



Perception of Refractive Errors and Impact of Corrective Treatments on Adult Patients Seen at a Tertiary Health Institution in South-South Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors contributed in the development of the manuscript, data collection as well as final writing and approval of the manuscript.

Authors BAE and NHO conceived and designed the study. Authors BAE, NHO, AAI and SNO analysed and interpreted data, as well as drafted and revised the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aim: To assess the perception of refractive errors and impact of corrective treatments on adults with refractive errors (RE) attending the Eye Clinic of University of Calabar Teaching Hospital (UCTH), Calabar.

Materials and Methods: This was a cross-sectional, descriptive study of 650 consecutive patients aged 18 years and above who have been diagnosed with refractive errors. They were interviewed using pretested, interviewer-administered questionnaires made up of both open and closed ended questions. Data were gotten and analysed using Statistical Package for Social Sciences (SPSS) for IBM (version 20, SPSS Inc, Chicago, IL, USA) after due ethical clearance and informed consent. Results were displayed using descriptive statistics and Chi square test was used to assess for relationship between categorical variables.

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Results: Of the 650 participants, 441 were females and 209 were males with a mean age of 44.48 years. Only 30% had previously heard the term 'refractive error' and were able to state the type of error they had. Excessive reading (49.8%), Aging (44%), Hereditary (40%), Exposure to dust/smoke (31.4%) and Poor diet (17%) were the commonly identified causes of refractive errors. About 39% of the participants expressed a fear of even going blind from the perceived visual disability. Many respondents (88.0%) believed that treatment could correct their eye problem; 71.4% of whom expected that spectacles would provide such a correction permanently. About 54% of participants felt that the diagnosis of refractive error and the use of prescribed spectacles have affected their lives negatively while only 9.4% reported a positive impact.

Conclusion: Misconceptions about RE exist among the participants especially concerning the cause and prognosis of refractive errors. These issues could affect compliance, lead to false expectations from treatment and negatively impact the quality of life. Appropriate, individualised and sustained health and eye health education sessions are, therefore, recommended for all patients with refractive error.

Keywords: Perception; refractive errors; impact of corrective treatment; Nigeria.

1. INTRODUCTION

Anomalies of the optical state of the eye are known as refractive errors [1]. Globally, uncorrected refractive errors (URE) is the leading cause of visual impairment and the second leading cause of blindness for all ages [2]. In Nigeria, the national blindness and visual impairment survey conducted from 2005 to 2007 revealed URE as the most common cause of visual impairment in Nigeria accounting for 61.6% of all causes [3,4].

A wide range of modalities are available for the correction of refractive errors. They can broadly be divided into optical (spectacles, contact lenses) and surgical (refractive surgery). By definition, spectacles are made of a pair of lenses set in a frame worn on the nose and ears in order to correct deficiencies in eyesight or to ornament the face. They are the cheapest and most commonly used form of refractive correction worldwide [5,6].

When uncorrected, refractive errors constitute a socioeconomic burden on the individual, his family and the society at large. It has been reported that without appropriate correction, millions of children are at risk of losing educational opportunities and adults are excluded from productive working lives [7,8,9].

In addition, UREs have far reaching effects on the quality of life of patients irrespective of their age, sex and ethnicity. They are associated with the development of behavioural problems in childhood, myopes exhibit personality pattern of introversion whereas hypermetropes tend to be extroverted [10]. Correction of refractive error

through dispensing of eyeglasses has been found to be associated with improved quality of life and decreased symptoms of depression [11,12,13].

Despite the high burden of the disease and easily available methods of correction, little understanding of both the condition and its correction exists among patients. The relevance of this is underscored by the 'health belief model' which theorises that health behaviour is determined by patient's personal beliefs or perceptions about their condition. These beliefs perception influences patients' acceptance of treatment, adherence to treatment, the outcomes of treatment and patients' satisfaction with treatment [13].

In India, Chawla et al. [14] reported that 47% of patients with refractive error did not know what was wrong with their eyes, were unaware of appropriate treatment and did not know what spectacles were meant for. Similarly, Ebeigbe et al on assessing attitudes and beliefs to spectacle wear among 500 undergraduates of University of Benin, Nigeria, found that two-thirds (68%) of the study population had never heard of refractive error and only 34% knew eyeglasses could be used to correct refractive error [15].

In addition to this lack of knowledge on refractive error, use of spectacles is fraught with challenges like social stigmatisation and misconceptions like fear of subsequent eye damage. Megbalayin found that among 1,175 Nigerian secondary school students, only 50% agreed they would wear spectacles if prescribed by their doctor and the reasons cited for noncompliance with prescribed spectacles

included fear of being mocked by friends, lack of parent's consent, fear of complications, lack of felt need and fear of being perceived as being visually handicapped [16].

Understanding of this common eye disorder among prospective patients is therefore crucial as it affects their acceptance of the diagnosis, uptake and compliance with the different forms of correction and satisfaction with treatment offered. This study, therefore, seeks to explore the gaps in patients' understanding of refractive error as an ocular disorder and the impact of spectacle use on their daily lives.

2. MATERIALS AND METHODS

2.1 Study Area

This study was carried out in the eye clinic of UCTH, Calabar. UCTH Calabar is a federal government institution in the South-South region of Nigeria which offers tertiary level ophthalmic care. The catchment area of the eye clinic in UCTH includes Cross River State and other neighbouring southern Nigeria states like Enugu, Ebonyi, Akwa Ibom and Rivers state and an average of 6900 patients are attended to annually. Optical services are offered daily in the eye clinic with refractive correction in the form of spectacles available to patients.

2.2 Study Design

This was a cross sectional descriptive study.

2.3 Study Population

This study was carried out among registered patients of the eye clinic aged 18 years and above who have been diagnosed with refractive error and have received a prescription for spectacle correction.

2.4 Sample Size Calculation

This was done using the leslie kisch formula with a finite population correction done. A minimum sample size of 658 was obtained.

2.5 Sampling Technique

Consecutive sampling method was used to recruit patients.

2.6 Data Collection

Data was collected over a 3-months period from February to April, 2018 using pre-tested,

semi-structured, interviewer administered questionnaires. Written informed consent was collected prior to questionnaire administration. Ethical approval for the study was obtained from the Health Research Ethics Committee of the University of Calabar Teaching Hospital, Calabar, Nigeria.

2.7 Data Management

Statistical Package for Social Sciences (SPSS) for windows (version 20, SPSS Inc, Chicago, IL, USA) was used for data entry, cleaning and analysis. Descriptive statistics were used summarise and display data. Chi-squared test was used to test for significance of associations between categorical variables. Fisher's exact test was used to test for association between categorical variables when observed counts were less than five. The threshold for statistical significance was set at a p value of < 0.05.

3. RESULTS

A total of 658 persons were recruited and interviewed for the study. Eight (1.2%) entries were discarded due to missing data leaving a total of 650 which formed the basis of data analysis.

The socio-demographic characteristics of the study participants are presented in Table 1. There were 209(32.2%) males and 441(67.8%) female giving a female to male ratio of 2.1:1. The mean age of participants was 44.48 ± 16.80 years. Majority of participants were aged less than 30 years accounting for 24.3%, followed by those in the 41-50 years group (21.2%), and then those aged more than 60 years (19.1%). Most respondents were married (68.3%). One hundred and seventy-nine (27.5%) were single and 4.2% were widowed. A little above half (50.8%) of the participants attained tertiary education, 36.0% attained the secondary level of education, 10.2% primary education while 13(2.0%) did not have any form of education.

3.1 Knowledge of Refractive Error among Study Participants

Of the 650 participants, 193 (29.7%) had heard the term refractive error while the remaining 457 (70.3%) had not. Thirty two percent (205) were able to correctly state that the type of refractive error they had while the remaining 68.5% (445) were not.

Table 1. Socio-demographic characteristics of study participants (N=650)

Variable	Frequency	Percentage (%)
Age group/years		
18-30	158	24.3
31-40	100	15.4
41-50	138	21.2
51-60	123	18.9
>60	131	20.2
Mean age ± SD	44.48 ± 16.80	
Sex		
Male	209	32.2
Female	441	67.8
Marital status		
Single	179	27.5
Married	443	68.2
Widowed	28	4.3
Tribe		
<i>Efik</i>	139	21.4
<i>Ibibio</i>	144	22.2
<i>Anang</i>	176	27.1
<i>Ibo</i>	80	12.3
<i>Yoruba</i>	17	2.6
<i>Hausa</i>	28	4.3
<i>Oron</i>	11	1.7
<i>Others*</i>	55	8.5
Highest level of education		
None	13	2.0
Vocational	7	1.1
Primary	66	10.2
Secondary	234	36.0
Tertiary	330	50.8
Occupation		
Civil servant	249	38.3
Self-employed	162	24.9
Private-employed	84	12.9
Unemployed	26	4.0
Student	129	19.8
Religion		
Christianity	648	99.7
Islam	2	0.3

Reported sources of information about type of refractive error among in descending order of frequency include from school 115 (56.1%), doctors including optometrists 84 (41.0%), family member 15(7.3%), internet 18(8.8%), word of mouth 21(10.2%) and counsellor 0(0.0%).

3.2 Perceived Causes of their Refractive Error among Study Participants

The major factors that participants attributed their eye condition to were reading too much 324 (49.8%), aging 286(44%), hereditary 259 (39.8%), exposing the eyes to dust or smoke

204(31.4%), poor diet 109 (17%), past eye injury 79(12%), reading with naked light 44(7%) and exposure to computer or phone light 36 (5.5%). Other attributed causes of refractive error reported by participants are displayed in Fig. 1.

3.3 Perception of Severity of Refractive Error

Two hundred and seventy-three of them (42%) felt their eye condition was 'mild', 240(36.9%) 'Moderate' and 137(21.1%) reported that they felt their eye condition to be severe.

When asked if they worry about going blind from refractive error, 253 (38.9%) reported that they were, while 397 (61.1%) participants stated that they were not (Fig. 2). More females than males expressed a fear of going blind from refractive error (40.8% vs 34.9%, $p=0.150$). Fear of blindness was also highest among persons aged 60 and above (47.3%) and least among persons aged 31 to 40 years (30%) this difference however did not show statistical significance ($p=0.083$).

3.4 Perception of Treatment of Refractive Error and its Impact on Study Participants

More than half of the participants 464(71.4%) believed that wearing spectacles will correct refractive error permanently, 163 (25.1) did not believe so and 23(3.5%) stated that they did not know. Other modalities for treating RE proffered by participants are shown in Table 2 and include eyedrop 267 (40.5%), vitamin tablets 259 (39.8%), contact lens 195 (30.0%), yeast 167 (25.7%), refractive surgery 77(11.8%), oral herbs 31(4.8%), diet 75(11.5%) and palm wine 15(2.3%).

Knowledge of contact lens was higher among persons with higher educational achievement ($p<0.001$), females ($p=0.360$) and younger age group ($p<0.01$).

Knowledge of refractive surgery showed a similar trend and was higher among females ($p=0.032$), persons with higher educational achievement ($p=0.198$) and younger age group ($p<0.01$).

Majority of the participants 429(66.0%) reported they can marry a patient who needs spectacles to see clearly while 221(34.0%) stated they cannot (Fig. 3).

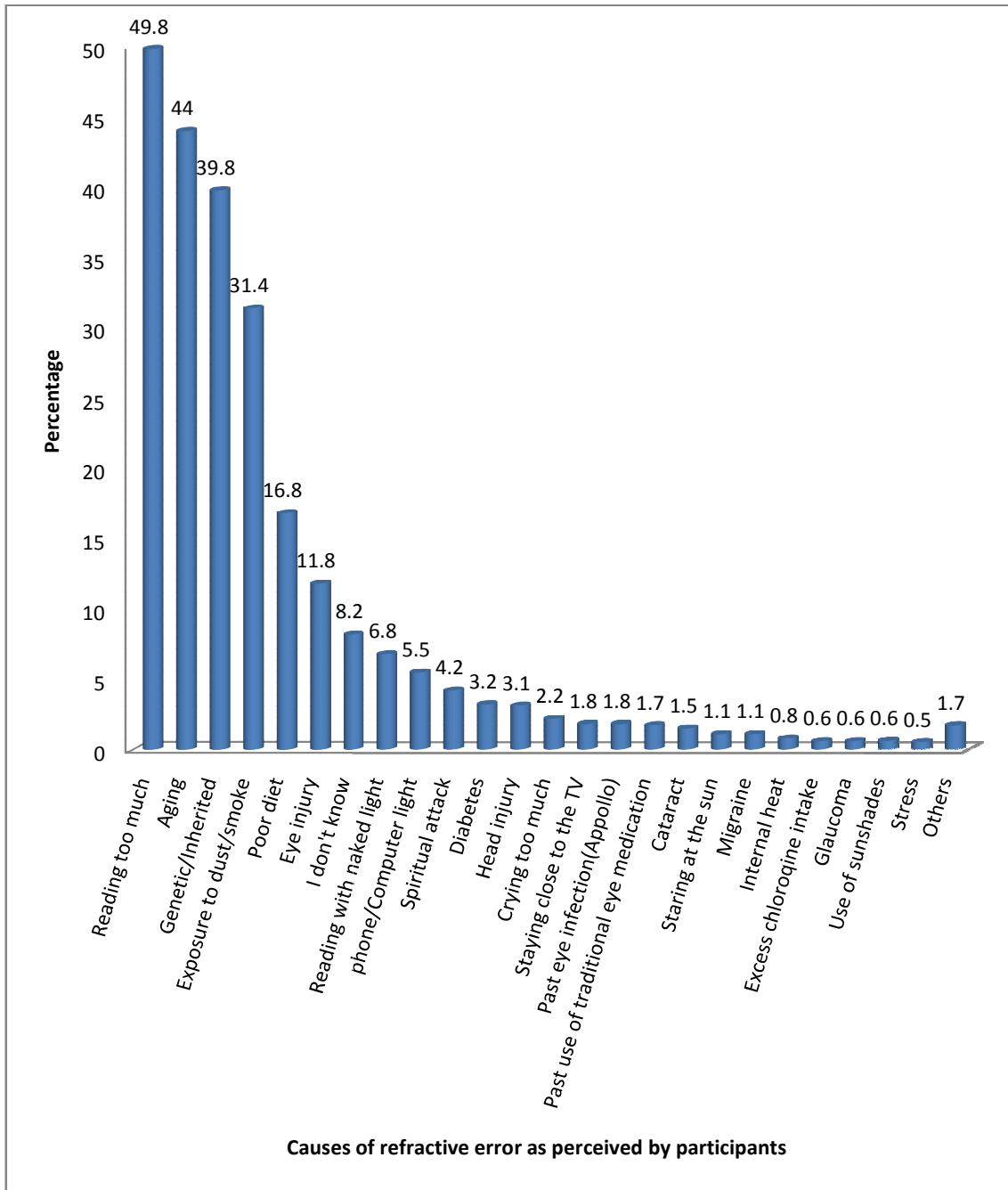


Fig. 1. Perceived causes of refractive error reported by study participants

Female participants (62% vs 38%, $p < 0.001$) and those with a family history of spectacle use (67.1% vs 32.9%, $p < 0.001$) were more likely to marry a spectacle user than not. Majority of those who reported a willingness to marry a spectacle user had a secondary education and above compared to those with primary education or less (90% vs 10%, $p < 0.001$).

3.5 Impact of Refractive Error and its Treatment on Study Participants

Three hundred and fifty-one (54%) participants reported a negative effect on their lives, 61(9.4%) reported a positive impact and 238 (36.6%) reported that a diagnosis of refractive error had made no impact on their lives. Among those who

reported a positive effect, 18(2.8%) reported that spectacles made them look intelligent and 43 (6.6%) said that it made them look fashionable.

Reported negative effects of diagnosis and treatment reported by participants are displayed

in Table 3. The most reported negative complaints were teasing 123 (18.9%), difficulty with work/school 76(11.7%) and the inconvenience of using glasses 55 (8.5%). Others are as shown in Table 3.

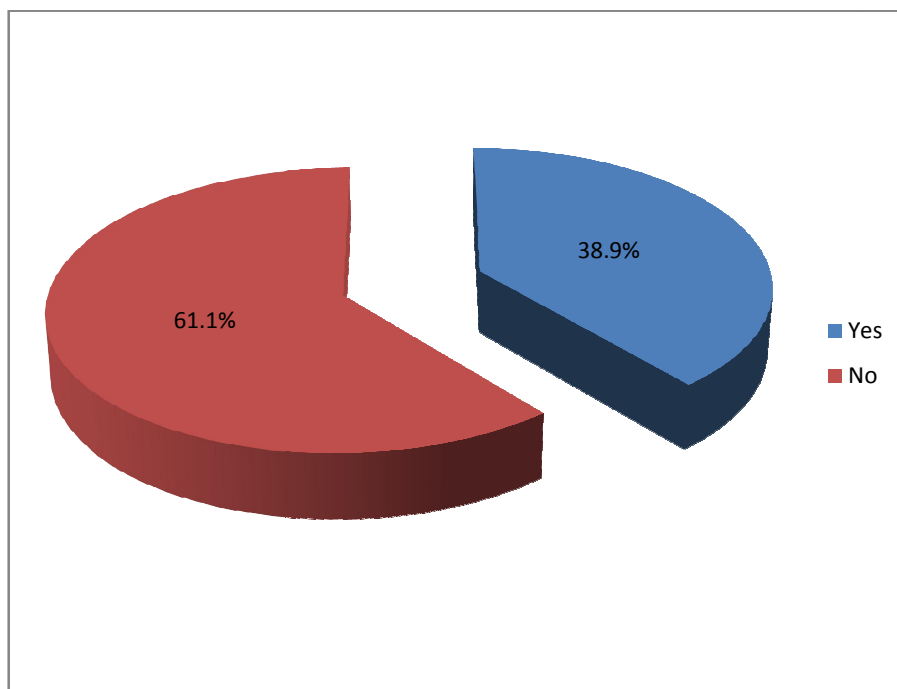


Fig. 2. Fear of going blind from refractive error as reported by participants

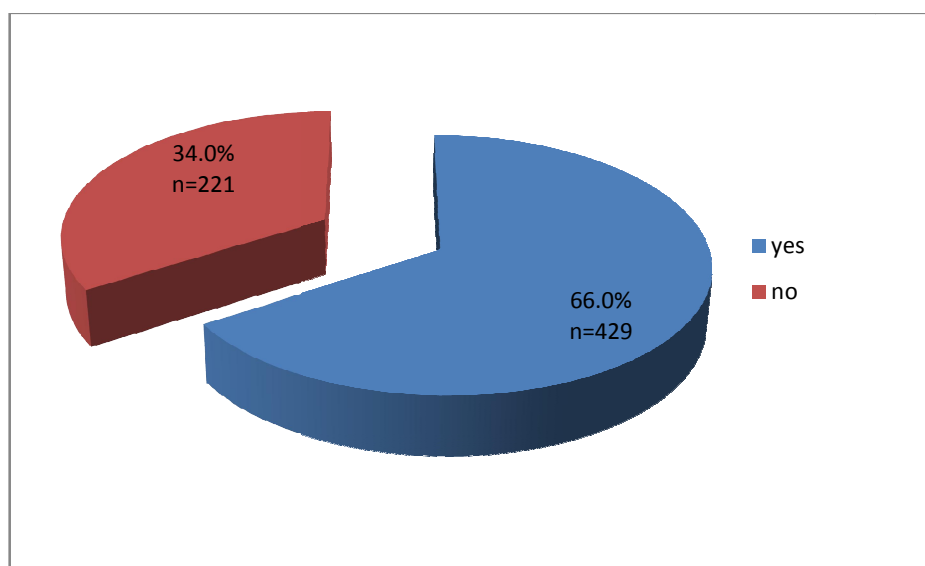


Fig. 3. Willingness to marry a person who needs glasses to see clearly

Table 2. Participant's perception of treatment of refractive error

Question	Response	
	Frequency	Percentage
A. Do eyeglasses correct refractive error permanently		
Yes	464	71.4
No	163	25.1
I don't know	23	3.5
Total	650	100
B. Other ways of correcting refractive error		
Contact lens	201	30.5
Refractive surgery	77	11.8
Eyedrop	267	40.5
Oral herbs	31	4.8
Multivitamin tablets	255	38.6
Diet	75	11.5
Yeast	174	26.4
Palm wine	15	2.3

Table 3. Impact of refractive error and treatment on participant's daily lives

Impact of refractive error on patient's lives	Frequency	Percentage
Positive impact		
Spectacles make me look intelligent	18	2.8
Spectacles make me look fashionable	43	6.6
Total	61	9.4
Negative impact		
Inconvenience of glasses	55	8.5
Teasing	123	18.9
Stress of hospital visits	7	1.1
Makes me sad	17	2.6
Difficulty with work/school	76	11.7
Depression on the side of the face	11	1.7
Difficulty driving	12	1.8
No more vigorous activities	19	2.9
Financial impact	8	1.2
Loss of friends	12	1.8
Reduced chances with the opposite sex	11	1.7
Total	351	54

4. DISCUSSION

Refractive errors are some of the commonest condition seen in eye clinics of many ophthalmic practises in Nigeria, but few studies have reported on its perception and the impact of spectacle use on its sufferers in a hospital setting [17-22].

The socio demographic distribution of this study's participants especially the abundance of university graduates, students and civil servants may be explained by the proximity of the study location to University of Calabar, Nigeria. Almost two –thirds (60.9%) of the study participants were below 50 years of age and therefore in the active and productive working age. This is relevant and underscores the possible losses

both economic and social that could occur if a satisfactory and acceptable form of refractive correction is not easily available to these persons [9,16].

Although the literacy rate of the participants was high, a complete knowledge of refractive error and all its different types was displayed by only 30% of them. Similarly, Ebeigbe et al. [15] in Benin reported that only 32% of university undergraduates had heard of the term refractive error. An explanation for this in this study may be that majority of the patients were not informed of their diagnosis or if they were, cannot remember the difficult medical term.

The highest attributable cause of refractive error in this study was excessive reading (50%)

possibly explained by the large number of students who participated in the study this being a university town. This contrasts with findings by Agarwal and Dhoble among secondary school students in India [22,23] where only 22% attributed their RE to excessive reading. In both studies, a similar proportion of participants attributed their eye problem to hereditary.

A significant number of participants attributed their eye problems to exposure to light from televisions, smart phones and personal computers, this could be because this study was done in the era of increased availability of affordable technology hence their increased use. Visual problems are the most frequently occurring health problems associated with excessive computer use [24]. Prolonged use of video display terminals which include smart phones and e readers have been associated with a constellation of symptoms referred to as 'computer vision syndrome (CVS) or digital eye strain'. Symptoms of CVS include blurred vision, double vision and headaches which were similar to presenting symptoms of refractive error [25].

The wide range of reported causes of RE stems from the study being a perception study and people are prone to attribute health problems to significant situations in the past as in the case of attributing refractive error to past eye injury, to crying after bereavement, past eye infection or to exposure to dust/smoke. It's been reported that soon after onset of symptoms, patients integrate their medical knowledge (accurate or not) with previous known experiences of themselves, relatives or acquaintances with similar symptoms or diagnoses a phenomenon described as 'Illness Causal attribution' in psychology [26].

Concerning the impact of refractive error and its treatment, 8.8% of participants reported that glasses made them look intelligent and smart. This finding is lower than reports by Agarwal [27] and Adeoti [28] where approximately 27% and 22% of participants in each these two studies respectively reported that spectacles made them look intelligent and fashionable. In contrast, only 1.1% of participants in this study complained that spectacles were a cosmetic blemish unlike in the Agarwal study where up to 32% did. The lower tendency toward regarding spectacles as unattractive as found in this study may be explained by their being in a current fashion trend and also because of the high preponderance of elite respondents.

Teasing arising from the use of spectacles was found to be the most common reported adverse impact of a diagnosis of RE in this study. This was most common in persons aged less than 30 years. Similar observations have been made by other authors with Ebeigbe et al reporting that up to 56% of undergraduates in a Nigerian University will not wear prescribed spectacles due to fear of mockery/teasing from friends [15]. Restriction from vigorous activities like sports and dancing were reported by participants in keeping with reports by Sumrana et al. [29] and Li et al. [30]. These restrictions are explained by a tendency of spectacles to fall off and break during rigorous activities.

Inconvenience of spectacles, loss of friends and low mood were also reported by study participants. To buttress this, studies have shown that refractive error patients on spectacle correction have a lower quality of life compared to those on contact lenses and those who have undergone refractive surgery. The major factor accounting for the reduced quality of life among those on spectacles is the 'inconvenience of wearing spectacles' [31,32]. This is especially important as trends in patient care have shifted towards caring for the overall person not just alleviation of symptoms. It has been found that results of standard methods of clinical and laboratory evaluation need to be complemented by assessment of patient's concerns and problems to enable holistic treatment [32].

Forty percent of participants reported a fear of their refractive error progressing to blindness. These fears adversely impact quality of life and could have been easily allayed in a lot of these participants through targeted health education which majority of the participants in this study did not receive [33].

Seventy one percent of respondents believed that use of spectacles will permanently correct their refractive error. This could explain why some patients discontinue spectacle use after some time has elapsed to seek other alternatives as they believe that since the spectacles have not permanently reversed the eye problem, they are not working.

A large proportion of respondents 70% and 78% respectively were not aware of contact lens and refractive surgery respectively as alternatives to spectacles for correcting their eye problem. This is higher than 55% and 48% reported by Ayanniyi et al. [34] but lower than approximately

80% found by SaberMoghaddamRanjbar in Iran [35] and Omolase in Ogun State, Nigeria [36]. Knowledge of contact lenses and refractive surgery was higher among persons of higher educational status. This is in keeping with reports Saber Moghaddam Ranjbar in Iran [35] and suggests that the information may have been gained in the course of school education not from the hospital as all patients irrespective of educational status would have the information if it was given in the hospital.

Popular reported alternatives to spectacle correction were eye drops (40%) multivitamin tablets (38%), ingestion of yeast tablets (25%) and diet (11.5%). This is similar to findings by Li et al. [30] and Ebeigbe et al. [15] who reported that lifestyle modifications like nutritional supplements, plenty exercise, pharmacological and topical remedies were employed by participants to stop the development of refractive error. Use of yeast to treat eye problem is a popular practise in our environment as it contains vitamin A which is good for the eyes.

Thirty four percent of respondents, majority of who were males stated that they will not marry a person who needs spectacles to see clearly. A similar observation was made by Savur [37] in India where 31.2% of participants stated that persons with refractive error should not marry and that even if one of a couple uses spectacles, there was a high risk of transmitting it to their off springs. This social pressure is more on members of the female gender and explains the reluctance of females to use spectacle correction and their willingness to choose more cosmetically acceptable alternatives like a contact lens and refractive surgery [30]. Patients with a family history of use of spectacles gave a more favourable response when asked if they could marry a spectacle wearer. This rather positive attitude may be because familiarity with spectacles in the home setting has reduced bias toward this device and increased their acceptability.

5. CONCLUSION

Misconceptions about refractive errors abound among patients with refractive errors attending UCTH Calabar Eye clinic. Diagnoses of refractive error and use of corrective treatments could have a negative and/or positive impact on patients. Refractive error and the benefits of spectacle use or other corrective modalities should be included in the daily health talks given to all patients

attending UCTH Calabar and other eye clinic. Furthermore, targeted, sustained counselling and eye health education for patients with a refractive error at the time of diagnosis and subsequent follow up on the diagnosis should be advocated for, and strengthened.

CONSENT

Written informed consent was collected prior to questionnaire administration.

ETHICAL APPROVAL

Ethical approval for the study was obtained from the Health Research Ethics Committee of the University of Calabar Teaching Hospital, Calabar, Nigeria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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