A study of prevalence of ocular disorders in primary school children in Warangal

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ABSTRACT

Objectives: To study the prevalence of common ocular disorders in primary and upper primary school children between 5 to12years of age. To screen primary school children studying in government schools. **Materials and methods:** In the present study, a total of 50 government schools were visited. A total of 5000 children were examined. The materials consisted of Ophthalmic screening kit which has been used to detect the common ocular disorders in school. **Results:** A total of 5000 children were examined, of which 2491were boys and 2509 were girls. So males (49.82%) and females (50.06%) had an equal representation. The total male children found with visual defects were 168 and total female children found with visual defects were 195. Total number of children found with visual defects were 363. Male and female children with visual defects is 3.36% and 3.9%. Total children with visual defects in the sample is 7.26%.The prevalence rate of myopia, is 1.8%, hypermetropia 0.2%, astigmatism is 0.36%, Refractive errors is 2.36%, bitot's Spots is 1.7%., conjunctival xerosis is 0.9%, Vitamin-A deficiency is 2.6%, squint is 0.42%, cornealopacity is 0.24%, cataracts is 0.16%, ptosis is 0.18%, amblyopia is 0.14%, keratitis is 0.3%, retinal diseases is 0.22%. The prevalence rate of other diseases is 0.64%. **Conclusion:** High prevalence of overall ocular morbidity and refractive errors among school students in urban South Indian area. It highlights the urgent need to implement at school level, health facility-based, cost-effective strategies, and appropriate eye careprograms targeting school children to reduce the burden of visual impairment among them.

Key words: Ophthalmic screening, Visual defects, Vitamin-A deficiency.

Introduction

School health is an important aspect of any community health program. The school age is formative period, physically as well as mentally, transforming the child into a promising adult. Poor vision in childhood effects performance in school and his negative influence on the future life of the child. Integration of vision screening and refractive services for the school students with screening of health issues is recommended by WHO[1]. Childhood blindness is important because of the number of year of blindness that ensues. School children are affected by various eye disorders like refractive errors, squint, vitamin-A deficiency and eye infections. Uncorrected refractive errors form one of the important causes of visual impairment and blindness in most developing countries including India. This along with vitamin-A deficiency forms a major preventable cause of blindness in the young age i.e., less than 20 years. Considering the fact that 30% of India's blind lose their eye sight before the age of 20 years and many of the mare under five when they become blind, importance of early detection and treatment of ocular disease and visual Impairment among young children is obvious. Children do not complain of defective vision and may not beware of the condition. They try adjusting to the problem of defective vision by sitting in the front rows, squeezing the eyes. This warrants early detection and treatment of ocular problems to prevent future blindness. School children form a sizeable segment of community. They represent 25% of population in developing countries. They are easily accessible and schools are the best form for imparting health education to children. Schools are one of the best centers for effectively implementing the comprehensive eye health care

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program. For planning and evaluating preventive and curative services for children, data on the prevalence and causes of blindness and severe visual impairment in children are needed. This includes planning special education and low vision aids.

Materials and methods

The study is across sectional type of study. The study was planned to know the prevalence of ocular disorders in Primary school children in government schools in Warangal during 2013-15.Children aged 5 to 12 years were selected.

Inclusion Criteria: School children aged 5 to 12 years studying in government schools. **Exclusion Criteria:** Children below 5 years and above 12 years.

- The principals of the selected schools were informed about the study and permission for the visit to the selected schools was sought personally. Visual acuity (unaided) was assessed by using Snellen's chart, color blindness was checked by using Ishihara's chart, axis deviation was assessed by cover/uncover test and torch examination of the eye was done. The first part of the questionnaire dealt within format ion regarding the child like age, sex, residential address, class in which studying and chief complaints related to eyes. Second part of the questionnaire included detailed examination of eye for diagnosing ocular morbidity and recording of vitamin-A deficiency signs and their ocular manifestations. The cutoff of uncorrected visual acuity for defining ocular morbidity due to refractive error in this study, was taken as a visual acuity of < 6/9 Snellen in the worst eye. Visual acuity worse than 6/60 was recorded as count fingers (CF at a certain number of feet), hand motion(HM at a certain number of feet), light perception (LP), or no light perception (NLP). The conversion of Snellen acuity to count fingers acuity was then obtained. The WHO clinical staging for trachoma and xerophthalmia was used. Vitamin-A deficiency was diagnosed if there was history of night blindness, or on examination there were signs of conjunctival xerosis, Bitot's spots, corneal xerosis or keratomalacia. Vitamin C deficiency was diagnosed if there was history of bleeding gums and on examination there were conjunctival hemorrhages. Congenital disorders were also looked for like hetero chromiairidium, ptosis, irregular pupil, erected upper lacrimal puncta, congenital cataract. Examinations were performed in the respective school compounds. Due consideration was given to the length of the room, so that it should be longer than 20feet and also to lighting, while selecting it. All the children present in the class at the time of visit were examined in one sitting. Maximum efforts were put to include all the students of the class. A total of 50 schools were visited comprising 5000 children, have been examined. Of these 2491were boys and 2509 were girls.

Results

Table 1: Age and sex distribution and percentage of Myopia and hypermetropia

S.No.	Age (yrs.)	Myopia			Myopia Percentage		
		M	F	T	M	F	T
1	5	0	0	0	0%	0%	0%
2	6	0	0	0	0%	0%	0%
3	7	3	2	5	0.93%	0.64%	0.i%
4	8	4	3	7	1.23%	1%	0.14%
5	9	3	5	8	0.90%	1.4%	0.16%
6.	10	8	5	13	2.25%	1.29%	0.26%
7.	11	10	12	22	3.21%	3.38%	0.44%
8.	12	17	18	35	4.41%	4.5%	0.7%
Total:		**45**	**45**	**90**	**1.8%**	**1.79%**	**1.8%**

S.No	Age	Hypermetropia			Hypermetropia Percentage		
		M	F	T	M	F	T
1	5	0	0	0	0%	0%	0%
2	6	0	0	0	0%	0%	0%
3	7	0	0	0	0%	0%	0%
4	8	0	1	1	0%	0.33%	0.02%
5	9	1	0	1	0.3%	0%	0.02%
6	10	1	2	3	0.28%	0.51%	0.06%
7	11	0	2	2	0%	0.56%	0.04%
8	12	2	1	3	0.51%	0.25%	0.06%
Total:		**4**	**6**	**10**	**0.16%**	**0.23%**	**0.2%-**

Prevalence rate of myopia was found to be 1.8% of the total sample with1.8% in male children and 1.79% in female children. So the prevalence rate was found to be almost equal in both the sexes. The prevalence rate of hypermetropia was found to be 0.2% of the total sample in the present study. The prevalence rate was found to be 0.16% in male children and 0.23% in female children.

Table 2: Age and sex distribution and percentage of Astigmatism and Conjunctival Xerosis

S.No.	Age	Astigmatism			Astigmatism Percentage		
		M	F	T	M	F	T
1	5	0	0	0	0%	0%	0%
2	6	0	0	0	0%	0%	0%
3	7	0	0	0	0%	0%	0%
4	8	0	0	0	0%	0%	0%
5	9	1	0	1	0.3%	0%	0.02%
6	10	3	2	5	0.84%	0.51%	0.1%
7	11	4	3	7	1.28%	0.84%	0.14%
8	12	2	3	5	0.51%	0.75%	0.1%
Total:		**10**	**8**	**18**	**0.40%**	**0.31%**	**0.36%**
Sno	Age	Conjunctival Xerosis			Conjunctival Xerosis Percentage		
		M	**F**	**T**	**M**	**F**	**T**
1	5	0	0	0	0%	0%	0%
2	6	0	1	1	0%	0.33%	0.02%
3	7	1	2	3	0.28%	0.64%	0.06%
4	8	3	2	5	0.92%	0.67%	0.1%
5	9	2	3	5	0.6%	0.85%	0.1%
6	10	2	2	4	0.56%	0.51%	0.08%
7	11	4	8	12	1.28%	2.2%	0.24%
8	12	5	10	15	1.2%	2.5%	0.3%
Total:		**17**	**28**	**45**	**0.68%**	**1.11%**	**0.9%**

Prevalence of astigmatism of the total sample was found to be 0.36%. The prevalence in male children was found to be 0.4%. The prevalence in female children was found to be 0.31% which is slightly lower than male children. The prevalence of corneal xerosis was found to be 0.9% of the total sample in the present study. The prevalence in male children was found to be 0.68% whereas the prevalence in female children was little higher compared to male children. It was found to be1.11%.

Table 3: Age and sex distribution and percentage of Bitot's spots and Squint

S.No	Age	Bitot'sSpots			Bitot'sSpots Percentage		
		M	F	T	M	F	T
1	5	0	0	0	0%	0%	0%
2	6	2	3	5	0.62%	1%	0.1%
3	7	5	3	8	1.44%	0.96%	0.16%
4	8	3	4	7	0.92%	1.34%	0.14%
5	9	2	7	9	0.6%	1.9%	0.18%
6	10	6	10	16	1.69%	2.59%	0.32%
7	11	8	11	19	2.57%	3.09%	0.38%
8	12	8	13	21	2.07%	3.25%	0.42%
Total:		**34**	**51**	**85**	**1.36%**	**2.03%**	**1.7%**
S.No.	Age	Squint			Squint Percentage		
		M	F	T	M	F	T
1	5	1	0	1	0.86%	0%	0.02%
2	6	0	0	0	0%	0%	0%
3	7	1	2	3	0.28%	0.64%	0.06%
4	8	1	1	2	0.307%	0.33%	0.04%
5	9	2	1	3	0.6%	0.28%	0.06%
6	10	2	3	5	0.56%	0.77%	0.1%
7	11	3	1	4	0.96%	0.28%	0.08%
8	12	2	1	3	0.51%	0.25%	0.06%
Total:		**12**	**9**	**21**	**0.48%**	**0.35%**	**0.42%**

Prevalence of Bitot's spots in the present study was found to be 1.7% of the total sample. The prevalence in male children was found to be 1.36%. The prevalence in Female children was higher compared to male children of 2.03%. The prevalence of squint in the present study was found to be 0.42% of the total sample. The prevalence in male children was found to be 0.48% and female children was found to be 0.35% the prevalence was little more in male children.

Table 4: Age and sex distribution and percentage of corneal opacity and cataract

S no	Age	Corneal Opacity			Corneal Opacity Percentage		
		M	F	T	M	F	T
1	5	0	0	0	0%	0%	0%
2	6	0	0	0	0%	0%	0%
3	7	1	0	1	0.28%	0%	0.02%
4	8	1	0	1	0.307%	0%	0.02%
5	9	1	1	2	0.30%	0.28%	0.04%
6	10	2	1	3	0.56%	0.259%	0.06%
7	11	0	2	2	0%	0.56%	0.04%
8	12	1	2	3	0.25%	0.5%	0.06%
Total:		**6**	**6**	**12**	**0.24%**	**0.23%**	**0.24%**
S.No.	Age	Cataract			Cataract Percentage		
		M	F	T	M	F	T
1	5	0	0	0	0%	0%	0%
2	6	0	0	0	0%	0%	0%
3	7	2	1	3	0.56%	0.32%	0.06%
4	8	1	1	2	0.307%	0.33%	0.04%
5	9	0	1	1	0%	0.28%	0.02%
6	10	1	1	2	0.28%	0.25%	0.04%
7	11	0	0	0	0%	0.%	0%
8	12	0	0	0	0%	0.5%	0%
Total:		**4**	**4**	**8**	**0.16%**	**0.15%**	**0.16%**

Prevalence of corneal opacity in present study was found to be 0.24%. The prevalence in male children was found to be 0.24% and female children was found to be 0.23%. It was almost equal in both sexes. The prevalence of cataract in the present study was found to be 0.16% of the total sample. The prevalence in male children was found to be 0.16%and female children was found to be 0.15% which was almost equal in both sexes.

Table 5: Age and sex distribution and percentage of Ptosis and Ambylopia

S.No.	Age	Ptosis		Ptosis Percentage			
		M	F	M	F	M	T
1	5	0	0	0	0	0	0%
2	6	0	0	0	0	0	0%
3	7	0	0	0	0	0	0%
4.	8	0	1	0	0	0	0.02%
5	9	0	1	1	0	1	0.02%
6	10	1	2	1	0	1	0.06%
7	11	1	1	2	1	2	0.04%
8	12	1	1	1	1	1	0.04%
Total:		**3**	**6**	**9**	**5**	**2**	**5**

S.No.	Age	Amblyopia				Amblyopia Percentage	
		M	F	M	F	M	T
1.	5	0	0	0	0	0	0%
2.	6	0	0	0	0	0	0%
3.	7	0	0	0	0	0	0%
4.	8	0	0	0	0	0	0%
5.	9	1	0	1	0	1	0.02%
6.	10	1	0	1	0	1	0.02%
7.	11	2	1	2	1	2	0.06%
8	12	1	1	1	1	1	0.04%
Total:		**5**	**2**	**7**	**5**	**2**	**5**

Prevalence of ptosis in the present study was found to be 0.18% of the total sample. The prevalence in male children was found to be 0.12% and female children was found to be 0.23%. The prevalence was found to be higher in female children compared to male children. The prevalence of amblyopia in the present study was found to be 0.14%. The prevalence in male children was found to be 0.2%and female children was found to be 0.07%. The prevalence was found to be higher in male children compared to female children.

Table 6: Age and sex distribution and percentage of Keratitis and Retinal diseases.

S.No.	Age	Keratitis			Keratitis Percentage		
		M	F	T	M	F	T
1	5	1	0	1	0.86%	0%	0.02%
2	6	0	1	1	0%	0.33%	0.02%
3	7	1	2	3	0.28%	0.64%	0.06%
4	8	2	1	3	0.61%	0.33%	0.06%
5	9	0	1	1	0%	0.28%	0.02%
6	10	2	1	3	0.56%	0.25%	0.06%
7	11	1	1	2	0.321%	0.28%	0.04%
8	12	0	1	1	0%	0.25%	0.02%
Total:		**7**	**8**	**15**	**0.28%**	**0.318%**	**0.3%**
S.No.	Age	Retinal Diseases			Retinal Diseases(%)		
		M	**F**	**T**	**M**	**F**	**T**

1	5	0	0	0	0%	0%	0%
2	6	0	0	0	0%	0%	0%
3	7	0	0	0	0%	0%	0%
4	8	0	0	0	0%	0%	0%
5	9	1	1	2	0.30%	0.28%	0.04%
6	10	2	1	3	0.56%	0.25%	0.06%
7	11	1	2	3	0.321%	0.56%	0.06%
8	12	2	1	3	0.51%	0.25%	0.06%
Total:		**6**	**5**	**11**	**0.24%**	**0.199%**	**0.22%**

Prevalence of keratitis was found to be 0.3% of the total sample. The prevalence in male children was found to be 0.28% and female children was found to be 0.318%. The prevalence was found to be higher in female children compared to male children. The prevalence of retinal diseases in the present study was found to be 0.22% . The prevalence in male children was found to be 0.24% and female children was found to be 0.199%. The prevalence was found to be higher in male children compared to female children.

DISCUSSION: In the present study, a total of 50 government schools were visited. A total of 5000 children were examined. Of which 2491were boys and 2509 were girls. So males (49.82%) and females (50.06%) had an equal representation. Total male children found with visual defects were 168 and total of female children found with visualdefectswere195. Total number of children with visual defects were 363 in the present study. In this study the overall prevalence of ocular morbidity in school children was found to be 7.26% of which boys represented 3.36% and girls 3.9%. The prevalence of ocular morbidity of 7.26% among school children of age 5-12 years in this study is comparable to that conducted in Maharashtra (10.2%)[2] in the age group of 6-15years, Mysore (5.4%) and much lower than a study conducted in Delhi,[3] where prevalence was reported to be 34.04% in the 5-14 years age group. However, higher prevalence of ocular morbidity has been reported states like Haryana (58.8%in 4-18 years) and Rajasthan (71.7% in 4-16years) and also from Hyderabad (43.5%in 3-16 years). It was because of the higher prevalence of trachoma and conjunctivitis found in these two northern states and refractive errors found in SouthIndia4. Moreover, the range of age groups covered in the above mentioned studies was also more as compared to the present study. Lower prevalence (15%) of ocular morbidity has been reported from Kolkata[5].West India among school children of 5-13 years, because of lower prevalence of refractive errors(2%)and smaller age group covered in that study. Review of international studies revealed lower prevalence of 15.6% of ocular morbidity in children aged 7-19 years in rural area of Tanzania, Africa [6].International differences in prevalence may also be explained by racial and ethnic variations, partly due to different lifestyles and living conditions in addition to different methodologies used. Marginal difference in the prevalence of ocular diseases among boys (6.7%) and girls(7.1%) in the present study is comparable to results of the study in Shimla[7] and Delhi and study conducted in Kolar district (13.5%) in boys and13.1% in girls). However, Khurana *et al.* reported higher prevalence in girls (73.5%)as compared to boys (49.4%) in Haryana. In their study, prevalence of infectious diseases like trachoma, conjunctivitis and blepharitis was high among girls because of increased use of common ocular cosmetic material. The common among these majority had vitamin-A deficiency related (39%) and refractive Errors (36%).

Refractive Error: Refractive errors are the most common reasons of the outpatient visit to an ophthalmic surgeon or an ophthalmic assistant. The over all incidence has been reported to vary between21% and 25% of patients attending eye out patient departments in India. From South Indiahigher (32%) prevalence rate of refractive errors among

school children of age 3-18 years as compared to the present study (2.36%) was observed, because of higher age group of children examined and higher case detection rate in that study by an optometrist. About 60-80% of visual impairment may be due to refractive error alone. The wide variability may be due to the sampling frame and non-representative population. The low prevalence in our study may be explained by the fact that it was done in an urban area where health facilities are easily approachable. In our study, refractive error increased with age and this was statistically significant. Similar pattern has been noted by S Mahapatro et al at Bhubanesar[6] and also by Goh P P et al in Malaysia[8]. .Screening for refractive errors is an integral part of School health problem. Internationally, lower prevalence of refractive errors(2.7-5.8%) has been reported among children of age 5-15 years from Africa, Finland[9], Chile[10] and Nepal[11] as compared to the present study. These differences may be explained by the different diagnostic criteria used by different authors, racial or ethnic variations in the prevalence of refractive errors, different lifestyles or living conditions(e.g. reading, watching TV, or using computer / visual display units, nutrition) or medical care (e.g. unnecessary or over correction of refractive errors which may worsen the refractive error by inhibiting natural "emmetropisation"). In the present study refractive error in boys was seen in1.18% cases against 1.7% in girls. About 98% of all refractive errors were myopes and 2% were hyperopes. The low prevalence of hypermetropia in our series may be due to the age group of children studied and cycloplegic refraction being done. Out of all the children having visual impairment, only one fourth were using refractive correction; which highlights the lack of awareness about the need for refractive correction. More boys were observed to use spectacle, probably due to cosmetic reason and parent's interest. Socioeconomic conditions were also possibly contributing to the under-use of the corrective measures. Barriers to the use of corrective spectacles include: parental lack of awareness of the vision problem, attitudes regarding the need for spectacles, spectacle cost, cosmetic appearance, and concerns that wearing glasses may cause progression of refractive error. Though best corrected visual acuity improved in 97.75%, it is similar with the reports from other studies in Andhra Pradesh, Delhi [12] and Gujarat [13].In the remaining cases visual impairment was primarily due to corneal scar, and congenital anomalies like nystagmus, coloboma of iris and retina etc. which masked the improvement in vision with correction. From a public health perspective, vision screening is an appropriate strategy to reduce vision impairment.

Vitamin-A Deficiency: Vitamin-A deficiency upto an extent of 5.4-9% in the 4 to 16 years age group has been reported in Rajasthan and Kolkata[14],as compared to 2.6% in the present study.This can be explained by lower socioeconomic status associated with unhealthy dietary pattern of children in those studies. Our low prevalence can also be explained by availability of better health services now a days, facilitating early detection and treatment. High prevalence of conjunctivitis, blepharitis and Vitamin-A deficiency in children studying in government schools as compared to private schools as observed in this study could be because many of the students in government schools belong to lower socioeconomic status and are more likely to have poor personal hygiene. Prevalence of vitamin-A deficiency increased with age in the present study, which is different to the Desai et al.,[15] study which decreased with age. It may be due to increased demand with age which could not be due to low socioeconomic groups found mostly in government schools as in the present study. Internationally, Wedneretal[6] reported the prevalence of night blindness as 5.3% and Bitot's spots as 0.6% among school children of age 7-19years in Tanzania. Since their study was done in the rural area, where children belonged to low socioeconomic status and had poor nutritional status, prevalence of vitamin-A deficiency was high.

Squint: Prevalence of squint as reported by Wedner et al., of 0.5% among children of 7-19 years in Tanzania, Africa is similar to the results of the present study (0.42%). However, higher (7.4% in 5-15 years) and lower (0.2-0.6% in 4-18 years) prevalence of squint has been reported from Haryana, Rajasthan, West Bengal and Delhi. For our sample, strabismus (squint) was generalized to incorporate various related diagnosis, including alternating exotropia, alternating esotropia, hypotropia, hypertropia and amblyopia. The prevalence rate of childhood cataract is 0.16% as per the study. Most of the cases were as a result of trauma and few were developmental. Most common form of ptosis noted was myogenic (simple congenital ptosis). Other types of ptosis noted are third nerve palsy, Marcus Gunnjaw winking phenomenon, mechanical ptosis from eyelid or orbital mass, blepharophimosis, Horner's syndrome and post traumatic ptosis. Simple congenital ptosis was the most prevalent formofptosis. A family

history of childhood ptosis was present in about 12% of queried patients with simple congenital ptosis. The prevalence of amblyopia in the present study was found to be 0.14% of the total sample. The prevalence in male children was found to be 0.2% and female children was found to be 0.07%. The prevalence was found to be higher in male children compared to female children. A prevalence of amblyopia of 1.1% was found in a study conducted by S.Ganekel et al in South India [16]. in children aged 5-15years. Visual deprivation was the predominant risk fact or that was reliably distinguished by its earlier onset in young children. Ametropia and anisometropia were the most common causes of amblyopia. Amblyopia is mainly caused by uncorrected refractive error during first decade of life. After this sensitive period, refractive correction does not improve with correction and the eye becomes amblyopic. It is necessary to correct refractive errors to prevent amblyopia. Meridonial type of amblyopia is common type followed by ametropic, anisometropic and strabismic. Timely diagnosis and treatment is likely to reduce the prevalence of amblyopia. The occurrence of other visual defects like keratitis,corneal opacity, albinism Coloboma iris were found to be sporadic. Higher prevalence of conjunctivitis and blepharitis(1.5-17.5%) has been reported in other parts of India as compared to our study. Variation in the prevalence of these infections can be explained by difference in socioeconomic status, personal hygiene of children, seasonal variations of occurrence of these diseases and geographical location. Low prevalence of congenital disorders was found to be the same as it has been observed in other studies from India. Heredity plays an important role in the occurrence of myopia with15% of Children with myopia giving a positive family history in either parents or Siblings. A great majority of children with Bitot'sspots i.e., about 97% have found not to be getting any kind of treatment for their condition. Similarly, about 62% of children with refractive errors need to be prescribed corrective glasses.

Conclusion

It high lights the urgent need to implement at school level, health facility-based, cost-effective strategies, and appropriate eye care programs targeting school children to reduce the burden of visual impairment among them. Screening of school children for visual impairments as a part of school health not only should beakey component of an effective blindness prevention programme but also an easy approach for a large-scale screening. Epidemiological studies are required to identify the quantum of refractory errors. Efforts are to be focused on primary prevention of blindness and timely correction of refractory errors to prevent irreversible visual loss. Primary teacher and parents are also to be educated and made aware of early detection of refractory errors. In this context, Information, Education and Communication (IEC) amongst people in primary health care play pivotal role in prevention and early detection of refractory errors.

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