Appraisal of Low Vision Devices in South East Nigeria

Samuel O. Ndukuba, Okechi U. Amaechi, and Precious C. Azubuike

ABSTRACT

With strategic interventions in vision rehabilitation, eye care professionals have a chance to reduce the implications of vision loss. This study appraised low vision devices in the low vision population of the South-East geopolitical zone of Nigeria. Clinical assessments including external examination, refraction, and ophthalmoscopy were carried out on 239 individuals with vision impairment seen in outreaches in 5 states of South-East Nigeria. Data were analyzed using the IBM SPSS (version 24.0). Statistical significance was based on p<0.05. Individuals with moderate and severe vision impairment were 53.1% and 23.0% respectively while blindness was 23.9% in the study population. More so, 64.4% of the population had never visited an eye care professional despite poor vision. Of the 32.2% who had used a form of assistive device; magnifiers were most common. Ignorance (53.1%), distance (20.9%), cost (7.9%), and insufficient service (7.9%) were challenges faced by respondents. The relationship between the use of low vision devices and their helpfulness to daily living was significant (P=0.04); urban dwellers also had a statistically significant better access to eye care services than rural dwellers (P=0.04). A human capacity that gets drained by vision impairment will be recovered if there is a strategic low vision intervention as this leads to an upturn in the socio-economic fortunes of the region. Eye care professionals need to integrate the basic practice of low vision into their regular practice. There is also a need for public awareness of the possibilities of low vision rehabilitation to promote uptake.

Keywords: Devices, low vision, South-East, visual impairment.

I. INTRODUCTION

Visual impairment has an impact on the development and prosperity of different countries. This is more common in developing countries where the majority of visual impairment and blindness occurs. If early diagnosis and treatment are used, visual impairment can be better managed [1], [2]. Many people around the world with permanent visual impairment have some residual vision which can be used with the help of low vision services, materials, and devices [3]. In addition to the evaluation, diagnosis, and management of visual impairment by an eye care physician (Optometrist or ophthalmologist), vision rehabilitation may include, but is not limited to, optometric, medical, allied health, social, educational, and psychological services [4]. The function is maximized by evaluation, diagnosis and treatment including, but not limited to, the prescription of optical (magnifiers and telescopes), non-optical, electronic and/or other treatments [5]. The rehabilitation process includes the development of an individual rehabilitation plan specifying clinical therapy and/or instruction in compensatory approaches [6].

The goal of every approach in vision rehabilitation is participation. Rehabilitation must then be tailored to correspond to the type of vision loss and may also be modified by the individual's choice or expectations. [7] Professionals in rehabilitation want to see their patients become part of society again and carry out their daily activities with relative independence [7], [6]. Low vision negatively impacts the quality of life with an increased need for dependency on caregivers for activities of daily living, increased rate of depression, risk of multiple falls, and inhibited social interaction [8]. Thus, the purpose of low-vision rehabilitation is to allow the person to resume or to continue to perform daily living tasks by providing appropriate optical/non-optical devices, environmental modifications, special mobility, and vocational training in the use of low-vision devices.

Individuals with vision impairment have come to have a range of options that can help them achieve the goals of rehabilitation [5]. Interventions in low vision rehabilitation have developed through the years from just magnifying lenses to more sophisticated electronic devices and non-optical interventions that broaden the scope of individuals who can profit from rehabilitation in low vision. All these have gone a long way in advancing the objective of independence among individuals with vision impairments [9].

II. MATERIAL AND METHODS

A. Research Design

This study involved cross-sectional collection of data from different states in South-East Nigeria.
B. Study Setting

The study was carried out in the five states that make up the South-East geopolitical zone of Nigeria, which are Abia, Anambra, Ebonyi, Enugu and Imo States. Data were collected in outreaches carried out in rural and urban areas in each of the states. Eye care professionals who were regularly involved in community eye care interventions were contacted and partnered with for data collection. The locations where outreaches were conducted, and data obtained include:

- Rural-Abia: Umuobiala, Umuopara and Nchara Akanu; Anambra: Amaeyi and Umudioka; Ebonyi: Igbeagwu and Ndiaboishia; Enugu Ogu and Oji; Imo: Ihite-Uboma and Umukaram.

C. Instruments/Data Collection Procedure

Data were collected from direct clinical investigation during some eye care outreaches in the region done between February 2020 and February 2021. With the COVID-19 pandemic and the consequent lockdown, no data were collected from April to October 2020. Outreaches done from November 2020 were in line with local and international guidelines on safety protocols including the use of nose masks and social distancing. Demographic data including age, sex, and location of residence of all respondents in the outreaches were taken. Visual acuity charts like the Snellen’s chart and the Tumbling E charts were used to screen both literate and illiterate subjects in the outreaches. Visual acuity was taken with individuals wearing their distant lens correction (where available).

Objective and subjective refraction were done using retinoscopy and trial lens case respectively - Individuals with visual acuity worse than 6/18 with the best refractive correction in the better eye were identified as low vision subjects [10]. Ophthalmoscopes and penlight were used to establish the cause of low vision. Structured questionnaires were also administered by the clinicians to all the low vision subjects to get information such as history of eye care services, history with low vision services, usefulness of devices (where applicable) and challenges with accessing low vision services. The relevance of the devices to them was assessed on a Likert scale (excellent, somewhat, and poor) and documented. Communication in the respective outreaches was done in Igbo and English languages, according to what the subjects could understand – those in Igbo language were translated back to the English Language.

D. Statistical Methods Used

Data collected were cleaned and analyzed IBM Statistical Package for the Social Sciences (version 24.0) and presented using frequencies, percentages, and tables. Statistical significance was based on p<0.05.

III. ETHICAL CONSIDERATION

The study was conducted in adherence to the tenets of the Declaration of Helsinki and ethical approval was obtained from the Ethics and Research Committee of the Abia State University with the reference number ABSU/REC/OPT/001.

Informed consent was obtained from study participants who enrolled voluntarily after the purpose and implications of the study were explained to them and their anonymity was maintained all through the study.

IV. RESULTS

A. Figures and Tables

**Table I: The Arrangement of Channels**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (n=239)</th>
<th>Percentage (%)</th>
</tr>
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<tbody>
<tr>
<td>Age (years)</td>
<td></td>
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</tr>
<tr>
<td>5-14</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>15-24</td>
<td>12</td>
<td>5.0</td>
</tr>
<tr>
<td>25-34</td>
<td>13</td>
<td>5.4</td>
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<tr>
<td>35-44</td>
<td>26</td>
<td>10.9</td>
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<tr>
<td>45-54</td>
<td>66</td>
<td>27.6</td>
</tr>
<tr>
<td>55-64</td>
<td>78</td>
<td>32.6</td>
</tr>
<tr>
<td>65-74</td>
<td>26</td>
<td>10.9</td>
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<td>5.4</td>
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<tr>
<td>85-94</td>
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<td>1.3</td>
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<table>
<thead>
<tr>
<th>Sex</th>
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<tbody>
<tr>
<td>Male</td>
<td>135</td>
<td>56.5</td>
</tr>
<tr>
<td>Female</td>
<td>104</td>
<td>43.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
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<tbody>
<tr>
<td>Business</td>
<td>95</td>
<td>39.7</td>
</tr>
<tr>
<td>Civil Service</td>
<td>102</td>
<td>42.7</td>
</tr>
<tr>
<td>Farming</td>
<td>26</td>
<td>10.9</td>
</tr>
<tr>
<td>Student</td>
<td>16</td>
<td>6.7</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>State/Location</th>
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<tbody>
<tr>
<td>Rural</td>
<td>104</td>
<td>43.5</td>
</tr>
<tr>
<td>Urban</td>
<td>135</td>
<td>56.5</td>
</tr>
</tbody>
</table>

Two hundred and thirty-nine (239) individuals with vision impairment were examined in the outreaches across South East Nigeria. In Abia, Imo, Ebonyi, Enugu and Anambra States, 55, 66, 42, 39 and 37 persons were respectively got in the outreaches, from both rural and urban areas. Subjects were between the age of 8 and 88 years, with age ranges 55-54 and 45-54 the highest with 78 and 66 persons respectively and the mean age of the study population was 53.25±14.28. The ratio of female to male participants in the study was 1:1.30 (Table I).

In this study, moderate Vision Impairment (VI) occurred most (53.1%) among the classes of vision impairment. This was followed by severe VI (23%), profound VI (13.4%) and near-total blindness (10.5%) respectively (Fig. 1).

![Fig. 1. Classes of vision impairment among respondents.](image-url)

Table II shows that eighty-five persons (35.6%) had a history of getting at least a consultation from an eye care professional. 59 of these persons (24% of the study population) indicated that they had seen an eye professional who prescribed telescopes or magnifiers for them. With 9
persons indicating that they had been referred to an eye clinic that would provide specialized service, a total of 68 persons (28.5%) had knowledge of low vision services.

<table>
<thead>
<tr>
<th>TABLE II: HISTORY OF EYE CARE/LOW VISION SERVICES</th>
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<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>History of Eye Care/Low vision service</td>
</tr>
<tr>
<td>Routine eye care service only</td>
</tr>
<tr>
<td>Referral for low vision</td>
</tr>
<tr>
<td>Low vision service</td>
</tr>
<tr>
<td>No history of eye care/low vision service Male</td>
</tr>
</tbody>
</table>

Out of the 64 persons identified with the use of magnifiers, 32 used handheld, 17 used spectacle magnifiers, 11 used dome magnifiers, and 5 used stand magnifiers. Also, 12 persons using magnifiers bought them from an open market (Fig 2). Twenty persons (30.8%) reported that the device used provided excellent help. 56.9% said the devices were somewhat helpful to them while 12.3% got poor outcomes from using the devices they had.

Fig. 3 shows that two hundred and twenty-six persons (226) indicated varying challenges faced with and while accessing low vision services. Ignorance (53.1%) and distance to access clinics (20.9%) were the highest challenges identified as reasons for not accessing services. More so, 2.1% and 2.5% of the study population indicated that their challenge was with unworkability of service with respect to their visual needs and lack of service providers respectively.

Table III shows the findings from the study that revealed a statistically significant relationship between the location of individuals and history of access to eye care services (P= 0.043). Also, the location of respondents was not statistically associated with the history of use of low vision devices (P= 0.195).

As also seen in Table III, there is no statistically significant relationship between age & sex and uptake of low vision devices (P= 0.164 & 0.168 respectively). However, there was a statistically significant relationship between occupation and uptake of low vision devices (P= 0.001).

**V. DISCUSSION OF FINDINGS**

This study showed more males with vision impairment than females in a ratio of 1.30:1. Majority of the respondents were aged 45 to 64 years (60.2%) with the mean age of the study population being 53.25±14.28 years. Most ocular morbidities which lead to vision impairment set in and progress in this age bracket [10], [11]. Similar findings have been reported in some studies [12], [13]. There are more persons with vision impairments in this study who live in urban areas (56.5%) compared to the 43.5% that live in rural areas. This must have been because, a greater number of those screened in the outreaches across the 5 states were residents in urban areas compared to rural areas. This also reflected in the occupation of our study population being 53.2% in urban areas (56.5%) compared to the 43.5% that live in rural areas. This has often been reported as being more in rural areas of South-East Nigeria were 10.9% while students were 6.7%.

Seeing that moderate vision impairment represents more than half of the entire population with VI in this study (53.1%), there is a chance that the burden of VI can be largely tackled. Visual acuity has been highlighted as a possible factor that affects the use of low vision aids with individuals with worse visual acuity less likely to find low vision devices.
useful [14]. While this may be debatable it is only logical to expect an individual with visual acuity of 6/60 and better to find low vision devices more helpful. With better awareness and availability of low vision services in the South-East region, we stand a great chance at increasing the number of effective workforces of the society that may have been depleted by vision loss. In another perspective, the international classification of diseases gave a clear definition of low vision which embraced the functional aspect which highlights the possibility of individuals with vision impairment worse than severe VI to potentially benefit from low vision services [15]. This again buttresses the need for functional vision assessment of persons with VI.

Access and utilization of eye care services is a major theme in the eradication of blindness. In this study 64.4% of our study population reported that they had never utilized the services of an eye care professional despite their poor vision. In a study, 74.5% of the respondents were aware of the need for regular eye examination, yet they did not seek care [16]. Further highlighting the challenges with utilization of eye care services in developing countries, a study reported 72.7% of 1234 respondents had not sought treatment despite affirming decline in vision in a region in India [17]. While it is possible that some eye care professionals are shorn of the required knowledge and practice in low vision [18], accessing general eye care service is the entry point to accessing low vision services.

The campaign towards encouraging eye care professionals to integrate low vision services into their routine practice is further highlighted by the findings of this study. Only 28.5% of our study population had accessed eye care services with a perspective of low vision service also delivered (either as referral or prescription of low vision devices). Lack of knowledge and awareness about low vision among eye professionals has been reported as a limitation to the provision of low vision services in India [19]. Another study among ophthalmologists in Nigeria cited lack of training in low vision care as some of the major barriers in clinical low vision provision [20]. This challenge calls for a strategic intervention in developing countries. There is need to integrate low vision services in routine eye care practice at all levels to contend with the challenges of vision loss.

Out of the 77 persons (32.2%) with vision impairment identified with the use of at least one form of assistive device, 11 persons (4.6%) used white canes while the other 27.6% used optical devices, namely, telescopes and magnifiers. Handheld (47.0%) and spectacle (25.0%) magnifiers were the most used optical devices in this study. Dome magnifiers (16.2%), stand magnifiers (7.4%) and telescopes (4.4%) were also identified to be in usage. This is different from the findings where the most prescribed devices were spectacle magnifiers and telescopes (41.3% respectively) [5]. Telescopes and spectacle magnifiers were also shown as the most prescribed [7], it may be that various factors affecting the actual uptake of devices would often show a difference between prescribed devices and those actually obtained by patients. In a situational report on low vision services in tertiary hospitals in South-East Nigeria, it was reported that affordability and acceptability were identified among other reasons as limitations with the uptake of services [21]. Meanwhile, the reality of uptake of prescribed devices may be better reflected by this outreach-based study, as most patients do not eventually pick up prescribed devices from the clinic.

From this study, there is a limited range of devices available to individuals with vision impairment in South-East Nigeria [20]. Qualitative rehabilitation has gone beyond the borders of what telescopes and magnifiers only can provide to massive opportunities through a wide range of electronic devices. More so, there are various potentials in non-optical devices. While we seek ways to maximize the limited options available to us, we have need to increase our scope of service delivery of low vision and rehabilitation [21].

Developing countries are largely affected by challenges in accessibility and uptake of low vision services [22]. This study showed 27.6% utilization of optical low vision devices among individuals with vision impairment. Considering that 12 persons obtained theirs from a market, the actual uptake of devices from an eye clinic was 22.6%. The low uptake/utilization of low vision services has also been reported in other studies [21], [23], [24].

Ignorance (53.1%), distance to access clinics (20.9%), cost of service (7.9%) and insufficient service (7.9%) were the highest challenges identified as reasons for not accessing services by respondents in this study. Also, 2.1% and 2.5% of the study population indicated that their challenges were with unworkability of service with respect to their visual needs and lack of service providers respectively. Barriers to the uptake of low vision services from the perspective of patients and ophthalmologists have been widely studied [25]-[27]. Reasons such as lack of understanding about low vision services, inadequate information and miscommunication by eye care professionals, low levels of awareness about low vision care, and the need to appear independent were major barriers to accessing low vision services identified in various places. Other factors identified by the study include negative societal views and stigma associated with use of low vision aids [26]. With the outcomes in South-East Nigeria exemplifying the average African experience, so much needs to be done to change the narrative in the practice and uptake of low vision services especially in developing societies. The scope of low vision services has increased over the years and such dynamics should be reflected to the benefit of our population of persons with vision impairment.

A study revealed barriers as well as implemented enablers to the uptake of low vision services in a tertiary hospital in India [24]. While that was a hospital-based work, it gives valuable guide on how to effectively improve the uptake of low vision services through awareness, improved referral systems, low vision counselling and stratification of low vision services.

From our study, 30.8% of individuals with assistive devices reported that the device used provided excellent help. 56.9% said the devices were somewhat helpful to them while 12.3% got poor outcomes from using the devices they had. There was a statistically significant relationship between the use of low vision devices and their helpfulness to activities of daily living given that the P value was 0.04. Researches have revealed great outcomes from the use of low vision devices when clinical assessments are done and devices prescribed [8], [21], [28].
It was also seen that 12 persons (18.2%) of individuals that used optical devices got them from an open market. This way, the necessary assessment was not done, and the right devices may not have been procured [22]. More so, with the limited range of devices available to eye care professionals in Nigeria, most persons with vision impairment may not be able to receive devices that is adequate for their vision needs.

However, urban dwellers had a statistically significant better access to eye care services than rural dwellers (P=0.04), an understandable outcome as eye care facilities are mostly in urban areas [1]. This was not the case in the relationship between the use of low vision devices and location as there was no positive relationship (P= 0.20).

While there was no significant relationship between age & sex with uptake of low vision devices (P= 0.16 & 0.17, respectively), the concerns around uptake of low vision devices need to be addressed. The positive statistical relationship between occupation and uptake of devices in this study (P=0.01) shows that the exposure and nature of vision demand that comes from certain jobs can have an impact on the willingness of individuals to seek interventions in vision rehabilitation.

VI. CONCLUSION

Based on the findings of analyzed data, the following conclusions were drawn; low vision devices are helpful in activities of daily living, individuals living in urban areas access eye care services better than those in rural areas. The history of use of low vision devices is not dependent on where the individual resides. The uptake of low vision devices is not a determined by age or sex of individuals and an individual’s occupation is a factor in the uptake of low vision devices.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES


