

# VISUAL ACUITY AND IMPAIRMENT AMONG HYPERTENSIVE ADULTS IN OKAGWE OHAFIA, ABIA STATE, NIGERIA

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## **ABSTRACT**

The objective of this study is to determine the level of reduction in visual acuity and visual impairment arising from ocular diseases among adults with hypertension. A community based study was conducted in a rural community in Abia State, Nigeria. A total of 213 subjects were screened for ocular diseases and impairments. Eighty seven (40.8%) males and 126 (59.2%) females were used for the study. The demographic data of the participants were taken. Furthermore, the arterial blood pressure was measured using the KODEA electronic sphygmomanometer. The case history of those who participated in the study, the visual acuity and other ocular examinations were taken. Out of the 213 subjects used for this study, 117 subjects had high blood pressure comprising of 54 (46.2%) males and 63 (53.8%) females. The visual acuity of both right and left eyes of the subjects with hypertension revealed a poor or absent visual acuity of 6/60 or less was seen in 58% of the male subjects and 53.9% of the female subjects. The major causes of visual impairment in this population were attributed to cataract and glaucoma which was present in 37.6% and 32.8% of the subjects respectively. Other associated factors of visual impairment recorded were hypertensive retinopathy, optic neuropathy, macular degeneration and diabetic retinopathy.

**KEYWORDS:** *Hypertension, glaucoma, retinopathy, cataract, optic neuropathy.*

## **INTRODUCTION**

Hypertension is health disorder in which there is a persistently raised blood pressure exceeding about 140mmHg of systolic pressure and 90mmHg of diastolic pressure at rest<sup>1</sup>. Hypertension is a common health problem with sometimes, devastating consequences, and often remains asymptomatic until late in its course. In Nigeria, hypertension is the commonest non-

communicable disease with a prevalence of about 20-25 percent in adult Nigerians. The prevalence is higher in the Southern Nigeria, compared to the North<sup>2</sup>. Hypertension confers cardiovascular risk by causing target-organ damage that includes retinopathy, heart disease, stroke, renal insufficiency and peripheral vascular disease. In the eyes, hypertension causes hypertensive retinopathy, hypertensive optic neuropathy and hypertensive choroidopathy<sup>3,4</sup>. The fundus features commonly seen in hypertensive retinopathy include focal and generalized arteriolar narrowing, microaneurysms, intra-retinal hemorrhages, cotton-wool spots, hard exudates and optic disc swelling<sup>5,6</sup>. Abnormal vascular permeability produces flame-shaped hemorrhages, retinal edema and lipid exudates<sup>6</sup>. The deeper blot hemorrhages appear with progression of hypertension and indicate worsening ischaemia. In hypertensive optic neuropathy, there is bilateral disc swelling or papilledema. This represents grade IV of hypertensive retinopathy or could appear in isolation without<sup>7</sup>. The features of hypertensive choroidopathy are choroidal vascular sclerosis, Elschnig spots representing focal areas of degenerative retinal pigment epithelium and the diffuse patchy atrophic retinal pigment epithelial degeneration of chronic hypertension<sup>3</sup>. These features are less recognized than retinopathy and are indicative of a poor prognosis. Other ocular conditions that are secondary to systemic hypertension include retinal vein occlusion, retinal arterial macroaneurysm, non-arteritic anterior ischaemic optic neuropathy and diabetic retinopathy<sup>8</sup>. Retinal vein occlusions occur most commonly at the level of the lamina cribrosa and commonly present with sudden painless visual loss or field defect. The signs include engorged tortuous retinal veins, superficial flame retinal hemorrhages, retinal edema, cotton wool spots and disc swelling<sup>6</sup>. Retinal arterial macroaneurysms are acquired focal dilatation of retinal arterioles. They are commonly seen in hypertensive retinopathy giving rise to a star shaped exudation and sometimes complicated by pre-

retinal or intravitreal hemorrhage. Non-arteritic anterior ischemic optic neuropathy presents with unilateral painless disc swelling followed by disc pallor and irreversible visual loss<sup>7,9</sup>.

Visual acuity is defined as the resolving power of the eye, or the ability to see two separate objects as separate. It is often referred to as the minimum separable (as opposed to the minimum visible).

The universal method of measuring visual acuity involves the use of the Snellen acuity chart<sup>10</sup>.

Visual acuity can also be presented in percentage, decimal and Logmar.

## **MATERIALS AND METHODS**

Okagwe Ohafia is located in Arochukwu/Ohafia Local Government Area of Abia state, in the southeast geographical area of Nigeria. The people are Igbo speaking with a rich cultural heritage. Cultural festivals include the new yam festival, *igba ekpe*, and the *egwu onwa* music<sup>11</sup>.

It is an autonomous community headed by a traditional ruler. Okagwe Ohafia people are traditionally farmers. Traders, civil servants, teachers, transport workers and various other occupations can also be found among the people. A total of 213 subjects assembled at the health center at Okagwe Ohafia for this study. A complete case history was taken on each subject. Those who had a history of hypertension were noted. The blood pressure was taken with the use of KODEA electronic sphygmomanometer. The eye was examined with the ophthalmoscope and retinoscope to take note of any pathological condition and to correct any refractive error. The visual acuity was then taken with the Snellen visual acuity chart. The visual acuity recorded was however, in the decimal visual acuity form for easy presentation of results. Thus, a Snellen visual acuity of 6/6 represents a decimal visual acuity of 1.0 and a Snellen visual acuity of 6/60 represents a decimal visual acuity of 0.1 and so on.

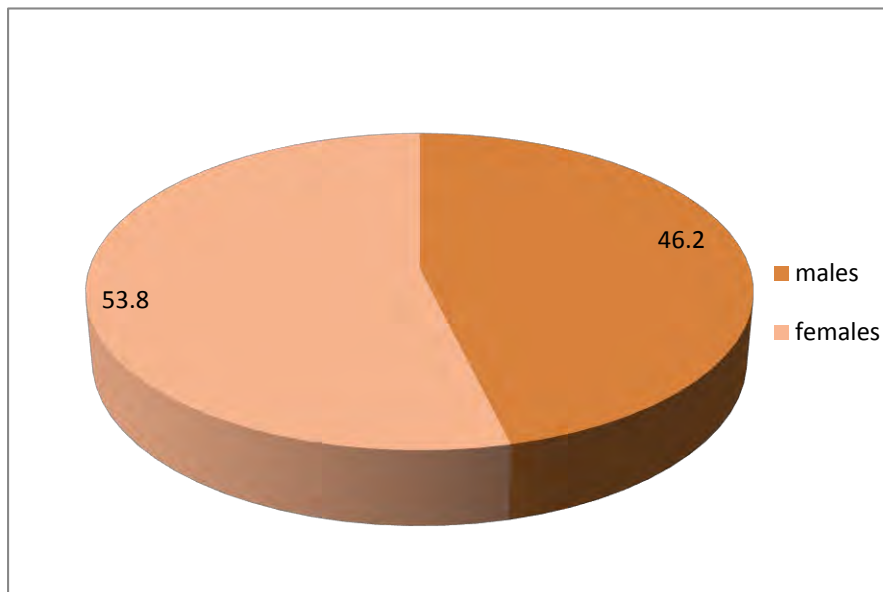
## RESULTS

Out of the 213 subjects examined, 87 were males making up 40.8% while 126 were females making up 59.2%. From this number, a total of 117 subjects had high blood pressure, 54 of them were males making up 46.2% and 63 were females making up 53.8%. This is shown in figure 1. The visual acuity of both right and left eyes of each subject was taken in which a total of 234 eyes; 108 from 54 male subjects and 126 from 63 female subjects were measured. Table 1 shows that 63 eyes (58.3%) of the male subjects and 68 eyes (53.9%) of the female subjects had a very poor or absent visual acuity falling within the range of 0-0.1. Table 1 also shows 9 eyes (8.3%) of the male subjects and 6 eyes (4.8%) having a good visual acuity within the range of 0.76-1.0. This is also clearly shown in figure 3. In figure 2, the percentage frequencies of the visual acuity for both male and female subjects are shown in which 56% of the eyes measured had a very poor or absent visual acuity. Some of the causes of the reduction in visual acuity are shown in Table 2. Cataract had the highest frequency of 44 (37.6%) of the hypertensive subjects. Glaucoma closely followed with 38 subjects making up 32.8%. Hypertensive retinopathy was seen in 4 subjects (3.4%) and optic neuropathy was present in 8 subjects (6.8%). Other causes of visual impairment found are diabetic retinopathy, macular degeneration and cornea opacity. Figure 4 is a bar chart showing the clear distribution of the diseases causing visual impairment.

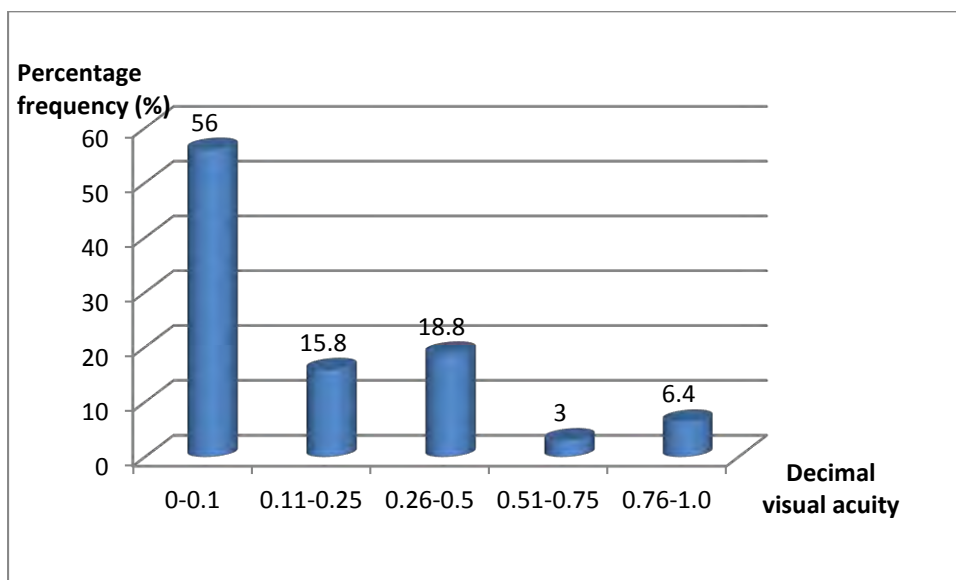
**Table 1: Frequency distribution of the visual acuity of both right and left eyes of the subjects with hypertension**

Decimal visual acuity	Male (Right and left eyes)		Female (Right and left eyes)	
	Frequency	Percentage frequency	Frequency	Percentage frequency
0-0.1	63	58.3	68	53.9
0.11-0.25	9	8.4	28	22.2
0.26-0.5	24	22.2	20	15.9
0.51-0.75	3	2.8	4	3.2
0.76-1.0	9	8.3	6	4.8
Total	108	100	126	100

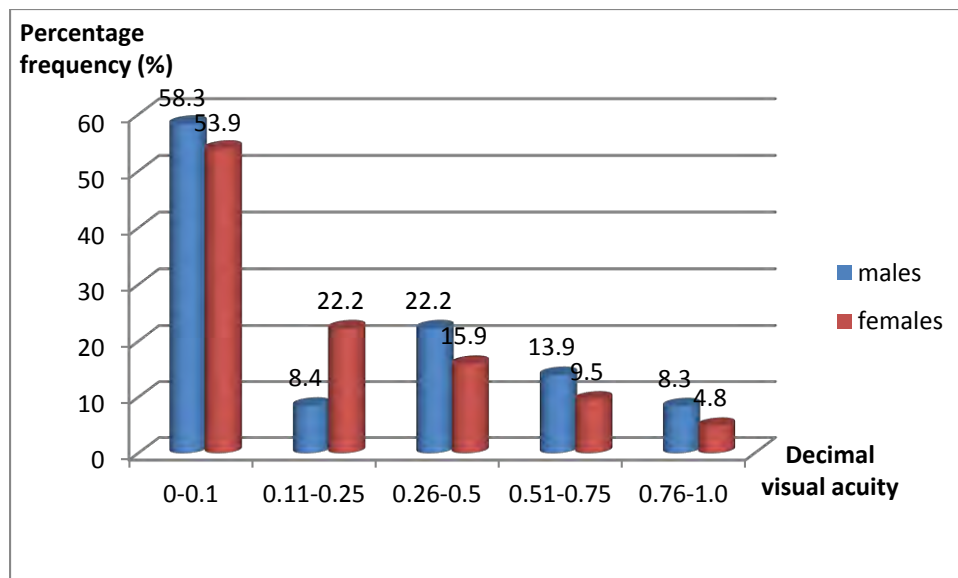
The table above shows the decimal visual acuity of the 117 subjects (234 eyes) with hypertension. A total of 108 eyes from 54 male subjects and 126 eyes from 63 female subjects were recorded. From the table, a decimal visual acuity of 0-0.1 corresponds to a visual acuity of 6/60 or worse in the Snellen chart. A decimal visual acuity of 0.25, 0.5 and 1.0 corresponds to a visual acuity of 6/24, 6/12 and 6/6 respectively. The frequency and percentage frequencies are shown for each decimal visual acuity range.



**Fig 1: Distribution of male and female subjects with hypertension in the study population**



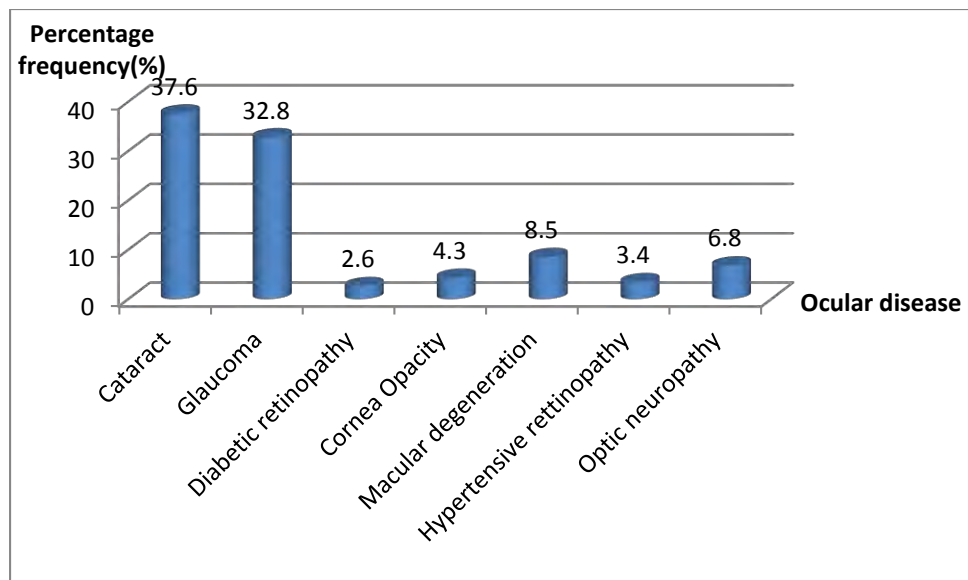
**Fig 2: Distribution of visual acuity of subjects with hypertension in the study population**



**Fig 3: Frequency of the visual acuity of male and female subjects with hypertension**

**Table 2: Ocular diseases associated with the hypertensive subjects studied**

Ocular disease	Frequency	Percentage frequency
Cataract	44	37.6
Glaucoma	38	32.8
Diabetic retinopathy	3	2.6
Cornea Opacity	5	4.3
Macular degeneration	10	8.5
Hypertensive retinopathy	4	3.4
Optic neuropathy	8	6.8



**Fig 4: Distrubtion of ocular diseases among the hypertensive subjects**



**Fig 5: A Subject being examined at Okagwe Ohafia Community Health Center by Dr. Azuamah Y.C.**

## DISCUSSION

The ages of the subjects used for this data were 20 years and above with a mean age of 57.4. A total of 117 subjects representing 54.9% of the total subjects studied had high blood pressure. A very high percentage of the male and female subjects' eyes with hypertension (58.3% and 53.9% respectively) showed a very poor visual acuity of 6/60 (0.1) or worse. A best corrected visual acuity of 6/60 (0.1) or worse was seen in 43 eyes (40.1%) in a study of patients with nonarteritic anterior ischemic optic neuropathy which results from hypertension<sup>7</sup>. From figure 3, the visual acuity of the eyes of the male and female subjects can be compared. The percentage frequencies for the male and female subjects were found to be close with the males being slightly higher. This reduction in visual acuity can be attributed the impairment of the ocular tissues as a result of the diseases shown in figure 4. Cataract had the highest percentage frequency of 37.6%. A 35 to 50% incidence of cataract formation was observed in several groups of salt-sensitive rats over a 4 year period<sup>12</sup>. Glaucoma was observed in 32.8% of the subjects. A 62.8% prevalence of cataract and 11% prevalence of glaucoma was observed in a study of the epidemiology of blinding eye diseases in Cross Rivers state Nigeria<sup>13</sup>. In a study on the provision of Low Vision services in the department of ophthalmology university of Calabar teaching hospital Nigeria, 11% of the patients was observed to have cataract, 25% had glaucoma, 3% had macular degeneration and 4% had optic atrophy<sup>14</sup>. Mitchell et al recorded a 5.4% prevalence of open angle glaucoma in a study to assess whether systemic hypertension is associated with open angle glaucoma<sup>16</sup>. Langman et al found that hypertension was significantly more common in patients with glaucoma<sup>17</sup>. In a study to assess the visual function in idiopathic intracranial hypertension, the visual acuity and visual field was carried out. Visual field defects and visual loss were noted in 87% of the patients<sup>18</sup>.

Hypertensive retinopathy is the major ocular disease resulting directly from hypertension and in this study, it was found in 3.4% of the subjects with hypertension. Foster et al diagnosed only 3 patients (8.6%) with hypertensive retinopathy in a study to determine the prevalence and severity of hypertensive retinopathy among hypertensive children<sup>19</sup>. Besharati reported 39.9% prevalence of hypertensive retinopathy in a study carried out in Iran<sup>9</sup>. A case study of young adult patients attending a missionary hospital in Nigeria revealed 4% of the subjects having retinopathy with a reduction in vision<sup>21</sup>. Optic neuropathy which also results from hypertension was seen in 6.8% of the subjects. Rasdi et al in a study to determine the visual outcome in hypertensive disorders in pregnancy found that majority of the women studied had a good visual acuity during antenatal and postnatal period<sup>8</sup>. These ocular diseases that cause visual impairment reduce the visual acuity and lead to blindness and must be managed together with the hypertension to prevent any further loss of vision or visual field. Hypertension is a common disease in this part of the world and proper health education is important to enlighten people especially in the rural areas of the devastating effects it has on the eyes and the need for early and proper management of this disease.

## REFERENCES

1. Park K. *Park's Textbook of Preventive and Social Medicine*, Bhanot Publishers, 20<sup>th</sup> ed, 2009, 323-328.
2. Amadi A.N. Environmental Health and Sanitation as Panacea to Disease Control and Prevention, 24<sup>th</sup> Public Lecture of the Federal University of Technology, Owerri, Imo State, delivered on Tuesday 31<sup>st</sup> May 2011.

3. Chartterjee S., Chattopadhyaya S., Hope-Ross, Lip P. Hypertension and the eye: changing perspectives, *Journal of Human Hypertension*, 2002, 16(10): 667-675.
4. Kumar, Abbas, Fausto. *Pathologic Basis of Disease*. 7<sup>th</sup> ed, Saunders Company, 2008, 1189-1206.
5. Amer A., Al-Droos M. Prevalence of hypertensive retinopathy in Prince Zaid bin Al-Hussein hospital, *Internal Medicine*, 2007, 4(3): 134-141.
6. Kanski J. *Clinical Ophthalmology*, 3<sup>rd</sup> ed, Butterworth-Heinemann, 1998, 346-351.
7. Falavarjani K.G., Sanjari M.S., Modarres M., Aghamohammadi F. Clinical Profile of Patients with Nonarteritic Anterior Ischemic Optic Neuropathy Presented to a Referral Center from 2003 to 2008, *Archives of Iranian Medicine*, 2009, 12(5): 472-477.
8. Rasdi A., Nik-Ahmad N., Bakiah S., Shatriah I. Hypertensive retinopathy and visual outcome in hypertensive disorders in pregnancy, *Medical Journal of Malaysia*, 2011, 66(1): 42-47.
9. Besharati M.R., Shoja M.R. Prevalence of retinopathy in hypertensive patients, *Saudi Medical Journal*, 2006, 27(11): 1725-1728.
10. Lee D.J., Gomee-Marin O., Lam B.L., Zheng D. Visual Acuity Impairment and Mortality in U.S Adults. *Archives of Ophthalmology*, 2002, 120:1544-1550.
11. Ohafia Forum (2010). *Ohafia Local Government Area: Its rich cultural heritage*, 6(2):28.
12. Rodriguez-Sargent C., Cangiano J.L., Caban G.B., Marrero E., Martinez-Maldonado M. Cataracts and hypertension in salt-sensitive rats. A possible ion transport defect, *Hypertension*, 1987, 9: 304-308.
13. Ekpenyong B.N. Epidemiology of blinding eye diseases in Cross Rivers State, Nigeria as seen in University of Calabar teaching hospital, *Journal of the Nigerian Optometric Association*, 2006, 13:28-36.

14. Ekpenyong B.N., Ndukwe O.C. Provision of vision services in the Department of Ophthalmology, University of Calabar Teaching Hospital, *Journal of Nigerian Optometric Association*, 2010, 16:34-39.
15. Azuamah, Y.C., Amadi, A.N., Amadi, C.O.A. Diabetes mellitus and some of its effect on the eyes among adults of rural communities at Ohafia L.G.A of Abia State Nigeria, *International Journal of Advanced Medical Sciences and Applied Research*, 2011, 11(1):13-29.
16. Mitchell P., Lee A.J., Rochtchina E., Wang J.J. Open-angle glaucoma and systemic hypertension: the blue mountains eye study, *Journal of Glaucoma*, 2004, 13(4): 319-326.
17. Langman M.J., Lancashire R.J., Cheng K.K., Stewart P.M. Systemic hypertension and glaucoma: mechanisms in common and co-occurrence, *British Journal of Ophthalmology*, 2005, 89: 960-963.
18. Rowe F.J., Sarkies N.J. Assessment of visual function in intracranial hypertension: A prospective study, *Eye*, 1998, 12:111-118.
19. Foster B.J., Ali H., Mamber S., Polomeno R.C., Mackie A.S. Prevalence and severity of hypertensive in children, *Clinical Pediatrics*, 2009, 48(9): 926-930.
20. Ekore R.I., Ajayi I.O., Arije A. Case finding of hypertension in young adult patients attending a missionary hospital in Nigeria, *African Health Science*, 2009, 9(3): 193-199.
21. Okpala N.C, Okpala A.M. Incidence of hypertension in Taura, Northern Nigeria: Lessons for our health care, *International Journal of Medicine and Medical Sciences*, 2010, 2(10): 281-284.