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Original Article

Community Section

Burden of Chronic Kidney Disease: A Cross-sectional Study Assessing Socio-demographic Correlates and Co-morbid Conditions in Chengalpattu District, Tamil Nadu, India

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ABSTRACT

Introduction: The global prevalence of Chronic Kidney Disease (CKD) is approximately 10-15%, with India experiencing an increasing burden due to lifestyle changes, diabetes, hypertension and environmental factors. Despite the high prevalence, region-specific epidemiological data remain scarce. Understanding the occurrence and contributing factors of CKD in Chengalpattu district is crucial for developing effective prevention and management strategies.

Aim: To estimate the prevalence of CKD in Chengalpattu district. To identify the socio-demographic determinants and co-morbid conditions associated with CKD.

Materials and Methods: A community-based cross-sectional study was conducted in Chengalpattu district from June 2024 to December 2024. A multistage sampling technique was used to select 420 adults. Adults who gave consent and were over 18 years old were chosen according to the Screening for Occult Renal Disease (SCORED) criteria. The study tool included socio-demographic details and the SCORED questionnaire. The Modification of Diet in Renal Disease (MDRD) equation was utilised to measure the estimated Glomerular Filtration Rate (eGFR). Data entry and analysis were performed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 26.0, respectively. The Chi-square test was used to identify associations between selected variables, with a p-value < 0.05 considered statistically significant.

Results: The study revealed that the overall prevalence of CKD was 55.5% (206 participants). Out of 420 participants, 371 were tested for eGFR, among whom the majority were in CKD stage 2 {177 (47.7%)}. A smaller proportion was diagnosed with stage 3a {22 (5.9%)}, stage 3b {2 (0.5%)}, stage 4 {4 (1.1%)} and stage 5 {1 (0.3%)}. The majority of participants were aged over 50 years {245 (58.3%)}, with a higher proportion of females {286 (68.1%)} and unemployed individuals {140 (33.3%)}. Proteinuria was found to be a strong and significant predictor of CKD, with an adjusted odds ratio of 11.55 (5.61-26.12). Age over 50 years showed a borderline significant effect on CKD {p-value=0.054, OR=3.71 (0.98-14.01)}.

Conclusion: The study findings indicate that CKD is a significant public health issue in the region, with a substantial proportion of the population exhibiting risk factors such as advanced age, male gender, a history of co-morbidities and proteinuria. This underscores the urgent need for early screening, lifestyle modifications and improved access to nephrology care.

Keywords: Family history, Glomerular filtration rate, Glucosuria, Proteinuria

INTRODUCTION

According to the Kidney Disease Outcome Quality Initiative (K/DOQI) clinical practice guidelines for CKD evaluation, classification and stratification, CKD is defined as kidney damage lasting for three months or more, as indicated by structural or functional abnormalities of the kidney, with or without decreased GFR. This may be demonstrated through pathologic abnormalities or markers of kidney damage, including abnormalities in blood or urine composition or imaging tests. It is defined as a GFR <60 mL/min/1.73 m^2 or the presence of other markers of kidney deterioration, such as albuminuria [1]. Developed nations report a CKD prevalence of 11-13%, whereas Low- and Middle-Income Countries (LMICs) bear a disproportionately higher burden [2]. A systematic review conducted between 2011 and 2017 in India estimated a CKD prevalence of 11.12%, which has increased to 16.38% in recent years (2018-2023) [3].

CKD is a growing public health concern globally and in India, driven by the increasing burden of non communicable diseases such as diabetes and hypertension. India contributes significantly to the global CKD burden; however, regional variations in prevalence and risk factors remain underexplored. Chengalpattu district, located in the state of Tamil Nadu, represents a semiurban region with a mixed socio-demographic profile, comprising both industrial zones and agrarian communities. This district has undergone rapid urbanisation in recent years, leading to lifestyle changes that may contribute to a rising burden of non communicable diseases, including CKD. However, population-level data on CKD prevalence and its determinants in this region are limited. The selection of Chengalpattu as the study area was guided by its representativeness of both urban and rural populations and the availability of primary healthcare infrastructure for potential screening and intervention programs. Most existing studies on CKD in Tamil Nadu have been conducted in tertiary care settings or larger urban centres like Chennai, thereby limiting their generalisability to semiurban districts like Chengalpattu [4]. A cross-sectional study by Rajapurkar MM et al., estimated the prevalence of CKD at around 17.2%, but it did not account for differences in rural and semiurban populations [5]. Similarly, Mani MK, reported on the success of community-based screening in Southern India but focused primarily on metropolitan populations [4]. As such, there is a critical need for local-level data to inform targeted prevention and management strategies in districts like Chengalpattu.

Present study aimed to estimate the prevalence of CKD in Chengalpattu district and to identify the socio-demographic determinants and co-morbid conditions associated with CKD.

MATERIALS AND METHODS

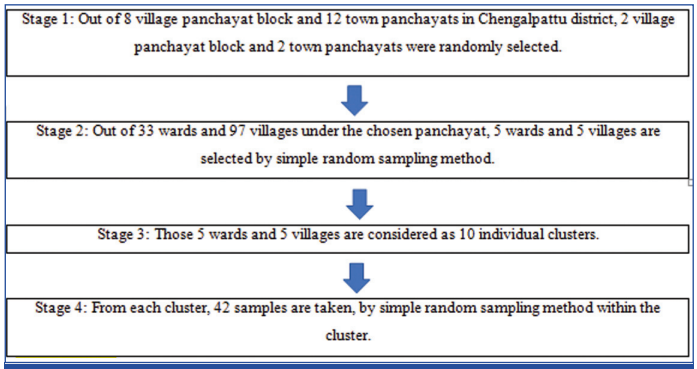
A community-based cross-sectional study was conducted in Chengalpattu district from June 2024 to December 2024. Institutional Ethical Committee approval was obtained before data collection (SRMIEC-STO723-563). Data collection was carried out after explaining the study's benefits and methods to all participants in Tamil. Written and informed consent were obtained from the participants before the start of the study. They were given the option to withdraw from the study at any time if they wished. No element of compulsion was exerted on them and participants were assured of the confidentiality of the data collected.

Inclusion criteria: Adults aged 18 years and above who provided consent, individuals with a family history of CKD regardless of the SCORED criteria were included in the study. The SCORED criteria were used to screen these participants for further CKD testing [6].

Exclusion criteria: Pregnant women, people with a history of urinary tract infections or fever at the time of the visit and females who were menstruating during the visit were excluded from the study.

Sample size: Based on a previous study by Sundstrom J et al., in which the final prevalence was found to be 10%, the 'p' value was taken as 10 and the 'q' value was taken as 90. With 'd' set at 3 and after substituting these values into the sample size estimation formula, $n=Z^2 P q/d^2$, the sample size was calculated as 384. With a non response rate of 10%, the final sample size was rounded up to 420 [7]. A multistage sampling method was used to select the study population.

[Table/Fig-1] explains the multistage cluster sampling method employed to obtain an equal distribution of participants from urban and rural areas (210 each). However, due to practical constraints such as differential response rates, consent refusals and accessibility issues, the final sample consisted of 223 urban and 197 rural participants. This minor variation does not significantly impact the study's validity, as both groups remain well-represented within the total sample size.



[Table/Fig-1]: Multistage sampling method.

A validated structured questionnaire was used to interview the study participants. Experts in the field assessed the questionnaire to ensure its validity. Recommended changes by the evaluators were implemented and the final approved questionnaire was adopted for data collection. The validation process involved conducting a pilot test on a smaller subset (10% of the sample size) and based on the feedback received, necessary modifications were made. The questionnaire consists of three parts: the first part contained 14 demographic-type questions, the second part includes nine yes or no questions and the third part involves vital signs monitoring and investigation results.

Socio-demographic characteristics of the study participants, such as name, age, sex, address, mobile number, religion, educational qualification, occupation, monthly income, total number of family members, per capita income, Socioeconomic Status (SES), marital status and religion, were collected. As part of the screening process, a family history of renal disease was included.

The next part of the questionnaire includes the screening tool, SCORED [6]. The SCORED questionnaire was utilised to identify individuals with a high likelihood of having occult renal disease. This questionnaire asks for self-reported information consisting of nine questions that cover variables such as age, sex, known anaemia, hypertension, diabetes, any history of heart attack, stroke, heart failure, or vascular problems and urinary protein loss. Points were assigned as follows: 1 point for ages 50-59 years, 2 points for ages 60-69 years and 3 points for ages 70 years or above. An additional point was awarded for female sex, a history of hypertension, diabetes, cardiovascular disease, congestive heart failure, stroke, the presence of proteinuria (detected by urine dipstick) and anaemia. The total possible score ranged from 0 to 13, with a score of 4 or more used as the cut-off to identify individuals eligible for further CKD testing.

Vitals assessed included pulse rate, respiratory rate, temperature and blood pressure. Body temperature was measured using a digital thermometer following standard infection control precautions. Blood pressure was measured using a calibrated sphygmomanometer. The Eighth Joint National Committee (JNC 8) guidelines were used to classify participants' blood pressure status, with hypertension defined as systolic BP ≥140 mmHg or diastolic BP ≥90 mmHg. The JNC 8 guidelines provide standardised, evidence-based criteria for diagnosing and managing hypertension. Using these guidelines ensures consistent identification of elevated blood pressure, which is a major risk factor for CKD. Early detection and management of hypertension based on JNC 8 can help prevent or slow CKD progression, making it crucial for screening and risk assessment in this study [8].

About 5 mL of a random urine sample was collected from participants to assess the levels of sugar, protein and haematuria, which were visually read using the dipstick method [9]. A non fasting 5 mL venous blood sample was collected following aseptic precautions for the estimation of serum creatinine. The blood sample was centrifuged at 3000 rpm for 5-10 minutes and the serum samples were separated. Samples were analysed using the Beckman Coulter Clinical Chemistry Analyzer DXC 700. For participants with positive findings, GFR was estimated using the MDRD study equation [10], which required age, sex, race and creatinine value.

Participants with GFR <60 mL/min/1.73 m^2 had repeat urine and blood tests after three months; if findings remained the same, they were diagnosed with CKD and referred to a nephrologist for further management [1]. Staging of CKD based on the eGFR values was done using the KDIGO guidelines [11].

STATISTICAL ANALYSIS

Data entry and analysis were conducted using Microsoft Excel and SPSS version 26.0, respectively. Both descriptive and inferential statistics were applied during the analysis. Categorical variables were expressed as frequency and percentage. The Chi-square test was used to identify associations between selected variables. A p-value of < 0.05 was considered statistically significant.

RESULTS

Out of 420 participants, the majority were aged over 50 years (245, 58.3%) and a significant proportion of the study population were female (286, 68.1%). It was observed that 223 participants (53.1%) were urban residents, while 197 participants (46.9%) were from rural areas. Only 36 participants (8.5%) had attained graduate or postgraduate education. The unemployed constituted the highest proportion (140, 33.3%), followed by skilled workers (130, 31.0%) and unskilled workers (92, 22.0%) [Table/Fig-2]. The operational definition used for unskilled work refers to work that does not require education or training, such as porter, watchman, or domestic servant. Complex work, which requires a long duration of training to attain certain skills, such as carpenter, mason, mechanic, or car driver, was categorised under skilled work [12].

Variable	n (%)
Age	
50 or less than 50 years	175 (41.7)
more than 50 years	245 (58.3)
Sex	
Male	134 (31.9)
Female	286 (68.1)
Residence	
Urban	223 (53.1)
Rural	197 (46.9)
Education	
Illiterate	115 (27.4)
Primary school	91 (21.7)
Secondary school	92 (21.9)
High school	86 (20.5)
Graduate/postgraduate	36 (8.5)
Occupation	
Unemployed	140 (33.3)
Semiskilled	47 (11.2)
Skilled	130 (31.0)
Retired	11 (2.5)
Unskilled	92 (22.0)

[Table/Fig-2]: Categorisation of the individuals according to their age, sex, residence, education and occupation.

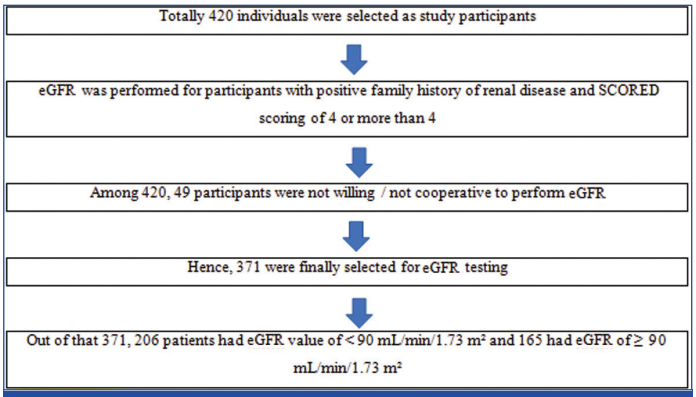
[Table/Fig-3] explains that 388 participants (92.4%) of the population were married. SES was categorised using the Modified BG Prasad classification [13] into five classes, with most respondents belonging to class III (149, 35.5%), followed by class IV (120, 28.6%) and class V (89, 21.2%). Among the study participants, Hinduism was the predominant religion (342, 81.3%), followed by Christianity (70, 16.7%) and Islam (8, 2.0%).

Variable	n (%)
Marital status	
Married	388 (92.4)
Single	6 (1.4)
Widow	26 (6.2)
Socioeconomic Status (SES)	
Class I	4 (0.9)
Class II	58 (13.8)
Class III	149 (35.5)
Class IV	120 (28.6)
Class V	89 (21.2)
Religion	
Hindu	342 (81.3)
Christian	70 (16.7)
Muslim	8 (2.0)
History of co-morbidity	
Present	371 (88.3)
Absent	49 (11.7)
Family history of renal disease	
Present	59 (14.0)
Absent	361 (86.0)
Proteinuria	
Present	105 (25.0)
Absent	315 (75.0)
Haematuria	
Present	0
Absent	420 (100.0)
Sugar in urine	
Present	123 (29.3)
Absent	297 (70.7)

[Table/Fig-3]: Categorisation of the individuals according to their marital status, Socioeconomic Status (SES), religion and urine examination.

As part of screening, participants were asked about their co-morbidity history, including anemia, hypertension, diabetes, heart attack, heart failure and vascular problems. The presence or absence of any co-morbidity was recorded. A family history of renal diseases and urine examinations were also conducted. A total of 371 participants (88.3%) had a history of co-morbidity and 59 participants (14%) reported a family history of renal disease, indicating a potential genetic predisposition. From the urine examination, it was found that 105 participants (25%) had proteinuria and 123 participants (29.3%) had sugar in their urine. Interestingly, there were no cases of haematuria.

[Table/Fig-4] describes how 420 participants were screened down to 371 participants based on positive family history and the SCORED questionnaire.



[Table/Fig-4]: Screening of participants for CKD diagnosis.

[Table/Fig-5] presents the staging of CKD based on eGFR values following the KDIGO guidelines [11]. Among the respondents, most were in stage 2 (177, 47.7%). A smaller proportion was diagnosed with stage 3a (22, 5.9%), stage 3b (2, 0.5%), stage 4 (4, 1.1%) and stage 5 (1, 0.3%).

Distribution of eGFR (mL/min/1.73 m²)	n (%)
Normal	165 (44.5)
1 (≥90)	0
2 (60-89)	177 (47.7)
3a (45-59)	22 (5.9)
3b (30-44)	2 (0.5)
4 (15-29)	4 (1.1)
5 (<15 or dialysis)	1 (0.3)

[Table/Fig-5]: Frequency distribution of estimated Glomerular Filtration Rate (eGFR).

[Table/Fig-6] describes the association between the presence of CKD and variables such as age, sex, residence, religion and education. It was observed that there was a statistically significant association between age and gender of the participants. Individuals older than 50 years were more likely to have CKD (p<0.0001, OR: 0.282 [0.182 - 0.435]). Males had a 2.181 times increased risk of developing CKD compared to females.

It can be observed that participants with co-morbid conditions had a significantly higher likelihood of CKD, with an odds ratio of 3.727 (1.313 - 8.573) [Table/Fig-7]. People with a positive family history had a higher risk of developing CKD, which was found

Variable	Diagnosis of CKD		Chi-square	p-value	Odds ratio (95% CI)
	Present (<90 eGFR (mL/min/1.73 m²) (n=206)	Absent (≥ 90 eGFR (mL/min/1.73 m²) (n=165)			
Age (years)					
≤ 50	56 (37.3%)	94 (62.7%)	33.746	<0.0001*	0.282 (0.182 - 0.435)
> 50	150 (67.8%)	71 (32.2%)			
Sex					
Male	83 (68.0%)	39 (32.0%)	11.514	0.006*	2.181 (1.384 - 3.434)
Female	123 (49.4%)	126 (50.6%)			
Residence					
Urban	103 (56.6%)	79 (43.4%)	0.165	0.684	-
Rural	103 (54.5%)	86 (45.5%)			
Religion					
Hindu	162 (53.8%)	139 (46.2%)	1.878	0.170	-
Others	44 (62.9%)	26 (37.1%)			
Education					
Educated	150 (54.5%)	125 (45.5%)	0.413	0.520	-
Illiterate	56 (58.3%)	40 (41.7%)			

[Table/Fig-6]: Association between age, sex, residence, religion, education and diagnosis of CKD.

Variable	Diagnosis of CKD		Chi-square	p-value	Odds ratio (95% CI)
	Present (<90 eGFR (mL/min/1.73 m²) (n=206)	Absent (≥90 eGFR (mL/min/1.73 m²) (n=165)			
Occupation					
Employed	141 (56.2%)	110 (43.8%)	0.132	0.715	-
Unemployed	65 (54.2%)	55 (45.8%)			
Socio-economic status					
Class I/II/III	106 (54.4%)	89 (45.6%)	0.226	0.634	-
Class IV/V	100 (56.8%)	76 (43.2%)			
History of comorbidity					
Yes	201(57.2%)	151(42.8%)	6.918	0.008*	3.727 (1.313 - 8.573)
No	5(26.3%)	14(73.7%)			
Family history of renal disease					
Yes	20 (37.0%)	34 (63.0%)	8.784	0.003*	0.414 (0.228 - 0.751)
No	186 (58.7%)	131 (41.3%)			
History of proteinuria					
Yes	95 (92.2%)	8 (7.8%)	77.801	<0.001*	16.796 (7.841-35.964)
No	111 (41.4%)	157 (58.6%)			
History of sugar in urine					
Yes	105 (85.4%)	18 (14.6%)	66.241	<0.001*	8.490 (4.847-14.871)
No	101 (40.7%)	147 (59.3%)			

[Table/Fig-7]: Association between occupation, socio-economic status, co-morbidity history, variables related to urine examination findings and diagnosis of CKD.

to be statistically significant. Both proteinuria and glucosuria were strongly associated with CKD (p<0.001, OR: 16.796 [7.841 - 35.964] and 8.490 [4.847 - 14.871], respectively).

[Table/Fig-8] shows that proteinuria was a strong and significant predictor of CKD, with an adjusted odds ratio of 11.55 (5.61 - 26.12). Age over 50 years showed a borderline significant effect on CKD (p-value=0.054, OR=3.71 [0.98-14.01]). Other variables, including sex, family history, history of co-morbidity and history of glucosuria, did not show significant associations with CKD.

S. No.	Variables	Beta coefficient	p-value	Adjusted OR (95% CI)
1.	Age >50 years	1.31	0.054	3.71 (0.98 - 14.01)
2.	Male sex	0.21	0.721	1.23 (0.40 - 3.76)
3.	History of co-morbidity	1.09	0.059	1.09 (0.431 - 2.184)
4.	Family history	0.31	0.571	1.36 (0.48 - 3.86)
5.	History of proteinuria	2.45	0.004*	11.55 (5.61 - 26.12)
6.	History of glucosuria	2.57	0.993	2.01 (0.61 - 6.18)

[Table/Fig-8]: Multivariate logistic regression analysis of CKD.

DISCUSSION

This study uniquely contributes to the limited but growing body of literature on CKD in southern India. By focusing on this semiurban district, which has a mix of rural and urban populations, the study adds region-specific data that are essential for tailoring public health responses. The findings hold particular significance for Chengalpattu, where the ongoing epidemiological transition and rapid urbanisation are reshaping disease profiles.

While several variables like age, sex and co-morbidities showed significant associations with CKD, others such as education, occupation, SES, residence (urban/rural) and religion did not. These

non significant associations are equally informative. This aligns with the study by Palo SK et al., which also found no significant association between religion or residence and CKD [14]. The lack of an urban-rural disparity suggests that the CKD burden is becoming more uniformly distributed across geographies, possibly due to shared risk exposures such as dietary changes, stress and environmental contaminants. Similarly, religion did not emerge as a determinant, underscoring that CKD risk in this population may be more strongly mediated by behavioural factors than by cultural practices alone.

Although marital status was not significantly associated with CKD prevalence in present study, its inclusion remains relevant given its known influence on health-seeking behaviour, treatment adherence and psychosocial support, which can indirectly affect disease recognition and management. Prior studies have highlighted the broader role of marital status in shaping health outcomes, warranting its consideration in population-based assessments [15].

A study by O'Callaghan-Gordo C et al., showed that in Northern India, older age was the only risk factor associated with lower mean eGFR. In Southern India, risk factors for lower mean eGFR and eGFR <60 were residence in a rural area, old age and low level of education. In present study, age alone showed significance, whereas residence and education did not show any significance [16].

A comparable study conducted in Kerala by Ramesh S et al., examined the correlation of self-management and social support with the quality of life in patients undergoing haemodialysis [17]. Notably, both studies highlight the multifactorial nature of CKD and emphasise the importance of socio-demographic and contextual determinants. In both populations, non-clinical factors such as occupation, education and access to care played a substantial role in CKD outcomes. Furthermore, both studies underscore the need for region-specific, comprehensive CKD strategies that go beyond clinical management to address the broader social and environmental contributors to the disease burden. This similarity reinforces the imperative for integrated interventions combining early detection, risk factor mitigation and patient-centered care across different stages of CKD.

The current research identified that the prevalence of CKD increased significantly with age, consistent with a meta-analysis by Tonelli M et al., which confirmed that renal function declines progressively with age, making older individuals more vulnerable to CKD due to nephron loss, vascular changes and co-morbidities [18]. A similar pattern was observed in the Chennai Urban Rural Epidemiology Study (CURES), emphasising the need for early screening in elderly populations [19]. Rao M et al., also noted a greater prevalence of CKD among older adults in both urban and rural settings in India, reinforcing the need for screening programs targeting elderly populations [20]. Similar findings were reported in a meta-analysis by Hirst JA et al., which established that CKD prevalence rises steeply after the age of 50 years [21]. The observed increase in CKD prevalence with age in this study was consistent with other reports, primarily due to age-related physiological declines in renal function. Decreased nephron numbers, vascular changes and common co-morbidities in older adults contribute to this trend, explaining similar findings across diverse populations.

The male participants in present study had a higher risk of CKD compared to females, which aligns with findings from the Indian CKD Registry [22], reporting a higher prevalence of CKD among men. This may be attributed to differences in lifestyle and occupational exposures. Agricultural workers, construction laborers, brick kiln and quarry workers and heavy metal industrial workers, such as automobile mechanics [23-25], are exposed to high heat and physical labour, which are significantly associated with lower kidney function. Persistent heat stress in such occupational settings promotes heat-related disorders and lowers eGFR, indicating compromised kidney function [26], along with a higher prevalence of risk factors such as smoking and alcohol consumption among males. Similar results were observed in a study conducted by Venugopal V et al., [27]. A global study by Ricardo AC et al., further noted that CKD progression was faster in men than women [28]. The higher risk of CKD among males observed in these studies may be attributed to lifestyle factors such as smoking, alcohol use and occupational exposures.

Tobacco use induces endothelial dysfunction, promotes oxidative stress and contributes to hypertension and proteinuria, all of which accelerate renal damage. Chronic alcohol consumption can lead to dehydration, electrolyte imbalances and increased blood pressure, indirectly impairing renal function. Additionally, occupational exposures—more common among males—to heavy metals, solvents and prolonged heat stress are known to cause chronic tubular and interstitial kidney damage [29]. Hormonal differences, such as the protective role of oestrogen in females, may also explain the slower progression of CKD in women. Oestrogens have demonstrated protective effects in potentially kidney-damaging pathways like collagen synthesis, nitric oxide production, the renin-angiotensin system, the formation of free radical species and the synthesis of endothelin [28]. Men are also less likely to seek preventive healthcare, leading to delayed diagnosis and faster disease progression, a trend observable globally [30].

Co-morbid conditions such as diabetes and hypertension were strong predictors of CKD in the present study, aligning with research by Zhang Y et al., which confirms that these conditions accelerate kidney function decline [31]. Similar findings were reported in the Indian CKD Registry and a study by Khandpur S et al., which highlighted that uncontrolled diabetes and hypertension are leading contributors to CKD in India [22,32]. Varma PP et al., also reported similar associations, emphasising that uncontrolled blood pressure and blood glucose are key contributors to renal damage and decline in eGFR [33]. This observation was further supported by the 2024 Global Burden of Disease (GBD) CKD study, which named diabetes and hypertension as the leading global risk factors for CKD [34]. These conditions are globally prevalent and share similar mechanisms—such as glomerular injury and vascular damage—that accelerate kidney function decline, explaining the consistent association across studies [34].

This study observed a significant association between family history of CKD and disease prevalence. A study conducted by Patnaik S et al., found that individuals with a positive family history had over twice the risk of developing CKD due to shared genetics and similar lifestyle environments [35]. Supporting this, another study by Gummidi B et al., in Uddanam, India, confirmed the familial clustering of CKD and highlighted the importance of targeted screening in high-risk groups. Genetic predisposition and shared environmental/lifestyle factors among family members contribute to similar health outcomes, including CKD [36].

Proteinuria was a strong predictor of CKD in this study, consistent with a study by Provenzano M et al., which emphasised that proteinuria is one of the earliest markers of kidney dysfunction and a key target for early intervention [37]. A study by Ruggenenti P et al., found that reducing proteinuria through lifestyle and pharmacological interventions slows CKD progression [38]. This is consistent with findings in a study by Turin TC et al., which concluded that proteinuria is an early marker of glomerular injury and CKD progression [39]. Bassiouni M et al., further demonstrated that even low-grade proteinuria increased the risk of adverse renal outcomes [40]. The mechanism of protein loss through damaged glomeruli leading to tubular injury and interstitial fibrosis was consistent across populations. Clinical guidelines globally use proteinuria as a key criterion in staging and managing CKD [34].

This study found that glycosuria was significantly associated with CKD. A study by Looker HC et al., confirmed that glycosuria is a

predictor of kidney disease progression [41]. Similar results were reported by Singh AK et al., who found that persistent glycosuria is a reliable indicator of diabetic nephropathy and early renal dysfunction [42]. The significant association of glycosuria with CKD in these findings likely reflects underlying diabetic nephropathy.

This study underscores the need to incorporate routine kidney function testing into Primary Health Centre (PHCs) and Health and Wellness Centre in Chengalpattu. Targeted interventions—such as mobile screening camps and occupational risk screenings—are crucial given the district's semiurban profile. A district-level CKD surveillance registry with structured follow-up can aid early detection and monitoring. Strengthening PHC capacity through point-of-care testing, staff training and referral linkages with Chengalpattu Medical College can improve access to nephrology care. Community education using the local language and involving frontline workers can enhance awareness. Region-specific planning and resource allocation are essential to address the rising CKD burden. The study provides valuable epidemiological insights from a community setting, offering a real-world perspective on CKD prevalence. It employed the SCORED questionnaire and standardised clinical measures, ensuring the reliability and accuracy of CKD diagnosis. The use of a multistage random sampling technique ensures representative sampling and reduces selection bias. Additionally, the use of field-feasible tools like dipstick proteinuria testing makes the approach replicable in similar low-resource settings.

Limitation(s)

Although the study provides crucial local insights, the findings may not be generalisable to the entire Indian population due to regional variations. While urine dipstick testing is highly feasible in community settings, it is known to detect transient or low-grade proteinuria, which may overestimate CKD prevalence in cross-sectional surveys, especially in asymptomatic populations. Potential confounding factors such as the use of nephrotoxic medications, hydration status at the time of urine sample collection, and undiagnosed co-morbid conditions may have influenced the results. While information bias is expected to be minimal, it cannot be entirely ruled out. Additionally, social desirability bias may have led participants to underreport their co-morbidity history.

CONCLUSION(S)

The study findings indicate that CKD is a significant public health issue in the region, with a substantial proportion of the population exhibiting risk factors such as advanced age, male gender, history of co-morbidities and proteinuria. The study underscores the need for early detection and preventive interventions to reduce CKD-related morbidity and mortality. The findings align with national and global studies, emphasising that non communicable diseases such as diabetes and hypertension remain the predominant contributors to CKD prevalence. The study highlights the importance of region-specific data in formulating effective health policies and intervention strategies for CKD management.

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