Faculty of Natural and Applied Sciences Journal of Health, Sports Science and Recreation
Print ISSN: 3026-9644 e-ISSN: 3043-6346
www.fnasjournals.com
Volume 2; Issue 3; May 2025; Page No. 9-15.

Evaluation of Low Vision and Blindness at the Federal Teaching Hospital, Gombe

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Abstract
Low vision and blindness are significant global health concerns that affect millions of individuals, impacting their ability to perform daily activities and participate fully in society. Low vision refers to a visual impairment not fully correctable by standard glasses, contact lenses, medication, or surgery, and that interferes with normal functioning. Blindness typically involves a more severe level of vision loss, ranging from profound impairment to complete loss of sight. The causes of low vision and blindness are diverse and include age-related conditions such as macular degeneration and glaucoma, congenital or hereditary disorders, injuries, and systemic diseases like diabetes. This study aimed to evaluate the prevalence and causes of low vision and blindness at Federal Teaching Hospital Gombe (FTHG), Northeastern Nigeria. A total of 7040 participants who gave their informed consent were recruited and evaluated at the Optometry Unit. Results showed that the prevalence of low vision and blindness was 9.46% and 0.07%, respectively. Glaucoma (28.5%), refractive errors (23.2%), and maculopathy (14.9%) were the leading causes of low vision. Glaucoma was the sole cause of blindness. Age was significantly associated with low vision ($P<0.05$), but gender was not. Myopia was the most common refractive error (39.1%). This study highlights the need for early and improved eye care services and awareness in the region.

Keywords: Blindness, Low Vision, Eyes, Gombe, Federal Teaching Hospital

Introduction

Low vision and blindness are significant global health concerns that affect millions of individuals, impacting their ability to perform daily activities and participate fully in society. Low vision refers to a visual impairment not fully correctable by standard glasses, contact lenses, medication, or surgery, and that interferes with normal functioning. Blindness typically involves a more severe level of vision loss, ranging from profound impairment to complete loss of sight. The causes of low vision and blindness are diverse and include age-related conditions such as macular degeneration and glaucoma, congenital or hereditary disorders, injuries, and systemic diseases like diabetes. Early diagnosis, improved access to eye care, and inclusive education and workplace accommodations are essential to improving quality of life and promoting independence among individuals with visual impairments. In low vision there is usually impaired visual function after treatment or refractive correction, with visual acuity <6/18 to light perception or visual field <10° W.H.O (2013). Visual impairment significantly impacts quality of life (Köberlein et al., 2013). In northeastern Nigeria, a survey in leprosy villages reported a blindness prevalence of 10.4% and severe visual impairment of 7.5% (Mpyet & Solomon, 2005)3. Low vision prevalence is projected to increase due to aging populations (Massof, 2002; Limburg & Keunen, 2009; Avitia et al., 2004). There is a lack of recent data on the prevalence and causes of low vision and blindness in Gombe State. This study aimed to evaluate the prevalence of low vision and blindness in patients attending the Ophthalmology Department at FTHG.

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Material and Methods

This prospective study was conducted at the ophthalmology department of FTHG, Gombe State, Nigeria. Standardized examination procedures were used, including visual acuity measurement, external and posterior segment examination, ultrasonography, and objective and subjective refraction. Ethical clearance and informed consent were obtained. Data were analyzed using SPSS and chi-square tests. The participants were given semi structured questionnaires to assess the patient's ability to copy given marked pages, and other irregularly arranged alphabets, and to indicate if they have been able to do needlework, or such similar tasks. Other investigations included Distance Visual Acuity tests. Participants were evaluated using specialized charts (like Snellen charts) to measure clarity of vision at a distance. The results are often expressed as a fraction (e.g., 20/20, 20/200), indicating the distance at which the individual can see compared to a person with normal vision. Near Visual Acuity were also done to assess the ability to see objects at close range, often using reading charts or passages of print. The visual field test (Perimetry) was done to determine the extent of the visual field, identifying blind spots (scotomas) and peripheral vision limitations. This included static and automated perimetry, such as microperimetry with Optical Coherence Tomography (OCT). Contrast sensitivity tests were carried out to measure the ability to distinguish between objects of varying brightness and color, considered crucial for everyday tasks. Each participant had assessment of pupillary responses, lid position, and eye movements, refraction to determine the best corrective lenses (glasses or contacts) for distance and near vision (where correction was considered a probability). Assistive Technology Assessment (ATA) was conducted asking the participants to Identify appropriate aids like magnifiers, screen readers, or other devices. Low Vision was generally taken as visual acuity worse than 20/70 in the better-seeing eye after correction, or a restricted visual field (e.g., 10 degrees or less), while blindness was considered as visual acuity of 20/200 or worse in the better-seeing eye after correction, or a visual field restriction of 10 degrees or less.

Results

The study population comprised 7040 participants. The prevalence of normal vision was 90.47% (n=6369). Low vision and blindness were observed in 9.46% (n=666) and 0.07% (n=5) of the participants, respectively. Glaucoma (28.5%), refractive errors (23.2%), and maculopathy (14.9%) were the most common causes of low vision. Glaucoma accounted for all blindness cases. Age distribution showed that the prevalence of low vision and blindness was higher in participants aged 50 years and above (54%). Gender distribution showed no significant difference in the causes of low vision and blindness (P>0.05). Myopia was the most prevalent refractive error (39.1%)

Table 1: Prevalence of Low Vision and Blindness in participants attending FTH Gombe.

Vision Status	Frequency	Percent
Normal Vision	6369	90.47
Low Vision	666	9.46
Blindness	5	0.07
Total	7040	100.00

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Table 2: Age Distribution of Low Vision and Blindness in participants attending FTH Gombe

Age	Low vision (n (%))	Blindness (n (%))	Total (n (%))
Below 10 years	7 (1.0)	0 (0.0)	7 (1.0)
10-19 years	81 (12.0)	0 (0.0)	81 (12.1)
20-29 years	79 (11.8)	1 (0.2)	80 (11.9)
30-39 years	67 (10.4)	0 (0.0)	67 (10.0)
40-49 years	70 (10.4)	0 (0.0)	70 (10.4)
50-59 years	87 (13.0)	2 (0.3)	89 (13.3)
60-69 years	123 (18.3)	0 (0.0)	123 (18.3)
above 70 years	152 (22.7)	2 (0.3)	154 (23.0)
Total	666 (99.3)	5 (0.7)	671 (100.0)

Table 3: Gender Distribution of Low Vision and Blindness in participants attending FTH Gombe

Gender	Low vision (n (%))	Blindness (n (%))	Total (n (%))
Male	349 (52.0)	2 (0.3)	351 (52.3)
Female	317 (47.2)	3 (0.4)	320 (47.7)
Total	666 (99.3)	5 (0.7)	671 (100.0)

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Table 4: Causes of Low Vision and Blindness in participants attending FTH Gombe

Causes	**Low Vision (n (%))**	**Blindness (n (%))**	**Total (n (%))**
Aphakia	3 (0.4)	0 (0.0)	3 (0.4)
Bilateral corneal opacity	37 (5.5)	0 (0.0)	37 (5.5)
Inoperable cataract	34 (5.1)	0 (0.0)	34 (5.1)
Diabetic Retinopathy	54 (8.0)	0 (0.0)	54 (8.0)
Glaucoma	191 (28.5)	5 (0.7)	196 (29.2)
Hypertensive retinopathy	17 (2.5)	0 (0.0)	17 (2.5)
Keratoconus	5 (0.7)	0 (0.0)	5 (0.7)
Maculopathy	100 (14.9)	0 (0.0)	100 (14.9)
Refractive Error	156 (23.2)	0 (0.0)	156 (23.2)
Optic Atrophy	16 (2.4)	0 (0.0)	16 (2.4)
Retinitis pigmentosa	33 (4.9)	0 (0.0)	33 (4.9)
ROP (retinopathy of prematurity)	1 (0.1)	0 (0.0)	1 (0.1)
Complicated cataract surgery	19 (2.8)	0 (0.0)	19 (2.8)
Total	666	5	671 (100)

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Table 5: Gender Distribution of Causes of Low Vision in participants attending FTH Gombe

Causes	Male (n (%))	Female (n (%))	Total (n (%))
Aphakia	2 (0.3)	1 (0.2)	3 (0.5)
Bilateral Corneal opacity	25 (3.9)	12 (1.9)	37 (5.8)
Inoperable cataract	20 (3.0)	14 (2.1)	34 (5.1)
Diabetic Retinopathy	27 (4.1)	27 (4.1)	54 (8.1)
Glaucoma	94 (14.1)	97 (14.6)	191 (28.7)
Hypertensive retinopathy	10 (1.5)	7 (1.1)	17 (2.6)
Keratoconus	4 (0.6)	1 (0.2)	5 (0.8)
Maculopathy	54 (8.2)	46 (7)	100 (15.2)
Refractive Error	74 (11.1)	82 (12.3)	156 (23.4)
Optic Atrophy	6 (0.9)	10 (1.5)	16 (2.4)
Retinitis pigmentosa	23 (3.5)	10 (1.5)	33 (5.0)
ROP	0 (0.0)	1 (0.2)	1 (0.2)
Complicated cataract surgery	10 (1.5)	|9 (1.4)	19 (2.9)
TOTAL	349 (52.4)	317 (47.6)	666 (100.0)

Discussion

There are several ways to categorize blindness. Certain types describe how much vision loss a person has, ranging from some impairment to complete blindness. People may also categorize blindness based on its causes, which vary widely from congenital conditions to those that occur later in life. The most common causes of blindness are age-related, including conditions such as AMD and glaucoma. Blindness can also result from injuries, infections, vitamin A deficiency, UV damage, congenital abnormalities, and many other conditions. This study revealed a low vision prevalence of 9.46% and a blindness prevalence of 0.07% at FTHG. The low vision prevalence is consistent with

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findings from other studies in Nigeria and globally (Fasina & Ajaiyeoba, 2003; Oluyadi, 2003; Taylor et al., 2005; Resnikoff et al., 2006). The lower prevalence of blindness compared to low vision aligns with previous research (Fasina & Ajaiyeoba, 2003; Oluyadi, 2003). The observed age distribution, with a higher prevalence of visual impairment in older individuals, corroborates the findings that age is a significant risk factor for visual impairment, (Bourne et al., 2017). Visual impairments are most common in older adults. Potential causes include; Age-related macular degeneration (AMD) which is an eye disorder that occurs when aging damages the macula, which controls sharp, straight-ahead vision. A cataract can cause clouding or blurring of vision, color fading, and reduced night vision. Diabetic retinopathy is a complication more likely to develop in older adults. It occurs when high blood sugar levels damage the tiny blood vessels supplying the retina.

The leading causes of low vision in this study were glaucoma, refractive errors, and maculopathy. Glaucoma was also the sole cause of blindness. These findings are consistent with previous reports highlighting glaucoma as a major cause of visual impairment (Barbie, 2004; Bosanquet & Pritti, 2005). Glaucoma is an eye disease that damages the optic nerve at the back of the eye. It is more common in the elderly and causes irreversible vision loss. However, other studies have reported cataract as the leading cause of blindness (Mpyet & Solomon, 2005; Pizzarello et.al., 2004). The differences in findings may be attributed to variations in study populations, geographic locations, and access to eye care services. The gender distribution of low vision and blindness showed no significant difference, suggesting that both males and females are equally affected. However, other studies have reported a higher prevalence of visual impairment in females (Pizzarello et.al 2004). The prevalence of myopia as the leading cause of refractive error-related low vision is consistent with global trends (Holden et al., 2017). Akano (2017), in his review opined that blindness is more common in women than men by 40% irrespective of age. The inequalities in visual impairment and blindness between women and men in Nigeria in his report, reflect that visual impairment is not consistently higher among women compared to men. Akano (2017) stated that men might disregard or ignore their vision problems until they become severe before seeking medical attention. Women, according to him, had a higher prevalence of blindness (4.4%) compared to men (4.0%). This gender inequality in blindness and visual impairment was suggested as probably due to social, cultural and economic differences between men and women, and the life expectancy factor, with that of men at 52 years and women at 54.1 years (Akano 2014). In traditional Nigerian communities and families, the lower social status of women can result in difficulties in making decisions about their own health (Akano, 2017).

Conclusion

In this study, the prevalence of normal vision was observed to be 90.47% (n=6369) among the participants. Low vision and blindness accounted for 9.46% (n=666) and 0.07% (n=5) of the participants, respectively. Glaucoma (28.5%), refractive errors (23.2%), and maculopathy (14.9%) were the most common causes of low vision in FTH Gombe. Glaucoma accounted for all blindness cases. Age distribution showed that the prevalence of low vision and blindness was higher in participants aged 50 and above (54%), and gender distribution showed no significant difference in the causes of low vision and blindness ($P>0.05$). Myopia was the most prevalent refractive error (39.1%). This study provides valuable data on the prevalence and causes of low vision and blindness at FTHG, Gombe State. Glaucoma and refractive errors are the leading causes of low vision, while glaucoma is the sole cause of blindness. Age is a significant risk factor for visual impairment. These findings highlight the need for early and improved eye care services, including early detection and management of glaucoma and refractive errors, and increased public awareness about eye health.

Recommendations

1. We recommend expanding refractive error services, by increasing access to refractive error correction services to enable earlier detection and treatment, thus reducing the prevalence of low vision associated with uncorrected refractive errors.
2. Also, we recommend enhancing advocacy efforts, intensifying advocacy efforts and campaigns on eye health and eye care services to promote wider coverage, awareness, and utilization of these services.

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