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Effectiveness of an educational training programme on self-care management among Chronic Kidney Disease (CKD) clients undergoing Hemodialysis

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Abstract
Background: Chronic Kidney Disease (CKD) patients undergoing hemodialysis require comprehensive self-care to manage symptoms, prevent complications, and improve their overall well-being. Education is a critical component in empowering clients to adopt appropriate self-management behaviors.
Objectives
1. To assess the level of knowledge regarding self-care management among CKD clients undergoing hemodialysis.
2. To evaluate the effectiveness of an educational training programme on self-care management.
3. To find the association between knowledge level 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. A structured knowledge questionnaire on self-care management was used before and after a 5-day educational training programme. Data were analyzed using SPSS v25.
Results: Pre-test findings revealed 40% had inadequate knowledge, 43.3% had moderate knowledge, and only 16.7% had adequate knowledge. Post-test results showed 63.3% had adequate knowledge, 30% had moderate, and only 6.7% remained with inadequate knowledge. Paired t-test indicated a statistically significant improvement in knowledge ($p < 0.01$). Education ($p = 0.019$) and duration on dialysis ($p = 0.034$) were significantly associated with post-test knowledge levels.
Conclusion: The educational training programme significantly improved knowledge regarding self-care management among CKD clients undergoing hemodialysis. It is recommended as a regular part of dialysis unit education strategies.

Keywords: Chronic Kidney Disease, Hemodialysis, Self-Care management, Patient education, Knowledge, Training programme

Introduction

Chronic Kidney Disease (CKD) is a progressive, irreversible loss of kidney function that affects millions globally, with an estimated 9.1% of the world's population suffering from some stage of the disease (GBD CKD Collaboration, 2020). In India, CKD prevalence is estimated to range between 8% and 16%, with an increasing number of patients requiring renal replacement therapy due to rising rates of diabetes and hypertension (Jha *et al*, 2016) [3]. Hemodialysis is the most common treatment modality for End-Stage Renal Disease (ESRD) in India, but it imposes significant physical, psychological, social, and economic burdens on patients.

Successful long-term dialysis outcomes are closely linked to patients' ability to follow self-care management practices, including fluid and dietary restrictions, proper vascular access care, adherence to prescribed medications, infection prevention, and timely attendance of dialysis sessions (Thomas *et al*, 2018) [5]. Lack of knowledge or poor compliance with these practices can result in complications such as hyperkalemia, hypertension, cardiovascular events, access site infections, and frequent hospitalizations.

Patient education has been identified as a cornerstone of effective CKD management. Structured educational interventions empower patients to understand their illness, engage actively in care decisions, and adopt positive health behaviors. The World Health Organization (WHO, 2021) [1] emphasizes that health literacy is directly related to chronic disease control, and CKD care is no exception. Several studies have demonstrated that targeted educational programs lead to improved knowledge, better adherence to treatment regimens, reduced complications, and enhanced quality of life (Patel *et al*, 2021: Karavetian *et al*, 2015) [2].

Despite its importance, patient education in dialysis centers is often inconsistent, unstructured, or not tailored to individual literacy levels. Many patients, particularly those with lower educational backgrounds, remain unaware of essential aspects of self-care. In this context, structured educational training programs—delivered using interactive methods, visual aids, and local language materials—can bridge this gap.

This study was designed to assess baseline knowledge of self-care management among CKD clients undergoing hemodialysis, implement a structured 5-day educational training programme, and evaluate its effectiveness in improving knowledge levels. Additionally, it examines demographic factors, such as education and duration on dialysis, that may influence learning outcomes.

Objectives

1. To assess the level of knowledge regarding self-care management among CKD clients undergoing hemodialysis.
2. To evaluate the effectiveness of an educational training programme on self-care management among CKD clients.

3. To find the association between level of knowledge 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 center 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
- Able to understand and respond to the questionnaire
- Willing to participate

Exclusion Criteria

- Severe cognitive impairments
- Critically ill or unstable clients

Intervention: Educational Training Programme

- **Duration:** 5 days
- **Format:** Interactive sessions, pamphlets, pictorial charts, and Q&A
- **Topics:** Diet, fluid restriction, medication adherence, hygiene, fistula care, signs of infection, and lifestyle modifications

Tool for Data Collection

1. Demographic Proforma
2. Structured Knowledge Questionnaire (25 MCQs; max score = 25)

Ethical Considerations

Institutional Ethical Committee approval obtained. Informed written consent was taken from all participants.

Statistical Analysis

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

Results

Table 1: Knowledge Score Before and After Intervention (N = 30)

Knowledge Level	Pre-Test n (%)	Post-Test n (%)
Inadequate	12 (40.0%)	2 (6.7%)
Moderate	13 (43.3%)	9 (30.0%)
Adequate	5 (16.7%)	19 (63.3%)

Interpretation

There was a significant increase in participants achieving adequate knowledge after the training programme.

Paired t-test Results

- **Mean pre-test score:** 12.3 ± 2.1
- **Mean post-test score:** 18.6 ± 2.4
- $t = 10.27$, $p < 0.01$ (statistically significant)

Table 2: Association Between Knowledge and Demographic Variables

Variable	p-value	Significance
Age	0.072	NS
Gender	0.228	NS
Education	0.019	Significant
Duration on Dialysis	0.034	Significant

Interpretation

Education level and dialysis duration were significantly associated with improved knowledge levels after intervention.

Discussion

The present study found that before the intervention, only 16.7% of participants had adequate knowledge, while 40% demonstrated inadequate knowledge of self-care practices. These results are consistent with the findings of Patel *et al*. (2021) [2], who reported that nearly half of CKD clients lacked sufficient knowledge about diet, fluid management, and vascular access care.

Following the 5-day educational training programme, the proportion of participants with adequate knowledge rose dramatically to 63.3%, with a corresponding decline in inadequate knowledge to 6.7%. The statistically significant improvement ($p < 0.01$) demonstrates the effectiveness of structured, interactive, and patient-centered education in enhancing knowledge. This aligns with Karavetian *et al*. (2015), who observed that dialysis patients receiving tailored education showed improved adherence and fewer complications compared to those receiving routine care.

Two demographic variables—education ($p = 0.019$) and duration on dialysis ($p = 0.034$)—were significantly associated with post-test knowledge levels. Patients with higher formal education likely have better health literacy and can process and apply health information more effectively (*Liu et al., 2018*). Similarly, patients who had been on dialysis for a longer duration may have acquired knowledge through repeated interactions with healthcare providers and experiential learning. However, the fact that many patients with long dialysis duration still lacked adequate baseline knowledge underscores the need for structured education from the start of treatment, rather than relying on passive learning over time.

The results also reinforce the importance of customizing educational interventions based on patients' literacy levels and learning preferences. Visual aids, demonstration-based teaching, and vernacular language materials can enhance comprehension in low-literacy populations. Involving

caregivers may further support adherence, especially for elderly or physically dependent clients.

From a clinical practice perspective, integrating structured education into the routine dialysis protocol could yield multiple benefits—improved patient outcomes, reduced complication rates, and decreased hospitalization frequency. Furthermore, it aligns with global best practices, as patient empowerment and self-management have been recognized as critical elements in chronic disease care (WHO, 2021) [1].

While the short-term results of this study are promising, future research should explore the long-term retention of knowledge and whether improved understanding translates into sustained behavioral change and measurable clinical outcomes. Conducting multicentric randomized controlled trials with larger sample sizes and extended follow-up periods would strengthen the evidence base.

Conclusion

Educational training programmes are effective in enhancing self-care knowledge among CKD clients undergoing hemodialysis. Regular, structured, and patient-friendly education should be implemented as a standard practice in dialysis care.

Limitations

- Small sample size
- Short-term follow-up
- No control group for comparison

Recommendations

- Implement structured education as a routine dialysis protocol
- Use visual aids and local language materials for better understanding
- Conduct larger randomized controlled trials with long-term follow-up

Conflict of Interest

None declared.

Funding

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