

Original Research Article

Barriers to spectacle acceptance among secondary school students in Igabi, North-Western Nigeria

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ABSTRACT

Background: The aim of this study was to determine spectacle acceptance and its barriers among secondary school students in Igabi, North-western Nigeria.

Methods: In a students' sample of 534, those with presenting VA < 6/9 in either eye that can be improved by 2 lines or more with refraction were identified. The students and their parents were provided with information on obtaining spectacles and its benefits. Two months later students were identified and assessed by direct inspection for purchase of spectacles and reasons for non-purchase were identified.

Results: Thirty-four students out of 534 (6.4%) had refractive error with the age group of 16-18 years accounting for 204 (38%) of the study population. Only 14 (41.2%) of those requested to buy -spectacles bought. Among those who bought and use spectacles, 10 (71.4%) were females. Cost was responsible for 14 (70%) of spectacle non-purchase while extent of refractive error and various misconceptions on spectacle use were also determinants of spectacle purchase and use. Spectacle use was associated with subjective improvement in academic performance in 12 (85.7%) of those who bought and use spectacles.

Conclusions: Cost of spectacles and various misconceptions on its use affect acceptance.

Keywords: Igabi, Refractive error, Secondary school, Spectacle acceptance

INTRODUCTION

Uncorrected refractive error (RE) is a major cause of visual disability among school aged children in different parts of the world including Nigeria.¹⁻⁶ RE can affect a student's vision and ability to read, resulting in school drop out with its attendant social problems.⁷ Recent evidence shows that provision of spectacles improves vision-related quality of life in adults and self-reported visual function in children.^{8,9} Although there is an increasing popularity of contact lens and refractive surgery, spectacle use remains the most popular method of correcting RE.¹⁰ Though a simple device, spectacles have been used effectively in those bearing significant visual burden of RE.

For this study, spectacle is acceptable when it is bought and used as prescribed for improving vision. Studies among children in Mexico, China and across Nigeria revealed low spectacle acceptance.¹¹⁻¹³

Reasons identified to affect spectacle acceptance varies across the different regions of the world. Congdon et al in a study among Chinese secondary school students identified factors such as belief that spectacles may weaken the eyes as being responsible for spectacle non-acceptance while a similar study in the university community of Waterloo UK found incorrect measurement of RE, incorporation of prism into lens and ocular pathology as the main causes of failure to accept corrective spectacles.¹⁴⁻¹⁵ A study among Tanzania

secondary school students found fear of spectacle damaging eyes and weight of spectacles as the major factors.⁷ Studies in Nigeria found cost, scratched and broken lens as major reasons.^{13,16}

This study intends to document actual rates of spectacle acceptance at time of unannounced follow-up examination to identify reasons for spectacle non-acceptance and suggest ways to improve spectacle acceptance. The knowledge gained will also be useful for planning health care services and advocacy that will help improve spectacle acceptance.

METHODS

This was a prospective, descriptive cross-sectional community based study done over a period of 4 months (February to May 2016). The minimum sample size was determined using the formula for population greater than 10,000.¹⁷ Kaduna state is an economic, educational and cultural center in north-western Nigeria with a population of 6,113,503 and Igabi Local Government Area (LGA) is one of the 23 LGAs of Kaduna state with a population of 481,320 and has representative demographic and socio-economic characteristics.¹⁸

Ethical clearance was obtained from the Ethical Review Committee of National Eye Center Kaduna while an informed consent from participating students and parents was also obtained. Permission of Kaduna state Ministry of Education and that of Inspectorate division of the Schools involved was sought and gotten. Principals of the Secondary schools also gave permission for the study while the Helsinki declaration was adhered to.

Students duly registered in the school and who gave informed consent were included in the study while those who declined consent or were absent from school during period of study were excluded.

Sampling technique

Calculated sample size was 600 and multistage sampling was used in 3 stages. Simple random sampling was applied at each stage for selecting the wards, schools and students. Five wards were selected from the 12 wards in the Local Government Area (LGA) in stage one. In second stage, one school was selected from each ward while the class register was used to select students to make up the sample size in the third stage. Twenty students were selected per class from junior secondary school 1 (JSS 1) to senior secondary school 3 (SSS 3) so that 120 students were selected in each of the 5 secondary schools.

Data collection

Structured interviewer administered questionnaire was used to obtain information on personal data, ocular complaints, family history of ocular disease or use of

glasses and other relevant information. Visual acuity (VA) of each child was tested and recorded separately using the Snellen's E chart in a well illuminated area. Students with uncorrected VA <6/9 in any or both eyes were referred to National Eye Center (NEC) Kaduna and conveyed there free of charge. At NEC Kaduna they had re-confirmation of VA, refraction with auto-refraction or manual refraction with or without dilatation, a subjective refraction and slit lamp examination. Those with other ocular conditions were referred appropriately. Referral for spectacles was made for those with VA <6/9 in any eye and whose vision could be improved by 2 lines or more with refraction. Parents were requested to accompany their wards so that the need for the spectacle correction will be explained to them. Two months after referral for spectacles an impromptu visit to the schools was carried out and students recommended to buy spectacles were identified and administered a follow-up questionnaire to identify whether they bought spectacle, reasons spectacles were not bought, whether they are wearing them at time of follow-up and how much improvement they noticed in academic performance with their spectacles.

Main outcome measures

Barriers to acceptance of spectacles as determined by a structured questionnaire among secondary students with uncorrected RE.

Data analysis

Data was entered into statistical package for social sciences (SPSS) 18 and analyzed. Chi square was used to compare categorical data while P value of <0.05 was considered statistically significant.

RESULTS

Six hundred participants were recruited into this study from 5 selected schools. Consent to participate in the study was granted by 534 students giving a response rate of 89%. The 66 excluded from vision screening were either absent from school or refused to give consent for the study. Age range of the students was 10-21 years with a mean age of 15.4 years and a standard deviation of 2.48 years. The age group of 16-18 years constituted 38% while age group of 10-12 years had 14% of the participants. Two hundred and eighty-five (53%) of the students were boys while 249 (47%) were girls. The ratio of boys to girls was 1.1:1.

Thirty-four students (6.4%) had VA <6/9 from which 8 of them had a VA < 6/24 at presentation that improved after refraction. Ocular pathologies identified among some of the students included retinal/macular scar (6students), pigmentary retinopathy (4students), keratoconus (1student) and cupped disc (3students). Intra-ocular pressure greater than 21mmHg was found in 2 students with cupped disc. Nineteen of the students with refractive errors (56%) were females while 15 (44%) were males P

> 0.05. Myopia accounted for 24 (71%), astigmatism 6 (18%) and hypermetropia 4 (11%) of those with RE.

Table 1: Age and sex distribution of the students.

Age (years)	Male (%)	Female (%)	Total (%)
10-12	43 (8)	31 (6)	74 (14)
13-15	102 (19)	70 (13)	172 (32)
16-18	110 (21)	94 (17)	204 (38)
>18	30 (6)	54 (10)	84 (16)
Total	285 (53)	249 (47)	534 (100)

Myopia occurred most in the age group 13-15 years. Fourteen Students with myopia (58%) were females while 10 (42%) were males. Equal number of males and females had hypermetropia.

Sixteen of the eyes with myopia out of 48 eyes required diopter lens power of between -1.50Ds and -1.75Ds. The largest myopic diopter power requirement was -3.25 Ds. The largest hypermetropic lens power requirement was +2.25Ds. Only 6 students (12) eyes had cylindrical correction. The highest cylindrical power required was 1.5D c.

Table 2: Distribution of 12 eyes according to cylindrical power of lens.

Cylindrical power	Male (%)	Female (%)	Total (%)
0.25	0 (0.00)	0 (0.00)	0 (0.00)
0.50	1 (50.00)	0 (0.00)	1 (16.7)
0.75	1 (50.00)	2 (50.00)	3 (50.00)
1.00	0 (0.00)	1 (25.00)	1 (16.7)
1.25	0 (0.00)	0 (0.00)	0 (0.00)
1.50	0 (0.00)	1 (25.00)	1 (16.7)
Total	2 (100.00)	4 (100.00)	6 (100.00)

Sixteen (47.2%) of the students with refractive errors had no symptoms while 10 (29.4%) complained of blurred vision and seventy per cent of those who complained of symptoms were females.

Twenty-two (64.7%) of the students felt they did not need spectacles while 12 (35.3%) admitted that they need spectacles. (See Fig 1). All the 34 students with RE were actually refracted and confirmed to require spectacles.

Fourteen students (41%) bought spectacles while 20 (59%) did not buy at two months' follow-up. Six students (43%) among those who bought spectacles were met using their glasses while 8 (57%) presented their spectacles at a later date. While 10 (71.4%) females bought spectacles only 4 (28.6%) males bought, this was statistically not significant (p>0.05). Only two students did not appreciate significant improvement in their vision with spectacles out of the 34 students recommended to buy spectacles, none of them had used spectacles prior to this study.

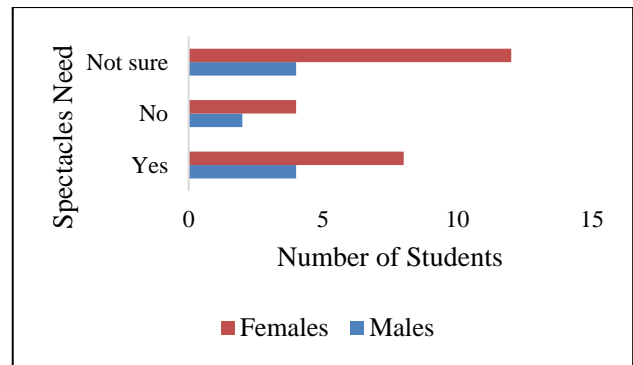


Figure 1: Distribution of students according to their perceived need for spectacles.

The six students (43%) who bought spectacles and were using them as at the time of unannounced follow-up had visual acuity (VA) between < 6/24 and 6/36 at presentation. Others are as seen in the figure below.

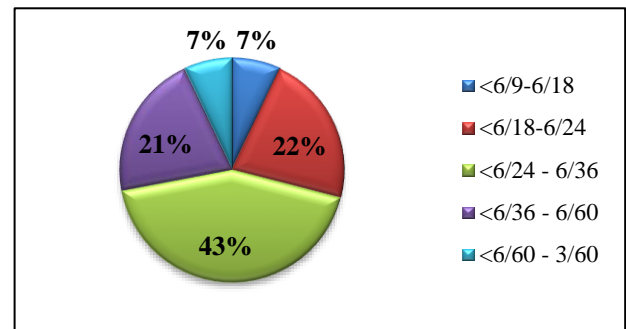


Figure 2: Distribution of spectacle usage and presenting VA.

Eight (57%) of the students who bought spectacles admitted wearing them only during school hours, four (28.6%) at all times (all females) while two (14.3%) wore them occasionally. Seven (50%) of those that bought spectacles paid more than N3,000 compare to only 17.6% who were willing to pay same amount at baseline. Fourteen (70%) of those that did not buy spectacles claimed that cost of spectacle was the main reason for non-purchase. Three (15%) claimed ugly looks with spectacles; one (5%) was not comfortable with spectacles and two (10%) attributed non-purchase to the belief that spectacles would weaken their eyes. All the 14 students (100%) bought their spectacles from the NEC Kaduna.

Seven (50%) of the students who bought spectacles were from high socio-economic status family background, five (36%) were from intermediate and two (14%) from low social status family background. The father's socio-economic status was determined based on what the students said the nature of their fathers' work was.

Twelve (85.7%) of those who bought spectacles noticed subjective improvement in their academic performance. Two (14.3%) did not notice any improvement in their academic performance.

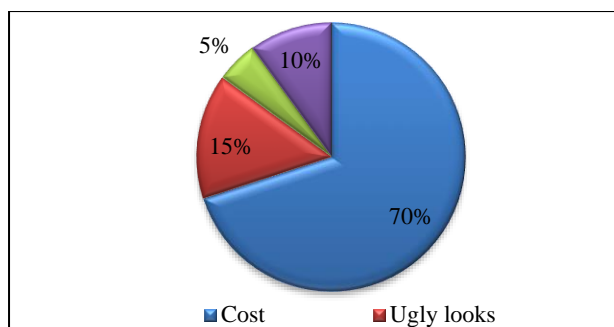


Figure 3: Reasons for spectacles non acceptance.

DISCUSSION

From this study the prevalence of refractive error was 6.4% which is higher than the 1.7% found by Kehinde et al in a study among school children in the same area.¹⁹ The difference can be accounted for by case definition and methodology used in the studies. However, the result in this study is similar to that of Ajaiyeoba et al among high school students in south-western Nigeria and that of Gauri et al which may be attributed to the similarity in the case definition.^{20,21} Myopia was identified to be the commonest type of RE in this study accounting for 71% of those with RE which is similar to that reported by McCarthy.²² In contrast, Otutu et al found astigmatism to be the commonest accounting for 60% REs.²³ Generally, around the teenage years there is a changing ocular refractive state from hypermetropia to myopia hence the higher myopia refractive state at this period.²⁴

The result also indicated that out of the 34 students recommended to buy spectacles on the basis of poor vision in at least one eye correctable with spectacles, only 41% obtained them within a two-month period. This is higher than the result obtained by Li et al in which only one third of students (30.7%) purchased the spectacles after a three month follow up.¹² He et al found that 40% of those requested to purchase spectacles bought them on follow-up which is similar to the findings of this study, but follow up period was 5 months unlike the 2 months in this study.⁶

Though many students had indicated interest in buying spectacles at onset of study, only few actually bought them and most of those who bought spectacles had poor VA at presentation which may be attributed to the greater need for good vision even though there were students with worse presenting VA who could not afford to buy spectacles. This group of students will need to be targeted for special support with regards to spectacle acquisition.

From the result, more females bought and used spectacles than males, though this was not statistically significant, studies elsewhere shows that females were more likely to have worse VA at initial examination and more likely to wear spectacles than males.²⁵ It has been suggested that the reason for this is that females tend to read and write

more which exposes them to more visual demands, however, objective studies will be needed to confirm this. Among those who bought spectacles, only 4 (28.6%) admitted wearing them regularly, 8 (57.1%) wear them only during school hours while 2 (14.3%) wear them occasionally. Li et al also had similar findings among rural Chinese school children thus, program planners will need to focus on educating beneficiaries on proper use of spectacles for maximal benefit.¹²

None of the students requiring spectacles in this study had ever used spectacles prior to the intervention; this is an eye opener to the burden of uncorrected REs in this part of the world and emphasizes the need to strengthen school eye health and training of manpower at the local level. Refractionists, opticians, optometrists, ophthalmic nurses and school teachers will need to be involved in screening for refractive errors at this level.

Fourteen (70%) of those who did not buy spectacles attributed it to the cost which is similar to the finding of Odedra in Tanzania but contradicts the finding of Li et al in China where only few children reported financial barriers to purchase of spectacles.^{7,12} The difference in the findings between China (Asia) and Nigeria (Africa) may be attributed to the high gross domestic product (GDP) per capita and the higher level of health care development in Asia compared to Africa. Thus, health care planners would need to be mindful when setting prices for spectacles especially in Africa where the GDP per capita is low. Though, free spectacles may further improve spectacles acceptance, long term sustainability through cost recovery may be a challenge. Besides, it may be associated with relatively low rate of spectacle compliance.¹³

Social beliefs such as “spectacles weaken eyes” and “gives ugly looks” were identified in this study also as barriers to spectacle acceptance with thirty percent of non-spectacle use in this study attributed to such social beliefs. Odedra et al and Congdon et al also found social beliefs to be important factors in their studies.^{7,14} Social beliefs cut across racial, religious and geographical boundaries; therefore, programs on spectacle provision must address the issues of social barriers irrespective of the country or region of operation.

Only 2 (14%) students whose background were from low socioeconomic status bought spectacles as against 7 (50%) and 5 (36%) who were from high and intermediate social class respectively. The low social class is the least educationally and economically, hence, the class with low tendency for spectacle purchase. A similar study in India found lack of education in the father to be associated with non-compliance in spectacle use even when given free.²⁵ This may be explained by the fact that in the developing countries it is the father that gives the consent for any decision in the family. The age group 13-15 years was responsible for 6 (43%) of spectacle purchase which was statistically not significant. Castaton et al found older age

group of 13-19 years to be less compliant on wearing glasses than younger age group of 6-12 years.¹¹ Parikshit et al agreed that though non-compliance was not related to age, older children were slightly more non-compliant. In a society where peer pressure is high, older children may be less likely to wear spectacles.²⁵

All the spectacles were bought from NEC, Kaduna despite giving them the option of places where they could buy their spectacles. This was because NEC, Kaduna was more convenient for them. This finding contradicts the findings of Li et al in China where only 21% of the students bought spectacles from where they had their refraction.¹² This may be due to availability of good quality optical services across China.

Twelve (85.7%) of those who bought spectacles had subjective improvement in their academic activities as they can now read their books and see the chalk board better. Only 2 (14.3%) did not report any improvement in their academic work. These were the students who had minimal improvement in VA due to myopic degeneration. Improvement in academic performance in this study even though subjective, gives some degree of satisfaction. Parikshit in a similar study found that among those with myopia, mean academic performance of spectacle wearers (compliant ones) was 65% in their last examinations compared to 61% among the non-compliant ones.²⁵ However, an objective assessment will be required to prove this.

CONCLUSION

This study found that the refractive error prevalence among secondary school students in Igabi LGA of Kaduna state was 6.4% with age group of 13-15yrs having the highest percentage of refractive errors (39%) and myopia accounted for 71% of all refractive errors in the study population. Only 47.2% of the students with uncorrected refractive errors experienced symptoms of blurred vision.

Cost was found to be major barrier to spectacle purchase and among those who bought spectacles only 28.6% wear them regularly while those with poor vision are more likely to buy and use spectacles. There was also a subjective improvement in academic performance with spectacle use.

Recommendations

Barriers to spectacle use in children occur in all populations but vary in their nature and importance therefore, requires investigation. To improve spectacle acceptance among secondary school students, specific strategies based on the identified barriers to spectacle acceptance will have to be adopted. Some of these strategies include:

Bulk purchase of spectacles can be adopted as a strategy to reduce the cost per unit of spectacle. Besides, materials for making spectacles can also be sourced locally so that cost resulting from foreign exchange can be saved and spectacles made cheaper.

Adequate education of students and parents on spectacle wear will help overcome long held erroneous beliefs. More effective methods targeting parents with health messages emphasizing importance of spectacles can be undertaken since many parents may not support the use of spectacles by their children

Yearly school eye screening of students especially new intakes is imperative. This will enhance early detection and intervention in those with refractive errors. A school based approach combined with home outreach can be adopted for an effective campaign.

Limitation

The limitation of this study includes the following:

The students enrolled in this study cannot be truly representative of all those in this age group in Igabi LGA, hence, Kaduna state. This is because secondary School enrolment in this area is still poor.

Being a school- based study; most data obtained are entirely based on the responses of the students. The data may be of questionable validity. A population- based study would have been more appropriate.

The study had some form of intervention through prescription of glasses, hence conclusion and findings may not be valid. A randomized trial will be more conclusive and convincing.

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