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Article

Comparative study on nutritional status, food intake pattern and lifestyle between dialyzed and non-dialyzed kidney patients in Dhaka, Khulna and Rajshahi divisions of Bangladesh

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Abstract: Chronic kidney disease (CKD) is a worldwide public health problem. As per nephrologists' estimation, the CKD population grows at approximately 5% annually and in 2022, over 29 million people will be afflicted with CKD in Bangladesh. The objective of this study was to compare nutritional status, food intake pattern, and lifestyle between dialyzed and non-dialyzed kidney patients in Bangladesh. It was a cross-sectional comparative study of patients aged 18 to 85 year old to compare nutritional status, food intake pattern, and lifestyle between dialyzed and non-dialyzed kidney patients. Sample was conducted in three divisions Dhaka, Khulna and Rajshahi in Bangladesh. Data on food intake pattern, height, weight, GFR, other diseases along with kidney disease, physical activity, smoking and socioeconomic status etc. were collected from fifteen clinical centers and sometimes from household via in-person interviews. A total of 244 patients aged were selected among them 152 people were dialyzed patients and 92 people were Non-dialyzed patients. We found a relationship among dietary food habit, lifestyle factors and health outcomes such as chronic kidney disease progression, heart disease and death. Patients had a mean monthly family income of 23683.46, a mean monthly expenditure on food of 3815.2 and a mean monthly expenditure on treatment of 13317.69. According to our findings, highest dialysis patients were sedentary than non-dialysis patients were active at their active life (20-40 Years). From this study it was investigated that, 41.0% patients have not changed their addiction habit after diagnosis, where 20.1% dialysis patients and 20.9% non-dialysis patients have not changed their addiction habit totally. Another significant finding of this study was that dialysis patients had poor consumption from 16 groups. It can be highlighted that, the prevalence of the diseases were higher in urban people than rural people. This study suggests that additional research is needed to investigate the optimal dietary recommendations and body mass index levels to prevent disease progression and poor outcomes among individuals with CKD. The prevalence of HD-CKD and NDD-CKD can be said to be SES dependent. Chronic kidney disease and its complications, which involve most organ systems, can be prevented, but awareness and use of accurate methods are needed to enable timely diagnosis.

Keywords: chronic kidney disease; nutritional status; food intake pattern; lifestyle

1. Introduction

Patients suffering from renal disease in the country are approximately 18-20 million. As per nephrologists' estimates, the chronic kidney disease (CKD) population grows at approximately 5% annually and in 2022, over 29 million people will be afflicted with CKD in Bangladesh. With the increase of diabetes and hypertension, the prevalence of chronic kidney disease (CKD) is also alarmingly going up particularly in disadvantageous population. Chronic kidney disease is defined as either kidney damage or glomerular filtration rate

(GFR) <60 mL/min/1.73m^2 for ≥3 months. Kidney damage is defined as pathologic abnormalities in blood or urine tests or imaging studies (Anand *et al.*, 2014). Staging of CKD is based on estimation of renal function by GFR. GFR is calculated from serum creatinine by Cockcroft-Gault and MDRD equations. Some study showed that there were a significant number of patients with normal serum creatinine level who had abnormal GFR with Cockcroft-Gault values≤50 mL/min (Duncan *et al.*, 2001). Non-dialysis Dependent Chronic Kidney Disease (NDD-CKD) is a designation used to encompass the status of those persons with an established CKD who do not yet require the life-supporting treatments for renal failure known as renal replacement therapy. According to the 2010 Global Burden of Disease study chronic kidney disease was ranked 27th in the list of causes of total number of global deaths in 1990 (age-standardized annual death rate of 15.7 per 100 000), but rose to 18th in 2010 (annual death rate 16.3 per 100 000) (Lozano *et al.*, 2013). Chronic kidney disease (CKD) prevalence is three to five times higher in the Bangladeshi population compared with other ethnic groups in the UK (WHO, 2012). The International Diabetes Federation (IDF) estimates that the diabetic population of Bangladesh will be eleven million by 2030. Patients suffering from renal disease in the country are approximately 18-20 million. As per nephrologists' estimates, the CKD population grows at approximately 5% annually and in 2022, over 29 million people will be afflicted with CKD in Bangladesh. People living with end stage renal diseases (ESRD) in the country are estimated to be 0.8-1 million and ~40,000 deaths occur annually due to lack of treatment (Jha *et al.*, 2012). Chronic kidney disease imposes substantial economic burden on affected individuals, especially in developing countries. About 2–3% of the health-care expenditure in developed nations is used to provide treatment for patients with end-stage kidney disease even though they account for 0.1-0.2% of the total population; in 2010 treatment costs accounted for 6.3% of the Medicare budget in the USA, 4.1% of the total health-care budget in Japan in 1996, and 3.24% of national health expenditure in South Korea in 2004 (deBrito-Ashurst *et al.*, 2011). Chronic kidney disease (CKD) has numerous causes. The most common causes of CKD are diabetes mellitus and long-term, uncontrolled hypertension (Jha *et al.*, 2012). The principal causes of chronic kidney disease in low income countries are chronic glomerulonephritis and interstitial nephritis reflecting the high prevalence of bacterial, viral, and parasitic infections that can affect the kidneys. However, diabetes causes 9.1 to 29.9 percent of the cases of end stage renal disease, and hypertension leads to 13 to 21 percent of the cases in the same countries (Barsoum, 2006). The diet for patients with end-stage kidney disease who are on dialysis is usually high in protein and low in sodium, potassium, and phosphorus. Fluid intake is also restricted. Protein needs are higher in patients with ESRD due to losses that occur during dialysis. The recommended dietary protein intake for clinically stable maintenance hemodialysis patients is 1.2 g/kg body weight/d, and 1.2 -1.3 g/kg body weight/d for individuals on peritoneal dialysis, 50% of which should come from sources high in biological value. Nutrition counseling should be intensive initially and provided every 1 or 2 months thereafter. If nutrient intake appears inadequate, malnutrition is apparent or adverse events or illnesses threaten nutritional status, counseling should be increased. The National Kidney Foundation clinical practice guidelines for nutrition in chronic renal failure suggest that patients achieve 100% of the Dietary Reference Intakes (DRI) for vitamins A, C, E, K, thiamin (B_1), riboflavin (B_2), pyridoxine (B_6), vitamin B_{12}, and folic acid, as well as 100% of the DRI for copper and zinc (Kopple, 2001). Nutritional status should be assessed, and every patient with ESRD should receive a diet plan. For patients who have progressed to the need for dialysis, morbidity and mortality can be reduced and quality of life enhanced through adherence to an appropriate dietary and medical regimen, along with regular physical activity. On the other hand, for non-dialyzed patient it is recommended that, the kidney diet must consists of low amounts of protein and should be limited at least to the recommended intake of 0.7–0.8 g/kg ideal body weight/day. If the GFR decreases below the value of 60 to 50 ml/min (stages 3 to 5), a more intense protein restriction is recommended. To prevent protein malnutrition, essential keto acids/amino acids are often taken as supplementation to protein-restricted diets (Agarwal *et al.*, 2006). This study was conducted to find out the prevalence of CKD and its association with risk factors as there was no exact data before this tiny endeavor that has been inaugurated in Bangladesh.

2. Materials and Methods

2.1. Study design and sample collection

Total 244 patients were selected for the study. The study was carried out from January, 2015 to October, 2015 which included study design, questionnaire preparation, literature review, data collection, data analysis and written up. Among the selected patients 152 were dialyzed patients and 92 were Non-dialyzed patients. Firstly, 120 CKD patients were interviewed from several hospitals of Dhaka and Rajshahi division namely Dhaka CMH, BSMMU, BARDEM, Marks Medical Hospital, National Kidney Foundation, Rajshahi Medical College, Ebne-Sina Clinic and 79 CKD patients were interviewed from several hospitals of Khulna division namely Khulna Medical College Hospital, Shohid Sheikh Abu Naser Medical Center, Queens Hospital Jessore, Jessore

Sadar Hospital. From Rajshahi 45 CKD patients were interviewed. A simple random sampling design following a simple random sampling procedure was done to choose the study area and a total of 244 patients ranging from 18 to 85years had been studied. Out of the chosen 244 patients, 97 were females and 147 were males.

2.2. Nutritional analysis

The study was cross-sectional comparative study in design comparing the dietary intake pattern, lifestyle, nutritional status of dialyzed and non-dialyzed patient. For dietary assessment, nutrition-related indicator such as- 30-days diet history interview were conducted.

2.3. Determination of dietary food intake pattern

Information about food intake pattern on cereals, white roots and tubers, meat/fish, egg, legumes/nuts and seeds, milk/ milk products, fats and oils, sweets, spices/condiments/beverages, sweet fruits, citrus fruits, leafy vegetables, non-leafy vegetables, colored vegetables etc were collected. Participants completed 30-days diet history. Interviewers recorded their food and beverage intake, food habit, water drinking, salt intake. In the 30-days diet history, the respondent is asked to remember and report all the foods and beverages consumed in the 30-days.

2.4. Lifestyle related information

Lifestyle of participants was determined by assessing their physical activity, walking time, working time, sleeping time, addiction habits.

2.5. Socio-economic information

Socio-economic information including age, educational qualification, occupation, monthly income and expenditure, monthly expenditure on food items, total family members for different usages information were collected by person to person interview with target patients. Disease Pattern Information of Target Population: Suffering from disease within last 90 days, name of the diseases, and number of disease-suffered patients; treatment cost, family member suffering from CKD, first confirmation and first detection of disease, frequency of measuring blood glucose level, creatinine level, GFR level and blood pressure level.

2.6. Anthropometric information

To determine nutritional status of dialyzed and non-dialyzed kidney patient's age, height, weight, BMI, GFR level of patients were recorded.

2.7. Data analysis

Information from finally checked questionnaires were entered in a data entry form using Statistical Package for Social Science (SPSS) Windows version 16 software and data entry were carefully done to avoid errors. The data were analyzed by applying percentages, crosstabs, chi-square test, standard deviations, means and correlation test and regression analysis. Comparative analysis was undertaken to investigate nutritional status, lifestyle, socioeconomic information, food intake pattern, clinical findings of children and anthropometric status.

3. Results

3.1. Socio-demographic status

There are total 65.6% patients from urban area, where 60.2% are male and 85.2% are muslim. For dialysis patients, 45.5% are from urban, 39.3% are male and 54.9% are muslim. And for non-dialysis patients, 20.1% are from urban, 20.9% are male and 30.3% are muslim (Table 1).

Table1. Distribution of Socio-demographic status of dialysis and non-dialysis kidney patients.

Socio-demographic status		Type of kidney disease		Total	Chi Square	P value
		Dialysis	Non-dialysis			
Location	Rural	16.8% (41)	17.6% (43)	34.4% (84)	9.918	<.01**
	Urban	45.5% (111)	20.1% (49)	65.6% (160)		
Total		**62.30% (152)**	**37.70% (92)**	**100% (244)**		
Sex	Male	39.3% (96)	20.9% (51)	60.2% (147)	4.427	<.05*
	Female	23.0% (56)	16.8% (41)	39.8% (97)		
Total		**62.30% (152)**	**37.70% (92)**	**100% (244)**		
Religion	Muslim	54.9% (134)	30.3% (74)	85.2% (208)	2.718	0.25
	Hindu	7.0% (17)	7.0% (17)	13.9% (34)		
	Christian	0.4% (1)	0.4% (1)	0.8% (2)		
Total		**62.30% (152)**	**37.70% (92)**	**100% (244)**		

3.2. Education

Total 4.5% patients were illiterate, 26.2% attended less than primary education, 2.5% competed primary education, 10.2% attended class VI to X, 9.8% completed SSC, 22.1% completed HSC, 23.0% completed above HSC, and 1.6% completed Hafizia, where in Dialysis patients, 1.2% patients were illiterate, 12.7% attended less than primary education, 2.0% competed primary education, 5.3% attended class VI to X, 6.6% completed SSC, 16.4% completed HSC, 16.4% completed above HSC, and 1.6% completed Hafizia, and in Non-dialysis patients, 3.3% patients were illiterate, 13.5% attended less than primary education, 0.4% competed primary education, 4.9% attended class VI to X, 3.3% completed SSC, 5.7% completed HSC, 6.6% completed above HSC, and none of Non-dialysis patient completed Hafizia. The Chi-square value is 16.03 and with 7df, the p value stands 0.0248 which is <0.05 and it is significant (Figure 1).

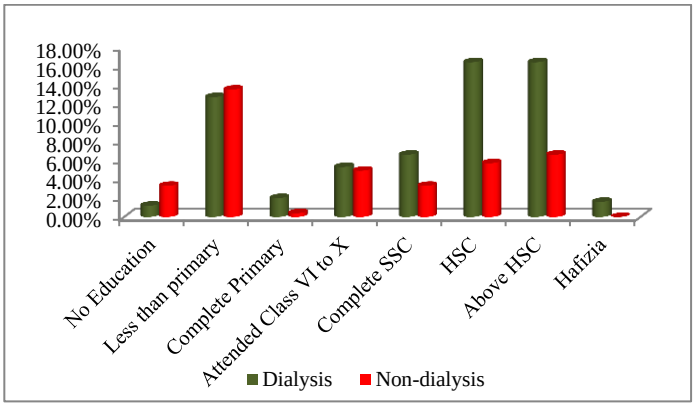

Figure 1. Percentage distribution of patients according to the education.

3.3. Socio-economic status of chronic kidney disease patients

The mean value for total family member is 4.5041, total room in house is 3.4959 and total land is 83.9908 where the std. deviations for total family member are 1.54093, total room in house is 1.91055, and total land is 108.77819 (Table 2).

Table 2. Mean and std. deviation value distribution for socio-economic status of chronic kidney disease patients.

Socio-economic status	Mean	Std. Deviation
Total family member	4.5041	1.54093
Total room in house	3.4959	1.91055
Total land (decimal)	83.9908	108.77819

3.4. Economic status

The mean value is 10451 for monthly personal income, 34361 for monthly family income, 7269.7 for monthly expenditure on food, 19953 for monthly expenditure on treatment and 31006 for total monthly expenditure, where highest standard deviation stands beside monthly personal income 28552.34236, and lowest stands beside monthly expenditure on food 3815.26907 (Table 3).

Table 3. Mean and std. deviation distribution for economic status of chronic kidney disease patients and their family.

Economic status	Mean	Std. Deviation
Monthly personal income	10451	28552.34236
Monthly family income	34361	23683.46320
Monthly expenditure food	7269.7	3815.26907
Monthly expenditure treatment	19953	13317.69268
Monthly expenditure total	31006	26395.90478

3.5. Percentage of monthly expenditure on food

Total 48.8% patient's family expend quarter of their total family income , 48.8% patient's family expend half of their total family income, 2.5% patient's family expend two-third of their total family income where in Dialysis patients, 29.1% patient's family expend quarter of their total family income, 32.0% patient's family expend half of their total family income, 1.2% patient's family expend two-third of their total family income and in Non-Dialysis patients, 19.7% patient's family expend quarter of their total family income , 16.8% patient's family expend half of their total family income, 1.2% patient's family expend two-third of their total family income. The Chi-square score is 5.061 and with 2df the p-value is 0.0796 which is not significant (>.05) (Figure 2).

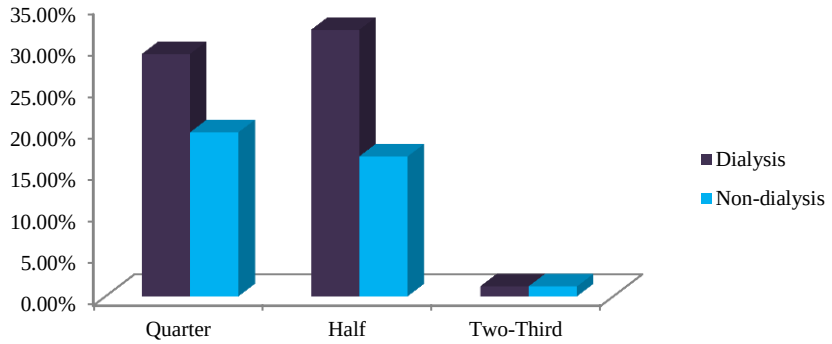

Figure 2. Percentage distribution of patients according to the monthly expenditure on food.

3.6. Average monthly expenditure on food

25.0% patients had monthly expenditure on food up to 1000 taka, 59.4% had monthly expenditure on food between 1001 taka to 2500 taka, 15.6% had monthly expenditure on food more than 2500 taka, where in Dialysis patients, 11.1% patients had monthly expenditure on food up to 1000 taka, 36.1% had monthly expenditure on food between 1001 taka to 2500 taka, 15.2% had monthly expenditure on food more than 2500 taka and in Non-dialysis patients, 13.9% patients had monthly expenditure on food up to 1000 taka, 23.4% had monthly expenditure on food between 1001 taka to 2500 taka, 0.4% had monthly expenditure on food more than 2500 taka. The Chi-square score is 8.506 and with 2df the p-value is 0.0142 which is significant (<.05) (Figure 3).

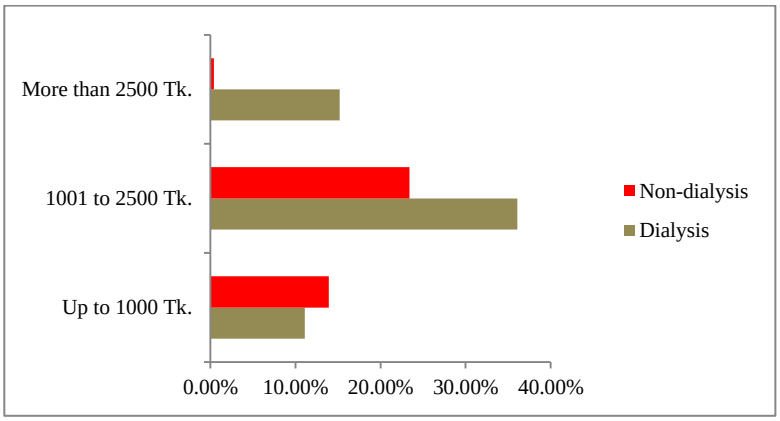

Figure 3. Percent distribution of patients according to the amount of average monthly expenditure on food.

3.7. Socio-demographic status of different stages of kidney patients

There are total 60.2% are male and 39.8% are female where 65.6% patients are from urban area, 34.4% are from rural area, 85.2% are Muslim and 13.9% patients are Hindu. For stage-5 patients, 45.5% are from urban, 39.3% are male and 54.9% are Muslim (Table 4).

Table 4. Distribution of socio-demographic status of different stages of kidney patients basis on glomerular filtration rate.

Socio-demographic status		Glomerular filtration rate (GFR)					Total	Chi Square	P value
		Stage 2 (60-89)	Stage 3A (45-59)	Stage 3B (30-44)	Stage 4 (15-29)	Stage 5 (less than 15)			
Sex	Male	4.1%	12.7%	2.5%	1.6%	39.3%	60.2%	15.87	<.01**
	Female	0.8%	7.4%	7.4%	1.2%	23.0%	39.8%		
Location	Rural	2.5%	8.6%	4.5%	2.0%	16.8%	34.4%	12.20	<.05*
	Urban	2.5%	11.5%	5.3%	0.8%	45.5%	65.6%		
Religion	Muslim	4.5%	14.8%	8.6%	2.5%	54.9%	85.2%	7.363	0.49
	Hindu	0.4%	4.9%	1.2%	0.4%	7.0%	13.9%		
	Christian	0.0%	0.4%	0.0%	0.0%	0.4%	0.8%		

3.8. Family's kidney disease history

Total 39.8% patient's family member suffered at kidney disease, 60.2% patient's family member not suffered at kidney disease, where in Dialysis patients, 24.2% patient's family member suffered at kidney disease, 38.1% patient's family member not suffered at kidney disease, and in Non-dialysis patients, 15.6% patient's family member suffered at kidney disease, 22.1% patient's family member not suffered at kidney disease. The Chi-square score is 4.148 and with 1df the p-value is 0.0416 which is significant (<.05) (Figure 4).

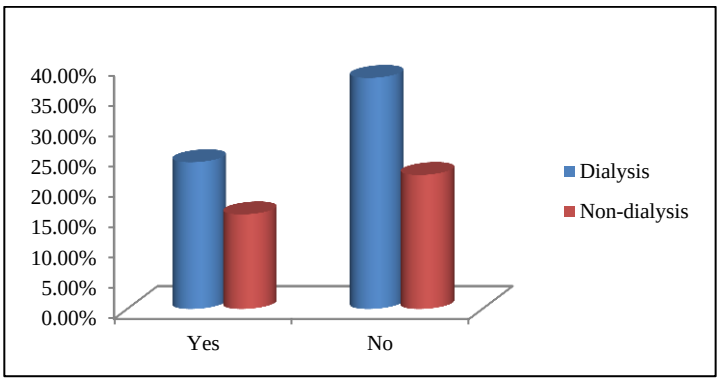

Figure 4. Percentage distribution of patients according to anyone of family suffered at kidney disease.

3.9. Multi disease condition among kidney patients

Total 15.2% dialysis patients have no other disease, 9.4% have diabetes, 12.7% have hypertension and 20.5% have other diseases where 16.4% non-dialysis patients have no other disease. Again, 18.9% male patients have no other disease, 11.1% hypertension, and 16.4% have other diseases where 12.7% female patients have no other disease. 18.9% male patients have no other disease where 12.7% female patients have no other disease. 26.2% Muslim patients have no other disease and 26.6% Muslim patients have other disease (Table 5).

Table 5. Percent distribution of multi disease condition among kidney patients.

		Multi-disease condition						Total
		No Other Disease	Diabetes	Hypertension	Cardiovascular disease	Asthma	Others	
Type of Kidney Disease	Dialysis	15.2	9.4	12.7	3.3	1.2	20.5	62.3
	Non-dialysis	16.4	4.9	6.1	0.8	1.2	8.2	37.7
Sex	Male	18.9	9.8	11.1	2.9	1.2	16.4	60.2
	Female	12.7	4.5	7.8	1.2	1.2	12.3	39.8
Location	Rural	13.9	7.0	8.2	0.4	0.4	4.5	34.4
	Urban	17.6	7.4	10.7	3.7	2.0	24.2	65.6
Religion	Muslim	26.2	11.9	14.3	4.1	2.0	26.6	85.2
	Hindu	4.5	2.5	4.5	0.0	0.4	2.0	13.9
	Christian	0.8	0.0	0.0	0.0	0.0	0.0	0.8

3.10. Patients (dialysis and non-dialysis) according to physical activity

Total 68.9% patients were sedentary, 20.5% moderate and 10.7% patient's active as their perception, where total 59.4% patients were sedentary, 25.0% moderate and 15.6% patients active at their active life (20-40 Years). Highest 40.2% dialysis patients were sedentary 9.8% Non-dialysis patients were active at their active life (20-40 Years) (Table 6).

Table 6. Distribution of patients (dialysis and non-dialysis) according to physical activity.

Physical activity		Type of kidney disease		Total	Chi Square	P value
		Dialysis	Non-dialysis			
Perception of respondent	Sedentary	43.0% (105)	25.8% (63)	68.9% (168)	9.207	<.05*
	Moderate	15.2% (37)	5.3% (13)	20.5% (50)		
	Active	4.1% (10)	6.6% (16)	10.7% (26)		
Active life (20-40 years)	Sedentary	40.2% (98)	19.3% (47)	59.4% (145)	12.48	<.01**
	Moderate	16.4% (40)	8.6% (21)	25.0% (61)		
	Active	5.7% (14)	9.8% (24)	15.6% (38)		

3.11. Patients (dialysis and non-dialysis) according to presence of addiction habit

Total 50.0% patients had addiction habit and 50.0% had no addiction habit before diagnosis of kidney disease. But, 32.0% patients have addiction habit until now after diagnosis where 68.0% have not. 33.6% dialysis patients and 16.4% non-dialysis patients had addiction habit before diagnosis of kidney disease where 19.3% dialysis patients and 12.7% non-dialysis patients had present addiction habit (Table 7).

Table 7. Distribution of patients (dialysis and non-dialysis) according to presence of addiction habit.

Presence of addiction habit		Type of kidney disease		Total	Chi Square	P value
		Dialysis	Non-dialysis			
Before Diagnosis	Yes	33.6% (82)	16.4% (40)	50.0% (122)	2.513	>.05
	No	28.7% (70)	21.3% (52)	50.0% (122)		
After Diagnosis	Yes	19.3% (47)	12.7% (31)	32.0% (78)	1.052	>.05
	No	43.0% (105)	25.0% (61)	68.0% (166)		

3.12. Patients (Dialysis and Non-dialysis) according to the type of addiction habit

Total 45.1% patients were addicted to smoking tobacco, 45.1% were addicted to non-smoking tobacco and 9.8% were addicted to both smoking and non-smoking tobacco at past, where total 32.1% patients are addicted to smoking tobacco, 64.1% are addicted to non-smoking tobacco, 3.8% are addicted to both smoking and non-smoking tobacco. 32.0% dialysis patients were addicted to smoking tobacco, 28.7% were addicted to non-smoking tobacco and 6.6% were addicted to both smoking and non-smoking tobacco at past. But, at present, 17.9% dialysis patients were addicted to smoking tobacco, 42.3% dialysis patients were addicted to non-smoking tobacco and 21.8% non-dialysis patients were addicted to non-smoking tobacco (Table 8).

Table 8. Distribution of patients (Dialysis and Non-dialysis) according to the type of addiction habit.

Type of addiction habit		Type of kidney disease		Total	Chi Square	P value
		Dialysis	Non-dialysis			
Past	Smoking Tobacco	32.0% (39)	13.1% (16)	45.1% (55)	6.662	<.05*
	Non-smoking Tobacco	28.7% (35)	16.4% (20)	45.1% (55)		
	Both Smoking and Non-smoking Tobacco	6.6% (8)	3.3% (4)	9.8% (12)		
Present	Smoking Tobacco	17.9% (14)	14.1% (11)	32.1% (25)	5.246	>.05
	Non-smoking Tobacco	42.3% (33)	21.8% (17)	64.1% (50)		
	Both Smoking and Non-smoking Tobacco	0.0% (0)	3.8% (3)	3.8% (3)		

3.13. Patients (dialysis and non-dialysis) according to second hand smoking

Total 51.2% patients suffered from second hand smoking, 48.8% not suffered from second hand smoking, where in dialysis patients, 24.2% patients suffered from second hand smoking, 38.1% not suffered from second

hand smoking, and in non-dialysis patients, 27.0% patients suffered from second hand smoking, 10.7% not suffered from second hand smoking. The Chi-square score is 4.864 and with 1df the p-value is 0.0274 which is significant (<.05) (Figure 5).

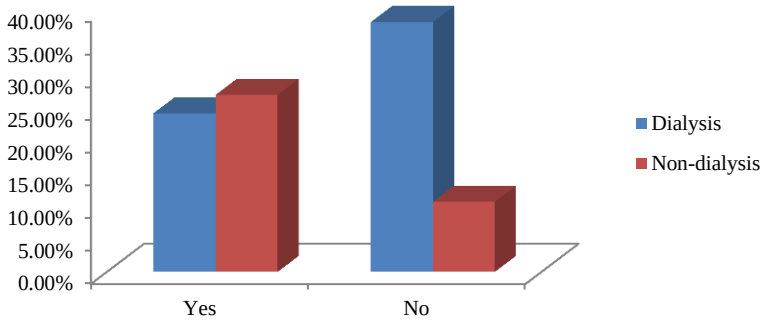

Figure 5. Percent distribution of patients (dialysis and non-dialysis) according to second hand smoking.

3.14. Distribution of CKD patients according to change at habits after diagnosis

Total 17.2% patients totally, 68.4% patients partially and 14.3% have not changed their food habit after diagnosis where the most 42.6% dialysis patients and 25.8% non-dialysis patients have changed food habit partially. On the other hand, total 13.9% patients totally, 48.0% patients partially and 31.1% have not changed their lifestyle after diagnosis where 35.2% dialysis patients partially and 20.9% non-dialysis patients have not changed their lifestyle totally. Again, total 23.0% patients totally, 36.1% patients partially and 41.0% have not changed their addiction habit after diagnosis, where 20.1% dialysis patients and 20.9% non-dialysis patients have not changed their addiction habit totally (Table 9).

Table 9. Distribution of CKD patients according to change at habits after diagnosis.

Change of habit and lifestyle after diagnosis		Type of kidney disease		Total	Chi Square	P value
		Dialysis	Non-dialysis			
Food Habit	Total	11.5% (28)	5.7% (14)	17.2% (42)	0.737	>.05
	Partial	42.6% (104)	25.8% (63)	68.4% (167)		
	No	8.2% (20)	6.1% (15)	14.3% (35)		
Lifestyle	Total	9.8% (24)	4.1% (10)	13.9% (34)	8.878	<.05*
	Partial	35.2% (86)	12.7% (31)	48.0% (117)		
	No	17.2% (42)	20.9% (51)	38.1% (93)		
Addiction Habit	Total	14.8% (36)	8.2% (20)	23.0% (56)	14.79	<.01**
	Partial	27.5% (67)	8.6% (21)	36.1% (88)		
	No	20.1% (49)	20.9% (51)	41.0% (100)		

3.15. Distribution of food item consumption (among16 group) of dialysis and non-dialysis patients

Total 48.0% patients had poor consumption from 16 groups, 45.9% had acceptable consumption, 6.1% had higher acceptable consumption, where 29.9% Dialysis patients had poor consumption from 16 groups, 27.5% had acceptable consumption, 4.9% had higher acceptable consumption and 18.0% Non-dialysis patients had poor consumption from 16 groups, 18.4% had acceptable consumption, 1.2% had higher acceptable consumption. The Chi-square score is 6.294 and with 2df the p-value is 0.0429 which is significant (<.05) (Figure 6).

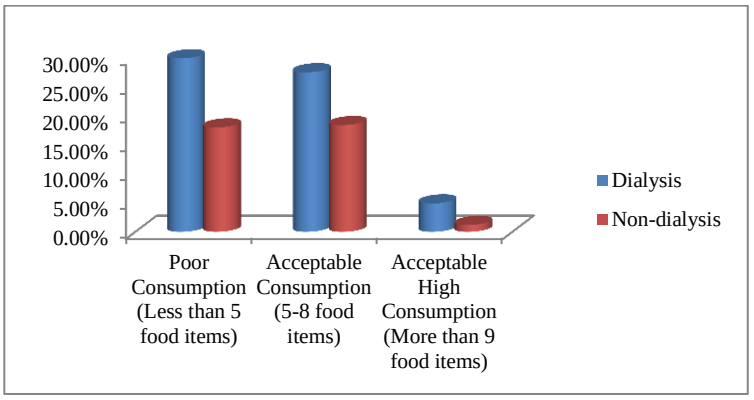

Figure 6. Percentage distribution of food item consumption (among16 group) of dialysis and non-dialysis patients.

3.16. Distribution of food item consumption among kidney patients

Total 48.0% patients were in poor consumption, 45.9% acceptable consumption, 6.1% acceptable high and 31.6% patients were in poor consumption, 25.4% acceptable consumption, 3.3% acceptable high among male and 16.4% patients were in poor consumption, 20.5% acceptable consumption, 2.9% acceptable high among female. The Chi-square score is 2.930 and with 2df the p-value is 0.2310 which is not significant (>.05) (Figures 7 and 8).

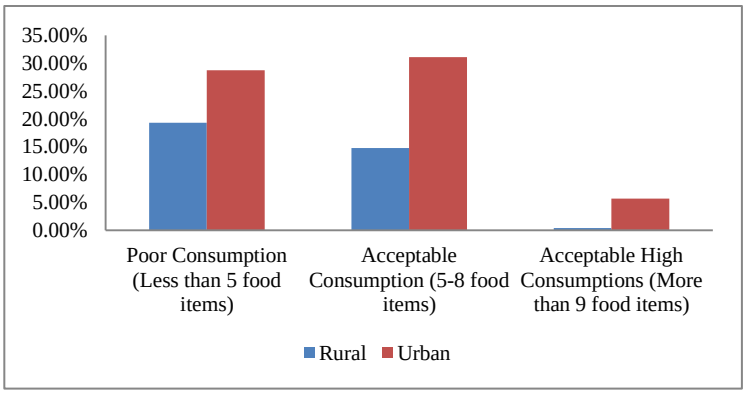

Figure 7. Percent distribution of food item consumption (among16 group) and location among kidney patients.

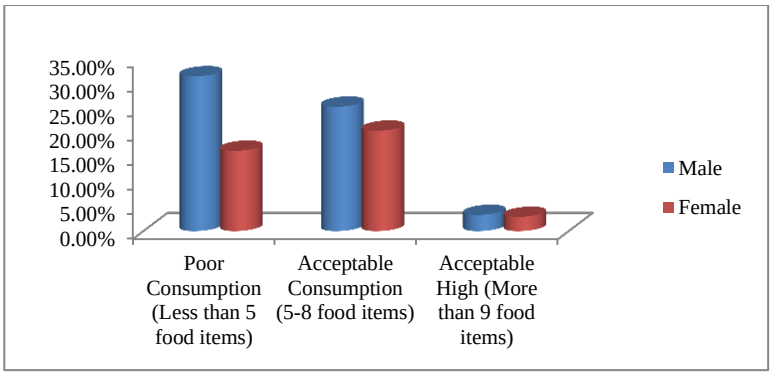

Figure 8. Percent distribution of food item consumption (among16 group) and sex among kidney patients.

4. Discussion

It can be highlighted that, the prevalence of the diseases were higher in urban people than rural people. This could be due to the affordability and purchasing power of calorie rich diet by individuals who earn high income hence they are more prone to the disease due to cholesterol derived from consumption of junk foods. Some most important observations were made in this cross- sectional study. Firstly, there were highest standard deviation stands beside monthly personal income 28552.34, and lowest stands beside monthly expenditure on food 3815.26. Patients had a mean monthly family income of 23683.46, a mean monthly expenditure on food of

3815.2 and a mean monthly expenditure on treatment of 13317.69. Especially HDD-CKD patient's families' experience direct loss of income and changes in consumption patterns because of the spending of household finances on care and welfare costs. According to this study, highest dialysis patients were sedentary than Non-dialysis patients were active at their active life (20-40 Years). Total 68.9% patients were sedentary, 20.5% moderate and 10.7% active as their perception, where 59.4% patients were sedentary, 25.0% moderate and 15.6% patients active at their active life (20-40 Years). The nature of occupation could also be a factor responsible for the disease prevalence as observed in this study. It was observed that those engaged in heavy occupational activities at their active life (20-40 Years) had the lowest prevalence of the disease compared with those who engage in light occupational activity. The sedentary lifestyle experienced by those who engage in light occupational activities as observed mostly among the chief executives, bankers, office secretaries and directors in the study population possibly is one of the reasons for the high prevalence of the diseases among those of light occupational activities. From this observation it can be said that, occupational activity is associated with the development of CKD. The high exposure of both HDD-CKD and NDD-CKD patients to tobacco and other addiction habits (past, passive or current) could be related to the increasing worldwide tendency of end stage renal disease. This observation was in harmony with the findings of other researchers that Tobacco and end stage renal disease: a multicenter, cross-sectional study in Argentinian Northern Patagonia (Lozano *et al.*, 2013; Anand *et al.*, 2014; WHO, 2012 and deBrito-Ashurst *et al.*, 2011). Use of tobacco in the form of smoking and chewing was significantly higher in CKD group than in the normal population (Jha *et al.*, 2012; Barsoum, 2006; Agarwal *et al.*, 2006). According to this study, 29.9% Dialysis patients had poor consumption from 16 groups, 27.5% had acceptable consumption, 4.9% had higher acceptable consumption and 18.0% Non-dialysis patients had poor consumption from 16 groups, 18.4% had acceptable consumption, 1.2% had higher acceptable consumption. CKD patients should follow proper diet chart that help to slow down chronic kidney disease.

5. Conclusions

This study points to an alarmingly high rate of Chronic Kidney Diseases in Bangladesh. It can be concluded that HDD-CKD and NDD-CKD are consequences of the level of the socio-economic state of the individual. Prevention programs will function best as part of national non-communicable disease strategies, with the involvement of general practitioners.

Conflict of Interest

None to declare.

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