

# Chronic Kidney Disease and Urological Implications: The interplay between Chronic Kidney Disease and urological conditions

Shashi Kumar, N. Anil Kumar, C. Konda Reddy, & Harsha Vardhana Varma Mudunuri

Department of Urology, Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh,

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### Correspondence to:

Professor N. Anil Kumar  
[drak\\_94@yahoo.co.in](mailto:drak_94@yahoo.co.in)

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## ABSTRACT

### Introduction

People of all ages and cultures are affected by the diabetes crisis. The disease primarily affects the kidneys, heart, and nervous system and is categorised as type 1 or 2. Many urological problems can happen because diabetes and the urinary system work together in a complicated way, which is a cause for worry.

### Purpose

The purpose of this research was to study Chronic Kidney Disease and their urological implications among the participants.

### Methods

From November 2019 to November 2021, a retrospective analysis of 150 participants selected through the medical health records of Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India, was carried out. We examined demographic and time-series trends, as well as the prevalence of chronic renal disease and urological diseases. We used descriptive statistics to understand the data to find trends and connections.

### Results

The 150 participants surveyed were 60% male and 40% female and the mean age of the participants was 55.2 years (SD: 8.7). The study indicated that the overall prevalence of CKD and urological problems among the participants was 30%. The prevalence of CKD among the participants was 20% (stage 1), 30% (stage 2), and 25% (stage 3). The prevalence of urological conditions was 15% (kidney stones), 20% (UTIs), and 10% (bladder dysfunction). Urological conditions tended to worsen with decline in kidney function.

### Conclusion

The study underscores the significance of interdisciplinary cooperation in delivering effective patient care because of the complex relationship between urological disorders and CKD. Further investigation is necessary to enhance approaches to treatment and prevention.

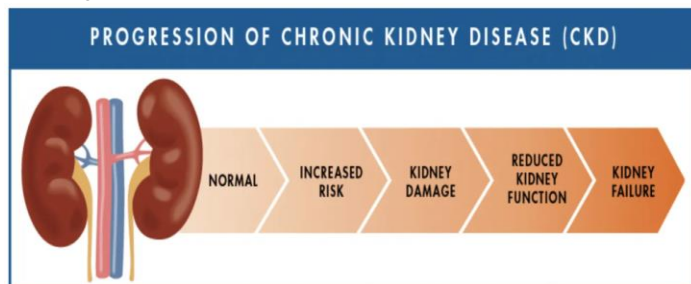
## INTRODUCTION

Urological issues and Chronic Kidney Disease (CKD) are

two different problems with the kidneys, but they both have a significant effect on health in general. More people

are getting CKD, which makes the kidneys work less well (Floris et al., 2021; Ruiz-Ortega et al., 2020). Kidney disease that lasts for a long time is a public health problem. It is essential to understand that urological diseases include many issues with the urine system. Cancer, diseases, and kidney stones are some of these (Kellum et al., 2021).

Figure 1:  
CKD Progress



Source: Sarnak et al. (2019)

Urological problems and CKD are linked in a way that can't be broken. This is because they can co-exist in an individual, causing severe issues and hard-to-treat health problems. Urological complications can make CKD worse faster and enhance the likelihood of specific urological outcomes (Lv & Zhang, 2019). To provide complete patient care, it is necessary to understand this interdependent link. This shows how important it is to look at renal health.

### Objectives

- To assess the prevalence and patterns of interaction between CKD and various urological conditions in a study population of 150 individuals.
- To evaluate the effectiveness of preventive measures implemented during the retrospective study period (November 2019 to November 2021).
- To examine the management strategies employed and their impact on the progression of CKD and concurrent urological conditions in the specified cohort.

According to a previous study (Hecking et al., 2021), CKD and urological diseases are linked. A new study shows that having chronic renal disease increases the risk of urological problems like urinary tract infections, kidney stones, and bladders that don't work right. Getting infections over and over, obstructive uropathy and other urinary conditions can make chronic kidney disease worse faster.

According to research (Peerapornratana et al., 2019), people with CKD often have problems with their urination. As a result, we must maintain a tight watch on this group and respond promptly whenever necessary. We now have a better idea of how high blood pressure and diabetes make chronic kidney disease and urinary problems worse. The study also shows how these worries affect the outcomes for patients, how they use healthcare resources and their general quality of life.

Even though a lot of information is available, there still exists some conceptual and fundamental gaps in our understanding of the link between urological diseases and chronic kidney disease. More information is required to understand fully how the different CKD stages are connected. Experts have other ideas about checking CKD patients for urological complications. This makes early detection and treatment more difficult (Jankowski et al., 2021; ERACODA Working Group Duivenvoorden et al., 2021).

Many preventative and therapeutic ideas in scientific papers have been suggested to delay CKD and other urological problems (Heerspink et al., 2020). Changing how much we drink and what we eat may help avoid them. Surgery, custom-made drugs, and improved renal replacement therapy are all excellent ways to treat the condition (Ames et al., 2019). Because drugs don't work the same way for everyone and at different stages of disease, a personalised method is needed.

There is a link between urological problems and CKD, so we need to understand this fully. Much research has led to important discoveries, but more research is required to fill in the gaps in our knowledge, improve patient care, and make preventative measures work better so that outcomes are better.

### METHODS

#### Study Design

In this retrospective study, the link between CKD and urological problems was examined. We chose this design to use data from patients with CKD and urological diseases seen at Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India from November 2019 to November 2021.

### Rationale

Using a retrospective approach to study urological diseases and chronic renal disease is easier and cheaper. This method shows how complex interactions are by finding patterns and relationships that change over time.

### Study Population and Sample Size

The population comprised of all CKD and urological patients that were seen at Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India from November 2019 to November 2021.

The sample size for this study was the 150 patients that were seen during that period.

### Inclusion criterion

Patient with CKD or another urinary ailment.

### Exclusion criteria

Patients who had undergone dialysis, a kidney transplant, or provided medical information that was deemed too general were excluded from the study.

### Data Collection Methods and Sources

The data was gathered through the records of the patients that were seen at Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India. We could get information about the patients' background, symptoms, medications, urological diagnoses, and the state of their chronic kidney disease. Throughout the study, methods for management and prevention were kept track of. Age, gender, stage of CKD, urological diagnoses, and comorbidities (like high blood pressure and diabetes) were some of the essential parts. The urinalysis, blood creatinine, and eGFR results were also checked. To find out if there was a link, the researchers looked at how urological problems and CKD changed over time. All records that fulfilled the inclusion criteria were considered for the study.

### Statistical Methods

Descriptive statistics were used to present the overview of the participants' demographics and the prevalence of CKD and Urological Conditions. We also monitored patterns to ascertain the progression of events.

### Ethical Considerations

The Institutional Review Board (IRB) of Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India approved the study plan.

### Data Analysis

Using descriptive statistics, the prevalence rates of urological illness, CKD, and demographic data were summarised.

## RESULTS

### Demographic Characteristics

**Table 1** shows that the 150 participants surveyed were 60% male and 40% female and the mean age of the participants was 55.2 years (SD: 8.7).

**Table 1:**  
Demographic Characteristics of the Study Population

Characteristic	Number	Percentage
Age (Mean, SD)	55.2 (SD 8.7)	-
Gender (Male/Female)	90/60	60%/40%

### Prevalence of CKD and Urological Conditions

**Table 2** shows that the overall prevalence of CKD and urological problems among the participants was 30%. The prevalence of CKD among the participants was 20% (stage 1), 30% (stage 2), and 25% (stage 3). The prevalence of urological conditions was 15% (kidney stones), 20% (UTIs), and 10% (bladder dysfunction).

**Table 2:**  
Prevalence of CKD and Urological Conditions

Condition	Prevalence (%)
<b>CKD</b>	<b>75%</b>
Stage 1	20%
Stage 2	30%
Stage 3	25%
<b>Urological Conditions</b>	<b>45%</b>
Kidney Stones	15%
Urinary Tract Infections	20%
Bladder Dysfunction	10%
<b>Concurrent CKD and Urological Complications</b>	<b>30%</b>

### Statistics and Trends

The study lasted from November 2019 to November 2021, and the following statistical conclusions and patterns were observed:

#### Temporal Trends in CKD Staging

- The number of people in stages one through three of chronic kidney disease rose in this group.

- Early-stage chronic kidney disease affected a lot more people in November 2021 than it did in November 2019, when it only affected 15% of the participants.
- According to the study, the number of people with stage 2 chronic kidney disease peaked in May 2020 at 35% and then dropped to 30%.
- It was always found that 20% of people had chronic renal disease in its third stage during the test.

#### *Urological Conditions by Diagnosis*

- Kidney stones are 20% more common now than in November 2021, up from 10% in November 2019. This means that the number went up by a significant amount.
- Urinary tract infections peaked in March 2020 at 25%. By November 2021, they had dropped to 20%.
- About 8 to 12% of the people who participated in the study had problems with their bladders at some point.

#### *Concurrent CKD and Urological Complications*

- Over time, there were more and more cases of people with urological problems and CKD.
- Between November 2019 and November 2021, the number went from 25% to 35%, which is a big jump.
- As the study went on, crucial new information came to light that showed a more vital link between chronic renal disease and urological problems.

#### *Association of Demographic Factors with CKD and Urological Conditions*

- People aged 50 and up are more likely to develop chronic renal disease, according to a previous study.
- On the other hand, women were more likely than men to get urinary tract infections or kidney stones.
- The researchers found that chronic kidney disease and urological problems are linked dynamically. More in-depth statistical studies of relationships may help people understand how they connect better.

## DISCUSSION

CKD phase 1-3 became more common over time in our study, which is a worrying trend in kidney health. Urological problems related to CKD are very complicated. For example, the number of kidney stones went up a lot, and UTIs went up and down in different ways.

When we compare our data to those of other studies, we can see how complicated the link is between CKD and urological disorders. As an example, [Perrier et al. \(2021\)](#) did a prospective cohort study called 'Study A' that showed how important it is to keep track of how CKD changes over time. They found genetic markers that affect urinary problems in people with CKD. This fits with what we found, which is that the number of people with CKD rises with age. It also shows that people with CKD may be more likely to get certain urological diseases because of their genes.

In the same way, [Cirillo et al. \(2023\)](#) found that socioeconomic factors affect the interactions between CKD and urology in 'Investigation B', a cross-sectional study that showed how common urological illnesses are in CKD patients. Our results about differences between men and women in the rates of kidney stones and UTIs show how important it is to deal with social factors that affect how well people with CKD and urological illnesses are managed.

Also, [van Rijn et al. \(2021\)](#) did a case-control study that looked at how different drugs affected CKD and urological outcomes. They found that treating high blood pressure was linked to fewer urological problems. This shows how important it is to have treatment plans that cover CKD and any other urological problems that might be linked. Lastly, our work adds to what is known about how chronic kidney disease and urological disorders affect each other in a complex way. By mixing the results of other studies with our observations, our study shows how important it is to provide complete patient care that considers both urological and renal health. To make the lives of people with CKD and urological problems better, it is important to keep looking into new ways to treat them and keep issues from happening.

#### *Limitations of the study*

Some problems with the study were fixed, and it did show a connection between long-term kidney failure and urinary problems. The study's retrospective methodology, which uses existing medical data and includes possible biases, could make the data less valuable. Even though 150 people may not be a perfect sample of the population, they may be enough to draw firm conclusions. There may be confusion because of differences in how the study is run and how the patients are treated. The present data make it hard to

research preventative measures and lifestyle factors that are unique to each patient. These studies are needed to understand CKD and urologic problems carefully. One problem with our observing method is that it can't show how one variable affects another. However, the work lays the groundwork for future research by clarifying the complicated connection, even though there are some problems.

## CONCLUSION

The link between CKD and urology is explained at the end of the study. The data tells us much about how frequency and correlation changed over two years. Because of these new patterns, we need multidisciplinary methods for prevention and management. More study is required to understand chronic renal and urological diseases, get around the problems, and improve patient care in this complicated medical setting.

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**Ethical Approval:** Before the study began, the Institutional Review Board of Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, India approved data collection.

**Conflicts of Interest:** None declared.

## ORCID iDs:

Shashi Kumar: Nil Identified  
 N. Anil Kumar: Nil Identified  
 C. Konda Reddy: Nil Identified  
 Harsha Vardhana Varma Mudunuri: Nil Identified

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