialysis and the selected variables

Variables	$\chi 2$ value	df	p-value	Inference
Clinical variables				
Weight gain	16.68	4	0.002	S
Serum sodium	4.804	4	0.308	NS
Urea	4.567	4	0.335	NS
Potassium	7.013	2	0.030	S
Bp	4.903	4	0.297	NS
Hb	1.898	2	0.387	NS
BMI	1.206	4	0.877	NS

Table 4 There is no association between the fatigue score among patients undergoing hemodialysis and the selected variables other than serum potassium and intradialytic weight gain.

4. Conclusion

The purpose of the study was to evaluate the effect of intradialytic leg stretching exercise on fatigue among patients undergoing hemodialysis in a multi-specialty hospital Kozhikode district. The findings of the study revealed Intradialytic stretching exercises proven to decrease fatigue at the level of significance ($p < 0.05$). so it can be used as routine care the hemodialysis unit to reduce fatigue. Clinical variables such as intradialytic weight gain and serum potassium was associated with fatigue whereas no other variables are not associated with fatigue.

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