

Intradialytic Stretching Exercises on Fatigue and Muscle Cramps

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Abstract:- Hemodialysis is one of the most widely accepted treatment modalities in patients with chronic renal failure. Although Hemodialysis can prolong life it can lead to several complications. The aim of the present study was to determine the effect of intradialytic stretching exercises on fatigue and muscle cramps among patients undergoing Hemodialysis at NIMS Hospital, Neyyattinkara, Kerala. The objectives of the study are to assess the level of fatigue perceived among clients undergoing Hemodialysis before and after intradialytic stretching exercise in both experimental and control group, To assess the frequency and severity of muscle cramps among clients undergoing Hemodialysis before and after intradialytic stretching exercise in both experimental and control group and to determine the effect of intradialytic stretching exercise on fatigue and muscle cramps among clients undergoing hemodialysis in control and experimental group. Orlando's Theory of Deliberative Nursing Process was used as conceptual framework in this study. Quasi experimental pretest posttest with control group design was used in this study. The data was collected from 60 samples. Data was analyzed using descriptive and inferential statistics. The present study reveals that majority of the clients undergoing Hemodialysis experience moderate to severe fatigue. Intradialytic stretching exercises proven to decrease fatigue at the level of significance ($p < 0.01$). The study also reveals that there is significant improvement in frequency and severity of muscle cramps after implementing intradialytic stretching exercises.

Keywords:- *Intradialytic Stretching Exercises; Effect; Fatigue; Muscle Cramps; Hemodialysis Patients.*

I. INTRODUCTION

Chronic kidney disease (CKD) is an umbrella term that describes kidney damage or a decrease in the glomerular filtration rate for three or more months. Chronic kidney disease is associated with decreased quality of life, increased health care expenditures and premature death. If untreated can result in End stage renal disease (ESRD) and necessitate renal replacement therapy ie. dialysis or kidney transplantation.² Chronic kidney disease (CKD) is an important public health problem affecting more than 10% of the general population. It is a silent disease and if not detected and treated early, may progress to End stage renal disease (ESRD). When the kidney's fail and life cannot be

sustained, any more therapies tailored to replace all or most of the functions of the kidney are essential, which constitute Renal replacement therapy (RRT).⁵

Hemodialysis is a lifesaving treatment for ESRD in which substances move from the blood through a semipermeable membrane and into a dialysis solution. It helps to correct fluid and electrolyte imbalances and to remove waste products.¹ Following a hemodialysis the patient normally feels weak and fatigued sometimes even too tired to eat. Sudden drops in Blood pressure may cause the patient to become weak, dizzy and nauseated. Fluid and electrolyte levels drops rapidly and cause the patient to feel lethargic and have muscle cramps.⁴

Chronic renal failure and its treatment can severely compromise quality of life of people affected by the disease. Caring for the client with CRF involves many challenges. Numerous physical and psychosocial manifestations are associated with renal disease and its treatment. Self management is integral to ensure a good quality of life. Nurses can support self management through education of clients, planning for exercise programs and through supportive communication.³

1.1 Need and Significance of the study

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, uremia is more. More than 60,000 people die annually because of kidney failure all over the world.⁶

It is estimated that in India about 1,00,000 persons suffering from End stage renal disease each year, of which only about 20,000 get treated.⁷

Fatigue which can be conceptualized on a continuum from extreme tiredness to high energy, has been reported to affect 60% to 97% of chronic Hemodialysis patients.⁸

Fatigue is one of the most frequent symptoms of patients with end stage renal disease undergoing maintenance dialysis therapy. The prevalence of fatigue ranges from 60% to as high as 97% in end stage renal disease patients on long term dialysis therapy.⁹

Muscle cramps are common complication of Hemodialysis treatment occurring frequently. It can involve

the legs, most commonly in the feet, and involve arms, hands and abdominal muscles. It is estimated that 33 to 86 percent of patients receiving dialysis have experienced cramps.¹⁰

Intradialytic exercise programs are important to enhance patient physical functioning, exercise capacity and improve overall health. Exercise during the treatment does not interfere with the treatment, and often the patients are more stable hemodynamically. Also exercise during dialysis improves clearances by opening up vascular beds in the working muscles, exposing more tissue to the dialysis procedure.¹

The incidence of ESRD in NIMS Hospital is increasing at an alarm state. The reported cases of Chronic renal failure admitted from 2009-2012 are as follows:

In Hemodialysis unit researcher observes that majority of the patients undergoing Hemodialysis experience severe fatigue and muscle cramps and found out the necessity of implementing therapeutic nursing interventions in reducing the severity of complications. As an interventional measure the researcher focused on the importance of practicing intradialytic stretching exercises like toe taps, arm curls, straight leg raise, seated marching in reducing the severity of complications. So the researcher felt interested in assessing the effect of intradialytic stretching exercises on fatigue and muscle cramps among dialysis patients.

1.2 Objectives of the study

- To assess the level of fatigue perceived among clients undergoing hemodialysis before and after intradialytic stretching exercise in both experimental and control group.
- To assess the frequency and severity of muscle cramps among clients undergoing hemodialysis before and after intradialytic stretching exercise in both experimental and control group.
- To determine the effect of intradialytic stretching exercise on fatigue and muscle cramps among clients undergoing hemodialysis in control and experimental group.

1.3 Hypothesis

H₁ - There will be a significant improvement in reduction of Fatigue and Muscle cramps after performance of intradialytic stretching exercises.

1.4 Conceptual framework

Conceptual frame work is based on Orlando's Theory of Deliberative Nursing process (1990). Orlando's theory radically shifted the nurses focus from medical diagnoses to nursing diagnoses that is to find and meet the client's immediate goals.

II. MATERIALS AND METHODS

2.1 Research approach

A Quantitative and evaluative approach was adopted for this study.

2.2 Research design

The research design adopted in the present study is Quasi experimental pre test post test with control group design.

2.3 Variables

Independent Variable - Intradialytic stretching exercise
Dependent variable - Fatigue and Muscle cramps

2.4 Setting of the study

The present study was conducted in Hemodialysis unit of NIMS Hospital Neyyattinkara, Kerala

2.5 Population and sample

The population for the present study were all Hemodialysis patients. The samples selected for the present study were patients who are undergoing Hemodialysis at NIMS Hospital, Neyyattinkara.

The total sample consists of 60 hemodialysis patients who satisfies the sample selection criteria, out of which 30 were in the experimental group and 30 were in control group.

Purposive sampling technique was used to select the samples for the present study.

2.6 Sampling Criteria

✚ Inclusion criteria

Hemodialysis patients;

- Age group of 20-60 years
- All the gender
- have stable cardiac profiles
- have no musculoskeletal impairments

✚ Exclusion criteria

Hemodialysis patients;

- irregular for hemodialysis
- have femoral catheters
- have known psychiatric disorders
- weak and critically ill

2.7 Tools & Technique

1. Structured questionnaire consisted of;
 - Part 1- Socio demographic data (12 items)
 - Part 2- Clinical data (3 items)
2. Multidimensional Assessment of Fatigue Scale
3. PENN Spasm Frequency Scale

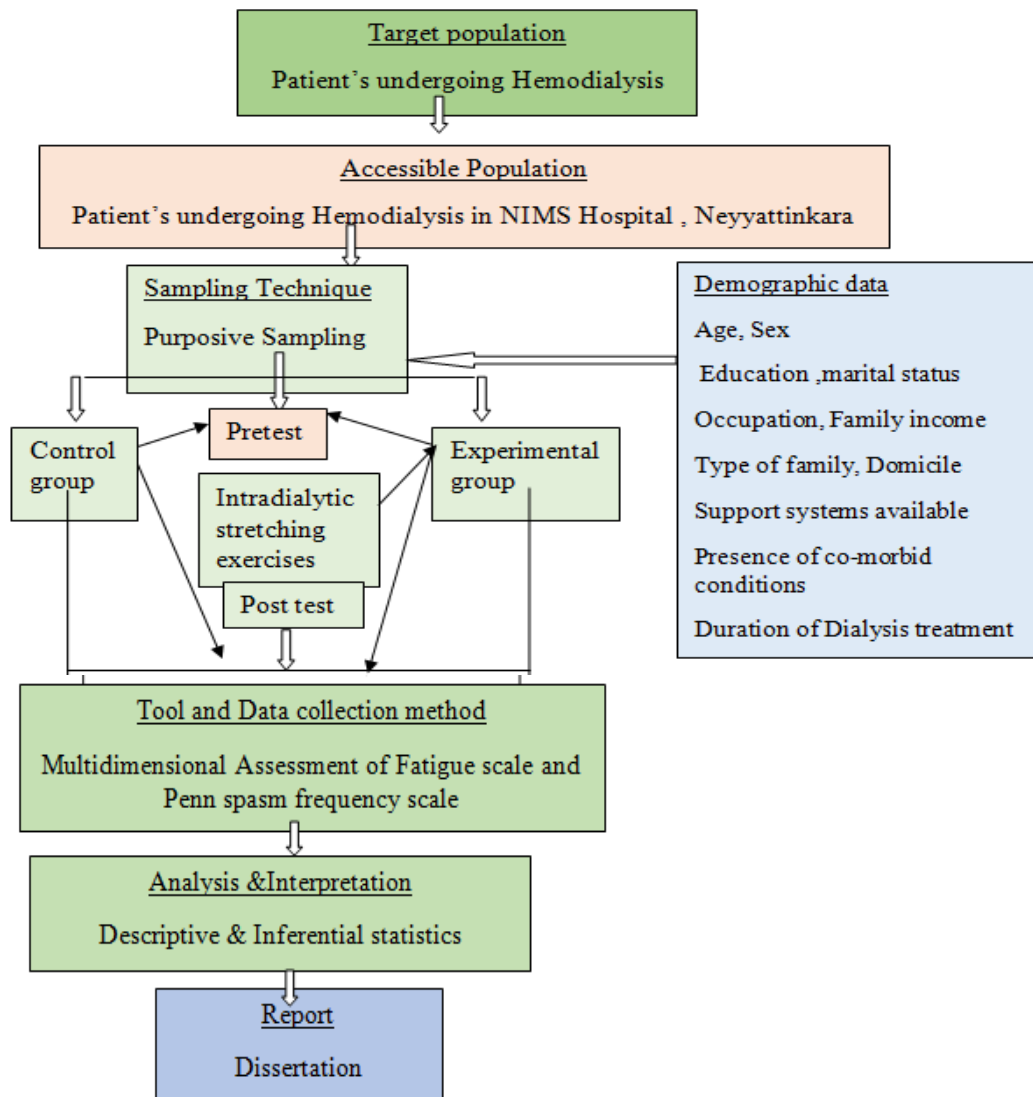


Figure- 1:Schematic representation of Research Methodology

2.8 Data collection procedure

The study was conducted after getting the permission from the ethical committee of NIMS hospital. The main study was conducted among 60 Haemodialysis patients, selected by purposive sampling. Data collection period was one month. Prior to data collection, the investigator introduces self and explain regarding the study and assures the confidentiality of the information provided by the study participants. Informed consent obtained. Thirty Hemodialysis patients each was assigned to both the experimental group and control group. The investigator taught the intradialytic stretching exercises on the first day to the experimental group and made the patients to perform intradialytic stretching exercise. The exercise duration is 30 minutes in the non access extremities. This exercise program is on 3 days ie, either Monday, Wednesday, Friday or Tuesday, Thursday, Saturday. Intradialytic stretching exercises consists of arm curls, seated marching, toe taps and lower leg raise. Pre test score taken before teaching exercises. Post test score was obtained after 3 weeks on Friday/Saturday when they came for Hemodialysis after successful completion of exercise program. Data collection process was concluded by thanking each participant.

III. RESULTS AND DISCUSSION

3.1 Description of the socio demographic and clinical variable characteristics under study.

- ❖ Among the samples ,26.7% of samples in experimental group belongs to age group of 51-60yrs ,23.3% belongs to age group of 61-70yrs & 41-50 yrs,13.3% belongs to the age group of 20-30 yrs & 31-40yrs whereas 30% of samples in control group belongs to the age group of 51-60 yrs,26.7% belongs to the age group of 61-70 yrs,23.3% belongs to the age group of 41-50 yrs,13.3% belongs to the age group of 31-40yrs,6.7% belongs to the age group of 20-30yrs.
- ❖ Among the samples in experimental group 66.7% of samples are males and 33.3% are females, in control group 56.7% of samples are females and 43.3% of samples are males.
- ❖ Among the samples in experimental group 76.7% of samples are married, 23.3% are single ,whereas in control group 80% of samples are married ,16.7% are single,3.3% are separated/divorced

- ❖ Among the samples in experimental group 40% of samples have primary education,36.7% have college education,13.3% have professional education, 6.7% have high school education,3.3% are illiterate ,whereas in control group 40% of samples have primary education ,30% have college education,23.3% have high school education,6.7% have professional education.
- ❖ Among the samples in experimental group 30% of samples are Govt.employees,26.7% are private employees,20% are unemployed and coolie workers,3.3% are agriculture workers, whereas in control group 26.7% are private employees & unemployed,23.3% are coolie workers,20% agriculture,3.3% Govt.employees.
- ❖ Among the samples in experimental group 46.7% of samples have family income<5000,20% have family income of 5001-10000&10001-15000,13.3% have family income of >15000 ,whereas in control group 43.3% have family income of 5000-10000,30% have family income of <5000,20% have family income of >15000,6.7% have family income of 10001-15000
- ❖ Among the samples in experimental group 56.7% of samples are Hindus ,33.3% are Christians ,10% are Muslims ,whereas in control group ,50% are Christians ,43.3% are Hindus,6.7% are Muslims.
- ❖ Among the samples in experimental group 76.7% of samples belongs to nuclear family,16.7% belongs to joint family,6.7% belongs to extended nuclear family, whereas in control group 56.7% belongs to nuclear family,26.7% belongs to joint family,16.7% belongs to extended nuclear family.
- ❖ Among the samples in experimental group 76.7% of samples resides in rural area,23.3% resides in urban area, whereas in control group 73.3% resides in rural area,26.7% resides in urban area
- ❖ Among the samples in experimental group 96.7% of samples gets support from family,3.3% gets support from relatives, whereas in control group 70% gets support from family,16.7% gets support from friends,13.3% gets support from relatives.
- ❖ Among the samples in experimental group 50% of samples have both diabetes mellitus and hypertension,33.3% of samples have none of the disease,10% have hypertension,6.7% have Diabetes mellitus whereas in control group 33.3% have Diabetes mellitus &Hypertension,23.3% have Diabetes mellitus 13.3% have hypertension and 13.3% have Diabetes mellitus, hypertension & coronary artery disease
- ❖ Among the samples in experimental group 50% of samples are undergoing hemodialysis since more than one year ,30% since 6-12 months,20% since <6months whereas in control group 50% since >1year,40% since 6-12 months,10% since <6 months.
- ❖ Among the samples in experimental group before hemodialysis none of the samples experience hypotension, during 36.7% of samples experience hypotension , after 23.4% of samples experience hypotension whereas in control group before hemodialysis none of the samples experience hypotension, during 60% of samples experience

hypotension after 10% of samples experience hypotension.

- ❖ Among the samples in experimental group 53.3% of samples are undergoing Hemodialysis with Ultrafiltration rate of 3L,30% with 4L,13.3% with 2L,,3.3% with 5L,whereas in control group 46.7% with 4L, 20% with 5L,16.7% with 2L&3L.
- ❖ Among the samples in experimental group 96.7% of samples are undergoing Hemodialysis with rate of blood flow through the dialyzer at a rate of 251-300ml/min,3.3% with 201-250ml/min whereas in control group 83.3% with 251-300ml/min,16.7% with 201-250ml/min.

3. 2 Description of Fatigue scores based on group

- ❖ Among the samples during the pre test in experimental group 86.7% of samples experience severe fatigue ,13.3% experience moderate fatigue whereas in control group 83.3% experience severe fatigue and 16.7% experience moderate fatigue
- ❖ Among the samples during post test in experimental group 56.7% of samples experience severe fatigue ,43.3% experience moderate fatigue whereas in control group 86.7% experience severe fatigue and 13.3% experience moderate fatigue.

3.3 Description of the effectiveness of intradialytic stretching exercises on fatigue

- ❖ Among the samples the mean post test score of experimental group is significantly higher than the mean pretest score p (<0.05). Hence it is evident that there is significant improvement in fatigue scores in the experimental group after implementing intradialytic stretching exercises
- ❖ Among the samples results shows there is no statistically significant difference between mean pretest and post test fatigue scores p (>0.05) of patients in the control group.

	Mean	SD	N	Mean Difference	Paired t	P
Pre test	45.9	4.6	30	5.9	11.8	0.000
Post test	40.0	3.4	30			

Table -1: Mean standard deviation and t value of overall fatigue before and after intervention in experimental group. n=60

** Significant at 0.01 level

Table. revealed that the mean post test score of experimental group is significantly higher than the mean pre test score (p <0.05). Hence it is evident that there is significant improvement in fatigue scores in the experimental group after implementing intradialytic stretching exercises.

Table-2: Mean standard deviation and t value of overall fatigue before and after intervention in control group.
n=60

	Mean	SD	N	Mean Difference	Paired t	P
Pre test	44.0	3.9	30	0.2	12.7	0.215
Post test	43.8	3.6	30			

3.4 Description of the effectiveness of intradialytic stretching exercises on frequency and severity of muscle cramps.

Table shows there is no statistically significant difference between mean pretest and post test fatigue scores (p>0.05) of patients in the control group.

- ❖ Among the samples results reveals that the post test score of experimental group is significantly higher than the pre test score (p<0.05). Hence it is evident that there is significant improvement in frequency of muscle cramps scores in the experimental group after implementing intradialytic stretching exercises.
- ❖ Among the samples results reveals no statistically significant difference between pretest and post test frequency of muscle cramps scores (p>0.05) of patients in the control group.
- ❖ Among the samples results revealed that the post test score of experimental group is significantly higher than the pre test score (p<0.05). Hence it is evident that there is significant improvement in severity of muscle cramps scores in the experimental group after implementing intradialytic stretching exercises.
- ❖ Among the samples results reveals no statistically significant difference between pretest and post test severity of muscle cramps scores (p>0.05) of patients in the control group.

Severity	Pre Test f %		Post Test f %		Z#	P
Mild	0	0.0	12	40.0	0.000	
Moderate	4	13.3	18	60.0		
Severe	26	86.7	0	5.04** 0.0		

Table.3 Effectiveness of intradialytic stretching exercises on severity of muscle cramps in experimental group

**Significant at 0.01 level

The above table revealed that the post test score of experimental group is significantly higher than the pre test score (p<0.05). Hence it is evident that there is significant improvement in severity of muscle cramps scores in the experimental group after implementing intradialytic stretching exercises.

Severity	Pre Test f %		Post Test f %		Z#	P
Mild	1	3.3	0	0.0	0.655	
Moderate	13	43.3	16	53.3		
Severe	16	53.3	14	46.7		

Table. 4 Effectiveness of intradialytic stretching exercises on severity of muscle cramps in control group

The above findings shows there is no statistically significant difference between pretest and post test severity of muscle cramps scores (p>0.05) of patients in the control group.

3.3 Discussion

The present study focused to determine the effect of intradialytic stretching exercises on fatigue and muscle cramps among patients undergoing Hemodialysis at NIMS Hospital Neyyattinkara. The findings of the study have been discussed based on the objectives of the study and findings of other similar studies.

A study was conducted to determine the effect of stretching exercises protocols on reduction of leg cramp during hemodialysis among patient admitted with renal failure. Quasi- experiment research design was applied. This study was conducted in Al .AzarAssuit Medical Hospital dialysis unit. The subjects of this study consists of 60 patients with muscle cramps during hemodialysis. The three tools included in the study are tools of socio - demographic data , Patient information about muscle cramps & management & tool of evaluated patient knowledge and skills after performance exercises. Results shows that there was lack of knowledge & skills related to muscle cramps before nursing instruction protocol, but there was statistical significant difference after performance of exercises. It was found also that high significant difference between before & after performance of exercises. The study concluded the importance of performance exercises for patient undergoing dialysis to prevent cramps. There is clearly a need for effective education regarding recognition of individual patient need and appropriate intervention strategies in muscle cramps in dialysis patient . Nurses, in partnership with patient, relatives and other health professionals can help to empower the individual to manage their cramps.

- ❖ The present study also reveals that there is significant improvement in frequency and severity of muscle cramps in the experimental group after implementing intradialytic stretching exercises.

IV. CONCLUSION

The present study reveals that majority of the clients undergoing hemodialysis experience moderate to severe fatigue and intradialytic stretching exercises had shown to decrease fatigue. The study also reveals that there is significant improvement in frequency and severity of muscle cramps after implementing intradialytic stretching exercises.

4.1 Nursing implications

The present study has got implications in the field of nursing service, nursing administration, nursing education and nursing research.

- ❖ Stretching exercises can be used by the nursing professionals who are working in dialysis unit.
- ❖ Nursing professionals can use stretching exercises as a non-pharmacological intervention in case of various situations like pain, fatigue, muscle cramps etc.
- ❖ Nurse educator should educate the students regarding stretching exercises and its implementation to decrease pain, fatigue, muscle cramps etc..
- ❖ The study is relevant for the nurse administrators to determine the need of stretching exercises in dialysis unit.
- ❖ Similar studies can be done with a large sample.
- ❖ This study will be a motivation for the beginning researcher to conduct similar studies.

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