



EFFECTIVENESS OF INTRADIALYTIC LEG EXERCISES ON FATIGUE AND MUSCLE CRAMPS AMONG PATIENTS UNDERGOING HEMODIALYSIS

Mrs. Priyanka Gupta

Lecturer, Vydehi institute of Nursing Sciences and Research Centre, Whitefield
Bengaluru- 560066

ABSTRACT Chronic kidney disease (CKD) is a progressive and irreversible condition that often culminates in end-stage renal disease (ESRD), requiring renal replacement therapy such as hemodialysis. Although hemodialysis prolongs survival, patients frequently experience distressing complications, particularly fatigue and muscle cramps, which significantly impair quality of life and treatment tolerance. Fatigue affects more than two-thirds of patients receiving long-term hemodialysis, while muscle cramps are reported in up to 86% of patients, often leading to premature termination of dialysis sessions. Non-pharmacological interventions that are simple, cost-effective, and safe are therefore essential to improve patient comfort and clinical outcomes. This quasi-experimental study evaluated the effectiveness of intradialytic leg exercises on reducing fatigue and muscle cramps among patients undergoing hemodialysis in a selected hospital in Bangalore. A total of 60 patients were selected using non-probability purposive sampling and assigned to experimental (n = 30) and control (n = 30) groups. Fatigue and muscle cramps were assessed using the Modified Fatigue Assessment Scale and Modified Muscle Cramp Assessment Scale before and after the intervention. The experimental group performed structured intradialytic leg exercises for 30 minutes during dialysis sessions, while the control group received routine care. The findings revealed a statistically significant reduction in fatigue and muscle cramp scores in the experimental group compared to the control group ($p < 0.001$). The study concludes that intradialytic leg exercises are an effective, safe, and feasible nursing intervention to reduce fatigue and muscle cramps among patients on hemodialysis. Incorporating these exercises into routine dialysis care may enhance patient comfort, dialysis adequacy, and overall quality of life.

KEYWORDS : Hemodialysis, Intradialytic Exercise, Fatigue, Muscle Cramps, Nursing Intervention, Chronic Kidney Disease

INTRODUCTION

Chronic kidney disease is a major global public health problem with increasing incidence and prevalence. According to global estimates, hundreds of millions of people are affected by CKD, and a significant proportion progress to ESRD requiring lifelong renal replacement therapy. Hemodialysis remains the most commonly used treatment modality for ESRD, particularly in developing countries such as India, where access to kidney transplantation is limited.

Hemodialysis involves extracorporeal removal of waste products and excess fluid from the blood, typically performed two to three times per week for three to five hours per session. While it is life-sustaining, hemodialysis is associated with multiple physical and psychological complications, including hypotension, nausea, anemia, sleep disturbances, fatigue, and muscle cramps. Among these, fatigue and muscle cramps are particularly prevalent and distressing, negatively affecting patients' daily functioning, adherence to treatment, and overall well-being.

Fatigue in hemodialysis patients is multifactorial in origin, arising from uremia, anemia, inflammation, inadequate dialysis, poor nutrition, sleep disturbances, and sedentary lifestyle. It is often described as an overwhelming sense of tiredness, weakness, and lack of energy that is not relieved by rest. Muscle cramps, on the other hand, are sudden, painful, involuntary muscle contractions commonly affecting the lower limbs during or after dialysis sessions. They are frequently associated with fluid shifts, electrolyte imbalances, hypotension, and reduced muscle perfusion.

Pharmacological management of fatigue and muscle cramps has shown limited effectiveness and may be associated with adverse effects. Consequently, there is growing interest in non-pharmacological strategies, particularly exercise-based interventions. Intradialytic leg exercises, performed during dialysis sessions, have emerged as a promising approach to improve muscle perfusion, reduce ischemia, enhance physical function, and alleviate symptoms without additional cost or risk. This study was undertaken to evaluate the effectiveness of intradialytic leg exercises on fatigue and muscle cramps among patients undergoing hemodialysis.

Objectives Of The Study

The objectives of the study were:

1. To assess the levels of fatigue among patients undergoing hemodialysis.
2. To assess the levels of muscle cramps among patients undergoing hemodialysis.
3. To evaluate the effectiveness of intradialytic leg exercises on fatigue among patients on hemodialysis.

4. To evaluate the effectiveness of intradialytic leg exercises on muscle cramps among patients on hemodialysis.

5. To determine the association between fatigue and selected demographic variables.

6. To determine the association between muscle cramps and selected demographic variables.

Conceptual Framework

The study was guided by **Imogene King's Goal Attainment Theory**, which emphasizes interaction, perception, communication, and mutual goal setting between the nurse and the patient. In this study, the nurse identified fatigue and muscle cramps as significant patient problems, communicated the need for intradialytic leg exercises, and collaborated with patients to achieve the shared goal of symptom reduction. The successful implementation of the intervention and subsequent reassessment reflected goal attainment through purposeful nurse-patient interaction.

Methodology

Research Design

A quasi-experimental pre-test post-test control group design was adopted to evaluate the effectiveness of intradialytic leg exercises.

Setting And Population

The study was conducted in the hemodialysis unit of a selected hospital in Bangalore. The population consisted of adult patients undergoing maintenance hemodialysis.

Sample And Sampling Technique

A total of 60 patients were selected using non-probability purposive sampling. The sample was divided into an experimental group (n = 30) and a control group (n = 30).

Inclusion And Exclusion Criteria

Patients aged 18–70 years who experienced fatigue and muscle cramps during hemodialysis and were willing to participate were included. Patients with cardiovascular disease, lower limb wounds, edema, or history of deep vein thrombosis were excluded.

Data Collection Instruments

Modified Fatigue Assessment Scale (FAS) to measure fatigue levels

Modified Muscle Cramp Assessment Scale to assess frequency, intensity, and severity of muscle cramps

Structured interview schedule for demographic and clinical variables

The tools were validated by experts and demonstrated high reliability

($r = 1$).

Intervention

The experimental group performed **intradialytic leg exercises** for 30 minutes during dialysis sessions. Exercises included quadriceps strengthening, hamstring stretching, and gluteal muscle exercises. The control group received routine care without exercise intervention.

Data Analysis

Data were analyzed using descriptive and inferential statistics. Paired and unpaired t-tests were used to compare pre-test and post-test scores. Chi-square tests were used to determine associations between variables.

RESULTS

The findings revealed that fatigue and muscle cramps were highly prevalent among patients undergoing hemodialysis. In the experimental group, post-test fatigue and muscle cramp scores were significantly lower compared to pre-test scores. In contrast, the control group showed no significant improvement.

Statistical analysis demonstrated a highly significant reduction in fatigue ($t = -24.88$, $p < 0.001$) and muscle cramps ($t = -26.63$, $p < 0.001$) in the experimental group following the intervention. These results confirm the effectiveness of intradialytic leg exercises in alleviating both fatigue and muscle cramps.

DISCUSSION

The findings of this study are consistent with previous research demonstrating the beneficial effects of intradialytic exercise on physical symptoms in hemodialysis patients. Exercise improves muscle blood flow, reduces ischemia, enhances muscle metabolism, and promotes removal of metabolic waste products, thereby reducing fatigue and cramp severity.

Fatigue reduction observed in this study aligns with studies conducted in India, Egypt, and other countries, which reported significant improvements following intradialytic exercise programs. Similarly, the reduction in muscle cramps supports earlier evidence suggesting that stretching and strengthening exercises reduce neuromuscular excitability and improve muscle elasticity.

The study highlights the critical role of nurses in implementing exercise-based interventions during dialysis sessions. As intradialytic leg exercises are simple, inexpensive, and safe, they can be easily integrated into routine nursing care without disrupting dialysis procedures.

Implications For Nursing Practice

- Intradialytic leg exercises should be incorporated into standard hemodialysis nursing protocols.
- Nurses should educate patients about the benefits of exercise in managing fatigue and muscle cramps.
- Dialysis units should provide structured exercise guidelines and training for staff.

Limitations

The study was conducted in a single center with a relatively small sample size, limiting generalizability. Long-term effects of the intervention were not assessed.

Recommendations

Future studies may include larger samples, multi-center designs, and long-term follow-up to evaluate sustained benefits. Comparative studies between different exercise modalities are also recommended.

CONCLUSION

Fatigue and muscle cramps are common and debilitating symptoms among patients undergoing hemodialysis. This study provides strong evidence that intradialytic leg exercises significantly reduce fatigue and muscle cramps, improving patient comfort and quality of life. As a safe and cost-effective nursing intervention, intradialytic leg exercises should be promoted as an integral component of holistic hemodialysis care.

REFERENCES:

1. World Health Organization. **Global prevalence of chronic kidney disease**. Geneva: WHO; 2010.
2. Jhamb M, Weisbord SD, Steel JL, Unruh M. Fatigue in patients receiving maintenance

dialysis: A review of definitions, measures, and contributing factors. *Am J Kidney Dis*. 2008;52(2):353–365.

3. Bossola M, Vulpio C, Tazza L. Fatigue in chronic dialysis patients. *Semin Dial*. 2011;24(5):550–555.
4. Davenport A. Intradialytic complications during hemodialysis. *Hemodial Int*. 2006;10(2):162–167.
5. Koufaki P, Mercer TH, Naish PF. Effects of exercise training on aerobic and functional capacity of end-stage renal disease patients. *Clin Physiol Funct Imaging*. 2002;22(2):115–124.
6. Mohamed HA, El-Dahshan ME. Effect of intradialytic leg exercise on fatigue in hemodialysis patients. *J Nurs Health Sci*. 2016;5(4):28–35.
7. El-Sayed S, Ali ZH. Effectiveness of intradialytic stretching exercises on leg muscle cramps among hemodialysis patients. *Int J Nurs Sci*. 2015;5(3):44–52.
8. Patil SS, Kulkarni MS. Effectiveness of intradialytic stretching exercises on muscle cramps among hemodialysis patients. *Indian J Contin Nurs Educ*. 2018;19(1):39–44.
9. Michielsen HJ, De Vries J, Van Heck GL. Psychometric qualities of the Fatigue Assessment Scale. *J Psychosom Res*. 2003;54(4):345–352.
10. King IM. **A Theory for Nursing: Systems, Concepts, Process**. New York: John Wiley & Sons; 198