



Research Article

Assessment of Refractive Errors in School-Going Children: A Retrospective Study

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ABSTRACT

Background: Uncorrected refractive errors constitute one of the leading causes of avoidable visual impairment among school-aged children and have a significant impact on academic performance and quality of life

Objective: To assess the prevalence and pattern of refractive errors among school-going children and to compare the distribution between urban and rural populations, as well as between male and female children.

Methods: A retrospective, record-based observational study was conducted using data obtained from school eye screening programmes from 1st August to 31st October 2025 under District Blindness Control Society Eluru. Children were categorized based on area of residence (urban/rural), gender, and type of refractive error. Descriptive statistics were used, and chi-square test was applied to assess associations.

Results: A total of 46,430 children were screened. Refractive errors were detected in 4,074 children, with a higher prevalence in rural areas and among female children. Myopia was the most common refractive error, followed by astigmatism, while hyperopia was least prevalent. A statistically significant association was observed between gender and type of refractive error ($p < 0.05$).

Conclusion: Refractive errors represent a considerable public health burden among school-going children, particularly in rural areas and among females. Strengthening periodic school vision screening and early intervention is essential to prevent avoidable visual impairment.

Keywords: Refractive errors; School children, Myopia, Astigmatism, Urban; Rural, Vision screening.

INTRODUCTION

Visual impairment due to uncorrected refractive errors remains a major public health challenge globally, particularly in low- and middle-income countries. In children, refractive errors adversely affect educational attainment, psychosocial development, and overall quality of life. School-based vision screening programmes offer an effective platform for early detection and timely correction of refractive errors.

Disparities in access to eye care services between urban and rural areas, along with gender-related differences in health-seeking behavior, may influence the prevalence and pattern of refractive errors. The present study aims to evaluate the distribution of refractive errors among school-going children and compare urban-rural and gender-based variations.

MATERIALS AND METHODS

Study Design: Retrospective, record-based observational study.

Study Population: School-going children (5-15Years) screened under organized school eye screening programmes in both urban and rural areas by District Programme Manager, District Blindness Control Society Eluru.

Data Collection: Secondary data were obtained from screening records and included demographic details, area of residence, gender, presence of refractive error, and type of refractive error (myopia, hyperopia, astigmatism).

Statistical Analysis: Data were analyzed using descriptive statistics and expressed as frequencies and percentages.

Comparative analysis was done between:

- Urban vs Rural
- Male vs Female
- Types of refractive errors among males and females

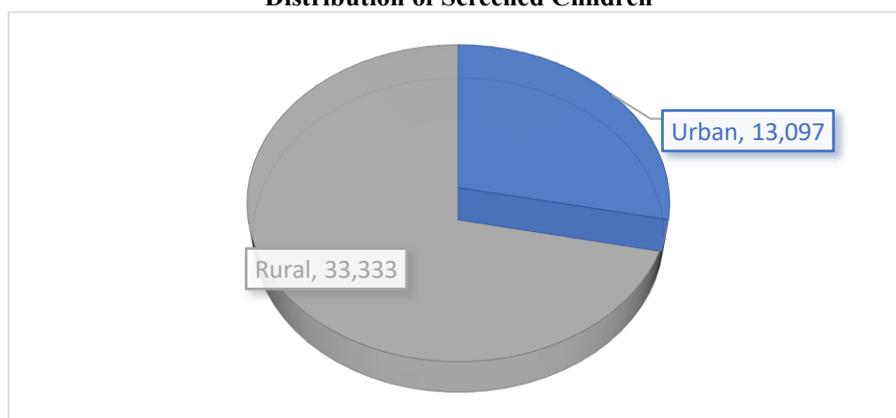
The chi-square test was employed to evaluate the association between gender and type of refractive error. A p-value of <0.05 was considered statistically significant.

RESULTS

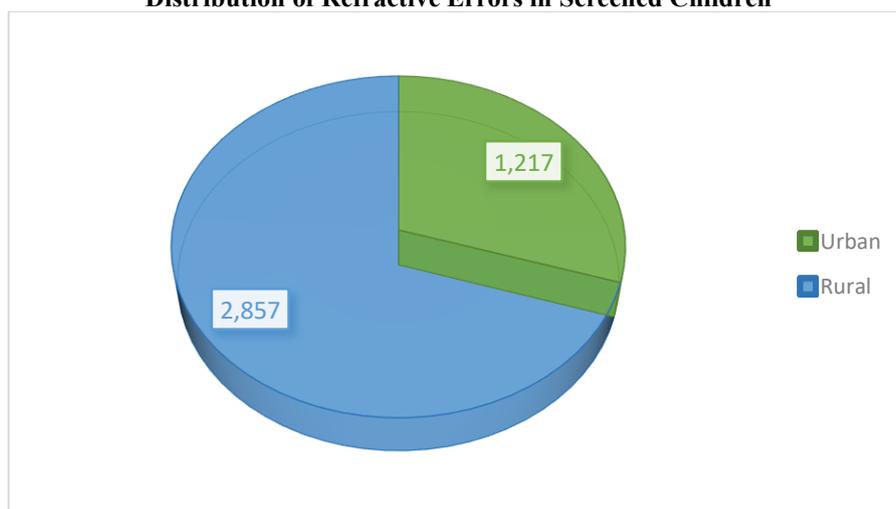
Out of 46,430 children screened, refractive errors were identified in 4,074 children. The prevalence of refractive errors was higher in rural areas compared to urban areas. Female children showed a greater burden of refractive errors than males across both settings.

Myopia emerged as the most prevalent refractive error in both genders and areas, followed by astigmatism. Hyperopia was the least common refractive error. Gender-wise analysis revealed a statistically significant association between gender and type of refractive error (χ^2 test, $p < 0.05$).

Distribution of Screened Children



Distribution of Refractive Errors in Screened Children



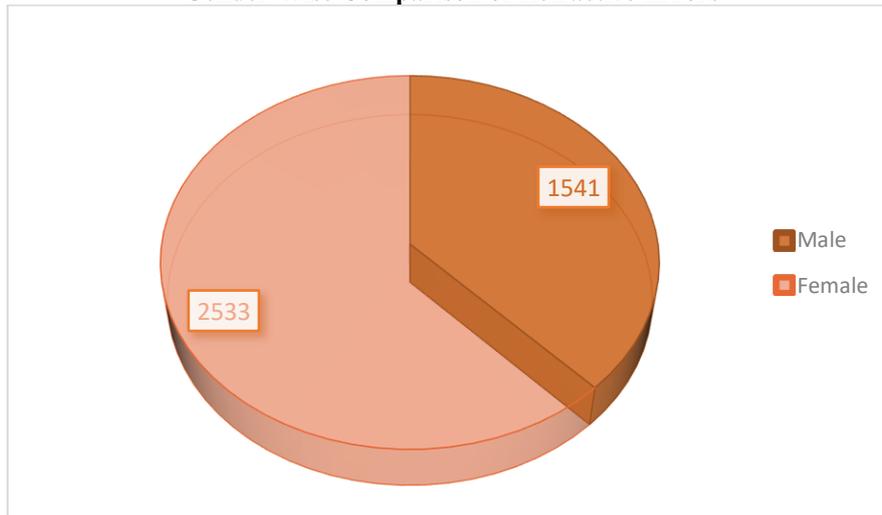
Prevalence of Refractive Errors

Area	Male	Female	Total
Urban	415	802	1,217
Rural	1,126	1,731	2,857
Total	1,541	2,533	4,074

- Refractive errors were **more common in rural children**.

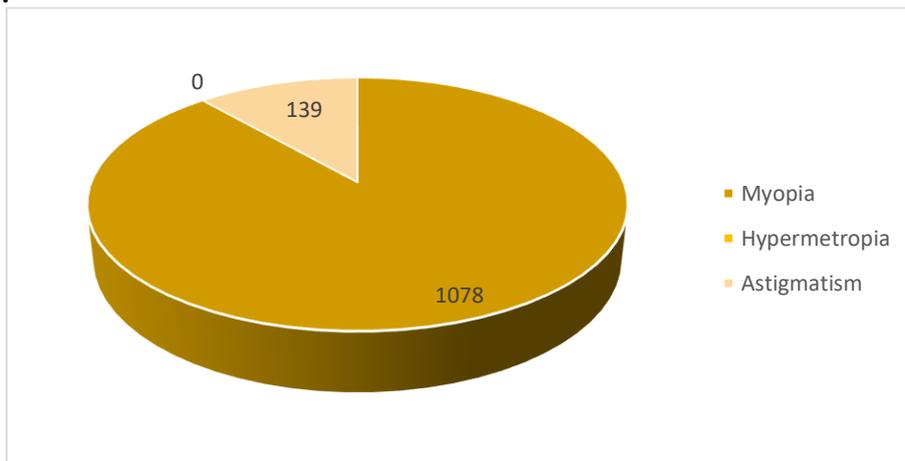
- **Female children** showed a higher prevalence than males in both areas

Gender-Wise Comparison of Refractive Errors

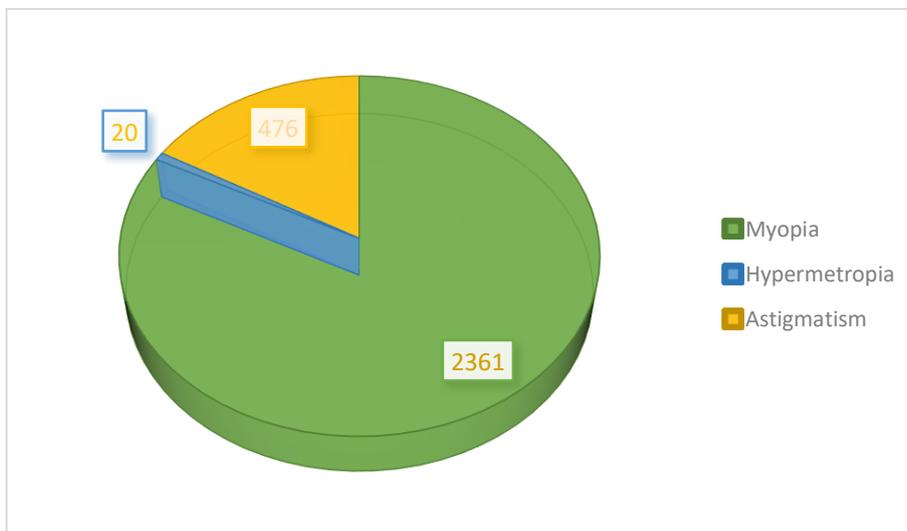


Distribution of Types of Refractive Errors

A) URBAN:



B) RURAL



Overall Pattern of Refractive Errors

- **Myopia** – Most common refractive error in both genders and areas
- **Astigmatism** – Second most common
- **Hyperopia** – Least common

DISCUSSION

The findings of the present study highlight a substantial prevalence of refractive errors among school-going children, with a higher burden observed in rural populations. Limited access to eye care services, reduced awareness, and delayed detection may contribute to this disparity. The higher prevalence among female children is consistent with observations from similar studies and may reflect sociocultural and healthcare access factors.

The predominance of myopia underscores the need for early identification and intervention, particularly in the context of increasing near-work activities and digital device usage among children.

CONCLUSION

Refractive errors constitute a significant and preventable cause of visual impairment among school-going children. Higher prevalence in rural areas and among females emphasizes the need for targeted interventions. Myopia is the most refractive error. Regular school vision screening, timely referral, and appropriate spectacle correction are critical components in reducing the burden of avoidable childhood visual impairment.

LIMITATIONS

The retrospective nature of the study and reliance on secondary data are notable limitations. Detailed clinical parameters such as cycloplegic refraction and follow-up outcomes were not available.

RECOMMENDATIONS

- Strengthening periodic school eye screening programmes.
- Enhancing awareness among parents and teachers are recommended to ensure early detection and management of refractive errors.
- Improved referral and spectacle compliance
- Special focus on rural and female populations.

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