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ORIGINAL RESEARCH

Effectiveness of leg exercises on muscle cramps among patients on haemodialysis in selected Government Hospitals, Dehradun, Uttrakhand

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Abstract

Introduction: Muscle cramps are a common and significant complication during haemodialysis, with a prevalence ranging from 35% to 86% among patients. These cramps can greatly impact the quality of life and overall well-being of those undergoing dialysis. Understanding the causes and exploring various treatment and prevention strategies is crucial for managing this condition effectively. Muscle cramps among haemodialysis patients, especially the elderly, can be effectively managed through various interventions. Intradialytic stretching exercises have shown significant promise in reducing cramp severity. Additional therapies like SCDs and acupressure further offer complementary benefits. By implementing these strategies, healthcare providers can enhance the quality of life for hemodialysis patients, ensuring better management of this common and troubling complication.

Methodology: The study utilized a Quasi-Experimental Research Design, specifically a one-group pretest and posttest design. This design allows the researchers to measure changes in muscle cramp severity before and after the intervention (leg exercises) within the same group of participants. A Non-Probability Purposive Sampling Technique was employed. This method involves selecting subjects based on specific characteristics and relevance to the study, rather than random sampling. Patients undergoing haemodialysis from Selected government hospitals in Dehradun, Uttrakhand were included in the study Patients who were experiencing frequent muscle cramps during dialysis sessions In-Total 50 patients undergoing haemodialysis in the selected hospitals were included in the study. To assess the effectiveness of leg exercises on muscle cramps among haemodialysis patients, the following tools were used: Structured Questionnaire- Designed to gather demographic information and baseline data on the frequency and severity of muscle cramps. Cramp Severity Scale: A validated scale to quantify the severity of muscle cramps before and after the intervention. Data Collection Process Pre-Intervention Assessment: Demographic Data: Collected using the structured questionnaire. Baseline Cramp Severity; Measured using the cramp severity scale before the implementation of leg exercises .Intervention:-Leg Exercises: Patients performed specific leg exercises during their dialysis sessions over a period of one month. Exercises included ankle pumps, leg raises, quadriceps stretches, and hamstring stretches. Post-Intervention

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Assessment: Cramp Severity: Re-assessed using the same severity scale to measure the effectiveness of the intervention.
Objective: To assess the effectiveness of leg exercises on muscle cramps among patients on haemodialysis in selected Government Hospitals.
Conclusion: The study concluded that leg exercises are highly effective in reducing the frequency and severity of muscle cramps among haemodialysis patients. Implementing these exercises as part of the standard care protocol in dialysis units can greatly enhance patient comfort and overall well-being.
Key words: Effectiveness, leg exercises, muscle cramps, patients, haemodialysis.

Introduction and Background
Muscle cramps are a common and significant complication during hemodialysis, with a prevalence ranging from 35% to 86% among patients. These cramps can greatly impact the quality of life and overall well-being of those undergoing dialysis. Understanding the causes and exploring various treatment and prevention strategies is crucial for managing this condition effectively.
Muscle cramps among hemodialysis patients, especially the elderly, can be effectively managed through various interventions. Intradialytic stretching exercises have shown significant promise in reducing cramp severity. Additional therapies like SCDs and acupressure further offer complementary benefits. By implementing these strategies, healthcare providers can enhance the quality of life for hemodialysis patients, ensuring better management of this common and troubling complication.
Causes of Muscle Cramps during Hemodialysis 1 Excessive Ultrafiltration: Rapid removal of large volumes of fluid can lead to hypovolemia and decreased perfusion to muscles, causing cramps. 2. Intradialytic Hypotension: Sudden drops in blood pressure during dialysis can reduce blood flow to muscles, resulting in cramping. 3. Electrolyte-Mineral Disturbances: Imbalances in electrolytes such as sodium, potassium, and calcium during dialysis can trigger muscle cramps. 4. Hypoosmolality: Lower plasma osmolality during dialysis, often due to fluid shifts, can lead to muscle cramping**.**
The etiology of cramping in dialysis patients is not fully understood, but several common triggers have been identified. These include: Electrolyte Abnormalities: Imbalances in sodium, potassium, calcium, and magnesium levels can contribute to muscle cramps. Hypovolemia: Reduced blood volume due to excessive fluid removal can lead to decreased perfusion to muscles. Hypotension: Drops in blood pressure during dialysis can reduce blood flow to muscles, causing cramps. Dialysis Prescription Factors: Variables such as blood flow rate and the rate of ultra filtration (fluid removal) can influence cramp occurrence. Dialysate Composition: The composition of the dialysis solution, including its electrolyte concentration, can impact cramp frequency. Therapeutic Maneuvers to Manage Muscle Cramps Intravenous Fluids: Administering fluids intravenously can help restore blood volume and electrolyte balance. Oral Medications: Medications such as quinine sulfate, vitamin E, or gabapentin may be used to alleviate cramps. Adjustments in Dialysis Settings: Modifying dialysis parameters like ultrafiltration rate and blood flow rate can reduce the likelihood of cramping. Warm Moisture Compresses: Applying warm, moist compresses to the affected area can provide relief. Stretching Exercises: Regular stretching can help prevent and relieve muscle cramps.

Recent Studies and Innovations Intradialytic Sequential Compression Devices (SCD)
A pilot study by Ahsan et al. evaluated the use of intradialytic sequential compression devices (SCD) for preventing lower extremity cramping in dialysis patients. The study found

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that applying SCD to the lower extremities prevented the occurrence of hemodialysis-related cramps in four cases, and no adverse side effects were reported.

Intradialytic Stretching Exercises

Practicing intradialytic stretching exercises has been shown to significantly reduce muscle cramps in elderly haemodialysis patients. A comparison of pre-intervention and post-intervention data (one month) illustrates the effectiveness of these exercises.

Acupressure with Massage

Another study investigated the effects of acupressure with massage on patients with end-stage renal disease (ESRD) undergoing dialysis. Over a 12-week period, patients experienced improvements in symptoms of fatigue and depression, with no reported adverse side effects.

In conclusion, muscle cramps during haemodialysis are a multifactorial issue that requires a comprehensive approach to manage effectively. By understanding the underlying causes and implementing both established and new strategies for treatment and prevention, healthcare providers can significantly improve the comfort and outcomes for patients undergoing dialysis.

Objective

1. To assess the effectiveness of leg exercises on muscle cramps among patients on haemodialysis in selected Government Hospitals.

Methodology:

Research Design: The researchers have used A Quasi Experimental Research Design (One group pre-test and post-test)

Sampling techniques: Non Probability Purposive sampling technique was used and students from various institutes of Dehradun City were selected

Subject Size: 50 patients who were undergoing haemodialysis among selected Government Hospitals, Dehradun.

Tools of data collection: In the present study the below scales were used to collect the data.

Structured Questionnaire to assess the **Effectiveness of leg exercises on muscle cramps among**

Patients on haemodialysis in selected Government Hospitals

Section I: Consisted of items related to demographic variables of the subjects of the study.

Section II: Consisted of questions regarding **Effectiveness of leg exercises on muscle cramps among**

Patients on haemodialysis in selected Government Hospitals

Validity and Reliability of tools: Tools were validated by the experts and the reliability was done by Cronbach's Alpha coefficient test. Cronbach's alphas were r= 0.86, & 0.9 for **Effectiveness of leg exercises on muscle cramps among patients on haemodialysis in selected Government Hospitals**

Findings

The analysis and interpretation of the data collected to assess **Effectiveness of leg exercises on muscle cramps amongpatients on haemodialysis in selected Government Hospitals** was done keeping the objectives of the study in consideration.

1. To assess the effectiveness of leg exercises on muscle cramps among patients on haemodialysis in selected Government Hospitals.

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Section – I

Table 1: Description of Distribution of Demographic Variables.

S.N	Demographic Variables	No.	%
A	Gender		
1	Male	20	40
2	Female	30	60
B	Marital status		
1	Single	2	4
2	Married	39	78
3	Divorced	1	2
4	Widow	8	16
C	Education		
1	Illiterate	13	26
2	Primary school education	7	14
3	Secondary school education	20	40
4	Higher secondary school education	10	20
D	Working condition		
1	Working employed	5	10
2	Notemployed	45	90
E	Residence		
1	Rural area	20	40
2	Urban area	30	60

Here is a summary of the demographic variables for the group of elderly hemodialysis patients, represented in both numbers and percentages:In Gender-The majority of the patients are female (60%),In Marital Status:Most of the patients are married (78%) The Education status of the paitents suggests The largest group of patients has secondary school education (40%), followed by those who are illiterate (26%).In Working Condition- A significant majority of the patients are not employed (90%) .More patients reside in urban areas (60%) compared to rural areas (40%).

Table 2: Description of Demographic Variables related to medical condition

Medical data	No.	%
Any Disease Condition		
No	5	10
Yes	45	90
Hypertension	30	60
Diabetes Mellitus	11	22
Cardiovascular diseases	2	4
Polycystic kidney	3	6
Other diseases	4	8
Time period of Hemodylysis		
<1 year	2	4
1-2 years	14	28
>2- 4 years	14	28
> 4 years	20	40
Session of Hemodylysis /week		
Two	4	8
Three	46	92

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Duration of session (hours)		
3 hours	6	12
4 hours	44	88

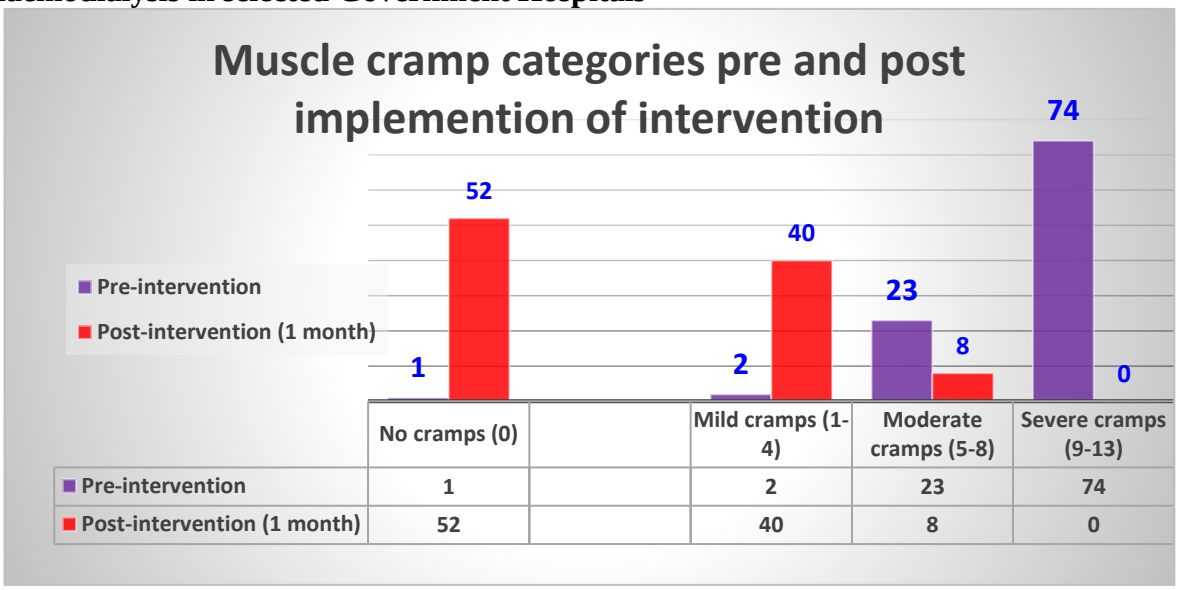
Here is a summary of the medical data for the group of elderly hemodialysis patients, represented in both numbers and percentages. A significant majority of the patients (90%) have some disease condition.Hypertension is the most common condition (60%), followed by diabetes mellitus (22%). 40% of the patients have been undergoing hemodialysis for more than 4 years.Most patients (92%) undergo hemodialysis three times per week.The majority of the patients (88%) have dialysis sessions lasting 4 hours.

Table 3: Describes the effectives of leg exercises in pre and post intervention among patients on haemodialysis

	Pre-intervention		Post-intervention (1 month)		
Scoring System	**No.**	**%**	**No.**	**%**	**P.value**
No cramps (0)	0	0	26	52	P < 0.001**
Mild cramps (1-4)	0	0	20	40	
Moderate cramps (5-8)	12	24	4	8	
Severe cramps (9-13)	38	76	0	0	
Total score (Mean ± SD.)	8.30 ± 2.68		2.99 ± 3.30		

The intervention significantly reduced the frequency and severity of muscle cramps in elderly hemodialysis patients. Prior to the intervention, the majority of patients experienced severe cramps, while none reported no cramps or mild cramps. One month post-intervention, there was a marked improvement, with 52% of patients reporting no cramps and 40% reporting only mild cramps. The mean total score for cramps also showed a significant decrease from 8.30 to 2.99 (P < 0.001), indicating the intervention's effectiveness.

FIG 1: Describes the Effectiveness of leg exercises on muscle cramps among patients on haemodialysis in selected Government Hospitals



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Analysis of Muscle Cramp Categories Pre and Post Intervention

The bar graph illustrates the distribution of muscle cramp categories among elderly hemodialysis patients before and after the implementation of an intervention over one month.

Statistical Significance

The P value is less than 0.001 ($P < 0.001$**), indicating that the reduction in muscle cramps following the intervention is statistically significant.

The intervention was highly effective in reducing the frequency and severity of muscle cramps among elderly hemodialysis patients. Prior to the intervention, a majority of the patients experienced severe cramps, while after one month of intervention, more than half of the patients reported no cramps at all, and none reported severe cramps. This demonstrates a substantial improvement in the patients' condition.

Discussion

As people age, the prevalence of ESRD rises[1] One of the most popular therapies for patients with end-stage renal disease (ESRD) is hemodialysis Muscle cramps are one of the most common side effects seen by dialysis patients, often resulting in the HD session ending early[2]
Applying workouts can help prevent this. Thus, the purpose of this study was to ascertain how older hemodialysis patients' muscle spasms were affected by intradialytic stretching activities[3]

The results of this investigation showed that most of the examined Patients experienced high blood pressure. This result was consistent with report that the most prevalent illness among the participants under study was hypertension.

Statistical Analysis

The significant P-value ($P < 0.001$**) indicates that the reduction in muscle cramps is statistically significant.

Conclusion

The study demonstrates that leg exercises are highly effective in reducing the frequency and severity of muscle cramps among hemodialysis patients. Implementing these exercises as part of the standard care protocol in dialysis units can enhance patient comfort and overall well-being. These findings advocate for the adoption of simple, non-invasive interventions such as leg exercises to manage muscle cramps in hemodialysis patients effectively.

Muscle cramps are a prevalent and distressing complication for patients undergoing hemodialysis. Research suggests that regular leg exercises can be an effective intervention to reduce the frequency and severity of these cramps. This study focuses on evaluating the effectiveness of leg exercises on muscle cramps among patients in selected government hospitals in Dehradun, Uttrakhand State.

Recommendations

1. Routine Implementation: Encourage the incorporation of leg exercises into the routine care of hemodialysis patients.
2. Patient Education: Educate patients about the benefits and techniques of leg exercises.
3. Further Research: Conduct larger studies to confirm these findings and explore additional exercises or interventions.
4. Healthcare Training: Train healthcare providers in guiding and supervising these exercises during dialysis sessions.

By adopting these recommendations, government hospitals in Dehradun, Uttrakhand State, and elsewhere can significantly improve the quality of care for hemodialysis patients.

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Conflict of Interest: Nil

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