

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 consecutive adult patients with chronic renal failure (CRF) 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 CRF while about a quarter (n= 20, 23.5%) had refractive error and difficulty in reading near prints. After diagnosis of CKD 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.

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

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

31

32 **INTRODUCTION:**

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

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

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

51 stage, patients require Renal Replacement Therapy [RRT] in the form of haemodialysis, peritoneal
52 dialysis or renal transplant for continued survival.

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

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

65 **MAYERIALS AND METHODS:**

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

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

71 **INCLUSION CRITERIA**

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

74 **EXCLUSION CRITERIA**

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

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80 The examinations were performed before patients had haemodialysis.
81 Ethical approval was obtained from the institutions ethical committee.
82 Measurement of blood pressure was performed by a renal unit nurse. Administration of questionnaire and
83 obtaining informed consent was carried out. Visual acuity testing and dilatation of patients' pupils with
84 mydriatics was performed. Ocular examination (anterior and posterior segments), intraocular pressure
85 measurement, direct and indirect ophthalmoscopy, fundus photography were all performed and at the end
86 data was entered into spread sheets for analysis. They were later fed into the database of the public
87 domain statistical software package for epidemiology, EPI info (version7.14) designed by the Centre for
88 disease control and Prevention in Atlanta, Georgia (USA) and analysed with the aid of a statistician.
89 Frequency was presented in percentages. Mean and standard deviations were calculated for descriptive
90 and comparative purposes. Statistical significance was tested using the chi-square test. P-value < 0.05
91 was taken as statistically significant.

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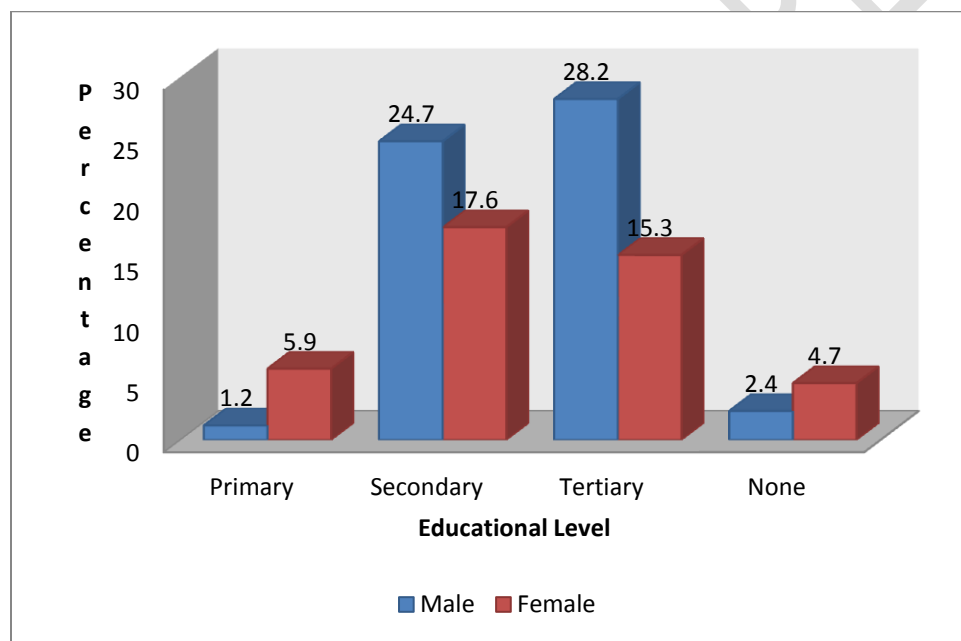
93 **RESULTS AND DISCUSSION:**

94 170 eyes of 85 patients were included in the study. The age and sex distribution is as follows.

95 **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%

96 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
97 to findings by Alasia et al[11] (46.2 ± 17.6 years) in a study carried out in this centre and other studies
98 carried out in Nigeria and other developing countries; Alebiosu et al[14] (39.6 ± 14.8 years), Bamgboye[19]
99 (38.6 years). Arogundade[20] (39.9 ± 1.67 years), Ulasi[21] (42.5 ± 15.43 years), Quattara et al[22] (44 ± 10
100 years). This however, differs from findings in developed countries. Karras et al[23] in a study conducted in
101 France, showed a mean age of 59.8 ± 14.5 years while a United Kingdom review of general practice
102 computerized data revealed a mean age of 57 ± 18.9 years for all stages of CKD[24]. The mean age noted
103 in developed countries is higher which implies an older age of onset of renal failure with incidence of
104 ESRD being higher in elderly people than in the general population [25]. Renal function deteriorates with
105 aging [26]. The extent of age-related glomerular filtration rate (GFR) decline, however, differs between
106 ethnic groups (blacks are more affected than whites) and sexes (males more affected than females)[26].

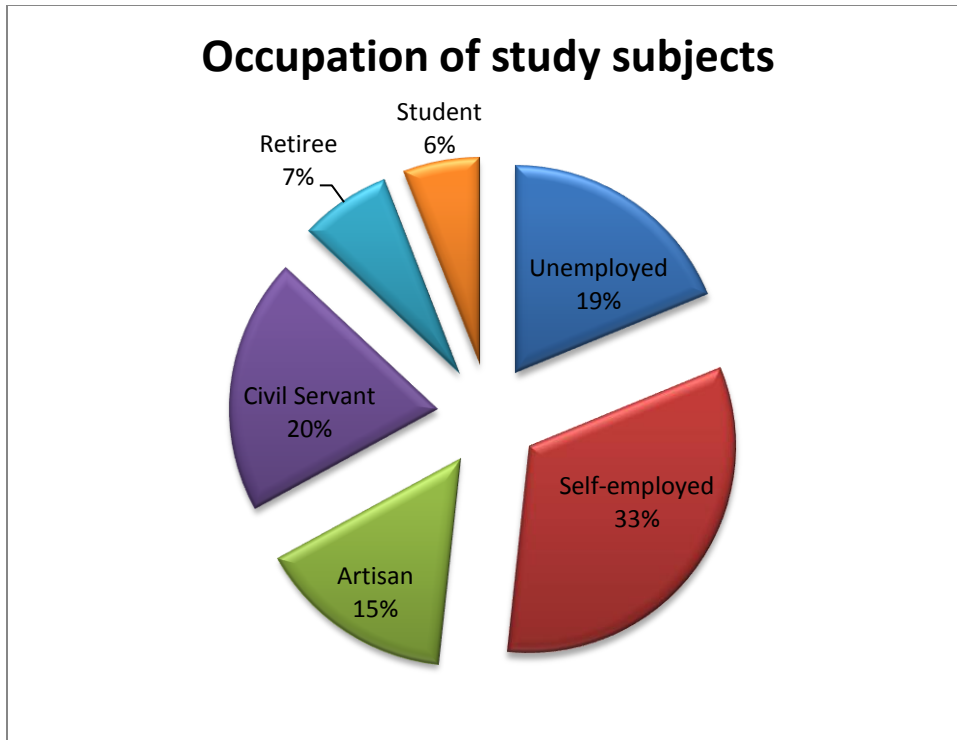


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108 **Figure 1: Educational level of study subjects**

109 A total of 79 (92.9%) subjects had formal education. Of this number, 43.5% (n=37) had tertiary education
110 and most of the educated were males (54.1%). (Fig 1)

111



112

113 **Figure 2: Occupation of study population**

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

116 **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%

126

127 Table 2 above shows the causes of chronic kidney disease in the sample population. The commonest
128 cause of renal failure was chronic glomerulonephritis (n=38; 44.7%) followed by hypertension (n=23;
129 27.1%) then diabetes mellitus (n=11; 12.9%). The least common causes were sickle cell disease and
130 renal carcinoma each contributing 1.2%. Major causes of CKD/ESRD tend to occur at a younger age in
131 blacks [21].

132 The male to female ratio of 1.8:1 found in this study is similar to worldwide data [27]. In Nigeria, Alasia et
133 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
134 et al[28] in Enugu; 1.9; 1. The reasons for this male preponderance are unknown but in Sub-Saharan
135 Africa, families value male more than female members and may therefore spending more money on them
136 for medical treatment.[19] However, it could be due to faster rate of deterioration of kidney function in
137 males with some forms of glomerulonephritis and polycystic kidney disease[26].

138 The 3 commonest causes of CKD in this study were chronic glomerulonephritis (44.7%), hypertension
139 (27.1%) and diabetes mellitus (12.9%).This is in keeping with studies from other hospitals in Nigeria and
140 some developing countries. [17, 29, 30, 31,] A rise in the percentage contribution of diabetes has
141 however been noted in various centers in Africa, which is consistent with the increase in urbanization and
142 improvement in the living standards in these countries [32]. In Western countries however, diabetes and
143 hypertension alone are the leading causes [2, 6]. Glomerular disease is more prevalent in Africa and this
144 is due to the high prevalence of infection-related nephropathies [3, 4]. These infections include infected
145 scabies, plasmodium malariae, schistosomiasis, mycobacterium leprae, filarial worms, toxoplasmosis and
146 streptococcal organisms [21]. The use of skin lightening creams and herbal remedies is also prevalent in
147 our environment [7].

148 **Table 3: Pattern of fundal findings in study subjects**

149	Fundal finding	Frequency	Percentage
150	Hypertensive retinopathy		
151	Grade II	27	31.7%
152	Grade III	17	20.0%
153	Grade IV	14	16.5%

154	Diabetic retinopathy		
155	Moderate non-prolif	1	1.2%
156	Severe non-prolif	4	4.7%
157	Proliferative	5	5.9%
158	HIV retinopathy	6	7.1%
159	CRVO	1	1.2%
160	Tractional retinal detachment	1	1.2%
161	CMV retinitis	1	1.2%
162	Macular oedema	31	36.5%
163	CSMO	7	8.2%
164	Glaucoma	4	4.7%
165	ARM D	3	3.5%
166	Optic neuropathy	2	2.4%
167	Diffuse retinal oedema	13	15.3%
168	Normal fundus	3	3.5%

169

170 **KEY:** Non-prolif – non-proliferative

171 CRVO- central retinal vein occlusion

172 CMV –cytomegalovirus

173 CSMO – clinically significant macular oedema

174 ARM D –age-related macular degeneration

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

178 Human immunodeficiency virus retinopathy was present in half of the patients with HIVAN and CMV
 179 retinitis was observed in 1 patient. This is in keeping with worldwide prevalence of HIV retinopathy of 40-
 180 60% [53, 54]. Other studies did not report HIV retinopathy or CMV retinitis. This is likely because HIVAN
 181 was not reported as a cause of CKD/ESRD in patients from other studies [39, 42, 43, 44, 45] Most
 182 (70.8%) of the people living with HIV/AIDS globally live in Sub-Saharan Africa [55].

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

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

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

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

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

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

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

210 **CONCLUSION:**

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

214 **COMPETING INTERESTS:**

215 Authors have declared that no competing interests exists

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