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Ocular morbidity among school aged children in Indian scenario

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ABSTRACT

Background: Vision is the most important special sense in human being. Normal vision is essential for normal physical, mental, psychological development and education. About 30% of blind population of India lose their eyesight before the age of 20 years and many of them are under 5 when they become blind.

Methods: The present study is a cross sectional study of children aged 6 to 15 years from Schools in the rural area within 30 kilometers surrounding Khammam, India during september 2012 to March 2014.

Results: Conjunctival abnormalities had the highest prevalence rate (4.36%) followed by Refractive errors (2.04%), Lid Abnormalities (1.35%), Corneal Abnormalities (1.02%), Squint (0.70%), Posterior segment abnormalities (0.51%), Amblyopia (0.32%), Colour vision abnormalities (0.28%) and lens abnormalities (0.23%).

Conclusion: Our study is one of the few studies to be conducted in this rural setup. This Study gives us benchmark data for comparing future studies in Khammam district and also helps in providing valuable information for proper planning and conduction of future school based health programs.

Keywords: Refractive Errors, Amblyopia, Squint, Childhood Blindness

INTRODUCTION

Vision is the most important special sense in human being. Normal vision is essential for normal physical, mental, psychological development and education. About 30% of blind population of India lose their eyesight before the age of 20 years and many of them are under 5 when they become blind. This warrants early detection and treatment to prevent permanent disability. The causes of blindness vary widely in different parts of the world although nutritional factors and infections are more common in developing countries, hereditary factors, developmental disease and the consequences of prematurity are more frequent causes in countries with better standards of living and health care services. Leading causes of blindness in developing countries are Trachoma, xerophthalmia, congenital cataract, glaucoma, optic atrophy, retinopathy of prematurity and uncorrected refractive errors. Fortunately most of the causes (75%) are either preventable or curable e.g. refractive error, Vit.A

deficiency, infections, cataract. It is gratifying to know that WHO and our Indian government have accorded priority for the prevention and control of blindness and visual impairment and included it in "Vision 2020". Data on causes and prevalence of ocular morbidity in children is essential for planning and evaluation of preventive and curative services for children in a given region. So the main intention of this study is to identify prevalence of ocular morbidity among school children in rural areas between the ages of 6 and 15.

METHODS

This is a cross sectional study of children from Schools in the rural area within 30 kilometers surrounding Khammam during September 2012 to March 2014. Four schools were randomly selected within the 30 kilometers radius and all the students in the age groups of 6 to 15 years present on the day of examination. Head masters of all the schools were approached before the screening

and permission was obtained and a date for screening was fixed which was announced in the school assembly.

Snellen's chart in both english and telugu for estimation of visual acuity. In children of lower grades who were not able to read snellen's letter chart, an E chart was used. Retinoscopy and subjective correction for children with visual acuity less than 6/6. Anterior segment examination including lids, conjunctiva, cornea, anterior chamber, pupil, iris and lens was done using a torch light and magnifying loupe. Visual axis and extra ocular movements were checked. Presence of any tropia or phoria was evaluated by doing Hirschberg corneal light reflex test, cover test and alternate cover test using an occluder. Colour vision examination was done using Ishihara's psuedo isochromatic colour plates. Dilated fundus examination was done using a direct ophthalmoscope.

RESULTS

Total number of children screened were 2156, out of which 50.4% were boys and 49.6% were girls. The selected sample had 620 children in the age group of 6-7 years, 591 in 8-9 years, 356 in 10-11 years, 364 in 12-13 years, and 245 children in 14-15 years. The ocular morbidity varied in this study from Conjunctival abnormalities which had the highest prevalence rate (4.36%) followed by Refractive errors (2.04%), Lid Abnormalities (1.35%), Corneal Abnormalities (1.02%), Squint (0.70%), Posterior segment abnormalities (0.32%), (0.51%). Amblyopia Colour abnormalities (0.28%) and lens abnormalities (0.23%). This has been explained in (Table 1) showing number of cases presenting with various ocular conditions and their percentage from the screened school children Among the 67 children with visual acuity < 6/9, 65.67% had refractive errors, 14.92% had congenital anomalies, 13.43% had posterior segment anomalies, 11.94% had amblyopia, 10.45% had corneal opacities and 7.46% had cataract. This is demonstrated in (Figure 1) which is a bar diagram showing prevalence of various ocular conditions.

Table 1: Number of cases presenting with various ocular conditions and their percentage from the screened school children.

Ocular Morbidity	Number of children	Percentage (n=2156)
Conjunctival Abnormalities	94	4.36%
Refractive Error	44	2.04%
Lid Abnormalities	29	1.35%
Corneal abnormalities	22	1.02%
Squint	15	0.70%
Posterior segment abnormalities	11	0.51%
Amblyopia	7	0.32%
Colour vision abnormalities	6	0.28%
Lens Abnormalities	5	0.23%

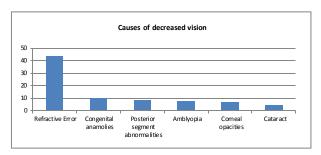


Figure 1: Bar diagram showing prevalence of various ocular conditions.

DISCUSSION

In this study, the total prevalence of ocular morbidity was 10.11%. Among Indian studies, the prevalence rates ranged from 15 to 58%. Naik R, et al,⁴ in a study conducted Ahmednagar, India noted a prevalence of 9.66%, while Gupta et al,⁵ found a higher prevalence of 31.6% in Shimla, India. Higher prevalence of ocular morbidity has been reported from north-indian states like Haryana (58.8% in 4-18 years) and Rajasthan (71.7% in 4-16 years) and also from Hyderabad in South India (43.5% in 3-16 years). 6-8 Visual acuity less than 6/9 on snellen's chart in the worst eye was found in 3.11% (67) children. Of these, refractive errors were the most common cause, seen in 44 children. Other causes of decreased vision included corneal opacities, cataract, posterior capsular opacity, choroidal coloboma, optic atrophy, squint and amblyopia.

Refractive errors were the major cause of decreased vision in the present study, with a prevalence of 2.04% and was the etiological factor for 65.67% of children with visual acuity less than 6/9. The prevalence of refractive errors was lower in the present study in comparison with previous studies. Prevalence of refractive errors ranged from 8% in the studies conducted by ER Abah et al⁹ and Naik R4 et al to 31.6% in the study conducted by Gupta et al⁵ in Shimla, India. Higher prevalence in the study conducted in Shimla might be due to lifestyle changes in the urban population of shimla in comparison to the rural population in the other studies. According to Refractive Error Study in Children (RESC), performed in a rural district near Hyderabad, India 10 and an urban area of New Delhi, India. 11 These studies have confirmed that the need for RE correction is higher for children. Results shown in the studies indicate that refractive error in children causes up to 77% of blindness and severe visual impairment (<6/60 in better eye) in India. Refractive error is the cause of visual impairment (<6/12 in better eye) in 83% children in urban india 11 and 70% in rural india 10. Of these cases, 86% of children in rural india presented without correction for refractive errors.

World Health Organization (WHO) defines blindness as a corrected visual acuity in the better eye of less than 3/60 and severe visual impairment as a corrected visual acuity

in better eye as less than 6/60. In the present study, prevalence of severe visual impairment was 3.7 per 1000 children (8 out of 2,156) and prevalence of childhood blindness was 0.46 per 1000 children (1 out of 2,156). As our survey included only school children, these prevalence rates are slightly less compared to WHO estimates which included an estimate of all the children in the community. As per WHO estimates, prevalence of childhood blindness in the world is 0.75 per 1000 children and in low income countries like India, it may be as high as 1.5 per 1000 children.

Lid Abnormalities were noted in 1.35% of the children examined in the present study. Among the 29 children with lid abnormalities, blepharitis was noted in 15 (51.72%), Chalazion and ptosis was seen in 3 (10.34%) children each, papilloma and nevus were seen in 2 (6.90%) children each and stye, entropion, trichiasis and distichiasis were noted in one (3.45%) child each. ER Abah et al identified only 0.3% prevalence of lid abnormalities in their study which they contributed to higher rates of immunization and effective screening programs.9 Gupta et al also had a lower prevalence of lid abnormalities (0.16%) which can be attributed to the fact that the population examined was in urban area compared to other studies which examined children in rural areas.⁵

Conjunctival abnormalities including conjunctivits, vernal conjunctivitis, pterygia, conjunctival xerosis, bitots spots, melanosis, nevus and pingencula were the most common with prevalence of 4.36% in the present study. In the Nigerian study by ER Abah et al, noted a higher prevalence of conjunctival abnormalities (7.3%) which can be explained due to a higher incidence of nutritional (Vitamin A and C deficiencies) and infectious (Trachoma) disorders. Indian studies by Naik R et al and Gupta et al had prevalence rates of 1.8% and 3.1%. Higher prevalence in the present study in comparison to the Indian studies can be explained by the incidence of a bout of conjunctivitis in school number 2 (Grace Childrens School, Konijerla, Khammam).

In our present study, 1% of children had corneal opacities which was in accordance to previous Indian studies that have documented 1.4% (Gupta et al⁵) and 0.4% (Naik R et al⁴). ocular trauma was the contributing factor in 50% of the children with corneal opacities. Post infective corneal opacities were present in 40.91% and congenital microophthalmos with microcornea was seen in 9.09% of children with corneal opacities. From this we can see that ocular trauma plays a major part in children with visual impairment.

As the immunization and nutritional programs help in reducing the incidence of post-keratitis corneal opacities, the need to educate the children, parents and teachers about measures to prevent ocular trauma is increasing. In the present Study, among 12 children giving history of ocular trauma, 66.67% had a best corrected visual acuity of less than 6/9. 75% had corneal opacities of varying

grades from minute nebular opacities in the periphery not affecting vision to total leucomatous opacities with band shaped keratopathy. Cataract was noted in 4 children (33.33%). Squint was seen in 2 (16.67%) children and one child presented with unilateral ptosis (8.33%).

In the present study, 7 children (0.32%) presented with amblyopia. Strabismic amblyopia was seen in 2, Stimulus deprivation amblyopia was seen in 2 post operative cases of cataract and Anisometropic amblyopia was seen in 2 children. The other studies did not give any data regarding amblyopia.

Congenital eye anamolies were noted in 12 (0.56%) children in the present study. These included 4 children with choroidal coloboma, 3 with optic disc coloboma, iris coloboma, two each of congenital toxoplasmosis (2), microcomea and cataract and once child had juvenile retinoschisis. Two children presented with congenital ptosis, and distichiasis and entropion were seen in 1 child each.

Limitations of the Study

As the present study is a school based study, it took into consideration only the children who are already attending schools. The children in the schools might be more health conscious than those who are not attending. Visually disabled children in the community usually do not attend the same schools as they are not equipped to teach them. Data collected from school surveys might not be depicting the actual community data as there are a lot of kids who do not have access to proper education.

CONCLUSION

These children with severe visual impairment require specialized care in diagnosing and rehabilitation. They would require specialized teaching techniques and low vision aids which are not readily available in the rural setup. Prompt diagnosis and proper rehabilitation is required to improve the quality of life of these children and for allowing them to contribute to the society.

In the present Study, higher incidence of preventable or treatable causes of ocular morbidity were identified. These include Vitamin A Deficiency, Ocular trauma, refractive errors, Conjunctivits, and lid abnormalities like ptosis and entropion. Refractive Errors can be easily managed at the school level itself. Teachers at the school can be trained in measuring the visual acuity of children every six months and refer them to an ophthalmologist for spectacle prescription. Other common eye ailments like conjunctivitis can be identified by the teacher and prompt referral to an eye care specialist will help in reduction of absentees.

This Study gives us benchmark data for comparing future studies in Khammam district and also helps in providing valuable information for proper planning and conduction of future school based health programs.

Preventable causes of blindness (e.g. trauma-related complications) can be tackled by improving the primary levels of health care delivery, whereas treatable causes (e.g. cataract, glaucoma, amblyopia, refractive errors) require specialized, paediatric ophthalmology units, systems for early identifications and referral and increased public awareness. A comprehensive approach is therefore needed for prevention and treatment of blindness and low vision, including providing low-vision aid services for children with low vision.

Primary health care programmes should include eye examination at birth, eye screening of preschool and school children, early management of congenital cataract, vaccination for infectious diseases in children and cooperation between paediatricians and ophthalmologists.

School health programmes play an important role in primary care and should be promoted for the diagnosis and management of common conditions, such as refractive errors, and trachoma and vitamin A deficiency in endemic areas; to promote a healthy environment; and to educate children in looking after their eyes as part of the normal school curriculum.

Thus, to conclude it is emphasized that primary, secondary and tertiary health care plays very important role in children's eye care. Care to be taken is summarized as follows:

Primary: Prevention of corneal scarring by measles immunization, nutrition/health education, etc. Early treatment of simple eye problems. Prevention of congenital rubella through immunization. Early identification and referral of children with sight-threatening disease.

Secondary: Identification and treatment of refractive errors and external eye infections in children; referral of more complex problems.

Tertiary: Specialized treatment and surgery for congenital cataracts, retinopathy of prematurity, corneal opacity, glaucoma, etc.

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