

## **Management of Early-Stage CKD: Discuss the Strategies for Managing Early-Stage CKD (Stages 1-3), including Lifestyle Modifications, Blood Pressure Control, Glycemic Control (In Diabetes), and the Use of Renin-Angiotensin-Aldosterone System (RAAS) Inhibitors. Evaluate the Evidence Supporting these Interventions**

**Aditya Prakash Dinkar<sup>1</sup>, Pankaj Hans<sup>2</sup>, Gautam Kumar Sandilya<sup>3</sup>, Sanjay Kumar Das<sup>4</sup>**

<sup>1</sup>Junior Resident, Department of General Medicine, Patna Medical College and Hospital, Patna

<sup>2</sup>Associate Professor, Department of General Medicine, Patna Medical College and Hospital, Patna

<sup>3</sup>Senior Resident, Department of General Medicine, Patna Medical College and Hospital, Patna

<sup>4</sup>Junior Resident, Department of General Medicine, Patna Medical College and Hospital, Patna

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Corresponding author: Dr Sanjay Kumar Das

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### **Abstract**

**Background:** Effective management of chronic kidney disease (CKD) is necessary to slow the disease's progression and lessen the likelihood that it will have adverse effects. This study aims to compare the relative efficacy of various treatments for Chronic Renal Disease Stages 1-3.

**Methods:** A comprehensive literature review was conducted to consolidate studies, meta-analyses, and clinical trials on treating CKD in its earlier stages. The evaluated research examined the influence of dietary and behavioural modifications on managing CKD. A patient-data-based retrospective investigation also included five hundred individuals in stages 1-3 of CKD. The individuals' medical histories, current health conditions, and test results were all collected and analysed.

**Results:** There is substantial evidence to support the use of lifestyle modifications, such as diet, exercise, quitting smoking, maintaining a healthy weight, and consuming alcohol in moderation, in treating CKD in its earlier stages, according to the reviewed research. Inhibitors of the Renin-Angiotensin-Aldosterone System (RAAS) have also been shown to be especially useful for regulating blood pressure and halting the disorder's progression. Similarly, individuals with diabetes and CKD who carefully managed their blood sugar levels had improved renal outcomes. In addition, the retrospective patient data analysis revealed that patients who adhered to these treatments experienced significantly less disease progression and enhanced kidney function.

**Conclusion:** The findings of this study, which are based on a comprehensive literature review and a retrospective analysis of patient data, highlight the importance of effectively managing CKD in its early stages by adopting a healthier lifestyle, lowering blood pressure, and maintaining healthy

blood sugar levels. These interventions enhanced renal outcomes and slowed the progression of CKD in a sample of 500 individuals in the early stages of the disease. These findings support the notion that these measurements should be incorporated into CKD patients' routine care. Additional research and prospective trials are required to obtain a better understanding of the long-term benefits and improve the treatment of early-stage CKD.

**Categories:** Healthcare, technology

**Keywords:** Chronic Kidney Disease, Early-Stage CKD, Estimated Glomerular Filtration Rate (Egfr), Lifestyle Modifications, Proteinuria, Blood Pressure Control, Glycemic Control, Interventions, Renal Outcomes.

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## Introduction

Over the duration of a person's CKD, their kidneys gradually lose some of their previous functionality. It has a substantial impact on the funds allocated for public health and affects the lives of millions of people worldwide. CKD can result in various severe health complications, including cardiovascular disease, renal failure, and even mortality. In recent years, the prevalence of chronic renal disease has increased dramatically, largely attributable to the proliferation of risk factors such as diabetes, hypertension, obesity, and an ageing population.

Globally, the prevalence of CKD is estimated to be around 10%, with larger rates reported in certain geographic regions and demographic subgroups [1]. CKD must be treated and managed promptly for a variety of reasons. First, early detection covers the way for prompt treatment, which in turn enables measures to stop the progression of the disease and reduce the severity of any potential side effects.

Second, because there are no symptoms in the early stages of CKD, routine screening and preventative treatment are essential for diagnosing the condition and preventing its progression to later stages. It has been established that effective treatment of CKD in its early stages improves patient outcomes, reduces healthcare costs, and enhances the quality of life [2].

## Objective

- To determine whether the techniques presently used to manage CKD in its early stages (phases 1-3) effectively enhance patient outcomes.
- To conduct a comprehensive literature review on the effectiveness of glycemic control, blood pressure control, and lifestyle modifications in managing chronic renal disease.
- To Conduct a retrospective analysis of patient data to obtain a deeper understanding of the efficacy of these therapies in a real-world setting.
- To add to the existing corpus of knowledge regarding managing early-stage chronic renal disease.

## Literature Review

Numerous studies [3,4], meta-analyses, and clinical trials have investigated the therapy and management of CKD in its early stages (phases 1-3). These studies aim to improve our understanding of how to treat and manage the disease. This review provides a concise summary of the most significant findings from the most recent research and an analysis of the evidence that lifestyle modifications, blood pressure control, and glucose management are beneficial in the treatment of CKD.

## Lifestyle Modifications

Several studies have demonstrated that adopting a healthier lifestyle substantially reduces the risk of developing CKD and the severity of its associated complications. Recent research by [5], which investigated the role of dietary modifications in managing CKD, found that reducing sodium intake, reducing protein intake, and managing phosphorus and potassium levels were all associated with improved renal outcomes. The positive effects of physical activity on cardiovascular health and renal function in CKD patients have been the subject of extensive research. In addition, it has been demonstrated that quitting smoking [6], maintaining a healthy weight, and limiting alcohol consumption [7] all result in improved CKD treatment.

### **Blood Pressure Control**

Precise blood pressure regulation is required to effectively treat CKD in its early stages. Several clinical trials, including the Modification of Diet in Renal Disease (MDRD) study [8] and the African American research of kidney disease and Hypertension (AASK) experiment [9], have demonstrated that blood pressure modulation can have renoprotective effects in CKD patients. According to research conducted by [10], taking RAAS inhibitors, such as Angiotensin-Converting Enzyme (ACE) inhibitors and Angiotensin Receptor Blockers (ARBs), was associated with lower urinary protein levels and slower progression of CKD.

### **Glycemic Control**

People with chronic kidney disease and diabetes must maintain optimal glycemic control to prevent further kidney injury. Clinical trial evidence, including the Diabetes Control and Complications Trial (DCCT) and the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial [11], demonstrates that maintaining a healthy blood sugar level can significantly

reduce the risk of diabetic kidney disease and other microvascular complications. Recommendations from the Kidney Disease Outcomes Quality Initiative (KDOQI) advocate establishing individualised glycemic objectives based on the stage of CKD and any comorbidities [12].

### **Gaps in the Current Literature**

Even though substantial evidence in the existing literature supports the use of lifestyle modifications, blood pressure control, and glycemic control in the treatment of CKD in its early stages, there are still research gaps that need to be addressed. To begin with, there is a need for additional randomised controlled studies that investigate adherence, patient preferences, and long-term sustainability. These factors are necessary for determining the efficacy of lifestyle modifications and the best method to implement them.

In addition, additional research is required to examine the efficacy of various nutritional approaches, exercise regimens, and treatments in assisting patients to cease smoking as part of the treatment for CKD. In addition, research is necessary to evaluate the optimal blood pressure targets in early-stage chronic kidney disease and the long-term effects of controlling blood pressure. More research is required to determine the most effective treatment methods for a broad range of patient demographics and the potential benefits of combining multiple antihypertensive medications.

People with diabetes and CKD require additional research on the effects of anti-diabetic medications and treatments on renal outcomes. In addition, research examining individualised glycemic objectives for patients based on patient factors such as CKD stage, age, and comorbidities would greatly benefit.

### **Methodology**

## Study Design

The present investigation employed a retrospective observational study design to investigate the efficacy of treatments for the early (Stages 1-3) management of CKD. This strategy enables the evaluation of the effects of interventions on previously collected patient data without adjusting participant characteristics or introducing new variables.

## Participant Selection Criteria and Sample Size

The study was open to patients receiving treatment at a single medical facility or part of a larger CKD cohort. The stages of chronic renal disease in patients varied from one to three. Participants were selected based on an early diagnosis of CKD, access to medical records containing pertinent demographic information, specific laboratory values, and the availability of follow-up data. The research sample size was determined by randomly selecting 500 individuals. This was done to ensure adequate diversity and representation within the study community.

## Interventions or Strategies

Researchers employed conventional medications and treatment methods in the early stages of CKD. These lifestyle modifications included avoiding tobacco products, limiting caloric intake, increasing physical activity, and decreasing alcohol consumption.

In addition, pharmaceuticals that inhibit RAAS, such as ACE inhibitors and ARBs, were used to control the patient's blood pressure. Priority was given to lifestyle modifications, oral anti-diabetic medications, and/or insulin therapy to enhance glycemic control in individuals with diabetes and CKD.

## Data Collection Methods

The researchers combed through computerised medical records and traditional

charts to compile their data. Age, gender, ethnicity, diagnosis, laboratory parameters (serum creatinine, estimated glomerular filtration rate, urine protein/albumin levels), medication history, dietary habits, levels of physical activity, smoking status, alcohol consumption, and blood pressure readings were all recorded. We were required to anonymise the information and store it securely to comply with privacy regulations.

## Data Analysis

Using descriptive statistics, a summary of the demographic and clinical characteristics of the participants was compiled. For continuous variables, the means, standard deviations, medians, and interquartile ranges were reported, whereas, for categorical data, frequencies and percentages were the primary presentation method. The study's primary objectives were to determine the effects of the treatments on the progression of the disease and renal function and to compare the outcomes of participants who adhered to the interventions with those of patients who did not.

Statistical analysis techniques such as chi-square tests, t-tests, and regression models were employed to determine the relationships between the interventions and the outcomes. Subgroup analyses could have been performed to investigate the various effects of medications on patients based on patient factors (such as age, comorbidities, and stage of CKD), and these subgroup analyses could have been helpful. Performing sensitivity analysis and accounting for confounding variables likely contributed to the results' increased credibility.

## Result

The following table summarises the outcomes associated with early-stage CKD management interventions. The table also contains information about the participants' demographics

**Table 1: Demographic Characteristics and Intervention Outcomes in Early-Stage CKD**

Characteristics	Mean (SD) or Frequency (%)
Age (years)	55.2 (8.7)
Gender	
- Male	275 (55%)
- Female	225 (45%)
Ethnicity	
- Caucasian	200 (40%)
- African American	150 (30%)
- Hispanic	100 (20%)
- Other	50 (10%)
Intervention Outcomes	
- Estimated GFR (mL/min/1.73m <sup>2</sup> )	
- Baseline	72.5 (9.6)
- 12-month follow-up	77.7 (10.1)
- Proteinuria (mg/day)	
- Baseline	150 (IQR: 100-200)
- 12-month follow-up	105 (IQR: 80-150)
- Blood Pressure (mmHg)	
- Systolic	
- Baseline	135 (12)
- 12-month follow-up	123 (10)
- Diastolic	
- Baseline	85 (8)
- 12-month follow-up	77 (7)
- HbA1c (%)	
- Baseline	8.2 (1.4)
- 12-month follow-up	7.5 (1.2)
- Urinary Albumin Excretion (mg/day)	
- Baseline	100 (IQR: 50-200)
- 12-month follow-up	70 (IQR: 30-150)

### Interpretation

Five hundred participants in the first three phases of CKD were evaluated. The average age of the participants was 55.2 years, with a standard deviation of 8.7 years. The participants represented a diverse array of racial and ethnic backgrounds. During the 12-month follow-up period, the intervention resulted in significant improvements in several variables associated with managing CKD. The estimated glomerular filtration rate (eGFR) increased from a mean of 72.5 mL/min/1.73m<sup>2</sup> at baseline (standard

deviation = 9.6) to a mean of 77.7 mL/min/1.73m<sup>2</sup> at the 12-month follow-up (standard deviation = 10.1). This form of improved glomerular filtration rate, also known as eGFR, indicates healthier kidneys.

After 12 months of treatment, the median amount of urinary protein excretion, an indicator of renal impairment, decreased from 150 mg/day (interquartile range: 100-200) to 105 mg/day (interquartile range: 80-150). In addition, after receiving treatment, the subjects' blood pressure was discovered to have decreased. After 12 months of

treatment, the average systolic blood pressure was 123 mmHg (SD = 10), a decrease from the baseline reading of 135 mmHg (SD 12). The average diastolic blood pressure was 85 mmHg (SD = 8), a decrease from the baseline reading of 77 mmHg (SD 7).

During the study, patients with diabetes and chronic kidney disease were able to attain glycemic control. A reduction in HbA1c from 8.2% (standard deviation = 1.4) at baseline to 7.5% (standard deviation = 1.2) at 12-month follow-up indicated improved long-term glycemic control.

The urine albumin excretion of the diabetic subgroup decreased from a baseline median of 100 mg/day (interquartile range: 50-200) to a 12-month follow-up median of 70 mg/day (interquartile range: 30-150), indicating reduced kidney injury. This was observed in a group of diabetics. The interventions implemented, such as lifestyle

modifications, blood pressure management, and glucose control, enhanced the management of CKD in its early stages, as demonstrated by these findings.

## Discussion

### Comparison to Existing Literature

This study confirms what is already known about the most efficacious early-stage treatments for chronic kidney disease. The improvements in eGFR, proteinuria, blood pressure, and glycemic control that have been reported are encouraging.

To the existing literature on treatments for early-stage CKD care and consistent with the findings of those studies, these findings are commensurate. This study contributes to the existing corpus of knowledge by demonstrating that these medications are effective in a wide variety of individuals with CKD in their early stages.

Study	Intervention	Findings
Current Study	Lifestyle modifications	Improved eGFR and reduced proteinuria
[13]	Lifestyle modifications	Significant improvements in eGFR
[14]	Blood pressure control	Strict control associated with reduced
[15]	Glycemic control	Intensive control resulted in reduced

The therapies under consideration are noted along the side of the table, and the studies conducted are listed at the top. In the third column, we will discuss the most significant discoveries regarding the early treatment of CKD. This table illustrates how the current study's findings are consistent with those of previous studies that have highlighted the importance of maintaining healthy blood pressure and glucose levels in patients with early-stage CKD to improve renal outcomes.

### Implications of the Results in Managing Early-Stage CKD

The findings of this study will significantly influence the medical management of CKD in its early stages. Increases in glomerular

filtration rate and decreases in proteinuria may indicate a delayed progression of renal disease than previously believed. This is of the utmost importance, as early detection of kidney abnormalities allows patients more time before requiring dialysis or a transplant. Healthcare professionals can improve the long-term outcomes of patients in the early stages of CKD by encouraging them to make lifestyle changes, such as adopting a healthier diet, engaging in regular physical activity, and quitting smoking. This investigation also highlights the significance of a collaborative effort in the early diagnosis and management of CKD. It is through the coordinated efforts of nephrologists, primary care physicians, dietitians, and many other healthcare

professionals that these patients can receive comprehensive care. CKD can place a strain on both individuals and healthcare systems. However, this burden may be reduced if healthcare professionals focus on modifiable risk factors and implement evidence-based therapies.

### Recommendations for Future Research

Although this study contributes to our understanding of how to manage CKD in its early stages, there are still many issues to be resolved. To determine whether or not the observed benefits are long-lasting and whether or not they prevent the progression of CKD to more advanced stages, it is necessary to conduct studies with extended follow-up periods.

Research comparing various therapy options, such as specialised dietary treatments or innovative pharmacological agents, could influence individualised approaches to managing CKD. Research into these therapies' cost-effectiveness and patient-centred outcomes would cast light not only on their potential but also on their acceptability. Future research should also evaluate the efficacy of medications in subgroups, such as those of various races or those with comorbidities. Because the CKD community is so diverse, this is the case. People with CKD could benefit from individualised treatment regimens that enhance health outcomes and health equity.

### Conclusion

This study examined glycemic control, blood pressure management, and lifestyle changes in early CKD treatment. The study found improved kidney outcomes. eGFR increased, proteinuria decreased, and blood pressure and glucose management improved. These findings, which support earlier studies, suggest that the drugs above can treat early CKD. Chronic renal disease should be treated immediately. Early diagnosis and therapy

improve kidney function and disease progression. This study found that patients with early-stage chronic kidney disease need comprehensive treatments targeting modifiable risk factors. Lifestyle changes, lowering blood pressure, and managing glucose can help early-stage CKD patients live longer. Healthcare providers should prioritise CKD diagnosis and therapy. Encouraging people to change their diet, exercise, and quit smoking can enhance kidney health. Controlling blood pressure and glucose levels helps prevent kidney damage.

These medicines may improve patient outcomes, halt CKD progression, and reduce healthcare personnel's workload if used in clinical settings. Despite this study's encouraging outcomes, its limitations must be considered. Prospective cohorts prevent causal inference in this study. Larger randomised controlled trials may yield better results. Self-reported lifestyle changes may have caused memory bias in the study. Future lifestyle research should use objective assessments or validated questionnaires. Long-term follow-up studies are needed to assess the benefits and their impact on CKD progression.

This study shows that lifestyle changes, blood pressure, and glucose management can improve kidney outcomes, emphasising the necessity for early-stage CKD treatment. These medications could change CKD progression and patient outcomes. More research is needed to fill gaps and prove early CKD treatment.

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