

<https://doi.org/10.48047/AFJBS.6.14.2024.5895-5902>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

PREVALENCE AND RISK FACTORS OF CHRONIC KIDNEY DISEASE AMONG SOUTH INDIAN URBAN POPULATION VISITING A TERTIARY CARE CENTRE - A CROSS SECTIONAL STUDY

Vinayak Mani Aishwariyaa¹, Durga Krishnan^{2*}, Mohan Rao³, Kolli Laasya Sree⁴, Venkata Sai Vignesh Challa⁵

¹Postgraduate, Department of General Medicine, Chettinad Health and Research Institute, Chennai, India. aishwariyaabell@gmail.com, 0009-0008-0802-5989

^{2*}Professor, Department of General Medicine, Chettinad Health and Research Institute, Chennai, India.

drdurga79@gmail.com, 0000-0003-0249-5097

³Professor & HOD, Department of General Medicine, Chettinad Health and Research Institute, Chennai, India. urmohan_rao@yahoo.co.in, 0009-0004-4973-0431

⁴ Postgraduate, Department of General Medicine, Chettinad Health and Research Institute, Chennai, India. laasyareddy3@gmail.com, 0009-0004-2983-5033

⁵ Postgraduate, Department of General Medicine, Chettinad Health and Research Institute, Chennai, India. challa001@gmail.com, 0009-0002-6845-6808

Corresponding Author*: Durga Krishnan

Volume 6, Issue 14, Aug 2024

Received: 15 June 2024

Accepted: 25 July 2024

Published: 15 Aug 2024

doi: [10.48047/AFJBS.6.14.2024.5895-5902](https://doi.org/10.48047/AFJBS.6.14.2024.5895-5902)

ABSTRACT:**INTRODUCTION:**

Chronic kidney disease (CKD) is an emerging silent epidemic of non-communicable disease worldwide. In India, increasing onset of diabetes and hypertension plays an important role in the development of CKD. This study was conducted to estimate the Prevalence and Risk factors for Chronic Kidney Disease among South Indian urban population based on clinical features and screening the population at risk in a tertiary care centre.

METHODOLOGY:

This is a cross sectional study done among the population visiting tertiary care centre. Sample size was 200 which included 122 Males and 78 Females. Data regarding Demographic factors, socioeconomic factors, lifestyle factors, risk factors for CKD, serum creatinine, serum urea, urine protein and sugar, random blood sugar were collected.

RESULTS:

Among the 200 study subjects, 158 (79%) were normal, 18 (9%) were newly diagnosed as CKD stage 1, 12 (6%) as CKD stage 2, 8 (4%) as CKD stage 3a, 2 (1%) as CKD stage 3b, 1 (0.5%) as CKD stage 4 and 5. Among the study subjects, 65% of them were diabetic, 53.5% were hypertensive, 32.5% had dyslipidemia, 13.5% had history of coronary heart disease, 52% of them had urinary complaints.

CONCLUSION:

This study showed that prevalence of CKD among the south Indian urban population visiting a tertiary care centre was 21%. Risk factors included in the study were diabetes, systemic hypertension, dyslipidemia, history of coronary artery disease, history of smoking and alcohol intake, history of NSAID's overuse, family history of CKD, diet and socioeconomic status. The study sample was small and this study included only people visiting a tertiary care centre with known comorbidities. Hence further multicentric studies with large sample size should be conducted in future.

KEYWORDS: chronic kidney disease (CKD), diabetes, hypertension, renal failure, end stage renal disease.

INTRODUCTION:

Chronic kidney disease (CKD) is an emerging silent epidemic of non-communicable disease worldwide, more in developing countries like India. It accounts for almost two thirds of death in India (1,2). According to National Kidney Foundation (NKF) guidelines, CKD by definition is damage to kidney or Glomerular Filtration Rate (GFR) less than 60ml/min or 1.73m^2 for three or more months with or without kidney injury, irrespective of the cause (3). In India, increasing onset of diabetes and hypertension plays an important role in the development of CKD (4).

Patients diagnosed with CKD has high risk for emergence to End Stage Renal Disease (ESRD). Renal diseases progressing to renal failure or other complications can be delayed or prevented by screening the population at risk i.e., by early diagnosis and proper treatment (5,6). Recent survey shows incidence of End Stage Renal Disease (ESRD) in India is increased to be 229/million population and annually more than one lakh patients pass into the need for renal replacement therapy (RRT) (7-9). In India Screening and Early Evaluation of Kidney Diseases (SEEK) was established to designate the prevention and risk factors for Chronic Kidney Disease (10).

Scarcity of screening programs among risk groups, in turn delays the chances of early diagnosis and proper treatment of the disease, leading to worsening of the disease. Most of the patients are diagnosed only at the later stages of the disease.

Hence this study was conducted to estimate the Prevalence and Risk factors for Chronic Kidney Disease among South Indian urban population based on clinical features and screening the population at risk in a tertiary care centre.

OBJECTIVES:

The aim of the study is to determine the Prevalence and Risk factors for Chronic Kidney Disease among South Indian urban population.

METHODS:

This is a cross sectional study done among the population visiting tertiary care centre from January 2023 to June 2023 in Chennai, Tamilnadu. After getting approval from Institutional Ethics Committee, data collection was started. After getting informed consent, information was collected using questionnaire prepared in local language from patients visiting tertiary care centre. Data regarding Demographic factors, socioeconomic factors, lifestyle factors, risk factors for CKD, serum creatinine, serum urea, urine protein and sugar, random blood sugar were collected. Data was analysed using SPSS 26.0 version. Chi square test and p-value <0.05 was considered to be significant.

SAMPLE SIZE:

Sample size was 200 which included 122 Males and 78 Females.

INCLUSION CRITERIA:

Both male and female above 18 years of age who were willing for the study were included.

EXCLUSION CRITERIA:

Patients who were less than 18 years of age were not included in the study.

Acute illness and patients who were taking drugs that alter creatinine levels were not included in the study.

LAB INVESTIGATIONS:

Blood samples were collected from all subjects visiting General Medicine OPD, CHRI. Blood urea was measured using UV kinetic test. Serum creatinine was measured using Jaffe kinetic method.

RANDOM GLUCOSE TEST:

A random glucose test is also known as casual blood glucose test (CBG) or random blood sugar test (RBS) is used to measure the blood sugar level of a non-fasting person. Blood samples are collected from the subjects visiting General Medicine OPD, CHRI. According to American Diabetes Association (ADA) guidelines, random blood sugar value of more than 200mg/dl denotes high random blood sugar.

BLOOD PRESSURE MEASUREMENT:

Blood pressure was measured using mercury sphygmomanometer. BP was recorded for patients in right upper arm in sitting position. According to European Society of Hypertension (ESH) recommendations, systolic BP more than 140mmHg or diastolic BP more than 90mmHg is considered as hypertension.

COLLECTION OF URINE SAMPLE:

Urine samples were collected in sterile specimen containers. Proper instructions were given to all subjects on collecting mid-stream urine.

URINE DIPSTICK ANALYSIS:

Urine dipstick is a semi-quantitative rapid method for urine analysis. Urine reagent strips are sensitive to glucosuria and proteinuria. The dipstick was inserted into collected urine samples for 60 seconds. The colour of the dipstick is then compared with the colour on the bottle strip and results were interpreted.

RESULTS:

This is a cross sectional study which estimates the prevalence of chronic kidney disease (CKD) and its risk factors among the 200 subjects who were willing for the study. As per Table 1 Males were predominant in the study (61%). Majority of the study population belongs to age less than 60 years (72%), mean age was found to be 40 -50 years (32%). Hindus (47%), Christians (29%), muslims (24%) were included in the study. Among the subjects, 34% of the subjects had completed their high school education, 28% were illiterate, 22% had completed a degree, 16% of them had completed primary school education. Modified kuppaswamy score was used for calculating the socioeconomic status, according to that 32% belonged to lower middle class (III), 31% upper middle class (II), 21.6% upper lower class (IV), 12.7% lower class (V).

Table 1: Socio demographic details of the participants of the study.

FACTORS	NUMBERS	PERCENTAGE
AGE	<60 - 144	72
	>60 - 56	28
SEX	MALE 122	61
	FEMALE 78	39
MARITAL STATUS	MARRIED 158	79
	UNMARRIED 42	21
RELIGION	HINDU 94	47
	CHRISTIANS 58	29
	MUSLIMS 48	24
EDUCATION	1-5 th 32	16
	6-12 th 68	34
	DEGREE 44	22
	ILLITERATE 56	28
OCCUPATION	STUDENT 20	10
	HOUSEWIFE 52	26
	EMPLOYED 70	35
	UNEMPLOYED 38	19
	RETIRED 20	10
SOCIO ECONOMIC	26-29 UPPER (I)	2.7
STATUS	16-25 UPPER MIDDLE (II)	31
(MODIFIED	11-15 LOWER MIDDLE (III)	32
KUPPUSWAMY	5-10 UPPER LOWER (IV)	21.6
SCORE)	<5 LOWER (V)	12.7

Table 2: Distribution of CKD and stages among subjects.

STAGES OF CKD	NUMBER	PERCENTAGE
NORMAL	158	79
STAGE 1	18	9
STAGE 2	12	6
STAGE 3a	8	4
STAGE 3b	2	1
STAGE 4	1	0.5
STAGE 5	1	0.5

TOTAL	200	100
-------	-----	-----

Table 3: Distribution of risk factors of CKD among study participants.

RISK FACTORS		MALE NO	%	FEMALE NO	%	TOTAL NO	%
DIET	VEG	4	4.88	8	10.26	12	6
	MIXED	118	96.72	70	89.74	188	94
DM	YES	84	68.85	46	58.97	130	65
	NO	38	31.15	32	41.03	70	35
S.HTN	YES	76	62.30	31	39.74	107	53.50
	NO	46	37.70	47	60.26	93	46.50
DYSLIPIDEMIA	YES	44	36.07	21	26.92	65	32.50
	NO	78	63.93	57	73.07	135	67.50
CHD	YES	19	15.57	8	10.26	27	13.50
	NO	103	84.43	70	89.74	173	86.50
H/O ALCOHOL	YES	92	75.41	-	-	92	46
	NO	30	24.59	-	-	30	15
H/O SMOKING	YES	64	52.46	-	-	64	32
	NO	58	47.54	-	-	58	29
H/O NSAIDS OVERUSE	YES	75	61.47	41	52.56	116	58
	NO	47	38.5	37	47.44	84	42
H/O NATIVE MEDICATION	YES	42	34.43	52	66.66	94	47
	NO	80	65.57	26	33.33	106	53
H/O URINARY SYMPTOMS	YES	62	50.82	42	53.84	104	52
	NO	60	49.18	36	46.15	96	48
FAMILY H/O CKD	YES	13	10.66	7	8.97	20	10
	NO	109	89.34	71	91.02	180	90

Among the 200 study subjects, 158 (79%) were normal, 18 (9%) were newly diagnosed as CKD stage 1, 12 (6%) as CKD stage 2, 8 (4%) as CKD stage 3a, 2 (1%) as CKD stage 3b, 1 (0.5%) as CKD stage 4 and 5. Screening showed 65% of the subjects with proteinuria, 10% with UTIs and 1% with oliguria.

Prevalence of CKD and its modifiable and non-modifiable risk factors are shown in table 3.

Among the study subjects, 65% of them were diabetic, 53.5% were hypertensive, 32.5% had dyslipidemia, 13.5% had history of coronary heart disease, 52% of them had urinary complaints. 75.4% of males had history of alcohol intake and 52.4 % of the males had history of smoking. None of the females who were included in the study had history of smoking and alcohol intake. Among the study participants, 58% of the subjects had history of overuse of NSAIDs, 47% had history of native medication intake. Compared to males more number of females were involved in intake of native medications, whereas NSAIDs overuse was more common among males.

Among the 200 study subjects 130 (65%) of them were known diabetics, 10 (5%) of them were newly diagnosed with diabetes, with RBS more than 200mg/dl, elevated HbA1C levels. Among the 42 CKD study population 32 was known case of diabetes and 10 was newly diagnosed with diabetes. The prevalence of diabetes among CKD was 76%, among them 45% of the subjects had good glycemic control.

Among the 200 study participants, 107 (53.5%) were hypertensive out of which 97 had history of S.HTN, 10 of them were newly diagnosed hypertensive. Among the CKD study subjects 30 of them were known hypertensive and 12 of them were newly diagnosed hypertensive. Thus the prevalence of Systemic Hypertension was 71.5% among CKD. History of NSAID's over usage was among 26 of the CKD population was 62%. Prevalence of smoking and alcohol was 66.7% among CKD subjects. Prevalence of family history of CKD is 9.5%

DISCUSSION:

This study included 200 adults among which 122 are males and 78 are females. Among the study participants 42 were diagnosed with CKD. Thus the prevalence of CKD stages 1, 12 (6%) as CKD stage 2, 8 (4%) as CKD stage 3a, 2 (1%) as CKD stage 3b, 1 (0.5%) as CKD stage 4 and 5. Screening showed 65% of the subjects with CKD had proteinuria which is similar to study performed by SEEK India cohort (11), 10% with UTIs and 1% with oliguria. Prevalence of CKD was higher among diabetes 76% and among them 45% of them had good glycemic control. Prevalence of Systemic Hypertension among CKD was 71.5%. Hypertension is the important factor for CKD which causes rapid decrease in eGFR. Prevalence of CKD is higher among subjects above 60 years of age (62%) which is similar to study conducted by Singh et al which concluded decrease in eGFR with increase in age (12).

In this study most of the population belonged to lower middle-class group according to modified kuppuswamy score. Prevalence of CKD was more among illiterate and lower middle class group which was due to lack of awareness and proper screening.

In this study none of the female participants had history of smoking and alcohol intake. But the prevalence of CKD among males with smoking and alcohol intake was 66.7%. Meanwhile female had higher association with CKD and history of NSAID's overusage.

Thus Diabetes, Systemic Hypertension and NSAID's overusage were the most common risk factors for development of CKD. Other risk factors include old age which was also responsible for reduction in eGFR in CKD.

Among the newly diagnosed CKD, 48% belonged to poor socioeconomic group. Hence proper awareness should be given regarding screening, early diagnosis and treatment among illiterate and low socioeconomic group to prevent the worsening of CKD.

CONCLUSION:

This study showed that prevalence of CKD among the south Indian urban population visiting a tertiary care centre was 21%. Risk factors included in the study were diabetes, systemic hypertension, dyslipidemia, history of coronary artery disease, history of smoking and alcohol intake, history of NSAID's overuse, diet and socioeconomic status. Prevalence of CKD was assessed only using urine dipstick method for proteinuria and serum creatinine levels. Due to economic constraints detailed clinical and laboratory examinations could not be done. The study sample was small and this study included only people visiting a tertiary care centre with known comorbidities. Hence further multicentric studies with large sample size should be conducted in future. People who fall under risk category should be advised to get regular screening and proper awareness among them would prevent the worsening of CKD.

Funding Statement: The authors did not receive financing for the development of this research.

Data Availability: No new data were created or analyzed in this study.

Conflict of interest: None.

REFERENCES:

1. Kokila K, Chellavel Ganapathi K. A study on prevalence of chronic kidney disease and its risk factors among adults in selected slums of Chennai. *Int J Community Med Public Health* 2019;6:504-9.
2. Prabahar MR, Chandrasekaran V, Soundararajan P. Epidemic of chronic kidney disease in India-what can be done? *Saudi J Kidney Dis Transplant*. 2008;19(5):847.
3. Haroun MK et al: Risk factors for chronic kidney disease: a prospective study of 23,534 men and women in Washington County, Maryland. *J Am Soc Nephrol* 2003, 14:2934-2941
4. Modi GK, Jha V (2006) The incidence of end-stage renal disease in India: A population-based study. *Kidney Int* 70: 2131-2133.
5. Ruggenti P, Schieppati A, Remuzzi G: Progression, remission, regression of chronic renal diseases. *Lancet* 2001, 357:1601-1608.
6. National Kidney Foundation: K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Am J Kidney Dis* 2002, 39:S1-266.
7. Kher V: End-stage renal disease in developing countries. *Kidney Int* 2002, 62(1):350-62.
8. Jha V: End-stage renal care in developing countries: the India experience. *Ren Fail* 2004, 26(3):201-8.
9. Sakhuja V, Sud K: End-stage renal disease in India and Pakistan: burden of disease and management issues. *Kidney Int Suppl* 2003,83(83):S115-8.
10. Epidemiology and risk factors of chronic kidney disease in India – results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC Nephrology* 2013 14:114.
11. Singh AK, Farag YM, Mittal BV, Subramanian KK, Reddy SR, Acharya VN, et al. Epidemiology and risk factors of chronic kidney disease in India- results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC Nephrol*. 2013;14(1):114.
12. Singh NP, Ingle GK, Saini VK, Jami A, Beniwal P, Lal M, et al. Prevalence of low glomerular filtration rate, proteinuria and associated risk factors in North India using Cockcroft-Gault and Modification of Diet in Renal Disease equation: an observational, cross-sectional study. *BMC Nephrol*. 2009;10(1):4.