

Original Research Article

Hypertension management in chronic kidney disease: insights from a multicenter survey of nephrologists in India

Pratibha Karande^{1*}, Kunal Khobragade¹, Pallavi Sutar²

¹Medical Affairs, Mankind Pharmaceuticals Ltd., Seawoods, Nerul Node, Navi Mumbai, Maharashtra, India

²Sant Gajanan Maharaj College of Pharmacy, Mahagaon, Gadhinglaj, Kolhapur, Maharashtra India

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*Correspondence:

Dr. Pratibha Karande,

E-mail: pratibha.karande@mankindpharma.com

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ABSTRACT

Background: Due to inadequate treatment adherence, delayed diagnosis, and a lack of healthcare resources, managing hypertension (HT) in patients with chronic kidney disease (CKD) in many regions of India is really difficult. This survey looks at ways to improve care through lifestyle changes, guideline-based interventions, and evidence-based practices.

Methods: "A cross-sectional, structured, multicenter survey of 304 nephrologists across India was conducted from August to November 2024. A questionnaire was developed to gather valuable insights into their clinical practices and preferences concerning the diagnosis and management of HT in CKD patients.

Results: Personalized approaches utilizing ACE inhibitors, ARBs, and CCBs for renal and cardiovascular benefits are necessary for the effective management of HT in CKD. Preventing the progression of CKD requires addressing non-adherence and enhancing patient education. Although they reduced proteinuria, combination treatments involving ACE inhibitors and ARBs raised safety questions. Nephrologists highlighted the clinical benefits of using specific medications in patients with CKD, especially for their effectiveness in managing related comorbidities and slowing the progression of the disease, despite difficulties with dosing and monitoring.

Conclusions: The survey reveals varied treatment approaches to HT in CKD, highlighting key challenges like poor adherence and resistant HT. It emphasizes the need for personalized care, early detection, and integrated multidisciplinary management.

Keywords: Hypertension, Chronic kidney disease, Nephrologist, Calcium channel blockers, Real-world survey

INTRODUCTION

Chronic kidney disease (CKD) and hypertension (HT) are closely linked conditions, each contributing to the development and progression of the other in a continuous cycle. This means that either one can lead to or result from the other.¹ CKD is aggravated by persistent high blood pressure (BP). At the same time, BP control becomes more difficult with worsened kidney function, creating a vicious cycle of multi-dimensional cardiovascular disease. This dynamic, multifactorial loop encompasses volume overload, activation of the renin-angiotensin-aldosterone system (RAAS), oxidative stress,

and endothelial dysfunction.¹ Moreover, factors encountered earlier in life, such as genetics, certain metabolic conditions, or specific environmental exposures, significantly contribute to the long-term renal health and the risk of developing HT later in life. There are also familial forms of kidney diseases, which, although rare, disproportionately increase the likelihood of progressive renal dysfunction and long-term sequelae if they are not diagnosed and treated early on.^{1,2}

Within India, CKD is an emerging public health concern and has diverse regional, and socio-demographic distributions. In one study, the overall prevalence of CKD

was 13.24%, with men having a higher prevalence (14.80%) than women (13.51%).³ There are remarkable disparities, with the southern zone having the highest prevalence at 14.78%. Rural populations are worse off, with a prevalence of 15.34% compared to urban populations at 10.65%. This is likely due to differences in healthcare access, socioeconomics, and lifestyle.³ Faithfully capturing the dire need for effective public health interventions to focus on prevention, early detection, and comprehensive management during the defined time frame, the prevalence appeared to change significantly from 11.12% in 2011-2017 to 16.38% in 2018-2023. Additionally, the range of estimates from 2.64% to 30.17% emphasized highlighting the growing concern around the heterogeneity in the CKD disease burden across different regions of India and the need for more tailored and strategic healthcare planning.³

Outside of its impact on the kidneys, CKD is increasingly understood as a significant multiplier of cardiovascular risk. Research has shown that CKD increases the risk of heart failure, stroke, and even sudden cardiac death.^{4,5} This risk is due to a 'perfect storm' of complex and chronic changes such as inflammation, uremic toxins, vascular calcification, and the body's neurohormonal systems, which worsen existing conditions like HT and diabetes. Also, even small declines in eGFR and the presence of albuminuria increase the likelihood of experiencing cardiovascular events, highlighting the importance of intervention.⁶ The complex interplay between CKD, HT, and cardiovascular disease requires a team approach to patient management, with control of high BP as one of the main strategies for managing CKD.

Guideline-directed medical therapy is essential in managing HT for patients with CKD. The KDIGO 2021, ISN, and AHA all emphasize tailored BP targets for patients. Most guidelines suggest <130/80 mmHg in most CKD patients, especially those with albuminuria. First-line treatment, especially in stage 3 and above, is RAAS blockade by ACEI/ARB due to their proven renoprotective benefits in proteinuria CKD. CCBs are often used in combination to achieve optimal BP control, and diuretics are used for patients with volume overload. Sodium restriction, weight loss, physical activity, and cessation of smoking are also important. Frequent assessment of electrolytes and renal function is needed to avoid potential harm while optimizing treatment.^{7,8}

The clinical management of HT in CKD is still difficult, even with established guidelines. Effective control is hampered by elements like drug intolerance, therapeutic inertia, late diagnosis, low patient awareness, and socioeconomic limitations. Furthermore, a more sophisticated, patient-centered approach is required due to the variability in clinical presentations and comorbidities. It becomes crucial in this situation to comprehend the viewpoints and methods of nephrologists.⁹

The results of a targeted survey to gather clinical opinions from nephrologists throughout India about the diagnosis, difficulties, and treatment approaches of HT in the CKD population are presented in this review article. This review aims to shed light on current practices, pinpoint unmet needs, and guide strategies for enhancing cardiovascular and renal outcomes in patients with CKD by combining real-world data with the most recent research.

METHODS

The clinical viewpoints of nephrologists regarding the diagnosis, treatment, and difficulties of HT management in patients with CKD were investigated through a cross-sectional survey. Effective management is still difficult because of treatment resistance, patient adherence problems, and variation in clinical responses, all of which contribute to the complex and bidirectional relationship between HT and CKD, where HT is both a cause and a result of CKD. In order to improve patient outcomes, the survey sought to identify important obstacles in clinical practice, investigate creative management techniques, and highlight current practices.

Responses from 304 nephrologists (collected from August to November 2024) actively involved in the treatment of patients with HT and CKD were included in the study, which was carried out across several clinical centers in India. A structured online questionnaire was used to gather data on CKD patients' unmet needs, clinical difficulties, and real-world experiences with HT management. Microsoft excel (version 22502, March 11, 365 Suite) was used to statistically analyze the responses in order to find recurring patterns and useful insights. In order to address the dual burden of HT and CKD, the findings are meant to inform clinical decision-making, improve current treatment paradigms, and influence future educational initiatives. This collaborative attempt emphasizes the necessity of a comprehensive strategy to enhance results in this susceptible patient group.

RESULTS

Total 304 nephrologists participated in the questionnaire-based survey. Based on the data, the majority, 111 nephrologists (36.5%) stated that between 41 and 60% of their patients had CKD and a history of HT. Following this, 100 nephrologists (32.9%) reported that between 21 and 40% of their patients were in this group. Furthermore, over 60% of the patients treated by 67 nephrologists (22%) had both conditions (Figure 1).

Based on the data collected, 127 nephrologists (41.2%) identified estimated glomerular filtration rate (eGFR) as the most commonly used diagnostic tool by them to evaluate renal dysfunction in hypertensive patients. The albumin-to-creatinine ratio (ACR) was used by 86 nephrologists (28%) and s. creatinine was indicated as preferred tool by 82 nephrologists (26.8%) (Figure 2 A).

The majority of nephrologists (126; 41.4%) stated that 10-20% of their patients use home BP monitoring for CKD. Ninety-three nephrologists (30.6%) followed, suggesting 21-30% usage. Furthermore, 33 nephrologists (10.9%) stated that over 30% of their CKD patients use home BP monitoring, whereas 52 nephrologists (17.1%) reported usage rates of less than 10% (Figure 2 B).

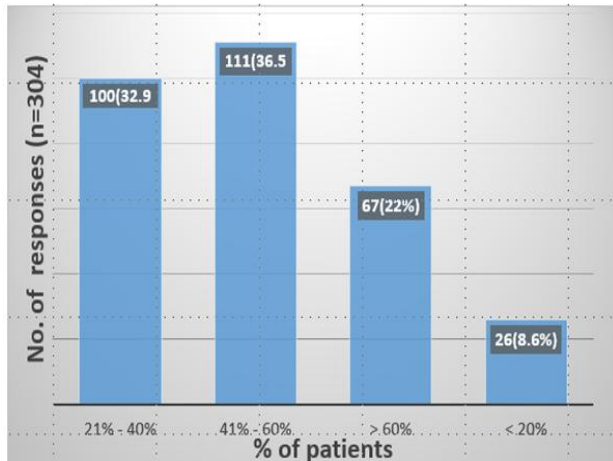


Figure 1: Percentage of CKD with history of HT.

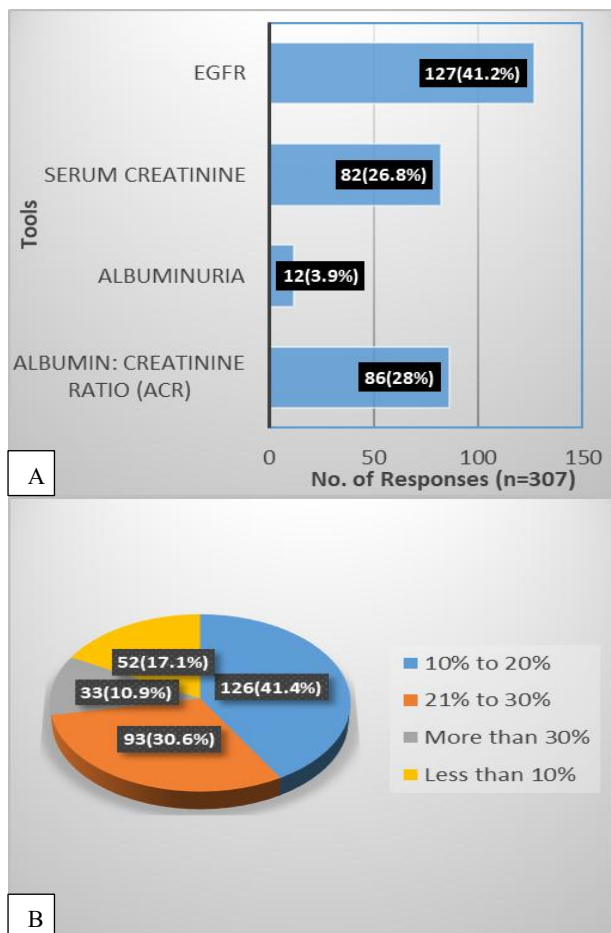


Figure 2: (A) Diagnostic tool in hypertensive patients to analyse renal dysfunction and (B) CKD patients with home blood pressure monitoring.

Non-adherence to medication was reported by 167 nephrologists (54.9%) as the most important problem when it came to managing HT. Subsequently, 40 nephrologists (13.2%) reported denial for HT, 43 nephrologists (14.1%) reported irregular exercise, and 53 nephrologists (17.4%) reported irregular eating habits. Just one nephrologist (0.3%) brought up a challenge (Figure 3).



Figure 3: Important challenge in controlling HT.

For hypertensive patients with CKD, a target systolic BP (SBP) of less than 130 mm Hg was reported by a significant majority of nephrologists (133; 43.8%). Following this, 83 nephrologists (27.3%) suggested a target of less than 120 mm Hg, 61 nephrologists (20%) reported less than 140 mm Hg, and 27 nephrologists (8.9%) suggested a target of less than 110 mm Hg (Figure 4).

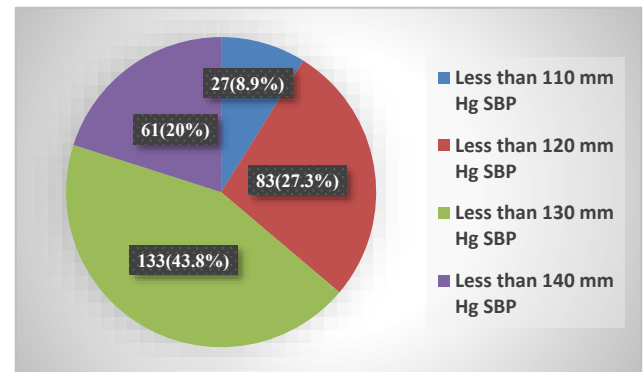


Figure 4: Hypertensive patients with CKD (BP Goal).

Regarding first-line treatment for BP control in patients with low eGFR and HT, 170 nephrologists (55.9%) reported using calcium channel blockers (CCBs), 58 nephrologists (19%) preferred angiotensin receptor blockers (ARBs), 56 nephrologists (18.4%) preferred ACE inhibitors (ACEis), 19 Nephrologists (6.3%) preferred diuretics, and 1 nephrologist (0.3%) preferred a combination of ACEi and ARB (Figure 5 A).

When asked which first-line CCBs they preferred for hypertensive patients with CKD, 277 nephrologists (91.1%) said they preferred cilnidipine in general. Of these, two nephrologists (0.7%) reported using benidipine, four nephrologists (1.3%) preferred

azelnidipine, and 21 nephrologists (6.9%) specifically preferred amlodipine (Figure 5 B).

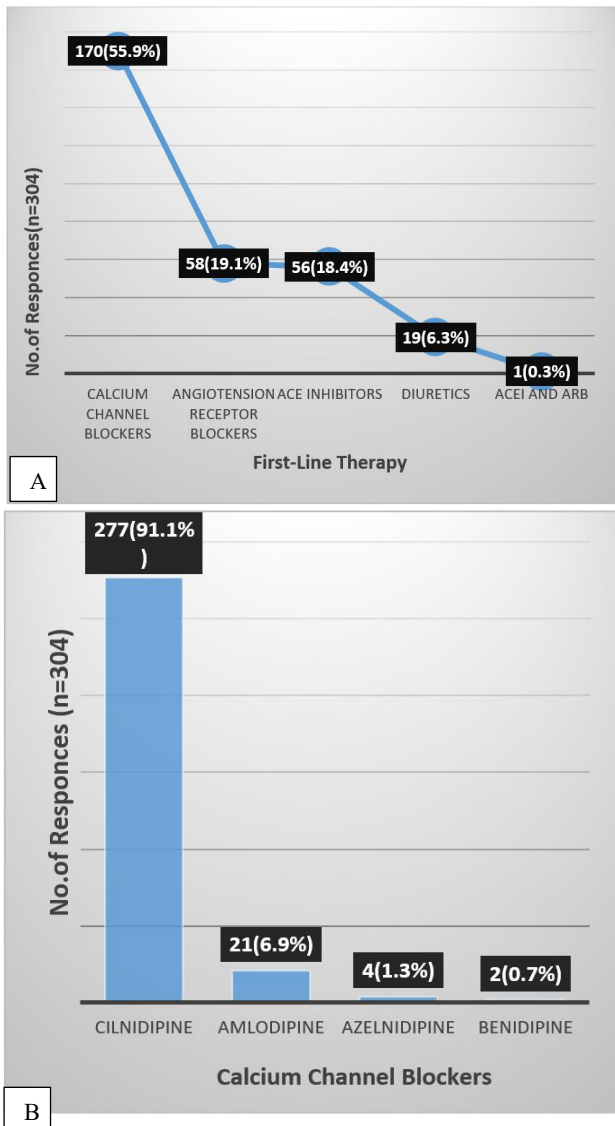


Figure 5: (A) First line therapy for BP control in hypertensive patient with low eGFR and (B) preferred first-line ca+ channel blocker in hypertensive patients with CKD.

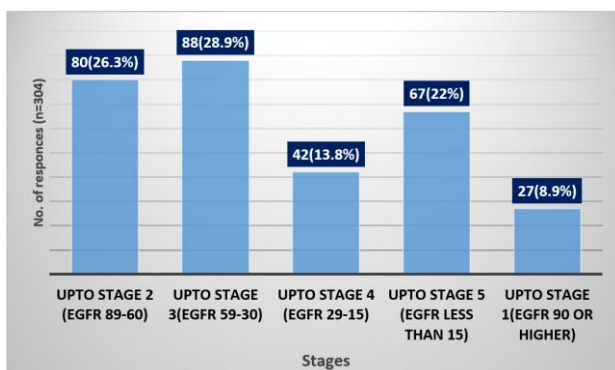


Figure 6: Use of cilnidipine at various stages of CKD among hypertensive patients.

Data collection revealed that 88 nephrologists (28.9%) reported continuing to use cilnidipine up to stage 3 CKD (eGFR 59-30 mL/min/1.73 m²) in hypertensive patients. Following this, 67 nephrologists (22.0%) reported using it up to stage 5 (eGFR <15), 42 nephrologists (13.8%) up to stage 4 (eGFR 29-15), and 27 nephrologists (8.9%) up to stage 1 (eGFR 90 or higher) (Figure 6).

DISCUSSION

The prevalence of CKD is rising in India, which presents a serious public health concern. According to the global burden of disease study, CKD was India's eighth most common cause of death in 2019. As diabetes and HT rates rise, CKD's prevalence is expected to rise as well.¹⁰ Another recent systemic review by Rajapurkar et al similarly showed a high CKD prevalence (up to 17.2%) in Indian adults with the disease's silent and underdiagnose nature.¹¹ The practical application of established international guidelines for the management of HT in patients with CKD in India is still uneven and challenging. Suboptimal BP control has been caused by a number of factors, including late diagnosis, limited access to healthcare resources, socioeconomic disparities, and therapeutic inertia.

The current survey was required in order to gain a better understanding of the practical experiences and difficulties nephrologists encounter when treating HT in patients with CKD. This survey attempts to close the gap between clinical practice and guideline recommendations by documenting their perspectives.

This survey provides insightful information about nephrologists' practical viewpoints on the challenging treatment of HT in patients with CKD. The results highlight important issues, diagnostic trends, and treatment preferences while also providing context for current clinical practices in India. In addition to comparisons with current literature and clinical guidelines, this discussion interprets the survey results according to patient population, diagnostic techniques, treatment barriers, and therapeutic approaches.

According to 36.5% of nephrologists surveyed, 41-60% of their CKD patients had pre-existing HT, another 32.9% estimated this overlap to be between 21 and 40% indicating a significant overlap between the two conditions. In line with global data showing that 60-90% of CKD patients have coexisting HT.¹² Given that HT both causes and results from renal dysfunction, this high burden emphasizes the reciprocal relationship between CKD and HT. Heterogeneity in regional epidemiology and healthcare-seeking behavior is further suggested by the observed variation across practices.

The most commonly used diagnostic marker was eGFR (41.2%), which was followed by serum creatinine (26.8%) and ACR (28%). Both KDIGO and ISN guidelines stress the significance of albuminuria in early

CKD diagnosis and cardiovascular risk stratification (KDIGO 2021), so its low adoption rate (3.9%) is alarming.⁷ These results point to a potential underutilization of important diagnostic instruments, which could postpone early intervention. Additionally, only 10.9% of nephrologists reported using home BP monitoring at levels above 30%, indicating its low adoption rate. One of the main gaps in rural and semi-urban nephrology practices, according to a multicenter study from India, is the restricted availability of ABPM and home BP devices.¹⁴ This implies that in order to ensure long-term BP control, patient education and access to self-monitoring resources must be improved.

Despite established guidelines, clinical management of HT in CKD remains challenging. Drug intolerance, therapeutic inertia, delayed diagnosis, low patient awareness, and socioeconomic constraints are some of the factors that hinder effective control.¹⁵ These obstacles are consistent with research from around world that shows that asymptomatic disease progression, polypharmacy and low health literacy are main challenges.

Further emphasizing the complexity of HT-CKD overlap, the 2023 ESC/ESH guidelines emphasize the significance of customized BP targets and medication selection based on comorbidities and tolerability.¹³ The need for age-specific engagement strategies is further supported by the variation in adherence by age group, with better adherence among patients aged 40-65 and poor adherence among younger and older individuals.

With 50.6% of their CKD patients estimated to have resistance, managing resistant HT is still a challenge. This is consistent with prevalence estimates of 20-30% worldwide.¹⁴ Respondents frequently identified key early indicators of renal deterioration, including elevated BP, proteinuria, and high ACR, indicating awareness of progressive CKD indicators.

In accordance with KDIGO 2021 guidelines, 43.8% of nephrologists set a BP target of less than 130 mmHg. However, 26.6% of patients started treatment when their SBP was greater than 150 mmHg, indicating a reluctance to pursue aggressive control, perhaps as a result of patient frailty or worries about adverse drug reactions. The complexity of treating CKD patients with comorbid HT is demonstrated by the fact that the majority of respondents (40.8%) identified use of optimal dose as the main therapeutic challenge, followed by titration issues and electrolyte monitoring.

Due to their renoprotective effects and tolerability, CCBs (53.2%) and ARBs (24.8%) were the most popular antihypertensive medications. According to recent data from India, cilnidipine has better results and higher persistence rates in CKD patients than other CCBs. Although ACE inhibitors were less popular (17.3%), this trend may be explained by worries about hyperkalemia and declining renal function. Due to large part to its dual

channel-blocking capabilities, improved BP control, and decreased incidence of pedal edema, 91.1% of respondents preferred Cilnidipine over alternatives like Amlodipine. These findings highlight a change in CKD management toward newer-generation CCBs.

Interestingly, even though current guidelines discourage the dual use of ACEi and ARBs due to the risks of hyperkalemia and AKI (Makani et al) a sizable portion (52.3%) supported the combination.¹⁵ The necessity of ongoing medical education and the distribution of guidelines is highlighted by this practice gap.

Limitations

Because the study relies on limited nephrologists and their self-reported data, objectivity may be limited and bias may be introduced. Its conclusions are not generalizable, and neither do they take into account changing treatment trends or patient-level outcomes. Patient viewpoints and non-pharmacological methods were not sufficiently taken into consideration. Response consistency may be impacted by differences in how resistant HT and CKD stages are defined.

CONCLUSION

The survey emphasizes how HT and CKD interact, as well as how different nephrologists' approaches to treatment vary. Even though ACEi and CCBs play a crucial role, problems like inadequate medication adherence, resistant HT, and suboptimal dosage are still common. In order to improve BP control and renal outcomes, the results highlight the necessity of customized treatment plans, improved patient education, and updated clinical guidelines. Setting individualized BP goals and identifying renal impairment indicators early are also essential for long-term care. Effective disease management can be further supported by encouraging home BP monitoring and removing obstacles to treatment. The significance of multidisciplinary care and integrated therapeutic approaches in the management of HT in patients with CKD is emphasized in conclusion.

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