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A STUDY TO EVALUATE THE EFFECTIVENESS OF INTRADIALYTIC STRECTCHING EXERCISES ON REDUCTION OF MUSCLE CRAMP AMONG HEMODIALYSIS PATIENTS ADMITTED IN SELECTED HOSPITALS, BANGALORE, KARNATAKA.

Nursing

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ABSTRACT

Background And Purpose Of The Study: Chronic kidney diseases involve progressive, irreversible loss of kidney function. The two main causes of chronic kidney disease are diabetes mellitus and high blood pressure which are responsible for up to two-thirds of the cases. Important management strategies are dialysis, kidney transplantation, dietary modification which include a diet low in salt and potassium, medications like iron supplements, vitamins.

Objectives: 1)To assess and compare pre-test level of muscle cramp among haemodialysis patients between experimental group and control group. 2)To assess and compare post-test level of muscle cramp among haemodialysis patients between experimental group and control group 3)To determine the effectiveness of intradialytic stretching exercises on reduction of muscle cramps among haemodialysis patients in experimental group. 4)To associate the post-test level of muscle cramp among hemodialysis patients in experimental group and control group with their demographic variables.

Design : True experimental design was selected for this study. Subjects: The participants were 60haemodialysis patients in selected dialysis centre Bangalore. Sampling method: Asimple random technique was used to select the sample of the study. Data collection Tool: Modified muscle cramp tool was used to collect the data from the sample.

Data Analysis: The obtained data were analysed by descriptive and inferential statistics and interpret in the term of objective and hypothesis of the study. Result: In the pre-test mean score for experimental group 12.03 with SD 2.09 and for Control group 11.0 with SD 2.71 with the calculated independent t-test value was 1.65 and in post-test the score was reduce for experimental group. Further paired t-test value 3.932** shows significant at 5% level. A significant association found with age group, marital status, education, religion, income per month, nature of physical activity, duration of illness, associated disease, duration of treatment, frequency of dialysis, previous experience of muscle cramps, pattern of muscle cramps. demographic variables.

Conclusion : These findings indicate that the intradialytic exercises was effective on reduction of muscle cramp among haemodialysis patients.

KEYWORDS

Chronic Renal Failure, Haemodialysis, Intradialytic Stretching Exercises.

INTRODUCTION :

Chronic kidney disease (CKD) is an important non communicable disease epidemic that affects the world population including India. The prevalence of end stage renal disease (ESRD) is raising throughout the developed and developing countries mainly due to diabetes mellitus and hypertension.. Worldwide, 10% of the population is affected by Chronic kidney disease, and millions die each year. According the 2010 Global Burden of Disease study, Chronic kidney disease was ranked 27th in the list of causes of total number of deaths worldwide in 1990, but rise to 18th in 2010.[1]

At the end of 2016, around 3 million patients received dialysis. It is expected to reach around 3.7 million no of patients receiving dialysis by 2020. We want to continue to make a significant contribution to meeting this demand in the future.[22] In India according to survey conducted by National kidney foundation, found that the kidney diseases rank third amongst life- threatening diseases and estimates approximately 200,000 people in India go into terminal kidney failure annually and millions more suffer lesser forms of kidney disease and the projected number of deaths due to chronic disease was around 5.21 million in 2008 and is expected to rise to 7.63 million in 2020 (66.7% of all deaths).[2]

As per 2013 estimated report In India, 10 lakhs people suffer from kidney failure and more than four crores are at risk . It is estimated that there are about 55,000 patients on dialysis and the dialysis population is growing at the rate of 10-20% annually.[3]

STATEMENT OF THE PROBLEM :

A Study to evaluate the effectiveness of intradialytic stretching exercises on reduction of muscle cramps among haemodialysis patients in selected hospital , Bangalore.

OBJECTIVES OF THE STUDY:

1. To assess and compare pre-test level of muscle cramp among haemodialysis patients between experimental group and control group.
2. To assess and compare post-test level of muscle cramp among haemodialysis patients between experimental group and control group
3. To determine the effectiveness of intradialytic stretching exercises on reduction of muscle cramps among haemodialysis patients in experimental group.
4. To associate the post-test level of muscle cramp among hemodialysis patients in experimental group and control group with their demographic variables.

OPERATIONAL DEFINITIONS:

1. Evaluate: In this study, it refers to judge or determine the effectiveness of intradialytic stretching exercise on reduction of muscle cramp amonghaemodialysis patients.
2. Effectiveness: In this study, it refers to result of intradialytic stretching exercises on reduction of muscle cramps as determine by statistical difference between pre-test and post-test level of muscle cramps on haemodialysis patients.
3. Muscle cramp: In this study, it refers to level of Painful involuntary spasms of the calf muscles of patients during haemodialysis which will be measured by modified muscle cramps tools.
4. Intradialytic stretching exercise: In this study it refers to the exercises like calf stretching (flexion and extension of knee), leg exercises (flexion, extension, internal and external rotation and ankle movement), arm exercises(flexion extension of elbow, wrist circle, ball fisting in arm)Pertaining during haemodialysis sessions for 20 minutes.
5. Haemodialysis:A medical procedure to remove fluid and waste product from the blood and to correct electrolyte imbalance. This is accomplished using a machine and a dialyzer, also referred to as an artificial kidney.

HYPOTHESES:

Rh1: There will be a significance difference in the pre-test level of muscle cramp among haemodialysis patients between experimental and control group.

Rh2: There will be a significance difference in the post-test level of muscle cramp among haemodialysis patients between experimental and control group.

Rh3: There will be a significance difference in the pre-test and post-test level of muscle cramps among haemodialysis patients in experimental group.

Rh4: There will be a significance association with the post-test level of muscle cramps among haemodialysis patients with their socio-demographic variables.

ASSUMPTION:
The study assumes that
1. Intradialytic stretching Exercise improves stimulation of muscles, bones and nerves.
2. Patients with haemodialysis may have lower level of muscle cramp.
3. Intra dialytic stretching exercise may reduce the level of muscle cramp among Chronic kidney disease haemodialysis patients

DELIMITATION:
Delimitations of the study are
1.The period of study will be limited to 6 weeks.
2.The sample size is limited to 60.
3.The study is limited to patients undergoing haemodialysis.
4.The stretching exercises were limited to calf muscle only.

CONCEPTUAL FRAMEWORK
The investigator has modified the Ernestine Widenbach conceptual model which found suitable to evaluating the effectiveness of intradialytic stretching exercises on reduction of muscle cramps among patients who are undergoing haemodialysis.

Research Approach: An evaluative approach was used.

Research design. True experimental design was used.Its include randomization, control and manipulation.

The Schematic Presentation Of Research Design

Group	Pre test	Intervention	Post test
Experimental group	Q1	x	Q2
Control group	Q1	-	Q2

KEY WORDS:
E: Experimental group.
C: Control group.

O_1: Pre-test to assess the level of muscle cramps among patients undergoing haemodialysis in control and experimental both the groups

X: Administration of intradialytic stretching exercises in experimental group among hemodialytic patients

O_2: Post-test to assess the level of reduction of muscle cramps among hemodialytic patients at the end 2nd hour of haemodialysis.

Variables :
Dependent variables : In this study, it refers to intradialytic stretching exercises

Independent Variables: In this study, it refers to level of muscle cramp among hemodialysis patients.

Socio Demographic Variables: In this study demographic variables are age group, gender, marital status, education, religion, income per month, nature of physical activity, duration of illness, associated disease, duration of treatment, frequency of dialysis, previous experience of muscle cramps, pattern of muscle cramps and duration of each dialysis.

Settings of the study:
The study was conducted in Columbia Asia Hospital, Hebbal. It is 105 bedded hospital with the bed occupancy 67%-70% every day. There is 6 dialyzer and an average of 20 patients are undergoing haemodialysis everyday.

Population: The study population consist of :

Target population: In this study target population consist of all patients undergoing haemodialysis.

Accessible population: In this study, accessible population consist of patients undergoing haemodialysis on selected Hospital , Bangalore who meet inclusive criteria.

Sample: In the present study , samples are the haemodialysis patients in Columbia Asia Hospital, Hebbal who fulfil the inclusion criteria.

Sampling technique: In this study, simple random technique was used.

Sample size: Sample size consist of 60 patients 30 sample are in experimental group and 30 samples are in control group undergoing haemodialysis in Columbia Asia Hospital, Hebbal, Bangalore.

Sampling criteria:
Inclusion criteria:
Patients With Chronic kidney disease who are :
1.Undergoing haemodialysis
2.Able to follow instructions in English, Kannada.
3.Willing to participate in the study.
4.Present during the period of data collection.
5.Admitted in the selected Hospital at Bangalore.

Exclusion Criteria:
Patients with Chronic kidney disease who are:
1. Undergoing Emergency haemodialysis.
2.Have femoral catheters.
3.With any lower limb pathology.

Instrument Of Data Collection: The tool consists of two section.

Section A: It consist of demographic profile like age group, gender, marital status, education, religion, income per month, nature of physical activity, duration of illness, associated disease, duration of treatment, frequency of dialysis, previous experience of muscle cramps, pattern of muscle cramps and duration of each dialysis.

Section B: it consist of modified muscle cramps tools. This part is consist of modified muscle cramp assessment tool with 5 category such as frequency of muscle cramp, duration of muscle cramp, quality of muscle cramp, perception of pain intensity, muscle tone assessment.

Scoring Technique:
The different level of muscle cramp are categorized as follows

Score (%)	Knowledge
<33	Mild
34 – 67	Moderate
68 – 100	severe

Content validity: There was 100 % agreement on most of the items.

Reliability of the tool: Test re-test method was used. The reliability quotient obtained for the tool was 0.9813.

Pilot study: The investigator selected 6 samples by simple random technique and divided them in two group experimental and control group. The researcher has not found any difficulties during the time of study.

Data Collection Procedure:
The researcher obtained permission from the hospital authorities for conducting the study. The data collection period was 30 days as the convenience of the respondents. Hemodialysis patients with muscle Cramps between the age of 30-60 years were properly informed about the purpose of the study and regarding Intradialytic stretching exercises. Consent was taken from all the patients.

The data was collected in the following phases:

Phase 1 : In this phase, pre-test was conducted every day, per day from 6 patients and divided them 3 in experimental group and 3 in control group by using amodified muscle cramps assessment tool

Phase 2: In this phase, For experimental group, intradialytic stretching exercises was used and in control group, there is no manipulation samples was in daily routine.

Phase 3: In this phase, the post test was conducted for both control and experimental group, after administration of intradialytic stretching exercises at the end of haemodialysis to experimental group.

Plan For Data Analysis:
The data was analysed by using both descriptive and inferential statistics based on the on the objectives and hypothesis of the study.

Ethical Consideration:
Written permission from the authorities of the hospital and informed consent from the subjects were obtained before conducting the study. No ethical issues confronted while conducting the study.

RESULT

Table – I Frequency And Percentage Distribution Of Socio Demographic Variables Among Hemodialysis Patients In Experimental And Control Group By Personal Characteristics.

SociodemoGraphic Variables		Experimental Group n=30		Control Group n=30		Total n=60	
		f	%	f	%	f	%
Age	30-40 years	3	10	4	13.3	7	11.6
	41-50 years	9	30	13	43.3	22	36.6
	51--60 years	11	36.6	13	43.3	24	40
	>60 years	7	23.3	0	0	7	11.6
Gender	Male	18	60	17	56.6	35	58.3
	Female	12	40	13	43.3	25	41.6
Marital Status	Married	24	80	25	83.3	49	81.6
	Single	6	20	5	16.6	11	18.3
Education	Illiterate	0	0	0	0	0	0
	Primary	4	13.3	4	13.3	8	13
	Secondary	10	33.3	12	40	22	36.6
	Higher secondary	12	40	10	33.3	22	36.6
	Undergraduate	3	10	4	13.3	7	11.6
	Post graduate	1	3.3	0	0	1	1.6
Religion	Hindu	15	50	10	33.3	25	41.6
	Muslim	8	26.6	11	36.6	19	31.7
	Christian	7	23.3	9	30	16	26.6
	Others	0	0	0	0	0	0

Table-2 Frequency And Percentage Distribution Of Socio Demographic Variables Among Hemodialysis Patients In Experimental And Control Group By Related Characteristics.

Sociodemo Graphic Variables		Experimental Group n=30		Control Group n=30		Total n=60	
		f	%	f	%	f	%
Income per month	<20,000	9	30	7	23.3	16	26.6
	21,000-30,000	17	56.6	19	63.3	36	60
	>31,000	4	13.3	4	13.3	8	13.3
Nature of Physical Activity	Sedentary	12	40	17	56.6	29	48.3
	Moderate worker	16	53.3	9	30	25	41.6
	Hard physical worker	2	6.6	4	13.3	6	10
History of patients with CKD	Absent	8	26.6	9	30	17	28.33
	Present	22	73.3	21	70	43	71.6

Table-3 Frequency And Percentage Distribution Of Socio Demographic Variables Among Hemodialysis Patients In Experimental And Control Group Patients By Related Characteristics.

Sociodemo Graphic Variables		Experimental Group n=30		Control Group n=30		Total n=60	
		f	%	f	%	f	%
Duration of illness	Less than 2 years	10	33.3	6	20	16	26.6
	3-4 years	16	53.3	22	73.3	38	63.3
	More than 4 years	4	13.3	2	6.6	8	13.3
Associated disease	Diabetes ellitus	13	43.3	17	56.6	30	50
	Hypertension	15	50	11	36.6	26	43.3
	Cancer	2	6.6	2	6.6	4	6.6
Duration of treatment	Less than 2 year	15	50	21	70	36	60
	3 – 4 Years	12	40	9	30	21	35
	More than 4 Years	3	10	0	0	3	5
Frequency of dialysis per week	Once	5	16.6	7	23.3	12	20
	Twice	19	63.3	19	63.3	25	41.6
	Thrice	6	20	4	13.3	23	38.3
Previous experience of muscle cramps	Yes	21	70	22	73.3	43	71.6
	No	9	30	8	26.6	17	28.3
patterns of muscle cramps	Constant	9	30	3	10	12	20
	Intermittent	21	70	27	90	48	80
Duration of each dialysis per day	2 hours	12	40	11	36.6	23	38.3
	2 – 3 hours	17	56.6	17	56.6	34	56.6
	More than 3 hours	1	3.3	2	6.6	4	6.6

Table 4 - Comparison Of Post-test Level Of Muscle Cramp In Experimental And Control Group.

n=60

Variables	Groups				Student independent t-test
	Experimental group		Control group		
Muscle cramps	Mean	SD	Mean	SD	9.75**
	5.63	0.88	10.90	2.82	

*Significant at 5% level

Table -4 Depicts the comparison of post-test level of muscle cramp in experimental and control group. In respect to experimental group the mean is 5.63with the SD 0.88and in control group the mean is 10.90 with SD 2.82. The student independent t-test value is 9.75. Hence it can inferred that the mean and SD value in experimental group is lesser than the mean and SD value in control group with the significant unpaired t-test value 9.75 at 5% level which indicate that the intradialytic stretching exercises was effective in experimental group on reduction of muscle cramps. Hence research hypothesis RH2 has proved and accepted.

Table-5 Paired T-test Value In Experimental Group And Control Group During Pre-test And Post-test

n=60

Groups	Pre- test		Post-test		Paired t-test
	Mean	SD	Mean	SD	
Experimental group	12.03	2.89	5.63	0.88	3.932** df=29
Control group	11.0	2.71	10.90	2.82	

Table-5 Depicts the paired t-test value for experimental group and control group in pre-test and post-test. In experimental group during pre-test mean is 12.0333 with SD 2.890 and in post –test mean is 5.633 with SD 0.889 while in control group pre-test mean is 10.998 with SD 2.7116 and for post-test mean is 10.903 with SD 2.82. And the paired t-test value is 3.932,df is 58 which is significant at 5% level. This result shows that intradialytic stretching exercises was effective on reduction of muscle cramp. Hence research hypothesis RH_3 has successfully proved and accepted.

Table-6 Association Between The Post-test Level Of Muscle Cramps Among Patients Undergoing Haemodialysis With Their Socio-demographic Variables.

Variables	Category	Mild		Moderate		Severe		Chi-squareValue, df, P value
		f	(%)	f	(%)	f	(%)	
Age	30-40 years	6	10	0	0	0	0	χ^2=10.26** df =3 p-value= 0.01
	41-50 years	10	16.6	13	21.6	0	0	
	51--60 years	25	41.6	2	3.3	0	0	
	>60 years	2	3.3	2	3.3	0	0	
Gender	Male	21	35	10	16.6	0	0	χ^2=1.20[b] df=1 p-value=0. 27 NS
	Female	9	15	19	31.6	0	0	
Marital status	Married	35	58.3	2	3.3	0	0	χ^2=10.80** df=1 p-value=0.001
	Single	12	20	10	16.6	1	1.6	
Education	Illiterate	0	0	0	0	0	0	χ^2=15.00** df=4 p-value=0.005
	Primary	0	0	4	6.6	4	6.6	
	Secondary	20	33.3	1	1.6	2	3.3	
	Higher secondary	16	26.6	4	6.6	1	1.6	
	Undergraduate	4	6.6	3	5	0	0	
	Post graduate	0	0	0	0	1	1.6	
Religion	Hindu	14	23.3	9	15	1	1.6	χ^2=3.80** df=2 pvalue=0.15
	Muslim	16	26.6	2	3.3	1	1.6	
	Christian	15	25	1	1.6	1	1.6	
	Others	0		0	0	0	0	
Income	<20,000	14	23.3	0	0	1	1.6	χ^2=8.60** df=2 p-value=0.01
	21,000-30,000	27	45	6	10	3	5	
	>31,000	5	8.3	4	6.6	0	0	
Nature of physical activity	Sedentary	20	33.3	3	5	6	10	χ^2=10.40** df=2 p-value =0.006
	Moderate worker	23	38.3	6	10	0	0	
	Hard physical worker	2	3.3	0	0	0	0	
History of CKD	Absent	10	16.6	3	3.3	4	6.6	χ^2=6.53** df=1 p-value=0.011
	Present	35	58.3	8	13.3	0	0	
Duration of illness	Less than 2 years	14	23.3	1	1.6	1	1.6	χ^2=7.20** df=2 p-value=0.027
	3-4 years	29	48.3	7	11.6	2	3.3	
	More than 4 years	4	6.6	2	1.6	0	0	
Associated disease	Diabetes mellitus	21	35	7	11.6	2	3.3	χ^2=9.80** df=2 p-value=0.007
	Hypertension	20	33.3	5	8.3	1	1.6	
	Cancer	4	6.6	0	0	0	0	
Duration of treatment	Less than 2 year	13	21.6	17	28.3	6	10	χ^2=7.80** df=2 p-value=0.20
	3 – 4 Years	9	15	6	10	6	10	
	More than 4 Years	3	5	0	0	0	0	
Frequency of dialysis	Once	9	15	2	3.3	1	1.6	χ 2=12.20** df=2 p-value=0.002
	Twice	28	46.6	8	13.3	1	1.6	
	Thrice	8	13.3	0	0	3	5	
Previous experience of muscle cramp	Yes	32	53.3	2	3.3	2	3.3	χ 2=4.80** df=1 p-value=0.028
	No	13	21.6	10	16.6	1	1.6	
Pattern of muscle cramp	Constant	9	15	3	5	0	0	χ 2=4.80** df=1 p-value=0.028
	Intermittent	36	60	9	15	3	5	
Duration of each dialysis	2 hours	16	26.6	3	5	5	8.3	χ 2=0.53 df=1 p-value=0. 465 NS
	2 – 3 hours	28	46.6	6	10	0	0	
	More than 3 hours	1	1.6	0	0	1	1.6	

Major findings of the study:

The findings of the study were discussed according to the objectives and hypothesis.

1.To assess and compare pre-test level of muscle cramp among haemodialysis patients between experimental group and control group.

The study findings indicate that in pre-test 80% of patients had moderate muscle cramp, 20% of them had severe muscle cramp in experimental group and in control group 10% of them had mild muscle cramp, 76.6% were had moderate muscle cramp and 13.3% of them had severe muscle cramp among haemodialysis patients. In the present study it was found that the mean 12.03 with SD 2.09 in experimental group and in control group mean is 11.0 with SD 2.71 with non significant student independent t-test value 1.65 at 5% level. Findings shows that their is no significant difference in the level of muscle cramps in experimental and control group.

Hence research hypothesis RH_1 has rejected.

2.To assess and compare post-test level of muscle cramp among haemodialysis patients between experimental group and control group.

In post-test, 100% patients had mild muscle cramp in experimental group and in control group 13.3% of them had mild muscle cramp, 73.3% were have moderate muscle cramp and 13.3% of them had severe muscle cramp among haemodialysis patients. The mean value 5.63 with SD 0.88 in experimental group and the mean value 10.90 with SD 2.82 in control group with student independent t-test value 9.75*.Findings shows that the mean and SD value in experimental group is lesser than the mean and SD value in control group with the significant unpaired t-test value 9.75* at 5% level which indicate

significant difference between experimental and control group .

Hence research hypothesis RH_2 has proved and accepted.

3.To determine the effectiveness of intradialytic stretching exercises on reduction of muscle cramps among haemodialysis patients in experimental group.

In the present study, it is observed that mean post-test level of muscle cramp for experimental group was 5.63 which was lower than the pre-test level of muscle cramp 12.03 with significant paired t-test value 3.93* at 5% level.This result shows that intradialytic stretching exercises was effective on reduction of muscle cramp.Hence research hypothesis RH_3 has proved and accepted.

4.To find the association between the post-test level of muscle cramp in experimental and control group with their selected demographic variables.

In the present study the association was sought between post-test muscle cramp level of significant patients undergoing haemodialysis and socio-demographic variables where a significant association was found like age ($\chi 2$=10.26), marital status(χ 2= 10.80), education(χ 2= 15.00), religion ($\chi 2$=3.80), income ($\chi 2$=8.60), nature of physical activity ($\chi 2$=10.40), history of CKD ($\chi 2$=6.53),duration of illness ($\chi 2$=7.20), duration of treatment ($\chi 2$=7.80),frequency of dialysis ($\chi 2$=12.20), previous experience of muscle cramp ($\chi 2$=4.80) pattern of cramp ($\chi 2$=4.80) with post-test level of muscle cramp at 5% and 1% level.

Hence research hypothesis RH_4 has proved and accepted.

There is no significant association was found between the variables like gender and duration of dialysis each day .

NURSING IMPLICATION:

Nursing education

- This study can motivate student nurses to explore new strategies for effective reduction of Muscle Cramps.
- Intradialytic stretching exercise intervention can be integrated with nursingCurriculum.
- The nurse educators encourage to conduct in service education program onIntradialytic stretching exercise to their staff working in the dialysis unit.

Nursing Practice:

- Develop skill in providing efficient nursing care to reduce the occurrence of muscle cramps.
- Intradialytic exercises can be incorporated as a routine care during the haemodialysis cycle.
- Teach the patients during haemodialysis period about the effectiveness of various non pharmacological measures for reduction of muscle cramps.

Nursing Administration :

- Nurse administrator can prepare the protocol regarding Intradialytic stretching exercise.
- The nurse administrator should encourage the student and staff members to actively participate in seminars, workshop and conferences regarding intradialytic stretching exercise in reducing Muscle Cramps.
- Nurse administrator can recognize intradialytic stretching exercise as a cheap, cost effective method in the management of Muscle Cramps.
- Nursing administrator can instruct and encourage their subordinates to utilizev t his as a in tervention in their clinical setting.

Nursing Research :

- Nurse researcher can do studies related to o the r beneficial effects of Intradialytic stretching exercise.
- A comparative study can be done to determine the effectiveness of intradialytic stretching exercise with other alternative therapies.
- Similar study can be done for the large population.

Limitations of the study:

- The investigator could get more of abroad reviews than Indian reviews to support the present study.
- Generalization will be better if large sample included.
- The investigator found difficulty to stick over the time schedule due to doctor rounds.

RECOMMENDATIONS

The study recommend s the following for further research,

- The study can be replicated with larger samples for better Generalization
- The study can be done for peritoneal dial ysis patients
- The study can be done conducted in different settings with similar Facilities
- A comparative study can be conducted between pharmacological and non- pharmacological intervention.

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