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Original Research Article

OCULAR MORBIDITY AMONG TRIBAL ASHRAM SCHOOL CHILDREN IN CENTRAL INDIA: A STUDY OF PREVALENCE AND IMPACT

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ABSTRACT

Background: Early childhood is one of the risk factors for many ocular diseases, if unnoticed may adversely affect the child's school performance and causing severe ocular disability especially in remote areas with scarce facilities. An early diagnosis and intervention lead to a better impact on life. **Aims:** To determine the prevalence and pattern of various ocular morbidities in school going children of tribal ashram schools of central India. **Settings and Design:** Cross-sectional study was conducted on students from class 1 to 12 (age 6 to 18) of government tribal ashram school.
Materials and Methods: Study was conducted for a period of 18 months among 2000 students from class 1 to 12 (age 6 to 18) of government tribal ashram school. All students between 6 to 18 years and whose parents/ guardian of student giving consent for the study, those who were present on the day of screening. **Statistical analysis used:** SPSS version 20.0 (Armonk, NY: IBM Crop).
Results: Total 2000 students were participated in the study and total of 1003 students were found to be suffering from various ocular morbidities, yielding an overall prevalence of ocular morbidity of 50.1%. Refractive error was found to be the most common ocular morbidity with 452 (22.6%) followed by Vitamin A Deficiency with 256 (12.8%) respectively.
Conclusions: Refractive errors and Vitamin A deficiency are the leading preventable and treatable causes of childhood blindness. These conditions can be easily detected through regular eye screening programs and can be promptly addressed.
Keywords: Ocular Morbidity, Tribal Children.

INTRODUCTION

Visual impairment is a global issue with a considerable socioeconomic impact, but it is often overlooked unless there is significant loss of vision.[1] In developed nations, the prevalence of childhood visual impairment was 0.3 per 1,000 children, while in developing nations, it was 1.5 per 1,000. Childhood blindness or low vision was found in 0.80 per 1,000 children. Unfortunately, 30% of blind individuals in India lose their sight before reaching the age of 20.[2-5] A recent systematic review reported that the prevalence of refractive errors among schoolchildren in India was 10.8%.[9] Many eye diseases originate in childhood, often going undetected, which can negatively impact a child's academic performance and lead to visual impairment later in life.[6] Conditions like refractive errors and cataracts can be treated, while others, such as vitamin A deficiency, are largely preventable. In developing countries, children between the ages of 6 and 16 make up 25% of the population. This age group can be easily reached through schools, making them an ideal setting for

screening undiagnosed vision-related eye conditions. In addition to refractive errors such disorders like lid abnormalities, strabismus, corneal opacity, vitamin A deficiency, cataract, retinal pathologies, and ocular trauma are also significant causes of ocular morbidity in children.[7-9] While there have been several studies conducted across various regions of India, research focusing on the tribal population remains limited. Despite government efforts, there is a lack of awareness among parents in tribal areas regarding eye-related diseases. It is widely agreed that the low socioeconomic status and limited transportation options in these communities hinder early access to care. Given these challenges, this study aims to assess the prevalence of ocular morbidity among students in tribal ashram schools. These facts highlight the importance of screening for visual issues to ensure timely intervention. Therefore, the goal of this cross-sectional study is to assess students for both reversible and irreversible causes of visual impairment, ultimately improving their quality of life. The data collected from this study will help refine and enhance current eye care delivery strategies.

MATERIALS AND METHODS

This Cross-sectional study was conducted for a period of 18 months among 2000 students from class 1 to 12 (age 6 to 18) of government tribal ashram school. All students between 6 to 18 years and whose parents/ guardian of student giving consent for the study, those who were present on the day of screening and those with pre-existing ocular morbidity were included in the study. Those who were absent on the day of screening, specially abled children were excluded. All students fulfilling the eligibility criteria from nine government tribal ashram were included. Consent was obtained from parents/guardian and respective authority at school before data collection. Semi-structured questionnaire was used to collect the demographic, socioeconomic status including detailed medical history followed by recording anthropometric data and BMI was calculated. Students were classified as Underweight- <5th percentile of body mass index (BMI), Normal weight- >5th to <85th percentile of BMI, Overweight- >85th to <95th percentile of BMI, and Obese- >95th percentile of BMI. Followed by ocular examination which included, visual acuity was assessed by Snellen's chart and Jaeger's chart was used for near vision. Ishihara's isochromatic chart was be used to identify the cases of color blindness. Examination of the eyelid margins and cilia, bulbar and tarsal conjunctiva for any infections or inflammations, the cornea and anterior segment along with Hirschberg test and pupillary reflex examination will be done using a pen-torch. Latent squint was be checked by cover-uncover test. Fundus examination was be done with direct and indirect ophthalmoscope. Student with uncorrected visual acuity equal to or less than 6/12 was referred to tertiary centre for cycloplegic refraction, detailed slit lamp examination and fundoscopy. Intraocular pressure was measure by Schiotz tonometer if needed. Students requiring surgery was advised and managed accordingly.

The data collected was entered in Microsoft office excel sheet and analysis was done by SPSS version 20.0 (Armonk, NY: IBM Crop). Qualitative variables were expressed by frequency and percentage, quantitative variables were expressed by mean and standard deviation. Chi square test was used to find the association between demographic variable and visual Acuity. P value less than 0.05 considered to be statistically significant.

RESULTS

Total of 2000 students from 1st grade to 12th grade was participated in the study. About 1045 (52.25%) students were female and 955 (47.75%) were male. The M: F sex ratio between students was observed to be 1:1. The Socio-Economic status were almost equally distributed between lower middle with 948 (47.4%) and lower class with 1052 (52.6%). Nutritional status of the students was presented in percentile for genders separately. About 27% were belongs to less than 5th percentile (underweight) followed by 33% belonging to normal BMI >5th to <85th percentile category, 30% were between >85th and <95th percentile (overweight) and 10% were observed with more than or equal to 95th percentile (obese) respectively.

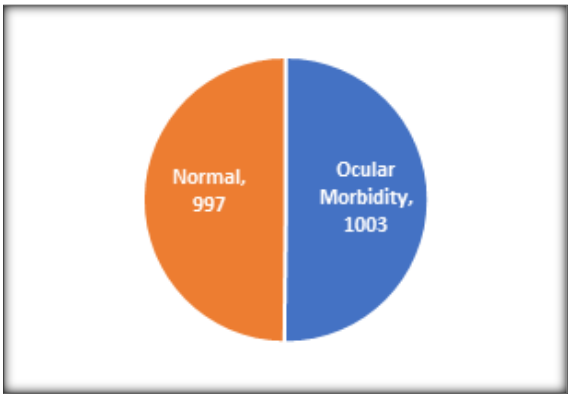

Figure 1: Prevalence of Ocular Morbidity among study participants (n=2000)

Table 1: Distribution of Ocular morbidity among study participants (n=1003)

Ocular Morbidity	Frequency (%)
Refractive Error	452 (22.6)
Vitamin A Deficiency	256 (12.8)
Infections	114 (5.7)

Congenital or Hereditary Disorders	90 (4.5)
Trauma	48 (2.4)
Functional (Squint)	40 (02)
Structural (Keratoconus)	02 (0.1)

The prevalence of Ocular morbidity observed among participants was 50.1%. (Figure 1) Refractive error was observed among 425 (22.6%) participants. About 271 (60%) had Myopia followed by 91 (20.1%) had Hyperopia and 90 (19.9%) had Astigmatism respectively. Vitamin A deficiency was observed among 256 (12.8%) of participants which accounts for xerosis 176 (68.7%) and Bitot's spot 80 (31.3%). One participant had papilledema and two had Keratoconus respectively. Squint was observed among 40 (2%) participants respectively. (Table 1)

Table 2: Distribution of Congenital Disorder and Trauma of study participants (n= 90)

Congenital Disorder	Frequency (%)
Nevus	32 (36)
Colour vision defective	12 (13)
Congenital cataract	10 (11)
Telecanthus	08 (09)
Nystagmus	08 (09)
Iris coloboma	06 (07)
Albinism	05 (06)
Fundal Coloboma	04 (04)
Antimongoloid slant	03 (03)
Disc drusen	02 (02)

About 32 (36%) of the students had Nevus followed by 12 (13%) had colour vision defective and 02 (02%) had Disc drusen. Nystagmus was observed among 08 (09%) of the participants respectively. (Table 2)

Table 3: Distribution of Trauma among participants (n=48)

Trauma	Frequency (%)
Corneal opacity	20 (41.7)
Eyebrow scar	08 (16.7)
Lid scar	08 (16.7)
Subconjunctival hemorrhage (SCH)	05 (10.4)
Phthisis bulbi	03 (6.3)
Adherent leukoma	02 (4.2)
Retinal scar	02 (4.2)

About 20 (41.7%) had corneal opacity followed by Eye and Lid scar 08 (16.7%). Adherent leukoma and Retinal scar distributed equally with 02 (4.2%) respectively. (Table 3)

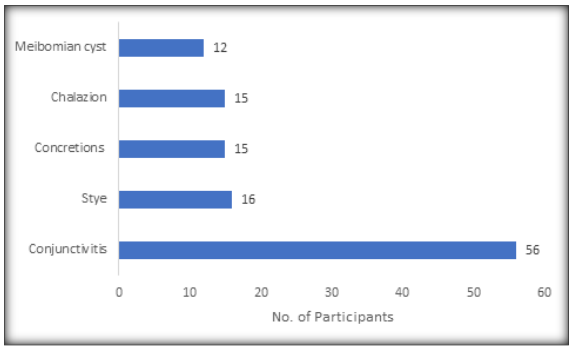

Figure 2: Distribution of Infection among participants (n=114)

About 56 (49%) had Conjunctivitis followed by 16 (14%) had Stye and 12 (11%) had Meibomian cyst Respectively. (Figure 2)

DISCUSSION

The current study was conducted among 2000 students studying from 1st grade to 12th grade. Majority of them were males 1045 (52.25%). The Socio-Economic status was almost equally distributed between lower middle with 948 (47.4%) and lower class with 1052 (52.6%). About 27% were underweight, and 30% were overweight and 10% were obese. Study by Sarkar A et al,[13] reported that most respondents in their study belonged to upper middle class 45.2% (244). In study by Deshpande JD et al,[6] the students were between 10 to 16 years and majority were males. Around 2.89% were obese, 15.12 overweight and 28.94% were underweight.

The overall prevalence of ocular morbidity among the study participants was 50.1%. Similar range of prevalence was reported by Parmar A et al,[10] and Stanly AM et al,[11] to be 45.5% and 55.1%. While lower prevalence was reported in studies by Deshpande JD et al. (6) (27.65%), Gupta M et al,[12] (31.6%), whereas Sarkar A et al,[13] reported a very high prevalence of 76.3%. Differences in prevalence may be explained by ethnic variations, partly because of lifestyle and living conditions in addition to different methodologies used.

Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. The most common ocular morbidity observed in the current study was refractive error was 425 (22.6%) followed by Vitamin A deficiency (12.8%). Similar results (22% - refractive error) was reported was reported by Gupta M et al,[12] While studies by Deshpande JD et al,[6] and Datta et al,[14] reported a low prevalence of refractive errors accounting to 10.12% and 2% respectively. These variations can be attributed to different socio-economic status of the participants in the study areas, nutritional status, lifestyles or living conditions (e.g. reading, watching TV, or using computer/ visual display units, nutrition) or medical care (e.g. unnecessary or overcorrection of refractive errors).

Higher prevalence of vitamin A deficiency was reported by Deshpande JD et al,[6] Sarkar A et al,[13] Kamath BP et al,[15] accounting for 25.58 %, 38.1% and 33.8% respectively. The lower prevalence compared to other studies could be due to better nutritional status as majority of the participants were in normal BMI category also could be attributed to the. While studies by Singh V et al,[16] and Misra S et al,[17] reported a lower prevalence accounting for 2.09% and 4% respectively.

Other ocular morbidities in the current study were infections (5.7%) among which conjunctivitis was reported among 49% followed by stye (14%) and meibomian cyst (11%). Other reported ocular morbidities were congenital and hereditary disorders (4.5%) followed by trauma (2.4%), squint (2%) and keratoconus (0.1%). Prevalence of Conjunctivitis reported by Deshpande JD et al,[6] was 2.57% and Kumar R et al,[18] reported a prevalence of 4.6%. Conjunctivitis spreads in overcrowding conditions and seen most commonly among people living in lower socio-economic conditions with poor hygiene. Pratap et al,[19] reported a similar prevalence (2.85%). Whereas a higher (7.4%) and lower (0.2-0.6%) prevalence of squint has been reported from Haryana, Rajasthan, West Bengal and Delhi. These variations could be attributed to ethnic variations, living conditions and congenital causes.[14, 20-22]

CONCLUSION

This study found a higher prevalence of ocular morbidity, with refractive error being the most common cause, followed by vitamin deficiencies. Both refractive errors and deficiencies are preventable and treatable causes of blindness. These issues can be easily identified through regular school screenings, which are an effective and simple method for early detection of eye problems.

Limitations

This study determined the prevalence of ocular morbidities, with refractive error (RE) and Vitamin A deficiency being the most commonly reported. However, cycloplegic tests and serum analysis of Vitamin A levels were not performed. As the study was conducted in a rural area, its findings may not be relevant to the general population or urban schools, and the results cannot be generalized.

Recommendation

In addition to annual vision checks to be conducted by a team of trained family physicians and optometrists, it is essential to raise awareness among school teachers to help identify any vision issues or common ocular problems in children at an early stage. Health education on eye care, supported by charts and posters, should be provided to children to help them reach their full potential in their education. Given that many children in this study suffer from refractive errors and Vitamin A deficiency, appropriate interventions, such as spectacles and nutritional supplements, should be provided.

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