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ACCESS THE MEDICATION ADHERENCE IN THE CHRONIC KIDNEY DISEASE PATIENT WHILE USING THE ANTIHYPERLIPIDEMIC DRUGS: A SYSTEMIC LITERATURE REVIEW

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ABSTRACT

Chronic Kidney Disease (CKD) is a progressive and long-term condition characterized by structural or functional kidney abnormalities persisting for at least three months, leading to gradual loss of renal function and increased risk of complications such as cardiovascular disease, anemia, and metabolic disorders. CKD is classified into five stages based on glomerular filtration rate (GFR), ranging from mild kidney damage to end-stage renal disease requiring dialysis or transplantation. Globally, CKD affects approximately 9–10% of the population and represents a significant public health burden, particularly in low- and middle-income countries where early detection and management remain limited. Among its complications, dyslipidemia plays a critical role in accelerating cardiovascular risk, making antihyperlipidemic therapy especially statins a cornerstone in CKD management. Medication adherence is a crucial factor in determining clinical

outcomes in CKD patients, as the disease often requires long-term and complex pharmacotherapy. The Adherence to Refills and Medications Scale (ARMS) is a validated self-reported tool used to assess adherence, particularly in patients with low health literacy, by evaluating both medication-taking and prescription refill behaviors. However, adherence in CKD is frequently suboptimal due to factors such as polypharmacy, adverse drug effects, poor disease awareness, and socioeconomic barriers. Non-adherence is associated with faster disease progression, poor control of comorbidities, increased hospitalization, and higher mortality rates. Clinical pharmacists play a vital role through medication review, patient counseling, and continuous monitoring, contributing significantly to improved adherence and therapeutic outcomes. Overall, enhancing adherence particularly to antihyperlipidemic therapy is essential for reducing complications, slowing disease progression, and improving the quality of life in CKD patients.

KEYWORDS: Chronic Kidney Disease, Medication Adherence, ARMS Scale, Dyslipidemia.

OVERVIEW OF CHRONIC KIDNEY DISEASE

According to WHO, Chronic Kidney Disease (CKD) is described as a long-term condition in which the kidneys are damaged and cannot filter blood effectively, leading to a gradual loss of kidney function over time. The disease is considered chronic because it persists for months to years and often progresses silently until significant damage has occurred.[1]

Regardless of the underlying etiology, chronic kidney disease is defined as either kidney damage or a reduced level of renal function that lasts for at least three months. CKD is present when GFR is less than 60 mL/min/1.73 m² for ≥3 months, even if there are no other signs of kidney damage. This threshold was chosen because below this level, the risk of complications such as cardiovascular disease, anemia, and bone disorders increases significantly. By including both structural damage and functional decline, the definition captures early as well as advanced stages of disease.[2]

Another crucial idea discussed is that CKD is more than just a lab abnormality; it is a progressive, chronic disease with significant health effects.[2]

STAGES OF CHRONIC KIDNEY DISEASE

5-stage classification system based on the level of kidney function: Stage 1 (G1):

GFR ≥ 90 mL/min/1.73 m² Normal or high kidney function

But with evidence of kidney damage (e.g., proteinuria, structural abnormalities)

Stage 2 (G2)

GFR 60–89 mL/min/1.73 m² Mild reduction in kidney function

Still requires evidence of kidney damage for CKD diagnosis

Stage 3 (G3)

GFR 30–59 mL/min/1.73 m² Moderate reduction

CKD is present even without other markers of damage

Stage 4 (G4)

GFR 15–29 mL/min/1.73 m² Severe reduction in kidney function

High risk of progression to kidney failure

Stage 5 (G5)

GFR < 15 mL/min/1.73 m²

Kidney failure (End-Stage Renal Disease) Often requires dialysis or transplantation

EPIDEMIOLOGY

One of the most common non-communicable diseases, chronic kidney disease (CKD) has become a significant worldwide health burden, affecting around 9–10% of the world's population. The aging of the population and the rising rates of important risk factors including diabetes, hypertension, and obesity are the main causes of the epidemiology's continuous rise in prevalence and incidence. All regions are affected by the disease, although low- and middle- income nations have a disproportionately larger burden because their healthcare systems frequently lack the resources necessary for early detection and treatment. As a result, many people don't receive a diagnosis until a long time later.[3]

COMPLICATIONS ASSOCIATED WITH CHRONIC KIDNEY DISEASE

Several systemic issues linked to chronic kidney disease (CKD) get worse as kidney function deteriorates. These include cardiovascular problems, which include heart failure, hypertension, and vascular disease and are the main cause of death. The article also discusses electrolyte imbalances like hyperkalemia and metabolic acidosis brought on by impaired

renal excretion, as well as anemia brought on by decreased erythropoietin production. In addition, mineral and bone problems (disturbances in calcium-phosphate metabolism) brought on by chronic kidney disease (CKD) result in weak bones. Due to immune system failure, patients are more susceptible to infections and frequently experience fluid overload, which worsens edema and lung congestion. As the illness worsens, uremic toxin buildup causes gastrointestinal and neurological symptoms that eventually lead to end-stage renal disease (ESRD), which requires dialysis or kidney transplantation.[4]

DYSLIPIDEMIA IN CHRONIC KIDNEY DISEASE

Patients with chronic kidney disease (CKD) frequently have dyslipidemia, a metabolic disorder marked by an unusual lipid profile that differs from that of the general population. Rather than only higher LDL cholesterol, the normal pattern also includes decreased HDL cholesterol, rising triglyceride levels, and qualitative changes in lipoproteins. These anomalies, which include altered lipoprotein clearance and decreased activity of enzymes involved in lipid breakdown, are brought on by impaired lipid metabolism brought on by decreased renal function.

The article also highlights the critical role dyslipidemia plays in the development of cardiovascular disease, the primary cause of death for people with chronic kidney disease. These lipid abnormalities become more noticeable when renal function declines and lead to vascular damage and atherosclerosis. As a result, dyslipidemia in CKD is both a metabolic problem and an important therapeutic target. Lipid-reducing medications, such statins, are crucial for lowering cardiovascular risk, particularly in the early stages of CKD.[5]

ANTIHYPERLIPIDEMIC DRUGS IN CHRONIC KIDNEY DISEASE

1. Statins (first-line therapy)

Primary drugs for CKD patients not on dialysis Reduce LDL cholesterol and cardiovascular risk

Recommended in most patients with CKD (especially ≥50 years)

2. Statin + Ezetimibe combination

Used when LDL targets are not achieved with statins alone More effective lipid lowering in moderate to severe CKD

Commonly recommended in reduced eGFR patients

3. Ezetimibe

Option for patients intolerant to statins Reduces intestinal cholesterol absorption.

4. Fibrates (with caution)

Mainly used for high triglycerides Require dose adjustment in CKD

Risk of myopathy, especially when combined with statins.[5]

MEDICATIONS ADHERENCE

The World Health Organization defines adherence as the degree to which a person's actions—such as taking medication, adhering to a diet, and making lifestyle modifications—correspond with recommendations made by medical professionals.[1][6]

Types

Though often used interchangeably, these have distinct meanings:

A) Adherence

- Active, patient-centered concept
- Patient agrees with and follows treatment plan
- Reflects informed participation

B) Compliance

- Older term
- Implies passive following of doctor's instructions
- Less preferred now because it ignores patient autonomy

C) Persistence

- Duration of time a patient continues treatment
- Measured from initiation → discontinuation

Methods of Assessing Medication Adherence

1. Subjective Methods

Subjective approaches, which rely on patient or caregiver reporting, are popular because they are cost-effective and simple to implement.[11]

a) Patient self-report

When patients are asked directly about how they take their drugs, if they skip doses, or whether they struggle to stick to the plan. This method is easy to use in clinical practice and

provides insight into the views of patients toward therapy, beliefs, and problems. However, adherence is very susceptible to recall bias and social desirability bias because patients may overreport it to please healthcare providers or out of fear of being evaluated. Accuracy is also impacted by the patient's cognitive state.[11]

b) Adherence to Refills and Medication Scale (ARMS)

It is a validated, self-reported method that records prescription refill and drug-taking behaviors in an understandable manner to assess medication adherence in patients with chronic diseases, particularly those with low health literacy. The 12-item scale is divided into two domains: four items gauge how frequently patients receive prescription refills, and eight items measure how frequently patients take their medications as prescribed. Every item is evaluated using a Likert scale with four points, ranging from "none of the time" to "all of the time." The total score ranges from 12 to 48, where higher numbers indicate less adherence and lower levels indicate better adherence.[7]

Scoring System

1. Uses a 4 – point Likert Scale :

- 1 = None of the time
- 2 = Some of the time
- 3 = Most of the time
- 4 =All of the time

2. **Total Score ranging**

- 12 (best adherence)
- 48 (worst adherence)[7]

2. Objective Methods

Objective methods provide more measurable and reliable data on adherence.

a) Pill Count Method

The number of medication left and the number prescribed are compared to measure adherence. This method is fairly simple, inexpensive, and provides a more objective assessment than self- report.[8]

b) Pharmacy Refill Records

It records the frequency with which patients receive prescription drug refills. Metrics like the

Proportion of Days Covered (PDC) and Medication Possession Ratio (MPR) are commonly calculated using these information. This method is particularly useful for long-term adherence monitoring and is less affected by patient bias.[9]

c) Electronic Monitoring

A more advanced method is electronic monitoring, such as Medication Event Monitoring Systems (MEMS), which use smart pill containers to record the time and date each time the container is opened. Because it provides thorough information on time and dose patterns, this is thought to be one of the most accurate methods for assessing adherence. It is particularly useful in research settings when precise adherence data are required.[10]

Medication Adherence in Chronic Kidney Disease

The level to which people with chronic kidney disease take their prescribed medications in accordance with the recommended dosage, timing, and frequency over an extended period of treatment is known as medication adherence in CKD patients. This is essential because CKD is a chronic and progressive condition that requires multiple medications to control complications like hypertension, anemia, and dyslipidemia. Adherence is a complex concept that includes initiation (beginning treatment), implementation (proper daily usage), and persistence (continuing therapy over time).

The research also emphasizes how CKD patients frequently have unsatisfactory medication adherence because of things like a heavy pill load, complicated regimens, side effects, therapy costs, and a lack of knowledge about how the illness develops. Patients with chronic kidney disease (CKD) are often prescribed many drugs due to comorbidities including diabetes and cardiovascular disease, which raises the risk of non-adherence. The study emphasizes that poor adherence is a crucial component of disease treatment and a major target for therapeutic therapies as it directly leads to quicker CKD development, more hospitalizations, and greater mortality.[12]

Adherence to Hyperlipidemic Drugs in Chronic Kidney Disease

The degree to which patients regularly take lipid-lowering medications, particularly statins, as directed in terms of dosage, timing, and duration while having a chronic and sometimes asymptomatic illness is known as medication adherence in CKD patients using antihyperlipidemic therapies. According to the paper, patients with chronic kidney disease (CKD) typically take many drugs (polypharmacy) for concurrent illnesses such diabetes,

hypertension, and anemia, which increases pill load and decreases compliance. In addition, because dyslipidemia does not cause symptoms right away, patients may not see the rapid advantages of statins, which might result in low treatment adherence. Nonetheless, the study highlights that consistent and appropriate use of statins is an essential part of controlling chronic kidney disease (CKD) since it significantly decreases the risk of cardiovascular complications, slows the progression of the disease, and improves overall survival.[14]

Factors Affecting Medication Adherence in Chronic Kidney Disease

CKD patients' medication adherence is impacted by a number of interconnected variables. According to the study, adherence is greatly decreased by treatment-related issues such a heavy pill load, complicated medication regimens, and side effects. Lack of knowledge regarding chronic kidney disease (CKD), ignorance of the long-term advantages of treatment, forgetfulness, and unfavorable attitudes about medications are patient-related problems. Non-adherence is also influenced by psychological and social issues such poor motivation, depression, and a lack of family or social support. Adherence is also made worse by aspects of the healthcare system, such as poor counseling, a lack of continuity of treatment, and poor contact with healthcare professionals. In order to improve results, the study highlights that non- adherence in chronic kidney disease (CKD) is a complex issue that calls for patient education, reduced regimens, and solid patient-provider communication.[13]

Impact of Non Adherence in Chronic Kidney Disease

Clinical results are significantly harmed when patients with chronic kidney disease (CKD) do not take their medications as prescribed. According to the study, individuals with poor adherence had a higher chance of the illness progressing to advanced stages and a quicker drop in kidney function (lower GFR), which increased the possibility that they would need dialysis or other renal replacement therapy. Poor blood pressure control and other comorbid illnesses have also been linked to non-adherence, which hastens kidney damage.Adherence is essential for delaying the course of chronic kidney disease (CKD) and improving patient prognosis since noncompliance results in lower clinical outcomes, more complications, and higher healthcare utilization.[15]

Stratergies to Improve Medication Adherence

Improving medication adherence in CKD patients can be effectively achieved through mobile health (mHealth)–based strategies. The study highlights that mobile applications enhance adherence by providing automated medication reminders, which help patients take drugs at

the correct time and reduce forgetfulness. These apps also offer educational content about CKD and its treatment, improving patient understanding and motivation to adhere to therapy. Additionally, features such as self-monitoring tools (for tracking medication intake, blood pressure, or symptoms), feedback systems, and alerts to healthcare providers support continuous engagement and accountability. The review further emphasizes that integration of digital tools with healthcare support, such as pharmacist or clinician follow-up through the app, significantly improves adherence outcomes by reinforcing behavior and addressing patient concerns in real time.[16]

Role of Pharmacist in Medication Adherence

Through thorough medication management, clinical pharmacists play a crucial role in enhancing medication adherence in patients with chronic kidney disease. One of their primary responsibilities is medication review and reconciliation, where they find drug-related concerns that are frequently brought on by polypharmacy in CKD, such as improper dosage, drug-drug interactions, and duplication of therapy. Additionally, pharmacists assist in simplifying complicated regimens, adjusting dosage schedules, and ensuring that drugs—including antihyperlipidemic medicines like statins—are safe and suitable for the patient's renal function level, all of which directly increase adherence.

Another major role is patient education and counseling, which addresses knowledge gaps and misconceptions about CKD and its treatment. Pharmacists advise patients on possible side effects and how to handle them, give clear instructions on how to take medications, and stress the value of long-term adherence even in illnesses like dyslipidemia that don't show symptoms.

Patients' self-assurance, drive, and involvement in their care all increase as a result. The study also emphasizes the significance of behavioral and supportive treatments that assist patients in forming regular medication-taking habits, such as motivational interviewing, adherence aids (pill boxes, charts), and reminder systems.

Additionally, clinical pharmacists collaborate with doctors and other healthcare providers to provide continuous monitoring and follow-up. They monitor patient development, routinely evaluate adherence, and modify treatment as needed. In some treatments, pharmacists also use telepharmacy services and digital health technologies to stay in constant communication with patients, give feedback, and encourage adherence. The study's overall findings highlight the

complex nature of pharmacist-led treatments, which use behavioral, educational, and clinical techniques to greatly increase medication adherence and clinical outcomes in patients with chronic kidney disease.[17]

CONCLUSION

Anemia, metabolic disorders, dyslipidemia, cardiovascular disease, and other serious consequences are all linked to chronic kidney disease (CKD), a progressive illness that raises morbidity and mortality. Antihyperlipidemic medication, particularly statins, is a crucial aspect of managing chronic kidney disease (CKD) since dyslipidemia increases cardiovascular risk.

However, appropriate drug adherence—which is frequently restricted in CKD patients due to polypharmacy, complicated regimens, side effects, and a lack of knowledge about the illness and its long-term consequences is crucial to the efficacy of these treatment options.

Clinical outcomes in chronic kidney disease (CKD) are significantly influenced by medication adherence, as noncompliance increases the rate of disease progression, complications, and healthcare utilization. Particularly for individuals with minimal health literacy, instruments such as the Adherence to Refills and Medications Scale (ARMS) offer a trustworthy way to evaluate adherence. A variety of approaches is needed to improve adherence, including patient education, regimen simplification, the application of digital health techniques, and the active participation of clinical pharmacists. To improve overall patient outcomes, lessen the burden of illness, and increase treatment efficacy, such incorporated therapies are crucial.

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