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A Two Year Review of Patients with Chronic Kidney Failure Undergoing Haemodialysis in a New Dialysis Centre in Nigeria: Any New Lesson?

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ABSTRACT

Chronic kidney failure (CKF) is a devastating medical, social and economic problem for the patients, their families and the country. Reports from Nigeria had shown increase in hospital prevalence rates of CKF. This study reviewed the first two year data of patients with CKF who were dialyzed in a new dialysis centre in Southwest Nigeria to determine whether any progress has been made in terms of referral pattern, pre-dialysis management and to determine if there is any change in the prevalent causes of CKF compared to earlier reports from the same region. This retrospective study evaluated patients with CKF dialyzed between December 2004 and December 2006. Seventy one patients (52 males, 19 females) with CKF were dialyzed during the study period. The mean age of the study population was 43.3 ± 18.9 years. The prevalent causes of CKF were hypertension and chronic glomerulonephritis. Three-quarters of the patients were transfused and 68 patients (96 %) commenced dialysis within one week of referral to a nephrologist and had no pre-dialysis care. Three patients had arteriovenous fistula before commencement of dialysis. Five patients had dialysis for more than 8 weeks and none of the patients was able to sustain dialysis for a year or had kidney transplantation. This report showed that CKF still affects our patients in their productive years with late referral to nephrologist. Our patients had little or no pre-dialysis care and were not able to sustain dialysis therapy for an appreciable time in view of cost with attendant high mortality.

INTRODUCTION

Chronic kidney failure (CKF) represents the end of the continuum of chronic kidney disease (CKD). It is defined as glomerular filtration rate (GFR) less than 15 mL / min and / or the presence of symptoms of uraemia [1]. Chronic kidney failure is a devastating medical, social and economic problem for the patients, their families and the country as a whole[2]. The prevalence of CKF has been increasing in the developed countries at a rate of 7 – 8 % in the last 10 years [2-4]. Although there is no population data of CKF in Nigeria, there is a suggestion that the incidence of CKF may be increasing judging by hospital admission rates [5-8]. In the 1960s, CKF accounted for 1.6 % of the hospital admissions [5]. On the other hand, reports from the 1980s documented hospital prevalence rates varying from 3.6 % to 8 % [6-8].

The main treatment of CKF is renal replacement therapy (RRT) either in the form of dialysis [haemodialysis (HD) or peritoneal dialysis (PD)] or ultimately kidney transplantation. The availability and quality of dialysis programme largely depend on the prevailing economic conditions, the political – social structures, overall health care facilities and the health care funding strategies of various countries [9, 10]. There have been a number of reports on CKF patients on dialysis in Nigeria [5-8, 11, 12]. These reports have pointed out the prevalent causes of CKF in Nigeria and various problems encountered in the management of these patients.

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The aim of this study was to review the data of the Ladoke Akintola University of Technology Teaching Hospital (LTH) haemodialysis centre, Osogbo, Osun State in the first two years, compare our findings with earlier reports from other centres in the south western part of the country (Nigeria) and propose possible solutions toward improving the management of patients with chronic kidney failure.

Keywords: *Chronic kidney failure, haemodialysis, Sub-Urban centre in Nigeria.*

SUBJECTS AND METHODS

The study was carried out at the Ladoke Akintola University of Technology Teaching Hospital (LTH) haemodialysis centre, Osogbo, Osun State, Nigeria. The centre commenced operation in December, 2004. In view of its central location, it serves as a referring centre for neighbouring states such as Kwara, Ondo, and Ekiti States. The centre only offers haemodialysis for now.

Ethical approval for the study was obtained from the Ethical Committee of the LAUTECH Teaching Hospital.

The study population consisted of all consecutive patients with CKF that underwent haemodialysis at the centre between December 2004 and December 2006. Information obtained from the patients' folders or case notes and dialysis records included age, sex, educational status, referral source, record of transfusion and number of units transfused, vascular access, creation of artero-venous fistula (AVF), use of erythropoietin, pre-dialysis use of phosphate binders, blood pressure at first dialysis, number of dialysis sessions and the duration of dialysis. The hepatitis B and C and human immunodeficiency virus (HIV) status of the patients were also noted.

The inclusion criteria were patients with CKF based on the history, physical examination, biochemical and ultrasound findings. Chronic kidney failure was defined Attempts were made to diagnose the underlying aetiology of the CKF from the clinical data obtained on each patient. Patients who were more than 40 years with previous history of hypertension, presence of other hypertensive target organ damage, and absence of cellular cast on urine microscopy were classified as having hypertensive nephrosclerosis. Patients with severe hypertension (i.e. systolic blood pressure e" 180 mm Hg and or diastolic blood pressure e" 110 mm Hg), presence of exudates, haemorrhages with or without papilloedema and presence of microscopic haematuria were classified as having malignant hypertension. Patients with proteinuria, presence of cellular casts on

Table 1: Baseline clinical and laboratory characteristic of the study population

Patients' Characteristics	Number (%)
Gender	
Male	52 (73.2)
female	19 (26.8)
Age group (years)	
< 20	7 (9.8)
20 - 39	26 (36.6)
40 - 59	19 (26.8)
e" 60	19 (26.8)
Mean age	43.3 ± 18.9
Systolic blood pressure (mm Hg)	
< 140	16 (22.5)
140 – 159	16 (22.5)
160 – 179	18 (25.4)
e" 180	21 (29.6)
Diastolic blood pressure (mm Hg)	
< 90	42 (59.1)
90 – 99	9 (12.7)
100 – 109	8 (11.3)
e" 110	12 (16.9)
Serum electrolytes, urea and creatinine	
Sodium (mmol / L)	135.2 ± 8.6
Potassium (mmol /L)	4.4 ± 1.1
Chloride (mmol / L)	100.7 ± 9.6
Bicarbonate (mmol / L)	22.2 ± 3.1
Calcium (mmol / L)(n = 22)	2.02 ± 0.26
Inorganic phosphate (mmol /L) (n = 19)	2.1 ± 0.9
Uric acid (mmol /L) (n = 25)	649.6 ± 230.9
Urea (mmol / L)	36.7 ± 11.3
Creatinine (µmol/ L)	1420. 6 ± 649.3
Packed cell volume (%)	20.0 ± 4.9

Table 2 : Aetiology of chronic kidney failure in the study population

Aetiology of Chronic Kidney Failure (%)	Number
Hypertension	29 (40.8)
Malignant Hypertension	2 (2.8)
Chronic glomerulonephritis	22 (31.0)
Diabetes mellitus	5 (7.1)
Autosomal dominant polycystic kidney disease	3 (4.2)
Obstructive uropathy	4 (5.6)
Unknown	6 (8.5)

microscopy were classified as having chronic glomerulonephritis. Patients with clinical and ultrasound findings in keeping with urinary tract obstruction were classified as having obstructive uropathy. Patients with history of diabetes mellitus, proteinuria, diabetic retinopathy and normal or increased kidney sizes on ultrasound and absence of active urinary sediments were classified as having diabetic nephropathy.

RESULTS

Seventy one patients with chronic kidney failure (52 males, 19 females) had hemodialysis during the study

Table3: Published studies on chronic renal failure in south west Nigeria

	Akinsola *et al.*[6]	Salako *et al.*[12]	Arije *et al.*[11]	Alebiosu *et al.*[13]
Number of patients	100	67	141	153
Period of study (yrs)	3	3	3	11
Gender Male	64	55		
Female	36	12		
Mean age ± SD (years)	33.4 ± 12.9			39.6 ± 14.8
Age range (years)	12 – 61		15 - 81	14 – 72
Aetiology of CRF (%)				
CGN	50 (50.0)	32 (47.8)		63 (41.2)
Hypertension	25 (25.0)	26 (38.8)		40 (26.1)
Diabetes mellitus		3 (4.4)		20 (13.1)
ADPKD		2 (3.0)		
CPN		1 (1.5)		
HIVAN		1 (1.5)		
Miscellaneous	9 (9.0)			
Unclassified	16 (16.0)			
Others		2 (3.0)		
Mean serum Cr (µmol / L)	1167 ± 849	2113		619 ± 424
Range serum Cr(µmol /L)	203 - 3253	309 – 4703		
Mean serum urea (mmol /L)		91.3		77.9 ± 34.9
Mean serum K (mmol/L)		4.8		4.7 ± 1.3
Serum bicarbonate (mmol/L)		19.3		17.8 ± 9.9
Mean plasma Ca (mmol /L)		1.87		1.87 ±0.45
Mean serum inorganic phosphate (mmol / L)		2.45		2.13 ± 1.13
Mean serum albumin (g/dL)				3.6 ± 1.2
Mean parked cell volume (%)		21.6		
Number of patients dialysed			141	34
Number of dialysis sessions				
d" 3 sessions			86 (61.0)	21 (61.8)
4 – 20 sessions			44 (31.0)	13 (38.2)
e" 21 sessions			11 (8.0)	
Mean SBP ± SD (mm Hg)				167.3 ± 15.5
Mean DSP ± SD (mm Hg)				106.0 ± 28.6

Key to Table. *CRF – chronic renal failure, CGN – chronic glomerulonephritis, ADPKD – autosomal dominant polycystic kidney disease, CPN – chronic pyelonephritis, HIVAN – Human immunodeficiency virus associated nephropathy, Cr – creatinine, K – potassium, Ca – calcium, SBP – systolic blood pressure, DBP – diastolic blood pressure*

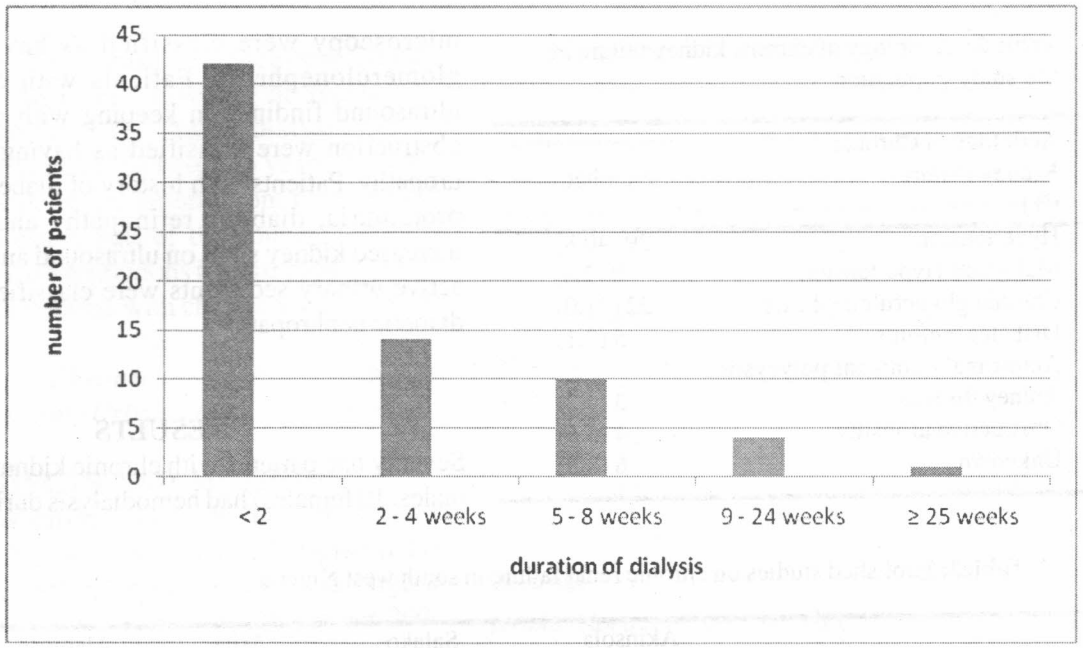

Fig. 1: Duration of dialysis in chronic renal failure patients

period. Table 1 shows the baseline clinical and laboratory characteristics of the patients. The male to female ratio was 2.7: 1. The mean age of the study population was 43.3 ± 18.9 years (range 16 to 86 years). Fifty two patients (73.2 %) were under 60 years of age. Sixty-eight out of the 71 patients (95.8 %) were referred to the centre and had to commence dialysis within one week of referral.

The aetiology of CKF is as shown in table 2. The leading causes of CKF in the study population were hypertension, glomerulonephritis and diabetes mellitus. The aetiology of CKF could not be determined in 6 (8.5 %) of the population.

Figure 1 shows the duration of dialysis in the study cohort. Forty two patients (59.2 %) had dialysis for < 2 weeks while only 5 (7.0 %) had dialysis for > 8 weeks. None of the patients had dialysis for a year or had kidney transplantation before their demise. Fifty patients (70.4 %) had d" 5 sessions of dialysis, 14 patients (19.7 %) had between 6 and 10 sessions, 4 patients (5.6 %) had between 11 and 20 sessions of HD and only 3 patients (4.2 %) had > 20 sessions of HD. Two patients had AVF before commencement of HD and 3 patients had AVF fashioned after commencement of HD. At commencement of dialysis, 57 patients (80.3 %) had blood pressure e" 140 / 90 mm Hg. Five patients (7.0%) were hepatitis B surface antigen (HBsAg) positive and only one patient had antibody to hepatitis C virus.

Fifty three patients (74.6 %) had blood transfusion and 136 units of blood were transfused. Forty patients out of the 53 patients transfused (75.5 %) had been transfused before referral for dialysis. Only 5 patients (7.0 %) had erythropoietin during the course of their management.

DISCUSSION

The mean age of the study population was 43.3 ± 19.1 years with majority of the patients (73.2 %) under the age of 60 years. This is not different from earlier reports from Nigeria as shown in table 3 but differs considerably from reports from developed countries where majority of patients requiring dialysis are over 60 years of age. For example, two –thirds of total dialysis patients in Japan are more than 60 years of age. Likely reasons suggested for the age difference in patients in developing compared to developed countries included the delay in detecting renal diseases and the failure in instituting measures in retarding progressive renal disease, both of which result in faster progression to end stage kidney disease (ESKD).

The male to female ratio is 2.7: 1. Earlier studies from south western Nigeria as shown in table 3 have documented a male preponderance in the dialysis population [6-8, 11, 12]. Reasons put forward to explain this gender difference included inherent proneness of males to developing chronic kidney disease, the faster progression of CKD in males and

the higher prevalence and severity of hypertension in males compared to pre-menopausal females.

Hypertension and chronic glomerulonephritis were the leading causes of CKF in this study population. This finding did not differ from findings from earlier studies as shown in table 3. The prevalence of hypertension in Nigeria is between 15 to 20% [15, 16] and studies have shown that blood pressure control rates are poor [17]. It is therefore not surprising that hypertension is still the leading cause of CKF in our population. Diabetes accounted for 7.1 % of the causes of CKF in the population. Though diabetes is the leading cause of CKF in most developed countries, it accounts for between 2 to 13.1 % of CKF in Nigeria from earlier reports [6, 13]. However, an increasing trend of diabetes as a cause of chronic kidney failure in Nigeria has been reported by Alebiosu *et al* [18]. This is likely due to the fact that many Nigerian patients with diabetes are surviving longer due to improvement in the medical care and are now developing diabetic nephropathy which tends to set in with increased duration of diabetes.

Most of the patients' first contact with nephrologists was when they had developed uraemia and needed urgent dialysis. Thus, none of the patients had a functioning permanent vascular access or had been started on erythropoietin before commencement of dialysis. In addition, majority of the patients had been transfused before referral for dialysis and most had inadequately controlled blood pressure. This finding is not peculiar to Nigeria. Reports from developed countries estimated that 20 to 50 % of patients starting dialysis are late referrals [19, 20]. Patients referred late to nephrologists experienced a greater degree of blood transfusion, a lower prevalence of permanent vascular access at initiation of dialysis, substantial underuse of anti-hypertensive medications, erythropoietin and phosphate binders [19]. Also, these patients experienced an earlier initiation of haemodialysis therapy and significantly poorer survival than patients who are referred early to nephrologists [19, 20]. Reasons for non-referral to nephrologists include non-recognition of early renal insufficiency, and non-nephrologists' attitudes and perception towards pre-dialysis care and in some health care systems or cases, physician concerns about loss of income [19].

Virtually all our patients could not sustain long term dialysis which eventually led to their death. This was because the patients had to pay for dialysis and patients' finances dictate the frequency and duration of therapy. A report by Arije *et al* showed that 70.8 % of the patients were able to remain on dialysis for less than 1 month and only 1.9 % remained on dialysis for over 12 months [11]. In a situation where the cost of one dialysis session is more than the lowest minimum monthly wage in the country, it is not surprising that patients were not able to sustain long term dialysis.

The issue of ethical appropriateness in starting RRT in a patient with limited resources who will most likely discontinue therapy after depleting all family resources and savings has been raised. However, it is ethically and morally inappropriate to withhold treatment from these patients particularly when patients' family members are initially willing to make any sacrifice to preserve life and believed that patients will recover from the illness despite all physicians' counsel [10]. It is after emotions and resources have been exhausted that it finally dawns on the family members that treatment cannot be sustained.

The implications of our findings are many. First, there has not been any significant change in the various causes of chronic kidney failure in the country over time. This should provide the country with a template for planning prevention programme towards reducing the burden of CKD. Preventive measures should involve targeted screening for urinary abnormalities, hypertension, diabetes, cardiovascular disease and other recognizable risk factors for CKD and the development of comprehensive team-based care for patients with known hypertension, glomerulonephritis and diabetes.

Second, the disease continues to affect our people in their productive years and most patients continued to die due to their inability to sustain dialysis treatment in view of the high cost. Thus, the country is being robbed of its work force and families are being deprived of bread winners with dire negative social consequences for the families and the nation. Unfortunately, there is no national renal registry. Therefore, the exact incidence and prevalence of chronic kidney failure in the population, its burden on the health care system and the outcome of these patients are not known. The recent move by the Nigerian Association of Nephrology (NAN) to establish a national registry is in the right direction. This will help in defining the burden of CKD in Nigeria and also arm the association with relevant data necessary to influence health care policy makers to make decisions that will effectively address CKD.

Most patients cannot sustain long term dialysis due to the high cost. A way out of this problem may be to seek alternative funding aside from that provided by the government. In doing this, we can learn from the National Kidney Foundation of Singapore (NKFS) by forming workable partnerships with pharmaceutical companies, private corporations with a "social conscience", non-governmental organizations, organized religious groups and individuals [21]. The pharmaceutical companies can help by providing dialysis machines at much reduced cost, providing equipment related to PD, developing training programs for allied health professionals and patients and providing widespread availability of erythropoietin for chronic dialysis patients at reduced cost [21]. The government in turn can encourage these companies by providing tax relief and reducing import duties on dialysis products while working on the ultimate aim of facilitating local production which will reduce cost. In initiating and sustaining this partnership, there must be transparency in the handling of funds and fulfilment of set-out objectives [21].

Third, most of our patients were referred quite late to nephrologists. This finding suggests the need for improved communication between nephrologists and other health care providers since early referral to nephrologists ensure adequate and necessary pre-dialysis care and promote a healthier transition to dialysis therapy. Patients should be referred to nephrologists when the glomerular filtration rate is < 30 mL / min [1].

The limitations of this study included the small number of the study population though it is unlikely that the findings will be different even if this review was done later on. Second, the aetiological diagnosis of CKD was not based on histology of kidney biopsies. Thus mis-classification of aetiology is possible.

In conclusion, this study showed that CKF continues to affect Nigerians in their productive years and was associated with high mortality due to inability of our patients to sustain long-term dialysis. Also, patients were still being referred quite late to nephrologists with little in way of good pre-dialysis care. There is a need to institute measures directed at detecting CKD and controlling factors that initiate and promote progression of CKD. In improving the survival outcomes in these patients, alternative sources of funding in addition to that provided by the government may help with the provision of renal replacement therapy.

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