

Original Research Article

## Prevalence of Ocular Morbidities in Three to Five Years Pre-School Children Residing At Burdwan Municipality

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### ABSTRACT

**Introduction:** Children are the most valuable resources of our Nation. Eyes are the most valuable sense organ of human being. In pre-school age many unnoticed ocular morbidities causes severe ocular disabilities, affecting children's performance in the school and in later life.

**Objective:** To estimate the prevalence of ocular morbidities amongst preschool children (3 to 5 years of age) in Burdwan Municipality, Burdwan, and West Bengal, India.

**Materials and Methods:** A cross sectional prospective study was carried out from March, 2012 to February, 2013 among 400 preschool children (3 to 5 years) in a Randomized Control Trial Sampling method of Government and Private schools at Burdwan Municipality. All the Preschool (3 to 5 years) Children of Burdwan Municipality were included in this study. Children below 3 & above 5 years of age & Children Studying in these schools but Residing outside Burdwan Municipality were excluded in this study. Mean age was 4.12yrs±2S.D.

This Research was conducted under the Institutional Ethical Committee, Approval & conformed to the Tenets of the Declaration of Helsinki.

**Data analysis:** - Statistical Analysis was done by Epi Info Software version-3.5.3. Fisher exact 2-tailed test was applied.  $P \leq 0.05$  was considered Statistical Significance.

The screening was done at the school & further examinations were carried out at the Ophthalmology out Patient Department of Burdwan Medical College & Hospital.

**Results:** Among 400 children of defined age group 212 (53%) were male & 188 (47%) were female (M: F = 1.13: 1) with the Mean age of 4.12 years. Among them ocular morbidities were seen in 39 students (9.75%). Twenty four students (6%) had refractive error. Allergic conjunctivitis and lids & adnexal disorders was prevalent in 12 (3%) & 02 (0.5%) children. One (0.25%) student was suffering from other ocular morbidity.

**Conclusion:** A blindness prevention approach should be followed from childhood in the school eye-screening programme. Majority of the ocular diseases in children are either preventable or treatable but if undiagnosed then may progress and affect the children's performance in the school and later life. A high prevalence of ocular morbidity among preschool children was observed among which Refractive error was the most common.

**Key words:** Ocular morbidities, preschool children, blindness, Refractive error.

### INTRODUCTION

Pre-school age is initial period when most of the children experience

different visual problems and if unnoticed may cause several ocular disabilities including children's performance in the

school. Seventy five percent of all school age children are school-going. [1] Refractive error is most common problems in school children and second leading cause of treatable blindness. [2] Children neither complain nor aware of their problem of defective vision. They adjust to the poor eye sight by sitting near the blackboard, holding the books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration. This warrants early detection and treatment to prevent permanent disability. [3]

Publications in different scientific literatures show that the prevalence of ocular morbidities amongst 0-15 years ranges from as low as 0.1/1000 in western countries in comparison to 1.1/1000 in the developing nations. [4] So, school students should be taught to practice the principles of good posture, proper lighting, avoidance of glare, proper distance and angle between the books and the eyes. Discovery of visual impairments as early as possible is essential to prevent social, physical and psychological damage to the child. [5] But there are very little publications on the ocular morbidities among pre-school children especially from Eastern part of India.

So, this study was conducted to estimate the prevalence of ocular morbidities amongst pre-school children (3 to 5 years of age) in Burdwan

Municipality, Burdwan, one major city in southern part of West Bengal, Eastern India,

## MATERIALS AND METHODS

The present cross-sectional prospective study was carried out among the pre-school children of Government and private schools at Burdwan Municipality from March, 2012 to February, 2013. History and Complete ocular examination data was obtained in a pre-designed pre tested proforma after taking proper consent from the parents.

## RESULTS

Among the 400 co-operative preschool children males were predominant, more between 4-5 years.

**Table-1: Distribution of study group according to age and sex**

Age (Yrs)	Male No (%)	Female No (%)	Total No (%)
3 - <4	67 (16.75)	66 (16.5)	133 (33.25)
4 - 5	145 (36.25)	122 (30.5)	267 (66.75)
Total	212 (53)	188 (47)	400 (100)

Ocular morbidities were seen in 39 children

**Table-2: Sex predilection for ocular morbidities**

Ocular Morbidities	Male No (%)	Female No (%)	Total No (%)
Present	21(5.25)	18(4.5)	39(9.75)
Absent	191(47.75)	170(42.5)	361(90.25)
Total	212 (53)	188 (47)	400 (100)

**Table-3: Age distribution of study group**

Ocular Morbidities	Present	Absent	Total
Age (Yrs)	No (%)	No (%)	No (%)
3 - < 4	08 (2)	125 (31.25)	133 (33.25)
4 - 5	31 (7.75)	236 (59)	267 (66.75)
Total	39 (9.75)	361 (90.25)	400 (100)

**Table-4: Distribution of cases according to the types of ocular morbidities**

Major site of diseases	OD	OS	Prevalence Number (%)
1.Refractive error			24 (6)
Myopia	20	20	20
Hypermetropia	04	04	04
2. Anomalies of Cornea & conjunctiva			12 (3)
Allergic conjunctivitis	12	12	
3.Disorders of lids & adnexa			02 (0.5)
Blepharitis	01	01	
Chalazion	01	00	
4.Any other ocular morbidity			01 (0.25)
Horizontal Nystagmus	01	01	
Total	39	38	39 (9.75)

Total prevalence of ocular morbidities among study group was 9.75%. Most common ocular morbidity was Refractive error (6%) followed by Allergic kerato-conjunctivitis (3%).

**Table-5: Distribution of Refractive error cases in relation with involved eyes (n=24)**

Refractive Error	Both eyes affected No (%)	Single eye affected children No (%)	Total children affected No (%)
Myopia	16 (66.66)	04 (16.67)	20 (83.33)
Hypermetropia	04 (16.67)	00 (0)	04 (16.67)
Total	20 (83)	04 (16.67)	24 (100)

**Table-6: Distribution of Refractive errors according to age (n=24)**

Ages	Myopia No. (%)	Hypermetropia No. (%)	Total No. (%)
3 years to <4 years	03 (12.5)	04 (16.7)	07 (29.2)
4 years to 5 years	17 (70.8)	00 (0)	17 (70.8)
Total	20 (83.3)	04 (16.7)	24 (100)

So, refractive error was the most common type of ocular morbidity, where Myopia (83.33%) was commonest. Between 4-5 years aged children myopia (70.8%) was more predominant. Hypermetropia was seen mainly in 3 to <4 years age. Myopia: Hypermetropia ratio was 5:1

➤ **Diagnostic criteria:** - [6]

Myopia- if refractive error was worse than - 0.5 DSph.

Hypermetropia – if refractive error was worse than + 0.5 DSph.

Astigmatism - if refractive error was worse than + 0.5 DCyl.

**First stage (Examination done at the schools):-** Visual acuity- (unaided & pinhole) by Snellen’s E-chart, evaluation of strabismus, colour vision, Vitamin-A deficiency disorders, screening for conjunctivitis, chalazion, blepharitis, nystagmus, congenital cataract, corneal opacities were done.

**Second stage (Examination done at Burdwan Medical College):** Cycloplegic refraction & dilated fundus examination were done in required cases.

**Table-7 Distribution of Refractive errors according to sex (n=24)**

Sex	Myopia No. (%)	Hypermetropia No. (%)	Total No. (%)
Male	11 (45.8)	03 (12.5)	14 (58.3)
Female	09 (37.5)	01 (4.2)	10 (41.7)
Total	20 (83.3)	04 (16.7)	24 (100)

Myopia was more common in male children.

**Table-8: Distribution of Allergic kerato-conjunctivitis cases in relation to socioeconomic status (n=400)**

	Present No. (%)	Absent No. (%)	Total No. (%)
Grade III	4 (1)	364 (91)	368 (92)
Grade IV	8 (2)	24 (6)	32 (8)
Total	12 (3)	388 (97)	400 (100)

Based on Modified Kuppuswamy’s Socio-economic status scale (2012) [7]

**Table-9: Distribution of allergic kerato-conjunctivitis cases in relation to the type of schools (n=400)**

	Present No. (%)	Absent No. (%)	Total No. (%)
Government	07 (1.75)	208 (52)	215 (53.75)
Private	05 (1.25)	180 (45)	185 (46.25)
Total	12 (3)	388(97)	400 (100)

Allergic kerato-conjunctivitis was more common in children belonging to the Government schools.

## DISCUSSION

Prevention is better than cure is properly applicable for the ocular morbidities among preschool children where priorities should be given to control permanent disabilities like corneal scarring, cataract, retinopathy of prematurity, refractive errors and low vision. [8] In developing countries, 30-72% blindness is avoidable, 9-58% is preventable, and 14-31% is treatable. [9] In this cross sectional study among the 400 pre-school children (3 to 5 years of age) with the mean age of 4.12 years 212 (53%) were male and 188 (47%) were female and majority (92%) of the students belonged to Middle/ Lower Middle Class as per Modified (2012) Kuppuswamy’s Socioeconomic Scale. [7]

Among 212 males and 188 females only 21 (9.9%) and 18 (9.6%) children had ocular morbidities respectively. So, there was no sex preponderance for overall prevalence of ocular morbidity. [10] In this study 4 to 5 years aged (79.5%) children were affected more commonly than 3 to <4 years (20.5%). The prevalence of ocular morbidities were 9.75 % (6% Refractive Error, 3% Allergic conjunctivitis, 0.5% with Lid and Adnexal disorder and 0.25% other Morbidities). This corroborates with different investigators in the scientific literatures. [10-18]

Refractive Error (6%) was the major cause of ocular morbidities more among the males (58.3%). 4 to 5 years age group children (70.8%) suffered more than 3 to <4 years (29.2%). Desai S et al (n=5135) reported the prevalence of

Refractive error among 4 to 16 years school children was 20.8%, more among the males and the highest in the 4 to 6 years of age group 25.6%.<sup>[19]</sup> Prevalence of refractive error in our study was supported by others.<sup>[10,11,15,20-25]</sup> These differences may be explained by the different diagnostic criteria, the racial or ethnic variations, different age groups and different sample size in different studies. Twenty (83.33%) children were myopic and 4 (16.67%) were hypermetropic (Myopia: Hypermetropia =5:1) with mean age 4.6 years and 3.5 years respectively. Majority (70.8%) myopes were in their 4-5 years of age and hypermetropes (16.7%) were in 3 to <4 years age. So, myopia was common among relatively older children.<sup>[10, 21, 26-29]</sup>

Only 12 (3%) student were suffering from Allergic keratoconjunctivitis of which 4 (1%) belonged to Grade-III and 8(2%) belonged to Grade-IV Modified (2012) Kuppuswamy's Socioeconomic status scale.<sup>[7]</sup> Our observation was supported by different scientific articles.<sup>[30, 31]</sup> But, Biswas J et al and Gupta Y et al have shown higher prevalence of allergic conjunctivitis (17.23% and 15.45 % respectively) among children.<sup>[32, 25]</sup> Variation in results may be explained by difference in socioeconomic status, personal hygiene and seasonal and geographic variations. Our study area seems to have dust and coal particles suspended in air from coal mines of Asansol, Dhanbad, Ranigange and Durgapur industrial belts. Rice husking mills of Burdwan Municipality and surrounding areas also pours suspended particles in air that acts as allergen for the eyes. This may explain why allergic keratoconjunctivitis was found as second most common ocular morbidities.

Only two (0.5%) students suffered from lid and adnexal disorders (Chalazion, Blepharitis) and one student (0.25%) suffered from horizontal nystagmus. This was supported by studies by Desai S et al

<sup>[19]</sup> Murthy GV et al. <sup>[33]</sup> Vitamin A deficiency was not seen in any students probably due to good vitamin A prophylaxis coverages.

The limitations of our study were study period and sample size. A larger study group with a longer study period may yield better outcome. Secondly, a comparative study among different age groups of children would be more fruitful.

## CONCLUSION

Children are asset of the nation. Most of the ocular diseases observed in our study were either preventable or treatable but if neglected may lead to severe disabilities or blindness. As the burden of blindness is already high in our country so we have to go through a blindness prevention approach, beginning right from the early childhood and school eye-screening programme should be an integral part of it. This study has revealed some significant childhood ocular morbidities like Refractive Errors, Allergic eye diseases, Lid and adnexal disorders which will help to strengthen the Childhood Blindness Control Programme by incorporating the screening of pre-school age children (3-5 yrs). Periodical screening of the child by ophthalmologists with the active involvement of parents, school teachers will help to reduce the childhood ocular morbidity burden in the society.

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