International Journal of Multidisciplinary Research and Bulletin
ISSN 3108-1428
Volume 5 Issue 4 (July – Aug) 2026

Prevalence and Pattern of Refractive Errors Among School-Aged Children in Isuikwuato LGA, Abia State, Nigeria

Ezeigbo AC[1*], Osaiyuwu AB[2], Omaka AC[3]
*Correspondence: Ezeigbo AC

[1*,3]Department of Optometry, Abia state university, uturu, Nigeria.
[2]Faculty of optometry, University of Benin, Nigeria.

Article History
Received: 16 July 2026 | Accepted: 21 July 2026 | Published: 26 July 2026
DOI: 10.5281/zenodo.21590494

ABSTRACT

Background: Refractive errors remain the most common visual disorder in childhood, with prevalence varying across regions due to differences in ethnicity, urbanization, and study methodology. Data on refractive error prevalence among school-aged children in rural Nigerian settings remain limited. This study determined the prevalence and pattern of refractive errors among school-aged children in Isuikwuato Local Government Area, Abia State, Nigeria.

Materials and Methods: A cross-sectional descriptive study was conducted involving 450 children aged 10-18 years selected from secondary schools using multistage sampling. All participants underwent comprehensive ocular examinations including visual acuity assessment and cycloplegic autorefraction. Refractive errors were classified as emmetropia, myopia, or hyperopia, with further grading by severity. Data were analyzed using descriptive statistics at $p<0.05$ significance level.

Results: Out of 450 participants, 322 (71.6%) were found to have refractive errors. Myopia was the most prevalent (42.3%, n=190), followed by hyperopia (29.3%, n=132) and emmetropia (28.4%, n=128). Among myopic participants, low myopia constituted the highest proportion (25.8%), followed by moderate myopia (14.3%) and high myopia (2.2%). Among hyperopic participants, low hyperopia was most common (14.9%), followed by moderate hyperopia (13.6%) and high hyperopia (0.9%).

Conclusion: The high prevalence of refractive errors (71.6%) among school-aged children in Isuikwuato LGA underscores a significant public health concern. Myopia was the predominant refractive error, with low-grade errors being most common. These findings highlight the urgent need for routine school-based vision screening programs and accessible eye care services in rural Nigerian communities.

Keywords: Refractive Errors; Myopia; Hyperopia; School Children; Prevalence; Nigeria.

I. Introduction

Refractive errors occur when the eye fails to properly focus light onto the retina, leading to blurred vision. This condition is primarily caused by abnormalities in the eye's length, curvature of the cornea, or lens shape. The different types include myopia, hyperopia and astigmatism. Among them, myopia has shown a particularly alarming increase in prevalence, largely due to modern lifestyle changes including increased screen time, intensive near work, and reduced outdoor activity[1]. Refractive errors remain the most common visual disorder in childhood, with prevalence varying across regions due to differences in ethnicity, urbanization, and study methodology[2,3].

In Nigeria, the prevalence of uncorrected refractive errors among school children varies depending on the region and diagnostic criteria used. In Aba, for instance, 78.1% of children with refractive errors were uncorrected[4]. Refractive errors represent one of the most common visual impairments in children and have increasingly become a public health concern due to their adverse effects on both academic achievement and overall quality of life. Their etiology is complex and multifactorial, encompassing genetic predispositions, environmental influences, and ocular anatomical parameters[5].

During childhood, vision undergoes critical developmental changes, with the eye progressively adjusting toward emmetropia—a process known as emmetropization. This balance between axial elongation and refractive elements of the eye plays a central role in minimizing refractive errors during growth[6].

This study aimed to determine the prevalence and pattern of refractive errors among school-aged children in Isuikwuato Local Government Area, Abia State, Nigeria.

II. Materials and Methods

Study Area

The study was conducted in Isuikwuato Local Government Area (LGA) of Abia State, Nigeria. Isuikwuato is a rural community, with a population engaged primarily in farming, trading and very few in the civil service. The LGA has ten wards with a mix of government-owned and private schools.

Study Design

The research adopted a cross-sectional descriptive survey design.

Study Population

The target population consisted of school children aged 10 to 18 years who were enrolled in selected government-owned and private schools within Isuikwuato LGA.

Inclusion Criteria

- Children aged 10-18 years enrolled in secondary schools
- Children who attended selected schools within Isuikwuato LGA
- Children whose parents provided written consent and who were willing to participate

Exclusion Criteria

- Children with active ocular infections or eye disease
- History of ocular surgery, significant trauma, or corneal pathology
- Children unable to cooperate during examination
- Known contraindications to cycloplegic agents

Sample Size Determination

Using the Leslie Kish formula for prevalence studies, the minimum sample size was calculated as 423. However, a total of 450 school-aged children were enrolled.

Sampling Technique

A multistage sampling strategy was employed: (1) Simple random sampling to select wards within the LGA; (2) Random selection of both public and private schools from each selected ward; (3) Proportionate random sampling to select participants from each school.

Research Equipment

- Pen torch
- Handheld autorefractometer (Nidek Ark - 30)
- Keeler ophthalmoscope
- Distance Snellen visual acuity charts
- Cycloplegic agent: 1% Cyclopentolate

Data Collection Procedures

History and Preliminary Assessments: Biographic data and detailed ocular histories were reviewed. Visual acuity was assessed using Snellen's chart at 6M. Anterior and internal ocular examinations were performed.

Cycloplegic Autorefraction: Two drops of 1% cyclopentolate were instilled 10 minutes apart. Full cycloplegia was confirmed when the pupil was fixed and fully dilated. Refractive values were recorded and spherical equivalent refraction calculated.

Classification: Participants were classified as emmetropic (>-0.50 D to < +0.50 D), myopic (≤ -0.50 D), or hyperopic (≥ +0.50 D). Myopia was categorized into low (SE -0.50 D to < -3.00 D), moderate (SE -3.00 D to < -6.00 D), and high (SE < -6.00 D). Hyperopia was categorized into low (SE ≥ 0.50D to +2.00D), moderate (SE +2.25D to +5.00D), and high (SE > +5.00D)[7].

Data Analysis Techniques

Data were analyzed using SPSS version 27.0. Descriptive statistics including frequency distributions, means, and standard deviations were used.

Ethical Considerations

Ethical approval was obtained from the Ethics Committee of the Faculty of Paediatric Optometry, Nigerian Postgraduate College of Optometrists. Written informed consent was obtained from parents/guardians, and assent from each child.

III. Results

Sociodemographic Characteristics

A total of 450 respondents were enrolled with a 100% response rate. Ages ranged from 10 to 18 years, with the highest proportion in the 13-15 years age group (n=228, 50.7%). The mean age was 12.4 ± 3.2 years. More than half were male (n=230, 51.1%).

Table 1: Characteristics of School Children in Isuikwuato LGA

Variables	Frequency (n=450)	Percentage
Gender		
Male	230	51.1
Female	220	48.9
Age (Years)		
10-12	135	30.0
13-15	228	50.7
16-18	87	19.3

Refractive Status

Out of 450 participants, 322 (71.6%) had refractive errors. Myopia was the most prevalent (42.3%), followed by hyperopia (29.3%) and emmetropia (28.4%).

Table 2: Refractive Status of School-Aged Children

Refractive Status	Frequency (n=450)	Percentage
Emmetropia	128	28.4
Hyperopia	132	29.3
Myopia	190	42.3

Grades of Refractive Error

Low myopia constituted the highest proportion among myopic participants (25.8%), followed by moderate myopia (14.3%) and high myopia (2.2%). Among hyperopic participants, low hyperopia was most common (14.9%), followed by moderate hyperopia (13.6%) and high hyperopia (0.9%).

Table 3: Distribution of Grades of Refractive Error

Grade	Frequency (n=450)	Percentage
Low Myopia	116	25.8
Moderate Myopia	64	14.3
High Myopia	10	2.2
Low Hyperopia	67	14.9
Moderate Hyperopia	61	13.6
High Hyperopia	4	0.9

IV. Discussion

This study revealed a high prevalence of refractive errors (71.6%) among school-aged children in Isuikwuato LGA. This indicates that refractive error constitutes a major ocular health concern among school children in this rural population. The high prevalence underscores the silent burden of uncorrected refractive errors in school settings, where routine eye examinations are often lacking.

Prevalence of Refractive Errors

The prevalence observed (71.6%) is considerably higher than values reported in several Nigerian and other African studies. Adebusoye et al. (2024), in a systematic review and meta-analysis of Nigerian children, reported a pooled prevalence of 5.9%[8]. Kumah et al. (2014) in Ethiopia reported a prevalence of 4.0% among school children[9]. The disparity may be explained by methodological differences, particularly the use of cycloplegic refraction in the present study, which is known to provide more accurate detection of refractive errors, especially latent hyperopia.

Among those with refractive errors, myopia was the most common (42.3%), followed by hyperopia (29.3%). The predominance of myopia agrees with reports by Ononuju (2020) in Abia State[10] and Magakwe et al. (2020) in South Africa[11], who also identified myopia as the leading refractive error among school-aged children. This agreement may be attributed to similarities in age distribution, as increasing age within the school years has been associated with a shift towards myopia due to sustained near-work demands and reduced outdoor activities.

Distribution by Age and Gender

The age distribution showed that the highest proportion of participants fell within the 13-15-year age group (50.7%). This is consistent with the natural school structure in rural Nigerian communities. The gender distribution showed a slight male predominance (51.1%), which is comparable to school-based eye studies in Nigeria[8,10].

Grades of Refractive Error

The predominance of mild forms of refractive error (low myopia 25.8%, low hyperopia 14.9%) suggests that most refractive errors identified were at an early or less severe stage. This pattern is typical of school-based eye screening studies, where visual anomalies are often detected before progression to more severe forms. The relatively low occurrence of high refractive errors may reflect the young age of the participants, as severe refractive errors tend to become more pronounced with increasing age if uncorrected.

Implications

These findings highlight the value of routine school vision screening, as early detection and appropriate correction of low-grade refractive errors can help prevent progression and reduce the long-term burden of visual impairment among school children. The high prevalence observed in a rural setting also suggests that geographic location alone does not protect against refractive errors, emphasizing the need for universal school-based vision screening programs.

V. Conclusion

This study demonstrates a high prevalence of refractive errors (71.6%) among school-aged children in Isuikwuato LGA, with myopia being the most common type (42.3%). Low-grade refractive errors predominated, suggesting that most cases were detected at an early stage. These findings underscore an urgent need for comprehensive school-based vision screening programs and accessible eye care services in rural Nigerian communities.

Recommendations

1. Routine school-based vision screening should be implemented for all primary and secondary school children.
2. Parents, teachers, and school administrators should be educated on the importance of routine eye examinations.
3. Eye care services should be made accessible and affordable in rural communities.

4. Government and health authorities should develop national guidelines for school eye health programs.

Limitations

The cross-sectional design limits causal inferences. The study was limited to a single LGA, which may limit generalizability. Cycloplegic refraction was performed, but other potential factors such as axial length and environmental exposures were not assessed.

Article Publication Details
This article is published in the **International Journal of Multidisciplinary Research and Bulletin**, ISSN 3108-1428 (Online). In Volume 5 Issue 4 (July – Aug) 2026
The journal is published and managed by **IRPG**.

Acknowledgements
We sincerely thank the editors and the reviewers for their valuable suggestions on this paper.

Funding
The authors declare that no funding was received for this work.

Data availability
No datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate
The author(s) declare that it is not applicable.

Consent for publication
The author(s) declare that this is not applicable.

Competing interests
The author(s) declare that they have no competing interests.

References

1. Holden, B. A., Fricke, T. R., Wilson, D. A., Jong, M., Naidoo, K. S., Sankaridurg, P., Wong, T. Y., Naduvilath, T. J., & Resnikoff, S. (2016). Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. *Ophthalmology, 123*(5), 1036–1042.

2. Atowa, U. C., Munsamy, A. J., & Wajuihian, S. O. (2017). Prevalence and risk factors for myopia among school children in Aba, Nigeria. *African Vision and Eye Health, 76*(1), 1-5.
3. Peng, Y., Li, Y., Wang, L., & Liu, X. (2021). The global prevalence and risk factors of myopia: A systematic review and meta-analysis. *Frontiers in Public Health, 9*, 701888.
4. Atowa, U. C., Munsamy, A. J., & Wajuihian, S. O. (2017). Prevalence and risk factors for myopia among school children in Aba, Nigeria. *African Vision and Eye Health, 76*(1), 1-5.
5. Mutti, D. O., Sinnott, L. T., Reuter, K. S., Walker, M. K., Berntsen, D. A., Jones-Jordan, L. A., & Zadnik, K. (2018). Risk factors for childhood myopia: The CLEERE study. *Investigative Ophthalmology & Visual Science, 59*(3), 1373–1380.
6. Flitcroft, D. I. (2012). The complex interactions of retinal, optical and environmental factors in myopia aetiology. *Progress in Retinal and Eye Research, 31*(6), 622–660.
7. Ajayi, I. A., Omotoye, O. J., Omotoso-Olagoke, O. (2018). Profile of refractive error in Ekiti, south western Nigeria. *African Vision and Eye Health, 77*(1), 1-5.
8. Adebusoye, S. O., Onovae, O., Adebusoye, T., & Sotunsa, J. O. (2024). Prevalence of refractive error in Nigerian children: A systematic review and meta-analysis. *Clinical and Experimental Optometry, 107*(4), 374–384.
9. Kumah, K., Assefa, N., & Tadesse, S. (2021). Refractive error and associated factors among school children in Addis Ababa. *Journal of Ophthalmic and Vision Research, 16*(4), 452–459.
10. Ononuju, C. O. (2020). Pattern of refractive errors among school children in Abia State, Nigeria. *Nigerian Journal of Ophthalmology, 28*(2), 112-118.
11. Magakwe, T. S. S., Xulu-Kasaba, Z. N. Q., & Hansraj, R. (2020). Visual impairment and refractive error among school-going children aged 6–18 years in Sekhukhune District (Limpopo, South Africa). *African Vision and Eye Health, 79*(1), a551.

Publisher's Note:

IRPG remains neutral with regard to jurisdictional claims in published maps and institutional affiliations. The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of IRPG and/or the editor(s). IRPG disclaims responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content.