Prevalence of Low Vision in Owerri Municipal Local Government Area of Imo State, Nigeria

Nwakuche I.P.[1,*], Iwuagwu F.O.[2], Ikonne E.U.[3], Onuoha U.C.[2]

[1]Department of Optometry, Faculty of Allied Health Sciences, Bayero University Kano, Kano State, Nigeria
[3]Department of Optometry, Faculty of Health Sciences, Imo State University Owerri, Imo State, Nigeria
[3]Department of Optometry, Faculty of Health Sciences Abia State University Uturu, Abia State, Nigeria
*Corresponding author: pinwakuche@gmail.com

Abstract This study evaluated the prevalence of low vision in Owerri municipal in Imo State, Nigeria. A total of 371 persons within the age of 18-97 years were examined and 60 persons had low vision. Low vision prevalence of 16.21% was found. The age bracket of 71-79 and 80-88 years were mostly affected while the least affected was 8-l6years. The prevalence of low vision was more in female (56.60%) than in males (43.33%). About 60% were above 50 years of age. The major causes of low vision were cataract (35.29%), glaucoma (29.41%) and glaucoma/cataract (23.52%). The most common visual acuity range after low vision assessment was <6/18-6/60 (16.67%), <6/60-3/60 (26.67%), respectively and no light perception (NLP, 13.33%). The findings from our results showed that gender and increase in age were the major risk factors for low vision. The results also established that cataract and glaucoma were the commonest causes of low vision. We therefore suggest that availability of efficient and effective low vision services would go a long way to reduce the burden of low vision in our society.

Keywords: prevalence, low vision, cataract, glaucoma, Imo State, Nigeria

Cite This Article: Nwakuche I.P., Iwuagwu F.O., Ikonne E.U., and Onuoha U.C., "Prevalence of Low Vision in Owerri Municipal Local Government Area of Imo State, Nigeria." *American Journal of Biomedical Research*, vol. 7, no. 1 (2019): 9-13. doi: 10.12691/ajbr-7-1-3.

1. Introduction

Worldwide, low vision is one of the serious public health concerns especially in developing countries [1]. Its burden is very devastating because it affects the quality of life and also inhibits mobility thus affecting economic well-being of the affected individuals as well as their families [2]. WHO [3] reported that there are 314 million visual impaired individual in the world, 37 million are blind, 124 million are low vision, and 53 million people are visually impaired due to uncorrected refractive error. Low vision is a reduced visual acuity or visual field loss which even with the best optical correction provided by regular lenses still results in visual impairment from the performance standard point or a visual acuity less than 6/18 to light perception [4,5]. It is often referred to as visual impairment, visual disability or partial sight. Low vision patients have impaired functional vision acuity and contract sensitivity which decreases their ability to read, use computer, drive cars or watch television for a long period.

Globally, low vision and blindness is more prevalent among elderly people above 60 years of age. This may be due to age related eye disorders such as macular degeneration, and cataract [6].

Low vision is associated with disability and mortality which results into heavy socio-economic consequences [7].

Whitfield et al. [8] reported that 0.7% of the population samples are blind while 2.6% were partially sighted when they evaluated the ocular status of Kenyan rural communities. They opined that Cataract was the major cause of blindness (36%) and were responsible for 39% of low vision cases. Oduntan et al. [6] in their study on central region of the Limpopo Province of South Africa, reported prevalence of low vision (2.43%), monocular blindness (1.77%) and binocular blindness (0.73%). They were of the opinion that cataract, corneal opacities and glaucoma are the main causes of low vision. They also highlighted that hypertensive, retinopathy, diabetic retinopathy and trauma can also cause low vision.

A national sample survey of blindness and low vision in China conducted by Zhang et al. [9] reported that the prevalence of blindness and low vision was 0.43% and stated that the major causes of the conditions were cataract (41.06%), corneal diseases (15.38%), trachoma (10.87%), and glaucoma (8.8%). The study of Mohidin and Yusoff [10] in Malaysia, reported that the most common causes of low vision were congenital structural defects, nystagmus, retinitis pigmentosa, and macular dystrophy in general populace. However, they reported that the most common causes of low vision among the ages of above 60 years were macular degeneration, diabetic retinopathy and glaucoma. They also reported that Retinitis pigmentosa is the main cause of low vision among the age group of 30-59. Munier et al [11] reported that macular degeneration

(16%), glaucoma (16%) and cataract 11% are the main causes of low vision and blindness in the republic of Ireland. Ejukonemu, [12] reported that corneal, lens problems, and glaucoma are the major causes of vision impairment among Braille reading children in Nigeria.

In Nigeria, according to the recent national blindness and visual impairment, population based survey published in 2009; there are over 1 million blind adults and 4.25 million low vision cases in Nigeria [13]. The major causes of low vision in Nigeria as released in Nigeria national blindness and visual impairment survey are cataract, glaucoma and uncorrected refractive error and 50% of all cases were either preventable or treatable [14]. However, low vision services in developing countries such as Nigeria are rarely available. The reason for lack of low vision services is due to lack of adequate research on the demography, epidemiology and prevalence figures of low vision cases [15]. There is need to evaluate the low vision status in all cities of Nigeria. This is because in coming decades, the ageing of the Nigerian populations and workforce, coupled with the increased visual demands of our modern society will increase the detrimental and devastating effects of low vision on our society. This study therefore evaluates the prevalence of low vision in Owerri municipal in Imo State, Nigeria.

2. Materials and Methods

The research work was carried out in Owerri Municipal Local Government Area of Imo State. The area has a postal code of 460. Its headquarters are in the city of Owerri. It covers an area of 58km^2 and a population of 127, 213 at the 2006 census. The total number of subjects seen used in this study was three hundred and seventy one (371) individuals.

Patent Selection

Subject used were selected from medical outreaches.

Research Instruments and Materials

1. The snellens visual acuity charts, ETDRS charts, Lea symbol charts (literate/ illiterate chart) 2. Pen torch, 3. Trial lens case, 4. Tonometer, 5. Ophthalmoscopes. 6. Numbing agent, 7. Dye (fluorescein), 8. Sterilizing agent (alcohol) , 8. Data collection case history.

Functional case history was taken which involved a comprehensive oculo-visual history of each subject and was recorded. Special emphasis on the functional problems of the subject including such items like vision to read, functioning in the kitchen, glare problem, traveling vision etc specific features of visual performance, effect of eye condition in activities of daily living, treatment or medication given, present aids and explanations were verified.

Visual Acuity Measurement

The visual acuity test was done using the illiterate and literate charts. The snellens chart is placed at a distance of 6m with the patient positioned to fixate on the chart. The ETDRS and Lea charts were used at different distances 1m, 2m, 3m and 4m. The visual acuities were converted to meters for uniformity using the minimum angle of resolution (MAR). The patients were asked to read the letters on the chart and the visual acuity was recorded at the point where the patient could no longer resolve or read the chart. The test was initially done for both eyes (OU) and then separated for each eye, the right eye (OD), the left eye (OS) for patients who could not read the snellens chart probably because of the degree of vision loss, other charts (thumbling E- chart, the ETDRS chart, the Lea chart) were used for the case where the visual acuity of the patient was very poor that he or she could not read anything on the snellens chart, other methods like counting finger, hand movement, light projection and perception was used as the case may be. These options set in after the patient failed to read the largest autotype from a distance of meters or foot.

External Examination

This was done with the help of a Pen torch light. It was projected into the anterior chamber and looked through the cornea and the iris to detect any abnormalities. The thickness of the cornea was checked and subsequent check on the lids; both lower and upper were checked for swellings and injections. The conjunctiva, sclera, papillary response and lacrimal potency were also checked. Ocular motility and presence of nystagmus were assessed using the broad H- test.

Internal Examination

An ophthalmoscope was used to observe the posterior segment of the eye. For the purpose of this research work, direct ophthalmoscope was used to observe the optic disc for its size, shape and distinct margin. It was also used to estimate the vertical cup/disc ratio, physiological cupping retinal detachment, artery vein ratio, pigmentation and any other irregularity on the fundus background.

Tonometry

This test was carried out using Perkins applanation contact tonometer (where necessary to determine the intra ocular pressure (lOP) of the subject. Intra ocular pressure of 18-21mg was considered as normal lOP. The subjects were asked to lie down on a bench with their faces facing the ceiling or sit and tilt their head. An anesthetic was instilled into both eyes for loss of sensation for at least 5 minutes. The fluorescein dye was instilled equally to enable read the pressure. The subjects were asked to raise their thumb (of the opposite eye being checked, the tonometer which has been sterilized with mentholated spirit (alcohol) was used to determine the IOP of the eye.

3. Results

The total number of subjects seen was 371 (three hundred and seventy one) out of which 60 persons has low vision. The findings of this research where presented in tables, percentages (%) which were the mathematical functions used to analyze the data. The age range used was eight (8) years interval. The prevalence of low vision in Owerri municipal was l6.7%.

Table 1 shows that among the 60 persons with low vision, that the age range of 80-97 had the highest percentage of low vision cases (25%) followed by year range of 71-79 and 62-70 with (21.67%) and (13.30%) respectively. The age range of 8-34 and 44-52 had the lowest percentage occurrence of 1.67% each.

Table 1. Population Distribution of Low Vision According to Age Range

Age (years)	Frequency	Percentage (%)
8 - 16	1	1.67
17 - 25	1	1.67
26-34	1	1.67
35-43	2	3.33
44-52	1	1.67
53-61	3	5.00
62-70	8	13.30
71-79	13	21.67
80-88	15	25.00
89-97	15	25.00
Total	60	100.00

Table 2. Prevalence of Low Vision According to Etiological Factors

Age (years)	Cataract	Glaucoma	Cataract \ Glaucoma	ARMD	Retinitis Pigmentosa	Corneal Opacity
8 – 16	-	-	-	-	1	-
17 - 25	-	-	-	-	-	1
26-34	-	1	-	-	-	-
35-43	-	1	-	-	-	1
44-52	-	-	-	-	1	-
53-61	-	3	-	-	-	-
62-70	2	3	2	1	-	-
71-79	5	2	5	1	-	-
80-88	7	4	3	-	1	-
89-97	6	3		2	-	-
Total	20	17	14	4	3	2

In the Table 2 shows the prevalence of low vision according to etiological factors. Among the etiological factors, cataract had the highest number (20) followed by glaucoma (17). The highest values of cataract and glaucoma were found in the age range of 80-88 years. Other etiological factors such as attracted glaucoma, ARMD, retinitis pigmentosa and corneal opacity had the values of 14, 4, 3 and 2 respectively.

Table 3. Classicization According to the Degrees at Which Visual Acuity Was Measured

V.A ranges	Male	Female	Frequency	%
<6/18-6/60	4	6	10	16.67
<6/60-3/60	9	7	16	26.67
<3/60-1/60	5	10	15	25.00
<1/600LP	6	5	11	18.33
NLP	5	3	8	13.33
Total	29	31	60	100%

The Table 3 shows that 16.67% had a visual acuity range of <6/18 6/60 26.67% V.A <3/60-1/60, 18.33% had NLP has VA <6/60-3/60, 25.00% had VA< 1/60-LP while 13.33% had NLP.

Table 4. Distribution of Low Vision According to Sex

Causes	Male	% male	Female	% female
Cataract	8	30.76	12	35.29
Glaucoma	7	26.92	10	29.41
Cataract and Glaucoma	6	23.08	8	23.52
ARMD	1	3.84	3	8.82
Retinitis Pigmentosa	2	7.67	1	2.94
Corneal Opacity	26	-	34	-

The Table 4 shows that females had the heights occurrence of low vision than males with respect to etiological factors except in corneal opacity. The total number of females with low vision was 34 persons, while the males were 26 in number. Cataract was highest in females 35.29 than in males 30.76. Glaucoma was also highest in female 29.41 than in male 26.92.

Table 5. Percentage Distribution frequency occurrence of low Vision

Gender sex	Distribution frequency of occurrence	Percentage of frequency
Male	26	43.33%
Female	34	56.67%
Total	30	100%

The Table 5 shows that females were more prevalence in low vision varies (56.60%) than males (43.33%).

4. Discussion

Globally, low vision is one of the public health challenges especially in developing countries. Despite its devastating effects, there is little or no information of its prevalence in Imo State, Nigeria. This study therefore evaluated the prevalence of low vision in Owerri municipal local government in Imo State, Nigeria. The prevalence of low vision in this study was 16.17%. The prevalence of low vision in this study was greater than that in Baotou (4.4%) [16], 4.1% in China [17], 7.2% in Volta region [18], and 9.8% in Accra region [19] in Ghana. The higher prevalence recorded in this study may be due to lack of adequate low vision care centers in the region.

In this study, the prevalence of low vision was higher in females (56.67%) than in males (43.33%). Resnikoff et al [20] stated that women are 1.4–2.2 times more likely to be vision impaired in all regions of the world compared to men. It was discovered that based on the level of visual acuity 26.67% had a visual acuity of <6/60-3/60, 13.33% has NLP. This result is in agreement with the report of Ajaiyeoba et al [21]. They reported that prevalence of ocular disorders is higher in females than males. Lu et al. [22] reported similar findings that visual impairment in Qidong City of Jiangsu Province was higher in women, the aged and illiterate persons. However, our finding is in contrast with the findings of Fasina and Ajaiyeoba [23] in their study in Yewa-North Local Government area of Ogun State, Nigeria where low vision in males was higher than that of females. Based on our interactions with the patients, the males seek for better healthcare than the females.

In this study, age range of 62-97 years has the highest prevalence and age range of 8-34 years, the lowest prevalence although geriatric eye disease set in at about 55-60 years. Similar findings were reported by many researchers. Zhang et al [16] reported that the low vision was more prevalent in elderly people and subjects with low education level in Baotou. Cheng et al [17] opined that the prevalence of low vision increased as age increases. The reasons for the higher prevalence of low vision in aged people may be due the fact that they are predisposed to aged related diseases such as cataract, hypertension, retinopathy, macular degeneration, and diabetic retinopathy which are the major causes of low vision and blindness.

In this study cataract was the leading cause of low vision followed by glaucoma in the study population. Other etiological factors of low vision found during this study were age related macular degeneration (ARMD), retinitis pigmentosa and corneal opacity. Age related cataract is the leading cause of visual impairment in developing countries. Wong et al [24] reported that cataract remains a major burden in many populations, even in Singapore that has accessible cataract surgical facilities. Zhang et al [16] reported that cataract was the major cause for visual impairment. Taylor et al [25] opined that the most common causes of low vision were under-corrected refractive error, cataract and age-related macular degeneration. WHO reported that the major causes of blindness was cataract (51%). The other causes included glaucoma, ARMD, childhood blindness, corneal opacities, uncorrected refractive errors, trachoma, and diabetic retinopathy [26]. Maberley et al [27] reported that among individuals with vision loss (vision worse than 20/40), cataract and visual pathway disease were the most common causes of visual impairment. They also reported that age-related macular degeneration and other retinal diseases were the next most common causes of vision loss. They observed that diabetic retinopathy and glaucoma were less frequently encountered as causes of visual impairment. Shah et al [28] reported that corneal disease accounted for more than one third of those with functional low vision in Pakistan National blindness and visual impairment survey. Kumah et al [19] stated that the commonest cause of low vision was cataract (50.85%), with retinal detachment being the least (1.69%). The rest were uncorrected refractive error (18.64%), glaucoma

(11.87%), ARMD (8.48%), and albinism (3.39%). Cataract and glaucoma were the major causes of low vision in this study. In contrast, Gilbert et al. [29] reported that retinal lesions and amblyopia were the commonest cause of functional low vision in school-age Children. The high prevalence rate of low vision could be attributed to lack of adequate eye care facilities and lack of eye care professionals in the study area. However, evidence exists that low-vision services improve quality of life and mental state [30]. The findings of this study have shown that education, employment prospects, independent and quality of life of people with low vision can be improved by enhancing vision through provision of quality and affordably low vision services.

5. Conclusion

This study established that the prevalence of low vision in Owerri municipal is very high and are common among elderly people. The findings showed that gender and increase in age were the major risk factors for low vision in the study area. The results also indicated that cataract and glaucoma were the commonest causes of low vision. We therefore suggest that the availability of efficient and effective low vision care services especially low cost cataract surgery and better screening method for glaucoma would go a long way to reduce the burden of low vision in the study area.

References

[1] Pizzarello L, Abiose A, Ffytche T, Duerksen R, Thulasiraj R, Taylor H, Resnikoff S. VISION 2020: The Right to Sight: a global initiative to eliminate avoidable blindness. Arch Ophthalmol 2004; 122(4): 615-620.

[2] Kingo AU and Ndawi BT. Prevalence and causes of low vision among schoolchildren in Kibaha District, Tanzania. Tanzania J Health Res 2009; 11(3): 111-115.

[3] World Health Organization /International Agency for the Prevention of Blindness. State of the World's Sight Vision 2020: The Right to Sight 1999-2005. Geneva, Switzerland: WHO; 2005.

[4] WHO. Management of low vision in children; Report of WHO consultation, Bangkok, 23-24 July, WHO/ PBL/93'. Geneva: WHO; 1992.

[5] Labib TA, El Sada MA, Mohamed B, Sabra NM, Abdel Aleem HM. Assessment and management of children with visual impairment. Middle East Afr J Ophthalmol 2009; 16(2):64-8.

[6] Oduntan OA. Prevalence and causes of low vision and blindness worldwide. S Afr Optom. 2005; 64 (2): 44-54.

[7] Frick KD, Foster A. The magnitude and cost of global blindness: an increasing problem that can be alleviated. Am J Opthalmol 2003; 134: 471-476.

[8] Whitfield R, Schwab L, Ross-Degnan D, Steinkuller P, Swartwood J. Blindness and eye disease in Kenya. Ocular status survey results from the Kenya rural Blindness prevention project. Br J Ophthalmol 1990; 74(6), 333-340.

[9] Zhang SY, Zou LH, Gao YQ, Di Y, Wang XD. National epidemiological survey of blindness and low vision in China. Chinese Med J 1992; 105: 603-608.

[10] Mohidin N, Yusoff S. Profile of a low vision clinic population. Clin Exp Optom 1998; 81: 198-202.

[11] Munier A, Gunning T, Kenny D, O'Keefe M. Causes of blindness in adult population of the Republic of Ireland. Br J Ophthalmolm 1998; 82: 630-633.

[12] Ejukonemu BOM. Magnitude of refractive errors and low vision among Braille reading children in Nigeria. VIR 2001; 3(1): 35.

[13] Kyari F, Gudlavalleti, MVS, Sivsubramaniam S, Gilbert CE, Abdull MM, Entekume G, Foster A, the Nigeria National Blindness and Visual Impairment Study Group. Prevalence of blindness and visual impairment in Nigeria: The national blindness and visual impairment survey. Invest Ophthalmol Vis Sci 2009; 50: 2033-2039.

[14] Abdull MM, Sivasubramaniam S, Murthy GVS, Gilbert C, Abubakar T, Ezelum C, Rabiu MM. Causes of blindness and visual impairment in Nigeria: the Nigeria National Blindness and Visual Impairment Survey. Invest Ophthalmol Vis Sci 2009; 50: 114-120.

[15] Barbie OME. Characteristics of the Nigerian low vision population. J Nig Opt Assoc. 2004; 2: 1-5.

[16] Zhang G, Li Y, Teng X, Wu Q, Gong H, Ren F, Guo Y, Liu L, Zhang H. Prevalence and causes of low vision and blindness in Baotou: A cross-sectional study. Medicine 2016; 95(37): e4905.

[17] Cheng JW, Cheng SW, Cai JP. The Prevalence of Visual Impairment in Older Adults in Mainland China: A Systematic Review and Meta-Analysis. Ophthalmic Res. 2012; 49: 1-10.

[18] Guzek JP, Anyomi FK, Fiadoyor S, Nyonator F. Prevalence of blindness in people over 40 years in the volta region of Ghana. Ghana Med J 2005; 39(2): 55-62.

[19] Kumah DB, Bempong BB, Abdul-Kabir M, Hardour R, Tchiakpe PM, Baafi, EB. Prevalence of low vision in the Shai-Osudoku District in the Greater Accra Region of Ghana. Med J Opht 2016; 1(2): 1-5.

[20] Resnikoff S, Pascolini D, Etya'ale D. Global data on visual impairment in the year 2002. B World Health Organ 2004; 82: 844-851.

[21] Ajaiyeoba AI, Isawumi MA, Adeoye AO, Oluleye TS. (2007) Prevalence and causes of blindness and visual impairment among school children in south-western Nigeria. Int Ophthalmol 2007; 26: 121-125.

[22] Lu H, Guan HJ, Dai Z. Prevalence of blindness and moderate and severe visual impairment among adults aged 50 years or above in Qidong City of Jiangsu Province: the China Nine-Province Survey. Zhonghua Yan Ke Za Zhi. 2012; 48(3): 205-10.

[23] Fasina FO, Ajaiyeoba AI. (2003). Prevalence and causes of blindness and low vision in Ogun State, Nigeria. Afr J Biomed Res 2003; 6, 63-67.

[24] Wong TY, Chong EW, Wong W, Rosman M, Aung T, Loo J, Shen S, Loon S, Tan DTH, Tai ES, Saw S. Prevalence and causes of low vision and blindness in an Urban Malay population. The Singapore Malay eye study. Arch Ophthalmol 2008; 126(8): 1091-1099.

[25] Taylor HR, Keeffe JE, Vu, HTV, Wang, JJ, Rochtchina E, Pezzullo ML, Mitchell P. Vision loss in Australia. Med J Australia 2005; 182: 565-568.

[26] Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. Br J Ophthalmol 2012; 96: 614-8.

[27] Maberley DA, Hollands H, Chuo J, Tam G, Konkal J, Roesch M, Veselinovic A, Witzigmann M, Bassett K. The prevalence of low vision and blindness in Canada. Eye, 2006; 20: 341-6.

[28] Shah SP, Minto H, Jadoon MZ, Bourne RRA, Dineen B, Gilbert CE, Khan MD. Prevalence and causes of functional low vision and implications for services: The Pakistan national blindness and visual impairment survey. Invest Ophthalmol Vis Sci 2008; 49(3): 887-893.

[29] Gilbert CE, Ellwein LB, the Refractive Error Study in Children Study Group. Prevalence and causes of functional low vision in school-age children: results from standardized population surveys in Asia, Africa and Latin America. Invest Opthalmol Vis Sci 2008; 49, 877-881.

[30] Lamoureux EL, Pallant JF, Pesudovs K, Rees G, Hassell JB, Keeffe JE. The effectiveness of low-vision rehabilitation on participation in daily living and quality of life. Invest Ophthalmol Vis Sci 2007; 48(4):1476-1482.