Assessment Of Refractive Error Prevalence Among School Children In A Semi-Urban Region Of South Delhi: A Cross-Sectional Approach

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Abstract

Objective: To determine the prevalence and pattern of refractive errors among school-going children aged 6–16 years in a semi-urban region of South Delhi.

Methods: This cross-sectional study included 1,300 students from private schools in semi-urban South Delhi between January 2023 and June 2023. Vision screening using the Snellen chart was conducted, and students with reduced vision underwent detailed refraction and ocular examination. Refractive errors were classified based on standard definitions.

Results: Refractive errors were observed in 24.6% of participants, with myopia (15.2%) being the most prevalent, followed by astigmatism (6.3%) and hyperopia (3.1%). The prevalence increased with age, and spectacle usage among affected children was only 38%.

Conclusion: There is a high burden of uncorrected refractive errors among children in semi-urban South Delhi. Regular school-based vision screening and public awareness are essential for early detection and intervention.

Keywords: Refractive errors, Myopia, School children, South Delhi, Visual impairment, Eye screening

Introduction

Refractive errors (REs) impact children's vision globally, some of the most prevalent causes of visual impairment, which in turn hinders their educational engagement and diminishes their quality of life. The main types of REs are Myopia, hyperopia and astigmatism, all of which can be efficiently corrected with timely diagnosis and proper treatment measures. However, in many parts of India, especially in transitional areas like semi-urban regions, these conditions often go unnoticed and untreated due to limited awareness, lack of routine screening, and inadequate access to eye care services.

Although considerable urbanization has occurred in South Delhi, there are still some semi-urban localities where healthy and educational infrastructure is not uniform. Children in these semi-urban locations may not receive regular vision screening at even the private schools, despite increasing visual demands of digital learning and academic pressures. It is important to obtain contemporary data on the prevalence of refractive errors in this context for the purposes of demanding public health actions.

This study aims to assess the prevalence and pattern of refractive errors among school-going children aged 6 to 16 years in semi-urban South Delhi. The findings are intended to inform policy decisions, enhance school-based vision programs, and bridge the gap in refractive error correction among this vulnerable population.

Materials and Methods

Study Design and Participants

This cross-sectional study was carried out in South Delhi, from January to June 2023, on children aged 6–16 years old from ten private schools in a semi-urban area. A total of 1,300 students were selected using stratified random sampling, and children with existing ocular disease, or any systemic disease that could affect vision were excluded.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board. Parental consent and student assent were secured before participation.

Vision Screening Procedure

Preliminary vision screening was conducted using an illuminated Snellen chart at 6 meters under natural lighting conditions. Children with visual acuity ≤6/9 in either eye were referred for detailed evaluation, including:

- Objective refraction (autorefractometer)
- Subjective refraction
- Cycloplegic refraction using 1% cyclopentolate where needed
- Slit-lamp and fundus examination to rule out other ocular pathologies

Definitions

- **Myopia**: Spherical equivalent ≤ -0.50 diopters (D)
- **Hyperopia**: Spherical equivalent ≥ +2.00 D
- **Astigmatism**: Cylinder ≥ ±0.75 D

Demographics

Of 1,300 students screened, 666 were male (51.2%) and 634 female (48.8%). Age distribution was:

- 6–9 years: 31.7%
- 10–12 years: 35.2%
- 13–16 years: 33.1%

Prevalence of Refractive Errors

Overall prevalence of refractive errors was 24.6% (n=320).

- **Myopia**: 15.2% (n=198)
- **Astigmatism**: 6.3% (n=82)
- **Hyperopia**: 3.1% (n=40)

Age-wise Prevalence

There was a significant age-related increase in prevalence:

- 6–9 years: 12.1%
- 10–12 years: 23.5%
- 13–16 years: 33.4% ($p<0.01$)

Gender Differences

Females had a marginally higher prevalence (25.8%) than males (23.5%).

Spectacle Coverage

Only 38% of students diagnosed with Refractive errors were wearing corrective glasses at the time of examination.

Discussion

Our analysis is consistent with findings from other parts of India documenting an increase in refractive errors, specifically myopia (Kaur et al., 2012019); (Saxena et al., 2015). The increased prevalence among older children may be attributed to greater academic workload and exposure to screens (Williams et al., 2015). It is quite surprising that a large proportion of private school pupils were identified as having uncorrected vision, indicating that students are not routinely checked for vision problems. This still highlights the need for regular and enforced vision screening programs in the school system (Murthy et al., 2002). The previously noted greater difference, although statistically small was once again incorporated without much change with the now underreported: girls are more willing to report vision problems or are simply more tired due to school (Zhao et al., 2000).

Conclusion

This study shows considerable prevalence of refractive errors among school children in semi-urban South Delhi, with low spectacle coverage. School-based vision screening programs need to be institutionalized, and awareness campaigns need to be geared towards parents and teachers to facilitate timely diagnosis and correction.

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