Research Article
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The knowledge of rural secondary school students on spectacle wear for correction of refractive errors: a south east Nigerian study

Abstract

Background: Uncorrected refractive error, the second commonest cause of preventable blindness globally, places a heavy burden on individuals and the society. Spectacles remain the cheapest mode of its correction. Despite the affordability and accessibility of spectacles, the prevalence of uncorrected refractive error remains high due to low demand for spectacles when needed. This could be related to knowledge regarding spectacle wear.

Objective: To assess the knowledge of rural secondary school students in Ebonyi State on spectacle wear for correction of refractive errors with a view to improving their utilization of spectacle wear for refractive error correction.

Methods: This study was a descriptive cross-sectional questionnaire-based survey of 11 randomly selected rural secondary schools in Ebonyi State, done from September, 2016 to December, 2016. The study instrument was a pretested, researcher-administered questionnaire with sub-fields on participant's socio-demographics and knowledge of rural secondary school students towards spectacle wear for correction of refractive errors. The collected data was analyzed using the Statistical Package for Social Science (SPSS) software for windows, version 22.0. Good knowledge of spectacle use was determined by proportion of students who correctly answered 50% of the questions. Descriptive statistics yield frequencies, percentages and proportions, analytical statistics utilized Chi-square or Fishers' exact test for categorical variables, and student-t test for continuous variables. A $p < 0.05$ was considered statistically significant.

Results: There were 453 participants comprising 192 (42.4%) males and 261 (57.6%) females (M: F = 1:1.4) aged 11 to 18 with a mean age of 14.6 ± 1.8 SD years. Most (60.3%; n=273) of the respondents had good knowledge of spectacle wear for refractive error correction. Predictors of good knowledge included being: male, (AOR=0.5; 95% CI = 0.317-0.780), p< 0.002, junior class (AOR=0.6 95% CI: 0.420-0.989), p <0.044, father being self-employed (AOR=1.8,95% CI: 1.173- 2.858), p< 0.008, mother being self-employed (AOR=0.4, 95% CI: 0.173-0.795), p< 0.011 and mothers being unemployed (AOR=0.3, 95% CI: 0.104-0.857), p< 0.025.

Conclusion: Knowledge of spectacle wear for correction of refractive error was generally good. However most of the participants had poor knowledge of the use of eye glasses for correction of refractive errors.

Keywords: knowledge, refractive error, spectacle wear, rural secondary schools.

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Introduction

A refractive error is an optical defect of the eye that results in light rays not being focused on the retina with resultant blurred vision.[1] Approximately 12.8 million children between the ages of 5 and 15 years are visually impaired from uncorrected or inadequately corrected refractive error with a global prevalence of 0.969%.[2] In 2008, Wedner[3] found refractive error to be the leading cause of visual disability among school-aged children of African descent. Some older studies done for other races agree with this finding.[4,5]

The use of spectacles or eye glasses for correction of refractive error dates back to the middle ages (5th—15th century) and has remained the commonest mode of correction for refractive errors at present.[6] Although refractive error can also be corrected with contact lenses or refractive surgery, spectacles are the easiest and safest method of correction and the advancements in ophthalmology has improved spectacles to suit all forms of refractive error. Spectacle wear continues to play an important role in prevention of blindness because of the global burden of uncorrected refractive error, which is the second commonest cause of preventable blindness.2

In a study, Semanyenzi.[7] reported that 18.9% out of 634 students had refractive error but of these only 26.7% among them were using spectacles. Seventy-five percent (n=90) of those students did not have any knowledge about refractive error and spectacles. Also a study done in Nigeria by Ebeigbe.[8] in Benin showed that majority of the participants had poor knowledge of refractive error as 68% (n=500) of the participants never knew about refractive error and only 38% of respondents knew that glasses could be used to correct refractive error.

A study in Saudi Arabia[9] established that most of the participants who used eyeglasses appreciated the need to use spectacles all the time, as the need was explained to them by their eye doctor. It was also reported in the same study that level of education influenced the level of knowledge of spectacle use in the correction of refractive error. Forty-one percent of those with high and medium education knew more on the need to use spectacles while only 20% of the participants with low education knew about the need to use spectacles to correct refractive error. These were supported by the findings of the study done in Ethiopia by Alemayehu et al10 where education was found

to have a significant influence on the knowledge of spectacle use. In Mashhad in Iran, Saber[9] reported that 54% of the participants knew that spectacles were used for refractive error correction. Similarly, a study done in rural India[11] revealed that participants had good knowledge (n=255; 92%) of the use of spectacles in the correction of refractive error. In Ethiopia it was reported that participants had high knowledge (90.4%) of spectacle use for correction of refractive error[10] contrary to Ebeigbe study where 23% of the respondents believed that drugs could be used to treat refractive error.

The purpose of this study is to determine the knowledge of refractive errors on spectacle wear for correction of refractive errors among this target population with a view to plan a better eye care services and health education programs for school children.

Methodology

Background: Ebonyi State is located in the South-Eastern part of Nigeria. The State's projected population for 2016 was 2,880,383.[12] It is situated between latitude 6.178 North and Longitude 7.959 East. The Ebonyi State has three senatorial zones; Ebonyi Central, North and South senatorial zones. The State which has Abakaliki as its capital is bounded on the north by Benue State, east by Cross River State, south by Abia State, and west by Enugu State. Ebonyi State has annual rainfall of 2000mm to 2100mm. The state is inhabited mainly by people of Igbo ethnic nationality who are predominantly Christians. The main occupation of the people is farming. The major towns in Ebonyi State include Afikpo, Onueke, and Abakaliki. The number of rural secondary schools in each senatorial zone is as follows; Central = 64, North = 77 and South = 79, making a total of 220 rural secondary schools.

Study designs and settings

This was a descriptive; community based quantitative study conducted among secondary school students in rural areas of Ebonyi State. The study was done from September 2016 to December 2016. The study instrument (Appendix 1) was a pretested semi-structured researcher-administered questionnaire with subfields on respondents' socio-demographic characteristics (sex, age, class, educational status of mother, educational status of father and parents occupation) and questions on their knowledge of refractive error and use of eye glasses for correction.

Scoring system for the questionnaire: The scoring scheme used for assessment of knowledge of the target population was adapted from knowledge, Attitude and Practice study done by Ogbonnaya.[13] The section on knowledge had ten (10) questions. For the purpose of this study, each correct answer to the questions was scored +1 and a wrong answer was scored 0, and the total score was used as a measure of the participant's overall knowledge regarding spectacle wear for correction of refractive error. Participants who scored 5 or more were graded as having good knowledge while participants who scored 4 or less were graded as having poor knowledge. Prior to final deployment for data capture and to establish its construct validity and psychometric reliability, the study instrument was pre-tested at community secondary school, Amaofia Ukawu Onicha LGA, a similar setting outside the study area. Feedback from the pre-test informed modifications in the questionnaire to enhance its surface validity, interpretation and its ability to achieve the study objectives

Inclusion criteria: Secondary school students in selected rural schools, Secondary school students in the selected schools whose parents gave consent and students who were present on the day of data collection who accepted to participate.

Exclusion criteria: Secondary school students in the selected schools who were too ill to participate, students whose parents did not sign consent, students who refused to participate in the day of study despite their parent's consent and students in selected schools who were not present on the day of data collection.

Sample size: The minimum sample size was determined by the formula for single proportions.[14]

n= z2pq/d2

Where n= the minimum sample size

z=the standard normal deviate set at 1.96 (which corresponds to 95% confidence interval)

p = the proportion in the target population estimated to have a particular characteristics related to refractive errors. Thirty-eight percent was the proportion of students who knew that spectacle could be used to correct refractive error in a study done in Nigeria8 giving p value of 0.38.

q=1.0-p = 0.62

d= degree of accuracy which is set at 0.05

Substituting the values in the formula gives:

$$N = \frac{(1.96)2(0.38)\ (1-\ 0.38)}{(0.05)2} = 362$$

However, assuming 80% participation rate since some parents, guardians, and subjects may not give consent; the minimum sample size was calculated thus:

362 X 80%

= 362/0.8

= 452.5 ~ 453

A multistage random sampling technique was used to select participants after the list of all the rural secondary schools in Ebonyi State was obtained from the state Ministry of Education. The secondary schools in the rural areas were grouped into three senatorial zones they were located in. Sampling ratio was used to determine the number of rural secondary schools to be studied in each senatorial zone.

Ethical approval: Ethical approval for this study was obtained from the Health Research Ethics Committee of Ebonyi State University Abakaliki.

Informed consent: The details of the study were written in simple English language which the parents or guardians of the students could understand with minimal or no assistance. It also contained a description of the benefits and the possible risks to the parents. This study information sheet was sent to the parents/guardians along with an informed consent form. Parents/guardians who consented signed or made a mark (such as thumb print) as appropriate to indicate consent. Verbal assent was obtained from the students at the time of the study.

Confidentiality: Data that were collected from the participants were kept confidential by the researcher and was not distributed to unauthorized persons or used for any other purposes outside this study.

Data management: Data entry and analysis were done using IBM Statistical Package for Social Sciences (SPSS), version 22. Descriptive statistical examination was performed to yield frequencies, percentages and proportions. Inter-class comparisons

for significant observed differences utilized the Chi- square (x^2) or Fishers' exact test for categorical variables and Student-t test for continuous variables. In all comparisons, a $p < 0.05$ (95% confidence interval) was considered statistically significant. Data was presented as frequency distributions, tables, and charts.

Results

There were 453 respondents that comprised of 192(42.4%) males and 261(57.6%) females (M:F=1:1.3) who were aged 11.0 to 18.2 years with a mean age of 14.6±1.8 SD and majority 307(67.8%) of the participants were in senior secondary class. See Table 1 for the socio-demographic characteristics of the participants.

Table 1 Socio demographic characteristics of respondents

Variable	Frequency (n=453)	Percent (%)
Age of respondents		
Mean±(SD)	14.6±1.8	
Age of respondents in groups		
<15 years	195	43
≥15 years	258	57
Gender		
Male	192	42.4
Female	261	57.6
Class		
Junior secondary	146	32.2
Senior secondary	307	67.8
Educational qualification of Mother		
No formal education	56	12.4
Primary education	204	45
Secondary education	122	26.9
Tertiary education	71	15.7
Educational qualification of Father		
No formal education	31	6.8
Primary education	195	43.1
Secondary education	143	31.6
Tertiary education	84	18.5
Employment status of Father		
Unemployed	12	2.6
Self-employed	285	62.9
Salaried employment	156	34.4
Employment status of Mother		
Unemployed /Housewife	31	6.8
Self-employed	361	79.7

Majority (60.3%; n= 273 out of 453) of the respondents had good knowledge of spectacle wear for correction of refractive error. Most of the respondents, (76.2%; n= 345 out of 453) knew why people wore spectacles. However, only 37.5% (n= 170 out of 453) of the respondents could define refractive error accurately and most refractive error known was long sightedness as noted by 42.9%, see Table 2.

Table 2 Knowledge of spectacle wear among the respondents

Variable	Frequency	Percent (%)
Knew why people wear glasses	n=453	
Yes	345	76.2
No	108	23.8
Reason why people wear glasses	n=345	
Evidence of bad vision	236	68.4
Individual is intelligent	60	17.4
A form of fashion	31	9
Protection from sun	18	5.2
Know what refractive error means	n = 453	
Yes	170	37.5
No	283	62.5
If yes what condition require refractive error correction	n= 170	
Short sightedness	60	35.3
Astigmatism	30	17.6
Itching	7	4.1
Long sightedness	73	42.9
If yes to meaning of refractive error what can be used to correct it	n= 170	
Eyeglasses	33	19.4
Drugs	35	20.6
Do not know	102	60
Consequences of not correcting refractive error	n=170	
Correct answer	126	74.1
Incorrect answer	44	25.9
Eyeglasses are useful in correction of refractive error	n= 170	
Correct answer	96	56.5
Incorrect answer	74	43.5
Non-use of glasses by those who have refractive error can limit career	n = 170	
Correct answer	134	78.8
Incorrect answer	36	21.2
Where people could get glasses	n= 453	
Correct answer	275	60.7
Incorrect answer	178	39.3
Knowledge of use of glasses		
Good knowledge	273	60.3
Poor knowledge	180	39.7

The male students were about three times less likely to have good knowledge of spectacle wear when compared with the female students. 95% CI: (0.317-0.780), p = 0.002. Respondents who were in junior class were about two times less likely to have good knowledge 95% CI: (0.420-0.989), p = 0.044. The students whose fathers were self-employed were two times more likely to have good knowledge of spectacle use when compared with those whose fathers were on salaried employment, 95% CI: (1.173- 2.858), p = 0.008. Also students whose mothers were self-employed and unemployed were 3 times less likely to have good knowledge of spectacle wear 95% CI: (0.173-0.795), p = 0.011 and 95% CI: (0.104-0.857), p = 0.025 respectively (Table 3).

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Table 3 Predictors of Good knowledge of spectacle wear for refractive error correction among respondents

Variable	Adjusted Odds ratio	p value	95% Confidence interval for Odds ratio	
			Lower	Upper
Gender				
Male	0.497	0.002*	0.317	0.78
Female	1			
Class of study				
Junior secondary	0.645	0.044*	0.42	0.989
Senior secondary	1			
Educational qualification of Father				
Primary education and less	1.397	0.227	0.812	2.401
Secondary education and more	1			
Educational qualification of Mother				
Primary education and less	0.611	0.075	0.355	1.051
Secondary education and more	1			
Employment status of Father				
Unemployed	0.606	0.464	0.159	2.314
Self-employed	1.831	0.008*	1.173	2.858
Salaried employment	1			
Employment status of Mother				
Unemployed/ Housewife	0.299	0.025*	0.104	0.857
Self-employed	0.371	0.011*	0.173	0.795
Salaried employment	1			

Discussion

The mean age of the respondents in this study was 14.6 ±1.8 years with majority of them females (57.5%). This was similar to a study done in Kebbi State where mean age of respondents was found to be 15.5 years (±2.12 standard deviation), however male (50.8%) and female (49.2%) were almost on equal distribution.[15]

Generally, respondents in this study were found to have overall good knowledge (60.3%) of why people wear spectacles. A study done in India[16] among secondary school students, though similar but showed a higher (92%) knowledge of the respondents on spectacles wear for correction of refractive errors. The difference could be that their study population was more informed on spectacle wear than in this study. It was equally shown in this study that most (60.0%) of the respondents did not know that eye glasses could be used to correct refractive error. This could be because only 37.5% could define refractive error correctly. This was contrary to a study done in Nairobi where most (61.2%) of the respondents knew that eyeglasses are used to correct refractive error.[17]

Gender, class of study, educational qualification of fathers and mothers, employment status of fathers and mothers were found to be significantly associated with good knowledge towards spectacle wear. The male students were about three times less likely to have good knowledge of spectacle wear when compared with the female students. The reason for this difference could be that female are more detailed than males and could learn more from parents, friends etc. Respondents who were in junior class were about two times less likely to have good knowledge. This could be that they are younger and less exposed to information. The students whose fathers were self-employed were two times more likely to have good knowledge of spectacle use when compared with those whose fathers were on salaried employment. This may suggest that the nature of job of respondents' fathers who were self-employed might have exposed them to more relevant information by their interaction with people outside their locality thereby enhancing their knowledge. However, students whose mothers were self-employed or unemployed were 3 times less likely to have good knowledge of spectacle wear. This might be that the responsibilities of mothers at home did not allow them enough time to go beyond their locality to be able to interact with other people. It may also be that those in government employment are better educated.

Limitation of this study

Most of the information may be influenced by problems of recall.

Conclusion

The knowledge of the participants in this study towards spectacle wear for correction of refractive error is generally good. However, most of them did not know that eye glasses are used for correction of refractive errors. Predictors of good knowledge were gender, class of study, self – employment of fathers and mothers who were self-employed or unemployed.

Recommendations

A periodic sensitization campaign should be carried out at the grassroots (in schools, churches and other social gatherings in communities) so as to educate the people on the need to use eyeglasses when needed. Advocacy visits to government and policy makers to integrate refractive services into school eye health programme is also recommended.

Appendix I

The Knowledge of Rural Secondary School Students on Spectacle Wear for Correction of Refractive Errors: A South East Nigerian Study.

You are not required to give us your name and this will not affect your academic activities rather it will help to improve eye health education in schools and the nation in general. All the information gotten from this questionnaire will be secured. Thank you.

Questionnaire

Introduction:

1 Tick good (√) against the correct answer(s) in the bracket provided.

2 Provide additional information as appropriate in the spaces provided.

A. Socio-Demographics Characteristics

1. Sex: male ( ) female ( )

2. Age ( )

3. Class ( )

4. Educational status of father: none ( ) primary ( ) secondary ( ) tertiary ( ). Others…

5. Educational status of mother: none ( ) primary ( ) secondary ( ) tertiary ( ). Others……

6. Occupation of the father: farmer ( ) business ( ) teacher ( ), politician ( ). Others…

7. Occupation of the mother: farmer ( ) business ( ) teacher ( ) politician ( ). Others…….

B. Knowledge:

1. Do you know why people wear eye glasses?

A. Yes ( )

B. No ( )

2. If Yes, what is the reason?

A. Person has bad vision ( )

B. person is using it for fashion ( )

C. person is intelligent ( )

D. To protect the eye from the sun ( )

3. Do you know the meaning of refractive errors?

A. Yes ( )

B. No ( ).

4. If yes, what can be used to correct it?

A. I do not know ( )

B. Drugs ( )

C. Eye glasses ( )

D. Others…….

5. If Yes, what conditions require refractive error correction.

A. Long-sightedness ( )

B. Short sightedness ( )

C. Astigmatism ( )

D. Itching ( )

6. Do you know the consequences of not using glasses to correct refractive error?

A. Poor academic performance ( )

B. Total loss of vision ( )

C. Lack of self-confidence ( )

D. I do not know ( )

7. Do you know where you can get your glasses if you need it?

A. Hospital ( )

B. Market ( )

C. Borrowing from a friend ( )

D. I do not know ( )

8. Where can one seek help if he has poor eye sight.

A. I do not know

B. Hospital

C. Church

D. Traditional medicine dealers.

9. Eyeglasses is very useful in correction of refractive error.

A. Yes

B. No

C. I do not know.

10. Can non-use of glasses by those with refractive error limit their career?

A. Yes

B. No

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Conflicts of interest

None.

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