PREFERENCE FOR LOW VISION AIDS IN A NIGERIAN TEACHING HOSPITAL

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ABSTRACT

Purpose: To determine the proportion of patients who would benefit from low vision aids and their preferences for these devices in the eye clinic of University of Nigeria Teaching Hospital Ituku-Ozalla, Nigeria

Methods:

This was a prospective cross-sectional study of all new consecutive low vision patients seen at the hospital within the study duration of 12 months. All patients with low vision were evaluated by the researcher and the findings entered on a research protocol. Data were analyzed using descriptive statistics to generate frequency and percentage distributions. Analytical statistics was employed to test for significance of observed inter-group differences. Statistical significance was indicated by $p < 0.05$.

Results:

A total of 197 patients were seen comprising of 120 males and 77 females (M: F = 1.6:1), mean age was 39.3 ± 22.9 SD years. From the study, 114 (57.9%) of the patients would benefit from optical low vision aids while 83 (42.1%) would benefit from non-optical low vision devices. In the group that had improvement with optical aids, 38.2 % required only telescopes, 14.5% benefited from magnifiers alone, and 32.8% required both telescopes and magnifiers. The remainder, *14.5%,* required both optical and non optical devices like face caps, antiglare glasses, and table lamps.

Majority of patients who preferred magnifiers wanted either spectacle borne (41.4%) or handheld (39.0%). Most of the patients who chose telescopes wanted spectacle borne (71.4%).

Conclusion: Majority of patients in this survey preferred either spectacle borne magnifiers or telescopes.

Keywords: Low vision, Preference, Nigeria

INTRODUCTION

Over 285 million people world-wide are visually impaired of whom 39 million are blind and 246 million have low vision. [1] In Africa, 20.4 million people have low vision [1]. About 90.0% of the world visually impaired live in developing countries.[1] This places a lot of burden on developing countries including Sub-Saharan Africa due to limited resources.

Low vision is a major cause of morbidity and has profound effects on quality of life. It inhibits mobility and reduces the economic well-being of the individuals affected as well as their families.[2] Low vision services have suffered from neglect in organized eye care especially in low-income countries.[2]

In the African continent, which is mainly a low income continent, the burden of low vision is high for those affected.[1] Based on figures from the Nigeria National Blindness and Visual impairment survey, it is estimated that approximately 800,000 individuals have functional low vision in this country[3]

Functionally, low vision is characterized by irreversible visual loss and a reduced ability to perform many daily activities.[4] It is an important public health problem.[5] The provision of low vision services is one of the priorities in the global initiative tagged VISION 2020-The Right tothe global initiative tagged VISION 2020-The Right to Sight, [6] a programme that is aimed at achieving Universal eye health which is a global action plan (GAP) 2014-2019.[7] There are approximately 5000 adults/million populations in Nigeria who require low vision aids.[3] The challenge of providing low vision service for such a large population is enormous and requires efficient use of available resources.[8] Studies across the globe have shown that patients with low vision can benefit from low vision aid which will lead to improved quality of life for the individuals. Unfortunately, low vision aids are not accessible to those that need it most, especially in Africa where approximately half the countries do not have low vision services.[9]

A hospital based study to evaluate prescribed optical device use found that magnifiers were reported to be useful by greater than 80% of the participants.[10] The researchers drew a conclusion that patients with low vision who were provided with prescribed optical low vision devices do use them and perceive them as beneficial.[10] In special schools for the visually impaired in Ghana, some of students with low vision showed an improvement in both distance and near visual acuity.[11] A study in Evangelical Church of West Africa (ECWA) low vision clinic in Kano demonstrated that 88.3% of the patients seen were advised to continue with their education and employment after they were provided with low vision services. These patients may have either dropped out of school or gone into premature retirement.[12]

Preferences for low vision devices depend on the visual tasks and activities of daily living of the individual. A hospital based study in Canada found that majority of elderly patients wanted near vision aids (magnifiers) for reading while telescopes were needed for watching television.[13] This was similar to a study in India where the majority preferred spectacle magnifiers for reading and writing tasks while the students in that study population wanted telescopes for seeing the boards.[14] Furthermore in Nepal, spectacle magnifiers were preferred by the majority of patients.[15] Majority of the patients in an Egyptian study preferred Low Vision Aids (LVA) for near work[16] while in Kano, magnifiers of various types were the most accepted and preferred devices.[12]

Objective

To determine the proportion of patients who would benefit from low vision devices and their preferences for these devices.

METHODS

Study Design and Scope

This was a prospective cross-sectional study of all consecutive new low vision patients seen at the low vision unit of the eye clinic of University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Nigeria between November 2014 and November 2015. Cases included were consenting patients who presented at the eye clinic having been treated at the main eye clinic for various ailments but whose visual needs were not adequately met by conventional methods in accordance with the Bangkok definition of low vision.[17] Thus, most subjects with operable cataracts were not routinely referred for low vision assessment and were not included in this study.

A person with low vision is one who has impaired visual function despite treatment of eye disease and/or correction of refractive error and has reduced visual acuity in the better eye which is less than 6/18 but better than light perception (LP) or a visual field constriction to less than 10˚ who uses or is potentially able to use vision for the planning and/ or execution of a task.[17] This definition of low vision excludes individuals whose visual acuity could be improved by surgical and/or medical treatment.

Sample size

For a population greater than 10,000, the sample size calculation is given by the formula, $n = \frac{Z^2Pq}{d^2}$

- P = 3.0% thus giving a p value of 0.03.
- Z = the standard normal deviate, usually set at 1.96. This corresponds to the 95% confidence
- q = 1.0-p
- d =standard error or degree of accuracy desired which is 0.025

Thus $n = \frac{1.96^2 \times 0.03 \times (1-0.03)}{(0.025)^2}$

Therefore n= 178.8 which is approximately 179, allowing for 10% attrition, n = 179 + 18 = 197 patients.

The calculated minimum sample size of 179 was based on a 3% prevalence rate of low vision in a previous hospital based survey, 95% confidence interval and a 5% margin of error.[18] The calculated minimum sample size was inflated to a modified sample of 197 to achieve wider coverage.

Ethical Considerations

Prior to the commencement of the study, ethical approval consistent with the tenets of 1964 Helsinki declaration on research involving human subjects was obtained from UNTH's Medical and Health Research Ethics Committee (Institutional Review Board). A written informed consent was received from each participant.

Study Procedure

All patients with low vision were seen by the researcher and the findings entered on a research protocol. Section A of the protocol consists of Socio-demographic data regarding age, gender, marital status, education, employment status and area of residency.

Section B of the pro forma contained the main presenting complaints, past ophthalmic history, and associated visual symptoms, functional visual problems, psychological challenges and general health condition.

Section C comprised of ocular examinations which included the presenting distance and near visual acuities. Distance vision was assessed with a pin hole to see if there was improvement following which the patient with improvement was refracted with Welch Allyn retinoscope and subjective refraction to get the best corrected visual acuities for near and distance. Visual acuity (VA) for distance was assessed with the use of Low Vision Resource Centre (LVRC) Bailey-Lovie Sloan Letters design charts and recorded in logarithm of the minimum angle of resolution (log MAR) unit at the standard test distance of 4 meters. Near visual acuity was recorded with LVRC near acuity chart at a distance of 45 cm. LVRC tumbling E chart was used for the illiterate adults. Good-Lite Lea symbols with testing distance of 3 meters were used for young children. Older children were tested with LVRC charts for distance and near vision. Each eye was assessed separately. Inability to identify letters or symbols was followed by attempts to get the visual acuity by reducing the distance between the patient and the charts, and also by counting fingers, hand movement and light perception. Color vision was tested with Bright Colour. Twelve (12-) pencils contrast sensitivity was assessed with Good-Lite Hiding Heidi low contrast flip chart.

Anterior segment examination was done with a pen torch and slit lamp biomicroscope (Haag-Streit). Pupillary reaction was assessed with a pen torch. Direct fundoscopy with Welch-Allyn (model 18,200) and indirect ophthalmoscopy with +20 dioptres. The pupils were dilated with 0.5% tropicamide and phenylephrine combination (generic name Trophen) when necessary. Central visual field analysis was done where applicable with Humphrey Standard Automated Perimetry (SAP). Intraocular pressure (IOP) was measured where necessary with Goldmann applanation tonometry.

Section D consisted of the clinical diagnosis and cause of low vision along with the recommended interventions which included objective refraction with Welch-Allyn streak retinoscope and subjective refractions. A trial of telescopes was done and the visual acuities with the telescopes noted. Trial of magnifiers for near vision was performed and the visual acuity recorded. Optical low vision aids was prescribed according to the patients' preferences.

Non optical low vision aids used were typoscopes for writing guide, face caps to reduce glare, goose necked lamp stands to improve illumination for patients while reading and black pens for writing on white papers in order to improve contrast. Patients were helped to easily access low vision devices and acquire visual training and rehabilitation.

Data Management

Data on each participant was carefully extracted, coded and double entries were made into the computer. Analysis of the data was done with the Statistical Package for Social Sciences version 18 (SPSS Inc., Chicago, Illinois, USA). The statistical tools that were used for data analysis included chi-square tests which measured association between two quantitative variables. Student t-test was used for continuous variables. Multiple regression analysis was done for multiple variables. Data presentations were with tables, charts and in prose. For all comparisons, a P-Value of <0.05 at one degree of freedom was considered significant

Results

A total of 197 patients took part in this study comprising 120 (60.9%) males and 77 (39.1%) females (M: F ratio 1.6:1) aged 39.3 ± 22.9 SD (range 6 to 91 years). One hundred and eighty eight (95.4%) had at least primary education. (Table1).

Table 1: Biodata of study population

Characteristics	N = 197,	%
Educational level		
Primary	92	46.7
Commercial	2	1
Secondary	53	26.9
Tertiary	41	20.8
None	9	4.6
Total	**197**	**100**
Marital status		
Single	101	51.3
Married	80	40.6
Widowed	14	12.7
Divorced/separated	2	2.3
Total	**197**	**100**
Location of residency		
Urban	110	55.8
Rural	87	44.2
Total	**197**	**100**
Occupation		
Student	61	31
Artisan	29	14.7
Retired	27	13.7
Civil servant	25	12.7
Trader	15	7.6
Farmer	15	7.6
Unemployed	13	6.6
Housewives	12	6.1
Total	**197**	**100**

Table 2: Presenting VA in the better eye for 197 low vision patients

Presenting VA (logMAR)	N= 197	n = 100%
Distance (logMAR)		
>1.3	77.0	39.1
1.3-1.0	59.0	29.9
0.9-0.5	52.0	26.4
0.4-0.1	0.0	0.0
0.0-0.2	9.0	4.6
Near		
>1.3	72.0	36.5
1.3-1.0	51.0	25.9
0.9-0.5	49.0	24.9
0.4-0.1	13.0	6.6
0.0-0.2	12.0	6.1

Key: logMAR means logarithm of minimum angle of resolution. VA is visual acui

Table 3 VA after assessment with optical low vision aids

VA (logMAR)	N = 197,	N% = 100
Distant		
>1.3	65.0	33.0
1.3 - 1.0	18.0	9.1
0.9 - 0.5	49.0	24.9
0.4 - 0.1	36.0	18.3
0.0 - −0.2	29.0	14.7
Near		
>1.3	66.0	33.5
1.3 - 1.0	22.0	11.2
0.9 - 0.5	28.0	14.2
0.4 - 0.1	66.0	33.5
0.0- −0.2	15.0	7.6

Seventy seven patients (39.1%) had presenting visual acuity (VA) in the better eye of less than counting 4 fingers at 4 metres (>logMar 1.3 >20/400, <6/120), Table 2. The presenting near VA ranges from >logMar 1.3 {Counting Fingers (CF), Hand Movement (HM), Perception of Light (PL)} to log 0.0 (20/20, 6/6). 72 (36.5%) had VA of >logMar 1.3, 62.4% of the patients had a presenting near VA > logMar 1.0 (Table 2). After refraction, the mean distant VA was logMar 1.0.

Using unpaired t-test, the difference between the distant presenting and refracted VA were not statistically significant. Results from the Table 3 showed that 57.9% had distant VA after optical low vision assessment of logMar 0.9 (20/160, 6/48) to log Mar - 0.2 (20/12.5, 6/4). The mean distant VA was logMar 0.8 and this was statistically significant when compared with the mean value of both the presenting and refraction VA. Most (84.1%) of those with distant VA of >logMar 1.3 did not have any improvement after low vision assessment. 75.9% of those with VA of logMar 1.0 - 1.3 had an average improvement of 7 lines to logMar 0.5. Majority (75.0%) of those with VA of log Mar 0.9 - 0.5 had an average improvement of 3 lines to log 0.4. Near vision after optical assessment improved with a mean of logMar 0.8 which was statistically significant when compared with the mean presenting near VA (Table 3). Furthermore, 91.1% of those with near VA of >logMar 1.3 did not have any improvement for near vision, while
8.9 had an average improvement to logMar 0.9. In addition, 71.4% of those with near VA between logMar 0.4 - 0.1 had an average improvement of 2 lines with final VA of logMar 0.0.

From the study, 114 (57.9%) of the patients would benefit from optical low vision aid while 83 (42.1%) would benefit from non-optical low vision aids. Among the group that improved with optical low vision devices, 42.7% preferred magnifiers while 36.5% preferred telescopes. Among the patients that preferred magnifiers, majority wanted either spectacle borne (41.4%) or hand held (39.0%) magnifiers, while 9.8% wanted stand magnifier and 9.8% wanted head borne magnifiers.

The types of telescope preferred by the patients were spectacle borne (71.4%), hand held (22.9%) and head borne (5.7%).

DISCUSSION

There were more males (M) than females (F) in this study in all the age groups. Various studies on gender distribution of low vision patients presenting to the hospital have reported similar significant male preponderance [19--21]

The greater number of males in this study was likely due to socioeconomic and cultural differences. In low and medium income countries (LMICs), the prevailing socioeconomic settings characterized by unhindered male access to family finance and healthcare may account for this trend. The mean age of the participants in our report was similar to the mean age of 48.0 years observed by Richard et al. in Bayelsa Nigeria and 43.3 years in Ogun state Nigeria by Otulana.[21, 22] This is in contrast to findings elsewhere. Goldstein et al. in USA observed a
mean age of 77.0 years and Ikesugi et al. 70.6 years in Japan.[23,24] This difference in the pattern of the age distribution may be a reflection of the older ageing populations in advanced countries.[19] Across all age groups, glaucoma accounted for the commonest cause of low vision in this study followed by oculocutaneous albinism. This agrees with the findings in the Nigerian national blindness and visual impairment survey in which glaucoma was the most common cause of low vision.[2] Similarly, Ikesugi et al. reported glaucoma as the leading cause of low vision in their cohort.[24] Globally, glaucoma remains the second leading cause of blindness and the leading cause of irreversible blindness.[25] This underscores the importance of early diagnosis and treatment of glaucoma to reduce this trend.

Majority of the patients in this study were able to achieve improvement in VA (both distance and near) after low vision assessment. In a report from Ontario, Canada on the effectiveness of a low vision clinic, the researchers found that benefits from attending the clinic were observed by 89.5% of patients while 81.0% of cases regularly used low vision aids.[26] These findings contrast with this present study where 57.9% could benefit from optical low vision aids. The difference with our own observations may be related to the severity of presenting VA in our series where 69% had VA ≥ log MAR 1.0. This group of patients had the least improvement in VA after optical low vision assessment. In our survey, more patients preferred magnifiers to telescopes. This could be related to patients need for near tasks like reading. Furthermore, most patients preferred either spectacle borne magnifiers or telescopes or the hand held devices. This could be related to ease of use (patients hands are free with spectacle borne devices). In Nigeria and Korea, previous studies equally showed that magnifiers for near work were preferred to telescopes for distant work.[12,27]
This is similar to findings in India where patients preferred spectacle magnifiers to other forms of optical low vision aids.[14] A hospital based survey in India on preference pattern for low vision aids by Monira et al showed that the low vision aids routinely offered to patients were spectacle magnifiers.[28] Contrary to these findings, in Nepal, the patients preferred telescopes and handheld magnifiers more.[29] The difference between the two reports could be related to the fact that the Nepalese study was done in children among whom many may prefer distant vision to near vision. An audit by Dawn et al in USA to evaluate prescribed optical device use in terms of frequency and perceived usefulness among people with age-related macular degeneration (AMD), found that magnifiers were reported to be moderately to extremely useful by greater than 80% of participants . [9]

Conclusion: There were more males than females in the study. Majority of the patients preferred spectacle borne low vision aids. The commonest cause of low vision in the study was glaucoma.

Conflict of interest: The author reports no conflict of interest.

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