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A Study to Assess the Effectiveness of Intradialytic Exercises on Prevention and Reduction of Muscle Cramps among Patients undergoing Hemodialysis in a Selected Tertiary Care Hospital of Western Maharashtra

Meril Jacob

Abstract: ***Introduction**: Muscle cramps, often known as abrupt, painful, involuntary skeletal muscular contractions, can occur in hemodialysis (HD) patients. It can affect the legs, usually the feet, but they can also affect the arms, wrists, and abdominal muscles. In this study, patients receiving hemodialysis were evaluated to determine how well intradialytic exercises can be used to lessen and avoid muscle cramps. **Material and methods**: In a tertiary care facility's dialysis unit, an experimental study was carried out. Based on the inclusion and exclusion criteria, a non - probability purposive sampling technique was employed to choose 60 samples from patients receiving hemodialysis. Socio demographic variables and clinical data was gathered. Patients muscle cramps were assessed using a modified Ashworth scale. During dialysis, intradialytic exercises were taught to patients and muscle cramps were reassessed. **Results**: Out of 60 samples, 50% of the individuals in the pretest reported having moderate or severe muscle cramps whereas in posttest, 25% of the individuals had no muscle cramps, while 75% of the study subjects had minor cramps. This helps us to infer there is a reduction in muscle cramps. Comparison of mean pretest score with the post test score infers that mean muscle cramp score of the pretest group is 10.3 with a standard deviation of 2.48 and that of posttest group is 1.78 with a standard deviation of 1.5. **Conclusion**: According to the study, performing intradialytic exercises leads to a statistically significant reduction in muscle cramps. It gave the researcher more understanding on how to develop an affordable exercise programme to reduce muscle cramping in hemodialysis patients. In order to assess the efficacy of this activity, it was advised that a comparable study be carried out on a broad scale.*

Keywords: Effectiveness, Intradialytic Exercise, Muscle Cramps, Hemodialysis

1. Introduction

On a global scale, kidney illnesses have an impact on quality of life. Acute renal failure and chronic kidney disease are the main disorders that influence the pathophysiology of the kidneys, and as the disease progresses, these conditions may call for renal replacement therapy or a kidney transplant. The basic goal of renal replacement therapy is to restore kidney function and stop future loss

Between 1990 and 2017, the global all age mortality rate of CKD increased by 4.15%. A half million individuals died from CKD in 2017

According to the Centers for Disease Control and Prevention (CDC) report that women are slightly more likely than males to have CKD (14% vs.12%). Individuals with age 65 years and older have the highest prevalence of CKD (38%), followed by ages 45 to 64 (12%) and ages 18 to 44 (6%).

More than four crore people in India are at risk of renal failure, which affects 10 lakh people. The number of people receiving dialysis is thought to be around 55, 000, and it is expanding at a rate of 10–20% annually.

Muscular cramps are a typical hemodialysis complication effect that regularly occurs. It can affect various parts of body, but most frequently the feet. According to estimates, between 33 and 95 percent of dialysis patients have cramps.

The National Kidney Foundation recommends 30 minutes or less of low intensity exercise every day of the week to avoid and lessen muscular cramps.

The Southern Alberta Renal Program (SARP) is an effective renal exercise training program in the Canadian province of Alberta, where regular exercise training is carried out by qualified nursing staff following kinesiologist evaluation in 6 hemodialysis units (including 1 pediatric unit).

Problem statement

A study to assess the effectiveness of Intradialytic exercises on prevention and reduction of muscle cramps among patients undergoing hemodialysis in a selected tertiary care hospital of Western Maharashtra.

Objectives

- To evaluate the effectiveness of Intradialytic exercises on reduction of muscle cramps among patients undergoing hemodialysis.
- To find the association between pretest score of muscle cramps of patients undergoing hemodialysis with selected socio - demographic variable.
- To find of the association between pretest score of muscle cramps of patients undergoing hemodialysis with selected clinical data.

Hypothesis

- Ho (1): There is no significant reduction in level of muscle cramps after performance of intradialytic exercises in patients undergoing hemodialysis.

- Ho (2): There is no association between the level of Muscle Cramps among patients undergoing hemodialysis with their selected socio - demographic variables.
- Ho (3): There is no association between the level of Muscle Cramps among patients undergoing hemodialysis with selected clinical data.

Research approach
Quantitative research approach was used to assess leg muscle cramps.

Research design
The research design adopted for this study was Quasi experimental. Pre - test and post - test experimental design was used.

Variables
- Independent variable: Intradialytic stretching exercises
- Dependent variable: Leg muscle cramps

Setting of the study
Hemodialysis unit of a tertiary care hospital of Western Maharashtra

Study population
It is an aggregate of cases that follows a designated criteria and accessible for the study CKD patients undergoing hemodialysis visiting the selected tertiary care hospitals of Western Maharashtra.

Sample
Sample means the patients undergoing hemodialysis experiencing leg muscle cramps in selected dialysis unit of Ernakulum district, Kerala

The sample size was calculated statistically from the sample size of a previous study conducted by Jancy PO and Parimala S in Ernakulam District of Kerala.
- Here a = 5% hence Z=1.96
- $\frac{(1.96)^2 62.65 \times 37.35 = 60.3}{12.2^2}$
- n is the minimum sample required to test the hypothesis.
- P is the proportion of the variable under study
- E is the precision of study
- Q is the proportion of 100 - P

The desired level of confidence was taken as 95%. The precision is taken as E=12.2, n= 60

Sampling technique
Non probability purposive sampling.

Sampling criteria

Inclusion criteria
- Patients with chronic renal failure.
- Patients who are available during the data collection period.
- Patients with the age group of 20– 70 years.
- Patients with moderate to severe Muscle Cramps [6 - 15] only taken as a sample after assessing with modified Ashworth Scale.

Exclusion criteria
- Emergency hemodialysis patients.
- Patient with ventilator support.
- Patients with peripheral vascular disorders
- Comatose patient
- Bedridden patients with musculoskeletal disorder

Tools

Section & Part	Content	Number of items	Scoring
Section A	Socio Demographic data	5	Age, Sex, Education, Comorbidity and Physical activity
Section B	Clinical Data	10	Clinical Data
Section C	Modified Ashworth Scale	15	Muscle tone
			Muscle strength
			Range of motion

Validity
- Section A and B is validated by 5 experts from department of Medical Surgical specialty.
- Section C is a standardized scale.

Reliability
Reliability is the degree of consistency and accuracy with which an instrument measures the attributes designed to measure. In this study, reliability was checked using test - retest method. The tool was found to be reliable (0.85).

Data collection process
- Identification of accessible population
- Sample selection (non probability purposive sampling)
- Select sample who meet inclusion criteria
- Obtain informed consent
- Measurement of modified Ashworth Scale for assessing muscle cramps.
- Patients with moderate to severe muscle cramps (6 - 15) are selected for study
- Collect socio demographic data and clinical data
- Teach intradialytic exercises
- Under supervision of researcher patient performs intradialytic exercises for 10 mins Teach intradialytic exercises
- Post test on completion of dialysis using modified Ashworth Scale.
- Assess the pretest and post test reduction of muscle cramps using modified Ashworth Scale.

Plan for data analysis
- Coding of data was done
- Tabulation was done in excel master sheet
- Descriptive analysis was used and interpreted in the terms of frequencies and percentages
- Inferential statistics is used to assess difference in lower extremity perfusion pre intervention and post intervention
- The data analysis will be done by using SPSS Version 23

2. Analysis and Interpretation

Analysis and interpretation of the data is the most important phase of research process, which involves the computation of the certain measures along with searching for patterns of relationships that exist among data groups

Organization of data

The data was collected, tabulated, analyzed, interpreted and the results obtained were organized in the following three sections.

Section A: Description of sociodemographic data and baseline data of study participants in terms of frequency and percentage.

Section B: Description of clinical data and baseline data of study participants in terms of frequency and percentage.

Section C: Effectiveness of intradialytic exercise and the comparison between the pretest and post test score.

Section D: Association of Pretest muscle cramp score with selected sociodemographic data.

Section E: Association of Pretest muscle cramp score with selected clinical data.

3. Results

Analysis and interpretation of the data collected to assess the effectiveness of intradialytic exercises on muscle cramps in patients undergoing Hemodialysis and its association with selected socio - demographic variables and clinical data was done. Descriptive statistics (Wilcoxon) is used to describe the effectiveness of intradialytic exercises and inferential statistics like ANNOVA test, Mann Whitney test was used to determine the effectiveness of intradialytic Exercise and its association with selected socio demographic variables and clinical data. The analysis shows that there is a significant improvement in muscle cramps with <0.05 level of significance. No statistically significant association were present with selected socio - demographic variables and clinical data.

Table 3: Assess the pre and post - test intradialytic exercise on reduction of muscle cramps among patients undergoing hemodialysis in study group

Muscle cramps score	Frequency (f)	Pre - test (%)	Frequency (f)	Post - test (%)
0 (No)	0	0	15	25
1 – 5 (Mild)	0	0	45	75
6 – 10 (Moderate)	30	50	0	0
11 – 15 (Severe)	30	50	0	0
Total	60	100	60	100

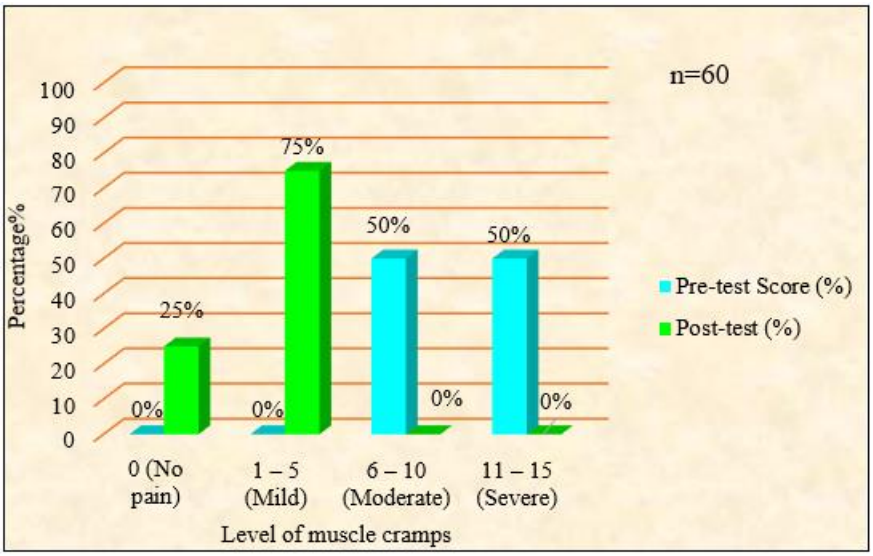
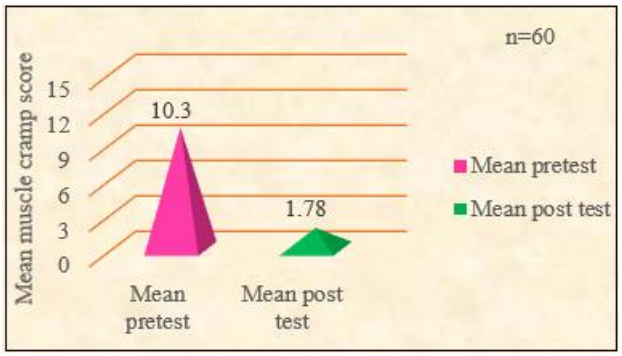


Table 4: Assess the effectiveness of intradialytic exercise on reduction of muscle cramps among patients undergoing hemodialysis in study group

Parameter	Pre - test		Post - test		Wilcoxon Z Value	P Value
	Mean	SD	Mean	SD		
Muscle cramps score	10.30	2.48	1.78	1.50	6.76	<0.0001



4. Discussion

A study conducted by AA Sharida et al to assess the effectiveness of intradialytic stretching exercises on prevention and reduction of leg muscle cramps among patients undergoing hemodilaysis concluded that 45% that is majority were having normal BMI. In the present study 71.7% which was majority were having normal BMI. Which means that the above study is congruent with the study

Jancy PO and Parimala S conducted a study to assess the Effect of Intradialytic Stretching Exercises to Reduce Leg Muscle Cramps among Patients Undergoing Hemodialysis in Selected Dialysis Unit of Ernakulum District in which 57% had moderate muscle cramps and 43% had severe muscle cramps in the preintervention. After post intervention 33% had moderate muscle cramps and 3% had no muscle cramps.

Implication to Nursing
The results of study have implication in nursing in the fields of nursing service, nursing education, nursing administration and nursing research

Nursing Practice
Nurse can provide health education regarding management of leg muscle cramps. Nurse can provide awareness programs about the new modalities of preventing leg muscle cramps such as exercise therapy, nutritional therapy, muscle pain therapy and vinegar therapy.

Nursing Administration
Periodically organize formal training program for nurses to know about the other alternative therapies. Nurse can arrange conference in service education, workshop which might be useful for the staffs. Encouraging the student and staff to disseminate the findings.

Nursing Education
Nursing curriculum should include content areas of various stretching exercises. The educational authority should be advisable to incorporative Intradialytic stretching exercise to patients undergoing hemodialysis by involving nurses. Nursing students should be equipped with the knowledge on the benefits of exercise.

Nursing Research
The study can be used as a reference material for further research regarding management of leg muscle cramps during dialysis. Research studies in this area will add to the body of knowledge of research, many nursing research studies can be derived from this topic

5. Summary of the Study

An experimental study is conducted to assess the effectiveness of intradialytic exercises on reduction and prevention of muscle cramps on patients undergoing hemodialysis in a selected tertiary care hospital in Western Maharashtra. A total 60 patients recruited for the study using purposive sampling technique. The procedure explained and informed written consent obtained from the subject who fulfilled the inclusion criteria. In the next stage participants were selected according to severity of muscle cramps. Recording of socio - demographic variable, clinical data and following which participants were taught intradialytic exercises by the researcher. The exercises were supervised by the researcher. The muscle cramps were reassessed by the researcher using modified Ashworth scale which was done to compare the pretest and posttest score. The concept model adopted for the study is Modified Katherine Kolcaba Theory of comfort. Implications of the study finding can be done in nursing education, nursing practice, nursing administration and nursing research.

6. Conclusion

The present study done to assess the to assess the effectiveness of intradialytic exercises on reduction and prevention of muscle cramps in a selected Tertiary care center in Western Maharashtra. The study revealed that there is a statistically significant improvement in muscle cramps after practicing intradialytic exercises. It provided deeper insight to the researcher regarding the implementation of a costeffective exercise regime to improve the muscle cramps in patients undergoing hemodialysis. Based on the study findings it was recommended that similar study can be conducted in large scale to evaluate the effectiveness of this exercises.

7. Recommendations and Suggestion

- Training can be provided to the staff nurses regarding passive intradialytic stretching exercises.
- Structured teaching program on active intradialytic stretching exercises can be provided to the patients undergoing hemodialysis.
- Encourage the patients to note the frequency of muscle cramps in a diary after performing the exercises.
- Intradialytic stretching exercises can be adapted as a procedure to the patients undergoing hemodialysis.
- Nurses can introduce the evidenced based practice of doing these stretching exercises during the hemodialysis session.

8. Limitation

- The study sample is limited to patients who are undergoing Hemodialysis.
- Study period is limited to six weeks only.
- Study setting is limited to dialysis center of tertiary care center

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