A Study to Assess the Effectiveness of Intradialytic Leg Exercise on Fatigue among Patients Undergoing Hemodialysis at Selected Hospital in Chengalpattu District

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Abstract:
The most popular technique for eliminating extra fluid, salt, and waste from the blood is hemodialysis. Dialysis wasn't always a pleasant experience. The symptoms include fatigue, cramps, headaches, nausea, and dizziness, which can range from mild to severe. A study was done to determine the effectiveness of intradialytic leg exercise on fatigue among patients undergoing hemodialysis at a selected hospital in Chengalpattu district. The aim of this study was to evaluate the effect of intradialytic leg exercises on fatigue among patients receiving hemodialysis and to associate the level of fatigue with the selected demographic variables among patients undergoing hemodialysis.

Methods: A quantitative research approach of quasi-experimental pre- and post-test with a comparison group design was used for this study. Out of 60 samples, 30 participants were allotted to the study group, and 30 were allotted to the comparison group. Pre- and post-test data were collected using structured instruments. The level of fatigue among patients undergoing hemodialysis was assessed using a standardized fatigue assessment scale, a five-point Likert scale. Comparison group participants underwent routine care, while the study group underwent intradialytic leg exercise along with routine care. The level of fatigue was evaluated for both groups using the same scale after 4 weeks. Both descriptive and Inferential statistics were computed to evaluate the level of fatigue between the study and comparison group.

Result: The findings showed that there was a statistically significant difference in fatigue at the level $p < 0.001$ among patients undergoing hemodialysis between the study and comparison group.

Discussion: It is concluded that intradialytic leg exercise helped hemodialysis patients to feel less fatigue.

Keywords: Intradialytic leg exercise, fatigue, hemodialysis patient.

Introduction:

Health refers to the ability of a person's body, mind, intellect, and interpersonal interactions to change in response to his/her surroundings. A person's health is

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defined as the status of his/her body and the extent to which it is free of illness or resistant to illness.

According to the Centers for Disease Control and Prevention (CDC), diabetes is the primary factor that causes chronic kidney disease in about 1 in 3 individuals. Diabetes patients frequently have excessive blood sugar levels (glucose), which over time can harm various bodily systems, including the kidneys. The kidneys are essential organs for maintaining body fluid rebalancing, blood pressure regulation, fluid volume regulation, and red blood cell production, as well as keeping bones strong and healthy. Kidneys assist in keeping salt and acid levels in the blood at appropriate levels while also removing toxic molecules from the blood.

Patients with chronic renal failure are often given hemodialysis. Kidneys can stop working for various reasons. Even though the kidneys may still generate urine, they may eventually stop functioning entirely, resulting in renal failure. If a person's kidneys fail and they do not receive hemodialysis, waste and toxins build up in the blood, damaging the entire body. A person with renal failure may fall into a profound sleep or coma, and the heart may stop beating.

The removal of waste, secretions, and undesired fluid from the body through hemodialysis aids in a person's survival. Hemodialysis can also be used to remove overdosed medications or excess drugs from the body. Acute kidney failure is sometimes treated as an inpatient and might be reversible. If the health is good otherwise, recovery is possible.

Fatigue can be reduced by administering

intradialytic leg exercises, which consist of ankle dorsiflexion, gastrocnemius passive stretch, soleus passive stretch, calf raising exercises, and knee strengthening exercises. These exercises are taught in easy steps, and after completing them, the fatigue would be reduced. Nurses are responsible for monitoring the level of fatigue and providing the proper interventions to maintain or enhance patients' physical functioning, quality of life, and self-reliance in everyday life.

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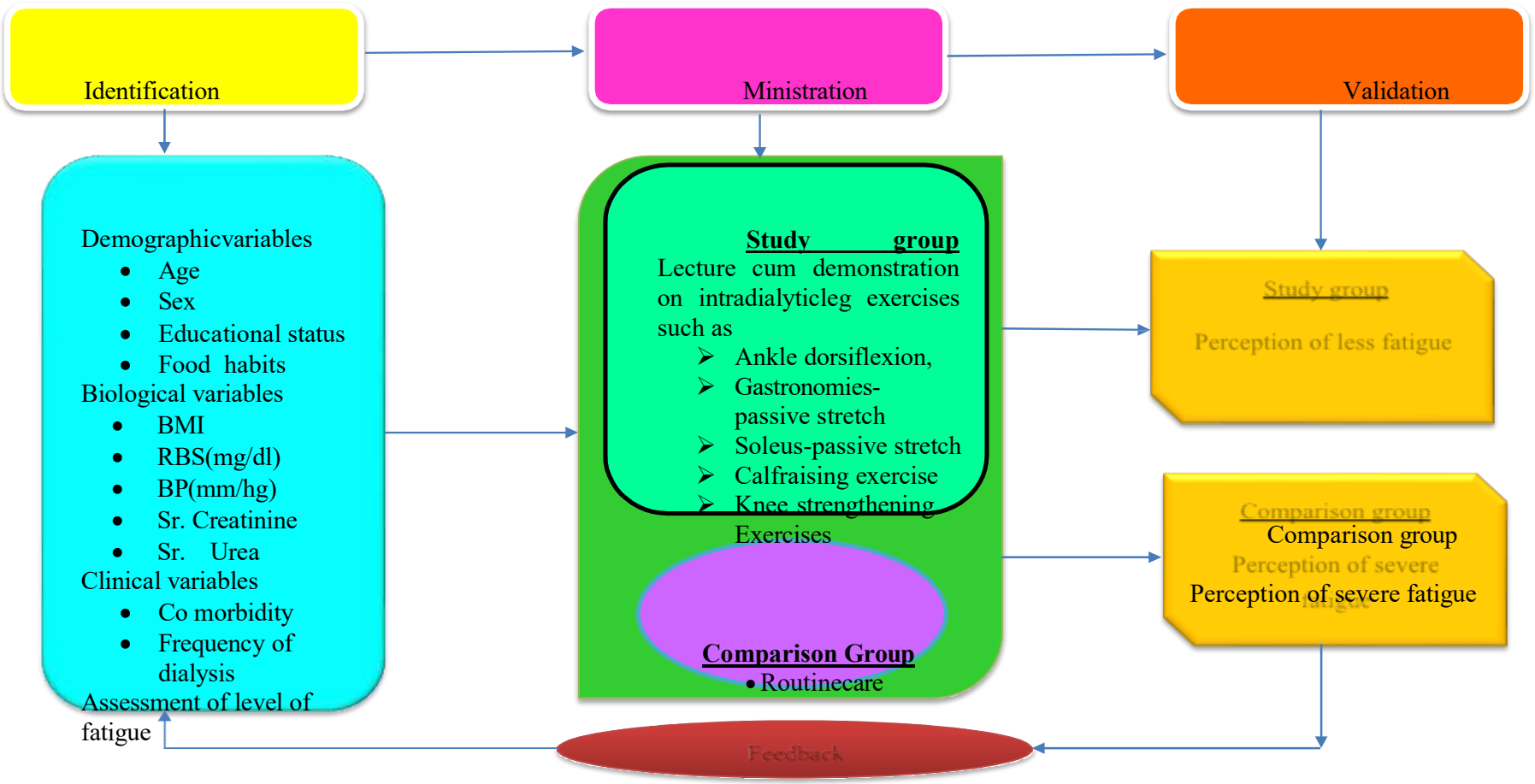

FigureNo1: Conceptual Model Based on modified Ernestine Wiedenbach's Helping Art of Clinical Nursing Theory., **(1969)**

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RESEARCHMETHODOLOGY

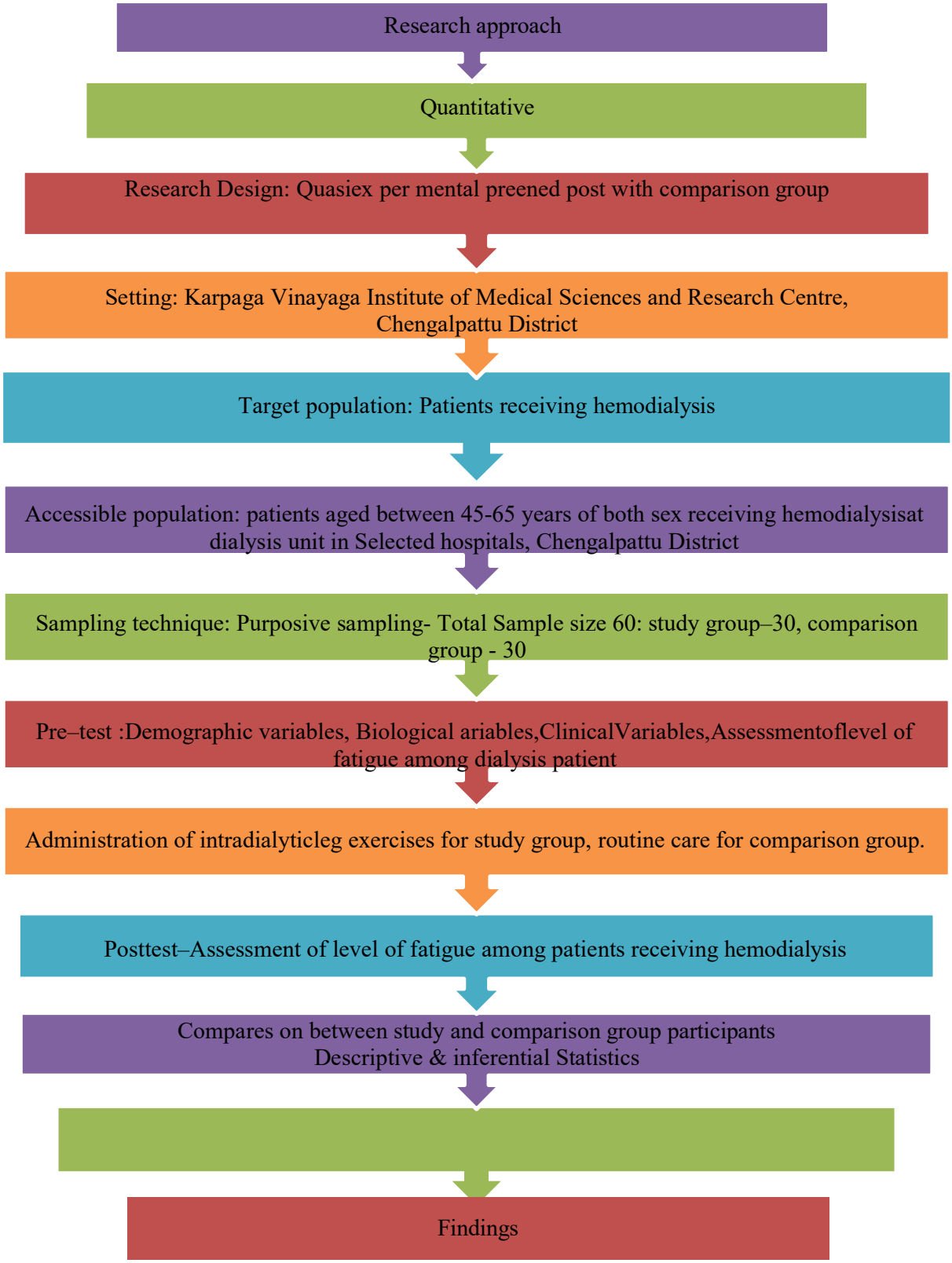

Fig No:2 Schematic representation of research methodology

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Development and Description of the Study:

A self-administered, structured questionnaire was used to evaluate the effectiveness of intradialytic leg exercises among patients receiving hemodialysis. variables, and assessment of fatigue.

After an extensive review of literature and discussions with the research supervisor and experts, the structured questionnaire was prepared to assess the demographic variables, biological variables, clinical

No	Data Analysis	Statistical Test	Objectives
1	**Descriptive Statistics**	Frequency, percentage, Mean, standard deviation	Distribution of demographic and clinical variables among study and comparison group. Distribution of level of fatigue among study and comparison group.
2	**Inferential Statistics**	Paired "t" test	Comparison of pre- and post-test on intradialytic leg exercise on fatigue within study and comparison group.
		Independent "t" test	Comparison of pretest and post-test on level of fatigue between study and comparison group.
3		Chi-square test	Association of post-test level of fatigue with selected demographic variables, clinical variables, and biological variables in study and comparison group.

Data Analysis and Interpretation:

This chapter deals with the analysis and interpretation of data collected from the study and comparison groups. The findings based on the descriptive and inferential statistical analysis are presented under the following sections:

Organization of Data

SectionA:

Distribution of demographic, biological, clinical variables, and level of fatigue.

SectionB:

Assessment of pre-test and post-test level of fatigue among patients undergoing hemodialysis within the study and comparison group.

Section C:

Comparison of the level of fatigue among patients undergoing hemodialysis between the study and comparison group.

SectionD:

Association of post-test level of fatigue among patients undergoing hemodialysis with selected demographic, biological, and clinical variables.

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Section A

Distribution of demographic variables among patients undergoing hemodialysis in study and comparison group. N=60

S. No	Demographic Variables	Study group (n=30)		Comparison group (n=30)		Chi-Square Value
		NO.	%	NO.	%	
1	**Sex**					χ^2=0.089
	Male	22	73.3	23	76.7	d.f=1
	Female	8	26.7	7	23.3	p=0.76
						6 N.S
2	**Age(years)**					χ^2=0.867
	45 – 50	9	30.0	-	-	d.f=3
	51 – 55	13	43.3	19	63.3	p=0.83
	56 – 60	5	16.7	7	23.3	3 N.S
	61 – 65	3	10.0	4	13.4	
3	**Marital status**					χ^2=0.351
	Married	29	96.7	28	93.3	d.f=1
	Unmarried	-	-	-	-	p=0.55
	Divorced	-	-	-	-	4 N.S
	Widow	1	3.3	2	6.7	
4	**Religion**					χ^2=2.977
	Hindu	27	90.0	22	73.4	d.f=2
	Christian	2	6.7	4	13.3	p=0.26
	Muslim	1	3.3	4	13.3	6 N.S
5	**Educational status**					χ^2=1.757
	Non formal education	16	53.3	19	63.3	d.f=3
	Primary education	8	26.7	8	26.7	p=0.62
	High school	5	16.7	3	10.0	4 N.S
	Higher secondary	1	3.3	0	0	
	Graduate and above	-	-	-	-	
6	**Occupation**					χ^2=0.350
	Labour	21	70.0	19	63.3	d.f=2
	Government employee	-	-	-	-	p=0.83
	Private employee	7	23.3	9	30.0	9 N.S
	Business	2	6.7	2	6.7	
7	**Family income(Rs.)**					χ^2=5.530
	5001 – 7000	4	13.3	6	20.0	d.f=3
	7001 – 9000	8	26.7	15	50.0	p=0.13
	9001 – 11,000	14	46.7	7	23.3	7 N.S
	>11,000	4	13.3	2	6.7	

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8	**Residence**					χ^2=2.125

S.No	Demographic Variables	Study group (n=30)		Comparison group (n=30)		Chi-Square Value
		NO.	%	NO.	%	
9	**Food habits**					χ^2=0.601 d.f=1 p=0.438 N.S
	Vegetarian	13	43.3	16	53.3	
	Non-vegetarian	17	56.7	14	46.7	
	Urban	13	43.3	13	43.3	
	Rural	17	56.7	15	50.0	
	Semi urban	0	0	2	6.7	

N.S – Not Significant

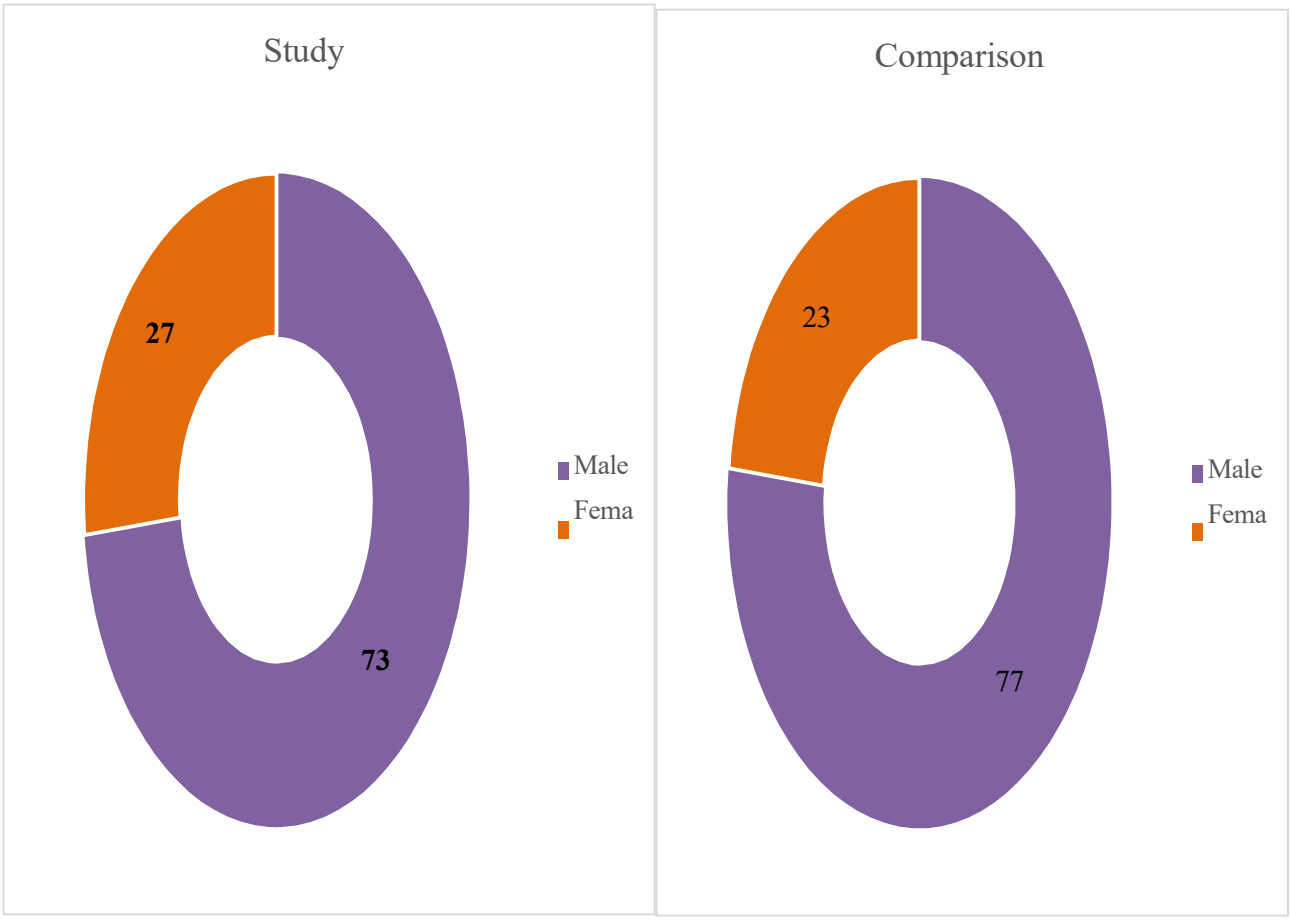

Fig No3: Distribution of sex among study and comparison group

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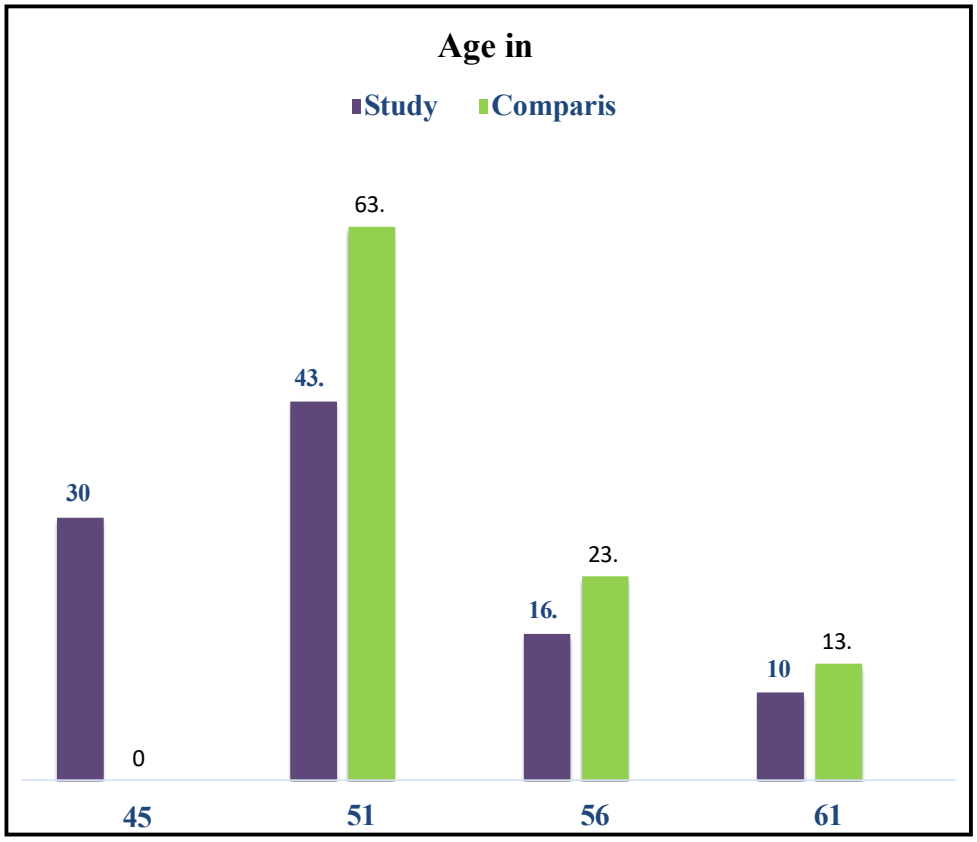
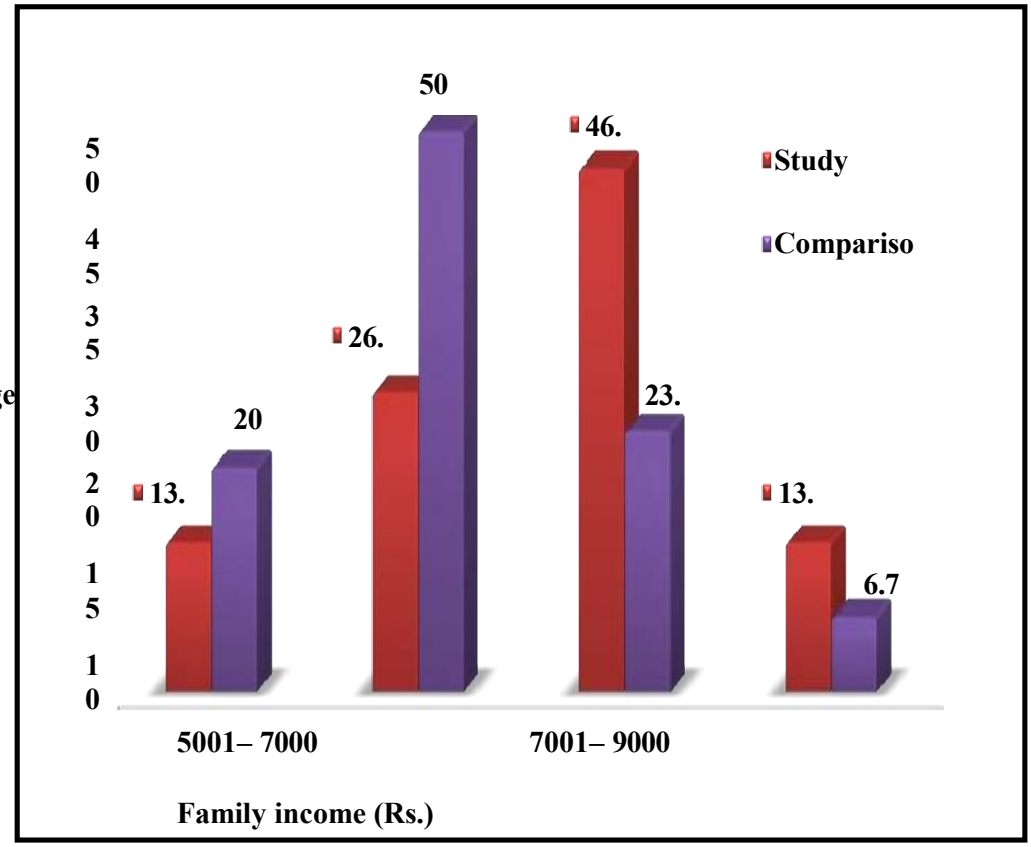


Fig No 4: Distribution of age among study and comparison group.



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Distribution of Family Income among Study and Comparison Group

Distribution of Biological Variables among Patients Undergoing Hemodialysis in Study and Comparison Group

N =60

S.No	Biological Variables	Study group (n=30)		Comparison group (n=30)		Chi-Square Value
		NO.	%	NO.	%	
1	**Height(Cms)**					χ^2=6.702 d.f=3 p=0.082 N.S
	150 – 155	8	26.7	17	56.7	
	155.1 – 160	17	56.7	9	30.0	
	160.1 – 165	4	13.3	4	13.3	
	165.1 – 170	1	3.3	0	0	
2	**Weight(kgs)**					
	55 – 60	21	70.0	18	60.0	χ^2=5.701 d.f=4 p=0.223 N.S
	60.1 – 70	6	20.0	11	36.7	
	70.1 – 75	0	0	1	3.3	
	75.1 – 80	2	6.7	0	0	
	>80	1	3.3	0	0	
3	**BMI**					**χ^2=8.440 d.f=3 p=0.038 SS***
	Under weight(<18.5)	5	16.7	0	0	
	Ideal weight (18.6–24.9)	14	46.7	12	40.0	
	Overweight(25–29.9)	10	33.3	18	60.0	
	Obese(>30)	1	3.3	0	0	
4	**Duration of sleep**					χ^2=4.777 d.f=3 p=0.189 N.S
	3– 5 hrs/day	3	10.0	3	10.0	
	>5– 7 hrs/day	9	30.0	14	46.6	
	>7– 9 hrs/day	18	60.0	11	36.7	
	More than 9 hrs/day	0	0	2	6.7	
5	**Random Blood Glucose (mg/dl)**					χ^2=2.112 d.f=2 p=0.348 N.S
	120 – 140	22	73.3	17	56.6	
	141 – 160	6	20.0	11	36.7	
	161 – 180	2	6.7	2	6.7	
	181 – 200	-	-	-	-	
6	**Blood pressure(mm of Hg)**					**χ^2=23.638 d.f=3 p=0.0001 SS***
	Normal<120/80	5	16.7	17	56.7	
	Pre hypertension Systolic 120-139, Diastolic 80-89	5	16.7	11	36.6	
	StageIHTSystolic140-159, Diastolic 90-99	17	56.6	2	6.7	
	Stage II HT Systolic 160>160, Diastolic 100>100	3	10.0	0	0	

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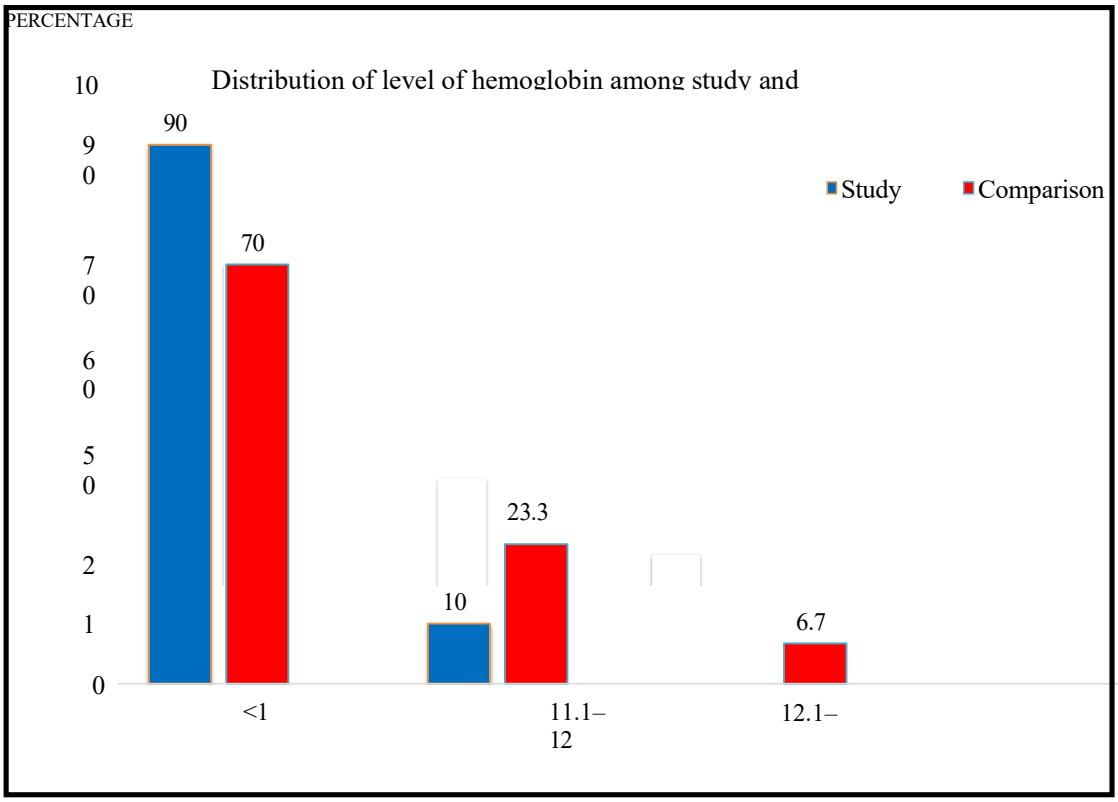
S.No	Biological Variables	Study group (n=30)		Comparison group (n=30)		Chi-Square Value
		NO.	%	NO.	%	
7	**Hemoglobin level (gms%)**					
	<11	27	90.0	21	70.0	χ^2=4.350 d.f=2 p=0.114 N.S
	11.1 – 12	3	10.0	7	23.3	
	12.1 – 13	0	0	2	6.7	
	13.1 – 14	-	-	-	-	
	>14	-	-	-	-	
8	**Serum creatinine (mgs/dl)**					χ^2=4.789 d.f=3 p=0.188 N.S
	2.0 – 3	10	33.3	8	26.7	
	3.1 – 4	9	30.0	15	50.0	
	4.1 – 5	8	26.7	7	23.3	
	>5	3	10.0	0	0	
9	**Serum urea(mg/dl)**					
	24 – 29	10	33.3	12	40.0	χ^2=8.182 d.f=4 p=0.085 N.S
	>29– 34	10	33.3	15	50.0	
	>34– 39	3	10.0	3	10.0	
	>39– 44	5	16.7	0	0	
	>44	2	6.7	0	0	

***p<0.0001,*P<0.05,SS–StatisticallySignificant,N.S–Not Significant

Distribution of family income among study and comparison group



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Distributionofclinicalvariablesamongpatientsundergoinghemodialysisin study and comparison group N = 60

S.No	Clinical Variables	Study group		Comparison group		Chi-Square Value
		NO.	%	NO.	%	
1	**Comorbidity**					
	Diabetes mellitus	7	23.3	12	40.0	
	Bronchial asthma	6	20.0	3	10.0	χ^2=2.553 d.f=3 p=0.466 N.S
	Cerebro vascular accident	3	10.0	2	6.7	
	Osteoarthritis	14	46.7	13	43.3	
	Others (specify)	-	-	-	-	
2	**Time since diagnosis of hypertension (years)**					
	<5	4	13.3	5	16.7	
	5.1 – 10	19	63.4	14	46.6	χ^2=2.202 d.f=3 p=0.532 N.S
	10.1 – 11	4	13.3	8	26.7	
	>11	3	10.0	3	10.0	
3	**Time since diagnosis of chronic kidney disease(months)**					
	1 – 10	4	13.3	7	23.3	**χ^2=9.320 d.f=2 p=0.009 SS****
	>10– 20	11	36.7	19	63.4	
	>20– 30	15	50.0	4	13.3	
4	**Duration of treatment**					
	<6months	1	3.3	7	23.3	
	6months –1year	11	36.7	16	53.4	**χ^2=12.742 d.f=3 p=0.005 SS****
	>1 year–2years	12	40.0	7	23.3	
	>2years	6	20.0	0	0	
5	**Frequency of daily sipper week**					
	Onetime	0	0	1	3.3	χ^2=1.191 d.f=2 p=0.551 N.S
	Two times	26	86.7	24	80.0	
	Three times	4	13.3	5	16.7	
6	**History of treatment for hypertension**					
	Regular	19	63.4	19	63.4	χ^2=0.000 d.f=2 p=1.000 N.S
	Irregular	10	33.3	10	33.3	
	No treatment	1	3.3	1	3.3	

**p<0.01,SS–Statistically Significant, N.S –Not Significant

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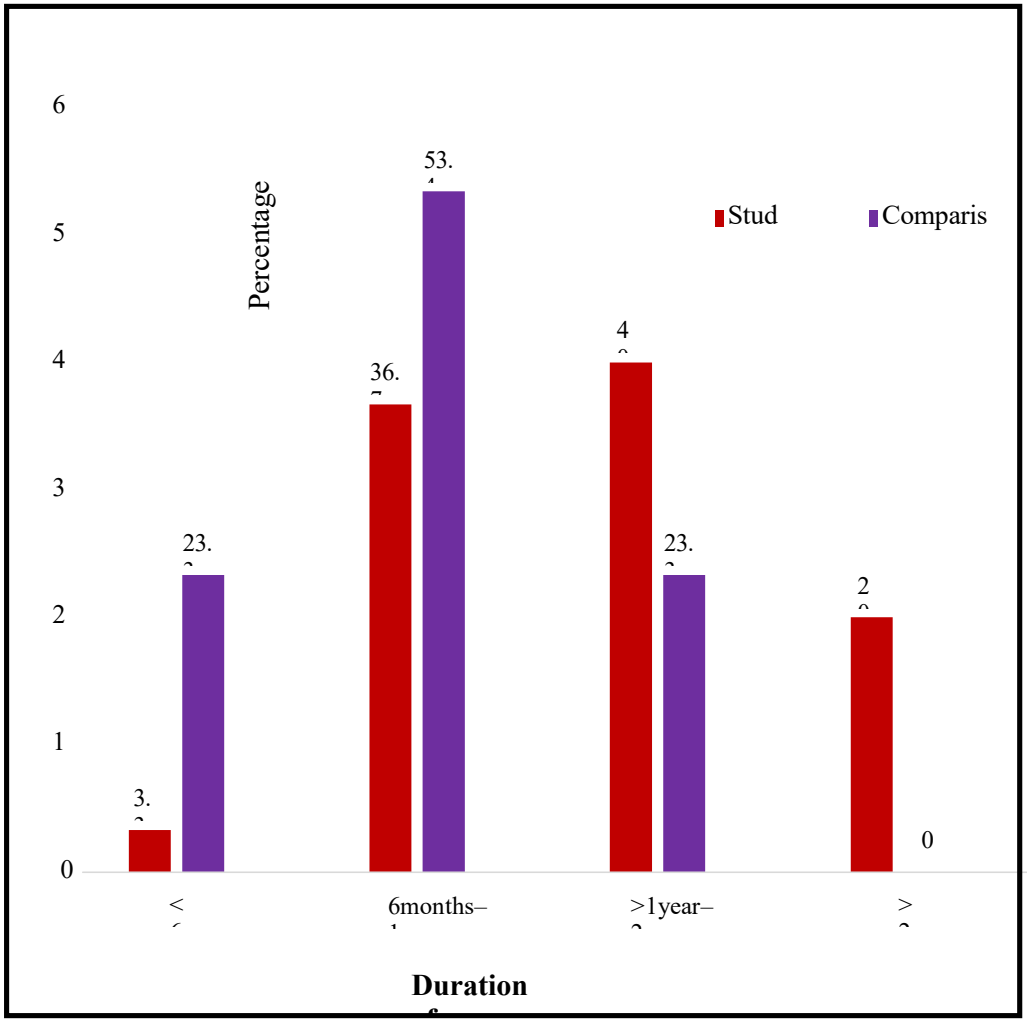

Distribution of duration of treatment among study and comparison group.

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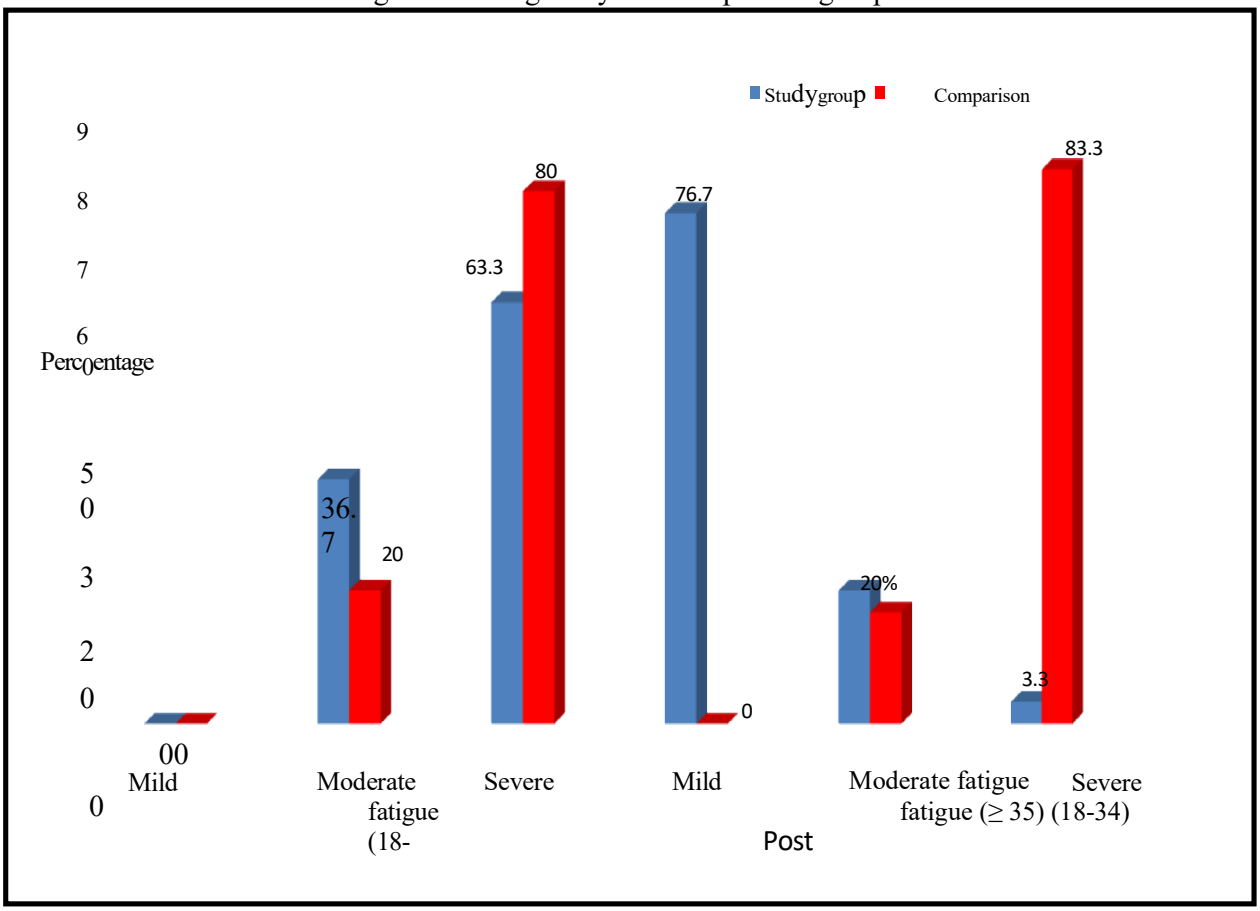
Distribution of pre- and post-test level of fatigue among patients undergoing. hemodialysis in study and comparison group. N = 60

S. No	Observation	Level of Fatigue	Study group(n=30)		Comparison group(n=30)	
			F	P	F	P
1	Pretest	Mild Fatigue(≤17)	0	0	0	0
		Moderate Fatigue(18–34)	11	36.7	6	20.0
		Severe Fatigue(≥35)	19	63.3	24	80.0
2	Post Test	Mild Fatigue(≤17)	23	76.7	0	0
		Moderate Fatigue(18–34)	6	20.0	5	16.7
		Severe Fatigue(≥35)	1	3.3	25	83.33

Distribution of level of hemoglobin among study and comparison group.



Distribution of pre-test and post-test level of fatigue among study and comparison group.

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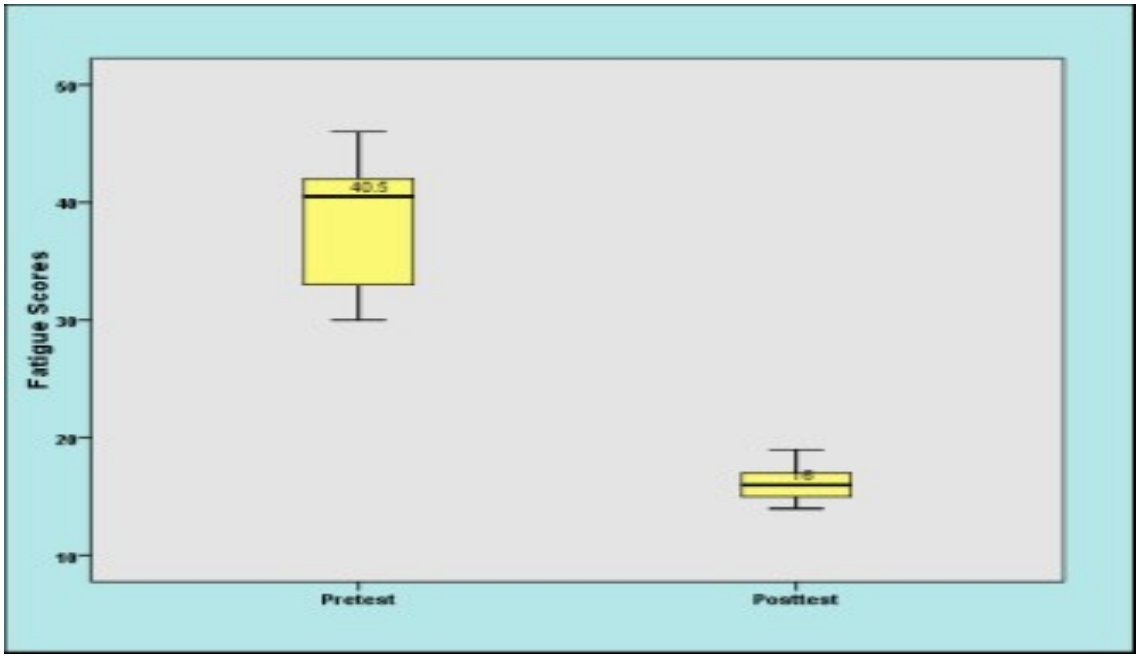
Section B:

Comparison of level of fatigue among patients undergoing hemodialysis within study group. **N = 30**

S. No	Observation	Mean	S.D	Mean %	Mean Difference Score& %	Paired 't' Test value
1	Pretest	38.37	4.98	76.7	20.06 (40.1%)	t=17.202 p=0.001 SS***
2	Post Test	18.30	6.14	36.6		

***p<0.001, SS-Statistically Significant



Effectiveness of intradialytic leg exercise on fatigue among the study group.

Comparison of level of fatigue among patients undergoing hemodialysis within comparison group N = 30

S.No	Test	Mean	S.D	Mean %	Mean Difference Score&%	Paired 't'Test value
1	Pretest	40.77	5.18	81.5	0.20 (0.4%)	t=1.989 p=0.056 N.S
2	Post Test	40.57	5.04	81.1		

N.S–Not Significant

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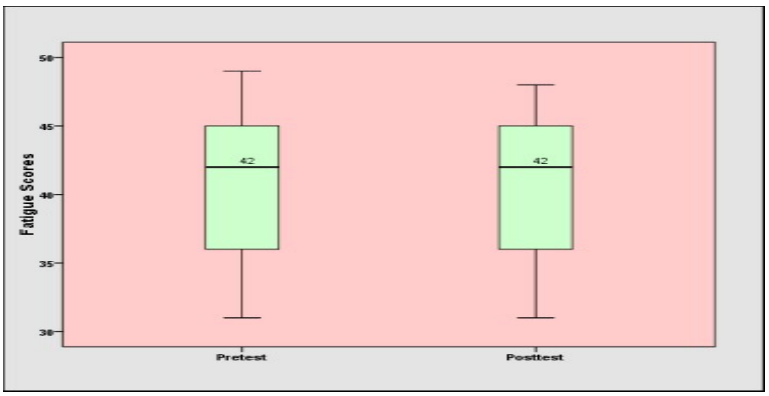

Comparison of pre-test and post-test level of fatigue among the comparison group.
Section: C
Comparison of level of fatigue between study and comparison group. N = 60

S.No	Observation	Group	Mean	S.D	Mean %	Mean Difference Score &	Student Independent't' Test
1	**Pretest**	Study	38.37	4.98	76.7	2.40 (4.8%)	t=1.830 p=0.072 N.S
			40.77	5.18	81.5		
2	**PostTest**		18.30	6.14	36.6	22.27 (44.5%)	**t=15.346 p=0.001 SS*** **
			40.57	5.04	81.1		

p<0.001, SS – Statistically Significant, N.S–Not Significant p=0.001

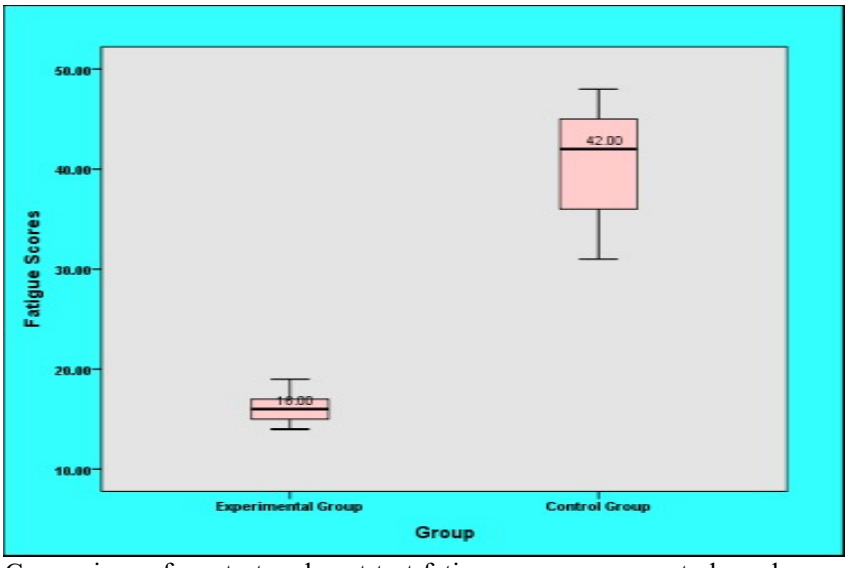

Fig. No. 14: Comparison of pre-test and post-test fatigue scores among study and comparison group.

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SECTION D:
Association of level of fatigue in post-test among patients undergoing hemodialysis with their selected demographic variables in the study group and comparison group.

		STUDYGROUP							COMPARISONGROUP						
S.No	**Demographic Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square& p-Value**	**Mild**		**Moderate**		**Severe**		**Chi-Square &p-Value**
		NO.	**%**	**NO.**	**%**	**NO.**			**NO.**	**%**	**NO.**	**%**	**NO.**	**%**	
1	**Sex**							**χ^2=7.032 d.f=2 p=0.030 SS***							χ^2=0.037 d.f=1 p=0.847 N.S
	Male	20	66.7	3	10.0	0			-	-	4	13.3	19	63.3	
	Female	3	10.0	3	10.0	1	3.3		-	-	1	3.3	6	20.0	
2	**Age(years)**							χ^2=7.881 d.f=6 p=0.247 N.S							χ^2=5.314 d.f=3 p=0.150 N.S
	45 – 50	5	16.7	2	6.7	1			-	-	3	10.0	6	20.0	
	51 – 55	12	40.0	1	3.3	0	0		-	-	0	0	10	33.3	
	56 – 60	4	13.3	1	3.3	0			-	-	2	6.7	5	16.7	
	61 – 65	1	3.3	2	6.7	0	0		-	-	0	0	4	13.3	

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		STUDYGROUP							COMPARISONGROUP						
S. No	**Demographic Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square& p-Value**	**Mild**		**Moderate**		**Severe**		**Chi-Square &p-Value**
		NO.	**%**	**NO.**	**%**	**NO.**	**%**		**NO.**	**%**	**NO.**	**%**	**NO.**	**%**	
3	**Marital status**							χ^2=0.315 d.f=2 p=0.854 N.S							χ^2=0.429 d.f=1 p=0.513 N.S
	Married	22	73.3	6	20.0	1			-	-	5	16.7	23	76.7	
	Unmarried	-	-	-	-	-	-		-	-	-	-	-	-	
	Divorced	-	-	-	-	-	-		-	-	-	-	-	-	
	Widow	1	3.3	0	0	0			-	-	0	0	2	6.7	
4	**Religion**							χ^2=1.502 d.f=4 p=0.826 N.S							χ^2=4.309 d.f=2 p=0.116 N.S
	Hindu	21	70.0	5	16.7	1			-	-	2	6.7	20	66.7.	
	Christian	1	3.3	1	3.3	0			-	-	2	6.7	2	6.7	
	Muslim	1	3.3	0	0	0			-	-	1	3.3	3	10.0	
5	**Educational status**							χ^2=5.215 d.f=6 p=0.517 N.S							χ^2=0.711 d.f=2 p=0.701 N.S
	Non formal education	12	40.0	3	10.0	1	3.3		-	-	3	10.0	16	53.3	
	Primary education	7	23.3	1	3.3	0	0		-	-	1	6.7	7	23.3	

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		STUDYGROUP							COMPARISONGROUP						
S.No	**Demographic Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square& p-Value**	**Mild**		**Moderate**		**Severe**		**Chi-Square &p-Value**
		NO.	**%**	**NO.**	**%**	**NO.**	**%**		**NO.**	**%**	**NO.**	**%**	**NO.**	**%**	
	High school	4	13.3	1	3.3	0			-	-	1	6.7	2	6.7	
	Higher secondary	0	0	1	3.3	0			-	-	-	-	-	-	
	Graduate and above	-	-	-	-				-	-	-	-	-	-	
6	**Occupation**							χ^2=5.999 d.f=4 p=0.199 N.S							χ^2=1.811 d.f=2 p=0.404 N.S
	Labour	16	53.3	5	16.7	0			-	-	3	10.0	16	53.3	
	Government employee	-	-	-	-	-			-	-	-	-	-	-	
	Private employee	6	20.0	0	0	1	3.3		-	-	1	3.3	8	26.7	
	Business	1	3.3	1	3.3	0			-	-	1	3.3	1	3.3	
7	**Family income (Rs.)**							χ^2=4.736 d.f=6 p=0.578							χ^2=3.120 d.f=3 p=0.373
	5001 – 7000	4	13.3	0	0	0			-	-	1	3.3	5	16.7	
	7001 – 9000	6	20.0	2	6.7	0	0		-	-	3	10.0	12	40.0	

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		STUDYGROUP							COMPARISONGROUP						
S.No	**Demographic Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square& p-Value** N.S	**Mild**		**Moderate**		**Severe**		**Chi-Square & p-Value** N.S
		NO.	**%**	**NO.**	**%**	**NO.**	**%**		**NO.**	**%**	**NO.**	**%**	**NO.**	**%**	
	9001 – 11,000	11	36.7	2	6.7	1			-	-	0	0	7	23.3	
	>11,000	2	6.7	2	6.7	0			-	-	1	3.3	1	3.3	
8	**Residence**							χ^2=1.582 d.f=2 p=0.453 N.S							χ^2=2.234 d.f=2 p=0.327 N.S
	Urban	9	30.0	3	10.0	1	3.3		-	-	1	3.3	12	40.0	
	Rural	14	46.7	3	10.0	0			-	-	4	13.3	11	36.7	
	Semiurban	-	-	-	-	-			-	-	0	0	2	6.7	
9	**Food habits**							χ^2=1.552 d.f=2 p=0.460 N.S							χ^2=0.107 d.f=1 p=0.743 N.S
	Vegetarian	10	33.3	2	6.7	1			-	-	3	10.0	13	43.3	
	Non-vegetarian	13	43.3	4	13.3	0			-	-	2	6.7	12	40.0	

*p<0.05,SS-StatisticallySignificant,N.S –Not Significant

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Association of level of fatigue in post-test among patients undergoing hemodialysis with their selected biological variables in the study group and comparison group. N = 30

		STUDYGROUP							COMPARISONGROUP						
S. No	**Biological Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square**	**Mild**		**Moderate**		**Severe**		**Chi-Square**
		NO.	**%**	**NO.**	**%**	**NO**	**%**		**NO.**	**%**	**NO.**	**%**	**NO**	**%**	
1	**Height(Cms)**							χ^2=3.601 d.f=6 p=0.730 N.S							χ^2=2.576 d.f=2 p=0.276 N.S
	150– 155	5	16.7	3	10.0	0	0		-	-	4	13.3	13	43.3	
	155.1– 160	13	43.3	3	10.0	1	3.3		-	-	0	0	9	30.0	
	160.1– 165	4	13.3	0	0	0	0`		-	-	1	3.3	3	10.0	
	165.1– 170	1	3.3	0	0	0	0		-	-	-	-	-	-	
2	**Weight(kgs)**							χ^2=5.016 d.f=6 p=0.542 N.S							χ^2=1.491 d.f=2 p=0.475 N.S
	55– 60	16	53.3	4	13.3	1	3.3		-	-	2	6.7	16	53.3	
	60.1– 70	5	16.7	1	3.3	0	0		-	-	3	10.0	8	26.7	
	70.1– 75	-	-	-	-	-	-		-	-	-	-	-	-	
	75.1– 80	2	6.7	0	0	0	0		-	-	0	0	1	3.3	
	>80	0	0	1	3.3	0	0		-	-					

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S. No	Biological Variables	STUDYGROUP							COMPARISONGROUP						
		Mild		Moderate		Severe		Chi-Square	Mild		Moderate		Severe		Chi-Square
		NO.	%	NO.	%	NO	%		NO.	%	NO.	%	NO	%	
3	**BMI**														χ^2=1.000 d.f=1 p=0.317 N.S
	Underweight (<18.5)	3	10.0	1	3.3	1	3.3	χ^2=9.540 d.f=6 p=0.145 N.S	-	-	-	-	-	-	
	Ideal weight (18.6– 24.9)	12	40.0	2	6.7	0	0		-	-	1	3.3	11	36.7	
	Overweight (25 –29.9)	8	26.7	2	6.7	0	0		-	-	4	13.3	14	46.7	
	Obese(>30)	0	0	1	3.3	0	0		-	-	-	-	-	-	
4	**Duration of sleep**														χ^2=2.883 d.f=3 p=0.410 N.S
	3– 5 hrs/day	2	6.7	0	0	1	3.3	**χ^2=13.913 d.f=4 p=0.008 SS****	-	-	0	0	3	10.0	
	>5– 7 hrs/day	9	30.0	0	0	0	0		-	-	4	13.3	10	33.3	
	>7– 9 hrs/day	12	40.0	6	20.0	0	0		-	-	1	3.3	10	33.3	
	More than 9 hrs/day	-	-	-	-	-	-		-	-	0	0	2	6.7	
5	**Random Blood Glucose(mg/dl)**							**χ^2=12.760 d.f=4 p=0.013**							χ^2=0.430 d.f=2 p=0.807 N.S
	120– 140	19	63.3	3	10.0	0	0		-	-	3	10.0	14	46.7	

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S. No	Biological Variables	STUDYGROUP							COMPARISONGROUP						
		Mild		Moderate		Severe		Chi-Square SS*	Mild		Moderate		Severe		Chi-Square
		NO.	%	NO.	%	NO	%		NO.	%	NO.	%	NO	%	
	141– 160	4	13.3	1	3.3	1	3.3		-	-	2	6.7	9	30.0	
	161– 180	0	0	2	6.7	0	0		-	-	0	0	2	6.7	
	181– 200	-	-	-	-	-	-		-	-	-	-	-	-	
6	**Blood pressure (mm of Hg)**														
	Normal<120/80	3	10.0	2	6.7	0	0		-	-	4	13.3	13	43.3	χ^2=1.431 d.f=2 p=0.489 N.S
	Pre hypertension Systolic 120-139, Diastolic 80-89	3	10.0	2	6.7	0	0	χ^2=5.424 d.f=6 p=0.491 N.S	-	-	1	3.3	10	33.3	
	Stage I HT Systolic 140-159, Diastolic 90-99	15	50.0	1	3.3	1	3.3		-	-	0	0	2	6.7	
	Stage II HT Systolic 160>160, Diastolic 100>100	2	6.7	1	3.3	0	0		-	-	-	-	-	-	

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S. No	Biological Variables	STUDYGROUP							COMPARISONGROUP						
		Mild		Moderate		Severe		Chi-Square	Mild		Moderate		Severe		Chi-Square
		NO.	%	NO.	%	NO	%		NO.	%	NO.	%	NO	%	
7	**Hemoglobin Level (gms%)**							χ^2=1.014 d.f=2 p=0.602 N.S							χ^2=1.714 d.f=2 p=0.424 N.S
	<11	20	66.7	6	20.0	1	3.3		-	-	3	10.0	18	60.0	
	11.1– 12	3	10.0	0	0	0	0		-	-	1	3.3	6	20.0	
	12.1– 13	-	-	-	-	-	-		-	-	1	3.3	1	3.3	
	13.1– 14	-	-	-	-	-	-		-	-	-	-	-	-	
	>14	-	-	-	-	-	-		-	-	-	-	-	-	
8	**Serum creatinine (mgs/dl)**							χ^2=4.309 d.f=6 p=0.635 N.S							χ^2=2.580 d.f=2 p=0.275 N.S
	2.0– 3	6	20.0	3	10.0	1	3.3		-	-	1	3.3	7	23.3	
	3.1– 4	8	26.7	1	3.3	0	0		-	-	4	13.3	11	36.7	
	4.1– 5	6	20.0	2	6.7	0	0		-	-	0	0	7	23.3	
	>5	3	10.0	0	0	0	0		-	-	-	-	-	-	
9	**Serum urea (mg/dl)**							χ^2=3.978 d.f=8 p=0.859 N.S							χ^2=4.080 d.f=2 p=0.130 N.S
	24– 29	7	23.3	2	6.7	1	3.3		-	-	4	13.3	8	26.7	
	>29– 34	7	23.3	3	10.0	0	0		-	-	1	3.3	14	46.7	

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S. No	Biological Variables	STUDYGROUP						Chi Square	COMPARISONGROUP						Chi-Square
		Mild		Moderate		Severe			Mild		Moderate		Severe		
		NO.	%	NO.	%	NO	%		NO.	%	NO.	%	NO	%	
	>34– 39	3	10.0	0	0	0	0		-	-	0	0	3	10.0	
	>39– 44	4	13.3	1	3.3	0	0		-	-	-	-	-	-	
	>44	2	6.7	0	0	0	0		-	-	-	-	-	-	

**p<0.01,*p<0.05,SS –Statistically Significant, N.S– Not Significant

TableNo14: Association of level of fatigue in posttest among patients undergoing hemodialysis with their selected clinical Variables in study group and comparison group

N=30

S.No	ClinicalVariables	STUDY GROUP						Chi-Square	COMPARISONGROUP						Chi-Square
		Mild		Moderate		Severe			Mild		Moderate		Severe		
		NO	%	NO	%	NO	%		NO	%	NO	%	NO	%	
1	**Comorbidity**							χ^2=3.820 d.f=6 p=0.701 N.S							
	Diabetes mellitus	5	16.7	1	3.3	1	3.3		-	-	2	6.7	10	33.3	
	Bronchial asthma	5	16.7	1	3.3	0	0		-	-	0	0	3	10.0	
	Cerebrovascular accident	11	36.7	3	10.0	0	0		-	-	3	10.0	10	33.3	
	Osteoarthritis	2	6.7	1	3.3	0	0		-	-	0	0	2	6.7	

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		STUDY GROUP							COMPARISONGROUP						
S.No	**Clinical Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square**	**Mild**		**Moderate**		**Severe**		**Chi-Square**
		NO	**%**	**NO**	**%**	**NO**	**%**		**NO**	**%**	**NO**	**%**	**NO**	**%**	
	Others (specify)	-	-	-	-	-	-		-	-	-	-	-	-	
2	**Times in cediagnosis Of hypertension (years)**							χ^2=1.169 d.f=6 p=0.978 N.S							
	<5	3	10.0	1	3.3	0	0		-	-	0	0	5	16.7	
	5.1 – 10	15	50.0	3	10.0	1	3.3		-	-	2	6.7	12	40.0	
	10.1 – 11	3	10.0	1	3.3	0	0		-	-	1	3.3	7	23.3	
	>11	2	6.7	1	3.3	0	0		-	-	2	6.7	1	3.3	
3	**Times in ce diagnosis of chronic kidney disease (months)**							χ^2=6.999 d.f=4 p=0.136 N.S							
	1 – 10	2	6.7	1	3.3	1	3.3		-	-	0	0	7	23.3	
	>10– 20	9	30.0	2	6.7	0	0		-	-	3	10.0	16	53.3	
	>20– 30	12	40.0	3	10.0	0	0		-	-	2	6.7	2	6.7	

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		STUDY GROUP							COMPARISONGROUP						
S.No	**Clinical Variables**	**Mild**		**Moderate**		**Severe**		**Chi-Square**	**Mild**		**Moderate**		**Severe**		**Chi-Square**
		NO	**%**	**NO**	**%**	**NO**	**%**		**NO**	**%**	**NO**	**%**	**NO**	**%**	
4	**Duration of treatment**							**χ^2=30.484 d.f=6 p=0.0001 SS*** **							
	<6months	0	0	0	0	1	3.3		-	-	1	3.3	6	20.0	
	6months –1year	8	26.7	3	10.0	0	0		-	-	4	13.3	12	40.0	
	>1 year–2years	10	33.3	2	6.7	0	0		-	-	0	0	7	23.3	
	>2years	5	16.7	1	3.3	0	0		-	-	-	-	-	-	
5	**Frequency of dialysis Per week**							χ^2=2.659 d.f=2 p=0.265 N.S							
	Onetime	-	-	-	-	-	-		-	-	1	3.3	0	0	
	Two times	21	70.0	4	13.3	1	3.3		-	-	4	13.3	20	66.7	
	Three times	2	6.7	2	6.7	0	0		-	-	0	0	5	16.7	
6	**History of treatment for hypertension**							χ^2=3.186 d.f=4 p=0.527 N.S							
	Regular	14	46.7	5	16.7	0	0		-	-	4	13.4	15	50.0	
	Irregular	8	26.7	1	3.3	1	3.3		-	-	1	3.3	9	30.0	
	No treatment	1	3.3	0	0	0	0		-	-	0	0	1	3.3	

***p<0.0001,SS –Statistically Significant,, N.S– Not Significant

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Discussion:

This chapter deals with the discussion of study findings based on the objectives of the study.

Objective 1:

To assess the level of fatigue among patients undergoing hemodialysis in the study and comparison group

The distribution of the level of fatigue among hemodialysis patients in the study and comparison group in the pretest revealed that the study group had 19 (63.3%) with severe fatigue and 11 (36.7%) with moderate fatigue in the pretest, respectively. At the same time, the post-test unveiled that 23 (76.7%) had mild fatigue, 6 (20%) had moderate fatigue, and 1 (3.3%) had severe fatigue among patients undergoing hemodialysis. This shows that there was an enhancement of the level of fatigue in the post-test in hemodialysis patients.

In the comparison group, 24 (80%) had severe fatigue and 6 (20%) had moderate fatigue in the pretest. In the post-test, 25 (83.3%) had severe fatigue and 5 (16.7%) had moderate fatigue, respectively. This denotes that most hemodialysis patients experience fatigue due to the lack of intradialytic leg exercise with regular care.

Objective 2:

To evaluate the effect of intradialytic leg exercise on fatigue among patients undergoing hemodialysis in pre- and post-test

A paired "t" test was used to compare the mean level of fatigue between the study and comparison groups' pre- and post-tests. The mean scores of fatigue in pre- and post-test were 38.37 and 18.30, respectively, among the study group, and the calculated "t" value was 17.202, which was statistically significant at the level $p < 0.001$. The above findings infer that there is a statistically significant difference within the study group on fatigue among hemodialysis patients.

A paired "t" test was used to determine the difference in fatigue levels within the comparison group. The mean score of the level of fatigue in pre- and post-test was 40.77 and 40.57, respectively, and the "t" value was 1.989, which was not statistically significant.

Objective 3:

To compare the level of fatigue among patients undergoing hemodialysis between the study and comparison group in pre- and post-test.

An independent "t" test was computed to compare the pre-test level of fatigue between the study and comparison groups. The calculated "t" value of 1.830 for the level of fatigue was not statistically significant at $p = 0.072$. It indicates that both groups had the same level of fatigue. The mean post-test fatigue score for the study and comparison groups was 18.30 and 40.57, respectively, and the calculated independent "t" value was 15.346 (statistically significant at level $p < 0.001$). It is evident from the above findings that there is a significant difference in fatigue levels between the study and comparison groups. Hence, it is proven that intradialytic leg exercise is effective in reducing fatigue among patients with hemodialysis.

H1: "There is a significant difference in the level of fatigue among patients undergoing hemodialysis who had received intradialytic leg exercise than those who do not" is not accepted.

H2: "There is a significant association between the levels of fatigue with selected demographic variables among patients undergoing hemodialysis" is accepted.

Objective 4:

Association of the selected demographic variables with the level of fatigue in post-test among the study and comparison group.

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The demographic variable age ($\chi^2 = 7.032$, $p = 0.030$) has shown a statistically significant association with post-test level of fatigue among patients undergoing hemodialysis at $p < 0.05$ level. The other demographic variables did not show a statistically significant association with post-test level of fatigue among patients undergoing hemodialysis in the study group.

The biological variables duration of sleep ($\chi^2 = 13.913$, $p = 0.008$) and random blood glucose ($\chi^2 = 12.760$, $p = 0.013$) have shown statistically significant association with post-test level of fatigue among patients undergoing hemodialysis at $p < 0.01$ and $p < 0.05$ level, respectively. The other biological variables did not show a statistically significant association with post-test level of fatigue among patients undergoing hemodialysis.

The clinical variable duration of treatment ($\chi^2 = 30.484$, $p = 0.0001$) has shown a statistically significant association with post-test level of fatigue among patients undergoing hemodialysis at $p < 0.001$ level. The other clinical variables did not show a statistically significant association with post-test level of fatigue among patients undergoing hemodialysis. The study findings proved that intradialytic leg exercise was effective in reducing fatigue among hemodialysis patients.

Summary:

A quantitative approach of quasi-experimental pre- and post-test with comparison group design was chosen to assess the effectiveness of intradialytic leg exercise on fatigue among patients undergoing hemodialysis at a selected hospital in Chengalpattu District. A total of 60 samples, which included 30 in each group, were included using purposive sampling technique. A pre-test was conducted for both study and comparison groups, and intradialytic leg exercise was given to the study group participants, while the comparison group participants were on routine care. Descriptive and inferential statistics were used to analyze the data. The intradialytic leg exercise was effective in reducing fatigue among patients with hemodialysis.

A person with CKD may receive medicinal, surgical, or hemodialysis treatment to control the condition, with hemodialysis being the most popular option. Fatigue is a significant non-hematological consequence of hemodialysis, among other hemodialysis difficulties that might occur as side effects. It is much simpler and less expensive to prevent a complication than to cure it once it arises. With this in mind, intradialytic leg exercises can be done anywhere and are relatively simple to learn in order to prevent or lessen the intensity of fatigue brought on by hemodialysis.

Conclusion:

It is concluded that among the most frequent adverse effects of hemodialysis is fatigue, which has a negative impact on the process. The current study evaluated the effectiveness of this side effect. This study highlighted the usefulness of intradialytic leg exercise in lowering fatigue in hemodialysis patients. Intradialytic leg exercises for hemodialysis patients may be performed easily, so the patient can benefit from them. The use of these intradialytic leg exercises can be encouraged by nurses, improving the patients' quality of life and disease prognosis.

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