



## THE ROLE OF PHARMACIST IN MEDICATION ADHERENCE AMONG PATIENTS WITH CHRONIC KIDNEY DISEASE

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### Abstract:

**Background:** Chronic kidney disease (CKD) poses a significant burden on healthcare systems, particularly in Australia, with rural and remote areas disproportionately affected. Patients with CKD often require complex medication regimens, but medication nonadherence is a common issue leading to poor outcomes. Pharmacists are well-positioned to support medication adherence in CKD patients through education, monitoring, and collaboration with healthcare teams.

**Objective:** This review aims to assess the role of pharmacists in improving medication adherence among CKD patients, explore barriers to adherence in this population, and examine the impact of pharmacist interventions on adherence.

**Conclusion:** Pharmacist-led interventions are vital for enhancing medication adherence in CKD patients. These interventions address barriers such as literacy issues and limited health access, ultimately improving patient outcomes. Evidence-based strategies, including multimodal education and interprofessional collaboration, have shown positive results in enhancing adherence and patient satisfaction. Patient preferences support the need for tailored pharmacist interventions, highlighting the importance of personalized approaches in supporting medication adherence for CKD patients. Increased utilization of pharmacist services is essential to optimize medication adherence and enhance the quality of care for individuals with CKD.

**Keywords:** barriers, interventions, patient perceptions, renal, compliance, medicines

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**Introduction:**

Chronic kidney disease (CKD) is a condition characterized by enduring functional and structural alterations in the renal system, frequently stemming from vascular complications of diabetes mellitus, organ-end damage due to hypertension, or glomerulonephritis, persisting for more than three months as a consequence of prolonged exposure to harmful substances [1]. The economic impact of CKD on the Australian healthcare system is substantial, with an estimated annual cost of around AUD 5.1 billion and approximately 1.3 million CKD-related hospitalizations each year. Rural and remote regions report nearly double the incidence of CKD cases compared to urban areas [2]. Among individuals of Aboriginal and Torres Strait Islander descent, CKD presents a significant health burden, with five times more hospital visits, potentially influenced by geographical isolation and socioeconomic challenges [3]. Managing CKD and its associated conditions often necessitates complex medication regimens to alleviate acute symptoms and impede or decelerate the progression of renal dysfunction [3].

Various obstacles hinder effective pharmacotherapy in CKD patients, with medication nonadherence being a prominent issue. Nonadherence to prescribed medications can hasten the advancement of renal failure, resulting in elevated morbidity and mortality rates [4]. The World Health Organization (WHO) identifies five key determinants of patient medication adherence, categorizing them in order of significance within the "donut model": (1) patient-related factors, (2) socioeconomic factors, (3) healthcare system and healthcare professional factors, (4) medication-related factors, and (5) condition-related factors. All healthcare providers, including physicians, nurses, and pharmacists, have a role in recognizing and addressing factors that may impede a patient's medication adherence at various stages of their healthcare journey [5]. However, this task can be intricate and demanding, particularly with patients managing the extensive medication regimens typical of CKD. Consequently, healthcare interventions aimed at supporting adherence to CKD-related medication regimens are infrequently implemented in practice. Pharmacist-led interventions, such as medication reviews, motivational counseling, and hospital discharge care transition plans, may prove pivotal in mitigating factors that hinder medication adherence [6]. Nevertheless, the effective execution of these interventions and the utilization of current adherence measurement practices in dialysis settings are not yet firmly established or explored. Patients with advanced CKD often undergo regular

hemodialysis therapy, presenting an opportunity for pharmacist interventions related to medications [7]. While pharmacists are recognized to have a role in clinical nephrology settings, the specifics of this role remain ambiguous. A deeper comprehension of the pharmacist's contribution to supporting medication adherence in the CKD context will facilitate a more thorough evaluation of the effectiveness of pharmacist interventions and the identification of best practices for managing this multifaceted disease [8].

**Objectives:**

The main objectives of this review are:

1. To assess the role of pharmacist in medication adherence among patients with chronic kidney disease.
2. To explore the barriers and challenges faced by patients with chronic kidney disease in adhering to their medication regimens.
3. To examine the impact of pharmacist interventions on improving medication adherence in patients with chronic kidney disease.

**The role of pharmacist in medication adherence among patients with chronic kidney disease:**

Patients with chronic kidney disease (CKD) often face the challenge of managing complex medication regimens in order to control symptoms and slow the progression of the disease. Non-adherence to these medications can have serious consequences, including worsening of CKD, increased healthcare costs, and decreased quality of life. Pharmacists play a vital role in supporting patients with CKD in improving medication adherence through a variety of interventions and strategies [9].

Pharmacists, as highly trained healthcare professionals specializing in medications and their effects, collaborate closely with patients with CKD to provide education on their medications. This includes explaining the purpose of each medication, proper administration techniques, and potential side effects. By helping patients understand the importance of adhering to their medication regimen, pharmacists empower them to actively manage their health and adhere to prescribed medications [10].

In addition to education, pharmacists also monitor medication adherence among patients with CKD using tools such as medication adherence assessments, pill counts, and medication synchronization programs. By identifying patients who may be struggling with adherence, pharmacists can develop personalized strategies to improve adherence. This may involve simplifying

medication regimens, addressing barriers to adherence, and providing ongoing support and encouragement. Furthermore, pharmacists collaborate with other healthcare team members, including physicians, nurses, and dietitians, to ensure patients with CKD receive comprehensive and coordinated care [11].

Regular communication among healthcare providers allows for sharing of information on patients' medication adherence, progress, and any challenges that may arise. By working together, healthcare providers can promptly address medication-related issues, ultimately enhancing patient outcomes and quality of life [12].

### **Barriers to adherence:**

Barriers to medication adherence in patients with Chronic Kidney Disease (CKD) were identified in a study, highlighting two key themes: literacy and health access. Within these themes, several sub-themes were linked, including lifestyle, regimen complexity, and confusion under literacy, and cost and logistics under health access. Patients receiving dialysis often struggle with medication adherence, frequently forgetting to take their prescribed medications, adjusting their medication routines based on their lifestyles, and lacking a comprehensive understanding or feeling confused about their medications and CKD condition [13]. The complexity of medication regimens, coupled with unnecessary medications and limited family and social support, were also cited as significant barriers to adherence.

Yeung and colleagues employed the modified Pharmacy Quality Alliance Proportion of Days Covered (PDC) model to assess medication adherence before and after exposure to educational materials targeting low health literacy, such as flashcards and videos [14]. The study underscored the critical role of health literacy in influencing medication adherence. Furthermore, a significant correlation was observed between age and adherence, with nonadherence rates notably higher among patient groups under 50 years of age ( $p < 0.05$ ) [15].

On the other hand, health access emerged as another prominent barrier to medication adherence. Financial constraints, encompassing treatment costs and low household income, along with the logistical hurdles associated with obtaining medications, were identified as key factors contributing to patient nonadherence. Nonadherence was particularly prevalent for medications like angiotensin-2 receptor blockers, angiotensin-converting enzyme inhibitors, and dihydropyridine calcium channel blockers, with notably low adherence rates reported [16].

### **Evidence based interventions:**

A study highlighted the significance of utilizing multimodal disease and medication education in pharmacist-led interventions to enhance medication adherence among Chronic Kidney Disease (CKD) patients. The research involved the use of smart-phone activated quick-response (QR) codes that were linked to educational videos and flashcards to convey crucial information to patients [17,18]. Patients who belonged to the intervention group and engaged with educational videos related to their medications and disease conditions exhibited a notable increase in medication adherence compared to those in the control group who did not have access to such educational resources, with a substantial 29% difference ( $p < 0.001$ ).

In cases where patients had low literacy skills, the implementation of QR-coded educational videos and images, which focused on utilizing simple terminology, images, and spoken phrases, led to a significant enhancement in patient medication adherence ( $p < 0.01$ ). Notably, a study by Yeung et al. conducted an extensive 180-day intervention aimed at enhancing knowledge, which resulted in a remarkable improvement in adherence based on dispensing data, showing a 71% adherence rate in the intervention group versus 44% in the control group ( $p = 0.0069$ ).

Similarly, the study by Qudah et al. targeted both knowledge and behavior by monitoring patient engagement in home blood pressure monitoring, medication adherence, and attendance at dialysis sessions. Patients in the intervention group who received weekly engagement with their pharmacist or physician over a 15-week period showed positive improvements. Specifically, 46% of patients in the intervention arm achieved the blood pressure target compared to only 14.3% in the control arm ( $p = 0.02$ ). The intervention group also experienced a significant average decline in weekly mean home systolic blood pressure compared to an increase in the control arm. However, there was no notable reduction in weekly home diastolic blood pressure, dialysis blood pressure readings, or interdialytic weight gain in either group.

Furthermore, collaborative care between pharmacists and physicians was found to have a beneficial impact on patient adherence by reducing adverse events and optimizing therapeutic outcomes. The involvement of a pharmacist in a team supporting CKD patients led to improved adherence to primary care guidelines [20].

Additionally, Song et al. demonstrated that pharmacist-led medication reviews at discharge significantly decreased the number of drug-related

errors with high statistical significance ( $p < 0.001$ ). Data collected on drug-related errors at discharge, the necessity for a doctor's appointment regarding CKD therapy within three months post-discharge, and emergency department visits within six months post-discharge due to CKD medication issues supported these results. Although medication adherence scores were higher in the intervention group led by pharmacists, the difference was not statistically significant [21].

### Pharmacist and patient perceptions:

In three studies, the significance of pharmacist-led interventions and their effectiveness as perceived by pharmacists was deliberated upon. Pharmacists expressed their belief in being highly effective yet underutilized in enhancing patient medication adherence. They highlighted the constraints of limited time allocated for implementing adherence-improving interventions and the shortage of pharmacists to carry out these crucial roles. Patient feedback echoed this sentiment, with a notable 77.5% and 92% of patients acknowledging pharmacist interventions as highly satisfactory and effective in enhancing adherence, expressing willingness to recommend the service to others [22].

Patients also indicated a preference for a diversified approach to pharmacist interventions. The combination of patient counseling along with informational leaflets emerged as the most favored method (68%), followed by standalone patient counseling (20%) and leaflets (12%). A significant proportion (42%) favored medication counseling during dialysis, with a consensus that educational materials related to medications during dialysis sessions would be beneficial (77.5%). Interestingly, a minority (37.7%) believed that their physician should handle the medication counseling role [23].

### Conclusion:

In conclusion, pharmacist-led interventions play a crucial role in improving medication adherence among patients with chronic kidney disease (CKD). Patients with CKD often face complex medication regimens and barriers to adherence, such as literacy issues and limited health access. Evidence-based interventions, including multimodal education and collaborative care between pharmacists and physicians, have shown positive outcomes in improving medication adherence and patient outcomes. Pharmacists are perceived as effective in supporting medication adherence, but there is a need for greater utilization of their services and resources. Patient preferences lean towards multi-modal delivery of pharmacist interventions,

highlighting the importance of tailored approaches to support medication adherence in CKD patients. Overall, pharmacist interventions have the potential to significantly impact medication adherence and improve the quality of care for patients with CKD.

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