Characteristics of Haemodialysis Patients at the University of Port Harcourt Teaching Hospital During the First Year of Operation

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ABSTRACT

Recent upsurge in the global incidence and prevalence of kidney failure especially in the developing countries such as Nigeria, has led to the emergence of haemodialysis units in the country. In 2007 a new four- machine haemodialysis unit came into operation at the University of Port Harcourt teaching hospital. This communication is a preliminary analysis of the clinical and epidemiologic characteristics of patients treated at the center in the first year of operation. During the period under study a total of 76 patients received haemodialysis treatment in the unit. They were 43 males and 33 females,(M/F=1.3:1) with a mean age of 43.01 ± 19.14 (range 10 to 79) years. The patients were mostly of the low income groups constituting 70.2% .Ethnographic distribution, reflected the local catchments population of the hospital. The indications for haemodialysis were End stage kidney failure (72.4%), Acute renal failure (14.5%), and acute-on-chronic renal failure(13.1%). Clinical status of the patients at first presentation was generally poor. Forty-two patients (55.3%) presented in advanced uremia with severe haemodynamic instability. Fifteen (patients (19.7%) presented in uraemic encephalopathy while 19(25%) presented in stable azotaemic state. Patients presenting for haemodialysis in this unit derive mostly from the low socio-economic groups. End stage kidney failure was the commonest indication for haemodialysis treatment. Most patients presented for the first time in very unstable clinical state. The findings are consistent with previous studies in other centers in Nigeria.

INTRODUCTION

The recent upsurge in the global incidence and the prevalence of kidney disorders, especially chronic kidney disease has created awareness of the problem, globally and even in the developing countries of the world such as Nigeria. It is estimated that well over 500 million persons worldwide suffer from some kind of kidney disorder [1]. In Nigeria, about 3-8 percent of adult medical ward admissions are as result of kidney disease and kidney failure[2, 3]. As a result there has been an increasing demand for the care of kidney failure patients in recent times in Nigeria and other resource poor countries in the sub-Saharan African countries. In response, a number of public health institution based and private healthcare provider - run kidney support services (mainly haemodialysis units) started to emerge couple of years ago in Nigeria.

Lagos University Teaching hospital (LUTH) [4] pioneered the process in 1981 followed by the University college Hospital(UCH0 [5] Ibadan in 1995. To date there are over 20 or more such centers across the country serving a population of about 140 million Nigerians. Unfortunately the history of these centers has been characterized by relatively small size, stunted growth and high attrition rates due to multiple developmental challenges [5]. As a result,   chronic

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dialysis patients in Nigeria, rarely survive beyond the first year of diagnosis [5, 6]. This is in contradistinction with their counterparts in the developed countries of Europe and North-America who survive for well over 10 to 20 years on dialysis with a good quality of life [7, 8].

In 2006, The University of Port Harcourt Teaching hospital established a new Haemodialysis unit through the Federal Government/Vamed engineering company tertiary health institution improvement programme. The unit is equipped with four "FRESENIUS 4008B" model Haemodialysis machines. The unit commenced operations in January 2007.

This communication is the findings of an analysis of the epidemiological and clinical characteristics of the patient treated in the unit during the first year of operation. This will be followed by a second communication detailing the haemodialysis performance of chronic dialysis patients treated in the unit during the first year (January to December, 2007) of operations.

Objectives of the Study

▪ To determine the epidemiologic and clinical characteristics of patients treated in the new haemodialysis unit of the University of Port Harcourt Teaching hospital.

MATERIALS AND METHODS

The data for analysis were obtained from the clinical case records and haemodialysis case records of all patients who received haemodialysis treatment in the new haemodialysis unit of the hospital, during the period 2nd January to 31st December 2007.

In the haemodialysis unit of the hospital, to ensure safety of dialysis records a separate haemodialysis record is kept with the support of the hospital medical records department. Thus each dialysis patient has hospital clinical case record, which is in the custody of the hospital medical records department, and a Haemodialysis case record, which is kept permanently in the haemodialysis unit.

The haemodialysis case record contains three sets of records namely:

1. the demographic **data** ,
2**. baseline clinical data -** which captures the source of referral to the dialysis unit, date of first diagnosis of renal failure, the primary underlying kidney disease, other co-morbid disorders, the baseline laboratory parameters

at first entry into the unit etc. Others are the pre-dialysis clinical status of the patient, a record of the immediate pre- and immediate post dialysis laboratory parameters as well as the dialysis prescription for each dialysis session,

3. **the haemodialysis monitor chart** in which the details of the proceedings of each dialysis session is recorded every half- hour for the duration of the dialysis.

The data for analysis retrospectively obtained from the patients' hospital and haemodialysis case records include the following: demographic and epidemiologic data such as age,sex, occupation, marital status, state of origin,ethno-linguistic group etc: clinical data such as the cause of renal failure, type of renal failure, primary renal disorder underlying renal failure, co-morbid clinical conditions,etc. Others include the baseline clinical and laboratory parameters at entry(pre-dialysis), such as, the over all clinical state of the patient, blood pressure,estimated creatinine clearance, haematocrit level, serum electrolytes, urea and creatinine levels, etc.

The primary kidney disorders were taken as entered in the patient case note by the consultant nephrologist in charge of the patient. There were three consultant nephrologists in the renal unit during the period under study.

Acute renal failure (ARF) was diagnosed based on relevant history of predisposing/precipitating factors (e.g. acute fluid/blood loss, ingestion of herbal mixtures etc), oligo-anuria (24-hour urine volume, <400mls), oedema, marked azotemia, metabolic acidosis, hyperkalemia, etc.

Diagnosis of acute glomerulonephritis(AGN) was based on history of an antecedent sore throat/ skin infections, facial puffiness, passage of scanty coke-coloured or smoky urine,hypertension,red-cell casts, white cell casts in the urine,azotemia,etc.Renal biopsies were not done.

Chronic glomerulonephrits(CGN) was diagnosed based history of progressive oedema,fatigue ,anorexia, vomiting etc,anaemia,hypertension,urinary red-cell casts,azotemia and renal ultrasound scan showing bilaterally shrunken kidneys with poor cortico-medullary differentiatiation.

Of the 22 patients with CGN record of renal biopsy was obtainable only in five(22.7%) patients.Histologic examination was by light microscopy with no immunologic staining due to the lack of requisite facilities in the histopathology department of the hospital. The histologic diagnosis in the five cases

were focal glomerular sclerosis (FGS) in two patients,messangiocapillary nephropathy in two patients and membranous nephropathy disease in one patient respectively.

Diagnosis of hypertensive nephrosclerosis was based on history of long-standing hypertension, clinical markers of longstanding hypertension such as peripheral arterial wall thickening,locomotor-brachialis,displaced heaving cardiac apex etc,azotemia and kidney ultrasound scan showing bilaterally shrunken kidneys with poor cortico-medullary differentiation. None of the patients had renal biopsy done.

Diagnosis of diabetic nephropathy(DN) was based on the history of longstanding diabetes (for at least five years), significant micro-albuminuria,gross proteinuria,anaemia,azotemia hypertension, and a kidney ultrasound scan showing, a normal or enlarged kidneys with poor cortio-medullary differentiation. Diagnosis of Obstructive uropathy was based on the presence of clinical and laboratory features of chronic renal failure in the setting of clinical, ultrasound and retrograde urographic evidence of obstruction of the urinary tract (commonest being prostatic lesions in elderly males).

Diagnosis of end-stage kidney failure was based on the presence of chronic kidney disease with an e-GFR of less than 5-15 mls per minute.

Presently all patients presenting for haemodialysis were screened for human immuno-deficiency virus(HIV), hepatitis B and C virus status. Patients testing positive for any of the three viruses were referred to centers treating such patients. Management to procure heamodialysis machines to be dedicated for the treatment of such cases.

Data Management

The data were analyzed with the aid of Epi-info computer based statistical package for biomedical research.

Averages are presented as mean $\pm$ standard deviation.Pearsons correlation coefficient(r) was used to establish relationship between quantitative variables, while Student t-test was used to measure statistical significance between variables with p-values set at 0.05.Tables are used as appropriate.

Study Limitations

The retrospective nature of the study does not ensure absolute completeness of the data. The non inclusion of patients positive for HIV, and Hepatitis B and C viruses also limited the scope of the data. The paucity of renal biopsies and the lack of electron microscopy and immunofluorecsent studies limit the accuracy of the clinical and histologic diagnosis.

RESULTS

During the period under study (January to December, 2007) a total of 76 patients were dialyzed in the haemodialysis unit of the hospital. They comprised 43 males and 33 females (M/F=1.3:1) with a mean age of 43.0 $\pm$ 19.4 years and age range from 10 to 79 years. The peak age at presentation was in the 40-49 and 50 -59 year age groups (table -1) which together were responsible for 35.5 % of the patients. There were no significant differences between the males and the females in all compared variables (P>0.05).

Students and the un-employed (31.6%), small scale business men/women (21.0 %), and junior public servants (17.6%) constituted the bulk of the patients

Table 1: Age and sex distribution

Age Group (Years)	Males	Females	Total	Percentage
10-19	3	7	10	13.2
20-29	5	6	11	14.5
30-39	5	6	11	14.5
40-49	7	8	15	19.7
50-59	10	2	12	15.8
60-69	8	2	10	13.2
70-79	5	2	7	9.2
Total	**43**	**33**	**76**	**100.0**

MEAN AGE. =43.0 $\pm$ 19.14 YEARS
AGE RANGE = 10 -79 YEARS

being together responsible for 70.2% of the patients (table 2).

Table 2: Occupational group

Occupational Group	Number	Percentage
Students/Unemployed	24	31.6
Businessmen/Women	16	21.6
Senior Public Servants	7	9.2
Junior Public Servants	15	19.7
Clergy	3	3.9
Artisans	3	3.9
Full Time Housewives	8	10.5
Totals	**76**	**100.0**

Distribution of the patients in accordance with states of origin (table 3) showed that Rivers state (53.3%), Imo state (15.8%), and Abia state (10.5%)

Table 3: State of origin

State of origin	Number	Percentage
Rivers State	42	55.3
Imo	12	15.8
Abia	8	10.5
Akwa- Ibom	4	5.3
Cross-River	2	2.6
Bayelsa	1	1
Delta	3	3.9
Edo	2	2.6
Ondo	2	2.6
Total	**76**	**100.0**

collectively contributed to 81.6% of the patients. Ethno-linguistically, (table 4) the Igbo speaking group (26.3%), Ikwerres (23.7%). and the Kalabaris (10.5%) were the dominant groups collectively responsible for 60.5% of the patients.

Table 4: Ethno-linguistic groups

Ethno-Linguistic Group	Number	Percentage
Igbo	20	26.3
Ikwerre	18	23.7
Kalabari	8	10.5
Ogoni	5	6.7
Andoni	3	3.9
Ndoni	3	3.9
Engeni	2	2.6
Okirika	1	1.3
Efik/Ibibio	6	7.9
Izon	1	1.3
Bini	2	2.6
Yoruba	2	2.6
Urhobo	2	2.6
Itsekiri	1	1.3
Total	**76**	**100.0**

The commonest indication for haemodialysis in the patients were End-stage kidney disease (72.4%), and Acute renal failure (14.5%), the two indications being responsible for 86.9 % of all the the patients (table 3).

The commonest conditions causing acute renal failure were acute glomerulonephritis (18.2%), post-operative sepsis (18.2%), pre-renal renal failure(27.2%) and obstetric haemorrhages (18.2%) respectively.

Chronic glomerulonephritis (33.8%), hypertensive nephropathy (23.1%) diabetic nephropathy (21.1%) and obstructive uropathy(9.2%) were the commonest disorders responsible for chronic kidney failure in the patients.(tables 4 and 5)

Most of the patients, 42(55.5%) presented for the first time in poor and unstable clinical state, characterized by gross oedema,moderate to severe hypertension(mean blood pressure 166.4/99mmHg), moderate to severe anemia(mean haematocrit 21%), pulmonary oedema and ascites. Nineteen patients (25%) presented in a state of uraemic encephalopathy, while 15 (19.7%) patients were in a relatively stable clinical state.

The pre-dialysis baseline laboratory parameters are detailed in table 6. For this purpose, the patients are segregated into acute renal failure (ARF) and chronic renal failure (CRF) sub-groups. The mean age of the patient with CRF (46.2 ± 17.7) years was significantly higher than the mean age (29.5 ± 13.9) years. ($p < 0.001$) In all other parametric variables there were no significant differences between the ARF and the CRF subgroups (table 6).

DISCUSSION

The epidemiologic and the clinical characteristic of the patients in this study are quite similar to the finding in other centers in Nigeria, both past and recent studies. The mean age of the patients, primary conditions underlying both acute and chronic kidney disease as well as the late stage of illness at presentation are similar with the observations by Akinsola *et-al* in Ife [2] (1989), Ojogwu *et-al* [9] (1983) in Benin, Arije *et-al* [6] (2001) in Ibadan, Menakaya *et-al* [10] (2005) in Lagos and recently by Bosan and Ibrahim in Zaria [11](2007) .

Acute glomerulonephritis,pre-renal oliguria resulting from significant body fluid losses, Obstetric complications, post-operative sepsis, nephrotoxic herbal drug exposures etc constitute the common causes of acute renal failure while, chronic

Table 5: Primary and underlying kidney disorders

Primary/Underlying Kidney Condition	Number	Percentage
Acute Renal Failure		
Acute Glomerulonephritis	2(18.2%)	2.6
Post Operative Sepsis	2(18.2%)	2.6
Obstetric Complications	2(18.2%)	2.6
Ingestion of Nephrotoxic Herbal Potions	2(18.2%)	2.6
Pre-Renal Renal Failure	3(27.2%)	3.9
Sub-total	**11**	**14.5**
Chronic Kidney Disease		
Chronic Glomerulonephritis	15(23.1%)	28.9
Hypertensive Nephrosclerosis	16(24.6%)	19.7
Diabetc Nephropathy	6(9.2%)	21.1
Obtructive Nephropathy	1(1.5%)	7.9
Iatrogenic Nephrectomy	1(1.5%)	1.3
Multiple Myeloma	4 (6.2%)	1.3
Indeterminate	22(33.8%)	5.3
Sub-total	**6 5 (100.0)**	**85.5**
Grand Total	**76**	**100.0**

Table 6: Baseline pre-dialysis laboratory parameters at presentation

BaselinePre-dialysi Parameters	Acute Renal Failure (n=11)		Chronic Renal Failure(n=65)		
	MEAN $\pm$ SD	RANGE	MEAN +SD	RANGE	p- value
AGE(YEARS)	29.5$\pm$13.9	14-47	46.2$\pm$17.7	12-78	P<0.001*
E-CREAT.CLEARANCE(MLS/MIN)	9.5$\pm$6.3	3-18.6	8.2$\pm$5.8	3.7-34.2	P>0.10
SYTOLIC BP.(MMHG)	155.6$\pm$27.2	130-190	171.2$\pm$31.9	107-240	P>0.05
DIASTOLIC BP.(MMHG)	96.7$\pm$19.2	70-120	102.3$\pm$27.9	70-140	P>0.5
SODIUM(MMOL/L)	133.8$\pm$7.2	125-140	134.8$\pm$6.0	122-140	P>0.5
POTASSIUM(MMOL/L)	4.5$\pm$0.8	4.1-6.0	4.7$\pm$1.0	3.5-6.5	P>.5
BICARBONATE(MMOL/L)	14.4$\pm$1.9	12-17	19.4$\pm$4.8	8-27	P<0.001*
UREA(MMOL/L)	30.5$\pm$13.7	14.5-52	32.9$\pm$36.2	4.2-62	P>0.10
CREATININE(UMOL/L)	1275.7$\pm$818.1	720-2730	1224.9$\pm$557.4	245-2505	P>0.5
TOTAL PROTIEN(MG/DL)	NIL	NIL	60.7 +4.0	57-65	—
ALBUMIN (MG/DL)	NIL	NIL	32 + 9.8	10-35	—
HAEMATOCRIT(%)	21.3$\pm$5.4	13.9 -22.0	20.9 +6.8	10-35	P>0.05

glomerulonephritis, hypertensive nephrosclerosis, diabetic nephropathy and the obstructive uropathy constitute the commonest causes of chronic kidney disease in Nigerian adults.

In this study patients with acute renal failure were almost two decades younger than those with chronic renal failure 29.5 versus 46.2 years (p<0.001). The reason for this is explained by the fact that the common causes of chronic kidney disease enumerated above have their highest prevalence in people of the middle and older age groups, whereas the common causes of acute renal failure occur more commonly in adolescents and adults.

The predominance of patients from Rivers state is a mere geographic expression of the fact that the haemodialysis center is located in River state. The dominance of the Igbo ethno-linguistic group reflects the high density of people of Igbo extraction living in Rivers state. Also Igbo's from neighbouring Imo, Abia and even Anambra states come all the way to Port Harcourt for haemodialysis treatment due to the absence of such facilities in those states.

The paucity of patients from Bayelsa state (only one patient) is surprising. Bayelsa state was carved out of the old Rivers state and shares socio- cultural similarities with Rivers state. Also, Yenagoa the state capital of Bayelsa is less than two hours from Port Harcourt. The paucity of standard medical facilities in the area may account for the poor referral rate as the Federal medical center, Yenagoa is the highest and main medical facility in the area. Cases of renal failure requiring dialysis may pass unrecognized by the medical practitioners in Bayelsa.

The findings from this study show that the bulk of the patients requiring haemodialysis treatment in our center were mainly people belonging to the economically disadvantaged groups, being mainly students, fulltime house wives, junior and intermediate public servants, etc.

This pattern however, reflects the general pattern of patients attending public health facilities in Nigeria and most other developing countries. The affluent (including top Government functionaries,) in Nigeria and in most other sub-Saharan African countries usually avoid the public health facilities but prefer private or overseas medical treatment. As a result the medical facilities in public health facilities remain ill-equipped and stunted.

The high prevalence of patients from the lower economic groups have far reaching implications for the ability to pay for haemodialysis services, which is quite expensive and not subsized by government.

Previous haemodialysis service experience [6, 12] in Nigeria has identified the singular role of poverty as dominant factor in the poor dialysis outcomes of patients who commence maintenance dialysis programs in the country.

The late presentation of majority of the patients in a very un-stable clinical state as well as in state of uraemic encephalopathy also influences the short term patient outcome. Only about 6% of the patients presented in a relatively stable clinical state, the remaining 94% presented in advanced uremia with marked fluid retention, severe hypertension, haemodynamic instability, severe anemia and uremic encephalopathy(Tables 6 and 7).Mortality rates in such patients in the early stage of commencement of dialysis is usually high. Late commencement of dialysis has been demonstrated to have deleterious effect on dialysis outcomes [13, 14].

CONCLUSION

This study of the epidemiologic and clinical characteristics of patient presenting for haemodialysis at the University of Port Harcourt teaching hospital show that the clinical and epidemiologic characteristics of our patients are similar to observations in other centers in other parts of Nigeria.

The bulk of the patients presenting for haemodialysis derive from the lower socioeconomic brackets of the society. This has far reaching implications on the ability to sustain long term dialysis. Late presentation in unstable clinical state is predominant which also has implications for overall patient outcome.

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