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Characteristics of the Low Vision Population in South-East Nigeria

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Abstract

The increasing attention on the indices around low vision and blindness globally is worth noting. With strategic interventions aimed at preventing avoidable blindness and reducing the burden of low vision, research is being carried out to reveal the magnitude, characteristics, and available interventions for low vision. This study was aimed at characterizing low vision among populations in the South-East geopolitical zone of Nigeria. A total of 1473 persons were screened in outreaches across the zone. Clinical assessments, including external examination, refraction and ophthalmoscopy, were carried out, and 239 persons (16.2%) were identified with vision impairment with the various categories established. Data were analyzed using the IBM Statistical Package for the Social Sciences (version 24.0) and presented using frequencies, percentages, and tables. Statistical significance was based on $p<0.05$. The prevalence of moderate and severe vision impairment was 8.6% and 3.7%, respectively, while blindness was 3.9%. Cataracts (32.6%) and glaucoma (22.2%) were the most common causes of vision impairment and blindness. There was no positive relationship between age, sex and occupation of individuals and level of vision impairment with P values of 0.52, 0.21 and 0.11, respectively. Living in a rural area was not significantly associated with a higher degree of visual impairment than living in an urban area with P=0.81.

Keywords: *Acuity, Low Vision, Southeast, Visual Impairment.*

Introduction

Vision plays an important role in our day-to-day life as activities of daily living are greatly affected by vision impairments. Visual impairment is a major health concern all over the world, with about 90% of the world's visually impaired living in developing countries [1]. Interestingly, most cases of visual impairment are preventable. Vision loss has far-reaching socio-economic implications on society as individuals with vision impairment are often alienated from the mainstream of society, especially in developing parts of the world [2]. However, with strategic interventions in vision rehabilitation, eye care professionals have a chance to reduce the implications of irreversible vision loss while they continue the fight towards keeping our society away from avoidable blindness through effective eye care services [1, 2].

Global estimates of visual impairment (VI) have been on the increase over the years. In 1990, it was estimated that about 148 million people had VI with 38 million blinds. By 2002, the estimate of the VI increased to 161 million with 37 million blinds [1]. The most recent World Health Organization (WHO) statistics in 2014 show that 285 million people are visually impaired worldwide, of which 39 million are blind, and 246 million have a low vision [2, 5].

The Global report on visual impairment by the World Health Organization (2007) [3], individuals in moderate and severe visual impairment categories have been described as having low vision, while those with profound

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visual impairment, near-total blindness, and total blindness are described as blindness. A person with low vision has impairment of visual functioning even after treatment and/or standard refractive correction and has a visual acuity of less than 6/18 to light perception or a visual field of less than 10^0 from the point of fixation, but who uses or is potentially able to use vision for the planning and/or execution of a task [3].

The causes of visual impairment are numerous, including not only congenital and acquired ocular conditions but systemic diseases with ocular complications and neurological issues and trauma [4]. Globally the causes of visual impairment and blindness, in particular, have been compiled from data across 39 countries from six regions of the world, including Africa, America, Europe, the Eastern Mediterranean region, South-East Asia, and the Western Pacific region, reveal that the principal causes of visual impairment are uncorrected refractive errors (URE) and cataract (43% and 33%, respectively), glaucoma (2%), age-related macular degeneration (AMD), diabetic retinopathy (DR), trachoma and corneal opacities (CO), all about 1%, respectively, with a large proportion of causes (18%) undetermined [5, 16].

The Nigeria National Blindness and Visual Impairment Survey was undertaken between 2005 and 2007. Prior to that, there were no accurate and comprehensive population-based data available to guide policymakers and plan eye care services bearing in mind the extent to which the country is diverse economically, geographically, ethnically, and culturally [10]. The Clinical and epidemiological research on the prevalence of blindness and visual impairment in Nigerians 40 years and above, published by [5], found that approximately.

1. 1.13 million Nigerians are blind (profound, near-total and total visual impairments).
2. 2.7 million adults have a moderate visual impairment.
3. And an additional 400 thousand have a severe visual impairment.

This study determined the prevalence of low vision in South-East Nigeria and categorized low vision in the region. The study also identified the causes of low vision/blindness in Southeast Nigeria and associated the prevalence of low vision with the socio-demographic features of respondents.

Material and Methods

Research Design

This study was a cross-sectional descriptive study with a retrospective data collection procedure from different states in South-East Nigeria.

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 the 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.

Urban- Abia: Umuahia and Aba towns; Anambra: Awka and Onitsha; Ebonyi: Abakiliki town; Enugu: Enugu town; Imo: Owerri.

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

Research 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 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 cases respectively - Individuals with visual acuity worse than 6/18 with the best refractive correction in the better eye were identified as low vision subjects (WHO, 2007). 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 socio-demographic information from them. 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

Statistical Methods Used

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

Results

A total of 1473 individuals were screened during the outreaches across the 5 states in South-East Nigeria. Abia, Imo, Ebonyi, Enugu and the Anambra States had 307, 399, 220, 249 and 298 persons respectively screened 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 1).

Out of the 1473 individuals who were screened during the outreaches across the 5 states, two hundred and thirty-nine (239) persons- representing 16.2% of the total population screened, were identified as low vision patients- with visual acuity of worse than 6/18 in the better eye while having best refractive corrections (Figure 1).

Of the various kinds of visual impairments recorded in the 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 (Figure 2). The study recorded various causes of Visual Impairment among respondents, of which Cataracts (32.6%), glaucoma (22.2%) and corneal ulcer/scar (9.6%) were the highest causes of vision impairment in the study, with cone dystrophy and myopia occurring least (Table 2).

Table 3 shows the Findings from the study that revealed no statistically significant relationship between the location of respondents (rural vs urban) and the prevalence of visual impairment ($X^2=0.986$, $P=0.805$). Also, as shown in Table 4 below, the age, sex and occupation of respondents were not statistically associated with the prevalence of low vision among them ($P=0.525$, 0.206 and 0.109, respectively).

Table 1. Socio-demographic Characteristics of Respondents

Variables	Frequency (n=239)	Percentage (%)
Age(years)		
5-14	2	0.8
15-24	12	5.0
25-34	13	5.4
35-44	26	10.9
45-54	66	27.6
55-64	78	32.6
65-74	26	10.9
75-84	13	5.4
85-94	3	1.3
Sex		
Male	135	56.5
Female	104	43.5
Occupation		
Business	95	9.7
Civil service	102	42.7
Farming	26	10.9
Student	16	6.7
State/location		
Rural	104	43.5
Urban	135	56.5

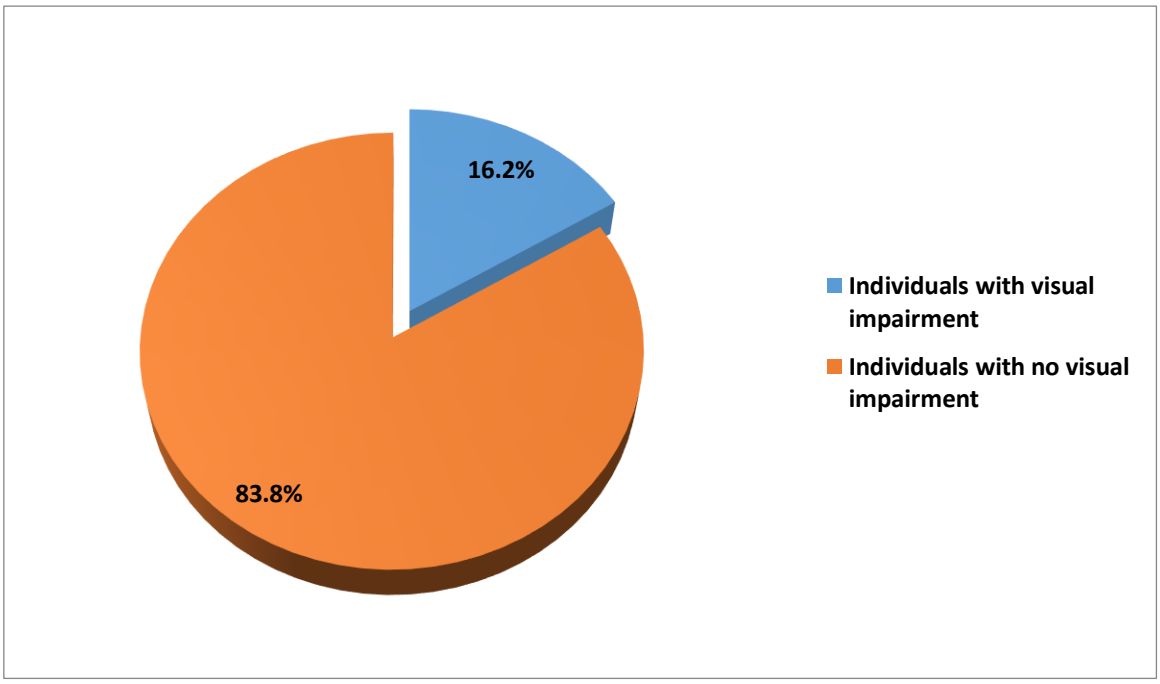

Figure 1. Prevalence of Visual Impairment among Respondents

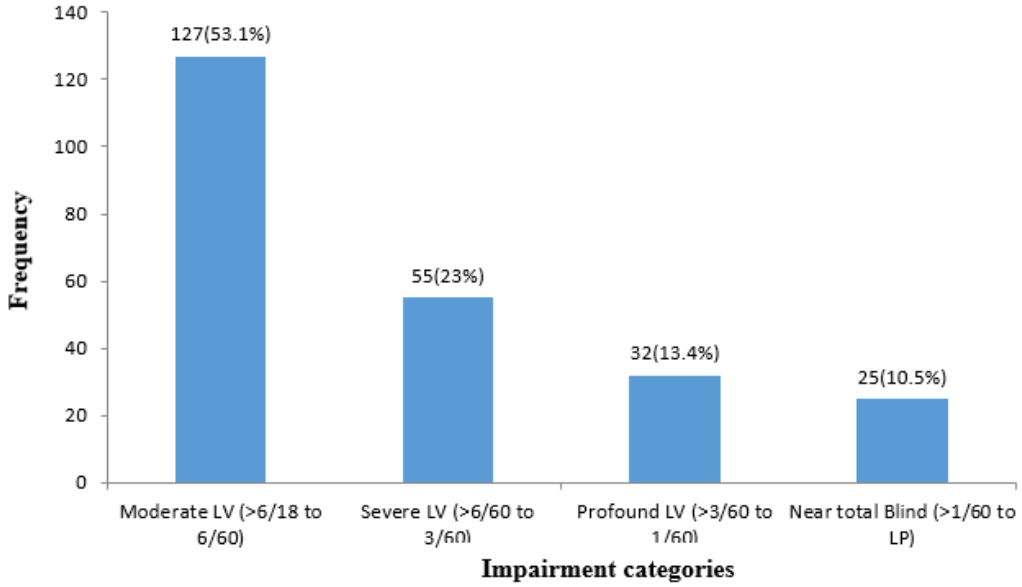

Figure 2. Categories of Visual Impairment among Respondents

Table 2. Causes of Visual Impairment among Respondents

Eye disorders*	**Visual impairment (%)**	**Blindness (%)**
Cataract	78 (32.6)	30 (51.7)
Glaucoma	53 (22.2)	10 (17.2)
Cornea ulcer/scar	23 (9.6)	9 (15.5)
Retinal pigmentosa	16 (6.7)	1 (1.7)
Albinism	14 (5.9)	-
Hypertensive retinopathy	11 (4.6)	3 (5.2)
Myopia	10 (0.4)	-
Optic atrophy	9 (3.8)	-
Microphthalmia	8 (3.3)	1 (1.7)
Diabetic retinopathy	5 (2.1)	-
Aphakia	4 (1.7)	2 (3.4)
Pterygium	3 (1.3)	1 (1.7)
Macular degeneration	3 (1.3)	-
Cone dystrophy	2 (0.8)	-

*Multiple responses were allowed

Table 3. Prevalence of visual impairment among respondents based on location

Test variable	**Location**	**Urban**	**df**	**(X^2)**	**P –value**
Level of vision loss	**Rural**				
Moderate LV	53(48.4)	74			
Severe LV	27(20.9)	28	3	0.986	0.805
Profound LV	14(12.2)	18			
Near total blind	10(9.5)	15			

Critical value: 7.815

Table 4. Association between Prevalence of Visual Impairment and Select Socio-demographic Characteristics of Respondents

Test variable	Moderate	Level of vision Severe	Profound	NTB	df	(X^2)	P –value
Age							
5-14	1(1.1)	1(0.5)	0(0.3)	0(0.2)			
15-24	6(6.4)	4(2.8)	2(1.6)	0(1.3)			
25-34	10(6.9)	1(3.0)	2(1.7)	0(1.4)			
35-44	16(13.8)	6(5.9)	1(3.5)	3(2.7)			
45-54	32(35.1)	16(15.2)	7(8.8)	11(6.9)	24	22.914	0.525
55-64	39(41.4)	20(17.9)	12(10.4)	7(8.2)			
65-74	14(13.8)	5(5.9)	5(3.5)	2(2.7)			
75-84	8(6.9)	2(3.0)	1(1.7)	2(1.4)			
85-94	1(1.6)	0(0.7)	2(0.4)	0(0.3)			
Sex							
Male	78(71.8)	31(31.1)	16(18.1)	10(14.1)	3	4.569	0.206
Female	49(55.3)	24(23.9)	16(13.9)	15(10.9)			
Occupation							
Business	51(50.5)	22(21.9)	11(12.7)	11(9.9)			
Civil service	60(54.2)	22(23.5)	14(13.7)	6(10.7)	9	14.389	0.109
Farming	7(13.8)	7(6.0)	5(3.5)	7(2.7)			
Student	9(8.5)	4(3.7)	2(2.2)	1(1.7)			

Critical values for age, sex, and occupation: 36.415, 7.815, 16.919, respectively

Discussion

This study showed more males with vision impairment than females in a ratio of 1.30:1. Nevertheless, with a total of 839 screened males compared to 634 females, the relative proportion of males with vision impairment is 16.0%. Females had a higher prevalence of vision impairment with 16.4%. Most 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 [6]. Similar findings have been reported in some studies [7, 8, 17]. 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 (932) compared to rural areas (541). This is also reflected in the occupation of our study population, with civil servants accounting for the highest percentage (42.7%), followed by those in business (39.7%). Farmers often reported as being more in rural areas of South-East Nigeria were 10.9%, while students were 6.7%.

According to the WHO [3] classification of low vision and blindness and the presenting visual acuity in the better eye of the respondents, the prevalence of vision impairment in this study was 16.2% as 239 persons out of the 1473 persons screened had visual acuity of at least worse than 6/18 in the better eye. The prevalence of moderate and severe vision impairment was 8.6% and 3.7%, respectively. This is like findings from The National Blindness Survey, which reported 13.12% and 2.05% prevalence of moderate and severe visual impairment respectively, in the South-East Zone for ages 40 years and above [9]. Also comparable are the findings of [7] in

Imo state with a prevalence of 24.4% and 2.4% for moderately and severely visually impaired individuals. The perceived differences in the findings may result from a broader age range compared to that of The National Blindness Survey and a broader range of states compared to the work of [7] in Imo state.

Meanwhile, the findings of this study corroborate the very high prevalence of severe vision impairment relative to other geopolitical zones of Nigeria as obtainable in the data from The National Blindness Survey, which showed a prevalence of 1.8% and 1.7% in the South-South and North-Central zones respectively, with other zones showing even lower prevalence [10, 16, 19].

According to the WHO [3] definition of blindness, there was a 3.9% prevalence of blindness in this study (comprising profound VI and near-total blindness). This is very similar to the blindness noted as 4.63% in adults 40 years and above in SE Nigeria from the National Blindness Survey report [10]. Data from the report also showed that the prevalence of blindness in the South-East was only better than that of the Northeast and Northwest zones. The prevalence of blindness in this study supports that stance. A community-based study in Imo State and a hospital-based study in Benin reported a slightly higher prevalence of 6.4% and 7.5%, respectively [7]. The high value reported in the hospital-based study in Benin is not surprising as patients with reduced vision are more likely to present to the clinic. The lower value in Anambra State also in South-East Nigeria may be attributed to the fact that the study was limited to only one local Government Area, unlike the present study. In addition, the Anambra State study was done over 20 years ago.

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. Lorenzini and Wittich [11] had highlighted visual acuity 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. While this may be debatable when considering how statistically significant this could be, 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 an effective workforce of the society that may have been depleted by vision loss.

Cataracts (32.6%) and glaucoma (22.2%) were the most common causes of vision impairment in this study. They were also the highest cause of blindness in the study. In a similar outreach-based study in Imo State, cataract was found to be the major cause of all classes of vision impairment [7]. A cataract is still the leading cause of blindness in middle and low-income countries [5, 20, 21], Nigeria inclusive. Adamu and Muhammad [12] identified glaucoma and retinitis pigmentosa as the major causes of low vision in Sokoto state. Similarly, glaucoma, cataract and retinal dystrophies were reported as the major causes in Calabar [13]. While they are quite like the findings of this study, cataracts- not being the major cause, may be linked to the fact that both studies were hospital-based, where the cataract is extracted and its input to the burden of low vision greatly reduced. With cataracts- a reversible cause of blindness, contributing largely to the causes of vision impairment, we have a great chance at reducing the burden of vision impairment by implementing the right strategies in vision intervention in communities. In contrast, age-related macular degeneration is the leading cause of vision impairment in high-income countries [14, 18, 20].

There was no statistically significant relationship between age, sex and occupation of individuals and level of vision impairment with P values of 0.52, 0.21 and 0.11, respectively. Similarly, in the work of [7], the gender and

occupation of the respondents were also not positively associated with visual impairment and blindness at P=0.12 and P=0.16, respectively. Meanwhile, it is known that age is one of the risk factors for many eye diseases, especially cataracts, glaucoma, and some retinal degenerations [15]. Also, the National Blindness survey in Nigeria [10] revealed a positive relationship between females and blindness. The ratio of screened urban residents to rural residents was 1.72:1. This led to more persons with vision impairment in urban than rural areas. With P=0.81, living in a rural area was not significantly associated with a higher degree of visual impairment and blindness than living in an urban area. This is different from the findings of [7] where dwelling in rural areas was positively related to vision impairment and blindness.

Conclusion

Based on the findings of analyzed data, the following conclusions were drawn; a 16.2% prevalence of visual impairment was recorded with moderate Vision Impairment (VI) being the most occurring (53.1%) among the classes of vision impairment. Cataracts (32.6%) and glaucoma (22.2%) were the most identified causes of visual impairment in the study area. The level of vision loss is not dependent on the Age, Sex or Occupation of individuals. The degree of vision impairment is not defined by where an individual resides, whether rural or urban.

Conflict of Interest

The authors declare no conflict of interest.

Authors' Contribution

Dr Ndukuba conceptualized the work, wrote the manuscript and as well as the majority of the writing. Mr Azubuike analyzed the data and contributed to the conceptualization, writing, and editing.

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