

THE FUTURE BURDEN OF CKD IN INDIA

Student Name: Harsh Kiritkumar Jadav

Student ID: 2526097

Supervisor: Dr Diola Bijlhout

Programme: MSc Public Health and Social Care in Practice

Prevalence

- Chronic kidney disease (CKD) is an abnormality of the kidneys that lasts at least three months, and it involves measurements of filtration and albuminuria (Stevens et al., 2024).

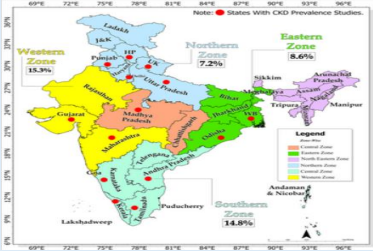


Figure 1: Map showing study locations and regional CKD prevalence estimates (Source: Talukdar et al., 2025)

- The prevalence of the disease as pooled estimate of Indian community studies was 13.24% (Talukdar et al., 2025).
- Gummidl et al. (2020) found significant disease with no known conventional etiological factors and revealed regional complexity.
- CKD leads to cardiovascular mortality (Bikbov et al., 2020).

Rationale and major risk factors

- Estimated numbers of diabetes and hypertension were 101 million and 315 million in India (Anjana et al., 2023).

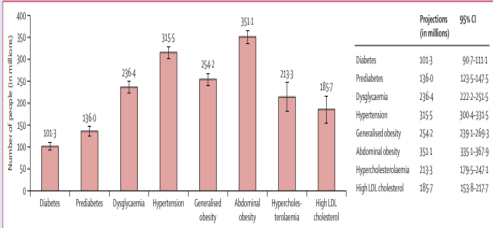


Figure 2: Projections for metabolic disease prevalence in India (Source: Anjana et al., 2023)

- Ageing of the population will raise the demand for healthcare and the risk of developing chronic disease (UNFPA, 2023).
- Exposure to heat and lack of adequate hydration were linked to compromised kidney activity among Indian salt workers (Venugopal et al., 2023).

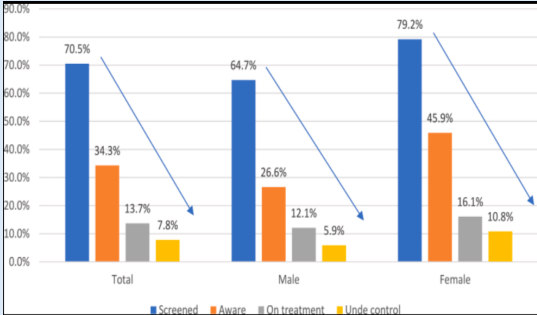


Figure 3: Prevalence of hypertensive Indian adults screened (Source: Guthi et al., 2024)

- Poor hypertension control shows significant prevention opportunities in current services (Guthi et al., 2024).
- It is proposed to transform the results of these interacting pressures into lifetime CKD risk left estimates to use in prevention planning.

Research question

What major risk factors and healthcare challenges are likely to increase the future burden of CKD in India?

Aim and Objectives

To simulate the residual lifetime incidence of CKD among initially unaffected adults in India, examining how major risk factors and healthcare access scenarios influence future burden.

- To identify major CKD risk factors and healthcare barriers through critical appraisal of contemporary Indian evidence.
- To estimate remaining lifetime CKD incidence using a simulation incorporating age, sex, risk profiles and competing mortality.
- To compare prevention and healthcare access scenarios to identify implications for equitable future service planning.

Research impact

- The results would inform focused screening, workforce planning and a cost-effective care continuum.
- Evidence of dapagliflozin suggests that it reduces progression in patients with known CKD (Heerspink et al., 2020).
- Empagliflozin gives additional support for better kidney outcomes (EMPA-KIDNEY Collaborative Group, 2023).
- The economic modelling promotes the assessment of affordable routes of dialysis when prevention is not successful (Gupta et al., 2022).

Healthcare challenges

- Lack of awareness, shortage of medicines and broken referral networks were obstacles to achieving timely kidney care (Jafar et al., 2020).
- Dialysis is not geographically uniform, posing significant transportation and financial barriers to access (Bharati and Jha, 2020).
- Pre-dialysis financial burden may compromise long-term outpatient control (Gummidl et al., 2022).
- Among urban haemodialysis service provision, qualitative evidence found a lack of staffing and service quality (Elias et al., 2022).

Proposed approach

Annual transitions between no CKD, CKD and death in adults aged 30 and older will be simulated in a secondary data model. Transitions will be informed by published incidence and mortality estimates, depending on the availability of data. The scenarios of baseline and improved prevention will be compared, and sensitivity analysis will rely on uncertain assumptions. Scenario interpretation will be informed by healthcare barriers without making unsubstantiated assumptions about causal effects. Residual lifetime incidence will refer to the chance of developing CKD prior to death, subject to being unaffected at the initial age. The outcome will be stratified based on age and sex to prevent obscuring of the differences among the populations. The study will differentiate between the prevention of new disease and prevention of disease after its diagnosis.

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