

Ocular morbidities in school going children of age group 6 to 15 years

Lavanya P¹, Prasanna Shankar Babu T G^{2*}

¹Assistant Professor, ²Associate Professor, Department of Ophthalmology, Shridevi Institute of Medical Sciences And Research Hospital, NH-4, Bypass Road, Tumkur- 572106, INDIA.

Email: hrbs2006@yahoo.co.in

Abstract

Background: The school going years is formative years for determining one physical, intellectual and behavioral development. Any problem in vision during the formative years can hamper the intellectual development, maturity and performance of a person in his future life. Children usually do not complain of defective vision. They adjust to poor eyesight by sitting near black holding books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration. This obstructs early detection refractive error is common ocular disorder in children .so timely detection of those problems and their correction by spectacles can tremendously improve the child's potential during his formative years. This study was done to determine prevalence of visual impairment due to Refractive error and other ocular disorders in school children of middle and lower status economic of Tumkur. **Methods:** A total of 532 children were examined from 2 government aided schools of Tumkur city from 1 November 2012 to 1 September 2014. All school children were subjected to examination including visual acuity, dilated refraction and colour vision. Visual impairment in school children of <10years and >10 years and different sex was noted. **Results:** On presentation 114 children [21.79%] had visual acuity equivalent <6/9 to visual impairment. Among them 28 (5.3%) Children had visual acuity equivalent to legal blindness as defined in US that is <6/60. Out of which 12(2.29%) had visual acuity equal economic blindness in India that is <6/60. The prevalence of visual acuity < 6/60 was significantly higher in > 10 years as compared to < 10 years in better eye. The prevalence of visual acuity < 6/60 was significantly higher in < 10 years as compare to > 10 years in worse eye. The prevalence of visual acuity < 6/60 was significantly higher in males as compared to Females in worse eye. The prevalence of visual acuity < 6/60 there is no significant difference between males and Females in better eye. **Conclusion:** Major cause of visual impairment in present study was found to be Refractive errors. Proper education of school teachers in detecting eye related disorders could be helpful in early detection and treatment of child.

Key Word: Visual Impairment, School children, Refractive Error, Ocular Disorders.

*Address for Correspondence:

Dr. Prasanna Shankar Babu T G, Associate Professor, Department of Ophthalmology, Shridevi Institute of Medical Sciences And Research Hospital, NH-4, Bypass Road, Tumkur- 572106, INDIA.

Email: hrbs2006@yahoo.co.in

Received Date: 30/01/2019 Revised Date: 22/03/2019 Accepted Date: 14/05/2019

DOI: <https://doi.org/10.26611/10091026>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:

30 May 2019

INTRODUCTION

School going years is formative years for determining ones physical, intellectual and behavioural development. Any problem in vision during the formative years can hamper the intellectual development, maturity and performance of a person in his future life. Children

usually do not complain of defective vision. They may not even be aware of their problem. They adjust to poor eyesight by sitting near black board, holding books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration. This warrants early detection and treatment to prevent permanent disability¹. Timely detection of these problems and their correction by spectacles can tremendously improve the child's potential during his formative years. Visual impairment can be a drag in the life of a child, his family and the society, school are one of the best centres for effectively implementing the comprehensive eye health care program.² The control of the childhood blindness is a priority in "VISION 2020 – The Right to Sight "; This global initiative aims to eliminate avoidable blindness by the year 2020, the first phase of focuses on the implementation of cost effective strategies.³ India is home of largest number of blind children in the world.

Ironically, in 50% of these cases, blindness can either be prevented or treated. Among the rural population of economically backward states of central India, childhood blindness is alarming high. Refractive error and vitamin A deficiency are most common causes of childhood blindness in the region ⁴. In India, refractive errors are second commonest cause of blindness after cataract. It accounts for over 7% of blindness, thus meaning that there are approximately 1 million blind people due to refractive errors in India. The high prevalence of blindness due to refractive errors reflects on availability of the refraction service and spectacles ⁵. Hence this study was undertaken to know the prevalence of refractive errors and other ocular morbidities in school going children of age group 6 to 15 years.

METHODOLOGY

School children age group 6-15 years of Tumkur city were examined for prevalence of visual impairment due to various ocular disorders from 1st November 2012 to 30th August 2014. Consent from school principals was taken for study. A total of 532 children were examined from 2 Government aided schools of Tumkur city. All children were co-operative for vision testing. The eyes of children were divided into Better eye and Worse eye. The eye which has even one line better vision than its corresponding fellow eye is considered as Better eye. If vision in both corresponding eyes in child are normal range that is 6/6 and 6/5 then eye better vision 6/5 is considered as Better eye and its fellow eye that is 6/6 is considered as Worse eye. If vision in both corresponding eyes of single child are equal but <6/6 then eye with more Refractive error on Retinoscopy is considered as Worse eye. If both corresponding eyes of single child has vision 6/6, 6/5 then both eyes are considered as better eyes. Statistical analysis included estimation of prevalence of various eye diseases with their 95% confidence intervals. Prevalence of eye disorders was estimated for the worse and better eye. Children were divided into two age groups, <10 and ≥10 years, for comparison of prevalence. Disease prevalence was compared between groups (males and female, < 10 yrs and ≥ 10 yrs) with chi-square test of goodness of fit. The excel and SPSS (SPSS Inc, Chicago) software packages were used for data entry and analysis. The results were presented in numbers and percentage for categorical data in table and figure. Statistical analysis included estimation of the prevalence of various eye diseases with their 95% confidence intervals. Disease proportional were compared between groups (male and female, <10 yrs and ≥10 yrs) with chi-square test of goodness of fit.

1. Calculation of 95% CI for proportion:

$$P \pm Z^{\alpha/2} \frac{\sqrt{pq}}{n} \text{ where } q = 1 - p$$

In the above test a “p” value of less than 0.05 was rejected as indicating statistical significance.

RESULTS

On presentation 114 children [21.79%] had visual acuity <6/9 equivalent to visual impairment. Among them 28 (5.3%) Children had visual acuity equivalent to legal blindness as defined in US that is <6/60. Out of which 12(2.29%) had visual acuity equal economic blindness in India that is <6/60. The prevalence of visual acuity < 6/60 was significantly higher in > 10 years as compared to < 10 years in better eye [P value is 0.021]. The prevalence of visual acuity < 6/60 was significantly higher in < 10 years as compared to > 10 years in worse eye [P value is 0.041]. The prevalence of visual acuity < 6/60 was significantly higher in males as compared to Females in worse eye. [P value is 0.003] The prevalence of visual acuity < 6/60 there is no significant difference between males and Females in better eye [P value is 0.005]. 4 children had visual acuity <3/60 in worse eye. The cause of <3/60 visual acuity in worse eye were strabismus 3 (3.39%) and oculocutaneous albinism 1(0.88%). All 6 children visual acuity did not improve >3/60 in worse eye. There was no legally or economically blind after refraction as best corrected visual acuity in better eye improved in all children. Prevalence of Hypermetropia the prevalence of hypermetropia was 18 children [3.44%]. It was more among males [p value 0.001] than females. Hypermetropia was more among >10 years than of <10 years. Range of hypermetropia + 0.5 to +6.0D [Average +0.75 D]. Prevalence of Myopia The prevalence of myopia was found to be in 18 children [3.44%]. It was more among females than males [p value 0.002]. It was more among >10 years than <10 years [p value 0.041]. There was no significant difference between males and females. Range of myopia -0.75 D to -11 [Average -1.5 D]. Prevalence of Astigmatism The prevalence of astigmatism was found to be 51 children [9.70%]. It was more common among > 10 years than <10 years. It is highly significant [P value 0.002]. It was common in males than females [p value 0.004]. Myopic astigmatism was present in 31 children [5.9%] is more than hypermetropic astigmatism i.e 20 children [3.8%]. With the rule astigmatism was found to be more than against the rule astigmatism. range of astigmatism -0.5 to 6D [Average -1.0D]. Prevalence of other ocular Morbidities The other ocular disorder that was seen in present study was VKC 9 children [7.89%], vitamin A deficiency in 7 children [6.14%], chalazion in 7 children [6.14%], blepharitis 6 children [5.26%], squint 5 children [4.39%], conjunctivitis 1 child [0.88%], limbal dermoid 1 child [0.88%], oculocutaneous albinism 1 child [0.88%], stye 1 child [0.88%] and coloboma iris 1 child [0.88%].

Table 1: Visual acuity in Better eye based on age and gender

Visual Acuity	Age		p-value	Gender		p-value
	<10 years	≥10 years		F	M	
6/6	265	209	0.065	233	241	0.071
6/9	9	10	0.061	9	10	0.065
6/12	3	8	0.031*	5	6	0.061
6/18	4	0	0.028*	1	3	0.057
6/24	0	4	0.024*	2	2	0.089
6/36	0	1	0.899	0	1	0.871
6/60	2	11	0.021*	5	8	0.046*
CF3M	1	0	0.882	0	1	0.877
CF2M	4	1	0.047*	2	3	0.060

* Significant at 5% level of significance

Table 2: Distribution of Best-corrected visual acuity in worse eye according to gender and age

Visual Acuity	Sex		p-value	Age		p-value
	Female	Male		<10 Years	≥10 years	
6/6	1	4	0.002*	2	3	0.005
6/9	9	10	0.077	9	10	0.07
6/12	5	6	0.061	3	8	0.003*
6/18	1	3	0.054	4	0	0.001*
6/24	2	4	0.073	0	4	0.00*
6/36	0	1	0.001*	0	1	0.04*
6/60	4	4	0.006	0	8	0.00*
CF3M	0	1	0.001*	4	1	0.041*
CF2M	2	3	0.003	1	0	0.002*

* Significant at 5% level of significance

Table 3: Distribution of Best corrected visual acuity in better eye according to gender and age

Visual Acuity	Sex		p-value	Age		p-value
	Female	Male		<10 Years	≥10 Years	
6/6	234	242	0.613	18	40	0.001*
6/9	0	1	0.047*	20	41	0.003*
6/12	0	1	0.621	1	0	0.081
6/18	0	0	Not-det	0	0	Not-determined
6/24	0	0	Not-det	0	0	Not-determined
6/36	0	0	Not-det	0	0	Not-determined
6/60	0	1	0.055	0	1	0.063

* Significant at 5% level of significance

Table 4: Prevalence of other ocular disorders

OCULAR DISORDER	No.	%
Refractive error	81	71.05
VKC	9	7.89
Vitamin A deficiency	7	6.14
Chalazion	7	6.14
Blepharitis	6	5.26
Squint	5	4.39
Conjunctivitis	1	0.88
Limbal dermoid	1	0.88
Albinism	1	0.88
stye	1	0.88
coloboma iris	1	0.88

DISCUSSION

In present study among 523 school children screened, 114 children [21.79%] had visual acuity equivalent to visual impairment $<6/9$. Among them refractive error was the first cause of the Visual impairment compared well with the study done by Madhu Gupta *et al* of Ocular morbidity prevalence among school children in Shimla, Himachal Pradesh, India ¹. Among them 28 [5.3%] Children had visual acuity equivalent to legal blindness as defined in US that is $\leq 6/60$. Out of which 12[2.29%] had visual acuity equal economic blindness in India that is $<6/60$ which is similar study done by Amruta S Padhye *et al* "Prevalence of uncorrected refractive error and other eye problems among urban and rural school children" ² The prevalence of visual acuity $\leq 6/60$ was higher in ≥ 10 years as compared to < 10 years in better eye. The prevalence of visual acuity $\leq 6/60$ was higher in < 10 years has compare to ≥ 10 years in worse eye which is similar to study done by Nirmaln P K *et al* in the Kariapatti paediatric eye evaluation project ⁶. The prevalence of visual acuity $\leq 6/60$ was higher in males has compared to Females in worse eye. The prevalence of visual acuity $\leq 6/60$ there is no difference between males and females in better eye which is similar to the study done by Mausumi Basu *et al* in the Study "Spectrum of Visual Impairment among urban female School students of Surat". ⁷ The prevalence of hypermetropia was in 18 children [3.44%]. It was more among males than females. Hypermetropia was more among ≥ 10 years than of <10 years. The prevalence of myopia was found to be in 18 children [3.44%]. It was more among females than males. It was more among ≥ 10 years than <10 years. There was no difference between males and females. The prevalence of astigmatism was found to be 51 children[9.70%]. It was more common among ≥ 10 years than <10 years. It was common in males than females. Myopic astigmatism was present in 31 children [5.9%] is more than hypermetropic astigmatism i.e. 20children [3.8%] which is similar to study done by Jialiang Zhao *et al* in "The progression of the refractive error in school children : Shunyi District , China. ⁸ The prevalence of ocular disorder that was seen in present study was refractive error 81[71.49%], VKC 9 children [7.89%], vitamin a deficiency in 7 children[6.14%] , chalazion in 7 children[6.14%] , blepharitis 6 children [5.26%], squint 5 children [4.39%], conjunctivitis 1 child [0.88%], limbal dermoid 1 child [0.88%], oculocutaneous albinism 1 child[0.88%], stye 1 child [0.88%] and coloboma iris 1 child [0.88%] which is similar to the study done by P Gogate *et al* in " Changing pattern of Childhood Blindness in Maharashtra. ³ Prevalence of Myopia was found to be 9.6% in present study. Gordon *et al* ⁹ reported that myopia was seen most frequently in age group 11 to

30 years and was less frequently seen in Younger and older age group. In present study prevalence of Myopia was found to be significantly higher among children aged 10 years or greater compared to those aged less than 10 years. This suggests indirectly that Myopia is a progressive and onset of Myopia may be delayed in some children. In study done by Gold Schmidt *et al* ¹⁰ Myopia was seen more frequently in girls than boys. Garner *et al* ¹¹ reported that there was no difference in prevalence of myopia between girls and boys which is similar to our results. Prevalence of Hypermetropia was found to be 20.98% in present study. Hypermetropia was commonly seen in less than 10 years age group. Our study was similar to study done by Kalkivayi *et al*. ¹² Hypermetropia found to decrease markedly with increasing age in our study, more prevalent in females which is similar to study done by Kalkivayi *et al*, ¹² Murthy et. Al, ¹³ Pokharel *et al* ¹⁴ and Chen *et al* ¹⁵ The prevalence of Astigmatism was found to be 10.6% [401 children]. It was more common among <10 Years than ≥ 10 years. The occurrence was common in females [p value <0.001]. Myopic astigmatism was present in 8.6%, Hypermetropic astigmatism was found to be 2%, our study was similar to study done by Kalkivayi *et al*.¹² A prevalence of 0.25% for Astigmatism $>_1.25D$ has been Reported in Malanesian children.¹⁶ Desai *et al* ¹⁷ found Vitamin A deficiency in 5.39%, Chalazion 0.25%, Blepharitis in 1.6%, Conjunctivitis in 5%, Corneal Opacity in 0.03%, stye in 0.21%. Gosh *et al* ¹⁸ recorded incidence of Vitamin A deficiency in 8.6% in Pondicherry. Colour vision defects were found in 2% of children in present study. Desai *et al* ¹⁷ found colour vision defects in 2.88% of school children. The most important cause of uncorrectable visual loss in our study was found to be Amblyopic mostly caused by uncorrected Refractive errors. The prevalence of Amblyopic was found to be 1.8% . A similar range of prevalence for Amblyopic, 1.7%-1.85% has been reported in Colombia ¹⁹, Denmark ²⁰, Madagascar ²¹ and Saudi Arabia. ²² See *et al* ²³ described strabismus as major cause of Amblyopic. They reported that early correction of Refractive errors reduced prevalence rate of Strabismus and Amblyopic. They reported observed a decrease in prevalence rate from 42.9% to 21.5%, which was significant in their observations. Hence early detection of Refractive errors is necessary to control Amblyopic and squint.

CONCLUSION

Major cause of visual impairment in present study was found to be Refractive errors. Uncorrected refractive error were found to be major cause of defective vision. Proper education of school teachers in detecting eye related disorders could be helpful in early detection and

treatment of child. Periodic evaluation of ocular and General health of school children can help in control of prevalence rate of curable and preventable blindness and other ocular morbidities. However the present study gives information about school children in Tumkur city and more attention, education, screening is required in schools of rural areas where prevalence of refractive errors and Vitamin A deficiency is high.

REFERENCES

1. Madhu Gupta, Bhupinder P Gupta, Anil Chauhan, Ashok Bhardwaj. Ocular morbidity prevalence among school children in Shimla, Himachal North India. *Indian J Ophthalmol* 2009; 57:133-138.
2. Amruta S Padhye, Rajiv Khandekar, Sheetal Dharmadhikari, Kuldeep Dole Parikshit Gogate, Madan Deshpande. Prevalence of uncorrected refractive error and other eye problems among urban and rural school children. *Middle east Africa journal ophthalmol* 2009;16(2): 69-74.
3. P Gogate, M Deshpande, S Sudrik, S Taras, H Kishore, C Gilbert. Changing pattern of childhood blindness in Maharashtra, India. *Br J Ophthalmol* 2007;91:8-12.
4. B. K Jain , An and Sudan, signet pinto. "Community participation in addressing the challenges of childhood blindness". *Community eye health Journal* , December 2005 volume 18; issue 56.
5. National programmed for control of blindness. "community based screening of children for detection of visual impairment". September 2006.
6. Nirmalan PK, Vijayalakshmi P, Sheeladevi S, Kothari MB, Sundaesan K, Rahmathullah L. The Kariapatti pediatric eye evaluation project: baseline ophthalmic data of children aged 15 years or younger in Southern India. *Am J Ophthalmol*. 2003 Oct;136(4):703-9.
7. Mausumi Basu, Palash Das, Ranabir Pal, Sumit Kar, Vikas K Desai, Abhay Kavishwar. Spectrum of visual impairment among urban female school students of Surat. *Indian journal of ophthalmol* 2011; 59:475-479.
8. Jialiang Zhao, Jin Mao, Rong Luo, Fengrong Li, Sergio R Munoz, Leon B Ellwein. The progression of refractive error in school-age children: Shunyi district, China. *Am J Ophthalmol* 2002;135(5):735-74.
9. Gordon A. "Refractive error in a Puerto Rican Rural population" . *J Am optima Assoc* 1990;61:870-874.
10. Gold Schmidt E. , " On the etiology of Myopia; An Epidemiologic Survey". *Acts ophthalmology* 1968;98; 1-172.
11. Garner Lf, Kin near R f, Klinger J. D , Mc Keller MJ "Prevalence of Myopia in school children in Vanuatu " . *Acts ophthalmology* 1985; 63; 323-326.
12. Kalkivayi v, Naduvilath. TJ, Bansal AK, Danadona L. " Visual impairment in school children in southern India". *I.J.O* 1997; 45:[2] 129-34.
13. Murthy G V Gupta SK Ellen LB Munoz SR , Pokharel GP ,Sanga L , "Refractive error in children in an urban population in New Delhi,` ` In vest ophthalmology vies sci,2002 Mar ;43[3] ;623.
14. Pokharel GP, Nigel AD , Munoz SR, Ellen L B. Refractive error study in children; results from Me chi Zone" Nepal , *Am. J. ophthalmology* 200 April: 129[4]; 436 -44
15. Chen PC, Chang Rj, Lee Da. Wheeler NC "prevalence of Ocular disorders Among 6 and 7 years olds in Santa Monica , California " . *J. am option Assoc.* 1996 jun;67[6]358-365.
16. Gamer Lf, Kinnear RF, Mc Kellar M, " Refraction and its component in Malanese school children in Vanuatu" . *Am J Optom physiol opt* 1988; 165; 182-189.
17. Desai Sandi, Desai Rajiv, Desai NC, Louisa Siobhan, Baragava G, Kumar K. " school eye health appraisal ,," . *I.J.O* 1989 Vol 37 , issue 4, 173175.
18. Gosh B.N., Data S. p. "orient Arch of ophthalmology"" 1969; 7;16. 19. Rodriguez MA, Castro Gonzalez M. " visual health of school children in Medellin, Antioquia, Columbia"" . *Bol Oficina sanit panam* 119; 11-14, 1995.
19. Jensen H, Gold Schmidt E . " Visual acuity in Danish school" *Acta ophthalmol* 64; 187-191, 1986.
20. An emery A, Andriamanamihaja R, Bossier P. "A Survey of the prevalence and causes of eye disorders in primary school children in Antananarivo" *Santé* 5; 163-166, 1995.
21. Abolfotouh MA, Badawi I , Faheem Y. " prevalence of Amblyopia Among school boys in Abha city , Asir region, Saudi Arabia". *J Egypt public health Assoc* 69; 1930, 1994.
22. See L.C. Song HS, Ku WC, lee js, Lain yes, Shih W B. "Neglect of childhood Strabismus: Keelung Ann-Lo community ocular survey 1993- 1995" . *Chang gang Yi Xue Zap Ahab*.

Source of Support: None Declared
Conflict of Interest: None Declared