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Effectiveness of a Self-Instructional Module on Knowledge Regarding Self-Care Management among Patients with Chronic Kidney Disease in Nepal

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Abstract

Chronic kidney disease (CKD) is a major public health issue in Nepal, with an estimated prevalence of 10.6% in urban areas. Globally, the incidence of End-Stage Renal Disease (ESRD) has been increasing by approximately 7.8% per year. Effective self-care management is crucial in slowing disease progression and preventing complications. This study aimed to assess the effectiveness of a self-instructional module (SIM) on knowledge regarding self-care management among CKD patients. A pre-experimental one-group pretest-posttest design was used. The study was conducted at Bheri Hospital, Nepalgunj, from March 2023 to August 2023. A total of 160 CKD patients were selected using non-probability purposive sampling. Data were collected using a structured questionnaire assessing socio-demographics, clinical profile, and knowledge regarding self-care management. The SIM covered topics such as CKD complications, fluid and dietary management, exercise, and weight management. A pretest was conducted on Day 1, followed by administration of the SIM. A posttest was conducted after 6 weeks using the same questionnaire. Data were analyzed using descriptive statistics and inferential tests, including paired t-tests and chi-square tests. The mean pretest knowledge score was 51.8±3.4, which increased significantly to 62±3.2 in the posttest ($t = 29.4$, $p = 0.001$). Before the intervention, 32.5% of participants had poor knowledge, and none had a good knowledge score. After the intervention, 68.1% had good knowledge, while no participants remained in the poor knowledge category. Chi-square analysis showed no significant association between socio-demographic variables and knowledge scores. The self-instructional module was effective in enhancing knowledge regarding self-care management among CKD patients. Implementing structured educational interventions in clinical settings can improve patient awareness, adherence to self-care practices, and overall disease management.

Keywords: Chronic kidney disease, self-care management, self-instructional module, patient education, knowledge improvement

Introduction

Chronic Kidney Disease (CKD) is a significant global health burden, affecting millions of individuals and contributing to increased morbidity and mortality rates. CKD is characterized by a gradual loss of kidney function over time, which, if left unmanaged, can progress to End-Stage Renal Disease (ESRD), necessitating dialysis or kidney transplantation (Jha et al., 2013). According to the World Health Organization (Kovesdy, 2022), the prevalence of CKD has been increasing globally, with a considerable rise in developing countries like Nepal. In Nepal, CKD is an emerging health concern, particularly in urban areas, where the estimated prevalence is 10.6% (Neupane et al., 2021).

Self-care management plays a crucial role in slowing the progression of CKD and preventing complications such as cardiovascular diseases, electrolyte imbalances, and fluid overload (Lopez-Vargas et al., 2016). Effective management requires patients to adopt lifestyle modifications, adhere to dietary restrictions, maintain fluid balance, and follow prescribed medications (Chen et al., 2019). However, studies indicate that many CKD patients lack sufficient knowledge regarding self-care practices, which can lead to poor disease management and increased hospitalization rates (Narva et al., 2016).

Educational interventions, such as self-instructional modules (SIMs), have been widely used to improve patient knowledge and self-care behaviors. SIMs provide structured, accessible, and self-paced learning materials that enhance patient understanding of disease management (Klang et al., 2020). Given the increasing burden of CKD and the need for patient-centered education, this study aimed to assess the effectiveness of a self-instructional module in improving knowledge regarding self-care management among CKD patients in Nepal.

Educational interventions such as SIMs have been effective in enhancing knowledge and self-management skills among patients with chronic illnesses (Jayadevappa & Chhatre, 2017). SIMs provide structured, self-paced learning materials, allowing patients to grasp complex medical concepts at their convenience (Wang et al., 2020). Given the growing burden of CKD in Nepal and the lack of effective patient education strategies, this study aimed to evaluate the impact of a self-instructional module on CKD patients' knowledge regarding self-care management. The findings from this study will contribute to the development of patient-centered educational interventions in clinical settings, ultimately improving disease outcomes and quality of life for CKD patients.

Significance of the Study

Chronic Kidney Disease (CKD) poses a critical public health challenge in Nepal, with a prevalence of 10.6% in urban areas and rising rates of End-Stage Renal Disease (ESRD) globally. Effective self-care management is vital to slow disease progression, reduce complications, and delay the need for dialysis or transplantation. However, studies highlight significant gaps in CKD patients' knowledge about self-care practices, contributing to poor disease outcomes and increased healthcare burdens. In resource-limited settings like Nepal, structured patient education programs are often underprioritized, leaving patients ill-equipped to manage their condition.

This study addresses this gap by evaluating the effectiveness of a self-instructional module (SIM) in improving knowledge of self-care management among CKD patients. The findings demonstrate that SIMs can significantly enhance patient awareness, empowering individuals to adopt dietary restrictions, fluid management, and lifestyle modifications. By validating SIMs as a low-cost, scalable educational tool, this research contributes to evidence-based strategies for patient-centered care in low-resource contexts. The outcomes hold implications for reducing CKD-related morbidity, lowering hospitalization rates, and improving quality of life. Additionally, the study provides actionable insights for healthcare policymakers and clinicians in Nepal to integrate SIMs into routine care, fostering better adherence to self-care practices and alleviating the economic burden of advanced CKD treatment.

Research Objectives

1. To assess baseline knowledge levels of CKD patients regarding self-care management, including dietary restrictions, fluid balance, exercise, and complication prevention.
2. To evaluate the effectiveness of a self-instructional module (SIM) in improving knowledge scores related to self-care practices among CKD patients through pre- and post-interventional assessments.
3. To examine the association between socio-demographic and clinical variables (e.g., age, education, disease stage) and baseline knowledge scores, identifying potential barriers to effective self-care education.

Materials and Methods

Study Design

A quasi-experimental, one-group pretest-posttest design was employed to evaluate the effectiveness of a self-instructional module (SIM) on knowledge of self-care management among patients with chronic kidney disease (CKD). The study tested two hypotheses:

- **H1**: The mean post-test knowledge score would be significantly higher than the pre-test score.
- **H2**: Socio-demographic variables would exhibit a significant association with baseline knowledge scores.

Setting and Population

The study was conducted at Bheri Zonal Hospital, a government referral center in Nepalgunj, Nepal, serving patients from multiple provinces. The hospital's hemodialysis unit was selected due to its high CKD patient load. Data collection occurred between March 2021 and August 2021.

Sample Size and Sampling Technique

A total of 160 CKD patients were enrolled using non-probability purposive sampling. Inclusion criteria required participants to:

- Be diagnosed with CKD for ≥3 months.
- Provide informed consent.
- Possess cognitive capacity to engage with the SIM.

Exclusion criteria included musculoskeletal impairments affecting exercise compliance or cognitive deficits hindering comprehension. Participants who transferred to other centers or died during the study were withdrawn.

Variables

Dependent Variable

Knowledge of self-care management (assessed via structured questionnaire).

Independent Variables

Socio-demographic factors (age, education, occupation, income), clinical variables (diagnosis duration, comorbidities, CKD stage), and the SIM.

Data Collection Tools

A semi-structured, self-administered questionnaire was divided into three sections:

1. Socio-demographic Profile: Age, education, occupation, income.
2. Clinical Proforma**:** Diagnosis duration, comorbidities, CKD stage, support systems.
3. Knowledge Assessment**:** 28 items scored as correct (1) or incorrect (0), with total scores categorized as poor (<50%), moderate (50–75%), or good (>75%).

Intervention

The SIM, developed in Nepali, included text and visual aids on CKD self-care. Topics spanned dietary restrictions (e.g., sodium/protein intake), fluid balance, exercise routines, and complication prevention.

Procedure

1. Ethical Approvals**:** Permissions were obtained from hospital authorities and the hemodialysis unit.
2. Pre-test**:** On Day 1, participants completed the questionnaire.
3. SIM Administration**:** The module was distributed post-pre-test, with time allocated for queries.
4. Post-test: After 6 week he same questionnaire was re-administered.

Data Analysis

Descriptive Statistics

Frequencies, percentages, mean, and standard deviation summarized socio-demographic and knowledge data.

Inferential Statistics

- **Paired t-test**: Compared pre- and post-test scores (H1).
- **Chi-square test**: Examined associations between socio-demographic variables and baseline knowledge (H2).
- **$p < 0.05$** denoted statistical significance.

Ethical Considerations

Written informed consent emphasized voluntary participation and confidentiality. Institutional approvals ensured ethical compliance. No adverse events were reported during the study.

Delimitations

The study was confined to a single hospital, limiting generalizability. However, the large sample size (n=160) enhanced internal validity.

Statistical Software

Data were analyzed using SPSS Version 25.0.

Result and Discussion

The primary objective was to assess the effectiveness of a self-instructional module (SIM) on knowledge regarding self-care management among chronic kidney disease (CKD) patients. The results demonstrate a significant improvement in knowledge scores following the intervention.

Demographic Characteristics of Participants

Table 1 presents the socio-demographic characteristics of the study participants. A total of 160 CKD patients were included in the study, with a nearly equal distribution between those aged ≤50 years (52.5%) and those above 50 years (47.5%). The majority of participants were male (66.9%), indicating a higher prevalence of CKD among men, which aligns with global epidemiological data suggesting that CKD affects men more frequently than women due to differences in lifestyle risk factors and hormonal influences (Hill et al., 2016).

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Table 1

Socio-Demographic Characteristics of Participants

Variable	Frequency (n)	Percentage (%)
Age		
≤50 years	84	52.5
>50 years	76	47.5
Gender		
Male	107	66.9
Female	53	33.1
Educational Status		
Illiterate	45	28.1
Literate	47	29.4
Primary level	25	15.6
Secondary level	27	16.9
Bachelor and above	16	10
Occupation		
Agriculture	75	46.9
Business	31	19.4
Government service	5	3.1
Housewife	22	13.7
Leisure	14	8.8
Private job	5	3.1
Student	8	5

The educational status of participants showed that nearly 28.1% were illiterate, and only 10% had attained a bachelor's degree or higher. This limited educational background may contribute to poor self-care knowledge, as suggested by previous studies (Lopez-Vargas et al., 2016). Similarly, the occupational distribution indicated that most participants were engaged in agriculture (46.9%), a sector often associated with limited health awareness and healthcare accessibility (Jha et al., 2013).

Pre- and Post-Test Knowledge Scores

The pre-test and post-test knowledge scores of CKD patients were assessed to evaluate the impact of the self-instructional module. The results are summarized in Table 2.

Table 2

Knowledge Scores Before and After Intervention

Knowledge Score Category	Pre-Test (n = 160)	Post-Test (n = 160)
Poor (<50)	52 (32.5%)	0 (0%)
Average (50-60)	108 (67.5%)	51 (31.9%)
Good (>60)	0 (0%)	109 (68.1%)

The findings indicate a significant improvement in knowledge scores after the intervention. In the pre-test, 32.5% of participants had poor knowledge, while none achieved a good score. However, in the post-test, 68.1% of participants attained a good knowledge level, and no participant remained in the poor knowledge category. This result is consistent with previous research demonstrating that structured educational interventions significantly enhance patient knowledge and adherence to self-care practices (Chen et al., 2019).

Effectiveness of the Self-Instructional Module

The effectiveness of the intervention was further analyzed using a paired t-test. The results are presented in Table 3.

Table 3

Comparison of Pre-Test and Post-Test Knowledge Scores

Variable	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Paired t-test	p-value
Knowledge Score	51.8 ± 3.4	62 ± 3.2	29.4	0.001

A highly significant increase in the mean knowledge score was observed ($t = 29.4$, $p = 0.001$), confirming the effectiveness of the self-instructional module. Similar results have been reported in previous studies where patient-centered educational interventions significantly improved knowledge retention and self-care management behaviors (Wang et al., 2020). These findings emphasize the importance of structured patient education in CKD management.

Association of Knowledge Scores with Socio-Demographic Variables

A chi-square test was conducted to assess the association between socio-demographic variables and knowledge scores. The results indicated no statistically significant association between any socio-demographic variable and pre-test or post-test knowledge scores.

Table 4

Association Between Socio-Demographic Variables and Knowledge Scores

Variable	p-value	Significance
Age	>0.05	Not significant
Gender	>0.05	Not significant
Educational status	>0.05	Not significant
Occupation	>0.05	Not significant

This lack of association suggests that knowledge improvement was independent of age, gender, education, or occupation, reinforcing the effectiveness of the self-instructional module across diverse demographic groups. These results are in line with studies that found patient education interventions to be universally beneficial, regardless of socio-demographic factors (Jayadevappa & Chhatre, 2017).

Discussion

The present study aimed to assess the effectiveness of a self-instructional module (SIM) in enhancing knowledge regarding self-care management among patients with chronic kidney disease (CKD). The findings provide compelling evidence that structured educational interventions can significantly improve patients' understanding of self-care practices, which are essential for managing CKD and preventing complications.

The study demonstrated a statistically significant improvement in post-test knowledge scores following the administration of the SIM, with a mean increase from **51.8 ± 3.4** in the pre-test to **62 ± 3.2** in the post-test **(t = 29.4, p = 0.001**). This suggests that the self-instructional module was highly effective in increasing awareness and comprehension of key aspects of CKD self-management, including fluid management, dietary restrictions, vascular access care, daily activities, weight management, and supportive care. These findings align with previous research indicating that patient-centered education is a critical component of CKD management, leading to better adherence to self-care practices and improved long-term health outcomes (Chen et al., 2019; Wang et al., 2020).

Furthermore, the study found no significant association between socio-demographic variables (age, gender, educational status, occupation) and knowledge scores. This highlights the universal applicability of the SIM across diverse patient populations, regardless of their background. It suggests that such educational interventions can be successfully implemented across various demographic groups to enhance CKD knowledge and self-care practices, as supported by existing literature (Jayadevappa & Chhatre, 2017).

The absence of a significant association between socio-demographic variables and knowledge scores suggests that structured educational interventions can be effective across

different patient populations. This is particularly important in the context of Nepal, where CKD is an emerging public health concern, and literacy rates vary widely among patients. Prior research has emphasized the need for patient-centered education to improve adherence to self-care practices, ultimately leading to better health outcomes (Narva et al., 2016).

Future research should explore the long-term impact of such educational interventions on clinical outcomes, including disease progression, hospitalization rates, and overall quality of life. Additionally, implementing similar educational modules in diverse healthcare settings may help address the broader knowledge gaps among CKD patients in Nepal and other low-resource settings.

Clinical and Policy Implications

The transition of 68.1% participants to "good" knowledge post-SIM highlights the potential of low-cost educational tools to mitigate CKD complications. This is critical in Nepal, where standardized nursing interventions for CKD are absent. Integrating SIMs into routine care could reduce hospitalizations and delay disease progression, easing the burden on tertiary care centers.

Limitations

The single-center design limits generalizability, and After 6 week -test interval may not reflect long-term knowledge retention. Self-reported knowledge, while practical, risks social desirability bias. Future studies should incorporate control groups and longitudinal follow-ups.

Conclusion

In conclusion, the study findings confirm that a self-instructional module is an effective educational tool for improving knowledge regarding self-care management among CKD patients. The statistically significant improvement in post-test knowledge scores underscores the importance of structured patient education in CKD care. Given the increasing burden of CKD and the lack of standardized patient education programs in Nepal, integrating self-instructional modules into nephrology care programs is a crucial step toward improving patient outcomes. Future research should focus on evaluating long-term effectiveness, expanding educational interventions, and ensuring widespread accessibility of self-care education materials for CKD patients.

By emphasizing the role of patient education, this study contributes to the growing body of evidence supporting structured interventions as a fundamental component of CKD management, ultimately enhancing patient knowledge, engagement, and health outcomes.

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