

## Research Article

### A 3-Year Review of Neuro-Ophthalmic Disorders Seen at the Eye Clinic of University of Port Harcourt Teaching Hospital, Nigeria

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#### Abstract

**Background/Aim:** Neuro-ophthalmology is a new subspecialty in Nigeria with only three persons who have undergone any form of training (3-12 months) in a population of about 180 million people with about 500 ophthalmologists. The aim of our study is to determine the common neuro-ophthalmic disorders seen at a newly established Neuro-Ophthalmology Clinic in a Tertiary Hospital in Southern Nigeria.

**Methods:** A retrospective case review was performed of all neuro-ophthalmic patients seen at University of Port Harcourt Teaching Hospital over a 3-year period. One hundred and thirty four case notes with complete records were retrieved. Data was collected on age, sex, and history of systemic illness. Others were presenting

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symptoms and signs, visual acuity, fundal findings, investigation results, diagnosis and treatment. Data analysis was done using SPSS Version 23 and P value < 0.05 was considered significant.

**Results:** A total of 5,254 new patients were seen in 3-years. Neuro-ophthalmic cases constituted 2.6% of all cases. There were 70 males and 64 females with a mean age of  $37.50 \pm 17.51$ . The commonest presenting complaint was poor vision (79.9%), followed by pain in the eye (5.2%), headache (5.2%), diplopia (3.7%) and ptosis (3.0%); and the commonest diagnoses were optic neuropathy (optic neuritis, optic disc atrophy, NAION and others of indeterminate nature) - 81.34%, idiopathic intracranial hypertension (3.0%), meningioma (3.0%) and ocular cranial nerve palsy (2.23%). Most patients were either blind (29.9%) in one or both eyes or had visual impairment (28.2%) at presentation.

**Conclusion:** This study shows that optic nerve disorders were the most common diagnosis and most patients presented late with almost one third being already blind at presentation.

**Keywords:** Blindness/Visual impairment; Late presentation; Neuro-ophthalmic disorders

#### Introduction

Neuro-ophthalmic disorders are not uncommon presentations in eye care facilities. They constitute an important cause of visual impairment and ocular morbidity and may signify the existence of an ocular, extra-ocular, intracranial or systemic disease.

Dhiman R, et al., [1] in a study at a tertiary eye care center in India, reported that neuro-ophthalmic disorders constituted 5% of all referrals to the center. In their study, the mean age of patients was  $30.8 \pm 19.5$  years with a male preponderance (M:F = 2:1). For Dhiman R, et al., the commonest neuro-ophthalmic diagnoses were optic neuropathies (63.8%), cranial nerve palsies (7.0%), cortical visual impairment (6.5%), and others (eye/optic nerve hypophasia, blepharospasm, and optic disc drusen) - 6%; traumatic and ischemic optic neuropathies were the most common and most cases of optic neuropathy were unilateral.

In a study in Benin City Southern Nigeria, Omoti AE, et al., [2] reported an incidence of 4.47% in a hospital-based study. The mean age of the study subjects was  $42.4 \pm 12.8$  years with no significant sex difference (M:F = 1.1:1). In this study, the most common disorders were motor nerve palsies (27.6%), optic neuropathies (22.4%) and migraine (14.5%) - most cases of optic neuropathy presented as optic atrophy of undetermined etiology (76.5%), optic neuritis (23.5%) or traumatic optic neuropathy (15.4%). The most frequently affected nerves in their study were the oculomotor (52.4%), abducens (19.1%) and facial nerves (14.3%) [2]. Multiple cranial nerve palsies were uncommon, constituting only 9.5% of all cases [2]. Other studies have also reported the oculomotor and abducens as the commonest ocular cranial nerve palsies [3-6]. In this study, the commonest presenting clinical features were poor vision (39.5%), diplopia (18.4%), headache (17.1%) and strabismus (7.9%) [2]; twenty-nine patients (38.2%) were already blind in the affected eye at presentation [2].

Similar to this study, Tagoe NN, et al., studying neuro-ophthalmic and clinical characteristics of brain tumors in a tertiary hospital in Ghana, reported the commonest ocular symptom as visual blur (83.3%), photophobia and ocular pain with the duration of symptoms before presentation ranging from one to 84 months [7]. Of the 36 patients they analyzed, 20 (55.5%) had pituitary adenoma and 10 (27.8%) had meningioma. Most of their patients had optic atrophy (74.3%) with 62.5% being either visually impaired or blind at presentation [4]. In another hospital-based study of 700 neuro-ophthalmic patients in Ethiopia, Bayu and Colleague reported the common neuro-ophthalmic disorders as optic nerve lesions (22%), herpes zoster ophthalmicus (18%), ocular motor palsies (17%), facial nerve palsy (10%) and papilledema (7%) [8].

In prospective study on the incidence of neuro-ophthalmic diseases in Singapore public hospitals, Lim SA, et al., [9] reported an overall annual incidence of 9.81 per 100,000. The incidence was said to increase with age and similar between men and women. The three commonest specific neuro-ophthalmic conditions were abducens nerve palsy (1.27 per 100,000), anterior ischemic optic neuropathy (1.08 per 100,000) and oculomotor nerve palsy (0.91 per 100,000). The incidence of optic neuritis was 0.83 per 100,000.

Visual impairment caused by neuro-ophthalmic disorders present with a wide variety of symptoms and signs but a sizeable number would have developed some form of visual impairment before presentation especially in resource poor countries including Nigeria. Other factors such as knowing where to go for treatment and the availability of an escort (especially for illiterate patients) to the hospital may also play a role in late presentation at the hospital.

## Methods

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 four (n = 134) patients were seen in this period. Data were collected and analyzed on age, sex, 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, intra-ocular pressure, pupillary light reaction, fundal findings, investigation results, diagnosis and treatment. Exclusion criteria included case files with incomplete records. Data were analyzed using SPSS Version 23 and P value < 0.05 was considered statistically significant. This study adhered to the Tenets of the Declarations of Helsinki on studies involving human subjects.

## Results

A total of 5,254 new patients were seen at the Eye Clinic of University of Port Harcourt Teaching Hospital over a 3-year period; out of which 134 were neuro-ophthalmic cases-constituting about 2.6% of all cases. There were 70 males and 64 females giving a male:female ratio of 1.1:1. The mean age was 37.50 ± 17.51 with a range of 8-68 years. Most patients were in the 20-59 year old range (n = 91; 67.9%). The commonest presenting complaint was poor vision (n = 107; 79.9%), followed by pain in the eye (n = 7; 5.2%), headache (n = 7; 5.2%), diplopia (n = 5; 3.7%), and ptosis (n = 4; 3.0%) (Tables 1 & 2).

Variable	Frequency	Percentage (%)
<b>Age (Years)</b>		
0- 9	3	2.2
10- 19	17	12.7
20- 29	37	27.6
30- 39	20	14.9
40- 49	18	13.4
50- 59	16	11.9
60- 69	19	14.2
≥ 70	4	3.0
Total	134	100 (%)
<b>Sex</b>		
Male	70	52.2
Female	64	47.8

**Table 1:** Age and sex distribution of study subjects (n = 134).

Presenting Complaint	Frequency	Percentage (%)
Poor vision	107	79.9
Pain in the eye	7	5.2
Headache	7	5.2
Diplopia	5	3.7
Ptosis	4	3.0
Proptosis	2	1.5
Trauma	1	0.7
Blindness	1	0.7

**Table 2:** Frequency of presenting complaint (n = 134).

Table 3 shows that most patients presented over one month after symptoms were first noticed (n = 110; 82.1%). Only 24 patients (17.9%) presented within the first month.

Duration of Complaint (months)	Frequency	Percentage (%)
< 1 month	24	17.9
1- 6 months	46	34.3
7- 12 months	34	25.4
≥ 13 months	30	22.4

**Table 3:** Duration of complaints (n = 134).

Table 4 shows that most eyes (58.1%) were either blind (n = 80; 29.9%) or had various degrees of visual impairment (n = 75; 28.2%) at presentation. Only 41.9% of the eyes had normal vision.

Visual Impairment	Right Eye (%) n = 134	Left Eye (%) n = 133
Normal vision	52 (38.8)	60 (45.1)
Visual impairment	36 (26.9)	39 (29.3)
Blindness	46 (34.3)	34 (25.6)
Total	134 (100%)	133 (100%)

**Table 4:** Visual impairment and blindness in 267 eyes (WHO definition).

Table 5 shows the common neuro-ophthalmic diagnoses. The commonest is optic neuropathy (n = 109; 81.34%) followed by idiopathic intracranial hypertension (n = 4; 3.0%), meningioma (n=4; 3.0%) and ocular cranial nerve palsy (n = 3; 2.23%). There were 2 cases each of pituitary macroadenoma and retinitis pigmentosa (n = 2; 1.50%). There was a case each of multiple sclerosis, acquired torsional nystagmus, Benign Essential Blepharospasm (BEB), TED and Walled Eye Bilateral Inter Nuclear Ophthalmoplegia (WEBINO).

Neuro-Ophthalmic Diagnosis	Frequency	Percentage (%)
Optic neuropathy (optic neuritis, optic disc atrophy, NAION and others of indeterminate nature)	109	81.34
Pseudotumor cerebri (Idiopathic intracranial HTN)	4	3.0
Meningioma	4	3.0
Ocular cranial nerve palsy	3	2.23
Pituitary macroadenoma	2	1.50
Retinitis pigmentosa	2	1.50
Multiple sclerosis	1	0.75
Benign Essential Blepharospasm (BEB)	1	0.75
Malignant hypertension	1	0.75
Walled Eye Bilateral INO (WEBINO)	1	0.75
Acquired torsional/vertical nystagmus	1	0.75
Cerebro-Vascular Disease (CVD)	1	0.75
Homonymous hemianopia	1	0.75
Glaucoma	1	0.75
Thyroid Eye Disease (TED)	1	0.75
Perivascular sheathing	1	0.75
Total	134	100.00

**Table 5:** Types of neuro-ophthalmic diagnoses (n = 134).

In table 6, there is a slight male preponderance in optic neuropathy; this was however not statistically significant (p = 0.564).

Neuro-Ophthalmic Diagnosis	Male (%)	Female (%)	Chi-square (p-value)
Optic neuropathy	59 (44.1)	50 (37.3)	P = 0.564
Others	12 (8.9)	13 (9.7)	
Total	71 (53.0)	63 (47.0)	

**Table 6:** Sex distribution of neuro-ophthalmic diagnoses (n = 134).

## Discussion

Neuro-ophthalmology is a fledgling subspecialty in Nigeria. This study was done mainly to highlight some of the common disorders seen and diagnoses made after undergoing a short-term training in neuro-ophthalmology in 2015. Similar to the studies by Dhiman R, et al., [1] and Omoti and Colleague [2], most patients in this study were young adults with a mean age of 37.5 years and a slight male preponderance which was not statistically significant (p = 0.56). Neuro-ophthalmic cases constituted only about 2.6% of all ophthalmic patients seen in our hospital, much lower than the 4.47% reported by Omoti and Colleague and 5% recorded by Dhiman R, et al. Dhiman's study was conducted in a referral center for neuro-ophthalmic disorders and this could explain the high percentage. Similar to this study,

Omoti's study is also hospital-based and in Southern Nigeria, but the eye department apart from being older than ours, had a neuro-ophthalmologist for a much longer time. This could explain the higher incidence recorded by them. The much lower incidence reported in the Singaporean study is not surprising as it is a developed economy.

The commonest neuro-ophthalmic disorders seen in this study was optic neuropathy (81.34%) - similar to the findings by Dhiman in India where optic nerve disorders were noted in 63.8% of their patients. Similar to this study, optic neuropathy had the highest representation (42.8%) in the Indian study. In this study, there was a slight male preponderance which is similar to that reported in the Indian study. India being a third world country may also be confronted by the same kind of challenges faced in Nigeria thus explaining the similarity in results. Bayu and Colleague in Ethiopia also reported optic nerve lesions as the commonest diagnosis in their patients and similar to us, theirs was also newly established neuro-ophthalmic clinic. Meningioma and pituitary macroadenoma were the commonest intracranial tumors seen in our patients - similar to the findings by Tagoe et al., in Ghana.

Similar to the studies by Omoti, Colleague and Tagoe NN, et al., the commonest presenting complaint of our patients was poor vision that was noted in about 80% of them. This was followed by headache, diplopia and ptosis. About 30% of our patients were already blind in one or both eyes at presentation - similar to the result in Benin City where about 38% of patients were reported to be blind in at least one eye at presentation. This is not surprising because most patients presented late (weeks to months after symptoms were first noticed) - the disease was already too advanced for any meaning intervention to be offered. Late presentation, blindness or visual impairment was also reported by Tagoe NN, et al., in Ghana. These similarities in late presentation and blindness may not be unrelated to the fact that like Nigeria, Ghana is a third world country with similar challenges relating to poverty and poor access to health care. Most of our patients worked and lived in Port Harcourt or come from neighboring cities or states in the Niger Delta region of Nigeria. Port Harcourt is the hub of the oil and gas industry in the country and in the past few years there had been an upsurge of air pollution from illegal refining of crude oil in the suburbs of the city causing atmospheric pollution with black soot. It is not clear if the pollution may have contributed to the large percentage of optic neuropathy but a community-based study with a larger sample may shed further light on it. Apart from a few patients who had white-collar jobs, most others were either subsistence farmers or fishermen - so can hardly afford to transport themselves to hospital much more pay for treatment or investigations requested for since there is no insurance coverage. As a result, they present late and when they do, cannot afford tests such as MRI that costs about 150 USD in our hospital. In addition the MRI machine may be faulty and so patients cannot easily access care outside because of additional costs in the presence of very lean resources.

As a result of the myriad of problems stated above, the precise diagnoses could not be established in some of our patients. There is also shortage of manpower in the field of ophthalmology so; some patients may have been managed by optometrists in peripheral centers before referral to our facility. Optometry practice poses a huge challenge for ophthalmologists in Nigeria since most people do not know the difference between the two and Government regulation on their scope of practice is not well defined.

## Conclusion

This study shows that optic nerve disorders are the commonest neuro-ophthalmic diseases seen in our setup. Most patients presented late and about one third were already blind at presentation. Late presentation because of financial constraints may have contributed to the high number of blindness and visual impairment recorded. In addition, mismanagement from peripheral centers may also be contributory. It is therefore necessary for government to subsidize health care; the hospitals should also be adequately equipped with the necessary functioning diagnostic equipment for early intervention. The government should also do more to define and regulate optometry practice in Nigeria as quite a large number of them engage in patient management until very late in the disease before referral to an ophthalmologist.

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