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CLINICO-EPIDEMIOLOGICAL PROFILE OF HAEMODIALYSIS PATIENTS IN A TEACHING HOSPITAL IN NORTH EASTERN INDIA

General Medicine

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ABSTRACT

Background: India, already the diabetic capital, heading towards same distinction with hypertension and with increase in aging population, all directly related to chronic kidney disease (CKD); CKD has become a hidden epidemic and a major public health problem both in terms of patient number and treatment cost.

Objectives: Study was done to delineate clinico-epidemiological and laboratory profile of patients on haemodialysis in northeast India.

Methods: This is a cross sectional study carried out in a teaching hospital, Sikkim. 50 patients of end stage renal disease on haemodialysis were interviewed using questionnaire.

Results: Majority of patients were men of Nepali ethnicity in the age group of 40-59 years, ex-employed, educated. Hypertension and diabetes mellitus were the commonest associated diseases. 58% of the patients underwent haemodialysis within one month of being diagnosed with CKD. Mean laboratory values were creatinine - 8.2 mg/dl, urea – 120 mg/dl, sodium – 137 mmol/l and potassium - 4.7 mmol/dl. Majority had low levels of haemoglobin, calcium, albumin & high levels of phosphate, triglyceride, parathyroid hormone, uric acid. Majority had received blood transfusion while on haemodialysis, with most common blood group being A+. Most common indication for initiation of dialysis was fluid overload with uremic symptoms. Majority were aware but not on renal transplant waiting list. Most common symptoms while on haemodialysis where muscle cramps, dizziness, fatigue.

Conclusion: Easily accessible and affordable dialysis facility along with increase in renal transplantation can cut the cost of treatment and improve quality of life in ESRD patients.

KEYWORDS

Clinico-epidemiological, Laboratory, CKD, Haemodialysis.

Introduction

Chronic Kidney Disease (CKD) refers to an irreversible deterioration in renal function. For operational purposes, CKD is defined as the presence, for at least three months, of evidence of kidney damage with an abnormal glomerular filtration rate (GFR) or, alternatively, by a GFR below 60ml/min/1.73 m^2 body surface area. A cut off of 60ml/min/1.73 m^2 body surface area is selected because it represents a decrement to approximately half of normal renal function and because its use avoids the classification of many older individuals who may have mild reductions in their GFR. [1]

CKD a major epidemic of this century, has become a major public health problem both in terms of patient number and treatment cost, with most patients either referred to one of many renal replacement therapies such as haemodialysis, peritoneal dialysis and renal transplantation or death supervenes as a result of cardiovascular disease.

India, which is the diabetic capital of the world, now heading towards the same in hypertension, and with increasing life expectancy of the population, CKD needs to be considered in their management, as all are directly related to it. [2] In India the incidence rate of end-stage renal disease (ESRD) is 232 per million population and with an annual growth of 10-20% of the dialysis population.

Thus, study was carried out to delineate the clinical and epidemiological profile of patients on haemodialysis seen in this region.

Methods

A hospital based cross sectional study was carried out in the department of General Medicine, at a teaching hospital in Sikkim after taking approval from the institutional ethical committee. A total of 50 CKD patients undergoing haemodialysis who gave written informed consent were recruited. Data was collected by direct interview and from the medical records of the patient using a predesigned, pretested proforma meeting the objectives of the study. Data was analysed using IBM-SPSS statistics version 22 software.

Aetiology was established as follows. Diabetic nephropathy by existence of diabetes mellitus, along with proteinuria and diabetic retinopathy in the absence of any other cause of CKD. Hypertensive nephrosclerosis if the patient had primary hypertension for more than 5 years before the beginning of renal failure in the absence of any other CKD. Chronic glomerulonephritis if proven by a renal biopsy or history of chronic oedema and/or proteinuria.

Results

A total of 50 CKD patients undergoing haemodialysis at a teaching hospital in East Sikkim, were included in the study. A majority (54%) of these patients were between the age of 40 to 60 years with the mean age of 50 ± 12. Among these 33 were male and 17 were female with most being of Nepali ethnicity (54%), Hindu (52%) and married (76%). Most of the patients belonged to East Sikkim (62%) and communicated to the dialysis centre in public transport (60%). Majority had done there middle schooling (56%), with most being ex-employed (44%) with a monthly income of most being >20,000 (42%) and on reimbursement (64%) especially from the Government as source of fund for their health care cost (Table 1).

TABLE 1: PATIENT DISTRIBUTION ACCORDING TO SOCIODEMOGRAPHIC VARIABLES

Variables	Percentage of patients
Age ranges	
<18 years	2%
18-29 years	12%
30-39 years	22%
40-49 years	28%
50-59 years	26%
60-69 years	8%
> 70 years	2%
Sex	
Male	66%
Female	34%

Religion	
Hindu	52%
Buddhist	30%
Others	18%
Ethnicity	
Nepali	54%
Bhutia	16%
Others	30%
Occupation	
Employed	36%
Ex-Employed	44%
Unemployed	20%
Education	
Illiterate	8%
Primary school	14%
Middle school	56%
Higher education	22%
Marital status	
Single/Divorced	24%
Married	76%
Address	
East Sikkim	62%
Other part of Sikkim	36%
Outside Sikkim	2%
Monthly Income	
< 5,000	26%
5,000-20,000	32%
> 20,000	42%

Most had history of addiction to alcohol (48%) and tobacco (36%) and did not have any family history of any kidney disease (76%). Hypertensive nephrosclerosis (32%) and diabetic nephropathy (30%) were the most common aetiology. Most patients had spent less than one month on conservative care (58%) with biopsy done on only 14% of the patients. Temporary central venous catheter was the mode of vascular access in all the patients for their first haemodialysis. Majority were aware about renal transplantation but were not on any waiting list for the same (56%), with 42% of the patients having no perspectives of renal transplantation with 84% having no likely kidney donors (Table2).

TABLE 2: ETIOLOGY OF ESRD; ACCESS TO HEALTH CARE SERVICES; NEPHROLOGY FOLLOW-UP BEFORE HD; PATIENT AWARENESS OVER CKD; ADDICTIONS

Characteristics	Percentage of patients
Aetiology	
Hypertensive nephrosclerosis	32%
Diabetic nephropathy	30%
Chronic glomerulonephritis	14%
Unknown	18%
Others	6%
Commute to HD centre	
Own vehicle	40%
Public transportation	60%
Source of funding	
Self	36%
Reimbursement	64%
Time spent on conservative care	
< 1 month	58%
1-6 month	22%
6 months-1 year	6%
> 1 year	14%
Kidney biopsy	
Yes	14%
No	86%
Vascular access used on 1st HD session	
Temporary central venous catheter	100%
Permanent access	0%
Perspectives on kidney transplantation	
None	42%
Aware - not on kidney waiting list	56%
Aware - on kidney waiting list	2%
Likely kidney donors	
None	84%
Yes - family members	8%
Yes - non-family donors	8%
Family history of CKD	
No	76%
Yes	24%
Addiction	
Tobacco	36%
Alcohol	48%
NSAIDS	14%
Herbal Medicines	8%
Others	2%

Most patients were on haemodialysis, for less than five years (86%) with 46% of them for less than one year. Most patients had received blood transfusion (78%) during haemodialysis with A (42%) being the most common blood group followed by O (32%). Most of them consumed a mixed diet (98%), not following the recommended diet (54%). Only 6% of the patient had a positive serology, all for hepatitis C. 86% had being vaccinated against hepatitis B while only 48% had being vaccinated against Influenza and pneumococcal. Muscle cramps (58%), dizziness (58%) and infection (52%) were the most common complication while on haemodialysis, with most being oliguric (96%) (Table 3).

TABLE 3: CLINICAL VARIABLES AND COMPLICATIONS WHILE ON HD

Variables	Percentage of patients
On dialysis	
<1 year	46%
1-5 years	38%
>5 years	16%
Blood transfusion while on HD	
Yes	78%
No	22%
Vaccination	
Hepatitis B	86%
Influenza	48%
Pneumococcal	48%
Complications while on HD	
Hypoglycaemia	60%
Muscle cramps	58%
Dizziness	58%
Infection	52%
Fatigue	46%
Itching	36%
Dyspnoea/ Chest pain	36%
Insomnia	30%
Chills	30%
Headache	28%
Nausea/Vomiting	24%
Dyselectrolemia	24%
Paraesthesia	14%
Bone & Joint pain	10%
Bleeding	10%
Seizures	8%
Restless legs	8%
Others	28%
Residual urine output	
Oliguric	96%
Non Oliguric	4%
Diet	
Vegetarian	2%
Mixed	98%
Not following recommended diet	54%
Following recommended diet	46%
Serology	
HIV	0%
Hepatitis B	0%
Hepatitis C	6%
Blood group	
A	42%
B	24%
AB	2%
O	32%

The mean height (cm) and weight (kg) were 157 ± 18 and 63 ± 24. Blood urea and serum creatinine were high with their mean values 120

± 82 mg/dL and 8.2 ± 2.9 mg/dL. Mean serum electrolytes and lipid profile were in normal range. The mean values of haemoglobin (g/dL), serum ferritin (µg/L) and transferrin saturation (%) were 7.3 ± 2.8, 140 ± 104, 16 ± 6.The mean values of calcium (mg/dL), phosphorus (mg/dL), alkaline phosphatase (U/L), albumin (g/L) were 8.4 ± 0.9, 5.2 ± 1.2, 189 ± 77, 2.9 ± 0.4. The mean values of 25-hydroxycholecalciferol (ng/mL), parathyroid hormone (pg/mL), T3 (ng/ml), T4 (µg/dL), TSH (µgU/mL), BNP (pg/mL) were 19 ± 9, 266 ± 243, 0.53 ± 0.17, 5.1 ± 2.1, 5.1 ± 3.9, 1235 ± 1165 (Table 4).

TABLE 4: ANTHROPOMETRIC AND BIOCHEMICAL PARAMETERS

Variables	Mean values	
Height	157 ± 18 cm	
Weight	63 ± 24 Kg	
Blood Urea	120 ± 82 mg/dl	High
Serum Creatinine	8.2 ± 2.9 mg/dl	High
Serum Sodium	137 ± 11 mmol/l	Normal
Serum Potassium	4.7 ± 2.7 mmol/l	Normal
Total Cholesterol	190 ± 48 mg/dl	Normal
Triglyceride	162 ± 71 mg/dl	Normal
LDL	100 ± 46 mg/dl	Normal
HDL	40 ± 7 mg/dl	Normal
Haemoglobin	7.3 ± 2.8 g/dl	Low
Serum ferritin	140 ± 104 mcg/l	Low
Transferrin saturation	16 ± 6 %	Low
Calcium	8.4 ± 0.9 mg/dl	Low
Phosphorus	5.2 ± 1.2 mg/dl	High
Alkaline phosphatase	189 ± 77 U/l	Normal
25-hydroxycholecalciferol	19 ± 9 ng/ml	Low
Parathyroid hormone	266 ± 243 pg/ml	High
Albumin	2.9 ± 0.4 mg/dl	Low
BNP	1235 ± 1165 pg/ml	High
T3	0.53 ng/ml	Low
T4	5.1 ± 2.1 mcg/dl	Normal
TSH	5.1 ± 3.9 mcgU/ml	Normal

Discussion

Sociodemographic variables in our study were comparable to that of the national data (Indian society of nephrology registry). [3,4] The study comprised of considerable number of patients in productive years of their lives, many a times being sole wage earner of family with multiple dependents. Approximately half of the patients were dependent on public transportation, many requiring to endure long journeys, thus compelling them to stay away for home for a considerable period of a day. This reflected the centralized nature of disposition of dialysis centre in Sikkim, and above findings bearing a negative impact on quality of life of patient.

58% of patients, had first healthcare visit immediately before or one month before the initiation of first haemodialysis with all patients undergoing first haemodialysis session through temporary venous access and only 14% of the patients had got a renal biopsy done. Thus indicating an important deficit in the primary care in the region.

Hypertension was the leading cause of ESRD followed by diabetes mellitus, this was in contrast to the national registry where diabetes was the most common cause. [3, 4] The common co-morbidities the patient had were retinopathy (68%), cardiovascular disease (24%), and neuropathy (12%). Muscle cramps, dizziness, fatigue, itching were the most common complications in the patients on haemodialysis which were similar to other studies. [5] These complications also added in affecting the quality of life along with adding the burden of few more medicines for relief of symptoms.

Majority were on insurance as source of their medical funding indicating high cost of haemodialysis treatment due to which many without reimbursement might have discontinued. Even those with reimbursement, faced dire economic consequences as the expenses incurred in travelling and economic loss of the person accompanying and other minor expenses occurring during travel and stay during haemodialysis were not covered by reimbursement.

90% of the patients had been admitted at least once and 54% of them more than 3 times, with infection (56%) being the most common cause. Thus, as infections are a major cause of mortality and morbidity in haemodialysis patients vaccinations against hepatitis B, influenza and pneumococcus are recommended. [6, 7] In our study almost all patients had been vaccinated against hepatitis B while only about 50% were vaccinated against influenza and pneumococcal infection. This might be due to low cost or free availability of hepatitis B vaccine via Government programme and high cost of the other two vaccines which also might not have been covered under Government reimbursement.

All patients knew about renal transplantation but only 8% had likely donors in the family and only 2% were on cadaveric renal transplant waiting list, thus indicating a lacunae in the knowledge about cadaveric transplantation. It might be due to non-availability of a transplant centre in the state and lack of promotion of cadaveric transplantation and donations in the country. Thus, the need of the hour is to increase awareness and bring about changes in the law to promote transplantation so that quality of life can be improved in the patients on haemodialysis.

Most common blood group was A $+^{ve}$ followed by O $+^{ve}$. This was in contrast to the blood group pattern of Sikkimese population where O $+^{ve}$ is the commonest blood group followed by A $+^{ve}$ and also Indian Transplant Registry of recipient's who underwent renal transplnantation were O +ve was the commonest blood group. [8,9]

There were three patients with serology positive for hepatitis C with none being positive for hepatitis B or human immunodeficiency virus (HIV). This was in contrast to infectious disease markers of major blood-borne pathogens in blood donors in Sikkimese population where hepatitis B was the most common pathogen followed by HIV. [10] It might be due to immunization against hepatitis B and presence of dedicated machine for serology positive patient of hepatitis C only at our centre.

Most of the patients had a normal lipid profile. This was in contrast to various studies were triglycerides were elevated. [11, 12] This may be, as most of the patients were on statins.

Most of the patients had moderate anaemia mainly of normocytic normochromic type with low mean serum ferritin and transferrin saturation. Thus iron status should be assessed in all CKD patients even with normocytic normochromic type of blood picture as the causes of anaemia in CKD are usually multiple (low erythropoietin production, short red cell survival, iron and folic acid deficiency and uremic inhibition of erythropoiesis) and it thus help in guiding treatment of anaemia. Most patients also gave history of blood transfusion, thus indirectly indicating high prevalence of anaemia.

Mean serum calcium was low with high levels of phosphate along with high parathyroid levels (secondary hyperparathyroidism) thus leading to bone disease as indicated by high alkaline phosphatase which is a marker of bone turnover. Along with hyperparathyroidism majority had hypovitaminosis D.

The mean albumin levels were low similar to other studies. [13] This is mainly due to poor nutrition and decreased albumin synthesis in haemodialysis patients.

The mean BNP was high similar to other studies. [14] Thus, this novel cardiac marker cannot be used in haemodialysis patients indicating cardiac haemodynamic stress in them.

Mean T3 was low, but mean values of T4 and TSH were in normal limits. This was similar to various studies. [15] This was, as the CKD independently has an effect on the thyroid profile plus the drugs like heparin used during dialysis also effects the thyroid profile.

Conclusions

Though the availability of haemodialysis has made ESRD treatable it is still associated with high morbidity and mortality due to CKD itself and also due to complications and/or risks associated with haemodialysis. Effecting majority in there productive years of life it causes financial catastrophe in the family due to high cost associated with the long term regular treatment. Also severely effecting QOL early intervention to retard the progression/prevent renal disease should be emphasized. Easily accessible and affordable dialysis facility along with increase in renal transplantation can cut the cost of treatment and improve quality of life.

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