A Study on Prevalance of Ocular Morbidity and Associated Factors among School Going Children between 10-15 Years of Age in Rural Community

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Abstract
Background: Vision is one of the most important special senses. They contribute greatly to one's learning capacities right from childhood. The control of blindness in children is considered a high priority within the World Health Organization -WHO VISION 2020 --The Right to Sight program. Most of the causes of blindness in children are either preventable or treatable. Corneal and lenticular conditions are the predominant causes of blindness in most of the available studies, whereas, among children outside blind schools, refractive errors are important causes of visual impairment and blindness. Vision screening in school children is an effective tool useful in detecting causes of decreased vision, especially refractive errors and in minimizing long-term visual disability. Refractive errors along with Vit. A deficiency, conjunctivitis, trachoma, ocular trauma, blepharitis, stye, color blindness and pterygium are few of the causes of ocular morbidity. School eye health services are one of the important aspects of health services in which children can be screened for diseases such as refractive error, squint amblyopia, trachoma etc. This study was conducted to assess the prevalence and pattern of visual impairment amongst school children and to recognize the avoidable causes of ocular morbidity
Aim: To Estimate the Prevalence of Ocular Morbidity among school going children in rural population.
Material And Methods: Schools in and around rural areas of Kuppam are selected. We have randomly selected 13 schools within Kuppam rural area, and all the students in the age groups of 10 to 15 years present on the day of examination in that school were examined. Snellen's chart in both English and Telugu was used for estimation of visual acuity. Retinoscopy and subjective correction were done in 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 torchlight 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. Color vision examination was done using Ishihara's pseudo isochromatic color plates. Dilated fundus examination was done using a direct ophthalmoscope.
Results: Total 2000 students were examined, 1063 students were female (53.2%), and 937 were males (46.8%). The age of the students ranged from 10 years to 15 years. Our research shows that ocular morbidity is prevalent in 45.65% of this population. The refractive error is 33.8% (myopia 31.4% and hypermetropia 2.4%). 28 children (1.4%) have eye lid pathology. 128 children (6.4%) have conjunctival pathology. 36 children (1.3%) had abnormalities of the cornea and sclera. 11 (0.55%) children had cataract. Twenty one percent of the children screened had squint, and 23 (1.2%) had retinal abnormalities.
Conclusion: Causes of childhood blindness vary according to the region and socioeconomic development. Early detection, Parent education, Routine examination, Appropriate treatment, Parent co-operation and adequate follow-up are important in improving the prognosis of pediatric patients. A comprehensive approach is therefore needed for the prevention and treatment of blindness and low vision
Key words: school going children, ocular morbidity, preventable causes, screening,rural area.

I.   Introduction

Vision is one of the most important special senses. They contribute greatly to one's learning capacities right from childhood. Ocular morbidities cause learning disabilities in children, which could further affect their personality, quality of life and overall socioeconomic status throughout life.

The control of blindness in children is considered a high priority within the World Health Organization -WHO VISION 2020 --The Right to Sight program. Most of the causes of blindness in children are either preventable or treatable. Premature birth, measles, congenital rubella syndrome, vitamin A deficiency, and meningitis are few of the causes of childhood mortality associated with blindness.[1]

India has an estimated 320,000 blind children. Estimated National Prevalence of Childhood Blindness/Low Vision is 0.80/1000 in India.[2]Corneal and lenticular conditions are the predominant causes of blindness in most of the available studies, whereas, among children outside blind schools, refractive errors are important causes of visual impairment and blindness.[3]

Children do not complain of defective vision and may not even be aware of their problem. This necessitates early detection and treatment to prevent permanent disability. Vision screening in school children is an effective tool useful in detecting causes of decreased vision, especially refractive errors and in minimizing long-term visual disability[4]. Refractive errors along with Vit. A deficiency, conjunctivitis, trachoma, ocular trauma, blepharitis, stye, colour blindness and pterygium are few of the causes of ocular morbidity. In India's 30% of blind lose their sight before the age of 20 years. The early detection and treatment of ocular morbidity and visual impairment in young children is self-evident[5]. Nutritional factors and infections are leading causes in developing countries, whereas the consequences of prematurity, hereditary factors and developmental abnormalities are more frequent causes in countries with better standards of living and health care services.

School eye health services are one of the important aspects of health services in which children can be screened for diseases such as refractive error, squint amblyopia, trachoma etc. The aim of this study was to assess the prevalence and pattern of visual impairment amongst school children and to recognize the avoidable causes of ocular morbidity.

II.   Materials And Methods

Source of data: Schools in and around rural areas of Kuppam are selected. We have randomly selected 13 schools within Kuppam rural area, and all the students in the age groups of 10 to 15 years present on the day of examination in that school were examined.

Study Design: Survey-based Cross-Sectional Study

Study period: 18 months from January 2020 to June 2021

Sample size: Based on the prevalence of ocular morbidity among school-going children as 27.65% from Maharashtra study by Deshpande Jayant D, Malathi K.13 By applying the formula n = 4pq/l2. Whereas n = sample size p = 27.65 q = 100-p = 72.35 l = allowable error = 10% of p = 2.765 By substituting values n = 1046.65 After adding a probable non -response rate of 10%, n = 1152 However, it is decided to take a sample of 2000 for the study

Inclusion criteria: All children of 10-15 years of age in selected schools in rural population of Kuppam whose parents/guardians giving informed consent

Exclusion criteria: 1. Children whose parents/guardians not giving consent.
2.Mentally disabled children.
3.Absentees on the day of screening.

Sampling method: Simple Random Sampling

Materials used for examination:
• Snellen's chart.
• Retinoscope.
• Jaeger's chart for near vision.
• Ishihara pseudoisochromatic plates for colour vision.
• Trial set.
• Torch and Loupe for Anterior segment evaluation.
• Direct Ophthalmoscope for Fundus evaluation.
• Occluder.

III.   Methodology

Snellen's chart in both English and Telugu was used for estimation of visual acuity.Retinoscopy and subjective correction were done in 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 torchlight and

magnifying loupe. Visual axis and extra ocularmovements were checked. Presence of any tropia or phoria was evaluated by doingHirschberg corneal light reflex test, cover test and alternate cover test using an occluder.Colour vision examination was doneusing Ishihara's pseudo isochromatic colour plates.Dilated fundus examination was done using a directophthalmoscope.

Statistical analysis:

Data was entered into Microsoft Excel datasheet and was analysed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test was used as a test of significance for qualitative data. Continuous data was represented as mean and standard deviation-value of <0.05 was considered as statistically significantafter assuming all the rules of statistical tests

IV.   Results

TABLE1: AGEDISTRIBUTION OF CHILDREN

		Count	%
Age	10	306	15.30%
	11	244	12.20%
	12	408	20.40%
	13	342	17.10%
	14	379	19.00%
	15	321	16.00%
	Total	2000	100.00%

In this study majority of subjects were in the age group 12 years (20.4%), 19% were in the age group 14 years and others as shown in above table.
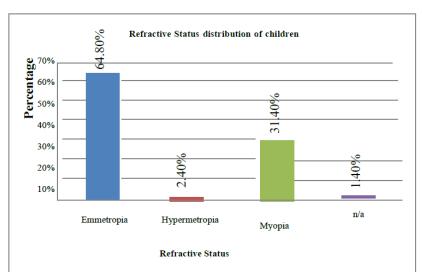
TABLE2: SEXDISTRIBUTION OF CHILDREN

		Count	%
Sex	Female	1063	53.20%
	Male	937	46.80%
	Total	2000	100.00%

In the study 53.2% were females and 46.8%weremales.

TABLE 3:REFRACTIVESTATUS OF CHILDREN

		Count	%
Refractive Status	Emmetropia	1296	64.80%
	Hypermetropia	49	2.40%
	Myopia	628	31.40%
	N/A	27	1.40%
	Total	2000	100.00%

In the study Prevalence of Myopia was 31.4% and Hypermetropia was 2.4%.

GRAPH 1: BAR DIAGRAM SHOWING REFRACTIVE STATUS DISTRIBUTION OF CHILDREN

TABLE4: ASTIGMATISM DISTRIBUTION OF CHILDREN

		Count	%
Astigmatism	Nil	1798	89.90%
	Irregular Astigmatism	58	2.90%
	Regular Astigmatism	144	7.20%
	Total	2000	100.00%

In the study 7.2% had regular and 2.9% had irregular astigmatism.

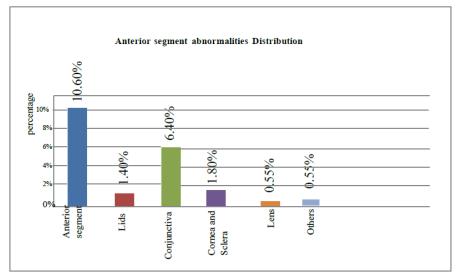**TABLE 5: ASSOCIATION BETWEEN REFRACTIVE STATUS AND SOCIO DEMOGRAPHIC FACTORS**

		Refractive status								P value
		Emmetropia		Hypermetropia		Myopia		n/a		
		Count	%	Count	%	Count	%	Count	%	
Age	10	209	68.3%	5	1.6%	86	28.1%	6	2.0%	0.264
	11	175	71.7%	5	2.0%	62	25.4%	2	0.8%	
	12	261	64.0%	10	2.5%	134	32.8%	3	0.7%	
	13	226	66.1%	7	2.0%	102	29.8%	7	2.0%	
	14	233	61.5%	12	3.2%	129	34.0%	5	1.3%	
	15	192	59.8%	10	3.1%	115	35.8%	4	1.2%	
Sex	Female	645	60.7%	33	3.1%	368	34.6%	17	1.6%	<0.001*
	Male	651	69.5%	16	1.7%	260	27.7%	10	1.1%	
B.G.Prasad Classification	1	54	35.1%	4	2.6%	95	61.7%	1	0.6%	<0.001*
	2	406	68.0%	15	2.5%	169	28.3%	7	1.2%	
	3	423	66.1%	14	2.2%	193	30.2%	10	1.6%	
	4	368	69.3%	11	2.1%	144	27.1%	8	1.5%	
	5	45	57.7%	5	6.4%	27	34.6%	1	1.3%	

In the study the Gender and Socio-economic status was significantly associated with refractive error. i.e. Refractive error was high among females compared to males and refractive error was high in class 5 Socio economic classification.

TABLE 6: ANTERIORSEGMENT ABNORMALITIES

	Abnormal		Normal	
	Count	%	Count	%
Anterior Segment	213	10.60%	1787	89.40%
Lids	28	1.40%	1972	98.60%
Conjunctiva	128	6.40%	1872	93.60%
Cornea and Sclera	36	1.80%	1964	98.20%
Lens	11	0.55%	1989	99.45.%
Others	11	0.55%	1989	99.45%

In the study 10.6% abnormal anterior segment, 1.4% had abnormal findings of lids, 6.4% had conjunctival abnormalities, 1.8% had cornea and sclera, 0.55% had lens abnormalities.

GRAPH 2: BAR DIAGRAM SHOWING ANTERIOR SEGMENT ABNORMALITIES DISTRIBUTION

TABLE7:FUNDUS(POSTERIOR SEGMENT)DISTRIBUTION

		Count	%
	Abnormal	23	1.20%
Fundus (Posteriorsegment)	Normal	1977	98.80%

Inthestudy1.2% had abnormal fundus (Posteriorsegment).

TABLE 8: LIDSEXAMINATIONFINDINGSDISTRIBUTION

		Count	%
	Normal	1972	98.6%
	Acute Dacrocystitis	3	0.2%
	Chalazion	3	0.2%
	Cicatricial Ectropion	1	0.0%
	External Hordeolum	3	0.2%
	Internal Hordeolum	3	0.2%
Lids	Meibomitis	2	0.1%
	Molluscum Contagiosum	1	0.0%
	Pseudo Ptosis	3	0.2%
	Ptosis	3	0.2%
	Squamous Blepharitis	6	0.3%

TABLE 9: CONJUNCTIVA EXAMINATION FINDINGS DISTRIBUTION

		Count	%
	Normal	1872	93.6%
	Bitot Spots	21	1.0%
	Concretions	1	0.0%
	Conjunctival Cyst	3	0.2%
	Conjunctival Dermoid	1	0.0%
	Conjunctivitis	13	0.6%
Conjunctiva	Dry Eye	1	0.0%
	Nevus	1	0.0%
	Viral Conjunctivitis	2	0.1%
	VKC	69	3.4%
	Xerosis	16	0.8%

TABLE 10: CORNEA AND SCLERA EXAMINATION FINDINGS DISTRIBUTION

		Count	%
Cornea and Sclera	Normal	1964	98.2%
	Anophthalmia	1	0.0%
	Atrophic Bulbi	1	0.0%
	Dry Eye	1	0.0%
	Episcleritis	3	0.2%
	Keratoconus	5	0.2%
	Keratoconus - Post PKP	2	0.1%
	Keratoglobus	1	0.0%
	Leucoma	2	0.1%
	Macula	5	0.2%
	Micro cornea	2	0.1%
	Microphthalmos	1	0.0%
	Nebula	10	0.5%
	PBK	2	0.1%

TABLE 11: LENS EXAMINATION FINDINGS DISTRIBUTION

		Count	%
Lens	Cataract	11	0.55%
	Normal	1989	99.45%

TABLE 12: FUNDUS EXAMINATION FINDINGS DISTRIBUTION

		Count	%
Fundus	Normal	1977	98.8%
	Albin Fundus	1	0.0%
	Atrophic Bulbi	1	0.0%
	Bergmeister Papilla	1	0.0%
	Coloboma	4	0.2%
	Healed Choroiditis	1	0.0%
	MacularScar	1	0.0%
	Not Visualised	5	0.2%
	Optic Atrophy	1	0.0%
	OpticNerve Hypoplasia	1	0.0%
	Pathological Myopia	4	0.2%
	Retinal Detachment	2	0.1%
	Retinitis Pigmentosa	1	0.0%

V.   Discussion

Demographic data:

A cross-sectional study was conducted among school childrenat selected government and private schools in Rural areas of Kuppam, over a period of one and a half years, to measure the prevalence of ocular morbidity among school children in the age group 10 to 15 years.

Total 2000 students were examined, 1063 students were female (53.2%), and 937 were males (46.8%). The age of the students ranged from 10 years to 15 years.

Prevalence of ocular morbidity:

According to our study, the prevalence of ocular morbidity was 45.65%.

This is similar to the study conducted by Prasanna Kamath et al[18] in Karnataka. This study reported the prevalence of ocular morbidity of 44.7% among school children of 6- 16 years of age.

Harpal Singh[7] in Bhopal, Singh V[8] in West Uttar Pradesh, Sharma A[9] in Uttarakhand reported prevalence of ocular morbidity to be 14.5%, 29.35% and 4.92% respectively. Prevalence was found to be less than the present study, maybe due to a difference in socioeconomic status, ethnicity and methodology. Few studies conducted in India, 2-3 decades back, have reported a high prevalence of ocular morbidity. According to a study conducted by Desai NC[10] in Jodhpur, the prevalence of ocular morbidity was 92.8%. One more study by Prathap VB[11] in 1989 reported prevalence of heritable disease as 41.49% and nonheritable disease as 58.51% in North India. High ocular morbidity was because of high prevalence of trachoma.

TABLE 13: PREVALENCE OF OCULAR MORBIDITY IN VARIOUS STUDIES

SiNo	Study	Agegroup	Study type	Prevalence(%)
1	Madhu Gupta[6]	6-16years	School based	31.6
2	DeshpandeJ[12]	10-16years	School based	27.6
3	Rajesh Kumar[13]	5-14years	School based	24.6
4	Harpal Singh[7]	5-16years	School based	14.5
5	Niti Talsania[14]	0-15years	Community based	21.2
6	AjaiyeibaAI[15]	4-24years	School based	15.5
7	NepalBP[16]	5-16years	School based	11
8	GuptaN[17]	6-16years	School based	30.4
9	Prasanna Kamathetal[18]	6-15years	School based	44.7
10	SinghV[8]	6-15years	School based	29.35
11	Present study	10-15years	School based	44.65

The difference in prevalence across various studies could be due to the definition of ocular morbidity, the age of the children included in the study, the setting of the study-school or community based and the year when the study was conducted.

Visual Acuity:

A Child with visual acuity equal to 6/12 or less in one or both eyes was considered abnormal, and those children were followed up. Prevalence of abnormal visual acuity ($\leq$ 6/12) was 0.6%. Similar findings were observed by GVS Murthy36 in Delhi. 0.1 % of children had severe visual impairment ($\leq$ 6/60), which is comparable to the study by Kuruvilla and colleague19 in coastal Karnataka.

Refractive error:

Refractive errors were the major cause of decreased vision in the present study with Myopia (31.45%) was the most common form of refractive error encountered followed by (2.4%) Hypermetropia and (10.1%) astigmatism. The findings were comparable to other studies by Nazia Uzma[19] in India, Vivek Trivedi[20] in Gujarat, Mohammad Khajal[14] in Qazvin city, BP Nepal[16] in Nepal, Syaratul-Emma Hashim[21] in Malaysia, Solange R Salomao[22] in Brazil, and Pi LH[23] in China.Prevalence of Hypermetropia showed an increasing trend with increasing age and was highest among 15 years old children (3.1%). Prevalence of myopia was highest among 15 years old (34.6%). Prevalence of astigmatism was almost constant throughout all age groups.

TABLE 14: PREVALENCE OF REFRACTIVE ERRORS

Study	Prevalence
Present study	33.8%
Gupta etal[6]	22%
Prasanna Kamath[18]	5.6%
Jayabiswas[24]	23.67%
SinghV[8]	17.36%
SharmaA[9]	2.77%
Kumaretal[13]	6.22%

Vitamin Adeficiency:

In the present study Prevalence of vitaminA deficiency was found to be Bitot spots (1%) and conjunctival xerosis (0.8%). It was lower when compared to the study done by V. Singh et al.[8] in 2004 in Asia and was about

2.6%.The reason behind the decline in vitamin A deficiency can be attributed to long term projects about childhood nutrition.

Eyelid abnormalities:
Eye lid pathology was found in total 28 children (1.4%).Among the 28 children with lid abnormalities, acute dacrocystitis was seen in 3(0.2%) , chalazion in 3(0.2%), squamous blepharitis in 6(0.3%), ptosis was seen in 3 (0.2%),pseudo ptosis in 3(0.2%), external and internal hordeolum was seen in 3 children each(0.2%), and molluscum contagiosum in 1 child.
Deshpande Jayant D[12] in Maharashtra reported prevalence of blepharitis - 0.96% Chalazion -2.90% Stye - 1.74%, Ptosis -0.58%. Rajesh kumar[13] in Delhi reported prevalence of stye-1.3%, blepharitis-1.0%. Sanjiv Desai[25] in Jodhpur reported prevalence as, blepharitis 1.6%, chalazion 0.25%, stye 0.21%.
Marginal differences in prevalence may be due to a difference in socioeconomicstatus, nutritional status, personal hygiene and seasonal variation of diseases.

Conjunctival abnormalities:
Conjunctival pathology was found in total 128 children (6.4%), majority of them being Vernal kerato-conjunctivitis seen in 69 (3.4%) children followed by Bitot spots in 21(1.0%), Xerosis in 16(0.8%), Allergic conjunctivitis in 13(0.6%), conjunctival cyst in 3(0.2%), viral conjunctivitis in 2(0.1%), nevus and conjunctival dermoid in 1 child each.

TABLE 15:PREVALENCE OF CONJUNCTIVAL PATHOLOGYIN VARIOUSSTUDIES

SN	Study	Prevalence
1	Present Study	6.4%
2	DesaiNC[10]	11.3%
3	SanjivDesai[25]	5.0%
4	MadhuGupta[6]	0.8%
5	RajeshKumar[13]	4.6%
6	GuptaY[26]	15.45%
7	NitiTalsania[14]	3.3%
8	PiLH[23]	11.76%

Corneal abnormalities:
In the present study, 26 (1.3%) children had a history of ocular trauma. Corneal opacities due to trauma and other abnormalities resulting in nebular grade opacity were found in 10 (0.5%), macular opacity in 5 (0.2%) and leucomatous opacity in 2 (0.1%) children. Iridodialysis was seen in 2 (0.1%) children, traumatic mydriasis in 1 child, traumatic aphakia in 1 child, dislocated IOL in 1 child. As much of these corneal opacities are not in the visual axis, the children vision was not much deteriorated. Congenital Microphthalmos with Microcornea was seen in 2 (0.1%) children. Keratoconus was seen in 5 (0.2%) children and Keratoglobus in 1 child. Penetrating keratoplasty was done in 2 children from a private school.

Cataract:
In the present study, 11 children presented with cataract. 7 children with cataract were already operated, and among them 1 child presented with posterior capsular opacification and 1 child with a dislocated intraocular lens. In a study done by Singh et al.[7] in 2011, Jaya Biswas[24] and Lalit Dandona[27] childhood cataract was found to be 3.58%,16.49% and 15.3% respectively. As the access to the health care is very limited to children in a rural area, it is important for health programs to increase the awareness regarding the cataract surgery and postoperative care and need for further ophthalmic examinations.

Retinal abnormalities:
Retinal abnormalities were found in 1.2% of the children screened .4 children with choroidal coloboma were seen, 3 of them had an associated disc coloboma along with iris coloboma. Pathological myopic fundus was seen in 4(0.2%) children, Retinal detachment was detected in 2(0.1%) children, Retinitis pigmentosa in 1 child.
Macular scar, Optic nerve Hypoplasia, Optic atrophy, albinic fundus, Bergmeister papilla, and healed choroiditis were presented in 1 child each.
These children with severe visual impairment require specialized care in diagnosing and rehabilitation. They would require low vision aids which are not readily available in a rural setup. Proper rehabilitation is required to improve the quality of life

TABLE16:PREVALENCE OF RETINAL ABNORMALITIES

Study	prevalence
Present study	1.2%
SharmaA[9]	0.06%
Jaya Biswas,etal[24]	4.12%
Lalit Dandona[27]	19.3%

Squint:
In the present study, 20 (1%) children had squint, of which 8(0.4%) children had esotropia, 10(0.5%) had exotropia, and 2(0.1%) had hypertropia. Nystagmus was noticed in 12 (0.6%) children. Medial rectus palsy was seen in 1 child.

In the present study, Amblyopia was present in 18(0.9%) children. It was higher compared to study done by Singh et al.[7] (0.49%) and Singh. V, et al.[8] (0.41%) but lower to the study done by Lalit Dandona[27](2.8%). Regular follow up and prompt spectacle change as the child grows is very important to avoid Amblyopia.

Proptosis was seen in 2 children, among which one child had pulsatile proptosis. Artificial eye was noticed in 1 child.

Congenital eye abnormalities were noted in 10 children. These included 4 children with coloboma,2 with microcornea and microphthalmos, 3 with retinal abnormality and one with anophthalmia.

TABLE17:PREVALENCEOFSQUINT

Study	Prevalence
Present study	1%
Gupta, et al[26]	2.5%
Prasanna Kamath, et al[18]	0.7%
Jaya Biswas et al[24]	6.19%

Risk factors for ocular morbidities:
In the present study, a higher incidence of preventable or treatable causes of ocular morbidity was identified. These include Refractive errors, Conjunctivitis, Ocular trauma, cataract, lid abnormalities like ptosis, entropion and corneal abnormalities. Gender and Socioeconomic status were significantly associated with refractive error i.e. Refractive error was high among females compared to males, and refractive e rror was high in class 5 Socioeconomic classification. Prevalence of anterior segment abnormalities and conjunctival abnormalities was significantly high in government school.

VI.   Conclusion

Childhood blindness results in 11.2 million blind-person years resulting in longer disability-adjusted life year (DALY) loss as compared to 5.5 million blind person- years of glaucoma in India. Therefore, childhood blindness was given at most priority in Vision 2020 – Right to sight initiative. Causes of childhood blindness vary according to the region and socioeconomic development. A large number of children suffer from refractive errors which have socioeconomic consequences. Screening programmes incorporating the provision of glasses for children with refractive error are a simple and effective means of eliminating this problem. Xerophthalmia can be eliminated by simple primary health care measures, for e.g. vitamin A supplementation, maternal and child health care.

Educating the schoolteachers in the common modes of eye injuries and how to prevent them will go a long way in avoiding this preventable cause of childhood blindness. 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.Early detection, Parent education, Routine examination, Appropriate treatment and adequate follow-up are important in improving the prognosis of paediatric patients. A comprehensive approach is therefore needed for the prevention and treatment of blindness and low vision. This include providing low-vision aid services for children with low vision. School health programmes play an important role in primary care and should be promoted for the diagnosis and management of common conditions, to promote a healthy environment, and to educate children in looking after their eyes as part of the normal school curriculum.

References

[1]. WHO Disease control and prevention of visual impairment. In: Vision 2020 Global initiative for the elimination of avoidable blindness: Action plan 2006-2011.Waddell A, Heseltine E (eds). Geneva, Switzerland, WHO press. 2007:9-3.
[2]. Jose R. Present status of the national programme for control of blindness in India. J Community Eye Heal J Indian. 2008;21:103-4.
[3]. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD10)-World Health Organization Version 2016; ChapterVII-H54.
[4]. Vision screening in school children. Training module. Danish Assistance to the National Programme for Control of Blindness. New Delhi, India.
[5]. Prajapati P, Oza J, Prajapati J, Kedia G, Chudasama RK. Prevalence of ocular morbidity among school adolescents of Gandhinagar district, Gujarat. Online J Health Allied Sci. 2010;9:5.
[6]. Gupta M, Gupta BP, Chauhan A, Bhardwaj A. Ocular morbidity prevalence among school children in Shimla, Himachal, North India. Indian J Ophthalmol 2009;57:133-8.
[7]. Singh H, Saini VK, Yadav A, Soni B. Refractive Errors in School Going Children– Data from a School Screening Survey Programme. Natl J Community Med 2013; 4(1): 137- 40.
[8]. Singh V, Malik K, Malik V K, Jain K. Prevalence of ocular morbidity in school going children in West Uttar Pradesh. Indian J Ophthalmol 2017;65:500-8.
[9]. Sharma A, Maitreya A, Semwal J, Bahadur H. Ocular morbidity among school children in Uttarakhand: Himalayan state of India. Ann Trop Med Public Health 2017;10:149-53.
[10]. Desai NC, Chouhan BS, qureshi MS, Sharma SR. eye diseases in primary school children in Jodhpur. Indian Journal Ophthalmology.1977;25(1):11-12.
[11]. Prathap VB, Lal HB. Pattern of pediatrics ocular problems in north India. Indian Journal of Ophthalmology.1989;37(4):171-172.
[12]. Deshpande Jayant D, Malathi K : Prevalence of ocular morbidities among school children in rural area of North Maharashtra in India. National Journal Of Community Medicine Vol. 2 Issue 2, July- sept 2011.
[13]. Kumar R, Dabas P, Mehra M, Ingle G K, Saha R and Kamalesh. Ocular morbidity among primary school children in Delhi. Health and Population-Perspective and Issues.2007;30(3): 222-229.
[14]. Talsania N, Shah A, Nayak H, Prajapati V. A cross-sectional study of ocular morbidity in urban slums non-schooling children of Ahmedabad City, Gujarat.National Journal of Integrated Research in Medicine.2012 April-June; 3(2): 119-124.
[15]. Ajaiyeoba AI, Isawumi MA, Adeoye OA, Oluleye TS. Pattern of eye diseases and visual impairment among students in southwestern Nigeria. Int Ophthalmol. 2007; 27:287–292.
[16]. Nepal BP, Koirala S, Adhikary S, Sharma AK. Ocular morbidity in school children in Kathmandu. British Journal of Ophthalmology. 2003;87:531–534.
[17]. Gupta N, Arya SK, Walia D, Mallik A, Sood S. Ocular morbidity among school- going children in the Union Territory of Chandigarh. Int Ophthalmol. 2013 Jul 16.
[18]. T prasanna kamath, B & Guruprasad, BS & Kiran, Deepthi & Muninarayana, Chandrappa. (2012). Prevalence of ocular morbidity among school going children (6-15 years) in rural area of Karnataka, South India. International Journal of Pharmaceutical and Biomedical Research. 3. 209-212.
[19]. Umnaz N, Kumar BS, Salar BM, Zafar MA,Reddy VD . A comparative clinical survey of the prevalence of refractive error and eye diseases in urban and rural school children. Canadian Journal of Ophthalmology. 2009;44(3):328-333.
[20]. Trivedi V, Zalawadiya S, Bhatt V J et al. Prevalence of refractive error in children (age group 7-15 years) of rural and urban area of Gujarath. http://openmed.nic.in/1933/01/bhatt.
[21]. Hashim ES, Tan HK, Hazabbah WH, Ibrahim M. Prevalence of refractive error in Malay primary school children in suburban area of Kota Bharu, Kelantan, Malaysia. Annals Academic Medicine Singapore. 2008;37(11):940-6.
[22]. Salomão SR, Mitsuhiro MR, Belfort Jr R. Visual impairment and blindness: an overview of prevalence and causes in Brazil. An Acad Bras Cienc. 2009 Sep;81(3):539-49.
[23]. Pi LH, Chen L, Liu Q, Ke N, Fang J, Zhang S, Xiao J, Ye WJ, Xiong Y, Shi H, Yin ZQ. Refractive status and prevalence of refractive errors in suburban school-age children. Int J Med Sci. 2010 Oct 18;7(6):342-53.
[24]. Biswas J, Saha I, Das D, Bandyopadhyay S, Ray B, Biswas G. Ocular morbidity among children at a tertiary eye care hospital in Kolkata, West Bengal. Indian J Public Health 2012;56:293-6.
[25]. Desai S, Desai R, Desai NC et al. school health appraisal. Indian Journal of Ophthalmology. 1989;37(4):173-175.
[26]. Gupta Y, Sukul RR, Gupta M, Phougat A Jain R, Varshney A.School eye survey in rural population in UP, India. Nepal Journal of Ophthalmology.2011;3(5):78-79.
[27]. Dandona L, Dandona R, Srinivas M, et al. Blindness in the Indian state of Andhra Pradesh. Invest Ophthalmol Vis Sci2001;42:908–16.