A Study on Ocular Disorders among School Children of Dibrugarh District, Assam

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Abstract: The study was conducted to explore the prevalence of visual impairment and other ocular disorders among school children and to understand the pattern of these eye disorders. It was also aimed to develop awareness for eye screening programs among teachers and parents 1963 children of 12 schools of Dibrugarh District, Assam were examined in a well illuminated space of each school. The children were examined with easy handling appliances namely Snellen chart, Trial frame, Torch light, Binocular Loupe, Ophthalmoscope etc. Socioeconomic classification was also worked out. Distant vision and colour vision were tested followed by examination of anterior segment, test for convergence insufficiency and squint and fundus examination. Intra-ocular pressure and visual field were also recorded. Children found with ocular disorders were referred to Medical College. There they were examined under slit lamp, those with defective vision were subjected to cycloplegic refraction and others having convergence insufficiency and strabismus were put on to synaptophore. They were then given necessary advice and treatment. Further, school teachers were made aware of the situation and were taught to test the vision of students. On observation, the prevalence of ocular disorders was found to be 9.98%. Refractive error was the commonest ocular disorder among which myopia prevailed in maximum cases. Conjunctivitis, corneal opacity, lid disorders, muscular imbalance etc. were other diseases seen. The study also succeeded in creating awareness and importance of school eye screening to eliminate blindness and other disorders.

Keywords: Ocular disorder, School children, Awareness, Eye screening, Snellen chart, prevalence, Refractive Error, conjunctivitis, Muscular imbalance.

INTRODUCTION

Holy children are precious resources of our society and assets of the nation. In fact, they are the future of our country. But unfortunately, some children grow and develop with some congenital and developmental anomalies of eyes, many acquire certain ocular disorders while others live with visual disability which remain unnoticed and unattended until they step into the learning temple – the schools. At school, large scale screening camps are held at periodic time to early diagnose, prevent, control and eliminate childhood blindness, visual disability and ocular disorders as well. In multiple studies and screening programmes conducted across nations a huge .burden of visual impairment most commonly due to refractive errors has been described in both developed and developing nations [1].

Early detection and preventive care are essential to maintain full functional ability and to avoid or minimize the consequences of ocular disorders such as amblyopia and strabismus or even blindness (Casser, Care Menche, Gross, Kneib & Morrow, 2005; WHO, 1999) [2]

In the last decade of 20th century, the World Health Organization drew global attention to the magnitude of avoidable blindness worldwide. The present scenario of blindness in the world is 37 million and amongst them, 12 million live in India. Every year an additional 1-2 million persons go blind in the world and 5 Lakh children go blind annually. One person goes blind in every 5 second and one child goes blind in every minute. These figures are expected to be double by the year 2020 if concerted and coordinated action is not initiated [3].

WHO sought stronger collaboration with the international agency for the prevention of blindness (IAPB) to assist the Member State to control and eliminate the possible cause of avoidable blindness? The resulting collaboration venture was "Global initiative for the elimination of avoidable blindness by the year 2020" known as VISION 2020: the Right to

Sight. Moreover prevalence of blindness was found to be higher in rural India as compared to urban due to poverty, illiteracy, ignorance, lack of ophthalmic facilities in rural areas and it directly effects on economic development and productivity of the area. Besides, Vitamin A deficiency is the single most important cause of childhood blindness in India [4].

Hence, the need for eye screening among school age children has been emphasized worldwide. It is strongly recommended that children receive a comprehensive eye examination to recover from their ill health. Therefore, an eye screening programme should be incorporated in the existing basic school system all throughout the country [2].

AIM OF THE STUDY

This work was carried out to study the prevalence of eye diseases among the school attending children and to understand the pattern of ocular diseases among them. It was also aimed to make an awareness campaign in the society and for teachers and parents in particular for periodic eye screening for early detection, prevention and timely management of ocular disorders and save the precious eye of precious children of the nation.

MATERIALS AND METHODS

This cross sectional study was conducted amongst the school children in the class's I-X (5 to 15 years of age) in 12 selected schools situated in different areas of Dibrugarh district of Assam. After obtaining necessary permission from Head of the Department of Ophthalmology, Assam Medical College, and Dibrugarh and from the Head Master, Head Mistress or Principal of selected schools, the work was started. During the study, a total number of 1,963 students of both sexes were examined against the total number of 2,143 students in the school register. Socioeconomic classification was worked out on the basis of Kuppuswamy Scale which takes into consideration of education, occupation and monthly income of parents and accordingly following groups were made: class-I: upper class, Class –II: Upper middle class, Class-III: Lower middle class, Class –IV: Upper lower class and Class –V: Lower class.

Examination room was selected in a well-ventilated and well illuminated place in each school. The students were examined with easy handling appliances and instruments. They are as follows: i) A torch light (ii) Adjustable trial frame with an occluder (iii) Snellen chart for vision testing (iv)Direct Ophthalmoscope for fundus examination (v) Ishiharas pseudoisochromatic test plates for colour vision testing (vi) Binocular loupe. Distant vision and colour vision were first tested, followed by examination of the anterior segment of the eyes. Thereafter a pencil test for near point of convergence and Hirschberg and cover Test for detecting heterophoria/ heterotropia were performed. Intraocular pressure was tested by digital tonometry and field vision was assessed by confrontation method. Finally fundus examination of each child was done.

All children with visual impairment and other ocular disorders, found in the school field survey were referred to outpatient Department of Ophthalmology, Assam Medical College, Dibrugarh for further examination and needful. Children are first examined under Slit Lamp Biomicroscope for final diagnosis of their anterior segment disease. Those children with defective vision were subjected to cycloplegic refraction (with 1% cyclopentolate), and those with defective convergence, heterophoria, heterotropia were subjected to Synoptophore test. For testing Binocularity, Worth four dots test was performed. All children were given necessary advice and treatment after final diagnosis for their disease.

Further, the school teachers were made aware of the common eye diseases of students and importance of periodic eye check-up in schools for early detection of these disorders and thereby instituting early intervention. Teachers were also taught to test visual acuity with the help of snellens chart.

OBSERVATION AND RESULTS

The present study was carried out among the students of 12 different schools of Dibrugarh District of Assam which includes children in the age between 5 and 15 years. The results obtained and calculated are shown in tables and figures below:-

Table-1: Prevalence of Ocular Diseases

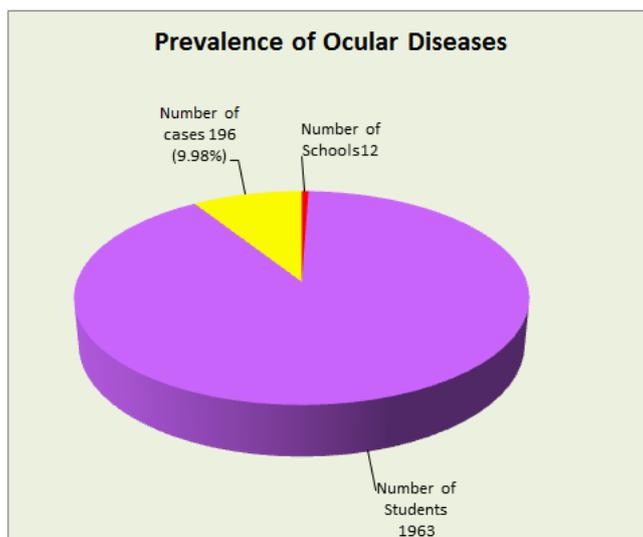| Number of Schools	Number of Students	Number of cases	Percentage (%)
12	1963	196	9.98

Fig -1

Table-2: Prevalence of Different Sex

Sex	Number of Students	Number of cases	Percentage (%)
Boys	1008	104	10.30
Girls	955	92	9.60
Total	1963	196	9.98

The above tables and figure shows that out of 1963 children belonging to 12 schools, a total of 196 (9.98%) children were found suffering from various ocular diseases. Out of 196 children with ocular disorders, 104 (10.3%) were boys and 92 (9.6%) were girls.

Table-3: Prevalence in different Socio-economic Class

Socio-economic class	Number of Students	Number of cases	Percentage (%)
Class-I : Upper	0	0	0.00
Class–II : Upper middle	876	81	9.20
Class–III : Lower middle	1003	92	9.10
Class–IV: Upper Lower	84	23	27.40
Class–V : Lower	0	0	0.00

Table-4: Prevalence of Different Ocular disease

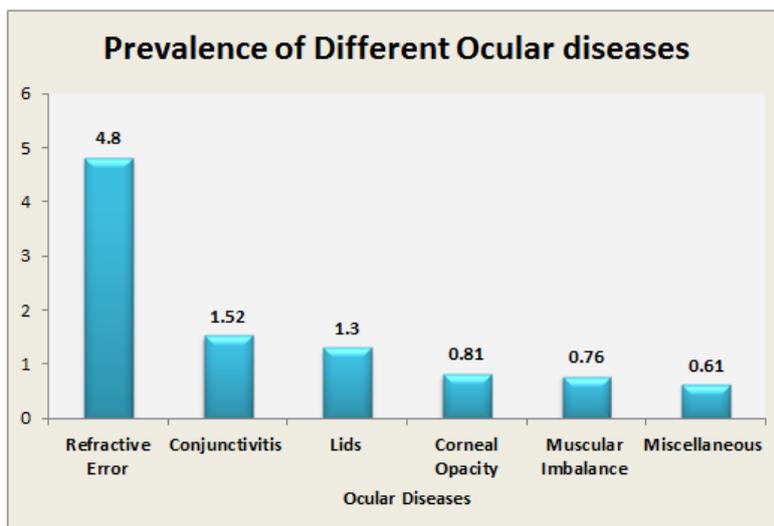| Ocular Diseases	Number of Cases	Percentage (%)
Refractive Error	96	4.80
Conjunctivitis (Allergic and mucopurulent)	30	1.52
Lids (Blepharitis, Hordeolum, chalazion, ptosis)	27	1.30
Corneal Opacity	16	0.81
Muscular Imbalance	15	0.76
Miscellaneous	12	0.61

Fig-2

The aforeshown tables and figure shows that ocular diseases are more prevalent (27.4%) among children belonging to Socioeconomic Class-IV. Among prevalence of different ocular diseases, Refractive Error is seen to be highest among all ocular diseases i.e. 4.8%.

Refractive Error

Table-5: Prevalence of Refractive Error among Different Sex

Sex	Number of students	Number of cases	Refractive Error	Percentage (%)
Boys	1008	104	51	5.00
Girls	955	92	45	4.70
Total	1963	196	96	4.80

Table-6: Prevalence of Different Type of Refractive Error

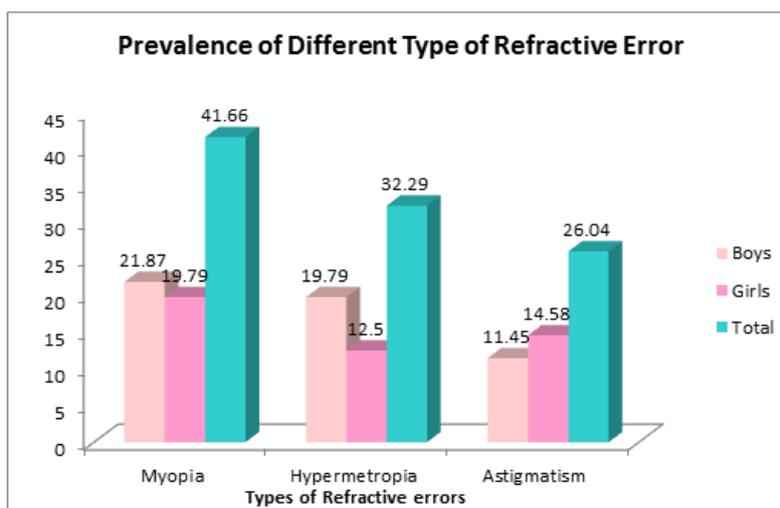| Types of Refractive Errors	Boys		Girls		Total	
	No.	(%)	No.	(%)	No.	(%)
Myopia	21	21.87	19	19.79	40	41.66
Hypermetropia	19	19.79	12	12.50	31	32.29
Astigmatism	11	11.45	14	14.58	25	26.04
Total	51	53.13	45	46.87	96	100.00

Fig-3

The aforepresented tables and figure demonstrate that refractive error is more prevalent among boys (5%) then girls (4.7%). It is also observed that the prevalence of myopia is more (41.56 %) as compared to hypermetropia (32.29%) and astigation (26.04%).

Conjunctivitis

Table-7: Prevalence of different types of conjunctivitis

Type of Conjunctivitis	Number of cases	Percentage (%)
Mucupurulent Conjunctivitis	12	40.00
Allergic Conjunctivitis	18	60.00
Total	30	100.00

Out of total 1963 students, 30 students (12 boys and 18 girls) were suffering from conjunctivitis. The prevalence rate was 1.52% (Table 4). The above table No. 7 shows that incidence of allergic conjunctivitis is higher (60%) than mucopurulent type (40%).

Corneal Opacity

In the present study, the prevalence of corneal opacity was found to be 0.81% (16 cases out of 1963). Of them, 10 cases gave history of trauma in the past and the rest suffered from painful red eye with discharge and later developed opacity.

Diseases of Lids

Table-8: Details of the diseases of Lids

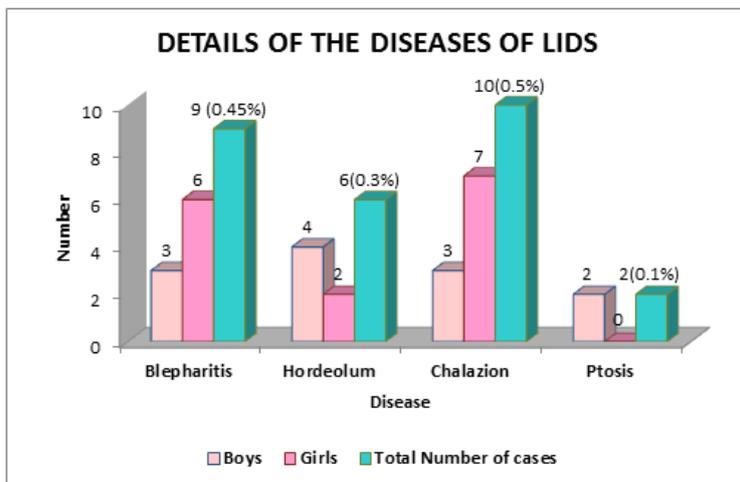| Diseases	Boys	Girls	Total Number of cases	Percentage (%)
Blepharitis	3	6	9	0.45
Hordeolum	4	2	6	0.30
Chalazion	3	7	10	0.50
Ptosis	2	0	2	0.10

Fig-4

The present study showed that out of 1963 students, a total of 27 students suffered from various diseases of lid. The above Table-8 and Fig-4 displays that 9 students suffered from blepharitis, 6 from hordeolum, 10 from chalazion and 2 from ptosis. Among them, chalazion heads the list with 0.5% prevalence in which girls were more affected. Blepharitis comes next with 0.45% in which also prevalence is more among girls.

Muscular Imbalance

Table-9: Prevalence of Different types Muscular Imbalance

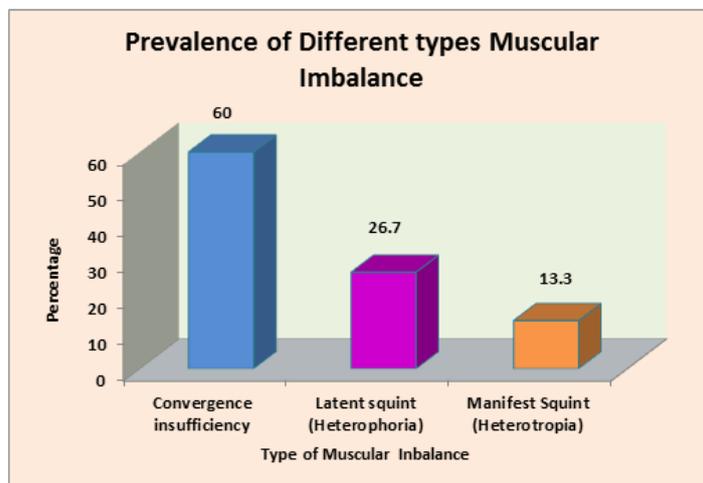| Type of Muscular Imbalance	Number of cases	Percentage (%)
Convergence insufficiency	9	60.00
Latent squint (Heterophoria)	4	26.70
Manifest Squint (Heterotropia)	2	13.30
Total	15	100.00

Fig-5

Out of total 1963 students, 15 (0.76%) students were seen to be suffering from various forms of muscular imbalance as evident from above table no.- 9 and Fig-5. The convergence insufficiency was highest (60%) in comparison to the other types of muscular imbalance. Heterophoria came in second position (26.70%) followed by heterotropia (13.30%).

Miscellaneous

Out of 1963 students, 12 students suffered from miscellaneous eye diseases. Among them, 3 students had colour blindness (0.15%), 2 had amblyopia (0.10%), 1 had microcornea with coloboma (0.05%) and 6 students had computer vision syndrome (0.30%). These children with computer vision syndrome presented with discomfort, irritation and watering on prolonged exposure to computer and television.
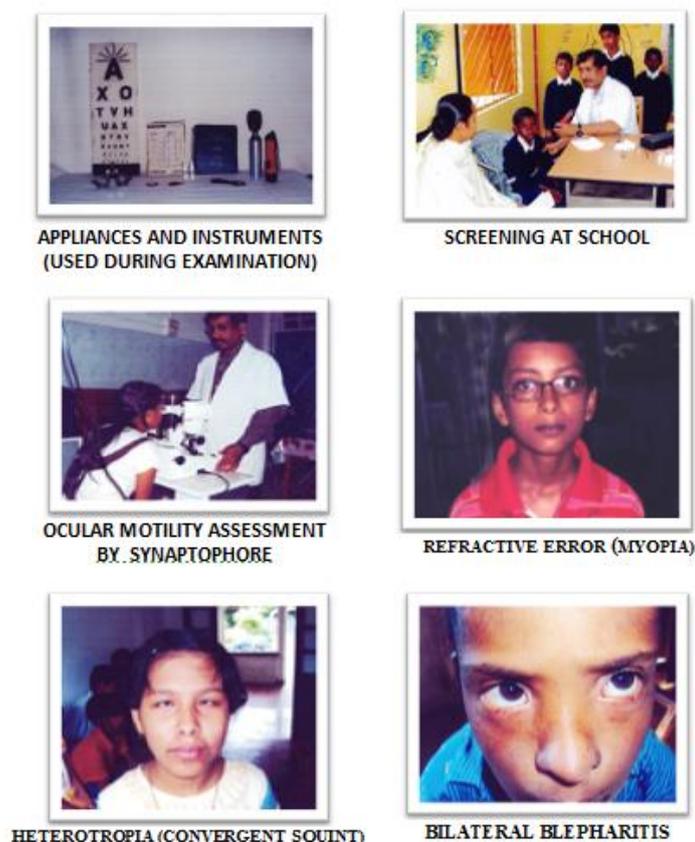

Fig-5: Photographs showing appliances, screening programme and some ocular disorders discovered during examination

DISCUSSION

School eye screening is the best procedure for early detection of visual disability and various ocular disorders to take timely intervention for prevention and elimination these diseases. Our present study was also conducted for achieving aforesaid goal and to create awareness in the community about importance of school ocular survey for better vision and better ocular health.

In our study, 196 students (9.98%) out of 1963 students were found to have various ocular disorders. It was seen that present study has similarity with some previous studies as shown below:-

Table-10

Study	Year	Prevalence (%)
Dutta and Gupta [5]	1968	9.20
Surinder Singh *et al* [6]	1974	13.79
Kuruvilla *et al*.[7]	1978	12.50
A Panda *et al.* [8]	2002	13.92
Nepal BP *et al.* [9]	2003	11.00
Present study	2010	9.98

The present study has shown the prevalence of ocular disease to be more among boys (10.3%) than among girls (9.6%). Previous study done by Desai *et al.* [10] also found higher incidence of eye diseases among boys. The observation of Turacli ME *et al.* [11] shows similar higher incidence among males than females. This study has shown that prevalence of ocular disease is more (27%) among socioeconomic class-IV, next are 9.2% and 9.1% among class –II and class –III respectively. The higher prevalence among class-IV may be attributed to unhygienic practices, lack of health consciousness, poverty and ignorance.

Among all ocular morbidities (9.98%) the refractive error (4.8%) was observed to be commonest ocular disorder. To support our observation it was found that Auzemery A. *et al.* [12], Turacli ME *et al.* [11], F. Ngounou *et al.* [13], Murthy GV *et al.* [14] and Nepal BP *et al.* [9] reported refractor error to be highest among the ocular diseases in school children. Present study showed that prevalence of refractive error was higher among among boys (5%) than in Girls (4.7%). This finding is supported by Surrinder Singh *et al.* [6] who found 2.77% of boys and 1.10% of girls to have refractive error. Desai *et al.* (1977) [10] also found higher prevalence among boys (1.46%) than in girls (1.36%). Among different types of refractive error, myopia was detected to be commonest (41.66%) refractive error in our study. Previous studies such as Nepal BP *et al.* [9], Tejas *et al.* [15], Mamatkhuzhwva GN [16] also reported myopia to be commonest refractive error among school children. It was also observed in the present study that myopia was almost equal in boys (21) and girls (19). Kaliki Vayi *et al.* [17] also noticed similar picture of prevalence of myopia among boys and girls.

In respect of conjunctivitis, 30 students (1.52%) out of 1963 were suffering from this ailment in our study. The following previous studies showed lower prevalence of conjunctivitis as shown below:-

Table-11

Study	Year	Prevalence (%)
A. Panda *et al*. [3]	1985	0.22
Susane H. Wedner *et al*. [17]	1998	0.36
Murthy GV *et al*. [14]	2001	0.73
Dr. Gupta M. *et al*. [18]	2006-07	0.80
Dr. Anu Jindal *et al*. [19]	2002	1.24
Present study	2010	1.52

Our observation was somewhat in conformity with the observations by Anu Jindal *et al*. [10] with 1.24% and Dambhare DG *et al*. [20] with 1.72%. Present study showed that out of 30 cases of conjunctivitis, 12 were boys and 18 were girls. This is similar to some previous studies. Desai *et al*. [10] observed higher prevalence among girls (13.58%) than boys (9.73%). Khurana *et al*. [21] in Rohtak city and Surinder Singh *et al*. [6] also observed similar results. Present study showed that incidence of allergic conjunctivitis (60%) is higher than mucopurulent conjunctivitis (40%). In previous studies, Kuruvilla *et al*. [7] observed higher prevalence of allergic conjunctivitis in which out of 378 cases, 298 cases were allergic conjunctivitis and 80 cases were mucupurulent conjunctivitis.

Concerning corneal opacity, in our study its prevalence was 0.81% (16 students). Of these 10 students gave history of trauma and 6 students had painful red eye. The result of the present study is comparable to prevalence reported by Khurana *et al*.

[21] i.e. 0.80% and that reported by Panda *et al.* [22] i.e. 0.81%. In the study of Anu Jindal *et al.* [19] out of 13 cases, 10 gave history of trauma and 3 had painful red eye.

As regards diseases of lid, prevalence of chalazion was 0.5% in our study which is similar to 0.40% prevalence of chalazion as reported by R. Kothari [23] in Jaipur city. We found incidence of blepharitis to be 0.45%, which is comparable to the incidence of 0.61% as observed by Surinder Singh *et al.*

[6]. The prevalence of hordeolum i.e. 0.3% in the present study is higher than that of Surinder Singh *et al.* [6] with 0.01% only.

Going into the cases of muscular imbalance, its prevalence in our study was found to be 0.76%. Previous studies tabled below observed that some studies showed higher prevalence while others observed lower prevalence of muscular imbalance among school children

Table-12

Study	Year	Prevalence (%)
Crane *et al.* [24]	1949	4.40
Desai *et al.* [10]	1977	2.67
Dr. Gupta M *et al.* [18]	2006	2.50
Auzmery A *et al.* [12]	1995	0.37
Sussane H. Wedner *et al.* [17]	1998	0.51
Present study	2010	0.76

Our present study also showed that convergence insufficiency was the commonest type of muscular imbalance i.e. 60% followed by Heterophoria (26.70%) and Heterotropia (13.30%).

Among the miscellaneous group in our study, colour blindness was seen in 0.15% which was lower than the previous study of Anu Jindal *et al.* [19] where it was 2.02%. The incidence of amblyopia which was 0.1% in the present study is lower than the previous study done by Auzmery A *et al.* [12], Turacli ME *et al.* [11] and other. Present study showed 2 cases of congenital ptosis (0.1%) and 1 case of microcornea with coloboma (0.05%). Previous studies showed a higher prevalence of congenital anomalies done by Desai *et al.* [10] with 2, 86%, Khurana *et al.* [21] with 0.65%, Sussane H. Wedner *et al.* [17] with 1.44%.

CONCLUSION

The present study demonstrated that 9.98% of school attending children suffered from ocular disorders in which boys (10.30%) were more affected than girls (9.60%). Prevalence of diseases was observed to be highest (27.40%) among socio economic class –IV. Refractive Error ranked the top position in respect of prevalence among all childhood ocular diseases and myopia was found to be the commonest error followed by hypermetropia and astigmatism. Other ocular disorders found among school children were conjunctivitis, corneal opacity, diseases of lid, muscular imbalance, colour blindness, amblyopia, microcornea and computer vision syndrome. From our study it can be concluded that it is of paramount importance to conduct regular school eye screening to detect and eliminate visual and other ocular disorders in time. School is the best and large gathering venue for children and so it is convenient to cover a large children population of the society to explore the ocular health.

Information, Education and Communication (IEC) amongst people in primary health care play pivotal role in prevention and early detection of visual and other ocular defects. School screening programs should be made mandatory. Conducting regular teacher training and orientation programs along with increasing parental awareness about ocular health can be of immense benefit. Teachers can be the bridging gap between parents and Ophthalmologist. Such regular school eye care programs would be a commendable step in marching ahead to attain the goal of vision 2020-Right to Sight for elimination of avoidable blindness by the year 2020.

REFERENCES
1. Rustagi N. Indian Journal Ophthalmol. 2012;60:203-6
2. British Journal of Visual Impairment. 2015. 33(1), 45-53.
3. National Policies and Legislations Related to Health, National Health Program of India, 8th edition by J. Kishor's, P-417
4. School Eye Screening and National Programme for control of Blindness by R. Jose and Sandeep Sachdeva, Indian Paediatrics, Vol-46, March-17, 2009: P. 205-208
5. Dutta SP and Gupta SP. Health status of school boys in Urban Pondicherry. 1968.
6. Singh S, Singh H, Joshi VS. Eye diseases among primary school children. Indian journal of ophthalmology. 1974 Sep 1;22(3):1.
7. Kuruvilla J, Rao PS. Ocular morbidity in school children in rural coastal area of Karnataka. Indian journal of ophthalmology. 1978 Apr 1;26(2):9.
8. A Panda. Childhood blindness and school health survey in Nepal; ATOS Proceedings. 2002; 578-79
9. Nepal BP, Koirala S, Adhikary S, Sharma AK. Ocular morbidity in schoolchildren in Kathmandu.

British journal of ophthalmology. 2003 May 1;87(5):531-4.

10. Desai NC, Chouhan BS, Qureshi MS, Sharma SR. Eye diseases in primary school children in Jodhpur. Indian journal of ophthalmology. 1977 Jan 1;25(1):11.

11. Turacli ME, Aktan SG, Dürük K. Ophthalmic screening of school children in Ankara. European journal of ophthalmology. 1995 Jul;5(3):181-6.

12. Auzemery A, Andriamanamihaja R, Boisier P. A survey of the prevalence and causes of eye disorders in primary school children in Antananarivo. Sante (Montrouge, France). 1995;5(3):163-6.

13. F. Ngounou. Survey of eye disease in primary school children in South West of Cameroon: 97th DOG Annual meeting. 1999.

14. Murthy GV, Gupta SK, Ellwein LB, Munoz SR, Pokharel GP, Sanga L, Bachani D. Refractive error in children in an urban population in New Delhi. Investigative ophthalmology & visual science. 2002 Mar 1;43(3):623-31.

15. Tejas. Primary school children Survey; Indian Ophthalmology year book. pg 363-364

16. Mamatkhuzhaeva GN. Prevalence of refractive anomalies among school children. Vestnik oftalmologii. 2002;118(1):47-9.

17. Kalikivayi V, Naduvilath TJ, Bansal AK, Dandona L. Visual impairment in school children in Southern India. Indian Journal of Ophthalmology. 1997 Jun 1;45(2):129.

18. Gupta M, Gupta BP, Chauhan A, Bhardwaj A. Ocular morbidity prevalence among school children in Shimla, Himachal, North India. Indian journal of ophthalmology. 2009 Mar;57(2):133.

19. Dr. Anu Jindal. Pattern of ocular and visual disorders in rural and urban School children of Amritsar District between age group of 4-12 years; AIOS Proceedings. 2002;575-76.

20. Dambhare DG, Bharambe MS, Mehendale AM, Garg BS. Nutritional status and morbidity among school going adolescents in Wardha, a Peri-Urban area. Online Journal of Health and Allied Sciences. 2010 Jul 30;9(2).

21. Khurana AK, Sikka KL, Parmar IP, Aggarwal SK. Ocular morbidity among school children in Rohtak City. Indian journal of public health. 1984 Oct 1;28(4):217.

22. Panda A, Angra SK. Eye diseases in school children. The Indian Journal of Pediatrics. 1985 May 1;52(3):289-91.

23. Kothari R. Ocular disorders in school; Indian Ophthalmology Today. 1993.

24. Foote FM, Scobee RG, Green EL. Screening School Children for Visual Defects. Re. port of a Study Conducted in St. Louis, Mo. 1948;1949.