

Burden of Chronic Kidney Disease in India and Relevance, Feasibility, and Challenges in the Indian Health Care System to Implement KDIGO 2024 Recommendations

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ABSTRACT

Chronic kidney disease (CKD) is a rapidly growing public health concern in India, driven largely by rising rates of diabetes, hypertension, obesity, and an ageing population. Because CKD is often asymptomatic in its early stages, a substantial proportion of patients are diagnosed only after significant, irreversible loss of kidney function — national registry data show nearly half of patients first present at Stage 5. This review evaluates the relevance, feasibility, and challenges of implementing the KDIGO 2024 guideline within the Indian healthcare system, drawing on the guideline itself, Indian epidemiological studies (including the SEEK India study and the Indian CKD Registry), and current literature, with particular attention to the role of clinical laboratories. KDIGO's standardized approach to diagnosis and staging — based on eGFR, albuminuria (ACR), and duration — along with its laboratory recommendations (automatic eGFR reporting, ACR over dipstick testing, IDMS-traceable creatinine assays) are directly applicable and could substantially improve early detection in India. However, recommendations such as annual ACR testing, cystatin C testing, and multidisciplinary CKD clinics face cost, infrastructure, and access barriers, particularly outside tertiary centres. We conclude that KDIGO 2024 should serve as the gold-standard framework for CKD care in India, provided it is adapted to local resource constraints through cost-effective screening, strengthened primary care, and tele-nephrology, to improve early diagnosis and outcomes across both urban and rural settings.

Keywords: Chronic Kidney Disease, KDIGO 2024, eGFR, Albuminuria, India

INTRODUCTION

Chronic Kidney Disease (CKD) has become one of the fastest-growing non-communicable diseases in India. It is a major cause of premature mortality, disability, cardiovascular disease, and healthcare expenditure. The increasing prevalence of diabetes mellitus, hypertension, obesity, and

population ageing has accelerated the CKD epidemic. Since CKD remains asymptomatic in its early stages, many patients are diagnosed only after significant and irreversible loss of kidney function. The objective of this article is to critically evaluate the relevance, feasibility, and challenges of implementing the KDIGO 2024 recommendations within

the Indian healthcare system, with particular emphasis on the role of clinical laboratories in improving early detection and management of CKD.

MATERIALS AND METHODS

This review synthesizes evidence from the KDIGO 2024 guideline, Indian epidemiological studies, national registries, and recent peer-reviewed literature on CKD. The applicability of guideline recommendations was assessed in relation to India's disease burden, laboratory infrastructure, healthcare delivery models, and resource availability.

METHODS

This review synthesizes evidence from the KDIGO 2024 guideline, Indian epidemiological studies, national registries, and recent peer-reviewed literature on CKD. The applicability of guideline recommendations was assessed in relation to India's disease burden, laboratory infrastructure, healthcare delivery models, and resource availability.

RESULTS

Magnitude of the Problem

Recent studies estimate that 13-17% of Indian adults have CKD, making it a major public health concern. The SEEK India Study, involving 5,588 adults from multiple regions, reported a CKD prevalence of 17.2%. Diabetes, hypertension, obesity, and older age were identified as the principal risk factors.

The Indian CKD Registry, which enrolled more than 52,000 patients, found that diabetic kidney disease is the leading cause of CKD in India, accounting for approximately 31% of cases, followed by CKD of unknown etiology, chronic glomerulonephritis, and hypertensive nephrosclerosis. The registry also demonstrated that nearly half of patients first present with Stage 5 CKD, indicating delayed diagnosis and referral.

Risk Factors

The major contributors to the CKD burden in India include diabetes mellitus, hypertension, obesity and metabolic syndrome, cardiovascular disease, an ageing population, smoking, nephrotoxic drugs (especially NSAIDs), environmental and occupational exposures, and recurrent kidney infections and kidney stones. The rapid rise in diabetes and hypertension has made diabetic kidney disease the most common cause of CKD in urban India.

Regional Variations

CKD prevalence varies across India due to differences in lifestyle, socioeconomic status, environmental factors, and healthcare access. Recent national data indicate that some states, including Kerala, have a relatively high burden of impaired kidney function, emphasizing the need for region-specific prevention and screening strategies.

Economic Burden

CKD imposes a substantial financial burden on individuals and the healthcare system. The costs of dialysis, kidney transplantation, medications, laboratory investigations, and repeated hospitalizations are considerable, with many patients relying on out-of-pocket expenditure. Progression to end-stage kidney disease often

leads to loss of productivity and catastrophic health expenses for affected families.

Public Health Challenges

India continues to face several barriers in CKD control, including low awareness of kidney disease, limited routine screening in high-risk individuals, late referral to nephrologists, inadequate access to dialysis in many areas, shortage of donor kidneys for transplantation, and variable availability of standardized laboratory services. Addressing these challenges requires integration of CKD screening into primary healthcare, standardized laboratory reporting of eGFR and urine albumin-creatinine ratio (ACR), and widespread public education.

DISCUSSION

Why KDIGO Is Useful in India

KDIGO recommendations are highly useful in India, but they should be applied with appropriate adaptation to Indian healthcare realities rather than followed rigidly. This is also the position reflected in the KDIGO guideline itself, which states that recommendations should be interpreted in the context of local resources, healthcare systems, and patient needs.

Improving Diagnosis and Prognosis of Chronic Kidney Disease

Standardizes CKD diagnosis: KDIGO provides a universal definition of CKD based on eGFR, albuminuria (ACR), and duration of 3 months or more. This allows uniform diagnosis across hospitals and laboratories in India.

Improves laboratory reporting: KDIGO recommends automatic eGFR reporting with every serum creatinine result, urine albumin-creatinine ratio (ACR) instead of dipstick protein testing, and standardized creatinine assays traceable to IDMS. These recommendations are directly applicable to Indian clinical laboratories and can improve early CKD detection.

Earlier detection: In India, many patients are diagnosed only when they reach Stage 4 or Stage 5 CKD. Implementing KDIGO-based screening in patients with diabetes and hypertension could substantially increase early diagnosis.

Challenges in India

Despite its value, some recommendations are difficult to implement fully. Annual ACR testing is not routinely performed in many primary care settings. Cystatin C testing has limited availability and high cost. SGLT2 inhibitor therapy cost may limit access for some patients. Frequent monitoring is constrained by financial limitations and travel distance. Multidisciplinary CKD clinics remain limited outside tertiary hospitals.

Recommendations That Should Be Adopted Widely

These have high clinical value and are feasible in most Indian settings: routine eGFR reporting, ACR measurement in diabetic and hypertensive patients, CKD staging using the CGA (Cause-GFR-Albuminuria) classification, blood pressure control, RAAS inhibitors when indicated, SGLT2 inhibitors for eligible patients where accessible, patient education and lifestyle modification, and early referral to a nephrologist for high-risk patients.

Recommendations Requiring Adaptation

Some KDIGO recommendations need modification according to Indian circumstances, including cost-effective screening strategies, greater emphasis on primary healthcare, use of essential laboratory tests where advanced biomarkers are unavailable, government-supported CKD screening programs, and local referral pathways and tele-nephrology for underserved areas.

Laboratory Implications

For laboratories in India, KDIGO implementation could include reporting eGFR with every serum creatinine result, encouraging urine ACR rather than relying only on urine protein dipsticks, using standardized creatinine methods, and flagging abnormal kidney function results to facilitate timely clinical follow-up.

CONCLUSION

CKD has become a major public health challenge in India, driven largely by the increasing prevalence of diabetes and hypertension. Early diagnosis through laboratory screening, timely intervention, and implementation of evidence-based guidelines such as KDIGO 2024 are essential to reduce disease progression, cardiovascular complications, and the need for dialysis and kidney transplantation. KDIGO should be regarded as the gold standard framework for CKD evaluation and management in India. However, successful implementation requires adaptation to India's healthcare infrastructure, economic constraints, and disease burden. A pragmatic, resource-sensitive approach can improve early diagnosis and outcomes while remaining feasible in both urban and rural healthcare settings.

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