A Cross-Sectional Study of Ocular Morbidity in Urban Slums Non-schooling Children of Ahmedabad City, Gujarat

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Abstracts: Background: Data on eye diseases among non-schooling children is very rare. Considering the fact those 19 million visually impaired children, 12 million children are due to refractive errors while 1.4 million are irreversibly blind for the rest of their lives. Early detection and treatment of ocular morbidity among children is important. Objective: To estimate the prevalence of ocular morbidity among urban-slums, non-schooling children of age 0-15 years. Methods: A cross sectional community based study was carried out in five slum areas of urban health training center, Asarwa, adopted by Dept. of Community Medicine to cover non-schooling children of below 15 years of age, from November 2010 to December 2010. Information was collected on a pretested semi structured proforma. An ophthalmologist from Regional Institute of Ophthalmology (RIO) did visual acuity and detailed ophthalmic examination. Data was analyzed with appropriate statistical tests like simple proportions and chi-square (x^2) test. Result: Total 391 (14.2%) children in urban –slums community, who were not going to school, were included. Prevalence of ocular morbidity was 21.2%, Trachoma 4.9%, vitamin A deficiency 3.6 %, conjunctivitis 3.3%, refractive errors 3.3% squint 2.5% & color blindness 1.0%. Overall prevalence of ocular morbidity in government hospital and non-schoolings did not show any statistical significant difference. Conclusion: A high prevalence of ocular morbidity among non-schooling children was observed. School health services should be further expanded as child health check-up for the benefit of non-schooling children as well. [Talsania N et al NJIRM 2012; 3(2) : 119-124]

Key words: prevalence, ocular morbidity, non-schooling children, urban slums

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Introduction: Eyesight is the most important source of information about one's environment and hence is the vital developmental significance. Childhood blindness has profound consequences not only for individual child, but also for the family & community. Visual impairment is a worldwide problem that has a significant socioeconomic impact. Data on the prevalence and causes of blindness and severe visual impairment in children is needed for planning and evaluating preventive, curative, special education and low vision services for children. Considering the fact those 19 million visually impaired children, 12 million children are due to refractive errors while 1.4 million are irreversibly blind for the rest of their lives[1]. Among the blind, there are 320,000 children under the age of 16 who are blind, which constitutes 1/5 of the world's blind children. It is estimated that fifty percent of these children could be cured if the adequate facilities and staff were available [2]. So, the importance of early detection and treatment of ocular disease and visual impairment among young children is obvious.

Seventy-five per cent of all school age children are school-going children[3]. The dropouts mostly belong to families with low socioeconomic status; relatively limited education and economic necessity results in children working to support the family[3, 4]. Most previous studies were done on school going children. Since a significant proportion of children from urban slums do not attend school, so this study was conducted to identify the burden of ocular morbidity among 'non-schooling' children. So, the Study was conducted to provide the baseline data on major causes of ocular morbidity among the non-schooling children, to identify the avoidable causes, treating the morbidity, and to refer them at Regional Institute of Ophthalmology (RIO), Ahmedabad and to describe variation by socio-Demographic profile.

Material and Methods: The present cross-sectional, community - based study was conducted amongst

non-schooling children from Very low Socio-economic strata, who reside in urban slum areas of Ahmedabad city. It was conducted in November 2010- December 2010 during which School Health Check up program was also running in the city. A joint teamwork was done by the Department of Community Medicine and the Dept. of Ophthalmology of Medical College, including experts from departments, M.S.W. and ophthalmic assistant.

Referring to earlier studies, none of the research studies conducted among non-schooling children from the community. The prevalence of ocular morbidity was found to be 40.65 % in primary school children of rural Delhi [5]. Based on this, the required Sample size, as calculated by the formula: 4PQ/L2 works out to be 150. Where P = 40 Percent (prevalence), Q = (100-P) =60 per cent, L= 20 per cent of P (Allowable error). So, minimum 150 children should be included for measuring the prevalence. We have surveyed the entire non-schooling children from the community field areas of our institute and excluded the school going children as they have already been covered under school health program.

All the study subjects were interviewed, clinically examined with torch-light and ophthalmoscope by an ophthalmologist. A pre tested proforma was filled up with a view to collect information on socio-demographic profile. Home visit was also made to complete the information whenever required. Standard procedures and case definitions were used to diagnose various eye diseases[6-8]. The ocular findings were assessed and reconfirmed by an ophthalmologist's team through a detailed eye examination and Vision testing, eye movements, Cover test (deviation), refraction, fixation patterns, undilated fundoscopy etc. Vision was tested using Snellen's Chart (E type) or LEA symbols. Examination of children less than five years of age was by observation, clinical light reflex and E chart. In cases of poor visual acuity (<6/9), a pinhole vision was tested to differentiate refractive errors from posterior chamber pathology Dilated ophthalmoscopic examination was not performed in the community- setting, as it required pupil dilatation.

Latent squint was diagnosed by cover-uncover test. Whenever in doubt, the Ophthalmologist confirmed the provisional diagnosis. ICD-10 codes have been used in the classification of diseases. All the cases were given appropriate treatment and referred to the affiliated tertiary care hospital for further management. Spectacles were provided to for correction of refractive errors. Data were collected, compiled; analyzed and appropriate statistical tests like simple proportions and chi-square (x^2) test were applied using Epi Info 6.

Result: Table 1 shows Families registered in five adopted urban field practices areas under Urban Health Training Center, Ahmedabad. Out of 2913 (23.4%) under 15 years population in the areas, 391 (13.4%) non-schooling in urban slums were surveyed for ocular morbidity examination.

Table 1: Area – wise distribution of families surveyed

Area	No. Of Families	Total Population	<15 population (%)	<15 Surveyed (%)
Kalapinagar (1)	502	2649	615 (21.1)	86 (14.0)
Parameswar Park na chapra, Ghoda Camp	501	2447	600 (20.6)	63 (10.5)
Khodidas ni chali, Asarwa	504	2344	560 (19.2)	76 (13.6)
Gajanand and Shantipura	500	2360	510 (17.5)	97 (19.0)
Ranchodpura	500	2643	628 (21.6)	69 (11.0)
Total	2507	12,443	2913 (100) (23.4)	391 (13.4)

Table 2 reveal that out of 1493 males, 215 (14.4%) were undergone Ophthalmic examination and out of 1420 females, 176 (12.4%) were thoroughly examined. The sex ratio was 0.95:1 (Number of females per 1000 males), which was not significant (x^2=2.35, df =2, P=0.12).

The study population comprised 391(13.4%) children in the community, who were not going to school. There were 215 (54.9%) males and 176

(45.1%) females in urban slum area. The age ranged from two months to fifteen years, majority being ten years or less. The overall prevalence of ocular morbidity in urban slum, non-schooling children was 83 (21.2%). The prevalence of ocular morbidity increased with age, being minimum 14 (16.9%) in less than 5 years age group followed by 31 (37.3) in 5-10 age group, and maximum 38 (45.8%) in 10-15 years age group. This association was found to be statistically significant (X^2=18.5, df=2, p<0.0001). Out of 215 Male, 49 (22.8%) of male and 176 female, 34 (19.3%) female had ocular morbidity. The Sex ratio of persons with morbidity was 0.82:1. There was no statistically significant co-relation between sex and morbidity (X^2=0.51, df =2, p >0.05).

Table 2: Age and sex wise distribution of ocular morbidities.

Age (Yrs)	**Male Children**		**Female children**		**Total children**	**Total examined**	**0ccular morbidity Present (%)**
	Total	**examined**	**Total**	**examined**			
0-5	**551**	**56 (26.0)**	**493**	**74 (42.0)**	**1044**	**130 (33.2)**	**14 (16.9)**
5-10	**514**	**84 (39.1)**	**452**	**63 (35.8)**	**966**	**147 (37.8)**	**31 (37.3)**
10-15	**428**	**75 (34.9)**	**475**	**39 (22.2)**	**903**	**114 (29.2)**	**38 (45.8)**
Total	**1493**	**215 (100)**	**1420**	**176 (100)**	**2913**	**391 (100)**	**83 (100)**

In table 3, ICD coding was given according to morbidity. Maximum 4.9% had trachoma, followed by 3.6% of xeropthalmia. When specific ocular morbidity were analyzed with respect to age, it was found that the prevalence of conjunctivitis, trachoma, refractive errors and squint increased with age because Refractive error and squint were manifested in later age group. Xerophthalmia was the only disease in which a decreasing prevalence was observed with an increase in age. The other morbidity could not be analyzed separately because of small number of cases. A case of Congenital Glaucoma (Buphthalmos) in age one year was found & treated at Hospital. A total 15 cases with treatable causes were referred, rechecked, followed-up and treated at Regional Institute of Ophthalmology (RIO).

Out of total 83 cases detected, majority 65 (78.3%) had ocular morbidity from

Table 3: Distribution of ocular morbidity (by type) amongst study subjects

Disease	ICD Code	Urban slums (N= 391) No (%)	Sex	
			Male (49)	Female(34)
Refractive errors	H 52.7	13 (3.3)	6 (12.2)	7 (20.6)
Conjunctivitis and dacryocysti	H 10.9	11 (3.3)	8 (16.3)	3 (8.8)
Trachoma	A 71.9	19 (4.9)	14 (28.6)	5 (14.7
Xerophthalmia	H 19.8	14 (3.6)	7 (14.3)	7 (20.6
Stye	H 00.0	4 (1.0)	2 (4.1)	2
Blepharitis	H 01.0	5 (1.3)	3(6.1)	2(5.9)
Colour blindness	H 53.5	4 (1.0)	3(6.1)	1 (2.9)
Chalazion	H 00.1	3 (0.8)	2(4.1)	1 (2.9)
Latent-Squint Manifest-	H 50.9	4(1.00) 6(1.5)	2(4.1) 2(4.1)	2 (5.9) 4(11.
Total		83(100)	49 (100)	34 (100)

avoidable causes while 18 (21.7%) had serious non avoidable illness like colour blindness, corneal opacity and they didn't aware about their status.

Table 4:Religion-wise distribution of ocular morbidity among study subjects

Religion	Ocular morbidity		Total
	Present	Absent	
Hindu	73 (20.1)	290(78.9)	363(92.8)
Others*	10 (35.7)	18(64.3)	28(7.2)
Total	83(21.2)	308(78.8)	391(100)

*Others include 28 Muslims and one Christian

Table 5: Age& Sex wise comparison of ocular morbidity by Hospital-based and community-based. (Present-Study)

Age group	M & J Hospital-based			Community –based N=83		
	Male	Female	Total	Male	Female	Total
0-5	29 (20.1)	14 (7.7)	43 (13.24)	10 (20.4)	04 (11.8)	14 (16.9)
5-10	34 (23.6)	65 (35.9)	99 (30.46)	14 (28.6)	17 (50.0)	31 (37.3)
10-15	81 (56.3)	102 (56.4)	183 (56.30)	25 (51.0)	13 (38.2)	38 (45.8)
Total	144 (100)	181 (100)	325 (100)	49 (100)	34 (100)	83 (100)

*figures in parenthesis show percentage.

Table 4 reveals that the prevalence of ocular morbidity was 20.1% in Hindu subjects as compared to 41.66% in subjects of other religion; the difference was statistically not Significant (X^2=2.91, df = 1, P >0.05).

Comparison of present community based study with the data of referred cases at Regional Institute of Ophthalmology was

showing similar trend in age & sex with morbidity and there was not any statistically significant difference found between both of them (X^2=2.96, P>0.05) (Table-5).

Discussion:

Current study confirms the high prevalence of overall ocular morbidity among non-schooling children in urban slums of Ahmedabad city and highlights the urgent need to implement community based, cost-effective strategies and appropriate eye care programs targeting non-schooling children to reduce the burden of visual impairment among the younger population.

Population-based data concerning prevalence of ocular morbidity among children are not readily available for India. The prevalence of ocular morbidity of 21.2% among school children of age 0-15 years in this study is less than a study conducted in Shimla, where prevalence was reported to be 31.6% in the 6-16 years of age group[9]. While it is more than the study conducted in Maharashtra where prevalence was reported to be 9.84%in 5-15 year age group[10]. Higher prevalence of ocular morbidity has been reported from neighbouring states like Haryana (58.8% in 4-18 years) and Rajasthan (71.7% in 4-16 years) and also from Hyderabad in South India (43.5% in 3-16 years) [11–13]. It was because of the higher prevalence of trachoma and conjunctivitis found in these two northern states and of refractive errors found in South India. We also found higher prevalence of trachoma and conjunctivitis than refractive error; this might be due to illiteracy, poor personal hygiene, poverty and poor environment and sanitation in urban slums[14]. Moreover, the range of age groups covered in the above-mentioned studies was also less as compared to the present study.

Marginal difference in the prevalence of ocular diseases between males and females in the present study is comparable to results of the study by Madhu et al [9], in Shimla (males 32.5% and females 30.6%). However, Khurana et al. reported higher prevalence in females (73.5%) as compared to males (49.4%) in Haryana[11]. In their study, the prevalence of infectious diseases like trachoma, conjunctivitis and blepharitis was high among females because of increased use of common ocular cosmetic material.

Prevalence of vitamin A deficiency was found to be same between males and females in this study contrary to the results of other studies[12, 15]. This difference was more appreciable with prevalence of night blindness. However, being subjective, the symptom of night blindness cannot be relied upon completely. Vitamin A deficiency up to an extent of 0.8-5.4% 0 to 16 years has been reported from west Bengal and Rajasthan [12, 15] respectively as compared to 3.6% in the present study. Since this study was done in the urban slums, where children belonged to low socioeconomic status and had poor nutritional status, prevalence of vitamin A deficiency was high.

The overall prevalence of uncorrected refractive error has been reported of 5.46% in the urban areas of Maharashtra[10]. Similar prevalence of refractive errors has been observed among children of 12-17 years in Ahmedabad city[16]. From South India, higher

(32%) prevalence rate of refractive errors among school children of age 3-18 years was reported[13]. Higher prevalence of refractive errors in the younger (5-10 years) age group could be because of high prevalence of age-related hypermetropia in young children as is also observed from other studies in North India[12, 16]. 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.

Colour blindness is a sex-linked disease hence it was found to be higher amongst males in this study. Similar prevalence of colour blindness has been observed in Comparable results (2.9% in 4-16 years) have also been reported from Rajasthan[12]. However, lower prevalence of colour vision defects (0.11%) has been reported by Pratap et al., from North India[17].

Prevalence of squint as reported by Pratap et al., of 2.8% of primary squint and that of paralytic squint as 0.42%, is comparable with the results of the present study[17]. 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 and West Bengal[5,11,12] Studies done abroad also revealed lower prevalence of squint (0.5%) by Wedner et al., among children of 7-19 years in Tanzania, Africa[18]. The findings of present community based study was compared with the hospital (RIO) records of ocular morbidity, it showed similar age and sex distribution of child patients. Limitation of the study was ophthalmoscopic examination could not be done in the community- setting, as it required pupil dilatation. More-ever study is conducted only in the field areas of UHTC, so it doesn't reflect the picture of all the slums of Ahmedabad city, which may have more ocular morbidity because the field areas are regularly surveyed & health camps organized by our institute and easy accessibility of tertiary center.

Conclusion: In a developing nation like India 50 to 60% of the blindness in children is preventable, through a combination of education and access to proper medical care. Nutritional causes of blindness are preventable through proper diet and education. Exophthalmia can be prevented by Vitamin A supplementation and measles vaccination. Blindness due to trachoma can be prevented by SAFE strategies. Blindness due to glaucoma can be prevented through early detection and appropriate treatment. Blindness caused by infection disease can be reduced through public health measures.

The results of the study strongly suggest that screening of non-schooling children for ocular problems should be done at regular intervals and it should be included as one of the components of the school Health Program. For this, Urban Health workers should be oriented and trained in identifying common eye problems among the children so that these children can be referred for prompt treatment. They should also impart awareness regarding ocular hygiene among children. In this manner the incidence of preventable causes of blindness among the children will be truly minimized.

Person having untreatable blindness require reorganization of their habits and re-education to allow them to do everyday tasks in different ways. Visual aids text-reading software's and Braille books are available together with many simple/complex devices to provide functional improvement for the individual with untreatable blindness or very low vision.

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