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Impact of a 6-Minute Walking Exercise on Fatigue Levels Among Chronic Kidney Disease (CKD) Clients Undergoing Hemodialysis

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Abstract- Background: Fatigue is a prevalent and debilitating symptom among chronic kidney disease (CKD) clients undergoing hemodialysis. Non-pharmacological interventions such as aerobic exercise are increasingly recognized for their role in symptom management. The 6-minute walking exercise is a simple, cost-effective intervention to improve fatigue and physical endurance.

Objectives: (1) To assess the existing fatigue level among CKD clients undergoing hemodialysis. (2) To evaluate the impact of a 6-minute walking exercise on fatigue levels. (3) To find the association between fatigue levels and selected demographic variables among CKD clients.

Materials and Methods: A quasi-experimental one-group pre-test post-test study was conducted among 30 CKD clients undergoing hemodialysis using purposive sampling. Fatigue was measured using the Fatigue Severity Scale (FSS) before and after a 2-week supervised 6-minute walking exercise program. Data were analyzed using SPSS v25.

Results: In the pre-test, 60% of clients had severe fatigue, 33.3% had moderate fatigue, and 6.7% had mild fatigue. After the intervention, 53.3% had moderate fatigue, 36.7% had mild fatigue, and only 10% reported severe fatigue. The mean fatigue score reduced from 5.9 ± 0.8 (pre-test) to 3.8 ± 0.9 (post-test), showing a statistically significant difference ($p < 0.01$). Significant associations were found between post-test fatigue scores and age ($p = 0.027$) and duration of hemodialysis ($p = 0.032$).

Conclusion: The 6-minute walking exercise significantly reduced fatigue levels among CKD clients on hemodialysis. This low-intensity aerobic intervention should be integrated into routine dialysis care to enhance patient well-being.

Keywords: Chronic Kidney Disease, Hemodialysis, Fatigue, 6-Minute Walk, Exercise, Non-Pharmacological Intervention

INTRODUCTION

Chronic Kidney Disease (CKD) is a progressive and irreversible condition that affects an estimated 850 million people worldwide, with prevalence rates continuing to rise due to the global epidemics of diabetes, hypertension, and aging populations (*WHO, 2021*). In India, CKD represents a significant public health challenge, not only because of the growing patient numbers but also due to the economic and social burden associated with long-term renal replacement therapy (*Jha et al., 2016*).

Hemodialysis remains the most utilized renal replacement therapy for End-Stage Renal Disease (ESRD) in India. While it is life-sustaining, the treatment regimen—typically requiring three sessions per week, each lasting four to five hours—places considerable physical, psychological, and social demands on patients. One of the most frequently reported and debilitating symptoms among this population is fatigue, which affects up to 60–97% of hemodialysis clients (*Kumar et al., 2022*). Fatigue in CKD is multifactorial, resulting from anemia, uremic toxins, chronic inflammation, nutritional deficits, cardiovascular deconditioning, and the psychosocial stress of living with a chronic illness.

Fatigue significantly impairs quality of life, limits physical functioning, reduces participation in daily activities, and contributes to social withdrawal and depression (*Thomas et al., 2020*). While pharmacological management—such as erythropoietin therapy for anaemia—can address some underlying causes, it often fails to completely relieve fatigue. Consequently, non-pharmacological interventions, especially physical activity programs, are gaining attention as effective, safe, and sustainable strategies.

The 6-Minute Walking Exercise (6MWT), originally developed as a standardized submaximal exercise test to assess functional capacity, has been adapted as a simple, low-cost, and patient-friendly intervention for individuals with chronic illnesses. It improves aerobic capacity, muscle strength, and endurance while also enhancing mood and overall well-being. Importantly, it can be performed in minimal space, requires no specialized equipment, and can be tailored to individual tolerance.

Evidence from studies in cardiovascular, pulmonary, and renal populations indicates that short bouts of walking can improve functional status and reduce symptom severity. However, in the Indian CKD population, research on the use of structured 6-minute walking interventions as part of dialysis care remains scarce.

This study was undertaken to evaluate the effectiveness of a supervised 6-minute walking exercise program in reducing fatigue levels among CKD clients undergoing hemodialysis and to explore associations between fatigue reduction and demographic variables such as age and dialysis duration.

OBJECTIVES

1. To assess the existing fatigue level among CKD clients undergoing hemodialysis.
2. To evaluate the impact of a 6-minute walking exercise on fatigue levels.
3. To find out the association between fatigue levels and selected demographic variables.

MATERIALS AND METHODS

Study Design:

Quasi-experimental one-group pre-test post-test design.

Setting:

Dialysis unit of a tertiary care hospital in Maharashtra.

Sample & Sampling Technique:

- Sample size: 30 CKD clients
- Sampling method: Non-probability purposive sampling

Inclusion Criteria:

- Diagnosed with CKD and on hemodialysis ≥3 months
- Physically able to walk independently
- Willing to participate

Exclusion Criteria:

- Severe musculoskeletal or cardiac limitations
- Cognitive or psychological disorders interfering with participation

Intervention: 6-Minute Walking Exercise

- Duration: 14 days (daily, post-dialysis or non-dialysis days)
- Setting: Hospital corridor (supervised)
- Protocol: Walk for 6 minutes at a self-selected pace; vitals monitored before and after

Tool for Data Collection:

1. Demographic Proforma
2. Fatigue Severity Scale (FSS – 9 items, score range: 1–7 per item)

Ethical Considerations:

Approval obtained from Institutional Ethical Committee. Written informed consent was taken from all participants.

Statistical Analysis:

- Descriptive statistics: Frequency, percentage, mean, SD
- Inferential statistics: Paired t-test for fatigue score comparison; chi-square for demographic associations
- Significance level: $p < 0.05$
- Software used: SPSS v25

RESULTS

Section I: Fatigue Levels Pre- and Post-Intervention (N = 30)

Fatigue Level	Pre-Test n (%)	Post-Test n (%)
Mild	2 (6.7%)	11 (36.7%)
Moderate	10 (33.3%)	16 (53.3%)
Severe	18 (60.0%)	3 (10.0%)

Mean Fatigue Scores:

- Pre-test: 5.9 ± 0.8
- Post-test: 3.8 ± 0.9
- Paired $t = 11.32$, $p < 0.01$ (Significant improvement)

Section II: Association Between Fatigue and Demographic Variables

Variable	p-value	Significance
Age	0.027	Significant
Gender	0.123	Not Significant
Education	0.071	Not Significant
Duration of Dialysis	0.032	Significant

Interpretation: Age and duration on dialysis were significantly associated with reduced fatigue levels post-intervention.

DISCUSSION

The findings of the present study reveal that fatigue is highly prevalent among CKD clients undergoing hemodialysis, with 60% of participants experiencing severe fatigue at baseline. This aligns with earlier studies by Jhamb et al. (2008) and Kumar et al. (2022), which reported fatigue as one of the most common and distressing symptoms in dialysis patients.

After a 2-week supervised 6-minute walking exercise program, there was a marked and statistically significant reduction in fatigue levels, with the mean Fatigue Severity Scale score decreasing from 5.9 ± 0.8 to 3.8 ± 0.9 ($p < 0.01$). The proportion of patients with severe fatigue dropped to 10%, while those with mild fatigue increased to 36.7%. These results support the evidence from Thomas et al. (2020), who demonstrated that low-intensity aerobic exercise significantly improves both physical and psychological dimensions of fatigue in dialysis patients.

Physiologically, walking enhances peripheral muscle oxygenation, reduces inflammatory markers, improves cardiovascular efficiency, and counters muscle wasting, all of which may contribute to reduced fatigue. Psychologically, exercise stimulates the release of endorphins, reduces depressive symptoms, and promotes a sense of self-efficacy, which may indirectly alleviate fatigue.

The significant associations observed between age and duration of dialysis with post-test fatigue scores suggest that younger patients and those with a shorter dialysis history may derive greater benefit from such interventions, possibly due to better baseline physical reserves and fewer comorbidities. However, the improvement in older and long-term dialysis patients indicates that the intervention is broadly applicable and beneficial.

From a clinical practice perspective, the results underscore the importance of integrating structured physical activity programs into routine dialysis care. The 6-minute walk is particularly suited to resource-limited settings, such as many Indian dialysis centers, because it requires no additional infrastructure, is safe when supervised, and can be adapted to patient tolerance levels.

These findings are consistent with the growing global emphasis on intradialytic and interdialytic exercise programs as part of comprehensive CKD management strategies (*Heiwe & Jacobson, 2014*). Regular implementation could potentially improve not only fatigue but also cardiovascular health, physical function, and overall quality of life.

Future studies should focus on longer intervention periods, inclusion of a control group, and assessment of long-term sustainability of fatigue reduction. Moreover, combining walking with other low-impact exercises, such as resistance training or yoga, may further enhance patient outcomes.

CONCLUSION

The 6-minute walking exercise significantly reduced fatigue levels among CKD clients undergoing hemodialysis. Healthcare professionals should advocate and integrate low-impact exercises as a non-pharmacological fatigue management strategy.

LIMITATIONS

- Single-center study
- Small sample size
- No control group for comparison

RECOMMENDATIONS

- Introduce supervised walking sessions in dialysis units
- Conduct multi-center studies with larger sample sizes
- Extend follow-up to assess long-term benefits

Conflict of Interest
None declared.

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