Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

"Health and Socio-demographic Profile assessment of Chronic Kidney Disease (CKD) patients in a district of Gujarat"

Contributors: (In Sequence)

1**. Dr. Jignesh P. Karangiya**, Assistant Professor, General Medicine Department , GMERS Medical College, Junagadh

[**Other details**- (Email:dr.jpkarangiya@gmail.com) (M. 8320793697)]

2. **Dr. Kapil J. Govani**, Associate Professor, Community Medicine Department, GMERS Medical College, Junagadh

[**Other details**- (Email: kapilgovani@gmail.com) (M. 9429455914)]

3. **Dr. Jeet B. Sureja**, Resident doctor, General Medicine Department, GCS Medical College & Hospital, Ahmedabad

[**Other details**- (Email: jeetbsureja@gmail.com) (M. 9925876876)]

4. **Dr. Kaushik K. Lodhiya,** Associate Professor, Community Medicine Department, GMERS Medical College, Junagadh

[**Other details**- (Email:kaushiklodhiya@gmail.com) (M. 9913465721)]

5. **Dr. Nasrin A. Hala,** Tutor, Community Medicine Department, GMERS Medical College, Junagadh [(Email: drnasrinpathan@gmail.com) (M. 8849917851)]

6. **Dr. Bhaveshkumar R. Sureja**, Professor & Head, General Medicine Department, GMERS Medical College, Junagadh

[**Other details**- (Email: drbrsureja@yahoo.com) (M.9825758758) **(Corresponding Author)]**

Corresponding Author:

Name : **Dr. Bhaveshkumar R. Sureja**

Address: (Dr. Bhaveshkumar R. Sureja, Professor & Head, General Medicine Department, GMERS Medical College-Junagadh, Near Majevadi Gate, Junagadh, Pincode-362001)

Mob. Number: M. 9825758758

E-mail address: drbrsureja@yahoo.com

Abstract:

Introduction: Chronic kidney disease (CKD) is a major public health problem due to its high cost of treatment. Objectives: (1) To assess the socio-demographic (S-D) profile of patients. (2) To assess and compare the health profile of CKD patients with control group. Methodology: Data from 340 patients (170 cases and 170 controls) was collected from tertiary hospitals in Junagadh district, Gujarat**. Fleiss with correction of continuity** method used for sample size calculation. Study was conducted during October 2022 to April 2023. Patient with eGFR <90 (ml/min/1.73m2) with albuminuria at least twice in 3 months considered as a case. Control group was taken from general surgery and orthopedic wards from the same hospitals. Odds ratio was applied to evaluate the role of various risk factors among case & control group. Results & Conclusions: Majority of cases were ≥60 years of age. Mean age of cases was 59.8±13.2. No significant gender difference was noted (P: 0.7). Educational status of the cases & controls showed significant difference (P: 0.01). The majority (55%) of cases belonged in urban areas. Major symptomatology of cases was bone/joint pain (81%) followed by lethargy (80%) and muscle cramps (67%). Other significant difference was noted for the following health variables e.g. history of chronic NSAIDs users, tobacco users, mean values of blood pressure and random blood sugar level.

Key words: Demographic & health variables, Chronic kidney disease, Case-control groups

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

Background:

Chronic kidney disease (CKD) is a major public health problem, both for its higher cost of morbidity and other tertiary care treatment. Chronic kidney disease is a type of non-communicable disease that includes a range of different physiological disorders. CKD is linked with an abnormal renal function and gradually decline in glomerular filtration rate (GFR) [1,2]. As the statistical data reports, both the prevalence and burden of CKD are tremendously rising world-wide, especially in developing countries like India[3]. The universal prevalence of CKD (all stages) is estimated to be between 8 to 16%. These data may reflect many lacs of deaths annually due to CKD and their relevant health complications[4]. Internationally, diseases of the kidney and urinary tract together are the 12th cause of death and the 17th cause of disability which shows its public health importance for human beings[5]. Kidney disease affects around 10 to 13% of the general population directly or indirectly[6]. It has been expected that >50 crores individuals globally have CKD irrespective of the etiological factors[7]. A data of 2018 year estimate put the number of patients on chronic dialysis in whole India was at about 1.75 lacs and might giving a prevalence of 12.9 crores of population approximately[8]. A systematic review data estimated that about two thirds of all patients with kidney failure (End stage renal disease, stage-5) died without getting dialysis in 2010[9]. This might be due to under diagnosis or case detected in last stage.

Glomerular filtration rate (GFR) is the best overall index of kidney function. Normal GFR varies according to age, gender, and body size, and declines with increasing age. The national kidney foundation recommends for using the CKD-EPI Creatinine Equation (2021) to estimate GFR. CKD was described as having reduced eGFR (< 90 ml/min per 1.73m2) for at least 3 months with albuminuria. The CKD stage was classified in accordance with the national kidney foundation guideline[10]. Which shows total 05 CKD stage (mild to severe) based on eGFR values.

Due to lack of health awareness, majority of the mild form of kidney disease cases are generally under diagnosed and under treated[11]. CKD is also linked with adverse outcomes of kidney failure, cardiovascular disease (CVD), and premature death etc[8]. Early diagnosis by health screening and proper management can prevent many complications of CKD at affordable interventions. Some of which are on the WHO's so-called best buys list for non-communicable disease (NCD) management[12]. So the current study is planned with following objectives (a) To assess the Socio-demographic (S-D) profile of patients. (b) To assess and compare the Health profile of patients with control groups.

Materials and Methods:

The study was case-control study. The case & control groups were taken from GMERS civil hospital Junagadh and three private hospitals of Junagadh, Gujarat during the period from October 2022 to April 2023. A patient with eGFR <90 (ml/min/1.73m2) with albuminuria at least twice in 3 months was defined as a CKD case. All willing CKD patients who came in medicine department (OPD / Indoor) of above tertiary hospitals considered as cases. For the ease of study, control groups were also selected from the same tertiary hospitals. Patients of the general surgery department (with gastro-intestinal problems like gastritis, hernia, appendicitis, intestinal obstruction etc.) and orthopedic department were taken in control group. No past history of CKD and recent lab investigations (e.g. renal function tests & urine protein) were checked prior to choose controls. Cases & controls were taken from hospitals only was the limitation of study. After the informed consent, all willing patients of ≥ 18 years of age were included. The patients were excluded if they were Pregnant women,

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

critically ill patients, denied for consent and under age (<18 year). Permission from the institutional ethical committee (IEC) was also taken. Sample size was calculated according to the Fleiss with correction of continuity method with following parameters[13]. [Two side significance level-95%, with power (1−β) = 80%, P2=0.3, case-control ratio= 1, ODDs- 2]. Calculated sample size was 153 for each group. Based on non-response & exclusion criteria, 28 patients were dropped out during the study. Finally a data of 340 patients (170 cases & 170 controls) was collected from personal interviews and from the patient's medical records. Pretested performa was used for the data collection. Performa contains questions based on S-D & health profile and symptomatology of CKD patients. Microsoft MS excel was used for the data entry. Data analysis was done by using MS excel and other statistical software. Appropriate statistical tests were applied e.g. odds ratio, mean, standard deviation (SD), Chi-square & P value and proportion.

Results:

In a current case-control study, out of total 340 patients, each group had 170 patients. Table-1 shows the socio-demographic profile comparison of both the group. No gender wise significant difference was noted among both the group (P: 0.7). Majority of cases (61%) and controls (44.7%) were ≥60 years of age (P: 0.003). Mean age of cases was 59.8±13.2. Mean age of controls was 56.2±13.4. Majority (55%) of cases were residing in urban areas. Majority of patients of both group were married and their religion was Hindu. Significant difference was noted for educational status between cases and controls (P: 0.01). Majority (56%) of patients belonged to middle socio-economic class. Based on occupational status, majority of cases (51%) were heavy worker whereas majority of controls (48%) were moderate workers. Among the various clinical symptoms of CKD cases, a few common symptomatology was shown in Table-2. Among all cases majority were having bone/joint pain (81%) followed by lethargy (80%) and muscle cramps (67%). In males, majority were having lethargy (84%) whereas in females majority were having joint pain (88%). Gender wise significant difference was noted for following symptoms e.g. nausea/vomiting (P: 0.01) and anorexia (P: 0.03), which was higher in females (Table-2). Different health variables were compared among cases and controls as shown in Table-3. History of DM was significantly higher among cases than controls (P: 0.009). Significant difference was also noted for history of hypertension (P: 0.002). Higher of cardio-vascular diseases history was found in cases (25%) as compare to controls (21.8%). Significant difference was noted for chronic non-steroidal anti-inflammatory drugs (NSAIDs) users among both groups (P: 0.0001). Higher number of tobacco users were found in cases (75%) as compare to controls (62.9%) (P: 0.02). No significant difference was noted for alcohol users among both groups. Very few of patients in both groups (6% cases, 3% controls) were giving history of narcotic drugs taken. Significant difference was noted for mean systolic & diastolic BP value among both groups (P: 0.001). Mean RBS level (≥ 200mg/dl) was noted higher among cases (44%) than controls (30%) (P: 0.009). Significant high (≥ 25) Body Mass Index (BMI) noted among cases as compare to control groups (P: 0.03) (Table-3).

Discussion:

In current study, different variables of socio-demographic profile was assessed between cases and control groups. As findings of Table-1 illustrates, CKD cases were of ≥ 60 years of age, more from urban areas, less literate and having high BMI (≥ 25). Other studies like SEEK (Screening and Early Evaluation of Kidney Disease) study in India also shows similar characteristics e.g. CKD patients were aged, more likely to be from urban area, obese or overweight, having history of DM, hypertension and cardio-vascular disease more than patients without CKD[14].

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

Identification of CKD is mainly through routine screening with serum chemistry profile and urine studies. Less likely CKD patients may be identified by symptomatology like gross hematuria, foamy urine (a sign of albuminuria), nocturia, joint pain, or decreased urine output etc[15]. Fatigue, poor appetite, nausea, vomiting, metallic taste, unintended weight loss, pruritus, changes in mental status, dyspnea, or peripheral edema etc. might be seen in advanced CKD stage among patients[16]. Table- 2 of current study shows gender wise symptomatology of CKD patients. Majority were having joint pain (81%) followed by lethargy/General weakness (80%) and muscle cramps (67%). Gender wise significant difference was noted for Nausea/Vomiting (P: 0.01) and Anorexia (P: 0.03).

As shown in different studies, major risk factors for the development and progression of CKD are diabetes mellitus and hypertension. CKD due to diabetes and hypertension affects nearly 5-7% of the global population and is more common in developing countries due to lack of early identification. Among end stage renal disease (ESRD) patients, around 9.1 to 29.9% cases were of DM and around 13 to 21% cases were of hypertension of different developing countries worldwide[17]. Table-3 in current study shows comparison of different health relevant variables among both the groups. Significant difference was noted for following variables among CKD cases and controls e.g. history of DM (P: 0.009), hypertension (P: 0.002), chronic NSAIDs users (P: 0.0001), tobacco consumptions (P: 0.02), mean values of blood pressure (P: 0.001) and mean Random blood sugar (RBS) level (P: 0.009) etc. Above risk variables were noted higher in CKD cases as compare to the control group patients which simulates with other study findings.

Conclusion & Recommendation:

Among cases majority of patients were ≥ 60 years of age as compare to the controls (P: 0.003). Mean age of cases was 59.8±13.2. Significant difference was noted for educational status between cases and controls (P: 0.01). Majority (56%) of the patients were belongs to middle socio-economical class. Major symptomatology of cases were joint pain (81%) followed by lethargy (80%) and muscle cramps (67%). Among cases, majority of females were having nausea/vomiting (P: 0.01) and anorexia (P: 0.03). Significant difference was noted for following variables among CKD cases and controls e.g. history of DM (P: 0.009), history of hypertension (P: 0.002), chronic NSAIDs users (P: 0.0001), tobacco consumptions (P: 0.02), mean values of blood pressure (P: 0.001) and mean RBS level (P: 0.009) and BMI value (P: 0.03). All such risk variables were noted higher in CKD cases as compare to the control group.

To identify kidney disease at preventable stage, early identification of risk factors is recommended. It also helps to reduce the burden of tertiary care treatment expenditures born by CKD.

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ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

Table -1: Socio-demographic profile of the patients (N=340)

Profile	Case Group (N=170)		Control Group (N=170)		Odds* Ratio	95% CI	P Value	Chi-square
	No.	%	No.	%				
Gender					0.9	0.6-1.4	0.7	0.1
Male	98	57.6	102	60.0				
Female	72	42.4	68	40.0				
Age					0.5	0.33-0.79	0.003	8.6
< 60 yr	66	38.8	94	55.3				
≥ 60 yr	104	61.2	76	44.7				
Residence					1.18	0.77-1.80	0.5	0.42
Urban	93	54.7	86	50.6				
Rural	77	45.3	84	49.4				
Marital status					0.8	0.34-1.96	0.8	0.04
Married	158	92.9	160	94.1				
Unmarried	12	7.1	10	5.9				
Religion					—	—	0.4	1.8
Hindu	99	58.2	102	60.0				
Muslim	63	37.1	55	32.4				
Others	8	4.7	13	7.6				
Education					—	—	0.016	12.2
Illiterate	27	15.9	23	13.5				
1 to 8 standard	64	37.6	42	24.7				
9 to 12 standard	51	30.0	77	45.3				
Graduate	21	12.4	16	9.4				
Post Graduate	7	4.1	12	7.1				
S-E Classification					—	—	0.09	4.7
Upper	10	5.9	14	8.2				
Middle	88	51.8	103	60.6				
Lower	72	42.4	53	31.2				
Occupation					—	—	0.34	2.2
Sedentary worker	8	4.7	13	7.6				
Moderate worker	75	44.1	81	47.6				
Heavy worker	87	51.2	76	44.7				
(*= using the approximation of woolf, CI= Confidence interval, P<0.05= Significant)								

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

Table -2: Common clinical symptomatology of case group (N=170).

Common Symptoms*	Total Case	%	Male (N=98)	%	Female (N=72)	%	P Value	Chi-square
Edema at leg	72	42.4	38	38.8	34	47.2	0.35	0.9
Decreased urine output	74	43.5	45	45.9	29	40.3	0.56	0.33
Breathing Difficulty	69	40.6	43	43.9	26	36.1	0.39	0.74
Nausea/Vomiting	55	32.4	24	24.5	31	43.1	0.01	5.7
Anorexia	101	59.4	51	52.0	50	69.4	0.03	4.5
General weakness / lethargy	136	80.0	82	83.7	54	75.0	0.23	1.44
Abdominal pain	30	17.6	16	16.3	14	19.4	0.75	0.1
Bone/joint pain	138	81.2	75	76.5	63	87.5	0.11	2.6
Muscle cramp	115	67.6	68	69.4	47	65.3	0.69	0.16
Dry skin/ Itching	74	43.5	40	40.8	34	47.2	0.49	0.46
(*= Multiple response, P<0.05= Significant)								

Table -3: Comparison of Health profile between Cases and Controls (N=340).

Variables	Case (N=170)	%	Control (N=170)	%	Odds*	95% CI	P value	Chi-square
History of DM					0.53	0.34-0.84	0.009	6.81
No	98	57.6	122	71.8				
Yes	72	42.4	48	28.2				
History of Hypertension					0.48	0.31-0.75	0.0019	9.68
No	89	52.4	118	69.4				
Yes	81	47.6	52	30.6				
History of CVD					0.82	0.49-1.35	0.52	0.4
No	127	74.7	133	78.2				
Yes	43	25.3	37	21.8				
Chronic NSAIDs users					0.39	0.25-0.63	0.0001	14.83
No	92	54.1	127	74.7				
Yes	78	45.9	43	25.3				
Tobacco Consumption (any form)					0.55	0.34-0.88	0.018	5.51
No	42	24.7	63	37.1				
Yes	128	75.3	107	62.9				
Alcohol Consumption (any form)					1.49	0.89-2.49	0.15	2.01

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

No	137	80.6	125	73.5				
Yes	33	19.4	45	26.5				
Narcotic Drugs Consumption					0.48	0.16-1.45	0.29	1.11
No	160	94.1	165	97.1				
Yes	10	5.9	5	2.9				
Mean Systolic BP					0.45	0.28-0.72	0.001	10.39
<140 mm/hg	94	55.3	124	72.9				
≥140 mm/hg	76	44.7	46	27.1				
Mean Diastolic BP					0.5	0.29-0.73	0.001	10.4
<90 mm/hg	99	58.2	128	75.3				
≥90 mm/hg	71	41.8	42	24.7				
Mean RBS					0.54	0.35-0.85	0.009	6.7
<200 mg/dl	95	55.9	119	70.0				
≥ 200mg/dl	75	44.1	51	30.0				
BMI value								
<25	67	39.4	87	51.2	0.62	0.4-0.95	0.03	4.28
≥ 25	103	60.6	83	48.8				
(*= using the approximation of woolf, CI= Confidence interval, P<0.05= Significant)								