

The relationship between demographic parameters and optic disc findings in neuro-ophthalmic patients in Port Harcourt, Nigeria: Initial report

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Abstract

Background: Neuro-Ophthalmology subspecialty is a newly established Unit at the Eye Department of University of Port Harcourt Teaching Hospital. There are hardly any data on neuro-ophthalmic conditions in our environment, so this study will provide the much needed baseline data for future reference.

Aim: This is an initial report to identify the spectrum of optic disc findings and determine their relationship with demographic characteristics (age and gender) of patients seen at the Neuro-ophthalmology Clinic of University of Port Harcourt Teaching Hospital.

Methodology: This was a hospital-based cross-sectional study with minimum sample size calculated using the formula for cross-sectional studies. Using the 95% level of significance, estimated proportion of 0.5, level of precision of 0.10 and non-response rate of 80%; a sample size of 133 was appropriate for the index study. One hundred and thirty three case notes with complete records were retrieved and data extracted on age, sex, presenting symptoms and signs, visual acuity, fundus findings, investigation results, diagnosis and treatment. Data was analyzed with SPSS version 20 and a p-value of 0.05 considered significant.

Results: There were 133 patients with a mean age of 37.50 ± 17.51 . There were 70 males and 63 females. Most patients had disc pallor - constituting 51.8%; others were disc edema (3.8%), papilledema (3.8%), hyperemia and perivascular sheathing. Fifty-two patients (39.1%) however had normal discs. Disc pallor (64.4%) and temporal disc pallor (66.7%) were commoner in males; but papilledema was commoner in females (80%). These differences were statistically significant ($p=0.048$).

Conclusion: Optic disc findings in neuro-ophthalmic patients this study shows that disc pallor was associated more with the male gender while papilledema was commoner in females.

Keywords: Demographics, fundus findings, neuro-ophthalmic patients

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Received: 28.09.2018, **Accepted:** 03.12.2018

INTRODUCTION

Optic neuropathy including optic atrophy constitutes one of the main causes of visual impairment or blindness in

the world. Optic disc pallor is the manifestation of partial or total optic atrophy and is a consequence of loss of nerve fibres, overgrowth of glial tissue and diminished amount of

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Quick Response Code:	Website: www.phmj.org
	DOI: 10.4103/phmj.phmj_18_18

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How to cite this article: Pedro-Egbe CN, Chukwuka IO. The relationship between demographic parameters and optic disc findings in neuro-ophthalmic patients in Port Harcourt, Nigeria: Initial report. Port Harcourt Med J 2018;12:107-110.

blood at the disc.¹ Using ophthalmoscopy, optic atrophy has classically been described into primary if the disc margin is clearly delineated and the disc dead white, and secondary, if the margin is blurred and the disc a greyish colour.^{1,2} It has been stated that pallor should not be the only criterion for optic atrophy; that in addition, there should be diminished visual acuity and visual field changes, and recession of the disc before such diagnosis can be made.¹ With appropriate investigation, the aetiology of most unexplained disc pallor can be known as was demonstrated by Lee *et al.* in their multicentre study.³ Age, gender and race are often the first clues to the diagnosis of optic atrophy as some optic atrophies are more common in males and within some certain age groups.⁴

Age is said to be probably the most important demographic parameter in the aetiology of disc pallor.² Many neuro-ophthalmic diseases have a clear sex predilection, which is important to recognise in making the diagnosis based on risk stratification and understanding the pathogenesis of the disease.⁵ Gender is said to act as a guide in favour of one diagnosis over another as seen in some neuro-ophthalmic cases such as Leber's hereditary optic neuropathy, traumatic neuropathy, toxic neuropathy and nutritional deficiency – all more common in males, and multiple sclerosis, meningioma, autoimmune/collagen vascular disorders, Sheehan syndrome, eclampsia – more common in females.^{2,5} The type and severity of optic neuropathy has also been shown to have ethnic variation – Blacks being found to have lower incidence of ischemic optic neuropathy and also lower incidence of severe visual loss secondary to idiopathic intracranial hypertension (IIH) than Caucasians.⁶ Overall optic atrophy was reported to be more prevalent in African-Americans (0.3%) than Whites (0.05%).⁶

METHODOLOGY

A retrospective chart review was performed of all neuro-ophthalmic patients seen at the Eye Clinic of University of Port Harcourt Teaching Hospital over a 3-year period (July 2015 to June 2018). One hundred and thirty-three (*n* = 133) patients were examined during this period. Data were collected and analysed on age, sex and history of systemic disease such as diabetes mellitus, hypertension and cerebrovascular disease. The details of the systemic diseases were extracted from the patient charts. Ocular examination data were collected on the presenting symptoms and signs, duration of symptoms, visual acuity, intraocular pressure, pupillary light reaction, fundal findings, investigation results, diagnosis and treatment. Exclusion criteria included case files with incomplete records. These were entered into

Microsoft Excel and exported to the Statistical Package for the Social Sciences (SPSS) version 20 for the analysis (IBM Corporation, Chicago, IL, USA). Data presentation involved tables and charts. Two-tailed Fisher's exact test was used to determine the relationship between age and gender categories and optic disc findings. The mean ages of patients according to optic disc findings were determined and compared using one-way analysis of variance. *P* = 0.05 was considered statistically significant, and confidence interval was determined at 95% level.

RESULTS

There were 133 patients ranging in age from <1 to 79 years. There were 70 male and 63 female giving a male:female ratio of 1.1:1. The mean age was 37.50 ± 17.51. The age group 20–39 had the highest representation (*n* = 56; 42.1%), followed by 40–59 (*n* = 34; 25.6%) [Figures 1 and 2].

Table 1 shows the optic disc findings in the study participants. Most of the patients had disc pallor (either generalised or temporal pallor) constituting 51.8%. Fifty-two patients (39.1%) had normal discs, whereas others' fundus findings were disc oedema (3.8%), papilloedema (3.8%) and hyperaemia and perivascular sheathing (0.8% each).

In Figure 3, the mean ages of the patients according to the optic disc findings are shown. The mean ages of those

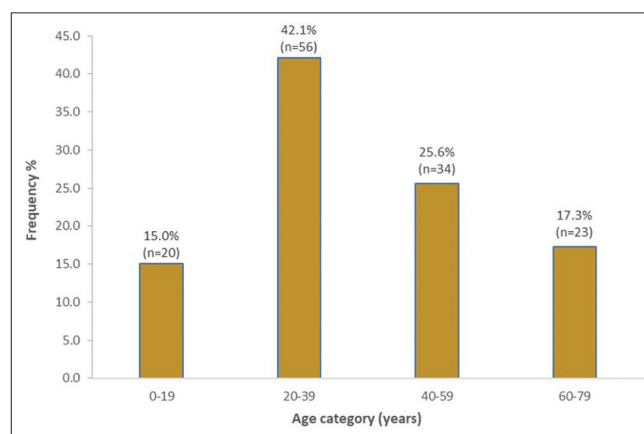


Figure 1: Age distribution of patients in the study

Table 1: Optic disc findings

Variable	Frequency	Percentage (95% CI)
Normal	52	39.0 (30.8-47.9)
Disc pallor	45	33.8 (25.9-42.5)
Temporal disc pallor	24	18.0 (11.9-25.6)
Disc oedema	5	3.8 (1.2-8.6)
Papilloedema	5	3.8 (1.2-8.6)
Hyperaemic disc	1	0.8 (0.0-4.1)
Perivascular sheathing	1	0.8 (0.0-4.1)
Total	133	100.0

CI: Confidence interval

with disc pallor and optic disc oedema were 43.2 and 45.2, respectively. Those with hyperaemic discs were the youngest with a mean age of 20 years. The relationship between mean age and optic disc findings was, however, not statistically significant ($P = 0.11$).

Table 2 shows the relationship between demographic characteristics (age and gender) and optic disc findings. Most patients with normal discs were in the 20–39 year age category ($n = 39$; 75.0%). Disc pallor was the most common in those aged 40–79 years ($n = 25$; 56.8%), whereas temporal disc pallor was seen mainly in those within the age categories 20–39 years ($n = 12$; 50.0%). Sixty per cent of those with papilloedema were in the 20–39-year-old group. These were, however, not statistically significant (Fisher's exact test = 17.791; $P = 0.394$). Disc pallor ($n = 29$; 64.4%) and temporal disc pallor ($n = 16$; 66.7%) were more common in males whereas papilloedema was more common in females ($n = 4$; 80%). These differences were statistically significant (Fisher's exact test = 11.015; $P = 0.048$).

DISCUSSION

Over 50 years ago, Rose posited that pallor of the optic disc was a physical sign and not a diagnosis and that congenital

and genetic optic atrophy were more common in males.¹ According to him, the three possible causes of optic disc pallor are overgrowth of glial tissue, degeneration of nerve fibres and diminished amount of blood at the disc and that in temporal atrophy, the macular fibres are selectively damaged.

The result of this study clearly shows that the most common optic disc finding in these neuro-ophthalmic patients is optic disc pallor, and most patients with optic disc pallor were young adult males whose ages ranged from 20 to 39 years, whereas papilloedema was noted in younger female patients. The disc pallor was either generalised pallor or limited to the temporal disc. Other optic disc findings were disc oedema, papilloedema or hyperaemia, which were noted in a few patients. About two-fifths of the patients, however, had normal discs. These differences were, however, not statistically significant. Disc pallor and temporal disc pallor were found to be more common in males, whereas papilloedema was more common in females, and these differences were statistically significant ($P = 0.048$). These findings have also been reported in previous studies where papilloedema and IIIH are noted to be more common in females^{7,8} and in some

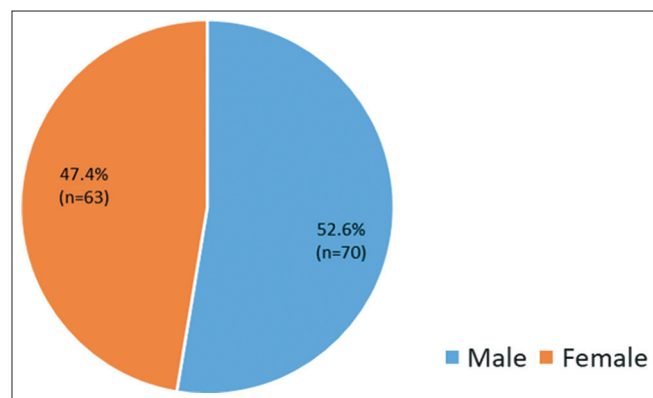


Figure 2: Gender distribution of patients in the study

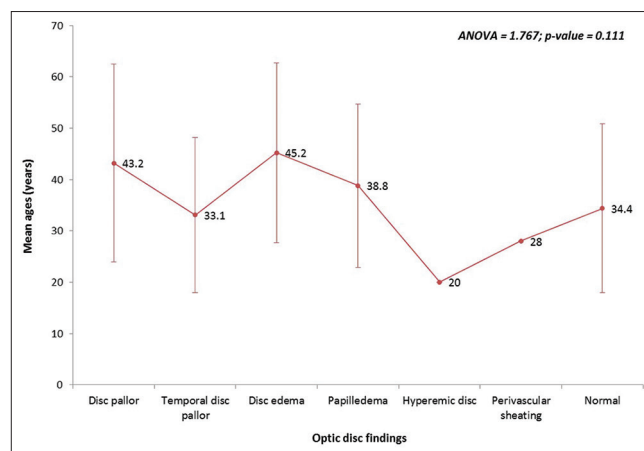


Figure 3: Mean age by optic disc finding ±1SD

Table 2: Relationship between demographic characteristics (age category and sex) and optic disc findings

Demographic characteristics	Normal, n (%)	Disc pallor, n (%)	Temporal disc pallor, n (%)	Disc oedema, n (%)	Papilloedema, n (%)	Hyperaemic disc, n (%)	Perivascular sheathing, n (%)	Total, n (%)
Age category (years)								
0-19	8 (40.0)	7 (35.0)	5 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	20 (100)
20-39	25 (44.6)	12 (21.4)	12 (21.4)	2 (3.6)	3 (5.4)	1 (1.8)	1 (1.8)	56 (100)
40-59	14 (41.2)	13 (38.2)	5 (14.7)	1 (2.9)	1 (2.9)	0 (0.0)	0 (0.0)	34 (100)
60-79	5 (21.7)	12 (56.5)	2 (8.7)	2 (8.7)	1 (4.3)	0 (0.0)	0 (0.0)	24 (100)
Fisher's exact test, P	17.791, 0.394							
Sex								
Male	22 (31.4)	29 (41.4)	16 (22.9)	2 (2.9)	1 (1.4)	0 (0.0)	0 (0.0)	70 (100)
Female	30 (47.6)	16 (25.4)	8 (12.7)	3 (4.8)	4 (6.3)	1 (1.6)	1 (1.6)	63 (100)
Fisher's exact test, P	11.015, 0.048*							

*Statistically significant

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studies by as much as a ratio of 8:1.⁸ It is, therefore, not surprising that most of our papilloedema patients were females and they all had IIIH.

In their study on gender- and ethnicity-related differences in optic nerve head topography in healthy Indian and Caucasian participants, Pilat *et al.* reported that disc and rim areas were larger in Caucasian males compared with females but smaller in Indians males compared with females.⁹ Similarly, using quantitative photographic evaluation of the optic disc of normal participants whose ages ranged over seven decades, Schwartz *et al.* reported that White males had larger relative areas of pallor than white females.¹⁰ It is likely that the higher male representation in optic disc atrophy may be because males have naturally larger discs as shown in these studies.^{9,10} The fact that most of our diagnoses of optic disc pallor were based on just slit-lamp biomicroscopy with +78D lens, it is difficult to correctly label all the cases seen as optic disc pallor. A fundus photograph or OCT would have been invaluable, but these are beyond the reach of most of the patients. Apart from that, they are also not available at our hospital. In their study, Naidu and Satya Srinivas also reported optic atrophy to be more common in males, and the peak incidence was the fourth to sixth decade⁴ similar to this study with the highest prevalence in the 40–79-year-old group.

CONCLUSION

This study shows that there is a significant relationship between optic disc findings and age and gender in our environment. This study is similar to other studies as disc pallor was associated more with the male gender whereas papilloedema was associated commonly with females.

The use of fundus photographs or OCT is advocated in any future study to validate this finding as it gives a more objective of the assessment of optic disc findings.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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