PATTERN OF REFRACTIVE ERRORS AMONG PRIMARY SCHOOL STUDENTS IN TTAADC

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Abstract
Introduction: Refractive error remains one of the primary causes of visual impairment in children worldwide. This study describes pattern of refractive errors among primary school students in TTAADC, Tripura.
Material and methods: Records of 148 children with different types of refractive error aged 6 to 12 years from different rural schools of Tripura Trible Area Autonomous District Council (TTAADC) in Tripura between January to June 2025 were examined to know the patterns of refractive errors.
Results: The commonest type of refractive errors among the children astigmatism (43%) followed by myopia (31%) and hyperopia (18%). Children in the age group 10-11 years had higher number of eyes with refractive error as compared to their younger ages. 78% students were from schools located in remotest underserved areas. Students were found that 46.62% were suffering myopic, 16.22% were suffering hypermetropic and 37.16% were suffering astigmatic. Among the children with refractive errors, only 23.5% students were wearing glasses.
Conclusion: A wide variation in the distribution of refractive errors between the geographic locations, gender basis, types of schools as well as between the different ethnic groups was observed. To reduce the blind ness, it is necessary to find out the refractive errors and to motivate them to ware spectacles with appropriate prescription glass. This study is the continues process to eliminate future blindness.
Keywords: Refractive errors; Myopia; Hypermetropia; Astigmatism; TTAADC;

Introduction: Refractive errors are one of the main causes of visual impairment in children worldwide.[1] Prevalence of visual impairment in children, is defined as uncorrected vision equal to or worse than 6/9, and it varies from as low as 2.72% in South Africa[2] to as high as 15.8% in Chile[3]. To address the problem of blindness in children, the World Health Organisation (WHO) recently launched a global initiative, VISION 2020-The Right to Sight, to eliminate avoidable blindness among children[4]. Out of three refractive errors myopia is the most common refractive error found in children. It was found that, high myopia is associated with potentially blinding conditions such as retinal detachment, macular degeneration, cataract and glaucoma. Therefore, understanding of prevalence and underlying the aetiological factors are most important to reduce the prevalence of refractive errors in childhood life.
Refractive errors, particularly myopia, is a major issue in Asian countries[5]. Furthermore, the prevalence of myopia has also increased among young Asian adult populations, as reported in a longitudinal 13 years study on students aged between and 17 years[6]. The progression of myopia was also noted to be more prevalent in older children, and was much higher than those reported in Western countries.
In Taiwan, 2 studies involving school children aged 6 to 18 years showed a prevalence of more than 80% by the age of 18[7]. Another study in a Japanese student population showed an overall prevalence of approximately 50%[8]. A study in Hong Kong showed that myopia was not only at its highest prevalence as compared to other countries, but myopia has also occurred in younger age groups[9].

Very few studies of the prevalence and distribution of refractive errors like myopia, hyperopia and astigmatism; among school children in the TTAADC of Tripura have been conducted. This study would provide informative figures better for planning in the national health program, and provide useful data on refractive error among primary school children, specifically in remotest area.

Aim of the study: To know the pattern of refractive errors among primary school students of TTAADC.

Material and methods

This study was carried out from January to June 2025, among primary school children in TTAADC, Tripura. 26 schools were randomly selected from the 211 registered junior basic schools of TTAADC, Tripura.

Inclusion criteria for this study were to encompassed all randomly selected primary school children from class 1 to class 5 in the TTAADC of Tripura. Vrabel Consent was taken from the guardians.

Exclusion criteria included students who were already facing ocular abnormalities, were absent from the school on the eye screening day, students those who have had normal visual acuity were exempted from the study.

Visual acuity assessments and objective refraction followed by subjective refraction were performed by 5 trained optometrists. Visual acuity was taken using Snellen's chart or tumbling E chart. Students who were unable to recognise alphabets were assessed using Tumbling E charts. A pinhole test was carried out if the visual acuity was equal to or less than 6/12. Students who were suspected of having refractive errors, using a referral criterion of uncorrected visual acuity equal to or worse than 6/9, were sent for further evaluation using dry retinoscopy techniques. Fundus examination by direct ophthalmoscopy for identifying any abnormalities in the retina. Anterior segment examination by torch light and binocular loupe.

Result

In the study total 639 students were examining in the hole study, where 148 (23.16%) students were found different types of refractive errors, in both genders. Out of 148 students 60.81% were girls and 39.19% were boys in different refractive errors in different classes of primary students. [Table – 1]

Refractive Errors	Boys	%	Girls	%	Total	%
Myopia	26	17.57%	43	29.05%	69	46.62%
Hypermetropia	11	7.43%	13	8.78%	24	16.22%
Astigmatism	21	14.19%	34	22.97%	55	37.16%
Total	58	39.19%	90	60.81%	148	100%

Table: 1 Refractive error in both genders

Out of 69 myopic students in both genders, in class-I boys were 2 and girls were 3, in class-II boys were 2 and girls were 4, in class-III boys were 3 and girls were 7, in class-IV boys were 7 and girls were 13, in class-V boys were 12 and girls were 16. [Table – 2]

Classes	Boys	%	Girls	%	Total	%
Class I	2	1.35%	3	2.03%	5	3.38%
Class II	2	1.35%	4	2.70%	6	4.05%
Class III	3	2.03%	7	4.73%	10	6.76%
Class IV	7	4.73%	13	8.78%	20	13.51%
Class V	12	8.11%	16	10.81%	28	18.92%
Total	26	17.57%	43	29.05%	69	46.62%

Table: 2 Class wise myopia distribution in both genders

Out of 24 hypermetropic students in both genders, in class-I boys were 0 and girls were 1, in class-II boys were 1 and girls were 0, in class-III boys were 2 and girls were 2, in class-IV boys were 5 and girls were 6, in class-V boys were 3 and girls were 4. [Table – 3]

Classes	Boys	%	Girls	%	Total	%
Class I	0	0%	1	0.68%	1	0.68%
Class II	1	0.68%	0	0%	1	0.68%
Class III	2	1.35%	2	1.35%	4	2.70%
Class IV	5	3.38%	6	4.05%	11	7.43%
Class V	3	2.03%	4	2.70%	7	4.73%
Total	11	7.43%	13	8.78%	24	16.22%

Table: 3 Class wise hypermetropia distribution in both genders

Out of 55 astigmatic students in both genders, in class-I boys were 2 and girls were 2, in class-II boys were 4 and girls were 5, in class-III boys were 3 and girls were 6, in class-IV boys were 4 and girls were 8, in class-V boys were 8 and girls were 13. [Table – 4]

Classes	Boys	%	Girls	%	Total	%
Class I	2	1.35%	2	1.35%	4	2.70%
Class II	4	2.70%	5	3.38%	9	6.08%
Class III	3	2.03%	6	4.05%	9	6.08%
Class IV	4	2.70%	8	5,41%	12	8.11%
Class V	8	5.41%	13	8.78%	21	14.19%
Total	21	14.19%	34	22.97%	55	37.16%

Table: 4 Class wise astigmatism distribution in both genders

In this study, it is also observed that students were found that 46.62% were suffering myopic, 16.22% were suffering hypermetropic and 37.16% were suffering astigmatic. Among the children with refractive errors, only 23.5% students were wearing glasses.

Discussion

Primary school education is the most vital educational years since children acquire the most learning time during this particular period. Thus, good visual acuity for those children was important to ensure optimum growth of their educational potentials. Subjects selected for this study represented remotest areas, a near-equal gender distribution, and all subjects were from different ethnic groups. The prevalence of refractive error was 23.16%. Girl students were much more sufferer than boys.

In children, the prevalence of refractive errors varies widely. Less than 1% prevalence of refractive errors was reported in primary school children in rural Tanzania[10], 8.1% in Kathmandu[11], 8.6% in Jhapadistrict[12], 14.8% in Malaysia[13], 36.7% in Hong Kong[9], and more than 50% in Singapore[14].

The study shows that many patients improved their vision with proper spectacles correction. In the study more than two thirds of the participants were from schools located in remotest area. The proportion of glass wearing students were very low. It may be due to the fact that financially stronger people prefer to wear spectacles.

The prevalence of refractive error and uncorrected refractive error would provide a useful and informative figure for further planning of the national health programme. Many factors would need to be considered when deciding whether to introduce eye-screening programmes in primary schools.

These factors include the prevalence of myopia, the impact of poor eyesight in children on their studies, human and financial resources needed for screening and referral, as well as availability and compliance of any treatment offered.

Conclusions:

Refractive error was the main cause of visual impairment in rural population. A wide variation in the distribution of refractive errors between the geographic locations, gender basis, types of schools as well as between the different ethnic groups was observed. Females are more sufferers. Illiteracy, unconsciousness, malnutrition, superstition also other causes of visual impairment in rural population. There will be a benefit of vision, through using low-cost spectacles if provided. Visual impairment can have a significant impact in a rural life also in terms of day-to-day activity, education and development. It is important that repeated awareness by appropriate eye care personnel through Eye Camps and effective low-cost strategies like appropriate spectacle distribution be developed to eliminate this easily treated cause of visual impairment and will prevent future blindness in the rural population.

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