

Assessment of Uncorrected Refractive Errors Among Selected Secondary School Student in Ohaozara Local Government Area, Ebonyi State, Nigeria

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Abstract: Uncorrected refractive errors remain one of the leading causes of preventable visual impairment among school-aged children globally, with significant consequences for academic performance, psychosocial wellbeing, and quality of life. This study assessed the prevalence, types, and associated factors of uncorrected refractive errors among secondary school students in Ohaozara Local Government Area (LGA), Ebonyi State, Nigeria. A school-based cross-sectional descriptive study was conducted among 345 students selected using a multistage sampling technique. Data were collected using interviewer-administered questionnaires and checklists to obtain sociodemographic characteristics, ocular history, and lifestyle factors. Visual acuity was assessed using a Snellen chart, while objective refraction was performed using autorefractors. Data were analyzed using descriptive and inferential statistics at a significance level of $p < 0.05$. Results showed that 43.8% of the respondents had refractive errors, while 56.2% had normal vision. Myopia was the commonest refractive error (23.8%), followed by myopia with astigmatism (9.0%), hyperopia (5.2%), and astigmatism (3.8%). Only 22.3% of students had undergone previous eye examination, while 7.0% reported spectacle use. There was a statistically significant association between refractive error and class level ($p = 0.001$), whereas no significant association existed with age, sex, or school attended ($p > 0.05$). The study concludes that uncorrected refractive errors, particularly myopia, are common among adolescents in Ohaozara LGA, with poor utilization of eye care services. Routine school vision screening and improved access to affordable corrective services are recommended.

Keywords: Refractive error, myopia, school children, visual impairment, Nigeria, adolescent eye health

I. Background to the Study

Refractive errors occur when the eye fails to focus incoming light accurately on the retina, resulting in blurred vision. Common types include myopia, hyperopia, and astigmatism. Uncorrected refractive errors are among the most common causes of visual impairment worldwide and are easily treatable with spectacles or contact lenses (WHO, 2024). However, millions of children in low- and middle-income countries continue to suffer avoidable visual disability because of poor access to eye care services. Among school children, poor vision negatively affects reading ability, concentration, classroom participation, and overall academic performance. In Nigeria, studies have reported varying prevalence rates across regions, reflecting differences in access to care, screening programs, and environmental exposures. Evidence from South-East Nigeria indicates that refractive errors remain a major cause of visual impairment among children, yet many cases remain undiagnosed. Despite growing evidence nationally, there is limited localized data from rural and underserved communities such as Ohaozara LGA, Ebonyi State. This lack of context-specific evidence limits effective planning of school eye health interventions. Therefore, this study was undertaken to assess the prevalence and pattern of uncorrected refractive errors among secondary school students in Ohaozara LGA.

II. Methodology

Study Design

A cross-sectional descriptive study design was adopted.

Study Area

The study was conducted in selected public secondary schools in Ohaozara LGA, Ebonyi State, South-East Nigeria. Ohaozara is a semi-urban/rural area with mixed socioeconomic characteristics and varying access to health and educational facilities.

Study Population

The study population comprised secondary school students aged approximately 10–19 years enrolled in selected schools.

Sample Size and Sampling Technique

A total of 345 students participated in the study. Respondents were selected using a multistage sampling technique.

Data Collection

Data were collected using:

- Structured interviewer-administered questionnaires/checklists
- Visual acuity assessment using Snellen chart
- Objective refraction using autorefractor

Information obtained included sociodemographic characteristics, ocular history, spectacle use, and lifestyle factors.

Data Analysis

Data were analyzed using descriptive statistics (frequencies, percentages) and inferential statistics. Chi-square and Fisher’s exact tests were used to test associations. Statistical significance was set at $p < 0.05$.

Results

Table 1: Sociodemographic Characteristics of Respondents (N = 345)

Variable	Frequency	Percentage
Male	145	42.0
Female	200	58.0
Age 10–13 years	—	—
Age 14–16 years	—	—
Age 17–19 years	—	—

Female students constituted the majority of participants.

Table 2: Ocular History of Respondents

Variable	Frequency	Percentage
Previous eye examination (Yes)	77	22.3
No previous eye examination	236	68.4
Spectacle use	24	7.0

Table 3: Prevalence and Types of Refractive Errors

Refractive Status	Percentage
Normal vision	56.2
Any refractive error	43.8

Distribution of Refractive Errors	
Type	Percentage
Myopia	23.8
Myopia + Astigmatism	9.0
Hyperopia	5.2
Astigmatism	3.8

Table 4: Selected Lifestyle Factors

Variable	Most Common Response	Percentage
Daily digital device use	1–2 hours	43.2
Outdoor activities	Once weekly	33.6
Adequate lighting during reading	Yes	67.8
Reading posture	Sitting upright	43.5
Sleep duration	7–8 hours	42.0

Table 5: Association Between Refractive Errors and Sociodemographic Variables

Variable	Test Statistic	p-value	Significance
Gender	$\chi^2 = 7.58$	0.49	Not Significant
Age group	$\chi^2 = 14.78$	0.54	Not Significant
School attended	$\chi^2 = 34.87$	0.70	Not Significant
Class level	Fisher's Exact	0.001	Significant

III. Discussion

This study found that 43.8% of the respondents had uncorrected refractive errors, indicating a substantial burden of visual impairment among secondary school students in Ohaozara Local Government Area. This prevalence suggests that nearly one out of every two students may be experiencing avoidable visual limitations capable of affecting learning, academic productivity, and psychosocial wellbeing. Uncorrected refractive errors remain the leading cause of preventable visual impairment globally, especially among school-aged children (WHO, 2024). Studies have shown that poor vision among adolescents is associated with reduced classroom participation, difficulty reading instructional materials, headaches, and poor academic performance (Smith & Ahmed, 2021; Adeoye & Nwosu, 2021).

The prevalence reported in this study is higher than findings from Enugu State, Nigeria, where Eze et al. (2021) reported 2.1%, and Delta State where Imasua and Omuemu (2024) found 4.4%. It is also higher than the 11.6% prevalence reported in Ogun State by Osayamwen and Amosu (2020). However, the present result is lower than the 58% prevalence documented in Abia State by Agwuna et al. (2023). Such wide variations across studies may be due to differences in age groups studied, urban-rural settings, sampling methods, diagnostic criteria, and environmental exposures such as educational intensity and screen time. Similar regional disparities in refractive error prevalence have been reported across sub-Saharan Africa (Ovenseri-Ogbomo et al., 2022).

Myopia was the most common refractive error in this study (23.8%), followed by myopia with astigmatism (9.0%), hyperopia (5.2%), and astigmatism (3.8%). The predominance of myopia is consistent with both Nigerian and international literature. For example, myopia was reported as the most common refractive error among school children in Delta State (Imasua & Omuemu, 2024), Enugu State (Eze et al., 2021), and several Asian populations where prevalence is increasing rapidly (Guo et al., 2022; Liang et al., 2025). The rise in myopia has been attributed to prolonged near-work activities, increased digital screen exposure, reduced outdoor time, and changing educational patterns (Holden et al., 2022; Wu et al., 2020).

The low proportion of students who had undergone previous eye examination (22.3%) and the very low spectacle use rate (7.0%) indicate poor uptake of eye care services in the study area. This reflects a major unmet need for adolescent eye health services. Similar low utilization rates have been reported in rural Nigerian communities, where barriers include cost, lack of awareness, limited access to eye care professionals, parental neglect, and misconceptions about spectacle wear (Umeh & Nnachi, 2020; Chukwuma et al., 2023). In many low-resource settings, children with refractive errors remain undiagnosed despite the availability of effective low-cost treatment through spectacles (WHO, 2024).

The study found no statistically significant association between refractive error and gender ($p = 0.49$). This suggests that both male and female students may be similarly exposed to environmental and behavioral risk factors such as reading demands and digital device use. This finding agrees with studies in Nigeria and Ethiopia where no significant gender differences were observed (Woldeyes & Seyoum, 2022; Olagunju et al., 2023). However, some international studies have reported higher prevalence among females, especially in urban populations, possibly due to behavioral and hormonal factors (Moreira-Rosário et al., 2025).

Age was also not significantly associated with refractive error ($p = 0.54$), although myopia appeared to increase slightly among older students aged 17–19 years. This trend is biologically plausible because myopia often progresses during adolescence before stabilizing in early adulthood (Li et al., 2024). Similar age-related increases in myopia prevalence have been documented in China, Europe, and North America (Banashchewski et al., 2023; Liang et al., 2025). The lack of statistical significance in this study may be due to the relatively narrow age range of participants.

No significant association was observed between school attended and refractive error ($p = 0.70$), suggesting that the burden was fairly distributed across sampled schools. This may indicate similar academic environments, comparable classroom conditions, and shared community risk factors across the schools studied. It also implies that interventions should target all schools rather than selected institutions alone.

In contrast, class level showed a statistically significant association with refractive error ($p = 0.001$), with higher prevalence among senior secondary students. This is an important finding because students in higher classes often face increased academic workload, prolonged reading hours, examination pressure, and greater use of digital devices. Several studies have linked educational intensity and prolonged near work with myopia

progression (Tang et al., 2021; Holden et al., 2022). The present result therefore supports the hypothesis that sustained academic demands may contribute to worsening visual outcomes among adolescents.

The lifestyle patterns observed in this study also provide useful insight. Many students reported regular digital device use and limited daily outdoor activity. Reduced outdoor exposure has been strongly associated with myopia development because natural light stimulates retinal dopamine release, which may inhibit excessive axial elongation of the eye (Wu et al., 2020; Chia et al., 2021). Therefore, promoting outdoor recreation alongside healthy screen habits may help reduce future refractive error burden.

The public health implications of these findings are significant. Because refractive errors are simple and inexpensive to diagnose and correct, failure to detect them early represents a missed opportunity to improve educational attainment and quality of life. School-based screening programs, subsidized spectacles, teacher referral systems, and parental eye health education have proven effective in improving uptake of corrective services in low- and middle-income countries (Olusanya et al., 2020; Harvey et al., 2024).

Overall, this study demonstrates that uncorrected refractive errors constitute a major but addressable health problem among secondary school students in Ohaozara LGA. The predominance of myopia, poor spectacle uptake, and association with higher class level underscore the urgent need for integrated school eye health programs in Ebonyi State and similar rural Nigerian settings.

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