Faridpur Med. Coll. J. 2013;8(2):80-84

Original Article

Epidemiological Pattern of Renal Insufficiency among the Patients of Nephrology Unit of Dhaka Medical College Hospital, Dhaka, Bangladesh

MN Haq[1], L Rahman[2], MZI Miah[3], EA Gazi[4], SC Baroi[5]

Abstract :

A hospital based descriptive cross sectional study was conducted at Nephrology unit of Dhaka Medical College Hospital (DMCH) to see the association between epidemiological pattern of renal insufficiency with socio-demographic factors, kidney related factors and others factors. Sources of data include patient interviews, diagnosis cards and case records. Respondents were categorized to their CKD stage according to their estimated GFR on Modification of Diet in Renal Disease (MDRD). The sample comprised 150 patients suffering from CKD with male and female ratio being 1.5:1, mean age of the population was 47 years (SD ± 14.5), 47.3% of the respondents had history of streptococcal throat infection and 10% had previous kidney disease Renal Replacement Therapy (RRT) was the commonly advised therapy for CKD indicating very late diagnosis of CKD. Total 49.3% had smoking habit while 60.7% was on regular physical exercise and 49.3% took extra salt on their dietary habit, 52.7% were diabetic and 78.7% were hypertensive and 40% had both diabetes and hypertension. Total 76.6% were in stage-5 of CKD where 60.7% of them used NSAID with 54.0% within normal range of BMI. There is statistically significant difference with stage of renal insufficiency and history of streptococcal throat infection (p=0.00) and therapy advised for CKD (P-0.01). Worldwide, CKD is becoming a common disease in the general population. It requires early, accurate and improved detction and mangemnt of diabetes and hypertension, the major contributors to CKD.

Key words : Renal insufficiency, Socio-demographic, Kidney related factors.

Introduction :

Chronic Kidney Disease (CKD) is an ancient disease. CKD is becoming a major public health problem worldwide. The current burden of disease may be due to a change of the underlying pathogenicity of CKD. Glomerulonephritis was one of the leading causes of kidney disease several decades ago. Now-a-days, infections have become a less important cause of kidney disease, at least in the western world[1].

1 Dr. Md. Nazmul Haq, MBBS, MPH, Assistant Surgeon, Borkul Health & Family Welfare Center, Hajigonj, Chandpur.

2. Dr. Latifur Raaman, MBBS, MPH, DDV, Associate professor & Head, Dept. of Community Medicine, Diabetic Association Medical College, Faridpur.

3. Dr. Md. Zohirul Islam Miah, MBBS, MS (Urology), Associate Professor & Head, Dept. of Urology, Diabetic Association Medical College, Faridpur.

4. Dr. Easin Ali Gazi, MBBS, MPH, Associate professor & Head, Dept. of Community Medicine, Gazi Medical College, Khulna.

5. Dr. Shukti Catherine Baroi, MBBS, MPH, Lecturer, Dept. of Community Medicine, Diabetic Association Medical College, Faridpur.

Address of correspondence :
Dr. Latifur Rahaman, MBBS, MPH, DDV, Associate professor & Head, Dept. of Community Medicine, Diabetic Association Medical College, Faridpur, Mobile No: 01712015502, Email: latifur50@yahoo.com

Moreover, current evidence suggests that hypertension and diabetes are the two major causes of kidney disease worldwide[2,3]. Patients with CKD are at high risk of the end stage of renal disease (ESRD)- a condition requiring dialysis or kidney transplantation to maintain patient's long term survival.

In 2001, the average annual cost for maintenance of ESRD therapy was between US $70 and $75 billion worldwide excluding kidney transplantation and the estimated number of end stage of renal disease (ESRD) patient will reach over million in 2010[4].

In addition, CKD has a complicated interrelationship with other diseases[5]. Recent studies have reported that CKD is an independent risk factor for cardiovascular disease (CVD)[6]. Therefore, kidney dysfunction should be an additional target for intervention and prevention of CVD[7]. In 2003, the American Heart Association (AHA) stated that persons with CKD should be regarded as the highest risk group for subsequent CVD[8].

Due to asymptomatic nature of this disease, CKD is not frequently detected until its later progress resulting in

lost opportunities for prevention. Progress to kidney failure on other adverse outcomes could be prevented or delayed through early detection and treatment of CKD[9,10].

The world's disease profile is changing and chronic diseases now account for the majority of global morbidity and mortality rather than infectious diseases. The causes of CKD reflect this change and diabetes, together with hypertension is now the major cause of end stage renal failure worldwide, not only within the developed world, but also increasingly within the emerging world. The incidence & prevalence of Diabetes will be double in the next 25 years, particularly in the developing countries. This will place an enormous financial burden on countries, including the cost of the management of ESRD. Thus, it is medically and economically imperative for awareness, detection and prevention programs to be introduced across the world, particularly in the developing countries. This will require concerted action from global institutions, governments, health service providers and medical practitioners.

Renal function declines with age. Epidemiologic studies have documented a dramatic age related rise in prevalence of CKD.

Materials and Methods :

.

A hospital based descriptive cross sectional study was conducted in the Nephrology unit of Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh during the period of May-August 2011. Non probability sampling technique was used to recruit 150 respondents. A structured questionnaire with diagnosis cards was used to collect data in order to assess the epidemiological pattern of renal insufficiency. Stage of renal insufficiency was determined by calculating GFR according to MDRD equation that is

GFR = 186.3 × (S. Creatinine)-1.154 × (age)-0.203 ×(0.742 if female) × (1.210 if African-American). Data was analyzed by using SPSS version 16.0 and descriptive statistics was determined in terms of frequency and percentage, and association was found out by using Pearson's Chi-square test.

Table No. I shows, Mean age of 150 respondents was 47.3 ± 14.5 years, 33.3% of them fall in 40-49 years age category. Male constituted the majority (60.0%) of the interviewed respondents and most of them (79.3%) were muslim by religion. Regarding educational status, 30% were illiterate and 26% below SSC, 34.0% were housewife and 29.3% were in service and 50.7% lived in urban area. Median monthly personal income were BDT 7500 and 42.0% of the respondents were less than BDT 5000 category. Regarding monthly family income, median were BDT 25000, among them 32.7% were in category of BDT 20001-30000 and 28.0% were in category of BDT 10001-20000.

Result :

Table I : Distribution of respondents by socio demographic characteristics (n = 150)

Characteristics	Frequency (%)
Age in category	
<30	21 (14.0)
30-39	27 (18.0)
40-49	50 (33.3)
50-59	29 (19.3)
60-69	13 (8.7)
70	10 (6.7)
Mean age 47.3 ± 14.5 years	
Sex	
Male	90 (60)
Female	60 (40)
Religion	
Islam	119 (79.3)
Hindu	29 (19.3)
Christian	2 (1.3)
Level of education	
Illiterate	45 (30.0)
Below SSC	39 (26.0)
SSC	7 (4.7)
HSC	29 (19.3)
Graduate	30 (20)
Occupation	
Farmer	25 (16.7)
Service	44 (29.3)
Business	21 (14.0)
Housewife	51 (34.0)
Day labor	8 (5.3)
Others	1 (0.7)
Residence	
Rural	74 (49.3)
Urban	76 (50.7)
Monthly personal income (in BDT)	
<5000	63 (42.0)
5001-10000	33 (22.0)
10001-20000	25 (16.7)
>20000	29 (19.3)
Median personal income BDT 7500	
Monthly family income (in BDT)	
10000	10 (6.7)
10001-20000	42 (28.0)

Table II : Distribution of respondents by duration of disease (in years category)

Duration (In years)	Frequency
1 or less	68 (45.3)
2-4	51 (34.0)
5-7	20 (13.3)
8-10	10 (6.7)
>10	1 (0.7)

Table No. II shows, among the respondents 45.3% suffered from CKD for 1 year or less and 34.0% suffered for 2-4 years, Total 47.3% of them had previous history of sore throat and 36.6% of them got proper treatment for that condition. Only 10.0% of them had past history of kidney disease other than CKD and 86.7% of them had proper treatment for that.

Table III : Distribution of respondents by therapy advised for CKD

Therapy	Frequency (%)
Medications	31 (20.7)
Renal replacement therapy (RRT)	119 (79.3)
If RTT, which one	
Dialysis	109 (91.6)
Renal transplantation	10 (8.4)

Table No. III shows, 79.3% of the respondents were advised for renal replacement therapy, out of which 91.6% were advised for dialysis and 8.4% for renal transplantation.

Table IV : Distribution of respondents by life style related characteristics

Characteristics	Frequency (%)
Smoking	
Yes	74 (49.3)
No	76 (50.7)
Alcohol	
Yes	31 (20.7)
No	119 (79.3)
Physical exercise	
Yes	91 (60.7)
No	59 (39.3)
Personal hygiene	
Daily bath	55 (36.7)
Regular tooth brush	1 (0.7)
Both	91 (60.7)
None	3 (2.0)
Dietary habit	
Colored beverage	17 (11.3)
Extra salt	74 (49.3)
Both	14 (9.3)
None	45 (30.0)

Table No. IV shows, regarding life style related characteristics, 49.3% were smoker, 20.7% were alcoholic and 60.7% were on regular physical exercise. Total 60.7% of them had both daily bath and regular tooth brush and 36.7% were only on daily bath. Total 49.3% took extra salt and 30.0% took neither colored beverage nor extra salt.

Table V : Distribution of respondents by history of renal disease.

Characteristics	Frequency (%)
Family H/O renal insufficiency	
Yes	41 (27.3)
No	109 (72.7)
Diagnosed diabetic	
Yes	79 (52.7)
No	71 (47.3)
If yes which diagnosed first	
Diabetes	63 (79.7)
Renal insufficiency	16 (20.3)
Diagnosed hypertensive	
Yes	118 (78.7)
No	32 (21.3)
If yes which diagnosed first	
Hypertension	84 (71.2)
Renal insufficiency	34 (28.8)
Diagnosed both diabetes and hypertension	
Yes	60 (40.0)
No	90 (60.0)

Table No. V shows, among the respondents 27.3% had family history of renal insufficiency, among them 52.7% were previously diagnosed as diabetic out of them 79.7% had diabetes before renal insufficiency. Total 78.7% were diagnosed as hypertensive out of which 71.2% had hypertension before diagnosis of renal insufficiency. And 40.0% of them were diagnosed having both diabetes and hypertension.

Table VI : Distribution of respondents by health status.

Characteristics	Frequency (%)
BMI	
Below normal	18 (12.0)
Normal	81 (54.0)
Overweight	51 (34.0)
Medication used	
NSAID	91 (60.7)
Homeopathy	30 (20.0)
None	29 (19.3)
Stage of renal insufficiency	
Stage 3	11 (7.3)
Stage 4	24 (16.0)
Stage 5	115 (76.7)

Table No. VI shows, among the surveyed respondents 54.0% were within normal range of BMI and 34.0% overweight and rest (12.0%) below normal BMI. Total 60.7% had history of NSAID use and 20.0% had homeopathy user. Out of them 76.7% were in stage-5, 16.0% were in stage-4 and 7.3% were in stage-3 of renal insufficiency.

Table VII : Distribution of respondents by association of stage of renal insufficiency with history of sore throat

		Sore throat		Total	P-value
		Yes	No		
Stage of renal insufficiency	Stage-3	4 36.4%	7 63.6%	11	0.01
	Stage-4	5 20.8%	19 79.2%	24	
	Stage-5	62 53.9%	53 46.1%	115	

Table No. VII shows that there is association of stage of renal insufficiency with history of sore throat (P value = 0.01), is statistically significant.

Table VIII : Distribution of respondents by association of stage of renal insufficiency with therapy advised for CKD

		Therapy for CKD		Total	P-value
		Medications	RRT		
Stage of renal insufficiency	Stage-3	11 100.0%	0 .0%	11	0.00
	Stage-4	18 75.0%	6 25.0%	24	
	Stage-5	2 1.7%	113 98.3%	115	

Table No. VIII shows that there is association of stage of renal insufficiency with therapy advised for CKD (P value = 0.00), is statistically highly significant

Discussion :

This descriptive cross-sectional study was conducted to identify the epidemiological pattern of renal insufficiency among the patients of Nephrology unit of Dhaka Medical College Hospital, Bangladesh. The study aimed to see whether there is relation between variables and there were some of the variables haveing statistically significant relations. The study sample was 150, which was selected purposively.

The mean age of the study respondents was 47.3 years with SD ± 14.5 years which is similar with study conducted in Sri Lanka where the figure was 47.8 years with SD ± 13.7 years[11], In Nepal 46.9 years with SD ± 17.9 years[12] and in India 42.3 years with SD ±12.5 years respectively[13]. But it differs with study conducted in the Kingdom of Saudi Arabia, where mean age was 37.4 years with SD ± 11.3 years[14]. In the current study CKD was more prevalent in 40-49 years of age category (33.3%) which is different from NHANES, USA 1999-2004 study where more prevalent among ≥60 years age category[15].

Sex distribution of the respondents of the present study revealed that 60% of them were male and 40% were female which is similar with study in India 56.16% male[13], in Nepal 57% were male[12], in Saudi Arabia 64.3% versus 35.7%[14] and study in Sri Lanka 71% versus 29%[11]. But some other studies have shown higher prevalence in female regardless of age, 9.3% versus 13.0%[16]. This indicates male dominance of seeking treatment in this part of the world.

Most of the respondents were Muslim 79.3%, rest of them belongings to Hindu 19.3% and Christian 1.3%. In the present study CKD were more prevalent among illiterate in contrast with graduate respondents 26% versus 19.3%, which is nearly similar with study in Taiwan 33%[17], in NHANES III study 22.1% versus 15.7%[15] but different in the study in Saudi Arabia which shows 21.4% versus 78.6%[14].

Present study revealed that most of the respondents were housewife 34%, service 29.3%, farmer 16.7% and business 14.0%. Regarding residence, higher percentage lives in urban area 50.7%, where as in rural area 49.3%. CKD is more prevalent with respondents having monthly income of BDT <5000 42.0% whereas 19.3% of the respondents had monthly income of BDT >20000 which is nearly similar with study in Taiwan 33% with low monthly income[17]. 6.7% of the respondents had monthly personal income of BDT 10000 and 32.7% had more than BDT 30000.

Regarding duration of disease, most of the respondents were in the category of 1 year or less (45.3%), indicating recently diagnosed CKD. Among the respondents 47.3% had previous history of sore throat, among them only 36.6% got proper treatment for that. The current study revealed that 10% of the respondents had history of previous kidney disease other than CKD which is nearly similar with study in Saudi Arabia 17.8%[14], and study conducted in Taiwan 22.6%[17]. Among them 86.7% got proper treatment for that condition. Commonly advised therapy for CKD was renal replacement therapy 79.3%, out of them 91.6% was advised for dialysis.

Total 49.3% of the respondents were smoker which differs with a study conducted in Saudi Arabia 28.6%[14], and in Taiwan study 27.8%[17]. The present study reveled that 20.7% had alcohol habit and 60.7% was on regular physical exercise which differs with study conducted in Taiwan 25.8%[17]. Total 60.7% maintain good personal hygiene and 49.3% take extra salt in their dietary habit.

In the present study 27.3% respondents have family history of renal insufficiency. About 53% respondents were diagnosed as diabetes which is similar with study conducted in India 41%[13], NHANES III study 40.2%[5]

and study in Saudi Arabia 39.3%[14] but vastly differs with study in Nepal 18.0%[12] and study in Taiwan 16.8%[17]. Out of them 79.7% was diagnosed for diabetes first in contrast with renal insufficiency and 78.7% were diagnosed as hypertensive which is nearly similar with study conducted in Nepal 54.0%[12] and study in Taiwan 47.8%[17] but differs with NHANES III study 24.6%[15] and study in Saudi Arabia was 39.3%[14]. Out of them 71.2% were diagnosed as hypertensive, and 40% respondents were diagnosed as both diabetic and hypertensive.

Total 54.0% respondents of this study had normal BMI, 34.0% were overweight and 12.0% were with below normal BMI, which differ with NHANES III study where 15.8% were in normal BMI, 14.7% with overweight and 19.8% were obese[15]. But Saudi Arabian study reveals 60.7% respondents of CKD were overweight[14]. And 60.7% respondents had history of random NSAID use and 20.0 % got homeopathic treatment.

In the current study most of respondents 76.7% were in stage 5 of CKD, 16.0% in stage 4 and 7.3% in stage 3 which is nearly similar with study conducted in Sri Lanka where 66.9% in stage-5, 4.1% in stage-4 and 3.3% in stage-3[11], but differs largely with NHANES III population based study where 5.7% in stage-1, 5.4% in stage-2, 5.4% in stage-3, only 0.4% stage-4 and 5 of CKD[15].

There is statistically significant relationship between stage of renal insufficiency with H/O sore throat (p=0.01), and the therapy advised for CKD is also in statistically significant relationship with stage of renal insufficiency (p=0.00).

Conclusions & Recommendation :

Worldwide, CKD is becoming a common disease in the general population. However, accurate detection of CKD in subgroups remains inadequate. Similar with other studies, the current study revealed that CKD is not only prevalent among hypertensive but also prevalent among normotensive respondents. Along with other risk factors like diabetes mellitus, cardio-vascular disease, CKD become a major burden for the world. However this data should generalize the Bangladeshi population with caution and to conduct further studies with larger sample size to evaluate the prevalence and risk factors for CKD. The present study reveals that most of the respondent's disease duration is 1 year or less that indicates CKD is undiagnosed for long time and detected at very late stage, which is more hazardous from the management point of view. The present study was solely conducted on the patient's attending at nephrology unit that means they were previously diagnosed as CKD. not a population based study that's why there were no respondent in stage -1 and stage -2 of CKD There needs to identify people who have or are at risk of developing CKD, those who need intervention to minimize cardiovascular risk and what that intervention should be, those who will develop progressive kidney disease and/or complications of kidney disease and how they can be managed and those who need referral to specialist kidney care centre.

Detection and prevention programs including screening of communities for diabetes, hypertension and CKD have to be implemented in order to avert this enormous problem. Lifestyle changes, modification of the ill effects of sweeping globalization and massive community education will be needed. It also requires a consorted approach from individual practitioners, nephrologists, diabetic and cardiovascular physicians for early detection and early intervention. Forming a partnerships with other appropriate societies such as the International society of Nephrology, International diabetes federation, Word Health Organizations, The World Bank and the Rockefeller Institute etc to communicate the magnitude of the problem to communities and to the governments worldwide.

References :

1. Barsoum RS. Chronic kidney disease in developing world. N Engl J Med 2006; 354:997-99.
2. Haroun MK, Jaar BG, Hoffman SC, Comstock GW, Klag MJ, Coresh J. Risk factors for chronic kidney disease: a prospective study of 23,534 men and women in Washington Country, Maryland. J Am Soc Nephrol 2003; 14:2934-41.
3. Perneger TV, Brancati FL, Whelton PK, Klag MJ. End-stage renal disease attributable to diabetes mellitus. Ann Intern Med 1994; 121:912-18.
4. Kysaght MJ. Maintenance dialysis population dynamics: current trends and long term implications. J Am Soc nephrol 2002; 13 (Suppl 1):S37-S40.
5. Sinvely CS, Gutierrez C. Chronic kidney disease: prevention and treatment of complications. Am Fam Physician 2004; 70:1921-28.
6. Mann JF, Gerstein HC, Pogue J, Bosch J, Yusuf S. Renal insufficiency as a predictor of cardiovascular outcomes and the impact of ramipril: the HOPE randomized trial. Ann Intern Med 2001; 134:629-36.
7. de Zeeuw D, Hillege HL, de Jong PE. The kidney, a cardiovascular risk marker, and a new target for therapy. Kidney Int 2005 (Suppl); 98:S25-S29.
8. Sarnak MJ, Levey AS, Schoolwerth AC, Coresh J, Culeton B, Hamm LL, et al. Kidney disease and a risk factor for development of cardiovascular disease: a statement from the American Heart Association Councils on Kidney in Cardiovascular Disease, High Blood Pressure Research, Clinical Cardiology, and Epidemiology and Prevention. Circulation 2003,108:54-69.
9. Locatelli F, Vecchio LD, Pozzoni P. The importance of early detection of chronic kidney disease. Nephrol Dial Transplant 2002, 17 (Suppl 2):2-7.
10. Ruggenenti P, Schieppati A, Remuzzi G. Progression, remission, regression of chronic kidney disease. Lancet 2001, 357:1601-08.
11. Ramachandran S, Renal deseases. Sri Lankan and global spectrum. J Ceylon Coll Physicians. 1994, 27:27-35.
12. Chhetri PK,Manandhar DN, Bhattarai SP, Pahari LR, Shrestha R. Risk factors of Renal Disease). Nep Med Coll J 2008; 10 (1):8-10.
13. Agarwal SK, Dash SC, Irshad M. Prevalence of Chronic Renal Failure in adults in Delhi, India. Nephrol Dial Transplant 2005; 20:1638-42.
14. Abdulkareem OA, Youssef MKF, Abdulla AAS, Dujanah M, Fayez A, Ali A, et al. Epidemiology of Chronic Kidney Disease in the Kingdom of Saudi Arabia. Saudi J Kidney Dis Transplant 2010; 21 (6):1066-72.
15. Jones CA, Mcquillan GM, Kusek JW. Serum creatinine levels in the US population: Third National Health and Nutrition Examination Survey. Am J Kidney Dis 1998, 32:992-99.
16. Chadban S, Briganti E, Kerr P. Prevalence of kidney damage in Australian adults: The AusDiab kidney Study. J Am Soc Nephrol 2003, 14:S131-S138.
17. High CCH, Shang-Jyh H, Chi-Pang W, Hsing-Yi C, Ted C, Ruei-Shiang S, et al. Prevalence and Low Awareness of CKD in Taiwan: A Study on the Relationship Between Serum Creatinine and Awareness From a Nationally Representative Survey. Am J Kidney Dis 2006; 48:727-38.