

Original Research Article

Evaluation of the incidence and risk factors of ocular disorder in primary school children: a cross-section analysis

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ABSTRACT

Background: School health is an essential part of any public health program. Poor vision in childhood can affect school performance and affect children later in life. Pupils can be affected by various eye diseases such as refractive errors, strabismus, color blindness, eyelid problems and cataracts. The aim of this study is to determine the incidence and risk factors of eye diseases in children aged 6-12 years.

Methods: This school-based cross-sectional study selected children aged 6-12 years from December 2018 to March 2019 from 09 primary schools in the Kanpur district. The institutional ethical clearance and appropriate permissions from the school authorities were obtained through the medical officer of Kalyanpur PHC and consent 51 from parents.

Results: A total of 2,100 students from 09 different schools, 1,070 boys and 1,030 girls, were tested. The most common eye diseases are myopic astigmatism with 16.6% (348 people), myopic astigmatism with 78.2% (272 people), 192 were against the rule astigmatisms, 80 were with the rule astigmatism astigmatisms, followed by simple myopic with 15.2% (53 people) and hypermetropic astigmatism with 1.7% (6 people). The next most common disease is allergic disease with 1.6% (34). The 1.4% (30) of children have strabismus. Blindness 0.26% (5), colour blindness 0.2% (4); eyelid and adnexal disease 0.13% (3) and cataract 0.03% (1)

Conclusions: Eye diseases in school-aged children can be easily detected by regular eye examinations; this research shows that vision deficiency is likely to be affected.

Keywords: Children, Ocular disorder, Refractive error, Vision syndrome, Vision deficiency

INTRODUCTION

Vision screening is important for early detection of ocular conditions in children to prevent the risk of vision loss. Primary goal of pediatric screening is to identify children with visual impairment, to provide early treatment and to reduce the risk of untreated.¹ This study included these children with early detection, spectacles, or correction amblyopia. Approximately 12.8 million children aged 5-12 years are blind due to wrong/ corrected refractive errors, with an estimated worldwide prevalence of 96%.² The world health organization recommended programs related to eye examination and screening for health problem

s for students.^{3,4} Students are affected by various eye diseases such as refractive errors, strabismus, vitamin A deficiency and eye diseases. Improper vision correction is one of the main causes of visual impairment and blindness in most developing countries, including India. This, along with a vitamin A deficiency, is the leading cause of blindness in young people aged, i.e., <20 years. Given that 30% of blind people in India are blind before age 20, the importance of early detection and treatment of vision and blindness in young children is evident.⁵ CVD is incurable and is not always considered a disease; colour visual impairment (CVD) is rarely included in screening procedures. CVD testing should be part of the screening

as it can affect the development of children. Other conditions targeted in the pediatric vision screening program include outer eyes, vitamin A deficiency, pediatric cataracts, allergic conjunctivitis, congenital anomalies, and congenital glaucoma.

Aim

This study aimed to assess the incidence and risk factors of ocular disorders among primary rural school-going children (aged 6-12 years).

METHOD

This school-based cross-sectional study selected children aged 6-12 years from December 2018 to March 2019 from 09 primary schools in Kanpur district. The institutional ethical clearance and appropriate permissions from school authorities were obtained through medical officer of Kalyanpur PHC and consent 51 from parents.

After obtaining the approval from the ethics committee, inspection camp was reported to the school authorities and written consent was obtained from the parents and approved form screening dates were reported and consent from the school authorities, Kalyanpur PHC physicians, and parents. At Dr. Jawaharlal Rhotagi Smarak Netra Chikitsalaya, an eye examination number is performed on both eyes of all students with free referral and treatment. After recording age and gender, the height and weight of people were measured first and Mark VA using the Snellen VA chart at 6 m. The study population includes children in grades 1 to 5 (6-12 years).

Inclusion criteria included children aged 6-12 years, male or female, with visual acuity $<6/9$, whose pinhole improvement was accepted as refractive error, and who were diagnosed with strabismus by recording thoughts and facial expressions with the movement were included in the study. Amblyopia can be diagnosed if visual acuity is $<6/9$, The pinhole test was applied to children with VA $<6/6$ to differentiate the refractive error from pathological conditions. The associated error was diagnosed when the VA was worse than $6/9$ in the pinhole tested. For children already wearing glasses, check vision with and without glasses. Mydriatic and post-mydriatic (PMT) were not done in school. Complete colour blindness using the Ishiharas chart, examine eye movements and the convergence insufficiency test for dissonance.

In anterior segment examination, the eyelid, lacrimal sac, conjunctiva, cornea, anterior chamber, pupil, iris and lens are examined with a flashlight. Visual axis alignment was checked using cover-uncover and alternate cover tests.

Exclusion criteria included children aged 6 to 12 years, children not attending school on the day of the examination, and children with eye surgery or eye disease. Each student's eye exam includes an eye exam and appendix. Test the visual distance of each eye at a

distance of 6 m using a Snellen eye chart. For children who already wear glasses, try to see the eyes with glasses. Measure the near vision of each eye from a distance of 25 cm using the Jaeger near map. The optometrist tested images to avoid inter observer variability and ocular aberrations (phoria and strabismus)-determined using the mask scale. Fundamental examination with a direct ophthalmoscope was performed and students with visual acuity of $6/9$ and below were evaluated in a tertiary centre (Dr. Jawaharlal Rhotagi Smarak Netra Chikitsalaya). An undilated fundus examination was done for every child using a direct ophthalmoscope. Children who wear glasses on the examination day are required to wear glasses. VA evaluation, cyclopentolate/atropine mydriatic refraction, PMT, treatment, detailed anterior and posterior segment evaluation, related examinations and appropriate treatment applied to children who reported in hospital.

Data management and analysis: Interpretation and analysis of the data were done using Microsoft office excel 2016. With statistical software: R software (EZR 1.32). After collecting data, the data were analyzed with using Microsoft office excel 2016. With Statistical software: R software (EZR 1.32). In all the tests, the significance p level was considered to be less than 0.05.

RESULT

A total number of 2100 students from 09 different schools were examined, 1070 of whom were males, and 1030 were females.

Table 1: Gender wise distribution of students.

Sex	No. of student
Male	1070
Female	1030
Total	2100

The commonest eye disorder was refractive error 16.6% (348) which most common was myopic astigmatism 78.2% (272) of which 192 were against the rule and 80 were with the rule astigmatism followed by simple myopia 15.2% (53) simple hypermetropia 4.7% (17) and hypermetropic astigmatism 1.7% (6).

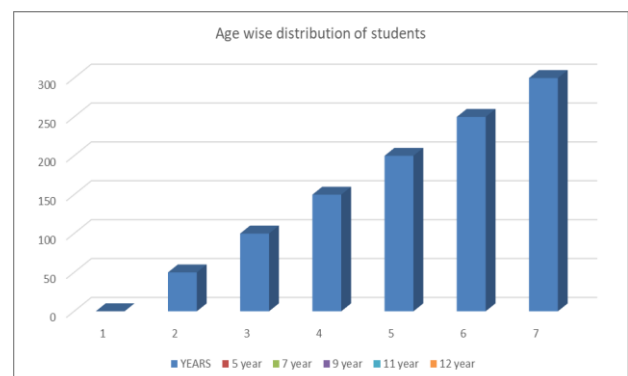


Figure 1: Age wise distribution of students' spectacle.

Age wise distribution of students of this spectacle usage was found to be present only in 81.3% (283) students, rest 18.7% (65) not aware of refractive error next common eye disorder was allergic conjunctivitis 1.6% (34).

Table 2: Prevalence of ocular disorder and their percentage.

Morbidity	Percentage (%)
Refractive error	16.6
Allergic conjunctivitis	1.6
Squint	1.4
Corneal opacity	0.26
Defective colour vision	0.20
Chalazion	0.13
Cataract	0.03
Normal	79.9

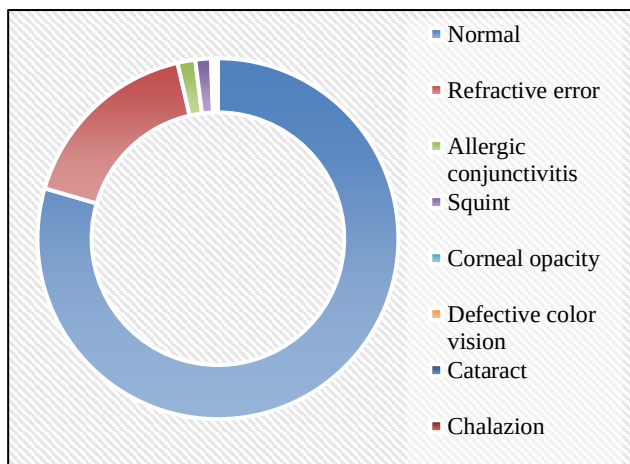


Figure 2: Ocular disorder and their percentage distribution

Squint was present in 1.4% (30) of children. Among them, alternate convergent squint was found in 54.8% (16) students of which 4 were hypermetropia. Alternate divergent squints were found in 45.2% (14) students out of which 2 had a refractive error.

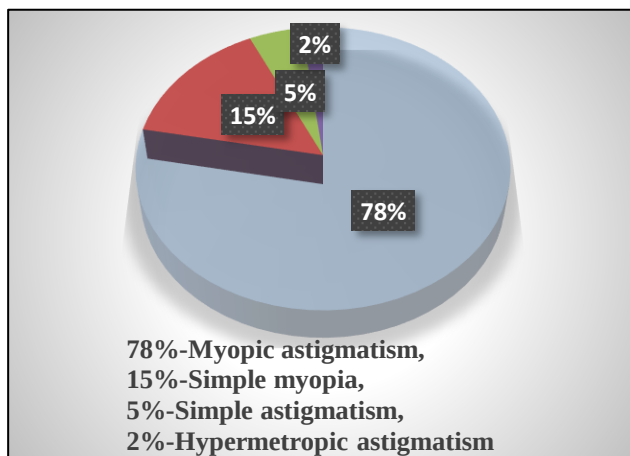


Figure 3: Types of refractive error.

Table 3: Types of refractive error.

Types	Refractive error
Myopic astigmatism	272
Simple myopia	53
Simple hypermetropia	17
Hypermetropic astigmatism	06
Total	348

Corneal opacity was present in 0.26% (5), defective colour vision was there in 0.2% (4); lids and adnexal disorders in 0.13% (3) and cataract 0.03% (1). There were no students with congenital anomalies, congenital glaucoma or vitamin A deficiency.

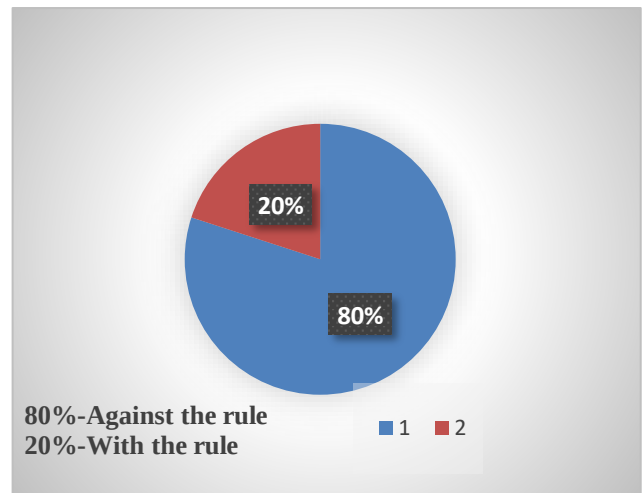


Figure 4: Types of astigmatism.

Table 4: Types of myopic astigmatism.

Types	Astigmatism
Against the rule	192
With the rule	80

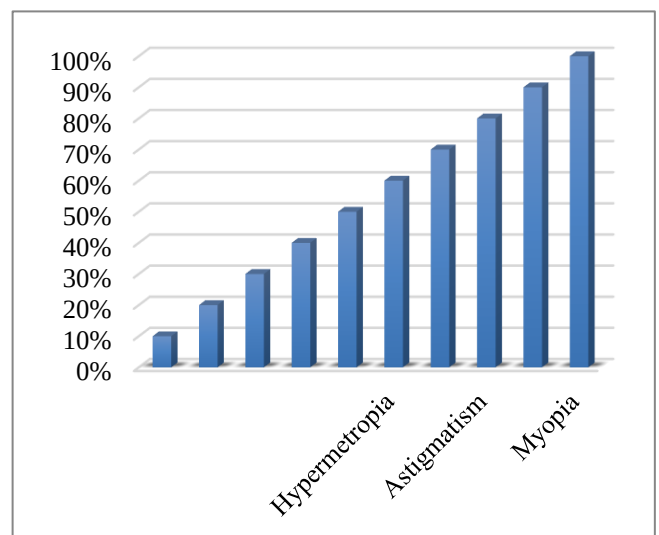


Figure 5: Spectacle usage among students.

Table 5: Lowest BCVA without correction.

Age (In years)	Best corrected visual acuity
6	6/9
7	6/12
8	6/9
9	6/9
10	6/9
11	6/18
12	6/9

DISCUSSION

School-age children account for 25% population of developing countries.⁶ To prevent Ocular disorder in children it is important to diagnose and treat ocular diseases as early as possible to prevent burden to the society. Eye exams for children are a process identifies vision problems to improve prognosis and reduce disability. Visual acuity assessment in children is difficult because of the ignorance of society.

In our study, ocular morbidity was 20.2% of the 2,100 children participating in this study, and the rate in rural Tanzania, Africa, where ocular morbidity was lower among children aged 7-19 years, was 15.6%. Refractive errors are the leading cause of vision loss and account for 16.6% of eye diseases in the 6-12-year-old group. A similar trend of refractive errors was observed among children aged 12-17 years in Ahmedabad.⁶ The overall incidence of outpatient ophthalmic patients in India is reported to be between 21% and 25%.⁷ Internationally, lower refractive error rates (2.7-5.8%) were reported among children aged 5-15 years in Africa, Finland, Chile and Nepal compared with this study.⁸ These differences could be explained by different diagnostic criteria used by different authors, racial or ethnic differences in the prevalence of refractive error, and different lifestyles or living conditions (e.g., reading, watching TV or using computer/visual displays, diet). Myopia astigmatism (78.2%) refractive error was found to be the most common cause, followed by simple myopia with 15.2%. Most children with uncorrected refractive errors have no symptoms and rarely experience eye strain when asked. Of the 348 children with refractive error, 81.3% used glasses, and the rest were unaware of the presence or absence of an abnormality. Barriers to the use of corrective eyeglasses include parental perceptions of vision problems, attitudes toward the need for eyeglasses, cost of eyeglasses, appearance, and concerns that eyeglass wear may lead to progressive refractive error.⁹ Most of this damage is caused by refractive errors and its treatment is simple and effective. Therefore, screening these students can help identify early symptoms and their impact on time. This was followed by allergic conjunctivitis with only 1.6%, which is lower than in other studies. Many other studies reported a high incidence of allergic conjunctivitis (3-17.5%). Although allergies rarely cause blindness, they can cause school absences due to their discomfort, chronicity, and

recurrence. Strabismus (1.4%) was the third most common cause of ocular morbidity among children in this age group.

An overseas study also found a lower prevalence of strabismus of strabismus (0.5%) among children aged 7-19 in Tanzania, Africa, according to Wedner et al.¹⁰ This was followed by small opacity 0.26% not affecting vision and defective colour vision of red-green colour blindness 0.2% was found among male students. A similar prevalence of colour blindness has been observed in an earlier study conducted in this part of the country.¹¹ However, a lower prevalence of colour vision defects (0.11%) has been reported by Pratap et al., from North India.¹² Children are less likely to complain of colour blindness. Identification of colour vision defects and giving adequate counselling should be done at the earliest in school children to save the child from frustration later on and help him to choose a suitable job. This was followed by chalazion at 0.13% and cataracts at 0.03%. However, there were no students with vitamin A deficiency. This can be explained by higher socioeconomic status associated with healthy dietary patterns of children in those studies. The study showed an increase in morbidity with age. This may be due to the fact that the dropout rate from school was high due to poverty, and refractive error related to habits like prolonged study hours, watching television, increased bad reading posture and hygienic practice- related problems like blepharitis, external hordeolum also increased. In this cross-sectional study, we could not draw any firm conclusions about the cause and effect of this association. This can be due to small sample size of obese children.

CONCLUSION

Because this study was conducted in a large school, it was easy enough to predict the prevalence of eye diseases in community children. In addition, this study had the advantages of good sample size, a trained ophthalmologist performing the examination, and a standardized protocol adopted during the screening process. Involving teachers in school screening programs can reduce optometrist workload reduce the workload of an optometrist. Teachers are the ones who were in regular touch with the students and would be easier for them to identify the children with vision problems at the earliest. Also, mothers who are the primary childcare should be given sufficient training to identify the ocular problems in their children. School eye screening visits should be at least once a year. Early detection of eye conditions in children is an advantage for management. The findings from this study help to treat all avoidable causes of visual impairment and blindness.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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