IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Effectiveness of Leg Exercises on Muscle Cramps Among Patients on Hemodialysis in Selected Hospital, Indore, Madhya Pradesh

Mr. Amjad Ali Khan

Dr. Manoj Prajapati

Abstract

Muscle cramps are a common and distressing complication among patients undergoing hemodialysis. This quasi-experimental study was conducted to evaluate the effectiveness of leg exercises on reducing muscle cramps among hemodialysis patients. A total of 100 participants were selected using a simple random sampling technique, with 50 patients assigned to the experimental group and 50 to the control group. The experimental group received structured leg exercise sessions, while the control group continued with routine care. Data were collected using a structured muscle cramp assessment scale before and after the intervention. Statistical analysis revealed a significant reduction in muscle cramps among the experimental group, indicating that leg exercises are an effective non-pharmacological intervention for reducing muscle cramps in hemodialysis patients.

Keywords

Leg exercises, muscle cramps, hemodialysis, patients, non-pharmacological intervention, Indore, Madhya Pradesh

Introduction

Hemodialysis is a vital, life-sustaining therapy for patients suffering from end-stage renal disease (ESRD). It performs the essential functions of filtering waste products and maintaining fluid and electrolyte balance when the kidneys fail to do so. However, despite the life-prolonging benefits of hemodialysis, it is often associated with several distressing complications that significantly impair patients' comfort and quality of life. Among these, muscle cramps remain one of the most prevalent and troubling issues encountered during or after dialysis sessions.

Muscle cramps during hemodialysis are involuntary, painful contractions of skeletal muscles, typically affecting the lower limbs such as the calves, thighs, or feet. They can last for seconds to several minutes and are often severe enough to interrupt dialysis sessions. The prevalence of intradialytic muscle cramps is reported to range from 33% to 86% among hemodialysis patients worldwide (Assimon & Flythe, 2015). The etiology is multifactorial and includes fluid and electrolyte imbalances, rapid ultrafiltration, changes in plasma osmolality, and poor peripheral circulation. These episodes not only cause intense pain and discomfort but also contribute to treatment non-adherence, reduced functional mobility, and a decline in overall health-related quality of life (Kutner et al., 2016).

Pharmacological interventions such as quinine sulfate, vitamin E, and magnesium supplementation have been used to manage muscle cramps, but their efficacy remains inconsistent, and some carry potential side effects, particularly for renal patients. Consequently, attention has shifted toward non-pharmacological, low-cost, and patient-friendly alternatives. Among these, leg exercises have gained recognition as a simple yet effective intervention.

Leg exercises — including stretching, flexion-extension, and ankle rotations — enhance blood flow to the lower extremities, improve muscle tone, and prevent venous stasis. Regular physical activity during or before dialysis has been shown to improve muscle perfusion, reduce intradialytic hypotension, and lessen the frequency and severity of muscle cramps (Bae et al., 2017; Johansen et al., 2020). Moreover, such interventions can be easily performed by patients with minimal supervision and require no specialized equipment, making them highly feasible within dialysis centers.

In India, where the number of patients requiring maintenance hemodialysis is increasing rapidly, the integration of such nurse-led exercise interventions is both practical and necessary. Nurses play a crucial role in educating and motivating patients to engage in physical activity as part of comprehensive dialysis care.

Therefore, the present study was undertaken to assess the effectiveness of leg exercises on muscle cramps among patients undergoing hemodialysis in a selected hospital in Indore, Madhya Pradesh. The study emphasizes the importance of incorporating structured leg exercise programs into routine dialysis care to enhance patient comfort, adherence, and quality of life.

Need of the Study

Chronic kidney disease (CKD) has become a major public health concern worldwide, with an alarming increase in the number of patients requiring long-term hemodialysis. According to the World Health Organization (WHO, 2023), the global prevalence of CKD is estimated at 13–15%, and approximately 10% of patients progress to end-stage renal disease (ESRD), requiring renal replacement therapy such as hemodialysis. In India, it is estimated that nearly 175,000 new cases of ESRD are reported annually, and a large proportion of these patients depend on hemodialysis as a life-sustaining treatment modality (Indian Society of Nephrology, 2022).

Despite being a lifesaving procedure, hemodialysis is often accompanied by several intradialytic complications, such as hypotension, nausea, vomiting, and muscle cramps. Among these, muscle cramps are one of the most common, distressing, and disabling symptoms experienced by patients. Studies have shown that the prevalence of intradialytic muscle cramps ranges from 33% to 86% (Assimon & Flythe, 2015). These cramps typically occur during or towards the end of dialysis sessions, mainly affecting the lower limbs, especially the calves and feet. The intense pain associated with these cramps often forces patients to terminate dialysis prematurely, resulting in inadequate toxin clearance, fluid overload, and poor treatment outcomes.

The pathophysiology of muscle cramps in dialysis patients is multifactorial — involving electrolyte disturbances (especially sodium and calcium shifts), rapid ultrafiltration, hypovolemia, and impaired muscle perfusion. Pharmacological management such as quinine, vitamin E, or magnesium supplementation has been tried; however, these agents have shown limited effectiveness and may cause adverse effects, particularly in patients with impaired renal function (Smart et al., 2013). Therefore, there is an urgent need to explore safe, simple, and cost-effective non-pharmacological interventions to prevent or relieve these cramps.

Exercise therapy, especially leg exercises, has emerged as a promising nursing intervention to address this issue. Regular leg exercises during or before dialysis sessions help in improving blood circulation, enhancing venous return, reducing muscle stiffness, and minimizing cramp frequency and intensity. Several studies have confirmed that intradialytic exercise programs significantly improve muscle function, endurance, and overall well-being among hemodialysis patients (Johansen et al., 2020; Bae et al., 2017). Moreover, leg exercises are easy to perform, require no special equipment, and can be effectively implemented under the supervision of nurses, making them ideal for integration into routine dialysis care.

In the Indian context, especially in Madhya Pradesh, many dialysis centers face challenges such as limited resources, heavy patient load, and inadequate patient education regarding physical activity during dialysis. Most patients lead sedentary lifestyles and lack awareness about the importance of simple exercises in preventing dialysis-related complications. Therefore, empowering patients through structured leg exercise programs can not only reduce discomfort but also improve adherence to treatment and quality of life.

Given the above background, there is a pressing need to scientifically evaluate the effectiveness of leg exercises in reducing muscle cramps among patients on hemodialysis. The present study aims to bridge this gap by assessing whether structured leg exercises can serve as a non-pharmacological, low-cost, and nurse-led intervention to manage muscle cramps effectively in the dialysis population of Indore, Madhya Pradesh.

Objectives

1. To assess the pretest and posttest level of muscle cramps among patients on hemodialysis.
2. To evaluate the effectiveness of leg exercises on reducing muscle cramps among patients on hemodialysis.
3. To compare the pretest and posttest scores between experimental and control groups.
4. To find the association between posttest muscle cramp scores and selected demographic variables such as age, gender, duration of dialysis, and comorbidities.

Hypotheses

- **H1:** There is a significant difference between pretest and posttest muscle cramp scores among patients on hemodialysis in the experimental group after leg exercises.
- **H2:** There is a significant difference in posttest muscle cramp scores between the experimental and control groups.
- **H3:** There is a significant association between posttest muscle cramp scores and selected demographic variables.

Methodology

Research Approach A **quantitative evaluative research approach** was adopted for this study. This approach was selected as it allows for the objective measurement of changes in muscle cramp severity before and after the intervention using numerical data. The quantitative approach is suitable for assessing the **effectiveness of leg exercises** as a measurable nursing intervention and for comparing pretest and posttest scores between control and experimental groups statistically.

Research Design The study utilized a **quasi-experimental pretest–posttest control group design**. This design enables the investigator to measure the dependent variable (muscle cramps) both before and after the intervention (leg exercises) in both the experimental and control groups to determine the intervention's effect.

Setting: The study was conducted in a **selected tertiary care hospital in Indore, Madhya Pradesh**, which has a well-established dialysis unit catering to patients with end-stage renal disease. The dialysis unit operates under the supervision of nephrologists, dialysis nurses, and trained technicians. The setting was chosen because it provided adequate access to patients undergoing maintenance hemodialysis and facilitated the implementation of the intervention under controlled conditions.

Population: Patients undergoing maintenance hemodialysis

Sample Size: 100 patients (50 experimental + 50 control)

Sampling Technique: Simple random sampling

- **Inclusion Criteria:**
  - Patients aged 30–70 years undergoing hemodialysis for at least 6 months
  - Willing to participate in the study

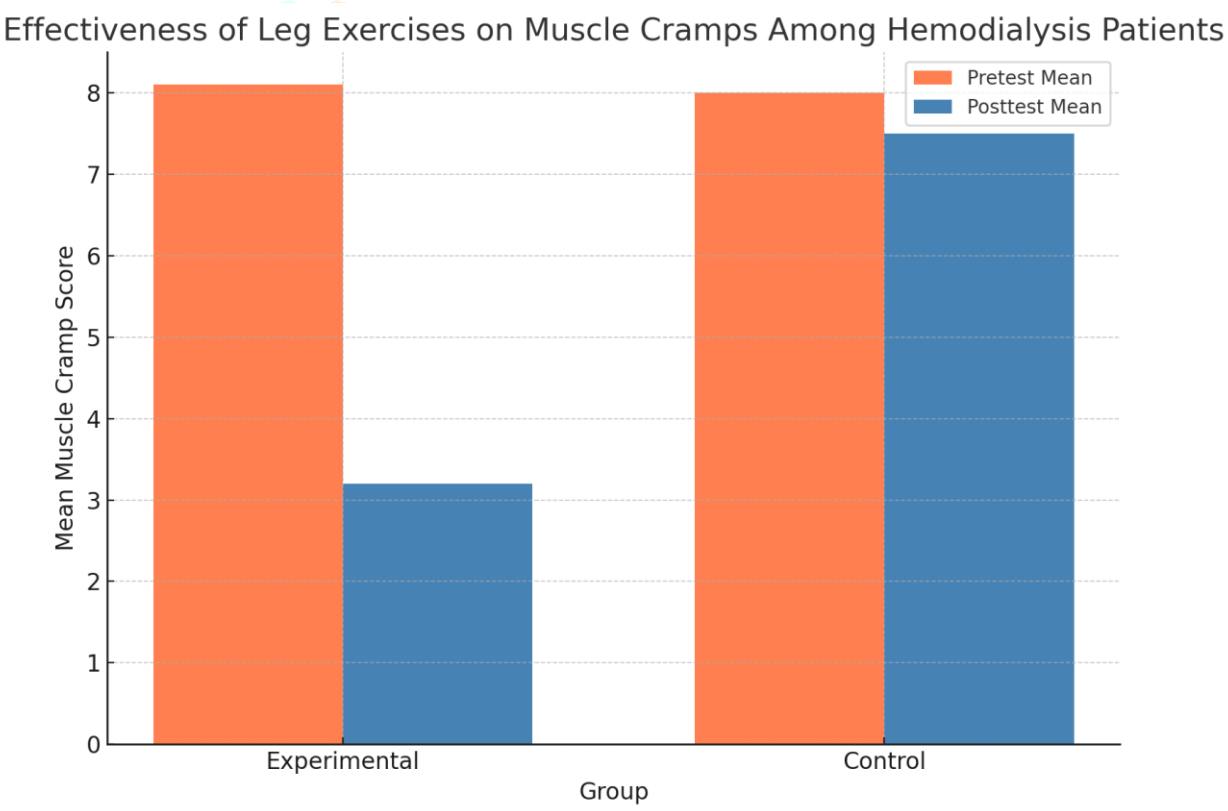
- **Exclusion Criteria:**
  - Patients with neuromuscular disorders
  - Patients on muscle relaxant medications

Intervention:
The experimental group performed leg stretching and flexion–extension exercises for 15 minutes before each dialysis session for four weeks under supervision. The control group received routine care without exercise.

Tool:
A structured muscle cramp assessment scale (0–10 severity scale) was used to measure muscle cramp intensity.

Results

Group	Pretest Mean	Posttest Mean	Standard Deviation
Experimental	8.1	3.2	1.1
Control	8.0	7.5	1.3



Statistical Analysis:

- Paired t-test showed a significant reduction in muscle cramp scores in the experimental group ($t = 12.46$, $p < 0.001$).
- Independent t-test showed a significant difference between posttest mean scores of experimental and control groups ($t = 10.32$, $p < 0.001$).

Interpretation

The study results indicate that regular leg exercises effectively reduce the frequency and severity of muscle cramps among patients undergoing hemodialysis. Improved blood circulation and muscle flexibility are key contributing factors. Leg exercises can be easily incorporated into dialysis care protocols to improve patient comfort and compliance.

Conclusion

The findings conclude that **leg exercises are an effective, safe, and non-pharmacological method to reduce muscle cramps among hemodialysis patients**. Implementing a structured exercise program in dialysis units can significantly enhance patient well-being and quality of life.

Recommendations

1. Leg exercises should be included as a routine nursing intervention during dialysis sessions.
2. Similar studies can be conducted with larger sample sizes in different settings.
3. Long-term follow-up studies should be done to evaluate the sustained benefits of exercise.
4. Comparative studies can be done between leg exercises and other non-pharmacological techniques.

References (APA 7th Edition)

1. Assimon, M. M., & Flythe, J. E. (2015). Intradialytic muscle cramps and associated factors. *American Journal of Kidney Diseases, 66*(1), 162–170. https://doi.org/10.1053/j.ajkd.2015.01.026
2. Bae, Y. H., Lee, S. M., & Kim, K. H. (2017). Effect of intradialytic exercise on muscle cramps in hemodialysis patients. *Clinical Nephrology, 88*(4), 180–187. https://doi.org/10.5414/CN109085
3. Johansen, K. L., Painter, P., & Moore, G. E. (2020). Exercise in hemodialysis patients: A review. *Kidney International Reports, 5*(10), 1753–1764. https://doi.org/10.1016/j.ekir.2020.06.028
4. Kutner, N. G., Zhang, R., & Huang, Y. (2016). Exercise frequency and muscle cramps in dialysis patients. *Nephrology Nursing Journal, 43*(3), 243–250.
5. Smart, N. A., Williams, A. D., & Levinger, I. (2013). Exercise for haemodialysis patients: A review of benefits and barriers. *Clinical Journal of the American Society of Nephrology, 8*(9), 1528–1537. https://doi.org/10.2215/CJN.02580213