

Epidemiological Study of Eye Diseases in Primary School Children in Private Schools in Vindhya Region

Eva Rani Tirkey¹, Neha Adlakha²

¹Department Of Ophthalmology, S.S.Medical College, Rewa, Madhya Pradesh, India

²Department Of Ophthalmology, S.H.K.M Government Medical College, Nalhar, Mewat, India

Timely diagnosis and treatment of ophthalmic disorders in children is vital to meet the challenges of childhood blindness.

Objective:- To know the pattern and prevalence of ophthalmic diseases prevalent in primary school children studying in private schools of Vindhya region.

Materials & Methods:- This study was conducted on 1300 students studying in private schools of Vindhya region. Detailed history was obtained from the children with respect to the age, sex, gender, class, row in class and presence of any known ocular disorder. A comprehensive ocular examination was carried out including visual acuity, pen torch examination, slit lamp biomicroscopy, cover-uncover tests, extraocular movements, retinoscopy and fundus examination.

Results:- A total of 1300 children were screened. Overall male to female ratio was 1.27:1. The mean age was 7.5 ± 1.25 years. The most common ocular disorder found was refractive errors (41.38%), allergic conjunctivitis (18.5%), corneal opacity (14.4%) and squint (8.4%). Other eye disorders were glaucoma (5.6%), ptosis (4.9%), color blindness (3.6%) and sty (2.9%). Myopia (43.68%) was the most common spherical refractive error detected while myopic astigmatism was the most common type of astigmatic errors. Mixed astigmatism was the least common error (8.53%) observed.

Conclusion:- We concluded that ophthalmological screening programmes can identify previously undiagnosed ocular problems in the primary school age children. Thus, it is worthwhile to conduct ophthalmological screening programmes for primary school children along with immediate referral and follow up.

Abstract

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Introduction

Childhood blindness refers to a group of diseases and conditions occurring in childhood or early adolescence which if left untreated results in severe blindness or some visual impairment that are likely to be untreatable later in life.^{1,2} School children form an important large target group which must be screened adequately for early detection of eye diseases and prevention of blindness. Control of childhood blindness is one of the priorities of World Health Organization's 'VISION 2020-The Right to Sight program.'³ Uncorrected vision problems in children can worsen over time and result in permanent loss of vision. Many of the causes of childhood blindness are also associated with childhood mortality (e.g. premature birth, measles, congenital rubella, vitamin A deficiency and meningitis). Thus timely detection of these conditions can contribute to higher chances of child survival. World Health Organization (WHO) defined blindness as a visual acuity less than 3/60 or a corresponding visual field loss of less than 10 degrees in the better eye with the best possible correction.⁴ By WHO criteria, there are 1.5 million children worldwide who are blind: 1.0 million in Asia, 0.3 million in Africa, 0.1 million in Latin America and 0.1 million in the rest of the world.

There are about 1.4 million blind children worldwide, out of which, two thirds live in developing countries. The causes of childhood blindness vary according to region, levels of socioeconomic development and health care provision.⁵ The prevalence of childhood blindness in India was reported to be 0.17%.⁶ Population-based studies from India reported a prevalence of uncorrected visual acuity of 2.7% and 6.4%

among children aged 7-15 years in rural and urban population respectively. The prevalence of best corrected visual acuity of 20/40 or worse was reported to be 0.78% and 0.81% in rural and urban population respectively.⁷ Steinkullar⁸ estimated that about 5% of worldwide blindness involved children younger than 15 years of age. The prevalence of blindness in children varies from approximately 0.3 per 1000 children in wealthy regions of the world to 1.2 per 1000 in the poorer countries or regions.⁹ Senthilkumar et al¹⁰ reported parents' perception and awareness of children's eye diseases in Chennai, India and concluded that one of the prerequisites of health-seeking behavior is knowledge of disease and their symptoms.

Visually impaired children have a reduced role to play in the economy.¹¹ More so, this can have severe negative impact on the education, personal development and future economic productivity of the individual. This impact is greater and has more severe consequences in poor or less developed parts of the world where resources and educational support are lacking. Poor education and inability to participate fully in daily life activities add greatly to the difficulty and suffering that poor vision or blindness cause in childhood. Childhood blindness due to various avoidable and treatable causes in any population suggests that eye care services in that population are inadequate.¹² For all these reasons, it is imperative that effective strategies be developed to eliminate avoidable and treatable causes of childhood blindness. Strategies to address eye health of children during the early years of life have therefore focused on school eye health programs. School eye screening program

is the second largest program of the National Program for Control of Blindness in India after cataract surgery.¹³ Vision screening of children in schools has traditionally been done by ophthalmic assistants and ophthalmologists. There is a huge deficit of trained eye care personnels. There is one ophthalmologist per 20,000 population in urban and per 200,000 population in rural areas in India. Similarly, there is one ophthalmic assistant per 200,000 population.¹⁴ A significant proportion of rural population does not have access to quality eye care services as the majority of ophthalmologists are concentrated in urban areas.¹⁵ Taking these aspects into consideration, innovative community based strategies are required to provide quality services to the underserved sections of the community. This study aimed at determining the frequency of undiagnosed eye problems in primary school children studying in private schools of Vindhya region through a comprehensive eye examination.

Objective

To know the pattern of eye diseases prevalent in primary school children studying in private schools of Vindhya region.

Research Design & Methods

This study was conducted in primary school children in private schools of Vindhya region of Central India. The principals of these schools were contacted and informed consent obtained after a detailed explanation of the purpose, content and benefit of the study. Ethical approval was taken from Institutional Ethical Committee. The Principal of each school was requested to nominate 1 or 2 teachers, depending upon the total number of students in that school. The selected teachers underwent a teachers training program organized by the department. The teachers attended theory lectures covering topics on magnitude of childhood blindness, importance of early detection of vision problems in children, the role of teachers in early detection of childhood eye diseases and methodology of vision screening of school children by their teachers in the schools. The process of vision assessment was then practically demonstrated by the trained optometrists and steps involved were explained in detail. All the children registered in these schools participated in the study in the order their names appeared in the school register from Class first to class fifth. Very few children who were unwilling to participate or were absent at the time of school visit were left out. A short talk supported by charts, posters, audio and audiovisual tapes etc regarding eye health education was given to children at each visit.

The materials taken with the team were internally illuminated vision drum, E charts, torch light, ruler, hand held slit lamp, direct ophthalmoscope, retinoscope, trial set, universal trial frame, RAF rule, chart, posters and audiovisual tapes. A comprehensive ocular examination was carried out by a team of ophthalmologists. Detailed information was obtained from the children with regard to the age, sex, gender, class, row in class and presence of any

known eye problem. Ocular examination included

- Visual acuity measurement using the standard Snellens' chart at 6 meters
- Extraocular movements, cover test and convergence test using RAF rule
- Torch light Examination
- Slit lamp biomicroscopy using hand held slit lamp
- Retinoscopy and subjective refraction
- Fundus evaluation using direct ophthalmoscope (sometimes with pupillary dilatation using 2.5% phenylephrine, if necessary)

All data were entered into a computer using the software SPSS statistical package version.

Results

A total of 1300 children were screened. The age and sex distribution of the study population is shown in Table 1 and Table 2. There were 728 males and 572 females in the study population with an overall male to female ratio of 1.27:1. The age range was 5 years to 10 years. The mean age was 7.5 ± 1.25 years. Of the 1300 students screened, 708 (54.46%) had eye disorders. There were more female students (53.38%) with ocular disorders than males (46.61%). The difference noted was not statistically significant, P value = 0.0725. Table 3 demonstrates the frequency of eye disorders. The most common ocular disorder was refractive errors. Refractive errors were found in 293 students (41.38%), 131 (18.5%) had allergic conjunctivitis, while another 102 students (14.4%) had corneal opacity and 60 students (8.4%) had squint. Other eye disorders were glaucoma (5.6%), ptosis (4.9%), color blindness (3.6%) and stye (2.9%). Table 4 shows the various types of ametropia in 293 students. Myopia (43.68%) was the most common spherical refractive error detected while myopic astigmatism was the most common type of astigmatic error. Mixed astigmatism was the least common error (8.53%) observed.

Table 1: Age distribution of Eye Diseases in Primary school children of Vindhya region

Age (in years)	Males	Females	Total
5-6 years	156 (12%)	142 (10.9%)	298 (22.9%)
7-8 years	234 (18%)	248 (19.07%)	482 (37.07%)
9-10 years	338 (26%)	182 (14%)	520 (40%)
Total	728 (56%)	572 (44%)	1300

Table 2: Sex distribution of Eye Diseases in Primary school children of Vindhya region

Age (in years)	Males	Females	Total
5-6 years	84 (11.8%)	58 (8.1%)	142 (20.05%)
7-8 years	154 (21.75%)	176 (24.85%)	330 (46.61%)
9-10 years	92 (12.99%)	144 (20.33%)	236 (33.33%)
Total	330 (46.61%)	378 (53.38%)	708

Table 3: Ocular diseases in Primary school children of Vindhya region

Ocular Disease	Males	Females	Total
Refractive Errors	131 (18.5%)	162 (22.88%)	293 (41.38%)
Allergic Conjunctivitis	70 (9.88%)	65 (9.18%)	131 (18.5%)
Corneal Opacity	49 (6.92%)	40 (5.64%)	102 (14.40%)
Ptosis	14 (1.97%)	19 (2.68%)	35 (4.94%)
Color Blindness	16 (2.25%)	10 (1.41%)	26 (3.67%)
Glaucoma	15 (2.11%)	27 (3.81%)	40 (5.64%)
Squint	26 (3.67%)	37 (5.22%)	60 (8.47%)
Stye	9 (1.27%)	18 (2.54%)	21 (2.96%)
Total	330 (46.61%)	378 (53.38%)	708

Table 4: Type of refractive error in Primary school children of Vindhya region

Type of Refractive Error	Males	Females	Total
Myopia	56 (19.1%)	72 (24.5%)	128 (43.68%)
Hypermetropia	12 (4.09%)	16 (5.4%)	28 (9.5%)
Myopic Astigmatism	35 (11.94%)	46 (15.69%)	81 (27.6%)
Hypermetropic Astigmatism	16 (5.4%)	15 (5.1%)	31 (10.58%)
Mixed Astigmatism	12 (4.09%)	13 (4.4%)	25 (8.53%)
Total	131 (44.7%)	162 (55.29%)	293

Discussion

School eye screening program is the second largest program of the National Program for Control of Blindness in India.¹⁶ Traditionally, this screening is done by ophthalmologists and ophthalmic assistants.¹⁷ WHO reported that about 50% of the total blindness worldwide was due to avoidable causes. The expected number of blind years is more for children than adults, therefore childhood blindness is given a higher priority in eye care policy making in various parts of the world, especially in the developing regions. School screening for uncorrected refractive errors and other eye conditions causing visual impairment has been the subject of many studies during the past few years.¹⁸ Its proponents suggest that school vision screening provides an effective way to identify children who require vision therapy, especially glasses.¹⁹ To benefit from the screening, children with abnormal screening results must receive follow-up eye care. This study was conducted in order to detect visual disorders like refractive errors, ptosis and squint that may predispose them to poor educational performance.

The prevalence of undetected vision problems among school children in the USA is estimated to be between 5% to 10%²⁰ while in our study, prevalence of eye diseases was found to be quite high (54.46%). The prevalence of significant refractive errors and other eye diseases among secondary school students aged 11-27 years in Tanzania has also been studied. Myopia was the leading refractive error (5.6%). Amblyopia (0.4%), strabismus (0.2%) and other treatable eye disorders were uncommon.²¹ In our study, refractive

errors were the most common ocular morbidity and were seen in 41.38%. This was in agreement with various studies conducted by Abiose et al²² and Nkaga and Dolin.²³ Allergic conjunctivitis was the second most common ocular morbidity (18.5%) in our study. This is in agreement with the findings of Okosa. Myopia was the most prevalent refractive error (43.68%) followed by myopic astigmatism (27.6%) and hypermetropia (9.5%). There is limited data available on the prevalence and types of refractive errors in children in developing countries, myopia (5.6%) was the most common refractive error among school children in Tanzania.¹³

Conclusions

The high prevalence of uncorrected significant refractive errors and ocular morbidity due to allergic conjunctivitis, chalazion and squint (strabismus) among the study population justifies a regular school eye screening/health education programme. Early detection of causes of eye diseases in children of primary schools provides the best opportunity for effective treatment of eye diseases in children. The School Eye Health Screening Program should however, be strengthened to provide among other things, spectacles for students to correct refractive errors, after proper ophthalmological assessment.

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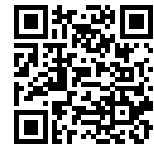
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Address for correspondence

Neha Adlakha MS

Assistant Professor,
Department Of Ophthalmology,
S.H.K.M Government Medical College,
Nalhar, Mewat, India
Email id: Neha.Adlakha777@Gmail.Com



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