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Original Research Article

Prevalence of Refractive Error and its Associated Factors among School Children in Chamarajanagar: A Cross-Sectional Study

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ABSTRACT

Background: Refractive errors are among the leading causes of preventable visual impairment in school-aged children and can adversely affect academic performance, psychosocial development, and quality of life. Early identification and timely correction through school-based vision screening programs are essential to reduce the burden of visual impairment and improve educational outcomes. This study aimed to estimate the prevalence of refractive errors, identify associated risk factors, and assess spectacle use among school children in Chamarajanagar district.

Methods: A school-based cross-sectional study was conducted over 18 months (April 2024–October 2025) among 275 students aged 12–14 years studying in selected government and private schools of Chamarajanagar district. Participants were selected using a multistage sampling technique. Sociodemographic characteristics, lifestyle factors, ocular symptoms, and parental history were collected using a pretested semi-structured questionnaire. Visual acuity was assessed using the Snellen chart, followed by objective refraction using retinoscopy. Data were analyzed using SPSS version 21, and associations were tested using chi-square and Fisher's exact tests, with a p-value <0.05 considered statistically significant.

Results: The prevalence of refractive error was 12.4%, with myopia (82.4%) being the most common type, followed by hypermetropia (11.7%) and astigmatism (5.9%). Among children with refractive errors, 61.7% were already using corrective spectacles. Refractive errors showed significant associations with socioeconomic status, parental history of refractive error, ocular symptoms (blurred vision, headache, watering, and redness), prolonged homework duration, television viewing, mobile/video gaming, computer use, and reduced outdoor activity. No significant association was observed with age, gender, school type, class, residential area, BMI, family type, continuous reading duration, or posture during reading and television viewing.

Conclusion: Refractive errors, particularly myopia, constitute a significant ocular health problem among school children in Chamarajanagar. Regular school vision screening, early diagnosis, health education, promotion of outdoor activities, reduction of excessive screen time, and timely spectacle correction are essential to prevent avoidable visual impairment and improve children's educational performance and quality of life. The findings provide valuable district-level evidence to strengthen school eye health programs and targeted preventive strategies.

Keywords: Refractive Errors, Myopia, School Children, Prevalence, Risk Factors, Spectacle Use, Vision Screening, Chamarajanagar.

INTRODUCTION

Uncorrected refractive error is the leading cause of visual impairment among children worldwide and has far-reaching consequences on education, psychosocial development, and future productivity.[1] If left undetected and untreated during childhood, refractive errors may result in amblyopia, poor academic performance, reduced classroom participation, and diminished quality of life.[2] Since most refractive errors are easily detectable and correctable, early identification through school-based screening programs is considered a major public health priority for preventing avoidable visual impairment and ensuring optimal child development.[3]

Globally, the burden of childhood refractive errors, particularly myopia, is increasing rapidly due to the combined influence of genetic susceptibility and environmental factors such as prolonged near-work activities, intensive schooling, increased screen time, and reduced outdoor exposure.[4,5] Projections indicate that the prevalence of myopia will continue to rise over the coming decades, emphasizing the need for effective preventive strategies and comprehensive school eye-health programs.[5] In addition to myopia, hyperopia and astigmatism also contribute significantly to visual impairment among children, highlighting the importance of screening for all forms of refractive errors.[6,7]

India bears a substantial proportion of the global burden of childhood visual impairment. Studies conducted across different regions have reported considerable variation in the prevalence of refractive errors due to differences in age groups, socioeconomic conditions, urban–rural settings, and study methodologies.[8,9] Variations in diagnostic criteria and the use of cycloplegic refraction further complicate comparisons between studies, underscoring the need for standardized assessment protocols such as the Refractive Error Study in Children (RESC) methodology.[10]

In southern India, school-based studies have consistently demonstrated that a significant proportion of children require refractive correction, while many affected children either do not possess spectacles or fail to use them regularly.[11]

Aims and Objectives

The study aimed to estimate the prevalence of refractive error among school children in selected schools of Chamarajanagar. The objectives are to identify the various risk factors associated with refractive error in the study population and to assess the extent to which children diagnosed with refractive error are using corrective spectacles.

MATERIALS AND METHODS

Study Design

A school-based cross-sectional study was conducted among students studying in the sixth to eighth standards in selected government and private schools of Chamarajanagar district, Karnataka, from April 2024 to October 2025. Data were collected from eligible students and their parents using a structured questionnaire, followed by comprehensive clinical eye examinations.

Inclusion and Exclusion Criteria

The study included all boys and girls studying in the sixth to eighth standards in the selected schools of Chamarajanagar district whose parents or guardians provided informed consent for participation. Students who were absent on the day of data collection were excluded from the study.

Sample Size Calculation

The sample size was determined using the prevalence of refractive errors (20.4%) reported by Meghala M. et al.[12] Considering a confidence level of 95%, an absolute precision of 5%, and an additional 10% to compensate for possible non-response, the final sample size was estimated to be 275. The sample size was calculated using the following formula:

$N = Z\alpha^2pq/d^2$

Where Zα was 1.96, p was 20.4%, q was 79.6%, and d was 5%.

Data Collection Tools

Data were collected using a pretested semi-structured questionnaire to obtain information on sociodemographic characteristics, near-work activities, outdoor activities, parental history of spectacle use, and history related to refractive errors. Anthropometric instruments were used to record height and weight. Visual acuity was assessed using a Snellen distant vision chart, and objective refraction was performed using a streak retinoscope to identify and confirm refractive errors.

Data Collection Procedure

After obtaining permission from the school authorities and informed consent from parents or guardians, eligible students were enrolled

using a multistage sampling technique. Demographic details and information on potential risk factors were collected through interviews with the children and their parents. This was followed by anthropometric measurements and vision screening. Students with reduced visual acuity underwent objective refraction to confirm refractive errors. At the end of the screening, the refractive status of each child was communicated to the parents and school authorities, and health education on eye care and the importance of regular spectacle use was provided.

Statistical Analysis

The collected data were entered into Microsoft Excel 2019, cleaned, and subsequently exported to the Statistical Package for the Social Sciences (SPSS) version 21.0 for statistical analysis. Descriptive statistics, including mean, standard deviation, range, frequencies, and percentages, were used to summarize the study variables. The association between categorical variables was assessed using the Chi-square test or Fisher's exact test, as appropriate. Correlation and regression analyses were performed to evaluate the relationship between relevant variables. ORs (Odds Ratios) with 95% confidence intervals (CIs) were calculated to estimate the strength of association between risk factors and refractive error. A p-value of <0.05 was considered statistically significant.

RESULTS

Variable	Category	Frequency	Percentage (%)
Age (in years)	12	93	33.8
	13	91	33.1
	14	91	33.1
Gender	Male	158	57.5
	Female	117	42.5
School	Government	209	76.0
	Private	66	24.0
Religion	Hindu	267	97.1
	Muslim	5	1.8
	Christian	3	1.1
Class	6th	93	33.8
	7th	91	33.1
	8th	91	33.1
Residence	Rural	145	52.7
	Urban	130	47.3

Table 1. Socio-Demographic Characteristics of the Study Participants (N = 275)

Table 1 illustrates the socio-demographic characteristics of the study participants. Most participants were 12 years old (33.8%), male (57.5%), studying in government schools (76.0%), belonged to the Hindu religion (97.1%), and were almost equally distributed among 6th, 7th, and 8th classes. Slightly more than half (52.7%) resided in rural areas.

Variable	Category	Frequency	Percentage (%)
BMI	Underweight	135	49.1
	Normal	134	48.7
	Overweight	6	2.2
Socioeconomic status	Lower	3	1.1
	Lower Middle	151	54.9
	Upper Middle	107	38.9
	Upper	14	5.1
Family type	Nuclear	186	67.6
	Three generation	76	27.6
	Joint	13	4.7
Vitamin A deficiency	Present	2	0.7
	Absent	273	99.3

Table 2. Nutritional and Family Characteristics (N=275)

Table 2 depicts the nutritional and family characteristics of the study participants. Nearly half were underweight (49.1%), while 48.7% had a normal BMI. Most children belonged to the lower middle socioeconomic class (54.9%) and nuclear families (67.6%). Vitamin A deficiency was observed in only 0.7% of participants.

Variable	Category	Frequency	Percentage (%)
Refractive error	Present	34	12.4
	Absent	241	87.6
Type of RE	Myopia	28	82.4
	Hyperopia	4	11.7
	Astigmatism	2	5.9
Spectacle use (among RE)	Yes	21	61.7
	No	13	38.3

Table 3. Ocular Profile of Study Participants (N=275)

Table 3 demonstrates the ocular profile of the study participants. Refractive error was detected in 12.4% of children, with myopia accounting for the majority (82.4%) of cases. Nearly two-thirds (61.7%) of children with refractive errors were already using corrective spectacles.

	Visual acuity	Right eye n (%)	Left eye n (%)
With spectacles	6/6	242 (88.0)	244 (88.7)
	6/9	9 (3.3)	3 (1.1)
	6/12	8 (2.9)	4 (1.5)
	6/18	6 (2.2)	11 (4.0)
	6/24	6 (2.2)	8 (2.9)
	6/36	3 (1.1)	5 (1.8)
	6/60	1 (0.4)	—
Overview	**Category**	**Frequency**	**Percentage**
	6/6	21	7.6
	Other corrected vision	254	92.4

Table 4. Presenting Visual Acuity among Study Participants

Table 4 illustrates the presenting visual acuity among study participants. Approximately 88% of children had normal visual acuity (6/6) in both eyes without correction. Spectacle correction improved visual acuity among children diagnosed with refractive error.

Variable	Most common response	Percentage (%)
Homework	1 hour/day	38.9
Television	1 hour/day	52.7
Mobile/video games	<1 hour/day	41.8
Computer use	Nil	75.6
Outdoor play	<2 hours/day	89.5
Continuous reading	<30 minutes	55.6
Reading posture	Sitting straight	59.6
TV posture	Sitting straight	59.6

Table 5. Near Work and Screen Exposure among Participants

Table 5 summarizes the daily visual habits of the participants. Most children spent one hour daily on homework and television viewing. Computer use was uncommon (75.6% reported no use), while the majority spent less than two hours playing outdoors. Sitting straight was the most common posture adopted during reading and television viewing.

Variable	P value
Double vision	<0.001
Blurred vision	<0.001
Pain	<0.001
Irritation	<0.001
Redness	<0.001
Watering	<0.001
Headache	0.015
Colour blindness	0.041

Table 6. Significant Clinical Symptoms Associated with Refractive Error

Table 6 shows the clinical symptoms significantly associated with refractive error. Blurred vision, double vision, eye watering, redness, irritation, eye pain, headache, and colour blindness demonstrated statistically significant associations with refractive error.

Variable	P value	Interpretation
Age	0.082	NS
Gender	0.348	NS
School	0.619	NS
Religion	0.012	Significant
Class	0.082	NS
Residence	0.734	NS
Socioeconomic status	<0.001	Highly significant
BMI	0.125	NS
Family type	0.146	NS
Vitamin A deficiency	0.105	NS
Parental history	<0.001	Highly significant

Table 7. Association between Demographic Variables and Refractive Error

Table 7 illustrates the association between demographic characteristics and refractive error. Religion, socioeconomic status, and parental history of refractive error showed statistically significant associations, whereas age, gender, school type, residence, BMI, family type, and vitamin A deficiency were not significantly associated.

Variable	P value	Interpretation
Homework duration	0.007	Significant
TV viewing	<0.001	Highly significant
Mobile/video games	<0.001	Highly significant
Computer use	<0.001	Highly significant
Outdoor play	0.032	Significant
Continuous reading	0.480	NS
Reading posture	0.520	NS
TV posture	0.183	NS

Table 8. Association between Behavioural Factors and Refractive Error

Table 8 summarizes the association between behavioural factors and refractive error. Longer homework duration, television viewing, mobile/video game use, computer use, and reduced outdoor activity were significantly associated with refractive error. In contrast, continuous reading duration, reading posture, and television viewing posture were not significantly associated.

DISCUSSION

The present study found the prevalence of refractive error among school-aged children to be 12.4%**,** indicating that refractive error remains an important public health problem in this population. This prevalence is comparable with the findings of Tajbakhsh et al.,[13] who reported the prevalence of myopia, hyperopia, and astigmatism as 11.6%, 6.7%, and 28.9%, respectively, although astigmatism predominated in their study. Similarly, the Sharma et al., study[8] reported an overall

refractive error prevalence of 11.71%**,** closely resembling the present findings. The comparable prevalence across these studies suggests that refractive errors continue to be the leading cause of visual impairment among school children, although differences in the predominant type of refractive error may be related to variations in genetic predisposition, environmental exposure, educational demands, and near-work activities.

In the present study, age was not significantly associated with refractive error. Similar observations have been reported in studies describing that refractive errors during early adolescence are influenced more by environmental and hereditary factors than by chronological age alone, with a more pronounced progression occurring during later adolescence.[14,15] Likewise, gender did not show a statistically significant association with refractive error, which is in agreement with the findings of Garcia et al.[16] and Nakamura et al.,[17] who also reported no significant gender predilection among school children. These findings indicate that boys and girls are exposed to comparable educational activities, digital screen use, and lifestyle patterns, thereby resulting in similar refractive error prevalence.

The present study also demonstrated that school type and residential area were not significantly associated with refractive error. These findings are consistent with the observations of Singh et al.,[18] who reported minimal differences between urban and rural children when educational opportunities and access to eye-care services were similar. The increasing use of digital devices and comparable academic demands across government and private schools may explain the absence of significant differences in the present study.

A significant association was observed between socioeconomic status and refractive error, with a higher prevalence among children belonging to lower and middle socioeconomic groups. Similar findings have been reported by Venkatachalam et al.[19] and Ashraf et al.[20] who attributed the increased prevalence to poor awareness, delayed diagnosis, and limited access to eye-care services.

The present study identified a significant association between refractive error and ocular symptoms such as blurred vision, eye pain, redness, watering, irritation, and double vision. Similar observations were reported by Atowa et al.[21] and Outi et al.,[22] who demonstrated that uncorrected refractive errors are among the leading causes of visual discomfort and asthenopic symptoms in school children. However, vitamin A deficiency did not show any significant association with refractive error, which is consistent with the findings of Cosmelli[23] who reported that vitamin A deficiency mainly affects the ocular surface and retinal function rather than refractive development.

Regarding the pattern of refractive error**,** myopia accounted for 82.4% of all refractive errors, followed by hyperopia (11.7%) and astigmatism (5.9%). These findings are comparable with those reported by Mahitha et al.,[24] all of whom identified myopia as the predominant refractive error among school children. Furthermore, Bilbao-Malave et al.[25] and Singh et al[18] emphasized that increased near-work activities and reduced outdoor exposure contribute significantly to the increasing prevalence of myopia. The overall prevalence of refractive error (12.4%) observed in the present study is also comparable with other Indian school-based studies.[26] Although 61.7% of affected children were already using spectacles, a proportion of children continued to have reduced corrected visual acuity, indicating inadequate spectacle compliance or outdated prescriptions. Similar concerns have been reported by Congdon et al.,[27] who highlighted poor compliance and lack of regular follow-up as major barriers to successful refractive error correction.

A significant association was also found between parental history and refractive error. This observation supports the findings of Lim et al.[28] and Wang et al.,[29] who demonstrated that children with one or both parents having refractive errors are at a substantially higher risk of developing similar conditions because of both genetic susceptibility and shared environmental factors.

Among ocular complaints, redness of the eyes**,** headache, and colour blindness were more frequently observed in children with refractive errors. Similar findings regarding headache have been reported by Das et al.,[30] who identified headache as one of the common presenting symptoms of uncorrected refractive errors. Likewise, Kalaiselvi et al.,[31] emphasized that children diagnosed with colour blindness should undergo comprehensive ophthalmic evaluation to

detect associated visual abnormalities, including refractive errors.

Lifestyle-related factors showed a strong association with refractive error in the present study. Increased duration of homework, television viewing, computer use, and mobile or video gaming were significantly associated with refractive error, supporting the near-work hypothesis proposed by Chakraborty et al.[32] Conversely, outdoor activity demonstrated a protective effect, with no refractive errors observed among children spending more than two hours daily outdoors. Similar protective effects of outdoor exposure have been reported by Bilbao-Malave et al.[25]

The present study demonstrates that refractive error among school children is influenced predominantly by socioeconomic status, parental history, ocular symptoms, and lifestyle-related factors, particularly prolonged near-work activities and inadequate outdoor exposure. The findings are largely consistent with previously published literature and reinforce the need for regular school-based vision screening, early diagnosis, timely spectacle correction, parental awareness, and promotion of outdoor activities to reduce the burden of refractive errors and prevent avoidable visual impairment among school-aged children.

Limitations

The present study has several limitations that should be considered while interpreting the findings. First, as this was a cross-sectional study, it was not possible to establish a causal relationship between refractive errors and the associated risk factors; only associations could be identified. Second, the study was conducted within a limited geographic area, which may limit the generalizability of the findings to the broader population. In addition, information related to lifestyle factors, such as screen time and outdoor activities, was collected through self-reporting, making it susceptible to recall bias and reporting inaccuracies. Furthermore, other potential confounding factors, including genetic predisposition, socioeconomic status, and environmental influences, were not explored in detail. Therefore, future longitudinal, multicenter studies involving larger and more diverse populations are recommended to validate these findings and provide a more comprehensive understanding of the determinants and progression of refractive errors.

CONCLUSION

The present study found that the prevalence of refractive error among school-aged children was 12.4%, with myopia being the most common type. Refractive error was significantly associated with socioeconomic status, parental history, ocular symptoms, and lifestyle-related near-work activities, while increased outdoor activity showed a protective effect. No significant association was observed with age, gender, school type, class, residential area, BMI, or family type. Most children showed satisfactory improvement in visual acuity following spectacle correction, emphasizing the effectiveness of early diagnosis and timely treatment. These findings highlight the importance of regular school-based vision screening programs for the early detection and management of refractive errors, thereby reducing avoidable visual impairment and improving the academic performance and quality of life of school children.

REFERENCES

1. Zhang J, Xu T, Li Y, et al. Prevalence, temporal trend, burden, and prediction of refraction disorders among children and adolescents. Chin Med J 2025;138(01):102-4.
2. Hong JD, Choi EH, Suh S, et al. UCI EyeMobile exam findings from school children following on-site screening. Clin Ophthalmol 2024;18:1667-78.
3. Almusmari G, Abdul-Gader AH, Alleki H, et al. Prevalence and impact of refractive errors in school-aged children: a cross-sectional study. Al-Majallah al-Dawlīyah Lil-Buḥūth al-'Ilmīyah 2024;3(7):11-44.
4. Surico PL, Parmar UPS, Singh RB, et al. Myopia in children: epidemiology, genetics, and emerging therapies for treatment and prevention. Children (Basel) 2024;11(12):1446.
5. Liang J, Pu Y, Chen J, et al. Global prevalence, trend and projection of myopia in children and adolescents from 1990 to 2050: a systematic review and meta-analysis. Br J Ophthalmol 2025;109(3):362-71.
6. Cao H, Cao X, Cao Z, et al. The prevalence and causes of pediatric uncorrected refractive error: pooled data from population studies for Global Burden of Disease sub-regions. PLoS One 2022;17(7):e0268800.

7. Khouj G, Alharbi AH, Alghamdi WM, et al. Uncorrected refractive errors among children attending pediatric ophthalmology clinic at Security Forces Hospital, Makkah, Saudi Arabia. Cureus 2023;15(3):e36234.
8. Joseph E, Meena CK, Kumar R, et al. Prevalence of refractive errors among school-going children in a multistate study in India. Br J Ophthalmol 2024;108(1):143-51.
9. Khanna RC, Prakash WD, Marmamula S, et al. Refractive error prevalence, effective refractive error coverage and spectacle coverage among school children in Telangana, South India. 2023.
10. Sharma IP, Naidoo K, Mashige KP, et al. Refractive error among school-aged children in Bhutan: secondary analysis of data from nationwide Bhutan School Sight Survey 2025.
11. Sheeladevi S, Seelam B, Nukella PB, et al. Prevalence of refractive errors in children in India: a systematic review. Clin Exp Optom 2018;101(4):495-503.
12. Megala M, Dhamodharan S, Duraimurugan M, et al. A study on prevalence of refractive error and its associated factors among school children in Tamil Nadu. International Journal of Community Medicine and Public Health 2020;7(1880):10-8203.
13. Tajbakhsh Z, Talebnejad MR, Khalili MR, et al. The prevalence of refractive error in schoolchildren. Clin Exp Optom 2022;105(8):860-4.
14. Dong YJ, Liu HB, Wang Z, et al. Prevalence of myopia and increasing trend in children and adolescents aged 7–18 years in Han ethnic group in China, 2005–2014. Chin J Epidemiol 2017;38(5):583-7.
15. Hu Y, Liao L, Morgan IG, et al. The onset and progression of myopia slows in Chinese 15-year-old adolescents following vocational rather than academic school pathways. Invest Ophthalmol Vis Sci 2024;65(10):42.
16. García-Lozada D, Angulo-Sánchez SV, Sánchez-Espinosa JM. Prevalence of refractive errors in school-aged and preadolescent children in Colombia. Int J Ophthalmol 2024;17(12):2288-94.
17. Nakamura Y, Hieda O, Nakai Y, et al. Gender differences in higher-order aberrations and refractive error in Japanese school children: the Kyoto Childhood Refractive Error Study. Jpn J Ophthalmol 2025.
18. Singh P, Agarwal R, Kashiv Y, et al. Comparison between primary school children of urban and rural areas for prevalence of uncorrected refractive errors and amblyopia. J Med Res 2015;3(8):871-6.
19. Venkatachalam K, Heralgi MM. Regional eye care survey: an essential prerequisite for overall betterment of eye care services. Indian J Ophthalmol 2023;71(5):2282.
20. Ashraf F, Mobeen R. Status of awareness of optometry and primary eye care services among common population in district Bhimber, Azad Kashmir. Ophthalmol Pak 2017;7(4):15-8.
21. Atowa UC, Hansraj R, Wajuihian SO. Vision problems: a review of prevalence studies on refractive errors in school-age children. Afr Vision Eye Health 2019;78(1):7.
22. Outi HYF, Perdigão LA, Almeida SA, et al. Prevalência e determinantes de erros refrativos em crianças: uma revisão sistemática sobre doenças oculares pediátricas. Arch Health 2024;5(5):e2404.
23. Cosmelli D. Vitamin A: deficiency and interventions. In: Elsevier eBooks 2023:460-70.
24. Mahitha CS, Srivastava VK, Sujatha V, et al. A study of refractive errors in school going children visiting ophthalmology OPD At MVJMC & RH in rural Bengaluru. Paripex - Indian Journal F Research 2024;13(4):37-9.
25. Bilbao-Malavé V, González-Zamora J, Gándara E, et al. A cross-sectional observational study of the relationship between outdoor exposure and myopia in university students, measured by conjunctival ultraviolet autofluorescence (CUVAF). Journal of Clinical Medicine 2022;11(15):4264.
26. Bakare PN, Gogate P, Magdum R, et al. Estimation of the prevalence of uncorrected refractive error and other ocular morbid conditions in school children of industrial area in a non-metro city in India. Cureus 2022;14(8):e27972.
27. Lohfeld L, Graham CM, Ebri AE, et al. Parents' reasons for nonadherence to referral for follow-up eye care for schoolchildren who failed school- based vision screening in Cross River State, Nigeria: a descriptive qualitative study.

PLOS One 2021;16(11):e0259309.

28. Lim DH, Han J, Chung TY, et al. High prevalence of myopia in Korean children with influence of parental refractive errors: the 2008–2012 Korean National Health and Nutrition Examination Survey. PLoS One 2018;13(11):e0207690.
29. Wang Q, Bi HY, Wang CF. Familial aggregation and heritability of myopia: a local population survey in Shanxi, China. J Trop Med 2021;2021:4847112.
30. Debsikdar RD, Khan ZM, Saleem M, et al. Headache in children: a common disability in ophthalmology OPD. PARIPEX Indian Journal of Research 2025;14(8):38-40.
31. Kalaiselvi G, Kumar D. Ocular disorders in children with learning disabilities in a tertiary hospital, Pondicherry. Indian Journal of Clinical and Experimental Ophthalmology 2018;4(3):347-51.
32. Chakraborty R, Read SA, Vincent SJ. Understanding myopia: pathogenesis and mechanisms. In: Myopia. Singapore: Springer 2020:65-94.