

# The Burden of Visual Impairment and Blindness from Vitreoretinal Diseases: A Nigerian Tertiary Hospital Retina Unit Experience

Oluwatoyin Helen Onakpoya<sup>1</sup>, Patrick Udonwa<sup>2</sup>, Oluwaseun Olaniyi Awe<sup>2</sup>

<sup>1</sup>Department of Ophthalmology, Faculty of Clinical Sciences, Obafemi Awolowo University, Ile Ife, Nigeria, <sup>2</sup>Department of Ophthalmology, Obafemi Awolowo University Teaching Hospital, Ile Ife, Nigeria

## Abstract

**Objective:** The objective of this study is to determine the burden of visual impairment and blindness from vitreoretinal diseases in the retina unit of a Nigerian tertiary hospital. **Methodology:** A prospective, cross-sectional study on all consecutive new patients presenting with vitreoretinal diseases (VRD) at the vitreoretinal (VR) clinic at Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife from May 2011 to April 2014. Patient's bio-data, presenting complains, Snellen's or tumbling E-chart visual acuity unaided, slit-lamp examination of the vitreous and fundus with +90/+78D, binocular indirect ophthalmoscopy as well as slit-lamp examination of anterior segment, and applanation tonometry findings were recorded in predesigned pro forma. Visual acuity was categorized using WHO/ICD. The data were analyzed using the SPSS software version 16 for simple frequencies and presented. **Results:** Of 2025 eyes reviewed, 112 (49.8%) eyes were visually impaired and 67 (29.8%) were blind. Eight (5.2%) patients were bilaterally blind. Diabetic retinopathy was the most common cause of bilateral blindness (25%), and concurrently, the most common VRD (29.8%). All categories of visual loss were more prevalent among the aged  $\geq 65$  years. More males (62.2%) were blind from VRD. Cataract was the most common ocular comorbidity seen (43.6%). **Conclusion:** The burden of visual impairment and blindness from VRD is large; eye health education for early presentation for eye care as well as the development of VR care with infrastructure upscale to include optical coherence tomography, laser, and surgical care for prompt diagnosis and treatment will be of benefit in reducing the burden.

**Keywords:** Blindness, diabetic retinopathy, Nigeria, visual impairment, vitreoretinal disease

## INTRODUCTION

Visual impairment and blindness causes significant socioeconomic as well as psychological problems in affected individuals and family members.<sup>1-3</sup> Globally, about 285 million people are visually impaired, and another 39 million people are blind.<sup>3</sup> As many as 1.13 million people aged 40 years and above are reported to be blind in Nigeria,<sup>4</sup> with cataract and glaucoma responsible for 43% and 16.7%, respectively.<sup>3,5</sup>

Vitreoretinal diseases (VRD) are pathologies affecting the vitreous and retina. They were previously reported to be rare in developing countries; however; their presence have been documented in different developing countries.<sup>6-8</sup> They are present across all age groups and can be a cause of visual loss. VRD is expected to increase as the population ages; diabetic retinopathy (DR) remains the leading cause of blindness among working age group in many countries.<sup>9,10</sup> With the projected

increase in the prevalence of diabetes mellitus, there is an imminent increase in the prevalence of visual loss from DR.<sup>11,12</sup> With increase in the frequency of cataract surgery performed globally, there is a concomitant increase in the incidence of posterior segment complications such as pseudophakic cystoid macular edema and retinal detachment.<sup>13</sup>

The increasing prevalence of VRDs can imply an increasing need for VRD care in the region. An assessment of the burden of visual loss from VRDs in the individuals affected with

**Address for correspondence:** Dr. Oluwatoyin Helen Onakpoya, Department of Ophthalmology, Faculty of Clinical Sciences, Obafemi Awolowo University, Ile Ife, Nigeria.  
E-mail: Uvtoyin2@yahoo.co.uk

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the view to influencing policies with regard to personnel training and relevant infrastructural development has become imperative. This is particularly important since blindness surveys usually summarize blindness from VRDs in an attempt to cover the overwhelming causes of blindness from cataract, glaucoma, and other communicable diseases.

This study was aimed at determining the burden of visual impairment and blindness from vitreoretinal diseases in a Nigerian tertiary hospital eye department.

## METHODOLOGY

This is a prospective, cross-sectional study carried out at the vitreoretinal clinic (VRC) of the Eye Care Center; the VRC is one of 6 weekly outpatient clinics in the study center. The study was carried out from May 2011 to April 2014; on all consecutive new patients attending the VRC of the study center. The patients were seen on referral from other clinics in the study center and outside the center, including general outpatient department, diabetic clinics as well as other hospitals. All patients were enrolled into the study on the day of first presentation to the VRC. The patients demographics were taken including leading presenting complains as well as Snellen's visual acuity or tumbling E visual acuity (unaided, with pin hole and with refraction) depending on the situation. In patients who did not have refraction, the pin-hole vision was taken as best correction.<sup>14</sup> The slit-lamp examination with Carl Zeiss for the anterior segment and Goldmann applanation tonometer as well as biomicroscopic examination of the vitreous and fundus with +90/+78D (Volk) lenses were carried out routinely. Binocular indirect ophthalmoscopy (Appasammy) with +20D lens (Volk) for wider field view of the fundus and ocular B-mode ultrasonography (Sonomed) were carried out in the VRC for patients requiring same. Some patients had fundus photograph and fluorescein angiography as indicated (Topcon). Ancillary investigations such as blood sugar analysis, glycosylated hemoglobin, complete blood count, Doppler ultrasound, and others were ordered for as required.

The patients' demographics such as age, sex, presenting complaints, duration before presentation, laterality as well as visual acuity were recorded in a predesigned study pro forma. The patients were grouped into children ( $\leq 15$  years), young adults ( $>15-44$  years), middle aged ( $>45-64$  years), and elderly ( $>64$  years) based on age as at last birthday. Visual acuity for each eye was graded using WHO/ICD.<sup>15</sup> The ocular examination findings as well as the results of ancillary investigations were recorded; the vitreoretinal (VR) diagnosis as well as ocular co-morbid condition for each eye was also recorded. Patients' identities, including names and addresses, were not recorded on the pro forma and tenet of Helsinki was adhered to for this study. Informed consent was obtained from the patients.

The main outcome measure was the prevalence of visual impairment and blindness in eyes presenting with VRD. The data were analyzed with IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY, USA for simple frequencies.

## RESULTS

A total of 225 eyes of 155 patients seen in the VRC with various VRDs constituted the study population. Their age ranged from 10 to 86 years with a mean, mode, and median of 56.5, 65, and 59 years, respectively. As many as, 40% were in the middle age group; there were 82 (52.9%) males with a male-to-female ratio of 1.1:1. Only 29 (18.8%) patients presented within a month of noticing symptoms, whereas 44.5% presented after 1 year of symptoms. The leading presenting complaint was poor vision in 115 (74.2%) patients followed by nyctalopia and floaters in 9.7% and 7.3%, respectively [Table 1].

Sixty-seven eyes (29.8%) with VRD were blind at presentation, 112 (49.8%) were visually impaired, and only 46 (20.4%) had normal vision in the eye with VRD [Figure 1]. Bilateral blindness was present in 8 (5.2%). Sixty-two percent of blind eyes were among the male patients. The rates of visual loss increased with increasing age group. The patients aged 65 years and above had the highest prevalence of bilateral blindness (50%), unilateral blindness (40.6%), bilateral visual impairment (56.1%), and unilateral visual impairment (49.5%), respectively, [Table 2]. The largest proportion 20 (29.9%) of bilateral blindness resulted from DR. Other causes of blindness

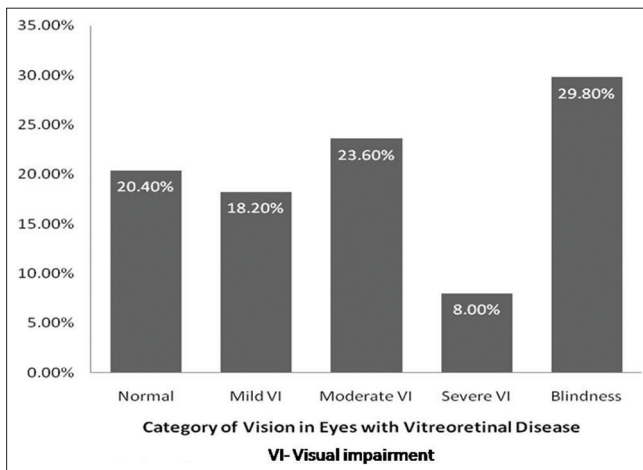
**Table 1: Characteristics of patients with vitreoretinal diseases**

	Frequency (%)
Age group	
Children	1 (0.6)
Young adult	31 (20)
Middle aged	62 (40)
Elderly	61 (39.4)
Total	155 (100)
Sex	
Male	82 (52.9)
Female	73 (47.1)
Total	155 (100)
Duration of symptoms before presentation	
<1 week	10 (6.5)
1 week-<1 month	19 (12.3)
1-<6 months	36 (23.2)
6 months-<1year	21 (13.5)
1-<5 years	42 (27.1)
$\geq 5$ years	27 (17.4)
Total	155 (100)
Presenting complaint	
Poor vision	115 (74.2)
Nyctalopia	16 (10.3)
Floaters	10 (6.5)
Flashes	4 (2.6)
Redness	3 (1.9)
Eye ache	3 (1.9)
Pricking sensation	2 (1.3)
Photophobia	1 (0.6)
Total	155 (100)

**Table 2: Visual impairment/blindness in patients versus sex and age group**

	Normal (%)	Mild VI (%)`	Moderate VI (%)	Severe VI (%)	Blindness (%)	Total (%)	P
Sex							
Male	12 (14.6)	10 (12.2)	19 (23.2)	6 (7.3)	35 (42.7)	82 (100)	0.356
Female	19 (26)	10 (13.7)	14 (19.2)	7 (9.6)	23 (31.5)	73 (100)	
Total	31 (20)	20 (12.9)	33 (21.3)	13 (8.4)	58 (37.4)	155 (100)	
Age group							
Children	1 (100)	0	0	0 (0)	0	1 (100)	0.341
Young adult	8 (25.8)	3 (9.7)	9 (29)	1 (3.2)	10 (32.3)	31 (100)	
Middle aged	12 (19.4)	6 (9.7)	10 (16.1)	9 (14.5)	25 (40.3)	62 (100)	
Elderly	10 (16.4)	11 (18)	14 (23)	3 (28)	23 (37.7)	61 (100)	
Total	31 (20)	20 (12.9)	33 (21.3)	13 (8.4)	58 (37.4)	155 (100)	

VI – Visual impairment

**Figure 1:** Visual impairment and blindness in patients presenting with vitreoretinal diseases

were age-related macular degeneration (AMD) and presumed toxoplasma chorioretinitis in 9 (13.4%) each [Table 3].

The most common VRD was DR 67 (29.8%) followed by AMD 36 (16%) and presumed toxoplasma chorioretinitis 24 (10.7%). Table 4 enumerates the pattern of VRD in the study population. The spectrum of DR was nonproliferative in 44 (65.7%) and proliferative in 23 (34.7%). Diabetic macular edema was present in 42 (62.7%) of these participants in combination with other types of DR. Most of the AMD were the dry type 31 (86.1%) of 36 eyes.

## DISCUSSION

Visual loss with its psychosocial consequences is not uncommon with patients presenting with VRD.<sup>1,2</sup> In this study cohort, diminution in vision was the most common reason for presenting for eye care; nearly three quarters (74.2%) presented with poor vision. About a third (34.2%) of patients who presented at the VRC had bilateral visual impairment and 5.2% were bilaterally blind. The prevalence of bilateral blindness from VRD in this study is similar to the 6.1% reported by Eze *et al.* in South-eastern Nigeria.<sup>7</sup> However, a much higher prevalence was reported in studies done by Nwosu (14%, Onitsha) and Teshome *et al.* (11%, Addis

Ababa).<sup>8,16</sup> The disparity in prevalence noted may be as a result of differences in sample size, as both studies had a larger sample sizes. Moreover, the current study being recent with more than a decade after a higher level of awareness and possibly presented before the blinding stage of these VRDs cannot be ruled out. The prevalence of bilateral visual impairment (34.2%) in this study on the other hand was much higher than those reported by Eze *et al.* (11%), Teshome *et al.* (14%), and Nwosu (16%).<sup>7,8,16</sup> In large community surveys, emphasis are laid mainly on bilateral blindness thus the actual burden of visual loss including unilateral visual loss may be underplayed. For individuals involved, unilateral impairment in sight with its attendant effect on stereopsis and visual field cannot be overemphasized. Forty-nine participants (31.6%) were unilaterally blind and 46.5% had unilateral visual impairment. The prevalence of unilateral visual impairment was higher when compared to previous studies; Eze *et al.*, 20.9%, Nwosu 16%, and Teshome *et al.* 20.9%.<sup>7,8,16</sup> While, Nwosu reported a higher prevalence of unilateral blindness (40%),<sup>16</sup> Teshome *et al.* and Eze *et al.* reported a lower prevalence of 20.9% and 17.5%, respectively.<sup>7,8</sup> The burden of visual loss in form of impairment and blindness from VRDs was high. Half of the patients with bilateral blindness in this cohort were aged  $\geq 65$  years, and the prevalence of both unilateral and bilateral visual impairment was also higher in this age group. The severity of some of the VRDs increased with increasing age as well as the presence of comorbid age related visually significant eye diseases such as cataract and glaucoma might be responsible for this trend. However, more male (62.2%) eyes were blind from VRD compared to their female counterparts despite the fact that almost equal number of either sexes presented at the VRC within the period of the study. Could late presentation by male participants be a contributory factor? Moreover, a larger proportion (63%) of male patients presented >more than 5 years from onset of symptoms compared to females in this study.

DR constituted the largest burden of VRD seen (29.8%), it was also the leading (25%) cause of bilateral blindness in this study as was documented by other researchers.<sup>17-20</sup> DR is not as rare as previously reported four decades ago in the region.<sup>6,11,21</sup>

**Table 3: Visual impairment/blindness in eyes versus type of vitreo-retinal diagnosis**

VR	Normal (%)	Mild VI (%)	Moderate VI (%)	Severe VI (%)	Blindness (%)	Total (%)
DR	12 (26.1)	16 (39)	14 (26.4)	5 (27.8)	20 (29.9)	67 (29.8)
ARMD	6 (13)	8 (19.5)	12 (22.6)	1 (5.6)	9 (13.4)	36 (16)
PreTCR	6 (13)	2 (4.9)	6 (11.3)	1 (5.6)	9 (13.4)	24 (10.7)
RP	7 (15.2)	5 (12.2)	0	1 (5.6)	4 (6)	17 (7.6)
RVO	3 (6.5)	1 (2.4)	5 (9.4)	2 (11.1)	5 (7.5)	16 (7.1)
RD	4 (8.7)	2 (4.9)	2 (3.8)	2 (11.1)	3 (4.5)	13 (5.8)
PVD	2 (4.3)	2 (4.9)	2 (3.8)	1 (5.6)	4 (6.0)	11 (4.9)
HR	1 (2.2)	0	4 (7.5)	3 (16.7)	3 (4.5)	11 (4.9)
SCR	3 (6.5)	1 (2.4)	1 (1.9)	1 (5.6)	1 (1.5)	7 (3.1)
NVG	0	1 (2.4)	2 (3.8)	0	3 (4.5)	6 (2.7)
DEG. MYO	0	1 (2.4)	3 (5.7)	0	1 (1.5)	5 (2.2)
MH	0	0	1 (1.9)	0	3 (4.5)	4 (1.8)
VH	0	2 (4.9)	0	0	1 (1.5)	3 (1.3)
CRAO	1 (2.2)	0	0	0	1 (1.5)	2 (0.9)
CHRUP	0	0	1 (1.9)	1 (5.6)	0	2 (0.9)
HIV RET	1 (2.2)	0	0	0	0	1 (0.4)
Total	46 (100)	41 (100)	53 (100)	18 (100)	67 (100)	225 (100)

PreTCR – Presumed toxoplasma chorio-retinitis; DR – Diabetic retinopathy; ARMD – Age-related macular degeneration; RP – Retinitis pimentosa; RVO – Retinal vein occlusion; PVD – Posterior vitreous detachment; HR – Hypertensive retinopathy; SCR – Sick cell retinopathy; NVG – Neovascular glaucoma; DEG.MYO – Degenerative myopia; MH – Macular hole; VH – Vitreous hemorrhage; CRAO – Central retinal artery occlusion; CHRUP – Choroidal rupture (posttraumatic); HIV RET – HIV retinopathy; VI – Visual impairment; VR – Vitreo-retinal

**Table 4: Spectrum of vitreoretinal diseases**

VR disease	Frequency (%)
DR	67 (29.8)
ARMD	36 (16)
PreTCR	24 (10.7)
RP	17 (7.6)
RVO	16 (7.1)
RD	13 (5.8)
PVD	11 (4.9)
HR	11 (4.9)
SCR	7 (3.1)
NVG	6 (2.7)
DEG. MYO	5 (2.2)
MH	4 (1.8)
VH	3 (1.3)
CRAO	2 (0.9)
CHRUP	2 (0.9)
HIV RET	1 (0.4)
Total	225 (100)

PreTCR – Presumed toxoplasma chorio-retinitis; DR – Diabetic retinopathy; ARMD – Age-related macular degeneration; RP – Retinitis pimentosa; RVO – Retinal vein occlusion; PVD – Posterior vitreous detachment; HR – Hypertensive retinopathy; SCR – Sick cell retinopathy; NVG – Neovascular glaucoma, DEG.MYO – Degenerative myopia; MH – Macular hole; VH – Vitreous hemorrhage; CRAO – Central retinal artery occlusion; CHRUP – Choroidal rupture (posttraumatic); HIV RET – HIV retinopathy; VI – Visual impairment; VR – Vitreoretinal

Cataract was the most common (43.6%) ocular comorbidity found in this study similar to previous reports.<sup>16,22</sup>

The nonavailability of optical coherence tomography (OCT) in the study center and its immediate environment militated

against further classification of VRDs, and hence, a limitation for this hospital-based study. The burden of visual impairment and blindness from VRDs is large, especially with increasing age. While increased eye health education to encourage early presentation for eye care is advocated in patients with VRDs, further development of VR care through training and infrastructure upscale to include OCT, laser and surgical care will be beneficial to patients.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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