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EFFECT OF FREE ACTIVE EXERCISES ON FATIGUE LEVELS AND EXERCISE ADHERENCE IN SUBJECTS UNDERGOING HEMODIALYSIS

Physiotherapy

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ABSTRACT

Hemodialysis is a life-saving treatment for people with kidney failure, which helps your body remove extra fluid and waste products from your blood when the kidneys are not able to. This study evaluates the fatigue levels and exercise adherence in hemodialysis patients. It was conducted on 30 hemodialysis subjects with age group 25 to55 years were included & all subjects were performed breathing exercises,stress free ball exercises, upper limb movements and lower limb movements . Fatigue and exercise adherence was assessed at baseline and after 6-weeks. Total 0f 30 hemodialysis individuals included in the study with mean age 42.30.The pre and post comparison of fatigue and exercise adherence showed clinically statistical significance with $p < 0.05$. The study concluded that breathing exercises, upper & lower limb movements were effective in decreasing the fatigue level & increase in exercise adherence in hemodialysis patients.

KEYWORDS

Hemodialysis, Breathing Exercises, Fatigue, Exercise Adherence

INTRODUCTION

Hemodialysis: It is procedure that removes waste and excessive fluid from the blood when the kidneys are no longer working properly. It helps control blood pressure and balance important minerals such as potassium , sodium and calcium in your blood. In hemodialysis, the wastes and excess water are removed by using an external filter called a dialyzer, which contains a semipermeable membrane. (1)

The separation of wastes is done by creating a counter-current flow gradient, where blood flow is in one direction and the fluid of the dialyzer is in the opposite direction. Patients undergoing hemodiaysis may suffer side effects such as hypotension, muscle cramps, excessive fatigue, inability to do work, and reduced physical activity.(2)

Hypotension can be caused by the drop in fluid levels during dialysis and can cause dizziness.

Epidemiology:

Because the early to intermediate stages of CKD are asymptomatic, it is difficult to estimate the true incidence and prevalence of the disease. It is believed that between 10% and 14% of the general population has chronic kidney disease (3)

Prevalence:

In 2012, CKD caused 2,546,700 (1%- 3%) and 2,968,600 (1%) disability-adjusted life years to be lost globally(7). An estimated 26 million Americans suffered from CKD in 2016.

Indications:

Hemodialysis initiation is needed for acute illness associated with: Acute kidney injury Uremic encephalopath y,Pericarditis., Life-threatening hyperkalemia , Refractory acidosis.,neuropathy , Intractable gastrointestinal symptoms. (3)

Contraindications :

Absolute contraindication to hemodialysis is the inability to secure vascular access, and relative contraindications include: Difficult vascular access., Needle phobia , Crdiac failure & Coagulopathy(4)

Complications :

Ultrafiltration- induced volume depletion. Somepatients who are prone to hypotension undergo a paradoxical withdrawal of reflex sympathetic nervous system activity during dialysis. Decrease in heart rate, Vascular resistance, Blood-pressure collapse.(5)

Need Of The Study

In Hemodialysis, the wastes and excess water are removed by using an external filter called a dialyzer, which contains a semipermeable membrane. The separation of wastes is done by creating a counter-current flow gradient, where blood flow is in one direction and the fluid of the dialyzer is in the opposite direction. The duration of Hemodialysis is approximately 4 hrs in a day continuously during which the patients are bound to bed.

Hence some exercises can be prescribed for these patients.

There are only few studies that focused on the physical activity and fatigue level in patients undergoing hemodialysis. Hence, this study focuses on the effects of free active exercises on fatigue levels and exercise adherence in subjects undergoing hemodialysis.

There are literatures which have analysed the effects of exercises after hemodialysis. There will be wasting of muscles,weakness of muscle and joint stiffness in patients who are bound to bed during hemodialysis procedure.

Aim Of The Study

To know the effects of free active exercises on fatigue levels and exercise adherence in subjects undergoing hemodialysis.

Objectives Of The Study

1. To evaluate the effects of free active exercises on fatigue levels in subjects undergoing hemodialysis using Fatigue severity scale (FSS).
2. To evaluate the effects of free active exercises on exercises adherence in subjects undergoing hemodialysis through exercise adherence rating scale (EARS)

Materials And Methods Materials Required For Study:

Paper:- it was used to calculate the scale

Pen:- it was used to calculate the interpretation Stress ball :- it can be a useful tool for finger movements and strengthening.

Methodology:

Study Setup:

Department of Nephrology, SVIMS. SVIMS University, Tirupati.

Study Duration:

4Weeks

Study Design:
Experimental study design

Sample Size :
30

Inclusion Criteria:
- Subjects undergoing Hemodialysis for four hours at least twice a week.
- Aged between 25 to 55 years old
- Both males and females ,
- Blood Pressure under medical control
- Subjects who did not exercise in the last 6 months before treatment
- All the subjects were stable on Hemodialysis for 2 months.

Exclusion Criteria :
- Subjects under peritoneal dialysis Active infections
- Inflammations
- Auto immune disorders
- Subjects who are irregular for Hemodialysis
- Severe muscle weakness or skeletal problems
- Subjects who are not willing to participate
- Free from (heart diseases, uncontrolled hypertension, unstable angina, musculoskeletal disorders, amputation at any limb) .

Study Procedure:
This study was commenced after obtaining permission from the institutional ethics committee. The subjects who fulfilled the inclusion criteria and after explaining the study procedure an informed consent form was obtained were included in the study.

The baseline assessment were taken such as Height, weight and BMI were measured.

Pre intervention assessment Fatigue and Exercise Adherence were measured using The Fatigue Severity Scale and Adherence Rating Scale respective

Treatment Protocol

MODE	FREQUENCY	DURATION	INTENSITY
BREATHING EX'S	3 days a wK / 1 session /dy 8 - 10 Reps , Sets -2 ,Rest period - 5 secs	5 mins	Mild/ moderate
STRESS FREE BALL EX'S	3 days a wK/ 1 session / day, 8-10 Reps, Sets -2 ,Rest period - 5 secs	5 mins	Mild/ moderate
UL MVTS	T3 days a wk / 1 session /dy ,8 -10 Reps ,Sets -2 ,Rest period - 5 secs	15 mins	Mild/ moderate
LL MVTS	3 Dys a wk / 1 session / day ,8-10 Reps ,Sets -2 ,Rest period - 5 secs	15mins	Mild/ moderate

Statistical Analysis
Individual data was analysed by intention to treat all continuous data was assessed for normality. Continuous data was described using mean and standard deviation.

Dichotomous outcomes were presented as risk ratios with 95% confidence intervals using paired T-TEST. Difference in the outcome was compared within the group. A "p" value <0.05

RESULTS
The results were analyzed using SPSS 23.version for the statistical analysis of the study.

In the present study,a total of 30 individuals were included who fulfilled inclusion criteria.

Outcome measures were taken before exercises such as FSS and EARS, at the end of 4th week after exercises the values were tabulated

Demographic Data:

N=30	Mean	Std. Deviation
Age	42.30	9.29
BMI	23.58	5.17
FSS_Pre	47.43	10.22
EARS_Pre	42.83	20.64

Paired Samples Test

N=30		Paired Differences					t	df	P value (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	FSS_Pre - FSS_Post	7.67	5.78	1.06	5.51	9.83	7.27	29.00	0.00
Pair 2	EARS_Pre EARS_Post	-9.60	11.21	2.05	-13.78	-5.42	-4.69	29.00	0.00

A Paired sample 't' test was preformed to evaluate the significance of the treatment intervention in subjects the fatigue severity scale level showed a mean [7.67±5.78] with the 't' value of [5.51±9.83] and showed a 'P' value of 0.00. This is shows that there was a statistically significant decrease in fatigue severity scale level after the subjects received.

A Paired sample 't' test was preformed to evaluate the significance of the treatment intervention in subjects the Exercise adherence rating scale showed a mean [-9.60±11.21] with the 'T' value of-4.69[-13.78±-5.42] and showed a 'P' value of 0.00.

This is shows that there was a statistically significant increase in Exercise adherence rating scale after subjects received .

DISCUSSION
Samia Eaid Elgazzar et.al 2022.states that the effect of practicing leg ergometric exercises on fatigue level among patients undergoing hemodialysis. Their study concluded that leg ergometric exercises was lower the fatigue levels of the patient. [6]

Mansour Ghafourifard et al 2021-in his study states that exercise benefits and barriers who undergoing hemodialysis.Their study concluded that providing exercise facilities ,encouraging the patients by the health care provider to engage in exercise programs ,and incorporation of exercise professionals into hemodialysis centers could help the patients to engage in regular exercise[7,8]

Soad Hassan Abd Elhameed et al 2019 states that effect of exercise program on fatigue and depression among geriatric patients undergoing hemodialysis. They concluded that implementation of the exercise program proved to be effective in improving the level of fatigue and depression among geriatric patients undergoing hemodialysis [9,10].

Farzaneh Salehi et.al 2020. states that effectiveness of exercise on fatigue in hemodialysis patients. Their study results showed that rehabilitation through exercising using mini-bikes had a significant impact on preventing further fatigue build-up in hemodialysis patients, making the mini bike an effective non-pharmaceutical intervention preventing the increase in fatigue experienced by patients undergoing hemodialysis .[11,12]

Limitations :
The study may have included a limited number of participants ,which could affect the generalizability of the findings.

The duration of the intervention may not be sufficient to observe long-term effects of free active exercise on fatigue and activity levels.

Future Recommendations :
- Conduct studies with large and a more a diverse group of participants to improve generalizability.
- Assess the long-term effects of free active exercise on fatigue and energy levels beyond the study period.
- Explore the combined effects of exercise with other therapeutic interventions, such as dietary modifications or counseling, for holistic care.

CONCLUSION
The findings of this study demonstrate that free active exercise has a significant positive impact on reducing fatigue as measured by the Fatigue Severity Scale and enhancing energy and activity levels as measured by Exercise-Adherence rating scale in individuals undergoing hemodialysis. Hence the alternate hypothesis is accepted

and the null hypothesis is rejected.

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