



(RESEARCH ARTICLE)



## Prevalence of visual impairment among patients attending the University of Port Harcourt Teaching Hospital, Rivers State, Nigeria

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### Abstract

Visual impairment, also known as loss of vision is the decreased ability of a subject to see to a degree. It is a global concern that is likely to escalate with prolonged life expectancies with increasing attention in the realm of eye care. In this study, the prevalence of visual impairment among patients attending the University of Port Harcourt Teaching Hospital, Rivers state, Nigeria was investigated. The study accessed a total of 7, 345 case notes of ethically sourced, visually impaired subjects who visited the hospital within five years (2015 - 2019) in the target study area. For each year accessed, records were grouped according to participants' age and gender, then matched with the type and causes of visual impairment in the study area. At the end of data collection, Results were passed through the graph pad prism (version 8.1), and subjected to statistical measure of central tendencies to obtain the average records and prevalence levels for collected variables, while setting confidence interval at a 95%. Differences in means across groups were also confirmed with the One-way analysis of variance (ANOVA), while setting a p value less than 0.05 as statistically significant. Following analysis, study found a statistically significant increase ( $p < 0.05$ ) in cases of visual impairment for 2019 as compared other year records, even though there was an inconsistent attenuation for the various years compared, with moderate vision having an apparently higher record than other visual impairments. Severe cases came second with 2018 having the highest cases than others but, with moderate impediments. Also, a significant increase ( $p < 0.05$ ) was seen in refractive error as compared to other causes of visual impediments. We recommend similar but more molecular approach to visual impairments within study area, and more.

**Keywords:** Visual Impairments; Cause; Prevalence

### 1. Introduction

Visual deficiency (VI), also referred to as vision impairment or loss of vision, is a diminished capacity to see to a degree that creates complications that are not normally fixable, such as glasses [1]. Some also include those who have a diminished ability to see because they have no access to contact lenses or glasses [2, 3]. Visual impairment is sometimes defined as the best visual acuity correction that is worse than either 20/40 or 20/60 [4, 5, 6]. For total or almost full vision loss, the word blindness is used. In normal daily activities such as reading and walking without adaptive training and equipment, visual impairment can cause difficulties [7].

Uncorrected refractive errors (43 percent), cataracts (33 percent), and glaucoma (2 percent) are the most common causes of visual failure worldwide [8]. Refractive errors include near-sightedness, far-sightedness, presbyopia, and

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astigmatism [9]. The most common cause of blindness is cataracts [8]. Other conditions that can cause visual problems include age-related macular degeneration, diabetic [9].

The World Health Organization (WHO) reports that 80% of visual impairment with medication is either preventable or curable [8]. This includes cataracts, river blindness and trachoma infections, glaucoma, diabetic retinopathy, uncorrected refractive defects, and certain cases of childhood blindness [8].

There were 940 million individuals with some degree of vision loss as of 2015 [10]. 246 million had low vision and 39 million were blind [8]. Most people with reduced vision are in the developing world and are over 50 years of age [8]. Since the 1990s, visual impairment rates have decreased. Visual impairments have substantial economic costs, both directly because of the cost of treatment and because of the cost of treatment [10].

Few studies on the prevalence of VI have recorded [11, 12]. More than 90% of people with VI live in developing nations. The greater prevalence of conditions linked to poverty or environmental conditions and inadequate access to health care facilities in developed countries can be due to this geographical difference [13]. In this report, however, the improvements, causes and rates of visual impairments as well as types among patients attending the state of Port Harcourt Teaching Hospital Rivers University were examined. To accomplish this, records were obtained from the Department of Ophthalmology at the University of Port Harcourt Teaching Hospital of subjects diagnosed with one type of visual disability or another and checked. Using a data capture type or a proforma designed specifically for the research, relevant information is extracted from the medical records. In order to compare mean differences across different variables, information on age, gender, causes of visual impairment, year range and clinical presentations was extracted and subjected to statistical analysis.

### **1.1. Aim of Study**

This study determined the prevalence of visual impairment among patients attending the University of Port Harcourt Teaching Hospital Rivers state, Nigeria. Specifically, the study;

- Determined the causes of visual impairment among patients attending the University of Port Harcourt Teaching Hospital Rivers state.
- Determined the frequency of visual impairment in the University of Port Harcourt Teaching Hospital Rivers state between 2015 and 2019.
- Identified the age group with most cases of visual impairment in the University of Port Harcourt Teaching Hospital Rivers State between the years of 2015-2019.
- Compared the difference in prevalence rate of Visual Impairment among patients attending the University of Port Harcourt Teaching Hospital between 2015 and 2019.

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## **2. Material and methods**

### **2.1. Study Area**

The study was conducted at the Port Harcourt University Teaching Hospital, a federal hospital located in Port Harcourt, Rivers State, on East-West Road. Rivers State is one of Nigeria's 36 states. The state has a total population of about 5,198,716 people, according to census data released in 2006, making it the sixth-most populous state in the country. As the center of Nigeria's oil industry, its capital and largest town, Port Harcourt, is economically important.

### **2.2. Study Design**

The study was prospective in nature, determining the prevalence and causes of visual impairment in primary and secondary school children age (5-15 years) in Rumuomasi Obia-kpor community, Rivers State.

### **2.3. Scope of Study**

The study only obtained data from previous records, relating to the prevalence and clinical presentation of visual impairment among patients who visited the eye clinic of the university of Port Harcourt teaching hospital, Port Harcourt, rivers state, within a period of five years (2015-2019).

## 2.4. Population of Study

The study population comprised of patients with visual impairments who regularly attended the eye clinic section of the University of Port Harcourt teaching hospital form 2015 - 2019.

## 2.5. Selection Criteria

Subjects of ages and gender that attended the university of Port Harcourt teaching hospital, having record of registration with the eye clinic between 2015 and 2019 were selected for the study. Study captured selected cases within year range of 2015 and 2019 in the target area

## 2.6. Methods of Data Collection

A data captured form was specifically used for gathering relevant data. A Check list was used as an instrument for data collection from the health management information system of the Teaching Hospital, Port Harcourt

## 2.7. Validity and Reliability of Instrument

Every data obtained from this study were collected alone from within the same values found in the medical records of patients as recorded in this study. This was interpreted accordingly.

## 2.8. Ethical Consideration

Approval to conduct this study was given by the department of Public and community Health, Novena University and an ethical consideration was given to the student from university of Port Harcourt teaching hospital, Port Harcourt, Rivers State. Permission was granted to proceed and use the hospital records to obtain the necessary data.

## 2.9. Data Collection Process

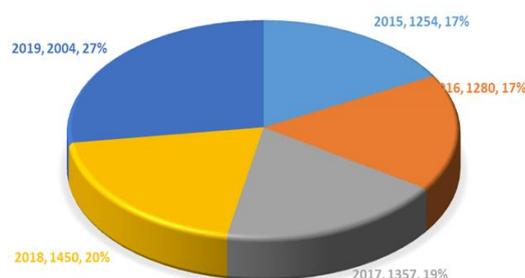
The records of diagnosed patients with visual impairment was obtained from the department of Ophthalmology in the University of Port Harcourt Teaching hospital, then reviewed and sorted thereafter. Relevant information on the prevalence and causes of visual impairments were extracted from the medical records using a data capture form or a profomer designed specifically for the study. Information such as age, gender, causes of visual impairment, year range and clinical presentations were also collected.

## 2.10. Statistical Analytical

Data collected from the field were presented with frequency tables. The two sections of the questionnaire were analysed using IBM Statistical Package for the Social Sciences (SPSS) version 20; a modern computer based statistical tool widely employed by researchers to handle research and statistical based problems. One-way analysis of variance (ANOVA) was used to compare the differences in means between groups, while setting any p-value less than 0.05 as statistically significant.

## 3. Results

From figure I (above), of the total 7345 files that were accessed, about 1450 (20%) of the records were obtained for the year 2018 (majority), while 2004 (27%) belonged to the year 2019 (second majority). Meanwhile, about 1254 (17 %) obtained records were for the year 2015, while 1280 (17%) and 1357 (19%) of the other records came from 2016 and 2017 years respectively.

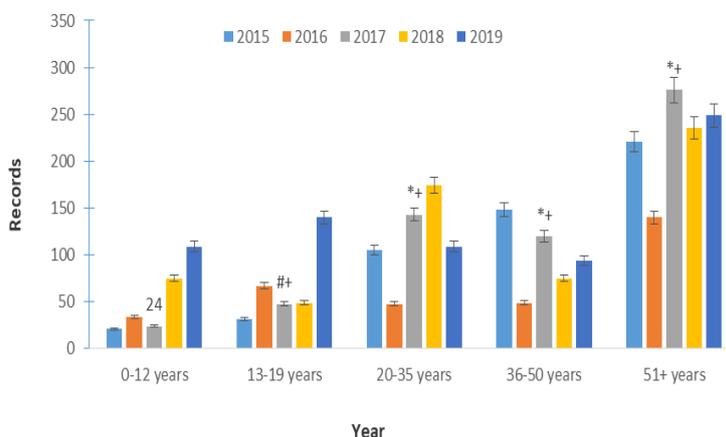


**Figure I** Summary of Total Number of Accessed Files



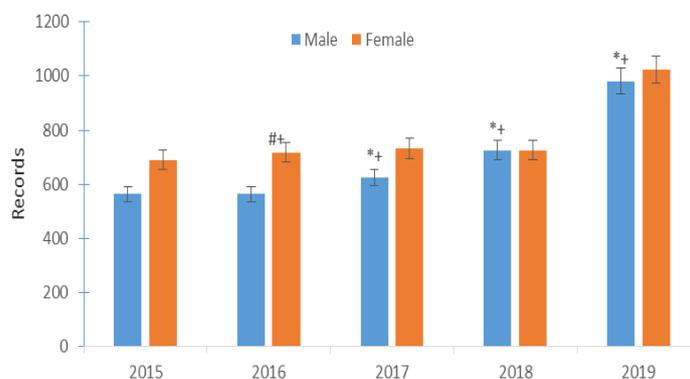
**Figure II** Summary of Total Number of Cases Considered

Figure II (above) gives a summary of the number of cases considered in the course of data collection. From the figure, about 527 (17%) of the cases were in 2015, with 2016, 2017, 2018 and 2019 returning 704 (22%), 611 (20%), 609 (19%) and 701(22%) cases respectively.



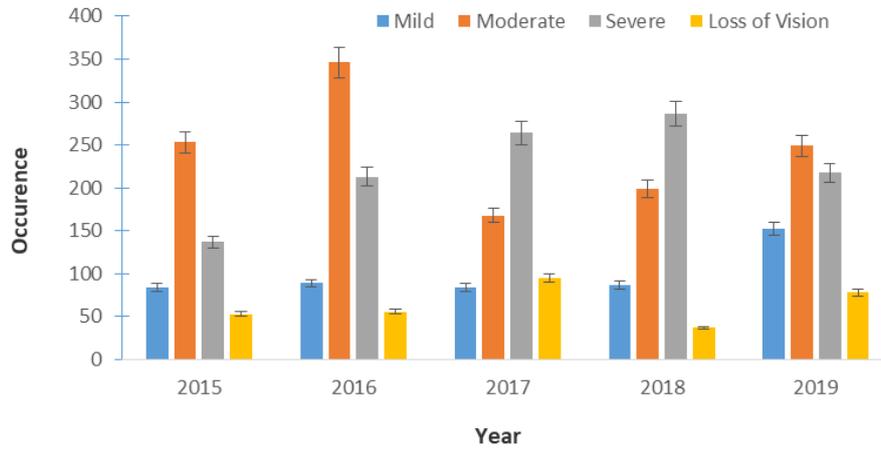
**Figure III** Socio-Demographic Characteristics of Accessed Cases by Age

From figure III (above), the socio-demographic properties of sampled records by age is shown to be significantly ( $p < 0.05$ ) higher for those aged 51+ years old as compared to others. \*+ = significant increase, #+ = insignificant increase compared to 0-12 years old records.



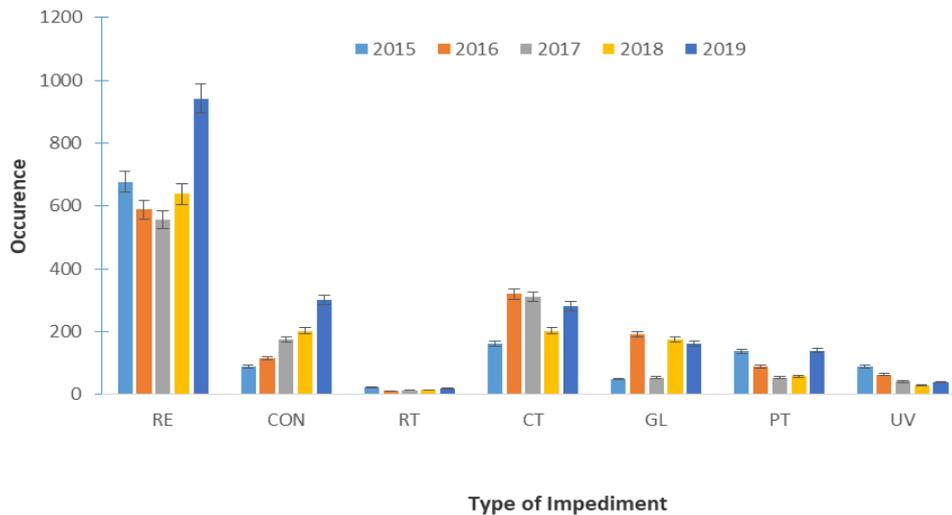
**Figure IV** Socio-Demographic Characteristics of Accessed Cases by Gender

Above figure IV shows the socio-demographic properties of accessed cases by gender. From the chart, a statistically significant increase ( $p < 0.05$ ) is seen in 2019 cases as compared other years. \*+ = significant increase, #+ = insignificant increase compared to 0-12 years old records.



**Figure V** Occurrences of Visual Impairments by Year

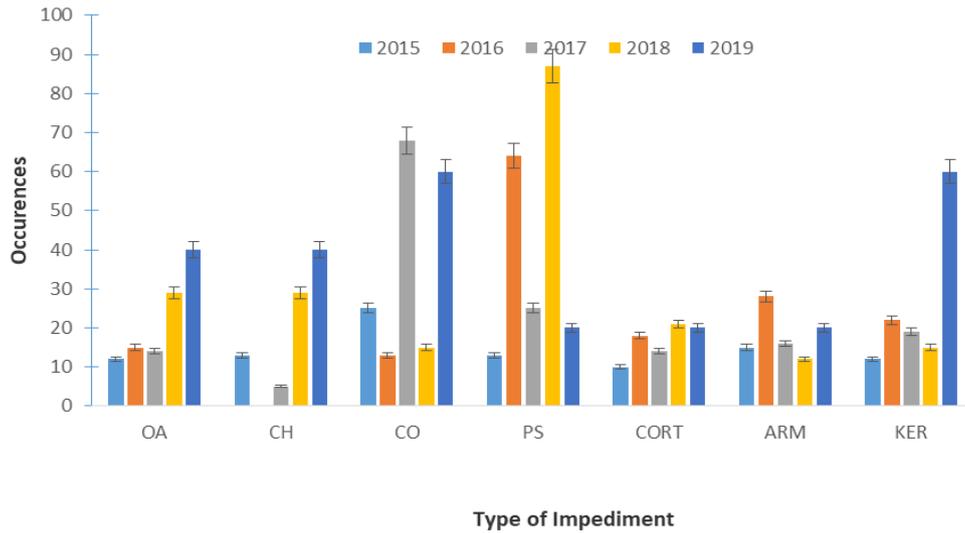
The figure above (V) compares the visual impediment records of accessed cases by year. Here, there is an inconsistent attenuation for the various years compared, even though moderate vision had an apparently higher record than other types of impediments. Sever cases came second with 2018 having the highest cases than others but moderate impediments.



**Figure VI** Causes of Visual Impairments

Key: RE = Refractive Error, CON = Conjunctivitis, RT = Retinopathy, CT = Cataract, GL = Glaucoma, PT = Pterygium and UV = Uveitis

The figure above (figure VI) is a comparative summary of visual impediment records based on the causes. From the chart, a significant increase in refractive error is seen as compared to other causes of visual impediments.



**Figure VII** Causes of Other Visual Impairments (Continuation)

Key: OA = Optical Atrophy, CH = Chalaza, CO = Cornea Opacity, PS = Pseudophakia, CORT = Cortical, ARM = ARMD, and KER = Keratitis.

The figure above (figure VII) is a comparative summary of visual impediment records based on the causes. From the chart, a significant increase in Pseudophakia is seen as compared to other causes of visual impediments.

**Table I** Total Number of Files Accessed: 7345

Year	2015	2016	2017	2018	2019
Value	1254	1280	1357	1450	2004

**Table II** Total Number of Accessed Cases

Year	2015	2016	2017	2018	2019
Value	527	704	611	609	701

**Table III** Comparative Changes in Age of Accessed Cases.

Age	0-12	13-19	20-35	35-50	50+
2015	21	32	105	148	221
2016	34	67	78	156	369
2017	24	48	143	120	276
2018	75	49	174	75	236
2019	109	140	109	94	249

**Table IV** Demographic Records of Cases by Gender

Year	2015			2016		2017		2018		2019
Gender	M	F	M	F	M	F	M	F	M	F
Value	564	690	563	717	624	733	725	725	981	1023
Total	1254		1280	1357		1450		2004		

**Table V** Gender Changes in Observed Cases

Year	2015		2016		2017		2018		2019	
Gender	M	F	M	F	M	F	M	F	M	F
Value	295	232	324	380	276	335	286	303	452	249
Total	527		704		611		607		701	

**Table VI** Categories of Visual Impairment

Year	Mild VI	Moderate VI	Severe VI	Loss of Vision
2015	84	253	137	53
2016	89	346	213	56
2017	84	168	264	95
2018	87	199	286	37
2019	156	249	218	78

**Table VII** Causes of Visual Impairment

Disease/ Year	2015	2016	2017	2018	2019
Refractive Error	677	588	556	638	942
Conjunctivitis	88	115	176	203	300
Retinopathy	22	12	14	15	20
Cataract	163	320	312	203	281
Glaucoma	50	192	54	174	162
Pterygium	138	90	54	58	140
Uveitis	88	63	41	29	40
Optic Atrophy	12	15	14	29	40
Chalaza	13	10	15	29	40
Cornea Opacity	25	13	68	15	60
Pseudophakia	13	64	25	87	20
Cortical Vi	10	18	14	21	20
ARMD	15	28	16	12	20
Keratitis	12	22	19	15	60

#### 4. Discussion

Visual deficiency (VI), also referred to as vision impairment or loss of vision, is a diminished capacity to see to a degree that creates complications that are not normally fixable, such as glasses (De Carlo et al., 2016). Some also include those who have a diminished ability to see because they have no access to contact lenses or glasses [2, 3]. Visual impairment is sometimes defined as the best visual acuity correction that is worse than either 20/40 or 20/60 [4, 5, 6]. For total or almost full vision loss, the word blindness is used. In normal daily activities such as reading and walking without adaptive training and equipment, visual impairment can cause difficulties [7].

Few studies on the prevalence of VI have recorded [8]. More than 90% of people with VI live in developing nations. The greater prevalence of conditions linked to poverty or environmental conditions and inadequate access to health care facilities in developed countries can be due to this geographical difference [9]. In this report, however, the improvements, causes and rates of visual impairments as well as types among patients attending the state of Port Harcourt Teaching Hospital Rivers University were examined. To accomplish this, records were obtained from the Department of Ophthalmology at the University of Port Harcourt Teaching Hospital of subjects diagnosed with one type of visual disability or another and checked. Using a data capture type or a profomer designed specifically for the research, relevant information is extracted from the medical records. In order to compare mean differences across different variables, information on age, gender, causes of visual impairment, year range and clinical presentations was extracted and subjected to statistical analysis.

The number of subjects with visual disability in the study location is currently summarized in Figure I and II. A total of 7345 files accessed from the teaching hospital were accessed from the table and talks, dating from 2015 to 2019. Around 1450 (20 per cent) of the data were collected from the records for the year 2018 as a majority, with the second majority of around 2004 cases in the year 2019 (27 percent). However, for the year 2015, there were a total of 1254 (17 percent) of the accessed documents, while 1280 (17 percent) and 1357 (19 percent) of the other records resulted from case notes for 2016 and 2017, respectively. A list of the number of cases considered in the process of data collection is also seen in the figure. No fewer than 527 (17 per cent) cases were registered for the 2015 year, with a total of 704 (22 per cent), 611 (20 per cent), 609 (19 per cent) and 701 (22 per cent) cases in 2017, 2017, 2018 and 2019. Compared to other records, there is a growing agreement that the use of the best-corrected visual acuity (the visual deficiency index) to measure a population's visual impairment burden is unacceptable since the visual impairment induced by an uncorrected refractive error is absent [14, 15]. The use of visual acuity presentation, that is, acuity for whatever refractive correction the individual is using, is more acceptable as it requires the inclusion of uncorrected refractive error as a cause of visual impairment. Figure III also indicates that the socio-demographic characteristics of sampled records by age are shown to be substantially higher for those aged 51+ years relative to others ( $p < 0.05$ ). Whereas, gender-wise, a statistically significant increase ( $p < 0.05$ ) was seen in 2019 cases, as opposed to other years, and particularly in female people.

The partial or total loss of vision is visual deficiency and is graded as mild with visual acuity  $< 6/18$ - $6/60$ , extreme  $< 6/60$ - $3/60$ , blind  $< 3/60$ -no light perception. Visual deficiency is considered to be a serious public health problem. Cases of visual disability are growing and the World Health Organization reports that 1 billion people worldwide are visually impaired [16]. Visual impairments also arise by visual acuity of about  $6/18$ -no light experiences. Few attention has been paid internationally to children's vision and causes of visual impairment [17].

There have been several research focusing on the prevalence of VI. Reportedly, more than 90% of people with VI live in developing countries. The greater prevalence of conditions linked to poverty or environmental conditions and inadequate access to health care facilities in developed countries can be due to this geographical difference [18]. In terms of gender, due to longer life expectancies and lack of access to health care services, women are at higher risk for VI, especially in rural areas. In addition, the global prevalence of blindness in women is higher than in men, and this gender gap is highest in high-income regions and lowest in Sub-Saharan Africa for blindness [19]. The authors speculated that in Sub-Saharan Africa, this low gender difference could be due to onchocerciasis, which in endemic African regions is more prevalent in men than women.

However, figures V through VII in the current study indicate a comparative shift in the different causes and forms of visual impairment in the study field. In contrast, there is an inconsistent attenuation in the records for the different years, particularly in relation to the causes of VI, while moderate vision had a record apparently higher than other forms of impediments. However, for moderate VI, the year 2016 returned a considerably higher record ( $p < 0.05$ ) than other accessed years. Extreme cases were also found to be second to moderate VI with the highest in reported cases than others but moderate impediments in the year 2018. A comparative study of reports of visual impediments due to causes also showed a statistically significant rise in refractive error as a major cause relative to other causes of visual

impediments (Figure VI), while visual impairments due to Pseudophakia tend to be substantially greater. The prevalence of VI varies according to whether vision appearance or best-corrected vision is recorded at this stage. In 2002, it was estimated that there were 161 million individuals with VI globally with the best-corrected vision. However, when the prevalence of uncorrected refractive error was included, this value greatly increased to 314 million people with VI. This suggests that an extra 153 million people were visually affected by uncorrected refractive error alone [20].

The prevalence of visual impairment among children aged 5-16 years in Kenya was relatively lower in comparison to other studies in other regions [21]. This is due to Kenya's strengthened health care system in the last 10 years. Kenya's Ophthalmic Division has improved patient services and raised public understanding of eye disorders such as refractive errors. This has allowed patients to recover their sight at an early age in the early detection of ocular diseases and management. Not only did we examine the prevalence of visual impairment in children between the ages of 5 and 16, we also examined the causes of visual impairment among the same children. Owing to low reports of ocular-related complications from infants, the age group was not studied in developed countries. Based on the presentation of visual acuity in relation to the World Health Organization criterion, the prevalence of visual impairment in our sample was 2.4 per cent. The primary explanation for the presentation of visual impairment in this age group was that 76 percent were inadequately qualified pediatric eye care providers to perform extensive eye exams. There is also a need for correction of refractive error among the population of children [21].

The current result is consistent with previous research where the key cause of presenting visual acuity deficiency is uncorrected refractive error. In a study of 137 studies of 78,543 participants from 82 countries, the main leading causes of visual impairment were uncorrected refractive errors [22]. It is unfortunate that it remains a major cause of visual impairment in Kenya, even with the rise in eye care providers, since the refractive error is correctable. Kenya is considered to be relatively advanced in East Africa, and public knowledge of refractive errors by health care practitioners should not be an obstacle. As it will decide if spectacles are needed, thorough eye examination is important.

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## 5. Conclusion

Visual disability remains a global problem that, as evident in the records returned for visually impaired records of over 50 + years in this report, is likely to increase with extended life expectancies. Approximately 90% of visually disabled people currently live in developed countries due to inadequate access to health care facilities. (2012 for Murthy and Johnson). However, in this report, there is an observed overall shift in the number of people with VI by age and gender, which can be due to the accomplishments of the 2020 vision. Notably, the vision 2020 gave women who are at higher risk of VI than men the right to Sight initiative; however, this gender difference was lower in males than females as noted in this study; suggested by potential childhood blindness and VI as a result of higher life expectancies in females than males. In the view of various stakeholders, such as regulators, clients, experts and the sector, obstacles and problems often seem to be very different.

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## Compliance with ethical standards

### *Acknowledgments*

Acknowledgments must be inserted here.

### *Disclosure of conflict of interest*

If two or more authors have contributed in the manuscript, the conflict of interest statement must be inserted here.

### *Statement of ethical approval*

If studies involve use of animal/human subject, authors must give appropriate statement of ethical approval. If not applicable then mention 'The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

### *Statement of informed consent*

If studies involve information about any individual e.g. case studies, survey, interview etc., author must write statement of informed consent as "Informed consent was obtained from all individual participants included in the study."

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