RESEARCH PAPER

Impact Of Pharmacist-Led Education On Knowledge, Attitude, And Practice In Chronic Kidney Disease: A Quasi-Experimental Hospital Study

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ABSTRACT

Background: DFU is a high complication that impacts millions of human beings around the world. DFUs are often Introduction: One of the most important global health issues in society that should be addressed and more educated is chronic kidney disease (CKD). Pharmacists are gaining an increasing role in the patient education process and patient chronic disease treatment. The paper evaluated the intervention in patient knowledge, attitude and practice (KAP) by pharmacist-led educational program. Methods: That was conducted in a hospital setting on 392 CKD patients. Structured education was provided to the participants by pharmacists. The assessment of KAP was conducted after a period of four months through the validated questionnaires at baseline. Results: There was also a significant increase in patient knowledge, where mean scores improved to 16.50 ± 2.46 the 2nd follow-up to the baseline of 12.36 ± 3.18 ($P < 0.001$). There was also a significant improvement in the attitude scores ($P = 0.002$). The practice scores rose to 7.31 ± 1.58 to 5.45 + 2.12($P < 0.001$). The percentage of patients exhibiting sufficient knowledge on CKD increased to 82.81 as opposed to 61.13% and the percentage of patients with appropriate management practices had risen to 81.77 as opposed to 33.16%. Conclusion: These results demonstrate the critical role of pharmacists in enhancing the CKD-related outcomes with the help of organized education and follow-up...

Keywords: Health, Pharmacist, Chronic Kidney Disease, Hospital Setting.

How to cite this article: Thipperudra J, Sumithra M, Impact Of Pharmacist-Led Education On Knowledge, Attitude, And Practice In Chronic Kidney Disease: A Quasi-Experimental Hospital Study .Int J Drug Deliv Technol. 2026;16(2s): 56-62; DOI: 10.25258/ijddt.16. 63-69

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Kidney Disease is worldwide community health issue that has enormous effects on mortality, morbidity, quality of life, and health expenditures relevant to its toxin [1]. CKD afflicts about 700 million individuals around the globe, and in 2017 alone, the disease was identified as the cause of the deaths of about 1.2 million people [2, 3]. The major nephrology societies, such as the International Society of Nephrology, the European Renal Association, and the American Society of Nephrology, have collectively lobbied the inclusion of CKD in the list of major non-communicable diseases in the world health system that causes premature deaths [4]. A recent community-based systematic review indicated a sharp rise in the prevalence of CKD in India, which has now reached 16.38% (2018–2023), with 11.12% (20112017) as the earlier result. The rising challenge of diabetes and high blood pressure in the nation contributes significantly to this tendency. CKD starts with mild cases which may not be symptomatic to more severe kidney failure where the renal functions are very impaired [5, 6]. The management of CKD is complicated and involves a multidisciplinary approach that requires regular monitoring, lifestyle alteration, personalized management of medications that depends on the renal functions, and complication prevention. Knowledge on CKD, medication, drug-induced renal damage, lab monitoring, nutrition, physical activity, and lifestyle in patients is vital towards clinical and economic outcomes enhancement [7]. Nevertheless, there is evidence that almost a third of patients do not know or have little knowledge about their condition [8]. Pharmacists are important healthcare professionals who address pharmaceutical care, minimize morbidity and mortality caused by drugs and decreases healthcare expenses [9,10]. The other well-known area of pharmacists is patient-centered education on chronic conditions, including hypertension, diabetes, COPD, asthma, hypothyroidism, and CKD. Past KAP research on CKD has been more directed towards measuring current levels of knowledge and correlates. As far as we can tell, there is little evidence concerning pharmacist-led educational interventions that are specifically intended to enhance KAP in CKD patients. Anantapur, the biggest district in Andhra Pradesh, India, has a high rural population with a significant number of people living beneath the

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poverty line with illiteracy and few healthcare facilities available to them. Finally, the study is expected to improve clinical and economic outcomes, particularly in rural communities with low healthcare access.

METHODOLOGY

Study design and setting

The study was a quasi-experimental, pre-and post, interventional study, which did not have a control group and was conducted in a hospital-based setting. GGH is a tertiary care governmental teaching hospital with a population of more than four million individuals and approximately 55 patients attending nephrology department every month. The research was initiated with a baseline period (January 2022February 2023) during which the variables affecting the level of KAP in the CKD patients were assessed. The interventional phase was then introduced on 3rd month of 2k23 to 4th month of 2k24, with two follow-up evaluations of the interventions taking place after four-month intervals to evaluate the effect of the educational interventions [11-13].

Study Criteria

Patients older than 18, who were diagnosed with chronic kidney disease (CKD), and were treated in the nephrology unit, either by dialysis, inpatient, or outpatient treatment were eligible to participate in the study. The study did not include patients who did not provide their consent and patients with a mental illness [14,15].

Sample Size and Sampling

There were no prior Indian studies related to CKD-related knowledge, attitude, and practice (KAP), so a 50% prevalence of adequate knowledge was used to calculate the sample size. The sample size was calculated using one population proportion formula with a prescribed margin of error, confidence interval, and statistical power. The final sample size was adjusted after considering a non-response rate. An eligible participant was recruited via a non-random convenience sampling technique to a desired sample size.

Data Collection Tool

The questionnaire was developed based on existing literature and consisted of four sections: (1) socio-demographic and clinical characteristics, (2) knowledge, (3) attitude, and (4) practice regarding CKD management.

Socio-demographic variables included age, gender, marital status, education, occupation, income, healthcare and lifestyle habits. Included CKD duration, comorbidities, CKD stage, family history of renal failure, osteoarthritis, and use of painkillers or herbal medicines.

The knowledge section comprised 20 questions covering CKD, laboratory tests, dietary requirements, and pharmacological and non-pharmacological management. Based on Bloom's cut-off criteria, scores were categorized as good (>80%), moderate (60–80%), or poor (<60%).

Attitude was assessed using 12 statements on a 3-point Likert scale (1 = disagree, 2 = neutral, 3 = agree), with total scores ranging from 3 to 36. Scores ≥18 indicated a favorable attitude.

The practice section included 8 questions assessing follow-up visits, laboratory monitoring, diet adherence, medication compliance, avoidance of risk factors, and non-use of traditional remedies. A score of 8 indicated appropriate practice [16].

Data Collection and Educational Intervention

After obtaining informed consent, baseline socio-demographic and KAP data were collected through face-to-face interviews [17]. Pharmacist-led educational interventions were then implemented, focusing on CKD awareness, laboratory interpretation, dietary modifications, and medication management. Interventions were tailored based on baseline predictors of KAP. Patient information leaflets and SMS reminders for medication adherence and follow-up visits were also provided. Data were collected at baseline, four months post-intervention, and at the second four-month follow-up using the same questionnaire.

Data Analysis

Data were analyzed using IBM SPSS version 22.0 [18]. Descriptive statistics (frequency, percentage, mean, and standard deviation) summarized socio-demographic, clinical, and KAP variables. Paired t-tests assessed changes in KAP scores, with $p < 0.05$ considered statistically significant.

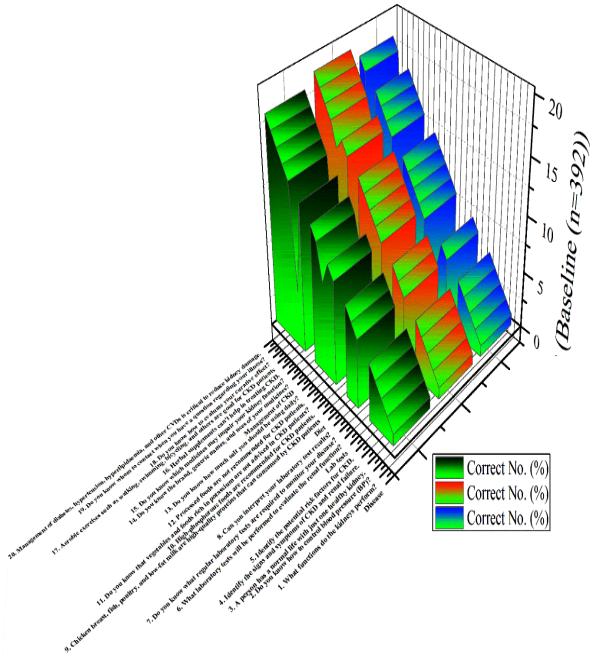
Ethical Considerations

The study was approved by the Institutional Review Board of GGH. Permission was obtained from the hospital's medical superintendent. Written and oral informed consent were obtained. Patient confidentiality was maintained using coded identifiers accessible only to the principal investigator [19].

RESULTS

The sample used in the study consisted majorly of persons that were in the early to middle adulthood stage with a greater percentage of 31-40 and 41-50. Most of the participants men and married. The educational backgrounds were extensive and a significant percentage of the participants had less formal education and a minor segment possessed postgraduate education. The status of employment was high with minimal unemployment which may imply financial dependency. A high percentage of people made moderate monthly salaries in terms of income. The participants most likely had been diagnosed with chronic kidney disease (CKD) within recent years, and Stage 2 of the disease was the most frequent one. Numerous respondents stated having comorbid conditions, including hypertension and diabetes. Lifestyle behavior involved high prevalence of smoking and alcohol use though most of them participated in physical exercises. The use of alternative medicine, including herbal medicine and pain relievers, was also characterised as a study highlight.

Figure 1: Three dimensional bar chart illustrating the % of correct answers to CKD-related knowledge questions at baseline.



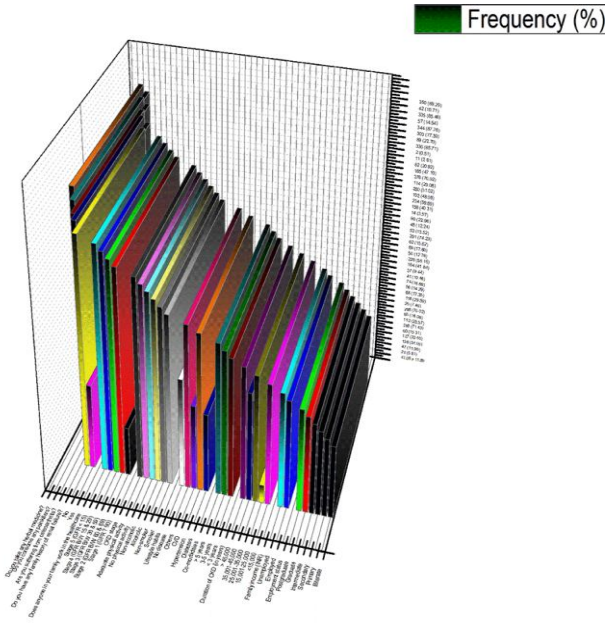


Figure 2: Three-dimensional bar chart demonstrating the distribution of different demographic The colors indicate the different variables each and each color indicates comparative data between the categories.

Knowledge Improvement Over Follow-ups

The research revealed that there were a significant and sustained increase in knowledge regarding chronic kidney disease (CKD) among the participants with the use of several follow-ups. The high level of knowledge exhibited by majority of participants during the second follow-up showed the positive influence of the educational interventions.

The participants about kidney functions, as well as the rise in awareness about blood pressure control, CKD symptoms, and renal function tests. Also, there was a significant improvement in dietary knowledge such as salt intake and consumption of processed foods. Drug education and CKD management practices also improved, and significant gains were made in the awareness of the participants regarding the importance of physical activity. The results of this study demonstrate the usefulness of organized educational activities that can improve the knowledge of participants and enable them to better manage CKD, which will eventually lead to improved self-care and health outcomes.

Attitudinal Changes on Follow-ups

This study showed that there was a gradual change in the attitude of the participants towards chronic kidney disease (CKD) management over three periods. The proportion of respondents who gave a favorable response stood at 72.96 percent initially, and 82.99% at the 1st follow-up and 2nd follow-up 89.84%. The levels of disagreement gradually declined with the initial figure between 41.07 and 48.98. The second follow-up showed outstanding change because the disagreement reduced in the majority of statements, which is a sign of positive change in perceptions.

Attitudinal changes were also reported to be significant in terms of disease awareness, changes in lifestyles, and compliance with CKD management plans. As an example, the consensus on the significance of kidney functioning enhanced, and the level of disagreement diminished considerably. Equally, there was significant improvement in attitudes towards lifestyle changes and treatment adherence, which is a positive indicator that the interventions did not only assist in promoting positive changes in the participants attitude towards the management of CKD.

The researchers also demonstrated significant differences in CKD-related practices of the participants. A range of 31.12 to 70.66 response. At the initial follow-up, the adherence was much higher, 80.15 to 81.96%. Adherence further improved by the second follow-up as 91.15% to 92.45% of the reported following CKD. Practices, such as medication adherence, frequent follow-ups, lab monitoring, and lifestyle changes. Some of the major strengths areas were the understanding of how kidneys work, management of the disease, and frequent medical appointments.

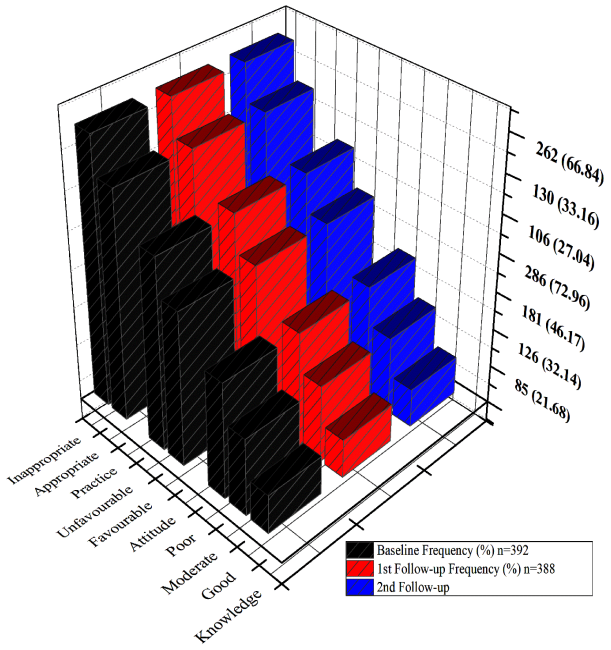
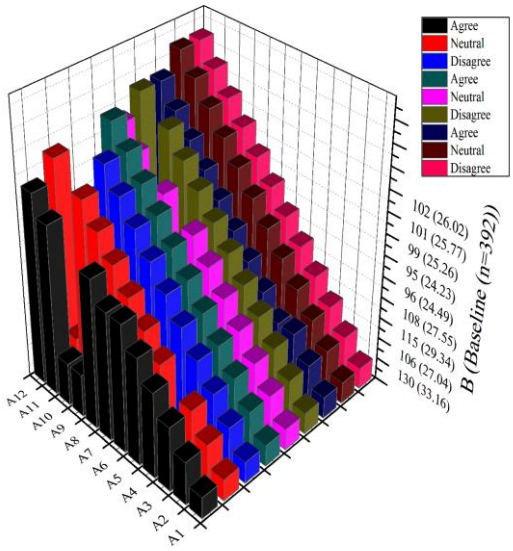


Figure 3: Regarding CKD management 3D stacked bar chart illustrating baseline responses to attitude-related statements (A1–A12).



Such sustained interventions contribute to better self-care practices, enhanced adherence to clinical recommendations, and improved overall disease management. Ongoing educational support may further strengthen long-term compliance and optimize clinical outcomes.

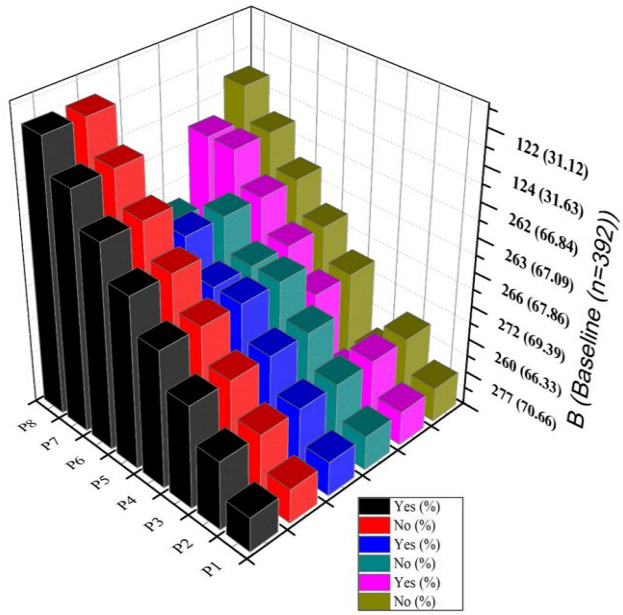


Figure 4: presents a 3D bar chart illustrating baseline responses to practice-related questions (P1–P8) concerning CKD management.

Progressive Improvement in (KAP) Across Follow-ups

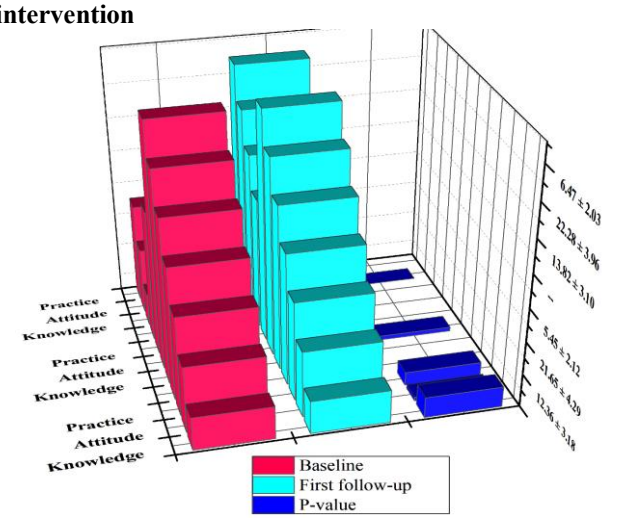
The highlighting effectiveness of structured educational interventions and continuous patient engagement.

Knowledge Improvement

A low percentage of participants at the onset of the study reported having high knowledge regarding chronic kidney disease (CKD) as a high percentage expressed inadequate knowledge. But following the educational intervention, knowledge levels increased significantly with the percentage of participants with good knowledge increasing significantly at every follow-up with 21.68% baseline rising to 82.81% at the second follow-up. Meanwhile, the percentage of persons possessing low levels of knowledge decreased significantly, which suggests that the educational program was efficient in raising CKD awareness.

With regard to attitude, the proportion of participants with a positive attitude towards CKD management increased gradually with a baseline of 72.96 percent, and 89.84 percent at the second follow-up, the attitudes towards treatment and lifestyle changes had shifted positively. On practice, practice of proper CKD management practices also increased considerably, and participants were more and more compliant with recommendations with time. These results demonstrate the effectiveness of the education interventions in improving knowledge, attitudes, and practices on CKD, which emphasizes that the long-term outcome improvements in patient care require ongoing education.

Figure 5: The 3D bar chart indicates a gradual increase in levels of (KAP) between the levels at the baseline, first, and second follow-up as a result of the educational intervention



Learning Evaluation Statistical (KAP) Scores over Time
Knowledge Improvement

The researchers noted that the (KAP) scores of the participants improved significantly in the course of the study. The knowledge score at the end of the first follow-up, at the second follow-up, and at the final follow-up showed that there was a significant increase in knowledge with a significant difference existing at the second follow-up. Though the attitude scores increased slightly, it was in a positive direction indicating a slow change in attitude of the participants with regard to CKD management. The attitude score increased progressively and statistically significant at the second follow-up. Regarding practice, there was a significant improvement in the mean score between baseline and first follow-up, and an extremely significant improvement between baseline and the second follow-up. This implies increased compliance with the management practices of CKD.

Although the differences in the knowledge and practice were significant, the fact that a steady increase in the attitude scores was observed means that a set of educational sessions is a necessary step towards establishing a longer-lasting behavior change. These findings underscore the importance of organized educational programs in enhancing CKD-related knowledge, attitudes and practices. Yet, these gains might have to be supported further to sustain them in the long-run.

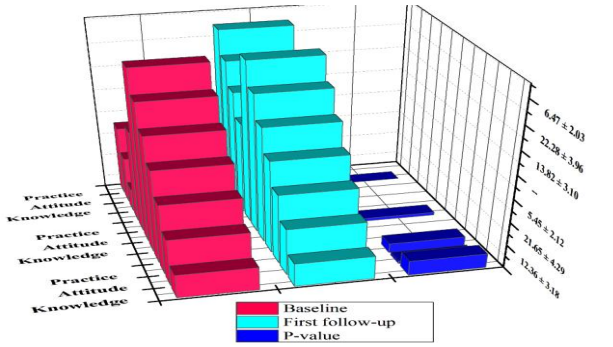


Figure 6: Comparison of the baseline and first follow-up KAP mean scores (red, cyan) and improvement in knowledge, attitude, and practice of the three groups with statistical significance (blue)

Discussion

Most previous studies have focused on pharmacist interventions among dialysis or inpatient CKD populations. In contrast, this study included all patients attending the nephrology unit for kidney care and evaluated the impact of pharmacist-mediated educational interventions on their (KAP). Before the intervention, patients received routine multidisciplinary care. The pharmacist first assessed baseline KAP levels and reviewed prescriptions for appropriateness of indication, dosage, medication suitability, dietary advice, and necessary lifestyle modifications. For patients with CKD, understanding the disease, laboratory parameters, medication use, and lifestyle adjustments is essential to achieve optimal therapeutic outcomes. The findings highlight the significant role of pharmacists in CKD management and improving clinical outcomes.

The study demonstrated a significant improvement in mean knowledge scores from baseline (12.36 ± 3.18) to first follow-up (13.82 ± 3.10) and further to second follow-up (16.50 ± 2.46). Similar improvements have been reported in studies conducted in Nepal. These findings indicate that repeated pharmacist-led educational interventions are necessary to achieve sustained knowledge gains, as adequacy of knowledge improved markedly by the second follow-up.

Attitude scores also improved significantly from baseline (21.65 ± 4.29) to 2nd follow-up (22.80 ± 3.66), although changes between consecutive follow-ups were not statistically significant. Nearly 90% of patients demonstrated a favorable attitude at the second follow-up. This suggests that while knowledge may improve quickly, changes in attitudes and beliefs require repeated and sustained interventions. Pharmacists have been shown to positively influence patient perceptions and behaviors in chronic disease management.

Practice scores improved significantly from baseline (5.45 ± 2.12) to 1st follow-up (6.47 ± 2.03) and further to 2nd follow-up (7.31 ± 1.58). By the end of the study, approximately 80% of patients demonstrated appropriate practices. These findings confirm that pharmacist-led education enhances patient adherence and self-management behaviors, potentially improving overall outcomes.

Strengths and Limitations

This single-center study provides important evidence on the role of pharmacists in improving CKD-related KAP. However, the absence of a control group may limit causal interpretation, and findings may not be generalizable to other settings. Future research should incorporate comparator groups and assess to further evaluate the impact of pharmacist interventions.

CONCLUSION

The highlights of the high response rate of pharmacist-based educational interventions in improving the (KAP) of (CKD) patients. The findings prove the efficacy of structured education to overcome knowledge gaps, empower patients to control their condition, and promote positive behavior change. After the intervention, patients demonstrated significant progress in their perception of CKD symptoms, risk factors, and nutrition and their attitude towards the condition changed to have more positive views and adherence to suggested management behaviors. Although these improvements were significant, to maintain these positive changes, regular follow-ups and additional support were needed. The paper focuses on the crucial role pharmacists have in the management of CKD, and why education and patient interaction should be continued. To attain the lasting impacts of the treatments on clinical outcomes and the overall quality of life of CKD patients, future studies should aim to determine how these interventions impact the health of the patients in the long-term in order to ensure that the interventions remain beneficial even after the study.

Acknowledgment

We would like to thank Department of Pharmacy Practice and Department of Pharmaceutical Chemistry and Analysis, Vels Institute of Science, Technology & Advanced Studies Chennai, Tamil Nadu-600117, India for their help and support to this research work.

Financial support and sponsorship

Nil.

Declarations

Conflict of interest

The authors state they have no known conflicting financial interests or personal relationships that would have seen to affect the work this paper reports..

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