IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 3 Ser.10 (March. 2022), PP 50-66
www.iosrjournals.org

Out–of-pocket expenditure of chronic kidney diseases (CKD)patients treated in a tertiary level hospital (DMCH) Bangladesh.

Tahmina Akter, Most. Sultana Rajia, Mukta Rozario

Abstract
Background
Chronic Kidney Disease (CKD) is a worldwide public health problem with an increasing incidence and prevalence, poor outcomes, and high cost. Out-of-pocket payments (OOPs) are as direct payments made by individuals to health care providers at the time of service use.
Objective
The objective of this study was to estimates the total Out-of-pocket expenditure for the treatment of CKD.
Method
This was a cross-sectional study over one year duration of CKD out of pocket expenditure estimation. Study sample were purposively selected total 110 respondents who were treated in Dhaka Medical College Hospital. Data was collected by semi-structured questionnaire withface to face interview andexpenditure voucher.
Result
Average monthly expenditure for ambulatory care patients were estimated 43,035 Tk. And 21,375 Tk for admitted patients. Total direct cost was 33,416 Tk and 17,239 Tk and indirect cost was 6,286 Tk and 4,111 Tk respectively. Average investigation expenditure was 24,530 Tk and 24,234 Tk respectively. CKD co-morbidities among the ambulatory and admitted respondents were 75% and 62% respectively. About 40% and 36% have high BP, 46% and 23% suffer from Diabetes and high BP respectively. Average expenditure for patients with co-morbid conditions was significantly higher than those who were without co-morbid conditions.
Conclusion:
Chronic Kidney Disease (CKD) is becoming a major public health problem worldwide. Hemodialysis is the ultimate treatment of CKD in developing country like Bangladesh. The financial impact of CKD is large, with particularly high cost relating to dialysis and co-morbidities. Managing CKD patients with dialysis, treatment and managing co-morbid conditions in individuals with CKD are potential sources of increasing cost in the care of CKD patients.

Key words:*Out–of-pocket expenditure, chronic kidney diseases, co- morbidities*

Date of Submission: 15-03-2022 Date of Acceptance: 29-03-2022

I. Introduction:

Chronic Kidney Disease (CKD) is becoming a major public health concern with a higher economic burden (Giuseppe et.al.,2017). CKD is defined as decreased kidney function or GFR for at least 3 months. It also known as chronic renal disease in which progressive loss in renal function over a period of months. The symptoms CKD are not specific. Patient may have feeling unwell and reduced appetite. CKD is diagnosed with other co-morbid conditions such as, high blood pressure, cardiovascular disease, diabetes mellitus and family history of CKD (kidney foundation,2011).

CKD is a global public health problem. the costs of renal therapy take-up a significant share of health care budgets. The prevalence and the incidence of CKD was estimated between 0.7% to 1.4% and180 to 200 per million populations (Scieppati et al., 2005). The national Kidney Foundation (2011) classified CKD as five stages (Stage 1 GFR> 90, Stage 2 GFR 60-89, Stage 3 GFR 30-59, Stage 4 GFR 15-29 and Stage 5 GFR <15).Globally, approximately 10% affected and million dies each year. CKD treatment cost quadrupled by the last 20 years and expected to continue increase. According to the Global Burden of Disease (2010) CKD was 27^{th} in the total number of deaths in 1990, 18^{th} in 2010 and 956000 deaths in 2013 up from 409000 deaths in 1990. Patients with CKD incur 85% higher costs and 50% higher government subsidies than those without CKD, and costs of care increase by CKD stage. The severity of CKD is classified into 5 stage (Paul et al.,2016).

The risk of CKD increases after 50 years of age. Renal function decline patient's quality of life and decline in cognitive function that may affects the working ability to patients and loss of employment (Giuseppe et.al.,2017). More than 20 million of U.S adults having CKD and 0.5% dialysis dependent CKD. The cost of

CKD treatment was increasing due to co-morbidities thus needs to seek multidisciplinary care like, physicians visits and medications which drives up direct healthcare expenditures and increases out-of-pocket expenditures, creating a financial burden for patients (Christina et al., 2017).

CKD Prevalence is estimated to be 8–16% worldwide (Vivekanand et al., 2013). Many developing countries in the South Asian region, screening for chronic diseases in the community has shown a widely varying prevalence (Georgi et al.,2016). In the coastal regions of the Srikakulam district and Chimakurthy mandal in the Prakasham district of Andhra Pradesh, India, 60% of the local population has been found to have CKD. In Srilanka, the average affected 1.8/1000 population (Georgi et al.,2016). CKD approximately 1 in 3 adults with DM and 1 in 5 adults with HTN patients. 27% DM occur in CKD stage 3, 40 % stage 4 and 5.89% HTN in stage 3-5.

In Bangladesh, the causes of CKD G5 among 954 patients who were on HD in 2012–13 were chronic glomerulonephritis 25.5%, diabetic nephropathy 41% and hypertensive renal disease, 33%. In 1998, glomerulonephritis (40%), diabetic nephropathy (31%), hypertension (15%), obstructive uropathy (8%) and undetermined (10%) were the causes of CKD G5. In 1994, 24% were diabetic nephropathy, in 1998, 31% (an increase of 7%) and in 2013, 41% further increase of 10% compared with 1998 (Giuseppe et al.,).

Out-of-pocket expenditure (OPE) is defined as direct payments made by individuals to health care providers at the time of service use. Globally, 100 million pushed into poverty because of OPE, and millions more cannot utilize health services or suffer financial hardship on direct payments by the patient. Countless households borrow money, sell assets, or divert resources to seek healthcare. Indeed, high OPE, the absence of risk-pooling mechanisms, and a high degree of poverty can result in profound and catastrophic financial shocks to vulnerable households. Former studies found healthcare expenditures to be closely linked to family income and highly correlated with low-income status (Christina et.al, 2017).

OPEs burden calculated as the ratio of 10% or more personal income spend on health care is called out-of-pocket expenditure burden (Abdulkarim et al., 2015). The financial impact of CKD is high relating to renal replacement therapy (RTT) and cardiovascular complications. The detailed analysis of cost will be useful in the treatment of CKD (Marior et al., 2012). Managing standards between costs and quality in health care is a great challenge. whereas CKD treatment is a unique set of challenges including an increased burden in the world population and the rising expenses associated with it.

In 2011, the Fresenius Medical Care worldwide network, estimated that roughly 2.1 million patients globally were being treated for End Stage Renal Disease (ESRD) with a 6-7% growth annually. Of course, approximately 2.1 million were undergoing hemodialysis or potential dialysis, and around 622000 were living with kidney transplants. The prevalence of treated ESRD patients in the general population shows high global variation, ranging from under 100 to over 2000 patients per million populations (pmp). ESRD prevalence is highest in Taiwan with around 2850 pmp, Japan 2490 pmp and the US with around 1970 pmp (Paul et al.,2016).

According to the world health report 2002 and Global Burden of Disease (GBD) project, diseases of the kidney and urinary tract contribute to the global burden of diseases, with approximately 850000 deaths every year and 15010167 disability- adjusted life years. They are the 12^{th} cause of death and 17^{th} cause of disability, respectively. Per-capita annual total direct health care expenditures and patient out-of-pocket expenditure for medical services included inpatient, outpatient, prescribed drug and payments for other medical equipment and services. Out-of-pocket spending included self-reported payments for services, supplies, and other items not covered by health insurance (Christina et al., 2017).

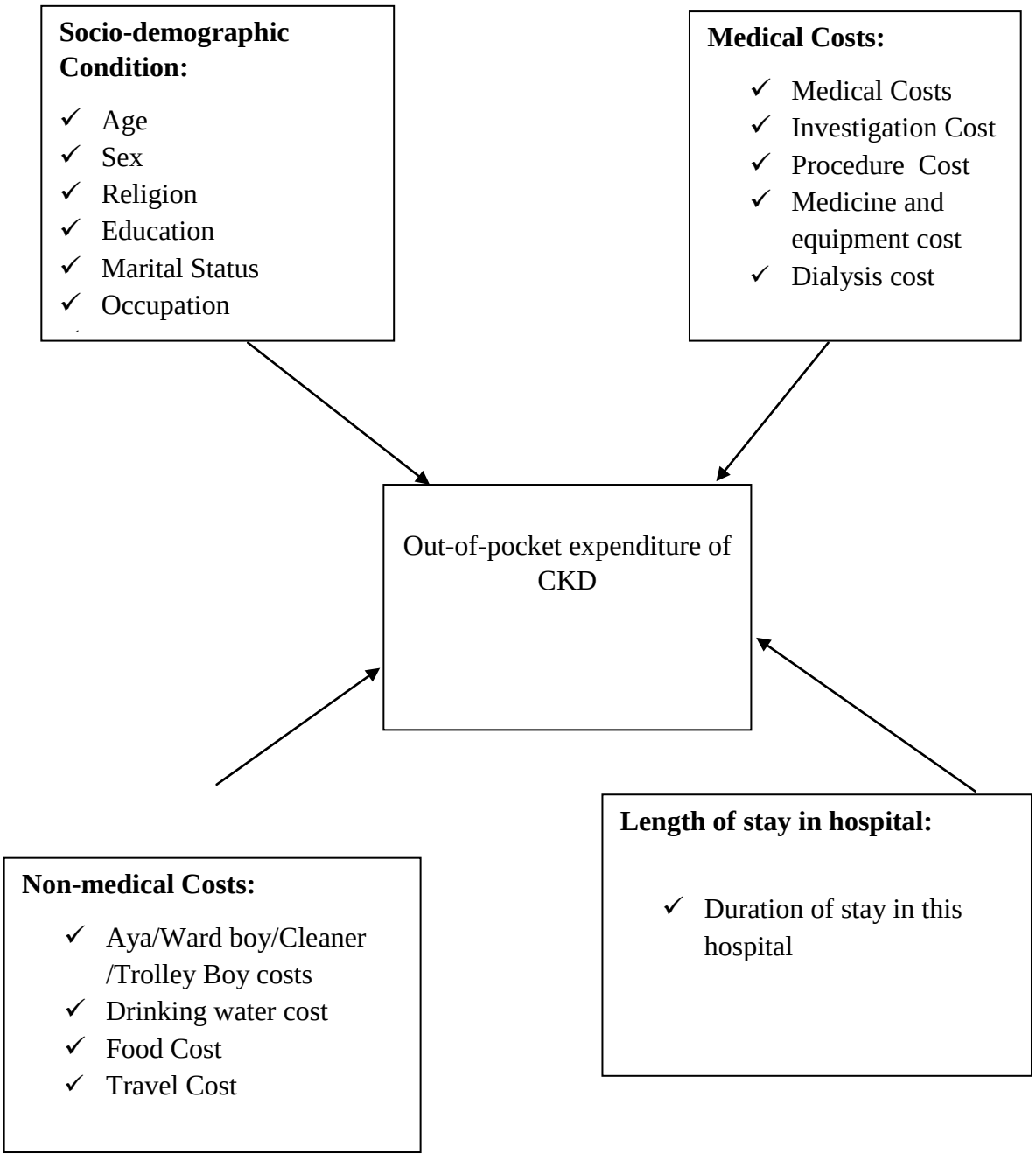
The burden is very high in developing countries of South Asia, Eastern Europe and Latin America. Diabetes mellitus, hypertension, lower socioeconomic status, environmental factors and intrauterine growth retardation are among the predisposing factors for CKD in developing countries in South Asia. Developed nations spend 2-3% of their annual health care budget for the treatment of ESRD, where 0.02-0.03% having CKD of the total population. In the United States, monthly costs of managing CKD is 1250 U.S dollar and more than 3000 U.S dollar is for Diabetes and heart failure. This situation is even worse in developing nations, where ESRD constitute a 'death sentence', because renal replacement therapy is often unaffordable. Near about 1 million people die each year in developing countries. CKD effects all dimension of health like physical effects or co-morbidities, social effects; (low quality of life, decrease productivity, job losses, family pressure and mental disorder (William et al., 2011).

CKD is rapidly growing disease in Bangladesh. The financial impact of CKD is large with renal replacement therapy (RTT) and co-morbidities. It is aspected, detail cost analysis will be helpful for cost effectiveness of treatment of CKD particularly (Marion et al.,2012). Managing the tradeoff between costs and quality in health care in general is a great challenge as well as CKD patient a set of unique challenges, including an increased burden of CKD patient in the world population and the rising expensesassociated with it. In 2011, the Fresenius Medical Care Worldwide network, estimated that roughly 2.1 million patients globally were being treated for ESRD with a 6-7% growth annually. Of course, approximately 2.1 million were undergoing hemodialysis, and around 622000were living with kidney transplants. The prevalence of treated ESRD patients in the general population shows high global variations, ranging from under 100 to over 2000 patients per million

populations. ESRD is highest in Taiwan with around 2850 pmp, closely followed by Japan with around2490 pmp and the US 1970 pmp (Paul et al.,2016). According to the world health report 2002 and global burden of disease project, diseases of the kidney and urinary tract contribute to the global burden of diseases, with approximately 850000 deaths every year and 15010167 disability- adjusted life years. They are the 12th cause of death and 17th cause of disability, respectively.

The aim of this study was to describe the total out-of-pocket expenditure for CKD patients treated in a tertiary level public hospital.

Conceptual Framework:



II. Methodology

Study design: A cross sectional study was conducted
Study population: Patients undergoing dialysis and treatment in nephrology department at DMCH.
Study place: The study was conducted at Dhaka Medical College Hospital (DMCH).
Study period: The study was conducted over one year, from January 2017 to December 2017. The study started with the proposal development and was completed with the submission of the final report. Extensive literature was reviewed from the beginning of the study till report writing. Proposal was approved by the approval committee of National Institute of preventive and Social (NIPSOM) in the month of may. Planning and designing of the study were done in July 2017. In September 2017 data were collected and data was processed and analyzed in the month of November 2017. Finally report was written, printed and submitted in December 2017.
Sampling technique: Convenient purposive sampling method were used in the study.
Sample size: As the sampling technique was purposive, the number of sample was taken purposively 110 (IPD-47 and OPD-63).
To determine the sample size for this study we use the formula,

$$n = \frac{z^2 pq}{d^2}$$

Here, n= the desired sample size which would help to measure the different indicators.
Z= standard normal deviation, usually set as 1.96 which corresponds to 95% confidence.
p=Assumed target proportion to have a particular characteristics.
q = 1-p
d = degree of accuracy level (0.5)
so, $n=\frac{(1.96)^2\times(0.5)\times(0.5)}{(0.05)^2}$
= 384
According to this formula the sample size was 384. But within the define data collection period (2 months), data were collected purposively as 110.
Selection criteria:
Inclusion criteria

- Patients who were diagnosed as CKD for more than three months.
- Willing to participate

Exlusion criteria

- Seriously ill patient
- HbsAg+ve patients

Data collection instrument:
Semistructured questionnaire.
Data collection technique:

- Face to face interview
- Review of expenditure voucher

Data collection procedure:
At first written permission was taken from the local authority of the selected hospital. Then the purpose of the study was described in details to the respondents and data were collected from the sample population through face to face interview with the questionnaire. Question were asked in Bengali. The questionnaire were pretested in National Institute of Kidney Diseases and Urology (NIKDU). Single questionnaire used for each respondent for data collection. Questionnaire was easy understandable to the respondent. Some ethical points were assured to the respondents.
Data processing and analysis:
At the end of data collection all data's were reviewed and checked for any mistakes and then entered into the computer with the help of statistical package for the social science (SPSS) version 20 software. An analysis plan was developed according to the objectives of the study. Frequency distribution was checked for final analysis of the study. Finally descriptive analysis was done for finding the results.
Result presentation:
Result was presented by using table, graph, and statistical inference.
Ethical consideration:
The study was approved by the ethical board of NIPSOM. Before starting collection of data brief description of the study objectives was given to the respondents and given full freedomity to participate or refuse to the study. The respondent were fully assured that there was no invasive procedure and never be disclosed their information. The information only used in study purposes. After completion all the procedure data were collected with their written consent.

Results(OPD)

Table 1: Distribution of the respondent by their age in year

Age category	Frequency	Percent	Statistics
<20 yrs	3	4.8	
20-29 yrs	7	11.1	Maximum age: 70 yrs
30-39 yrs	10	15.9	
40-49 yrs	29	46.0	Minimum age : 17 yrs
50-59 yrs	9	14.3	
>59 yrs	5	7.9	Mean age: 43.98
Total	63	100.0	SD: 11.81

Table shows 46% of the respondent were age in between 40-49 years and 15% of them were in 30-39 years old.

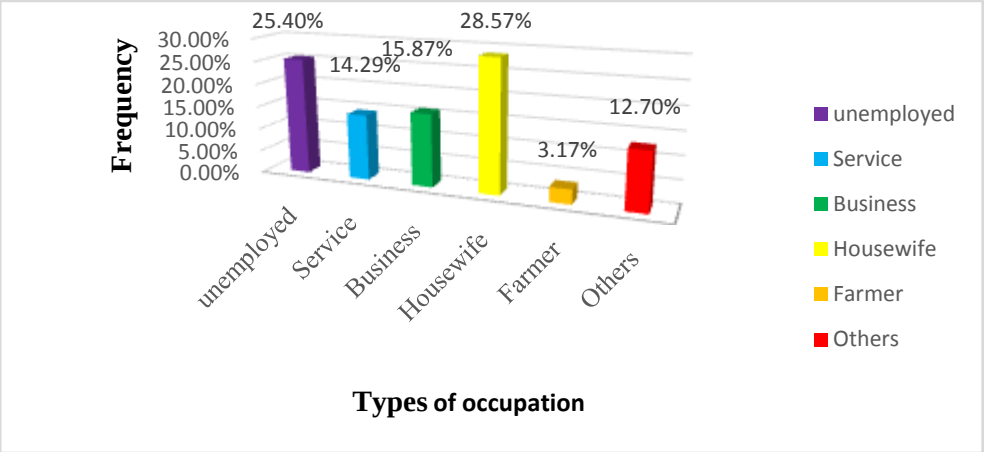


Figure 1: Distribution of the respondents by occupation.

Housewives were 28.5%, 25% were unemployed due to sickness, 15.8% were businessman, 14.2% were service holder and 3.1% were farmer.

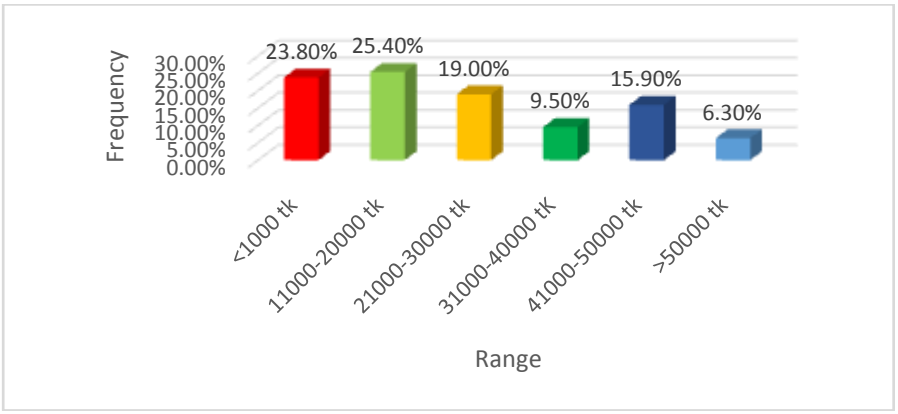


Figure 2: Distribution of the respondents by their average monthly income.

Maximum 25.4%, and minimum 6.3% Tk income.

Table 2: Distribution of the respondents by total expenditure as doctor's fee.

Category	Frequency	Percent	Statistics
<1000 Tk	9	14.3	Maximum: 5000 Tk Minimum: 800 Tk Mean: 1965 Tk
1000-1900 Tk	12	19.0	
2000-2900 Tk	10	15.9	
3000- 3900 Tk	5	7.9	

>3900 Tk	4	6.3	
Not needed	23	36.5	
Total	63	100	

Maximum respondents went to the private doctors chamber and most of them (19%) spent 1000-1900 Tk for doctors fee purpose and only 6.3% spent >3900 Tk. 36% visited to government hospital.

Table 3: Distribution of the respondents by total cost for investigation

Category	Frequency	Percent	Statistics
<10000 Tk	7	11.1	Maximum: 60000 Tk Minimum: 5000 Tk Mean: 24539 Tk
10000 - 19000 Tk	18	28.6	
20000 - 29000 Tk	15	23.8	
30000 - 39000 Tk	15	23.8	
>39000 Tk	8	12.7	
Total	63	100.0	

Above table describes, 28.6% of the respondents expend in 10000-1900 Tk, 23.8% spent in 20000-29000 Tk and 30000-39000 Tk and only 12.7% spent >39000 Tk. Maximum expenditure was 60,000 Tk and minimum was 5,000 Tk.

Table 4: Distribution of the respondent by monthly expenditure for medicine purchasing.

Category	Frequency	Percent	Statistics
<1000 Tk	11	17.5	Maximum: 4000 Tk Minimum: 600 Tk Mean: 1892 Tk
1000- 1900 Tk	21	33.3	
2000- 2900 Tk	23	36.5	
3000-3900 Tk	4	6.3	
>3900 Tk	4	6.3	
Total	63	100.0	

Majority (36.5%) of the respondents spent in between 2000-1900 Tk, and 6.3% spent 3000-3900 Tk and >3900 Tk.

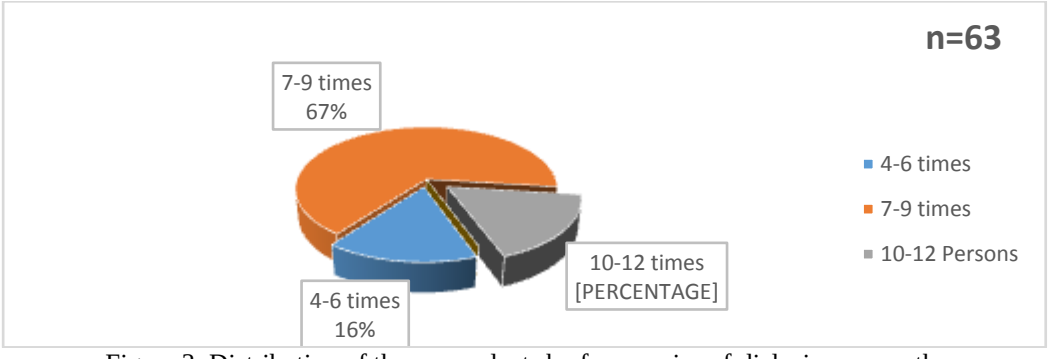


Figure 3: Distribution of the respondents by frequencies of dialysis per month.

Maximum (67%) were in the group of 7-9 times, and only 16% were in 4-6 times group.

Table 5: Distribution of the respondents by total dialysis cost per month.

Category	Frequency	Percent	Statistics
1100-2000 Tk	26	41.3	Maximum: 5000 Tk
2100- 3000 Tk	27	42.9	Minimum: 1100 Tk
3100- 4000 Tk	8	12.7	Mean: 2333 Tk
4100- 5000 Tk	2	3.2	
Total	63	100.0	

Among them 42.9% spent in 2100-3000 Tk, 41.3% spent 1100-2000 Tk, 12.7% spent 3100-4000 Tk and only 3.2% spent 4100-5000 Tk for the purpose of dialysis per month.

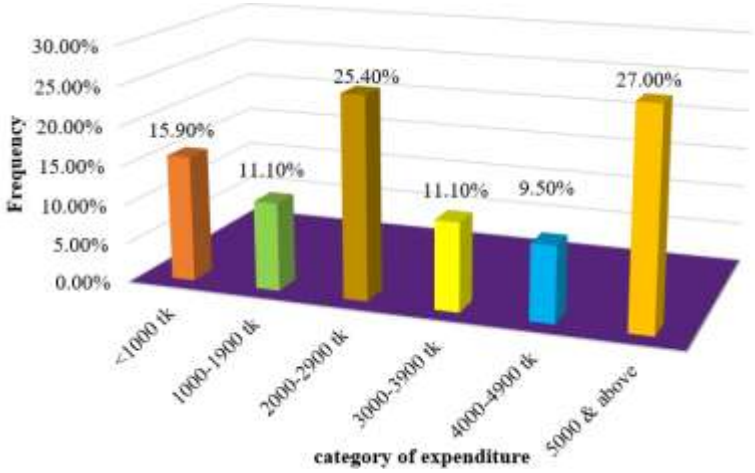


Figure 4: Distribution of transportation cost by the respondents.

Figure shows that 27% of the respondent spent 5000 and above for transport purpose, 25.4% spent in 2000-2900 Tk,15% spent below 1000 Tk and 11.1% spen in 1000-1900 & 3000-3900 Tk for transportation.

Table 6: Distribution of arteriovenous (AV) fistula procedure cost by the respondents.

Category	Frequency	Percentage	Statistics
6000-10000 Tk	6	9.5	Maximum: 22000 Tk Minimum: 6000 Tk Mean: 1488 Tk
11000-15000 Tk	29	46.0	
16000-20000 Tk	27	42.9	
>20000 Tk	1	1.6	
Total	63	100.0	

Table shows 46% of the respondents spent in 11000-15000 Tk, and 1.6% spent above 20000 Tk.

Table 7: Distribution of the respondents by total vaccination cost.

Category	Frequency	Percentage	Statistics
2000-2900 Tk	6	9.5	Maximum: 4500 Tk Minimum: 2000 Tk Mean: 3304 Tk
3000-3900 Tk	5	7.9	
>3900 Tk	11	17.5	

Not needed	41	65.1	
Total	63	100.0	

Majority (17.5%) of the respondents spent above 3900 Tk, 9.5% spent in 2000-2900 Tk, and 7.9% spent in 3000-3900 Tk among the vaccinated (35%) respondents.

Figure 5: Distribution of the respondent by the requirement of monthly investigation.
Among them 63% required monthly investigation and 37% not required investigation.

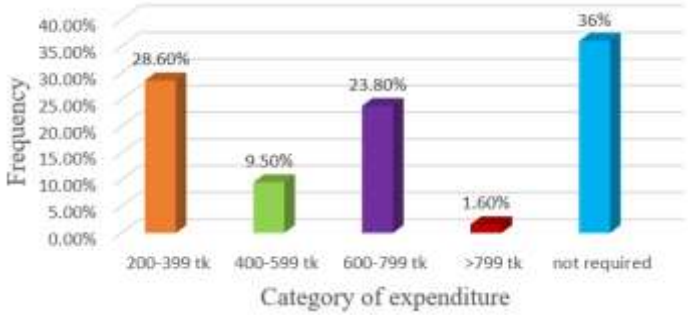


Figure 6: Distribution of respondents' monthly expenditure for investigation purpose.

Among them 28.6% spent 200-399 Tk, 23.8% spent 600-799 Tk, 9.5% spent 400-599 Tk and 1.6% spent above 799 Tk. Per month for investigation purpose. 36% respondents not required investigation.

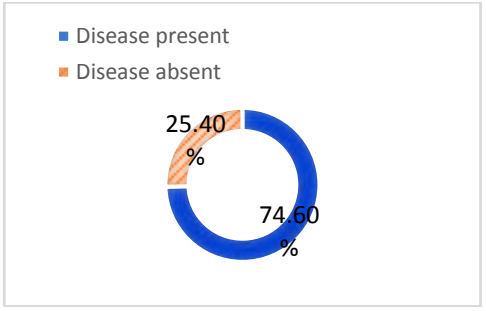


Figure 7: Distribution of the respondent by presence of CKD associated disease

Figure shows, 75% of the respondent had CKD co-morbidity and 25 % had no CKD co-morbidity.

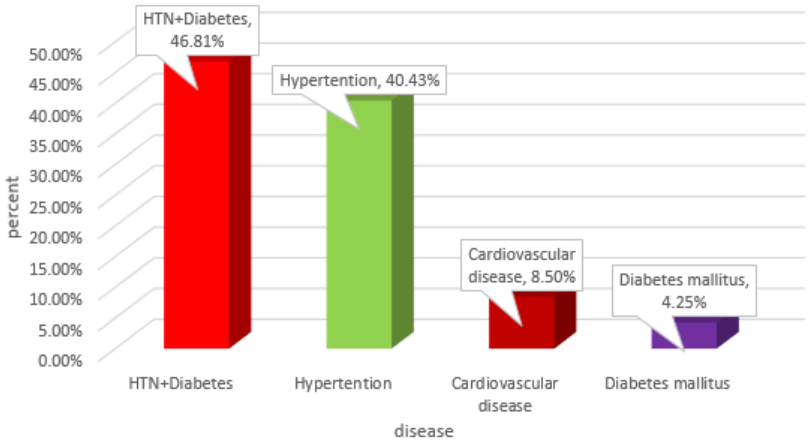


Figure 8: Distribution of the respondent by types of CKD co-morbidities.

Figure shows maximum (46.8%) of the respondent had HTN & DM, 40% had only HTN, 8.5% had cardiovascular disease and only 4.2% had Diabetes mellitus.

Result(IPD)

Category of age	Frequency	Percent	Statistics
21-30 years	8	17.0	
31-40 yrs	14	29.8	Mean age 46.53
41-50 yrs	10	21.3	SD – 15.7
51-60 yrs	4	8.5	
61-70 yrs	7	14.9	
71-80 yrs	4	8.5	
Total	47	100.0	

Table 8: Distribution of the respondent by age.

Table 8 shows that IPD respondents maximum 29.8% were between 31-40 yrs' of age group and 8.5% were 51-60 and 71-80 years group.

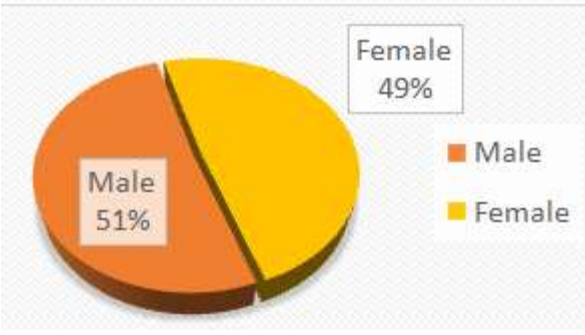


Figure 9: Distribution of the respondent by gender.

Figure 9 represented that 51% male and 49% were female respondents.

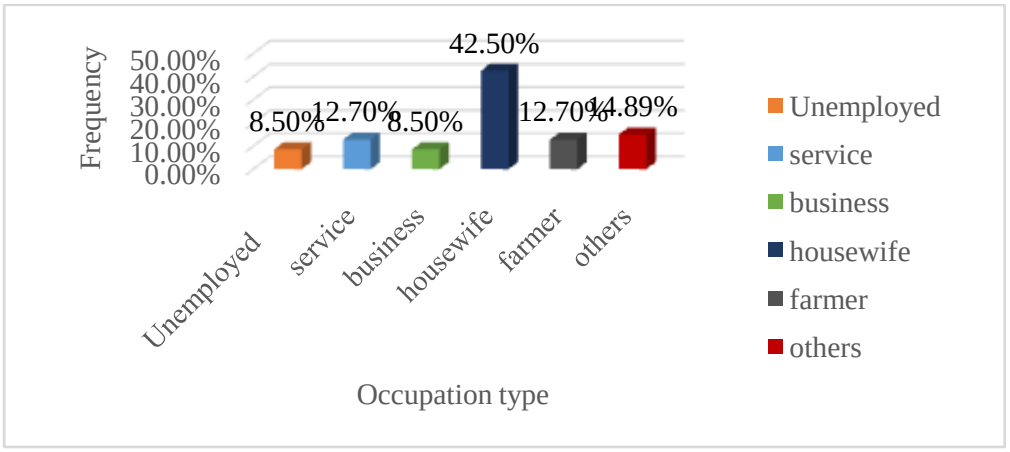


Figure 10: Distribution of the respondent by their occupation.

Figure 10 showed that Majority 42.5%were housewives, 12.7% were farmer and service holder, 8.5% were unemployed and businessman and 14.8% were other occupations of the respondents.

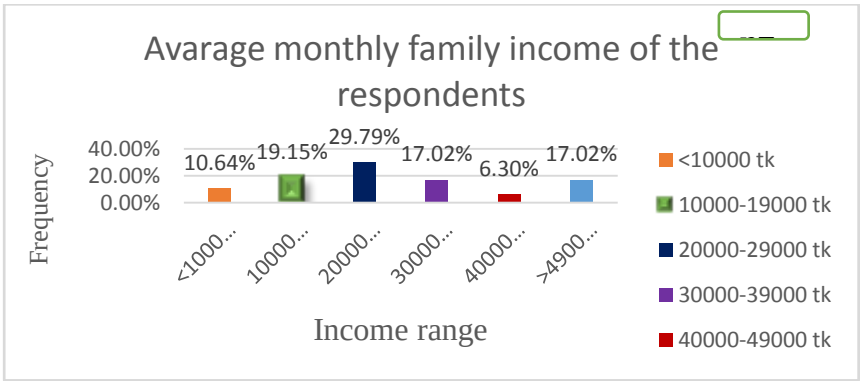


Figure 11: Distribution of the respondents by average monthly income of the family.

Figure 11 shows that Maximum 29.7% family income were in between 20000-29000 Tk and only 6.3% were in between 40000-49000 Tk.

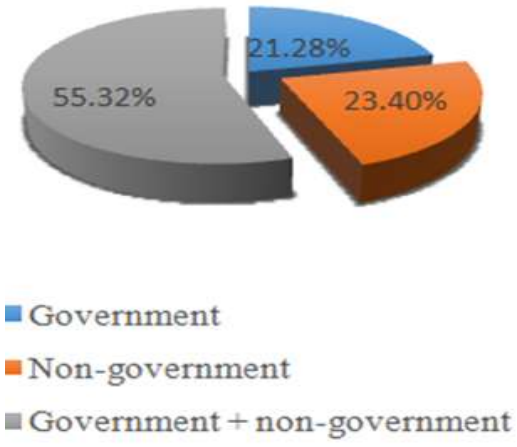


Figure 12: Distribution of the respondent by the place of investigation done.

Maximum 55.32% investigation done in government + non-government institution and minimum (21.28%) were done in non-government or private institutions shows Figure 5.

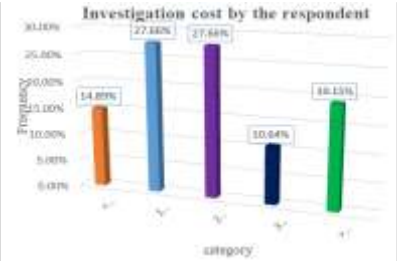


Figure 13: Distribution of the respondents by their investigation cost.

According to Figure 6 about 27.6% spent in between 10000-19000 Tk and 20000-29000 Tk, 19.1% spent more than 39000 Tk,14.8% of them spent <10000 Tk and 10.6% spent between 30000-39000 Tk for investigation purpose.

Table 9: Distribution of the respondents by medicine purchasing cost during hospital stay.

Category	Frequency	Percent	Statistics
<1000 Tk	17	36.2	Maximum: 5000 Tk Minimum: 500 Tk Mean: 1995 Tk
1000-1900 Tk	7	14.9	
2000-2900 Tk	9	19.1	
3000-3900 Tk	7	14.9	
>3900 Tk	7	14.9	
Total	47	100.0	

Among them 36.2% of the respondents spent <1000 Tk, 19.1% spent between 2000-2900 Tk and 14.9% spent between 1000-1900 Tk,3000-3900 Tk and more than 3900 Tk for medicine purchase during the period of hospital stay.

Figure14: Distribution of the respondents by the requirements of dialysis during hospitalization.
Figure14 shows that 79% required dialysis and 21% not required dialysis during hospital staying.

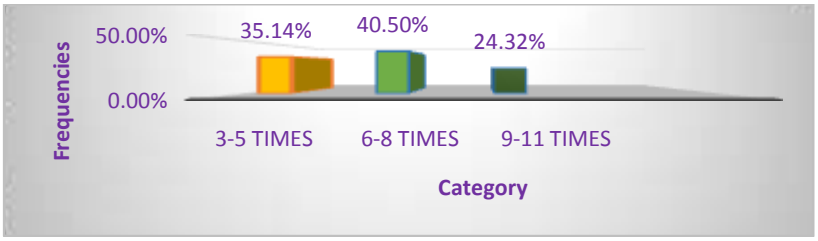


Figure 15: Distribution of the respondents by frequencies of the dialysis during treated in the hospital.
Figure 15 showed that 40.50% respondents required 3-5 times, 35.14 % required 6-8 times and 24.32% required 9-11 times dialysis during the period of hospital stay.

Table 10: Distribution of the respondents by dialysis charge at first time.

Category	Frequency	Percent	Statistics
400-600 Taka	3	6.4	Maximum: 1200 Tk Minimum: 400Tk Mean:870 Tk
700-900 Taka	33	70.2	
1000-1200 Taka	1	2.1	
Dialysis not required	10	21.3	
Total	47	100.0	

This table divided into three category where, maximum 70.2% spent in between 700-900 Taka and very few 2.1% spent between 1000-1200 Taka. 21% of the respondents were dialysis not required.

Table 11: Distribution of the respondents by medicine and equipment purchasing cost for dialysis at first time.

Category	Frequency	Percent	Statistics
1000-1900 Taka	4	8.5	
2000-2900 Taka	0	0	Mean: 4394 Tk
3000-3900 Taka	2	4.3	Maximum:5500 Tk
4000-4900 Taka	11	23.4	Minimum: 1200 Tk
5000-5900 Taka	20	42.6	
Dialysis not needed	10	21.3	
Total	47	100.0	

This table shows 42.6% spent in the range of 5000-5900 Tk, 23.4% in the range of 4000-4900 Tk, 8.5% in the 1000-1900 Tk and only 4,3% spent 3000-3900 Tk for the purpose of medicine and equipment purchase for dialysis.

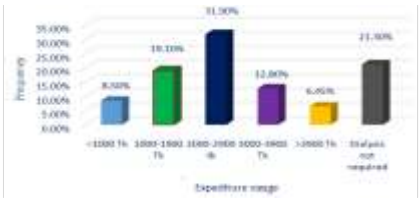


Figure 16: Distribution of the respondents by total medicine purchasing cost for all cycle of dialysis.

Among the Figure 16 31.9% spent in the range of 2000-2900 Tk, 19.1% in 1000-1900 Tk, 12.8% spent in 3000-3900 Tk, 8.5% in <1000 Tk and 6.4% spent more than 3900 Tk. 21% were not dialysis required.

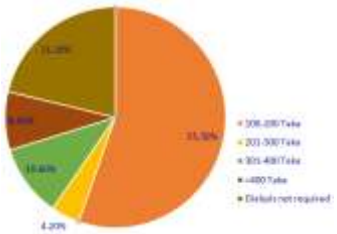


Figure 17: Distribution of the respondents by other expenditure for dialysis.

Among them maximum (55.3%) spent 100-200 Tk and only 4.3% spent in 201-300 Tk. Twenty one percent of the respondents not required dialysis.

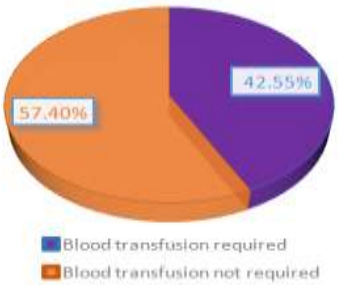


Figure 18: Distribution of the respondents by requirement of blood transfusion during hospital stay.
Blood transfusion required for 42.5% and 57.4% not required of the respondents.

Table 12: Distribution of the respondent by their total expenditure for blood transfusion.

Category of cost	Frequency	Percent	Statistics
<1000 Taka	10	21.3	Mean: 1462 Tk
1000-1900 Taka	4	8.5	Maximum: 5000 Tk
>1900 Taka	6	12.8	Minimum: 500 Tk
BT not required	20	57.4	
Total	47	100.0	

Table 12 shows 21.3% respondents spent <1000 Tk,12.8% spent in >1900 Tk and 8.5% in 100-1900 Tk for blood transfusion purpose. Blood transfusion not required for 57.4% respondents.

Table 13: Distribution of the respondents byaverage duration of hospital stay.

Category	Frequency	Percent	Statistics
<10 days	10	21.3	
10-19 days	21	44.7	
20-29 days	14	29.9	Maximum : 45 days
>29 days	2	4.3	Minimum : 8 days
Total	47	100	

Table 13 shows 44.5% of the total respondentwas in 10-19 days, 29.9% was in 20-29 days, 21.3% was in <10 days and only 4.3% were >29 days stay in the hospital. They were maximum 45 days and minimum 8 days admitted in the hospital.

Table 14: Distribution of the respondents by their expenditure for the purpose of bed rent.

Category	Frequency	Percent	Statics
<3000 Taka	2	4.3	
3000-3900 Taka	0	0	Mean: 4035 Tk
4000-4900 Taka	1	2.1	Maximum:5500 Tk
>4900 Taka	2	4.3	Minimum: 2200 Tk
Not needed	42	89.4	
Total	47	100.0	

Among the respondents 4.3% spent >3000 tk and >4900 tk and 2.1% were in 4000-4900 tk. Maximum (89.4%) respondents were stay in free bed.

Table 15: Distribution of the respondents by their transportation cost.

Category	Frequency	Percent	Statistics
500-1500 Tk	9	19.1	Mean: 3155.32Tk
1600-3000 Tk	21	44.7	Maximum: 10000Tk
3100-4500 Tk	6	12.8	Minimum: 500 Tk
4600-6000 Tk	9	19.1	
>6000 Tk	2	4.3	
Total	47	100	

Table shows that, among the respondents maximum (44.7%) spent in the group of 1600-3000 Tk and only 4.3% of them expend >6000 Tk for transport purpose.

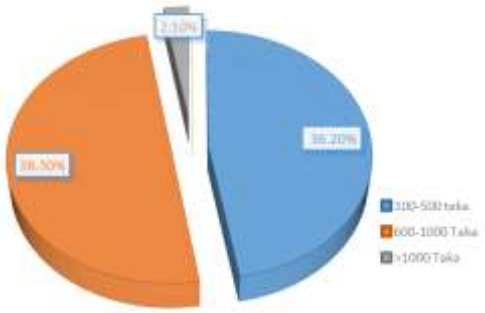


Figure 19: Distribution of the respondents by their expenditure for support services.

Figure 19 showed that 38%, 600-1000 Tk, 36%, 100-500 Tk and only2% spent>1000 for this purpose.

Table 16:Distribution of the respondents by food purchasing expenditure.

Category	Frequency	Percent	Statistics
100-1000 tk	4	8.5	Mean: 3415 Tk
1100-2000 tk	3	6.4	Maximum: 5000 Tk
2100-3000 tk	8	17.0	Minimum: 200 Tk
3100-4000 tk	3	6.4	
4100-5000 tk	7	14.9	
Hospital or home supply	22	46.8	
Total	47	100	

About 46% of the respondents bearing food from their house and hospital. 17% expend in the range of 2100-3000 Tk, 8.5% spent in 100-1000 Tk and 6.4 % spent in 1100-2000 Tk and 3100-4000 Tk

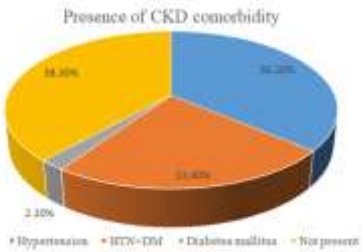


Figure200: Distribution of the respondents by presence of CKD comorbidity.

Among them 62% had CKD comorbidity. Maximum (36.2%) had hypertension,23.4% had both hypertension and diabetes mellitus and only 2.1% had diabetes mellitus.

III. Discussion

This cross sectional study was carried out in Department of Nephrology in Dhaka Medical College Hospital. The study was carried out over one year from January 2017 to December 2017. This study was carried out with the aim of estimating out-of-pocket expenditure by the respondent for the treatment of CKD. A total of 110 respondent was included in this study, 47 were admitted patients and 63 were ambulatory care patient. Significant findings of the study is describing as table and graph.

To assess the out-of-pocket expenditure of CKD patients, some criteria was selected which were helped me to estimate the expenditure. Selected criteria were socio-demographic condition, family members, average monthly income, some variable related to direct and indirect medical cost.

The study shows maximum age was 23 and 17 yrs, mean age was 46.5 and 43.9 yr among the IPD respondents 29.1% was in the age group 31-40 yrs, and among the OPD respondents 46% of the respondent were age in between 40-49 years and 15% of them were in 30-39 years old. In another study shows average age of the respondent were 65.5 yrs (Christina et al.,2017). In stage 4 and stage 5 and they had a median age of 58.9 yrs and 60.8 yrs (Giuseppe et al.,2016).

Study showed 92.1 % and 91% were Muslim among the IPD and OPD respondents respectively and 7.9 % and 9% was Hindu of the total respondent. Among them 83% and 81% were married, maximum of them were illiterate, maximum (42.5% &28.5%) occupation category were housewife in both IPD and OPD respondents.

Maximum (46.8%&41.3%)ofthetotalrespondentswerein3-5personsgroup.Averagemonthly income of them was 27021 Taka & 27666 Takarespecctively.

In a similar study shows most cases, caregivers were workers (77, 41.6 % and 54, 38.6 %) followed by retirees (62, 33.5 % and 49, 35.0 %) and housewives (32, 17.3 % and 27, 19.3 %), respectively, for patients in stages 4 and 5 (Giuseppe et al.,2016).

Current study shows that the total direct and indirect expenditure per month for ambulatorycarepatientsandaveragetotaldirectandindirectexpenditureperadmission cycle for admitted patient. Among the admitted respondent, their average direct expenditurewere39,503Takaandindirectexpenditurewere7,526Takaperadmissioncycle.Ontheotherwayamongthea mbulatoryrespondentstheirdirectexpenditurewas 50,149 Taka where the indirect cost was 6,286 Taka permonth.

Based on the average yearly estimate, unadjusted and adjusted total direct medical expenditures for CKD were approximately $24.6 billion and $10.7 billion/year, while OKD were approximately $48.1 billion and $18.2 billion/year in the US population. (Mukoso et al.,2017)

Manydevelopednationsspend2-3%oftheirannualhealthcarebudgetforthetreatment of ESRD, where 0.02-0.03% having CKD of the total population. In the United States, monthly costs of managing CKD is 1250 U.S dollar and more than 3000 U.S dollar is for Diabetes and heart failure. (William et al.,2011).

The annual mean total healthcare expenditures was $12,877 (Christina et al.,2017), for CKD stage 4 and €1058.4 (Giuseppe et al.,2016)

Medicine cost for admitted and ambulatory care patients were 6,569 Taka and 1,892 Taka respectively. Investigation for diagnosis for admitted and ambulatory care were 24,232 Taka and 24,539 Taka respectively. The ambulatory care patient spent average 455 Taka for investigation per month. about 28.6% of the respondents spent in 10000- 19000 Tk, 23.8% were in 20000-29000 Tk and 30000-39000 Tk and only 12.7%spent

>39000 Tk for investigation purpose.Maximum expenditure were 60000 Tk and minimum were 5000 Tk for investigation purpose (tableOPD-5).

The annual antihypertensive medication cost is estimated £152 million, prescribing of vitamin 'D' supplements, erythropoietin, erythropoiesis stimulating agents and phosphate binder was estimated £27 million (Marion etal.,2012).

Average dialysis expenditure per month for ambulatory care patients were 2,333 Taka and 3,178 Taka for admitted patients per admission cycle. Ambulatory patients spent 3,333 Taka for dialysis package charge per month.

Another study shows, annual dialysis cost per patient were £24043 (Marion et al.,2012).

The respondents were spent for blood transfusion 1,462 Taka (IPD) and 744 Taka (ambulatory) on an average.

Thehospitalcostsforthetreatmentofabloodstreaminfectionwereestimatedat£5397 (Marion etal.,2012).

Study shows that, maximum (64%) respondents went to the private chamber and 36% went to the government hospital and most of them (19%) spend 1000-1900 Tk for doctors fee purpose and only 6.3% were spend >3900 Tk. And 36% visited to gov. hospital.

Others similar study describes, Patients diagnosed with CKD received the highest percentage of consultations by a specialist 77% (Alejandro et al.,2016). Another study shows,therewere679538nephrologyoutpatientconsultationsinEnglandin2009–10, at a total cost of £106 million (Marion etal.,2012).

The total expenditure on primary care tests and consultation for CKD is estimated at £143 million. the cost of outpatient consultations for Stages 3–5 CKD, excluding RRT patients, is estimated at £53 million (Marion et al.,2012).

Tableshows44.5%ofthetotalrespondentwasin10-19days,29.9%wasin20-29days, 21.3% was in <10 days and only 4.3% were >29 days stay in the hospital. They were maximum 45 days and minimum 8 days admitted in thehospital.

Themedianlengthofstaywas3days,forwhich88%ofbed-dayswerespentingeneral ward and 12% in ICU (Alejandro etal.,2016).

Study shows, about 46% of the respondents spent in 11000-15000 Tk, 42% were in 16000-20000 Tk and only 1.6% spent above 20000 Tk for arteriovenous fistula. 100% oftherespondentweredonefistulainprivate.TominimizetheAVfistulacostfacilities by public hospital is very essential. There is no similar study wasfound.

Average transportation expenditure was accounted as, 3,155 Taka and 2,982 Taka for admitted and ambulatory care patient respectively.

Similar study result were estimated, NHS-funded transport was provided for 61% of patient journeys in England for hospital and satellite HD. Costs of £50 million have beenestimatedforthejourney,usingtheaveragetransportcostforapatientattendance from NHS Reference Costs

2009–10 (Marion et al.,2012). About 7.9 % and 6.8 % patientswithCKDinstages4and5usedhealthtransportssuchasambulancesorsocial welfare transports for going to the Center without paying money, whileprivate

transport were used for 94.9 % and 182 (96.3 %) patients and public transports for
5.1 % and 3.2 % patients in stages 4 and 5respectively

Among the IPD respondents 62% had CKD comorbidity. Maximum (36.2%) had hypertension, 23.4% had both hypertension and diabetes mellitus and only 2.1% had diabetes mellitus. Amon the OPD respondents 75% of the respondent had CKD co- morbidity and 25 % had no CKD co-morbidity among the OPD respondents and 62% had CO-morbidities among the IPD respondent. (Figure IPD-15 & OPD-13)
Maximum (46.8%) of the respondent had HTN & DM, 40% had only HTN, 8.5% had cardiovascular disease and only 4.2% had Diabetes mellitus (Fig.OPD-14).
Another study shows the group with CKD had the highest prevalence of high cholesterol (85.0%), high blood pressure (87.8%) and diabetes 49.6% (Christina et al.,2017).89% of the CKD diagnosed patients had Hypertension (Marion et al.,2012).
Average expenditure for patients with co-morbid conditions ($95,749) was significantly higher than those without co-morbid conditions ($36,360) (Paul et al.,2016).
About46%oftherespondentsbearingfoodfromtheirhouseandhospital.17%expend in the range of 2100-3000 Tk, 8.5% spent in 100-1000 Tk and 6.4 % spent in 1100- 2000 Tk and 3100-4000 Tk for food purchase average food purchasing cost was 3,415 Taka.
A similar study shows, unadjusted mean social annual cost was per patient by cost component and by CKD stages 4 and 5 average €161(Euro) was spent for fooding purpose in Italy (Guissepee at al.,2016).
This study shows maximum respondents were female among ambulatory patients and maximum respondents were male in admitted patients because dissimilarity between bed distribution in the inpatient department where male bed is more in number than female bed.
Among them 35% of the respondents were HBSAg vaccinated, and 65% were not vaccinated, average vaccination cost calculated as 3,304 Taka. About 63% required monthly investigation and 37% were not required monthly investigation. Among them
28.6% spent 200-399 Tk, 23.8% spent 600-799 Tk, 9.5% spent 400-599 Tk and 1.6% spent above 799 Tk. 36% respondents not required investigation.
Maximum (89%) of the respondent were admitted in non-paying bed, so the bed rent was affordable for them. Mean expenditure for bed rent was 4,035 Taka.
According to the above discussion, maximum expenditure was for investigation purpose.Ifallinvestigationfacilitiesgivenbythegovernmenthospital,thecostwillbe minimized. Over all study shows the total out-of-pocket expenditure is very high in relation to their average monthly income. Here, average monthly family income was 27021Taka&27666Takaforadmittedandambulatorycarepatientsrespectively,and totalout-of-pocketexpenditurewas56,435Tkpermonthforambulatorycarepatients. On the other hand total out-of-pocket expenditure was 47029 Tk for admittedpatients

IV. Conclusion

Current study shows that, Chronic Kidney Disease (CKD) a major public health problem. Hemodialysis is the ultimate treatment of CKD in developing country like Bangladesh. The financial impact of CKD is large, with particularly high cost relating to dialysis and co-morbidities. Managing CKD patients with dialysis, treatment and managing co-morbid conditions in individuals with CKD are potential sources of increasing cost in the care of CKD patients. Out-of-Pocket expenditure for CKD treatment is very high in relation to their average monthly family income

V. Recommendation

Followingrecommendationcanbeenlistaspercurrentstudyresultregarding CKDand its out-of-pocketexpenditure:

- Universal health coverage may reduce the expenditureburden.
- Health insurance may reduce out-of-pocketexpenditure.
- Bangladeshgovernmentwouldworktoexpandthefacilitiesatthedistrictlevel.
- Arteriovenous fistula should done in public institution for free ofcost.
- Ambulatory care service facility should increase to minimize the hospitalstay.
- Investigation facilities should ensure free ofcost.

Acknowledgement

All praises to the Almighty Allah for enabling me to carry out the work of this research successfully. I thankful to the director of DMCH for give me permission to conduct the study in this hospital. My special thanks to doctors, nurses and supporting staff and specially the patients of Dhaka Medical College Hospital who cooperated with me in providing necessary information for the study during data collection period. I would like

to thanks to all of my family members and fellow course mates for their cooperation and support during the completion of this research work.

References

[1]. Abraham, G., Varughese, S., Thandavan, T., Iyengar, A., Fernando, E., Naqvi, S.A., Sheriff, R., Ur-Rashid, H., Gopalakrishnan, N. and Kafle, R.K., 2016. Chronic kidney disease hotspots in developing countries in South Asia. *Clinical kidney journal*, *9*(1), pp.135-141.

[2]. Bellelli, S. and Turchetti, G., 2014. The social cost of chronic kidney disease in Italy. *Value in Health*, *17*(3),p.A292.

[3]. Coresh, J., Astor, B.C., Greene, T., Eknoyan, G. and Levey, A.S., 2003. Prevalence of chronickidneydiseaseanddecreasedkidneyfunctionintheadult US population:Third National Health and Nutrition Examination Survey. *American journal of kidney diseases*, *41*(1),pp.1-12.

[4]. Couser, W.G., Remuzzi, G., Mendis, S. and Tonelli, M., 2011. The contribution of chronic kidney disease to the global burden of major noncommunicable diseases. *Kidney international*, *80*(12),pp.1258-1270.

[5]. Damien,P.,Lanham,H.J.,Parthasarathy,M.andShah,N.L.,2016.Assessingkeycost driversassociatedwithcaringforchronickidneydiseasepatients.*BMChealthservices research*, *16*(1),p.690.

[6]. Essue, B.M., Wong, G., Chapman, J., Li, Q. and Jan, S., 2013. How are patients managing with the costs of care for chronic kidney disease in Australia? A cross- sectional study. *BMC nephrology*, *14*(1), p.5.

[7]. Hamer,R.A.andElNahas,A.M.,2006.Theburdenofchronickidneydisease:isrising rapidly worldwide. *BMJ: British Medical Journal*, *332*(7541),p.563.

[8]. Honeycutt,A.A.,Segel,J.E.,Zhuo,X.,Hoerger,T.J.,Imai,K.andWilliams,D.,2013. Medical costs of CKD in the Medicare population. *Journal of the American Society of Nephrology*, *24*(9),pp.1478-1483.

[9]. INTERNATINAL FEDERATION OF DIABETIES: Facts and figures. Available at http://www.idf.org/home/index.cfm?unode=C6549496D-8756- 45CO-677G6.

[10]. INTERNATIONAL FRDERATION OF REAL REGISTRIES: available athttp://www.ifrr.net/.

[11]. Jha, V., Garcia-Garcia, G., Iseki, K., Li, Z., Naicker, S., Plattner, B., Saran, R., Wang,

[12]. A.Y.M. and Yang, C.W., 2013. Chronic kidney disease: global dimension and perspectives.*The Lancet*, *382*(9888), pp.260-272.

[13]. Kerr, M., Bray, B., Medcalf, J., O'donoghue, D.J. and Matthews, B., 2012. Estimating the financial cost of chronic kidney disease to the NHS in England. *Nephrology Dialysis Transplantation*, *27*(suppl_3), pp.iii73-iii80.

[14]. Levey, A.S., Coresh, J., Balk, E., Kausz, A.T., Levin, A., Steffes, M.W., Hogg, R.J., Perrone, R.D., Lau, J. and Eknoyan, G., 2003. National Kidney Foundation practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Annals of internal medicine*, *139*(2), pp.137-147.

[15]. Meraya AM, Raval AD, Sambamoorthi U. Chronic Condition Combinations and HealthCareExpendituresandOut-of-PocketSpendingBurdenAmongAdults,Medical Expenditure Panel Survey, 2009 and 2011. Prev Chronic Dis2015;12:140388.

[16]. Ozieh, M.N., Bishu, K.G., Dismuke, C.E. and Egede, L.E., 2017. Trends in healthcare expenditure in United States adults with chronic kidney disease: 2002–2011. *BMC health services research*, *17*(1).

[17]. Schieppati, A. and Remuzzi, G., 2005. Chronic renal diseases as a public health problem: epidemiology, social, and economic implications. *Kidney International*, *68*.

[18]. Small, C., Kramer, H.J., Griffin, K.A., Vellanki, K., Leehey, D.J., Bansal, V.K. and Markossian, T.W., 2017. Non-dialysis dependent chronic kidney disease is associated with high total and out-of-pocket healthcare expenditures. *BMC nephrology*, *18*(1).

[19]. Tolla, M.T., Norheim, O.F., Verguet, S., Bekele, A., Amenu, K., Abdisa, S.G. and Johansson, K.A., 2017. Out-of-pocket expenditures for prevention and treatment ofcardiovascular disease in general and specialised cardiac hospitals in Addis Ababa, Ethiopia: a cross-sectional cohort study. *BMJ Global Health*, *2*(2), p.e000280.

[20]. Tsukamoto,Y.,Wang,H.,Becker,G.,Chen,H.C.,Han,D.S.,Harris,D.,Imai,E.,Jha, V., Li, P.K., Lee, E.J. and Matsuo, S., 2009. Report of the Asian Forum of Chronic Kidney Disease Initiative (AFCKDI) 2007."Current status and perspective of CKD in Asia": diversity and specificity among Asian countries. *Clinical and experimental nephrology*, *13*(3),pp.249-256.

[21]. Turchetti, G., Bellelli, S., Amato, M., Bianchi, S., Conti, P., Cupisti, A., Panichi, V., Rosati, A., Pizzarelli, F. and Tuscany CKD Study Group, 2017. The social cost of chronic kidney disease in Italy. *The European Journal of Health Economics*, *18*(7), pp.847-858.

[22]. WorldHealthOrganization.GlobalDiseaseBurden,Estimatesof20002012.Available from:http://www.who.int/healthinfo/global_ burden_disease/

[23]. estimates/en/index1.html. [Last cited on 2014 May20].

[24]. Zimmet,P.,Alberti,K.G.M.M.andShaw,J.,2001.Globalandsocietalimplicationsof the diabetes epidemic. *Nature*, *414*(6865),pp.782-787.