Original Research Article

Demographics and pattern of ocular diseases in patients with Chronic Kidney Disease at the University of Port Harcourt Teaching Hospital

ABSTRACT

Aims: To determine the demographics and pattern of ocular diseases in patients with Chronic Kidney Disease at the University of Port Harcourt Teaching Hospital

Study design: This was a hospital-based cross-sectional study.

Place and Duration of Study: This study was carried out at the Dialysis clinic of the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria from February 2013 to February 2014.

Methodology: The Sample size was estimated to be 85 adult patients and cconsecutive adult patients with chronic renal failure who are having haemodialysis were enrolled into the study. The patients who met the inclusion criteria were randomly booked at the Dialysis Clinic and had no prior knowledge of the study; hence there was no bias in case selection. Ethical approval was obtained from the institutions ethical committee. Each participant had a comprehensive ocular examination including fundus photography. Subjects needing further evaluation and treatment were referred to the Eye Clinic of the Ophthalmology Department of the University of Port Harcourt Teaching Hospital, Port Harcourt.

Results: A total of 170 eyes of 85 persons were examined in this study (100% coverage). A total of 30 (35.4%) females and 55 (64.6%) males were examined giving a male to female ratio of 1.8:1.

Approximately half of the study subjects (54.1%) had no previous eye problem prior to developing chronic renal failure while about a quarter (n= 20, 23.5%) had refractive error and difficulty in reading near prints .After diagnosis of chronic kidney disease however a total of 40 (47%) of study subjects had visual impairment while 2(2.4%) were blind and 43(50.6%) of the study population however had normal vision.

Conclusion: Chronic Kidney disease is an important cause of ocular morbidity in our environment with majority of those affected being males in the third to fifth decades of life. Posterior segment disorders were the commonest disorders seen.

Key words: Demographics, Pattern, Visual impairment, chronic kidney disease

INTRODUCTION:

The World Health Organization health report shows that intrinsic diseases of the kidney and urinary tract resulted in the death of 1 million people in 2002 thereby ranking 12th on the list of major causes of death.[1]. The prevalence of impaired renal function is estimated to range between 10-20% of the adult population in most countries of the world. [1].

Renal disease, especially glomerular disease, is more prevalent in Africa and seems to be of a more severe form than is found in Western countries. [2]. This is due to the high prevalence of infection-related nephropathies [3,4] and non-communicable diseases.[5]. Similar to other developing countries of the world, no reliable statistics are available on the prevalence of kidney diseases in Nigeria[6] but hospital-based studies put the prevalence at between 3.6% to 10.4%[7,8]

In Nigeria, the 3 commonest causes of Chronic kidney disease in adults are chronic glomerulonephritis, hypertension and diabetes mellitus [9,10,11] while common causes in children include glomerulonephritis and posterior urethral valves,[9]. Analgesics abuse, ingestion of herbs and use of skin bleaching or lightening soaps and creams containing hydroquinone and mercury are also known preventable risk factors commonly seen in Nigeria. [7[Other causes of Chronic kidney disease are polycystic kidney disease, Human Immunodeficiency Virus (HIV) /Acquired Immune Deficiency Syndrome (AIDS), obstructive nephropathy, renal carcinoma, tuberculosis, sickle-cell disease, autoimmune diseases and past episode of acute renal failure[12-15]. Chronic kidney disease tends to be asymptomatic in the early stages so patients usually present late with consequent poorer prognosis.[1] End stage renal disease is

the most severe form of CKD and at this stage, patients require Renal Replacement Therapy [RRT] in the form of haemodialysis, peritoneal dialysis or renal transplant for continued survival.

The kidneys' functions include urine production, excretion of waste products of metabolism (urea ,electrolytes) and production of the hormones calcitrol (active form of Vitamin D which regulates calcium metabolism) and erythropoietin (stimulates red blood cells production by the bone marrow) as well as the enzyme renin (part of renin-angiotensin system which regulates the systemic blood pressure). Chronic kidney disease thus leads to systemic fluid overload, electrolyte derangements, persistent uraemia and failure of the kidney to maintain its hormone secreting functions. Clinical manifestations of Chronic kidney disease include heart failure, hypertension, anaemia, severe pruritus, peripheral edema, bone pain, hiccups, reduced vision, metabolic acidosis, bleeding tendencies, muscle twitching and seizures,[16] Fluid overload can cause lid swelling which may be isolated or associated with facial puffiness.[17] At the ESRD stage, 80% of patients will have developed secondary hypertension.[18].

This study aims to elucidate the demographics and pattern of ocular diseases in patients with chronic kidney disease undergoing hemodialysis in the University of Port Harcourt Teaching Hospital.

MAYERIALS AND METHODS:

This was a hospital-based cross-sectional study carried out at the Dialysis clinic of the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria.

The Sample size was estimated to be 85 adult patients using the equation for calculation of sample size and cconsecutive adult patients with chronic renal failure who are having haemodialysis were enrolled into the study.

INCLUSION CRITERIA

1. Patients aged 18 years and above attending the Dialysis clinic of the University of Port Harcourt Teaching Hospital, Port Harcourt.

EXCLUSION CRITERIA

1. Patients below 18 years of age even if attending the Dialysis clinic.
2. Patients who did not consent to participate in the study

The examinations were performed before patients had haemodialysis.

Ethical approval was obtained from the institutions ethical committee.

Measurement of blood pressure was performed by a renal unit nurse. Administration of questionnaire and obtaining informed consent was carried out. Visual acuity testing using the Snellen literate and illiterate charts and dilatation of patients' pupils with 0.5% Tropicamide ~~mydriatics~~ was performed.. ~~Ocular examination~~ , intraocular pressure measurement was done using the Perkins MK2 applanation tonometer, direct ophthalmoscopy was done using Direct ophthalmoscope (Welch-Allen, Model number 11720)while indirect ophthalmoscopy was performed using Binocular indirect ophthalmoscope (Keeler, Model number 1945-P-1001) , Fundus camera (Carl Ziess ,mydriatic. FF 450 Plus model) was used for fundus photography and at the end data was entered into spread sheets for analysis. They were later fed into the database of the public domain statistical software package for epidemiology, EPI info (version7.14) designed by the Centre for disease control and Prevention in Atlanta, Georgia (USA) and analysed with the aid of a statistician. Frequency was presented in percentages. Mean and standard deviations were calculated for descriptive and comparative purposes. Statistical significance was tested using the chi-square test. P-value < 0.05 was taken as statistically significant.

RESULTSAND DISCUSSION:

170 eyes of 85 patients were included in the study. The age and sex distribution is as follows.

Table 1: Age and sex distribution of study subjects.

Age range (years)	Sex		Total
	Female	Male	
<20	0 (0%)	2 (2.4%)	2 (2.4%)
20-29	4 (4.7%)	9 (10.6%)	13 (15.3%)
30-39	8 (9.4%)	16 (18.8%)	24 (28.2%)
40-49	6 (7.1%)	13 (15.3%)	19 (22.4%)

50-59	6 (7.1%)	7 (8.2%)	13 (15.3%)
60-69	4 (4.7%)	4 (4.7%)	8 (9.4%)
70-79	1 (1.2%)	2 (2.3%)	3 (3.5%)
80-89	1 (1.2%)	2 (2.3%)	3 (3.5%)
Total	30 (35.4%)	55 (54.6%)	100.0%

The age range of patients in this study is 19 to 83 years with a mean of 43.5±15.56 years. This is similar to findings by Alasia et al[11] (46.2±17.6 years) in a study carried out in this centre and other studies carried out in Nigeria and other developing countries; Alebiosu et al[14] (39.6±14.8 years), Bamgboye[19] (38.6 years). Arogundade[20] (39.9±1.67 years), Ulasi[21] (42.5±15.43 years), Quattara et al[22] (44±10 years).This however, differs from findings in developed countries. Karras et al[23] in a study conducted in France, showed a mean age of 59.8±14.5 years while a United Kingdom review of general practice computerized data revealed a mean age of 57±18.9 years for all stages of CKD[24]. The mean age noted in developed countries is higher which implies an older age of onset of renal failure with incidence of ESRD being higher in elderly people than in the general population [25]. Renal function deteriorates with aging [26]. The extent of age-related glomerular filtration rate (GFR) decline, however, differs between ethnic groups (blacks are more affected than whites) and sexes (males more affected than females)[26]. A total of 79 (92.9%) subjects had formal education. Of this number, 43.5% (n=37) had tertiary education and most of the educated were males (54.1%). (Fig 1)

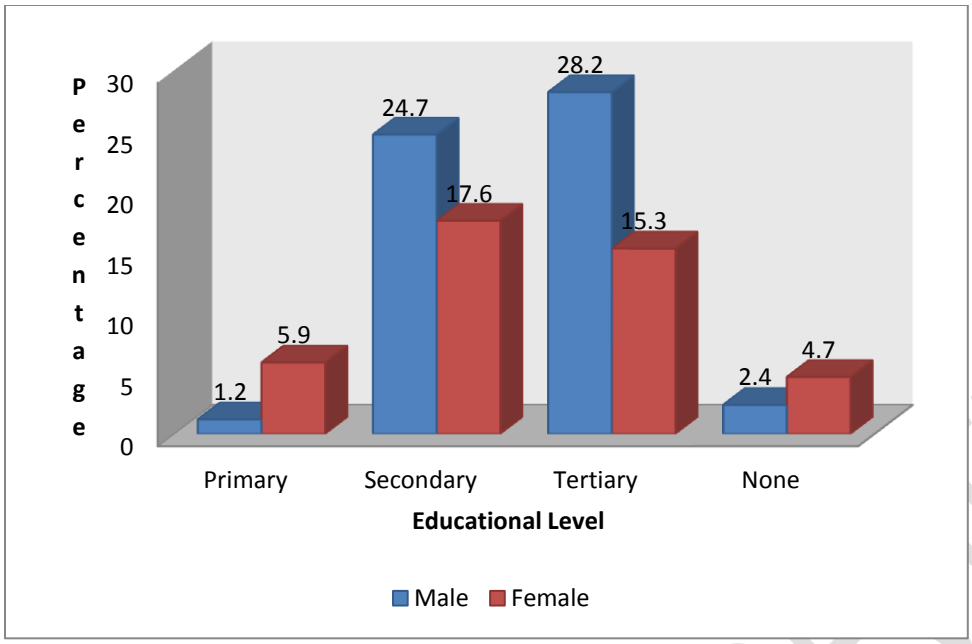

Figure 1: Educational level of study subjects

As shown in Figure 2, 58 (68.2%) subjects were employed Out of those employed, 28 (32.9%) were self-employed. 16 subjects (19%) were unemployed

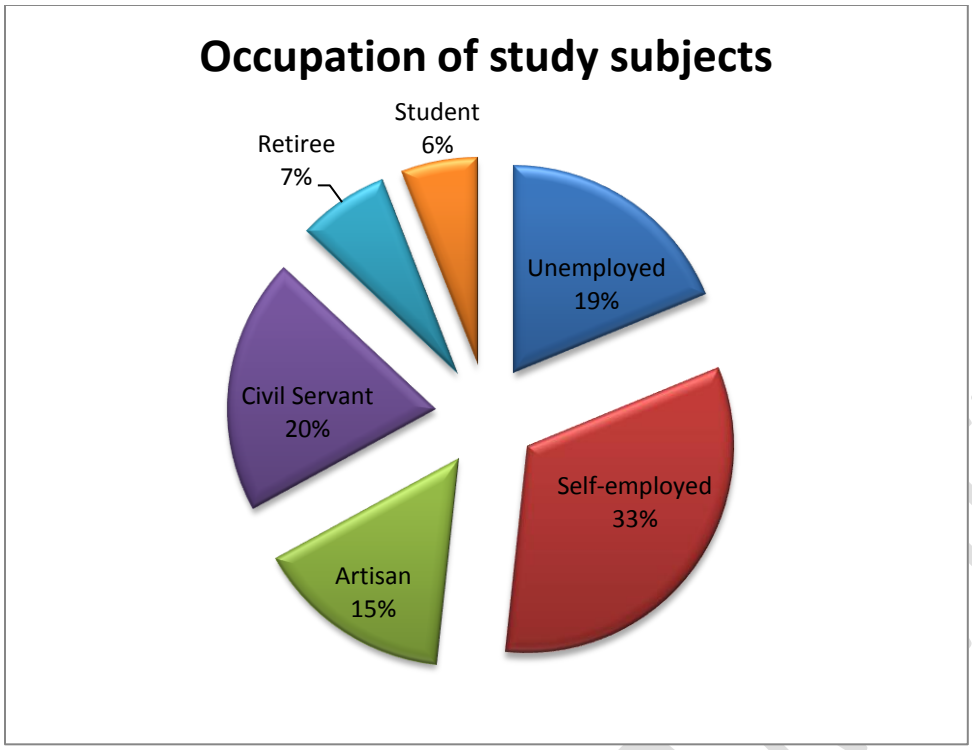

Figure 2: Occupation of study population

Table 2 below shows the causes of chronic kidney disease in the sample population. The commonest cause of renal failure was chronic glomerulonephritis (n=38; 44.7%) followed by hypertension (n-23; 27.1%) then diabetes mellitus (n=11; 12.9%). The least common causes were sickle cell disease and renal carcinoma each contributing 1.2%. Major causes of Chronic Kidney Disease/End Stage Renal Disease tend to occur at a younger age in blacks [21]. The male to female ratio of 1.8:1 found in this study is similar to worldwide data [27]. In Nigeria, Alasia et al[11] in Port Harcourt got a male to female ratio of 1.9; 1; Alebiosu et al[14] in Sagamu; 1.42; 1 and Ulasi et al[28] in Enugu; 1.9; 1. The reasons for this male preponderance are unknown but in Sub-Saharan Africa, families value male more than female members and may therefore spending more money on them for medical treatment.[19] However, it could be due to faster rate of deterioration of kidney function in males with some forms of glomerulonephritis and polycystic kidney disease[26].

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Table 2: Causes of Chronic kidney disease in 85 subjects

Cause of chronic renal failure	Frequency	Percentage
Chronic glomerulonephritis	38	44.7%
Hypertension	23	27.1%
Diabetes Mellitus	11	12.9%
HIV Associated Nephropathy	6	7.1%
Obstructive nephropathy	3	3.5%
Adult polycystic kidney disease	2	2.3%
Sickle cell disease	1	1.2%
Renal carcinoma	1	1.2%
Total	**85**	**100.0%**

The 3 commonest causes of Chronic Kidney Disease in this study were chronic glomerulonephritis (44.7%), hypertension (27.1%) and diabetes mellitus (12.9%).This is in keeping with studies from other hospitals in Nigeria and some developing countries. [17, 29, 30, 31,]. A rise in the percentage contribution of diabetes has however been noted in various centers in Africa, which is consistent with the increase in urbanization and improvement in the living standards in these countries [32]. In Western countries however, diabetes and hypertension alone are the leading causes [2, 6]. Glomerular disease is more prevalent in Africa and this is due to the high prevalence of infection-related nephropathies [3, 4]. These infections include infected scabies, plasmodium malariae, schistosomiasis, mycobacterium leprae, filarial worms, toxoplasmosis and streptococcal organisms [21]. The use of skin lightening creams and herbal remedies is also prevalent in our environment [7].

Study subjects had more than one fundal pathology. The commonest fundus finding was hypertensive retinopathy of different grades seen in a total of 58 (68.2%) subjects, followed by macular edema seen in 31 (36.5%) patients. Only 3 (3.5%) of the study subjects had normal fundoscopic findings.

Human immunodeficiency virus retinopathy was present in half of the patients with Human Immunodeficiency Virus Associated Nephropathy (HIVAN) and Cytomegalovirus (CMV) retinitis was

observed in 1 patient. This is in keeping with worldwide prevalence of HIV retinopathy of 40-60% [53, 54]. Other studies did not report HIV retinopathy or CMV retinitis. This is likely because HIVAN was not reported as a cause of Chronic Kidney Disease/End Stage Renal Disease in patients from other studies [39, 42, 43, 44, 45]. Most (70.8%) of the people living with HIV/AIDS globally live in Sub-Saharan Africa [55].

Table 3: Pattern of fundal findings in study subjects

Fundal finding	Frequency	Percentage
Hypertensive retinopathy		
Grade П	27	31.7%
Grade Ш	17	20.0%
Grade IV	14	16.5%
Diabetic retinopathy		
Moderate non-prolif	1	1.2%
Severe non-prolif	4	4.7%
Proliferative	5	5.9%
HIV retinopathy	6	7.1%
CRVO	1	1.2%
Tractional retinal detachment	1	1.2%
CMV retinitis	1	1.2%
Macular edema	31	36.5%
CSMO	7	8.2%
Glaucoma	4	4.7%
ARMD	3	3.5%

Optic neuropathy	2	2.4%
Diffuse retinal edema	13	15.3%
Normal fundus	3	3.5%

KEY: Non-prolif – non-proliferative

CRVO- central retinal vein occlusion

CMV –cytomegalovirus

CSMO – clinically significant macular oedema

ARMD –age-related macular degeneration

Central retinal vein occlusion was noted in 1 patient. Hypertension is an important risk factor [52, 56]. Other studies did not report retinal vascular occlusion.

Optic neuropathy was observed in 2.4% of study subjects. This is similar to findings in another study.[39]. It was however not reported by other studies [42, 43, 44, 45]

Of the 42% with visual impairment, macular edema from diabetic retinopathy is the leading cause of visual impairment in this study being accountable for half of the cases. Only a few studies assessed visual impairment in association with fundal findings [39, 42]. Other studies reported maculopathy but not macular edema specifically and may have included it with figures for diabetic retinopathy. Maculopathy (Macular edema, CSMO, ARMD) accounts for a total of 22 (52.4%) cases of visual impairment. Maculopathy was reported as a much lower cause of visual impairment (9.7% of subjects) by Bajracharya et al [39] same with Ahmed et al [42] who reported 17%. The difference observed may be racial [57]. The higher prevalence in this study could be due to a high prevalence of hypertensive patients in the study population as hypertension has been shown to worsen diabetic retinopathy [48].

Hypertensive retinopathy stages 3 and 4 were responsible for about a third of cases of visual impairment in this study. This differs from other studies (Bajracharya et al [39] 15%; Ahmed et al [42] 11 %.).This difference may be due to a higher prevalence of hypertension in the study population. Some of the studies only assessed the patients with fundus photograph for retinopathy and did not check for visual impairment [44, 47],

Diabetic retinopathy accounted for 14.3% of patients with visual impairment. This is higher than findings in other studies (Bajracharya et al [39] 3.8%, Vrabec et al [43] 8%, Ahmed et al [42] 13%). The difference observed may be due to diabetic retinopathy being more severe in blacks [57].

The other causes of visual impairment were a case each of retinal detachment secondary to proliferative diabetic retinopathy and CMV retinitis in an HIV patient. The Nepal study [39] also had a case of retinal detachment while other studies did not [42, 43, 44, 45].

Cytomegalovirus retinitis tends to occur in advanced HIV infections. Because of its strong association with both blindness and mortality in HIV patients CMV retinitis is universally acknowledged as the clinically most important ocular complications of AIDS [54].

CONCLUSION:

Chronic Kidney Disease in our center mainly affected males and people in the 3rd to 5th decades of life. Ocular morbidity was mainly due to posterior segment (fundal) pathologies with hypertensive retinopathy topping the list.

COMPETING INTERESTS:

Authors have declared that no competing interests exists

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