

Risk factors of Chronic Kidney Disease among the Patients attending nephrology clinic at Teaching Hospital, Batticaloa

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Abstract- Chronic Kidney Disease (CKD) is becoming a major health challenge worldwide especially in developing countries. It was earlier due to diabetes and hypertension like emerging chronic diseases, but now rapidly transits to multifactorial causes with increasing incidence and causing major health burden. A hospital based Cross Sectional Descriptive study was conducted to assess the associated risk factors of chronic kidney disease among 250 patients who were attending the nephrology clinic, Teaching Hospital Batticaloa (THB) from March 2016 to January 2017. Structured interviewer administered questionnaire, patient's medical reports and medical records review were used to collect the data through Simple random sampling approach. Chi square test was used to look into the significant relationship between CKD and associated risk factors. Among the study population CKD were 66%, which was higher in men than that in women (40% vs 26%), and it was increasing with aging. In both sexes, CKD was significantly associated with ageing ($p=0.000$), male gender ($p=0.000$), doing agriculture ($p=0.000$), exposure of agrochemical ($p=0.000$), smoking ($p=0.000$), drinking alcohol ($p=0.013$), tobacco and betel chewing ($p=0.031$), hypertension ($p=0.000$), diabetic mellitus ($p=0.000$), cardiovascular diseases ($p=0.005$), early kidney related disease conditions ($p=0.000$) and family history of kidney disease ($p=0.032$). In conclusion majority of the study sample had CKD and it was significantly associated with multi-factorial causes especially with ageing, agriculture, smoking, drinking alcohol, non-communicable diseases and possible genetic predisposition in vulnerable populations.

Index Terms- chronic kidney disease, risk factors, agriculture, diabetes, Batticaloa.

I. INTRODUCTION

Chronic Kidney Disease (CKD) is increasingly recognized as a worldwide public health problem which is estimated prevalence of 8% - 16% and presumed to be another leading cause of mortality and leading to tremendous medical costs [1, 2]. It is defined as either kidney structural damage or a decrease in Glomerular Filtration Rate (GFR) $< 60 \text{ ml/min/1.73 m}^2$ for three or more months. And it's divided into five stages based on the progressive decline in GFR. This is a very serious condition because CKD often goes undetected and undiagnosed until it gets worse slowly over time which is incurable, has occurred. If CKD is caught early, medicines and lifestyle changes may help slow its progress [3]. At the End Stages of Renal Disease (stage 4 and 5) ESRD, kidneys can no longer clear waste and fluid on their own, all most complete renal failure and need a form of renal replacement therapy [4]. For that, renal transplantation, hemodialysis (HD) and peritoneal dialysis are the widely accepted treatment modalities for patients [5]. This progression of CKD is associated with a number of serious complications, including increased incidence of cardiovascular disease rather than progression to end stage renal disease, renal failure, hyperlipidemia, heart failure, coronary heart disease, or stroke anemia and metabolic bone disease, nutritional issues [6, 7].

In Sri Lanka, CKD is becoming one of the major health crises and highly concentrated in the North Central province with prevalence of 15% and having alarming signs on North Western Uva, Eastern, and Northern Provinces with a prevalence of 2-3% (8). The incidence of CKD is doubling every 4 to 5 years in Sri Lanka, leading to more than 5,000 deaths annually; excess of 150,000 people are currently affected. Although a number of agents have been postulated, no single offending agent has been identified as the cause of CKD [6]. The etiology, and demographic patterns in Sri Lanka are largely unknown. The disease mainly affects males of age group 30-60 years from poor socio-economic backgrounds who are involved in paddy farming, lived dry zonal area with exposure of one or more environmental factors and a possible genetic predisposition (9). Due to the rapid increase in prevalence, increasing attention has been focused on chronic kidney disease and its treatment recently. The estimates suggests that in excess of 6000 people were undergoing treatment for this condition in 2005 and millions of people around the world suffer from kidney diseases which is often associated with poor prognosis and it incurs, economic burden on the patient, family, community and the country as a whole [10]. In eastern province, Batticaloa district is one of the vulnerable area for CKD where is carried out agricultural production and comes under dry zone area. Therefore, this study has been conducted to identify risk factors of CKD among the patients at nephrology clinic Teaching Hospital Batticaloa as an intention of finding the significance solution for vulnerable people.

II. METHODS AND MATERIALS

This study was a hospital based Cross sectional Descriptive study carried out to assess the associated risk factors of chronic kidney disease among 250 patients who were attending a Nephrology clinic at THB during March 2016 to January 2017.using Evan Morris hyper geometric equation, the sample size was calculated (250 patients) from the total Nephrology clinic patients (700). Nonjudgmental simple random sampling method was used among subjects. Structured interviewer administered questionnaire and Patient’s medical reports review were used to collect the data. Data were collected from both male and female patients (above 19 years) who were attending study area during that study period and whom willing to participate in this study and exclusion criteria of this study were Age was less than 20 years patients, who were not present at the time of study, who refused to participate in this study, adults who were mentally disabled or not fit to participate in this study and pregnant mothers. Collected data were transferred to SPSS 19 statistical software and analyzed based on the research problem. The significant association of CKD and each investigated health-risk factor was tested using chi square test. This health risk factor categorized into socio-demographic, lifestyle, environment and health status of patients. Statistical significance was set at p-value of <5%. Ethical clearance was obtained from the Ethics Review Committee, Faculty of Health-Care Sciences, Eastern University, Sri Lanka and the permission was obtained from both Director and Consultant nephrologist of THB.

III. RESULTS AND FINDINGS

Table 1: Description of Socio demographical characteristics of participants

Characteristics	Overall		CKD	
	n	%	n	%
Gender				
Male	129	51.6	100	40
Female	121	48.4	65	26
Age(Years)				
20-30	50	20	11	4.4
31-40	32	12.8	15	6
41-50	40	16	26	10.4
51-60	53	21.2	45	18
61-70	59	23.6	52	20.8
>70	16	6.4	16	6.4
Ethnicity				
Tamil	127	50.4	79	31.6
Sinhala	4	1.6	2	0.8
Muslim	117	46.4	83	33.2
Others	2	0.8	1	0.4
Education level				
Never attended	33	13.2	32	12.8
Primary	75	30	63	25.2
Junior Secondary	52	20.8	33	13.2
Senior Secondary	83	33.2	34	13.6
Tertiary/collegiate	7	2.8	3	1.2
Occupation				
Unemployed	124	49.6	70	28
Agriculture	50	20.0	47	18.8
Self-employed other than agriculture	6	2.4	4	1.6
Government	17	6.8	9	3.6
Non-government	52	20.8	34	13.6
Retired	1	0.4	1	0.4
If agriculture, Duration(Years)				
<5	11	4.4	10	4
5-10	3	1.2	3	1.2
>10	43	17.2	41	16.4
Type of involvement				
Part time	16	6.4	16	6.4
Full time	41	16.4	38	15.2

In-come(Rupees)				
None	74	29.6	25	10
<5000	41	16.4	40	16
5000-10000	29	11.6	24	9.6
>10000-15000	40	16	26	10.4
>15000	66	26.4	50	20

The study was conducted among above 20 years old adults who were attended nephrology clinic, THB in Batticaloa. Out of them 51.6% (n=129) were males, 48.4% (n=121) were females, from that males, females with CKD were respectively 40% (n=100), 26% (n=65); majority of the responders were age group of 61-70 years (23.6% (n=59)) from that 20.8% (n=52) had CKD, Tamils were 50.4% (n=127) but highly Muslims 33.2%(n=83) were affected with CKD and 33.5% (n=83) had senior secondary education but 25.2% (n=63) of CKD patients had primary education. Majority of them 49.6% (n=124) were unemployed but 20% (n=50) were doing agriculture, among them 18.8% (n=47) had CKD, as a full time 16.4% (n=41) with more than 10 years 16.4% (n= 41) respectively. Among study sample most of them 57.6% (n=144) had less than 10000 rupees as a family income, from that population 35.6% (n=89) had CKD (Table 1).

Table 2: Description of influencing factors of Chronic Kidney Disease.

Variables	Over all		CKD	
	n	%	n	%
Exposure of agrochemicals:				
Yes	55	22	49	19.6
No	195	78	116	46.4
Main water source:				
Well	153	61.2	105	42
Tube well	23	9.2	15	6
Pipe born	74	29.6	45	18
Smoking:				
Yes	72	28.8	60	24
No	178	71.2	105	42
Alcohol:				
Yes	55	22	44	17.6
No	195	78	121	48.4
Tobacco, betel, lime: chewing:				
Yes	65	26	50	20
No	185	74	115	46
Diabetic mellitus:				
Yes	94	37.6	81	32.4
No	156	62.4	84	33.6
Hypertension:				
Yes	107	42.8	93	37.2
No	143	57.2	72	28.2
Cardiovascular disease:				
Yes	24	9.6	22	8.8
No	226	90.4	143	57.2
*Other kidney related diseases:				
yes	63	25.2	10	4
No	187	74.8	155	62
Family history of kidney diseases:				
Yes	23	9.2	19	7.6
No	227	90.2	146	58.4

*Other kidney related diseases such as acute kidney failure, recurrent urinary tract infection, obstructive uropathy, bladder cyst, systemic lupus erythematosus, urinary incontinence, post renal transplantation follow-up patients.

Among the study sample, 22%(n=55) had exposure of agrochemical from that 19.6%(n=49) had CKD; Majority of the respondents 61.2%(n=153) had used well as a source of drinking water, from that 42%(n=105) of them had CKD, 29.6%(n=74) of them getting pipe born water with that 18% (n=64) of them had CKD and considerable portion of them (CKD 6%, Non CKD 3.2%) had used tube well as water source respectively. 28.8%(n=72) had smoking habits among that, considerable portion of them (24%(n=60)) had CKD;

had habit of alcoholic respectively 22% (n=55), among them 17.6% (n=44) had CKD; 26%(n=65) had betel, lime chewing habits among that, considerable portion of them (former 20%(n=50) had CKD. Out of this study population, majority of the patients 37.6 % (n=94) had diabetic mellitus, 42.8% (n=107) had hypertension, 9.6% (n=24) had Cardiovascular disease; 25.2% (n=63) had other kidney related diseases respectively. Out of the CKD patients 32.4 % (n=81) had diabetic mellitus; 37.2% (n=93) had hypertension, 8.8 % (n=22) had Cardiovascular disease; 4% (n=10) had other kidney related diseases before they had diagnosed as CKD patients. But in Non CKD patients suffered from those diseases in very minimal percentage. 9.2% (n=23) had Family history of kidney diseases, from that 7.6% (n=19) had CKD (Table 2).

Table 3: Significant levels of identified risk factors of CKD

Significant variables	P value
Gender – male	0.000
Age	0.000
Ethnicity	0.431
Occupation - Agriculture	0.000
Exposure of agrochemical Main water source	0.505
Dietary pattern	0.509
Smoking	0.000
Alcohol	0.013
Tobacco, betel, lime chewing	0.031
Diabetic mellitus	0.000
Hypertension	0.000
Cardiovascular disease	0.005
*Early kidney related diseases	0.000
Family history of kidney diseases	0.032

*Early kidney related diseases include Kidney stone, polycystic kidney disease, Nephrotic syndrome, Glomerular nephritis

According to the result of this study being male, aging, doing agriculture, exposure of agrochemical, smoking habit, had a history of diabetic mellitus, hypertension, early kidney related disease, cardiovascular diseases, alcoholic habit, tobacco, betel, lime chewing habits and family history of kidney diseases were significantly associated with CKD in Batticaloa. On the other hand ethnicity, main water source and dietary pattern were not significantly associate with CKD (Table- 3).

IV. DISCUSSION

Chronic Kidney Disease is a global epidemiological health problem which can causes premature morbidity, mortality and lowers quality of life and number of risk factors are associated with increasing prevalence of chronic kidney disease (CKD) in many patients [11,12] Therefore, this study aimed at assessing the prevalence and risk factors of CKD among the patients in nephrology clinic THB. This study revealed that 66% of them had CKD which were higher in males (40%) than in females (26%) and increasing with aging. Some studies supported this findings and shown that had significant association with aging (>55 years) and it was more prevalent among the age group of 50-70 years [12, 13]. But studies shown opposite association (higher in female than male), Severe stages of CKD were more frequent in males than female [14].

This study was found that being male, age, doing agriculture, poor income, exposure of agrochemical, having habits of smoking and drinking, had history of chronic illness, early kidney related disease conditions and had family history of kidney disease were significantly associated with CKD than other variables observed in nephrology clinic THB (p<0.05).This present study was supported by the study done in the North Central region of Sri Lanka that being male, aged, poor income, diabetic nephropathy, hypertension, having lipid, glomerulonephritis, obstructive uropathy, genetic predisposes were more significantly associated with CKD [13,15]. This study revealed that agriculture, exposure of agrochemical significantly associated with CKD as a previously reported study done in farming community Sri Lanka [12] shown that the exposure of agrochemical, heavy metals were (Arsenic, cadmium, lead, selenium and chronic lead exposure were significant risk factor for the development of CKD. But there was no any significantly associated with source of drinking water and CKD but some studies done in North Central Province Sri Lanka to identify the etiological factor of CKD[9,12] shown that there was significantly associated with drinking well, tube well water and CKD. The present study revealed that the life style habits such as smoking, drinking alcohol, tobacco and betel, lime chewing were significantly associated with CKD as previously reported studies shown that had significant positive associations with heavy cigarette smoking and increases the risk of

CKD for both men and women [16,17,]. Current study was found significant association between CKD and other health conditions including diabetes, hypertension, cardiovascular disease, kidney stone, glomerular nephritis, nephrotic syndrome, polycystic kidney disease and Other kidney related diseases which was shown similar association of previously reported studies [18, 19,]. Some previous studies reported that, urbanization, obesity, history of CKD, taking ayurvedic treatment, history of snake bite, hyperuricemia, interleukin-6 levels, hematuria, hyperlipidemia, consumption of insecurity food, long term use of non-steroidal anti-inflammatory drugs and analgesics were also increase the risk of CKD [20, 21].

V. CONCLUSION AND RECOMMENDATION

Being male, aged, doing agriculture, exposure of agrochemical, smoking and drinking alcohol, had a history of chronic illness (hypertension, diabetes mellitus, cardiovascular disease), early kidney related disease conditions (a kidney stone, glomerular nephritis, nephrotic syndrome, polycystic kidney disease) and had a family history of kidney disease was more significant risk factors than others for being CKD in Nephrology clinic THB. So multifactorial causes are the reasons for the CKD. Due to that, it is requiring multi-level efforts such as to limit the progression and prevent the further complication of CKD among the affected patients, carry out a massive awareness campaign to make them more aware about the risk factors, disease progression and treatment availabilities, to prevent the occurrences and reduce the prevalence of CKD in the vulnerable group, giving proper information regarding use of precaution for exposure of agrochemicals, water treatment for heavy metals, lessen malnutrition and change unhealthy behaviors and habits acquired.

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