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Ocular Morbidity among Tribal School Children in Siliguri Sub-Division of Darjeeling District: A Cross-Sectional Study

Authors
Dr Rupanjli Lakra[1], Dr Malabika Debbarma[1], Dr Louis Tirkey[2]
[1]Assistant Professor, Department of Ophthalmology, North Bengal Medical College, West Bengal
[2]Assistant Professor, Community Medicine, North Bengal Medical College, West Bengal
Corresponding Author
Dr Louis Tirkey
Assistant Professor, Community Medicine, North Bengal Medical College & Hospital
P.O. Sushrutnagar, West Bengal, India, Pin: 734012
Email: *louistirkey@gmail.com*, Mobile: 9434234599

Abstract
Introduction: *Vision is the most important special sense in human being. Normal vision is essential for normal physical, mental, psychological development and education. Early detection and treatment of ocular morbidity is an easy way to improve child health and development.*
Objectives: *To estimate the prevalence of ocular morbidity among Tribal school children aged 5 – 15 years and socio-demographic factors related to it.*
Materials and Methods: *A school-based observational study with cross-sectional design was adopted to examine Tribal school children aged 5–15 years in randomly selected rural schools of Phansidewa & Naxalbari blocks of Siliguri sub-division in Darjeeling district from April - July 2018 with a sample size of 180. Interpretation and analysis of the data was done using IBM SPSS version 20.*
Results: *A total of 180 Tribal students 86(47.8%) males and 94(52.2%) females were examined. The overall Prevalence of ocular morbidity was high (51.7%). Allergic conjunctivitis (38.7%) was the major cause of ocular morbidity followed by Vitamin A deficiency (33.4 %) and refractive error (23.7%).*
Conclusion: *Data on ocular morbidity among Tribal school children is not readily available. Our study is one of the few studies to be conducted among the Tribal school children in rural area. A high prevalence of ocular morbidity among Tribal school children was observed. Since most of this morbidity is either preventable or treatable, school screening in tribal area forms an effective method to reduce this load.*
Keywords: *Tribal, School children, Ocular morbidity, Conjunctivitis, Refractive error.*

Introduction

Vision is the most important special sense in human being. Normal vision is essential for normal physical, mental, psychological development and education. Early detection and treatment of ocular morbidity is an easy way to improve child health and development.

Mostly ocular morbidity originates in childhood and if undetected may result in severe ocular disabilities, in addition to affecting development, educational performance.[1] Children in the school-going age group (6-16 years) represent 25% of the population in the developing countries.[2]

There are an estimated 1.4 million blind children worldwide, 73% of whom live in low-income countries.[3] An additional 7 million suffer from low vision, and another 10 million children have a correctable refractive error causing visual impairment, Visual acuity of <6/18).[4] Estimated National Prevalence of Childhood Blindness/Low Vision is 0.80/1000 in India.[5] In children of age range 5–15 years, the visual impairment is 6.4%, with refractive errors as the major cause.[6]

The control of blindness in children is considered a high priority within the "WHO's Vision 2020 - The Right to Sight Programme."[7] Many conditions associated with blindness lead to childhood mortality; hence, control of blindness in children is closely linked to child survival.[8] A national survey on blindness 2001-02 showed that 7% of children aged 10-14 years have problems with their eye sight. A study conducted in the West Uttar Pradesh, it was found that the prevalence of ocular morbidity among school going children was 29.35%.[9]

Considering the fact that 30% of India's blind lose their sight before the age of 20 years, the importance of early detection and treatment of ocular morbidity and visual impairment in young children is obvious.[10] Data on ocular morbidity among Tribal school children is not readily available. So, as an important public health topic, the present study was conducted (i) to estimate the prevalence of ocular morbidity among Tribal school children in Siliguri sub-division of Darjeeling district and (ii) to study the socio-demographic factors responsible for the causes of ocular morbidity in the Tribal school children.

Materials and Methods

This study was a school-based, observational study with cross-sectional study design carried out in 6 schools of Phansidewa & Naxalbari Community Blocks of Siliguri sub-division, Darjeeling district in West Bengal, among 180 tribal school children belonging to the age group of 5 - 15 years from April 2018 to July 2018. Siliguri sub-division is situated at the foothills of the Himalayas. Tribal population of Phansidewa & Naxalbari blocks constitute with 30.6% and 19.6% of the total population of blocks respectively (census 2011). Economy is mainly based on Tea garden & agriculture. Major religion is Hindu; languages spoken are Hindi, Bengali and Sadri.

Sample size was calculated using formula for determination of sample size for estimating proportions, where:

Sample size (N)= $Z^2 PQ/d^2$ with a prevalence of 29.35%,[9] and 95% Confidence Interval, Absolute error of 5% and adding 10% non-respondents, we got a minimum sample size of 180.

Multistage random sampling technique was used. In the first stage, all the schools in Phansidewa & Naxalbari blocks of Siliguri sub-division were enlisted; 6 schools out of them were selected randomly. In the next stage, all the tribal children aged 5 – 15 years group of the respective schools were enlisted and 30 tribal children from each school were randomly selected.

Data Collection

The Headmasters of the selected schools were informed about the study and permission for the visit to the selected schools was sought personally. The Headmasters of the selected schools informed the parents of the students regarding the study and permission was taken and dates for examinations were fixed. The data collection instrument was a pretested semi-structured questionnaire. It was pretested in randomly selected tribal school children which was not included in the study. Queries from children were asked in Hindi language, while information was filled in English language by the principal investigator. Examinations were done in the respective school campuses in clean, quiet and well-lit rooms. Only children present on the day of examinations were examined. Visual acuity (unaided) was assessed by using Snellen's chart, colour blindness was checked by using Ishihara's chart and torch examination of the eye was done. Visual acuity was measured using the Snellen's Visual acuity chart at 6 meter. Children with

Visual acuity <6/9 underwent a pinhole vision to differentiate refractive errors from pathological conditions. Refractive error was diagnosed when a Visual acuity worse than 6/9 improved on pinhole test. Anterior segment examination including lids, lacrimal sac, conjunctiva, cornea, pupil, iris and lens were done using a torch light. A detailed anterior segment examination was done and children needing further assessment and management were referred to a higher centre.

Data Analysis

Collected data was checked for consistency and entered in Microsoft-Excel 2007 data sheet and it was analyzed by IBM Statistical Package for Social Sciences (SPSS) version 20. It was organized and presented using the principles of descriptive statistics. All analysis was done with the test of significance (*P* value, *chi*-square).

Result

A total of 180 tribal students between aged 5 – 15 years were studied. Mean age of the study participants was 8.257 ± 2.230 years. In the present study 94 (52.2 %) were females and 86 (47.8%) were males, 73 (40.6%) were in 8 – 10 years age group followed by 70 (38.9%) were in age group 5 – 7 years, majority 155 (86.1%) were Hindu followed by 25 (13.9%) were Christian, 97 (53.9%) of respondents' father were illiterate and maximum 168 (93.3%) of participants' father were tea garden labourer [Table 1].

Overall Prevalence of ocular morbidity among tribal school children of age 5-15 years was 51.7% [Table 2].

The commonest presenting symptoms were diminished vision (33.3%), followed by night blindness (26.9%) and itching of eye (25.8%) [Figure1].

Allergic conjunctivitis constitute (38.7%) the major cause of ocular morbidity followed by Refractive errors (23.7%), Bitot's spot (18.3%), Conjunctival Xerosis (9.7%), Corneal Xerosis (5.4%) and others (4.3%) [Figure2].

Prevalence of ocular morbidity more in the age group 8 – 10 years (22.8%), followed by 5 – 7 years age group (19.4%) and in 11 years and above (9.4%). and it was found to be not significantly different ($\chi2$=1.154, *df* = 2, *p* value=0.652). Similarly the prevalence of ocular morbidity was more among female children (30.0%) compared to male children (21.7%). However, it was found to be not significantly different ($\chi2$=2.632, *df* = 1, *p* value=0.105) [Table 5].

Table-1: Socio-Demographic characteristics of children

Characteristics	Frequency N=180	%
Age (In years)		
5 -7	70	38.9
8 – 10	73	40.6
11 & above	37	20.6
Mean = 8.257 SD = 2.230		
Gender		
Male	86	47.8
Female	94	52.2
Hindu	155	86.1
Christian	25	13.9
Education level of Father		
Illiterate	97	53.9
Primary School	71	39.4
Secondary	12	6.7
Occupation of Father		
Govt. Job	3	1.7
Private Job	9	5.0
Labourer (Tea Garden)	168	93.3

SD = Standard Deviation

Table-2: Prevalence of Ocular Morbidity

Ocular Morbidity	Frequency N=180	%
Present	93	51.7
Absent	87	48.3
Total	**180**	**100**

Table-5: Distribution of children having ocular morbidities according to age & gender

Age	Ocular Morbidity N=180		Total N (%)	
	Present N (%)	Absent N (%)		
5 – 7 yrs	35 (19.5)	35 (19.4)	70 (38.9)	χ^2 =1.154
8 -10 yrs	41 (22.8)	32 (17.8)	73 (40.6)	*df* =2
≥ 11 yrs	17 (9.4)	20 (11.1)	37 (20.5)	*p* = >0.05
Total	**93 (51.7)**	**87 (48.3)**	**180 (100)**	
Gender				
Male	39 (21.7)	47 (26.1)	86 (47.8)	χ^2=2.632
Female	54 (30.0)	40 (22.2)	94 (52.2)	*df* =1
Total	**93 (51.7)**	**87 (48.3)**	**180 (100)**	*p* = >0.05

Figure in parenthesis shows row percentage

Figure 1: Bar diagram shows distribution of children according to symptoms (N=93)

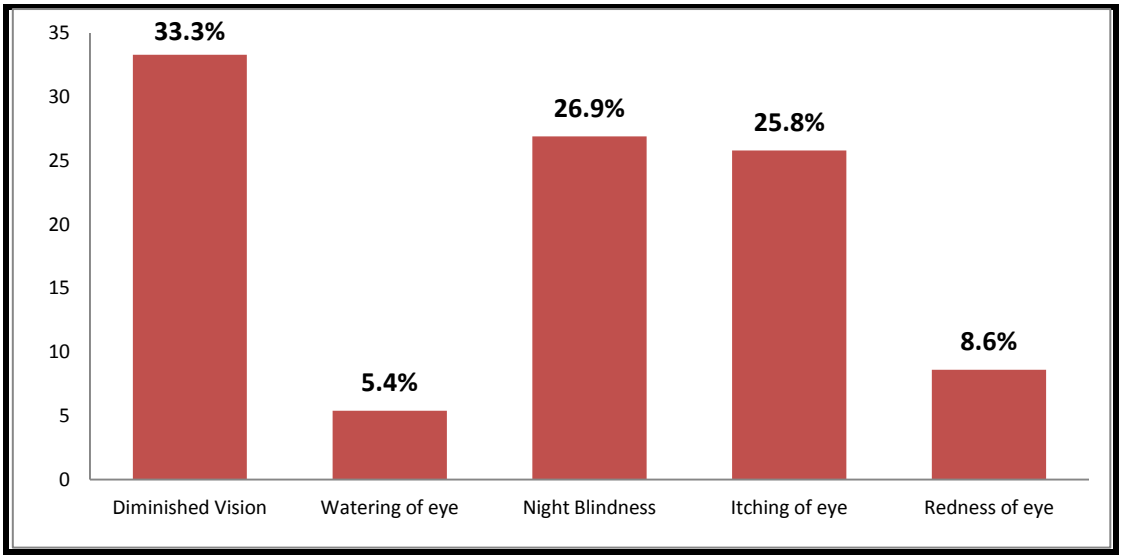
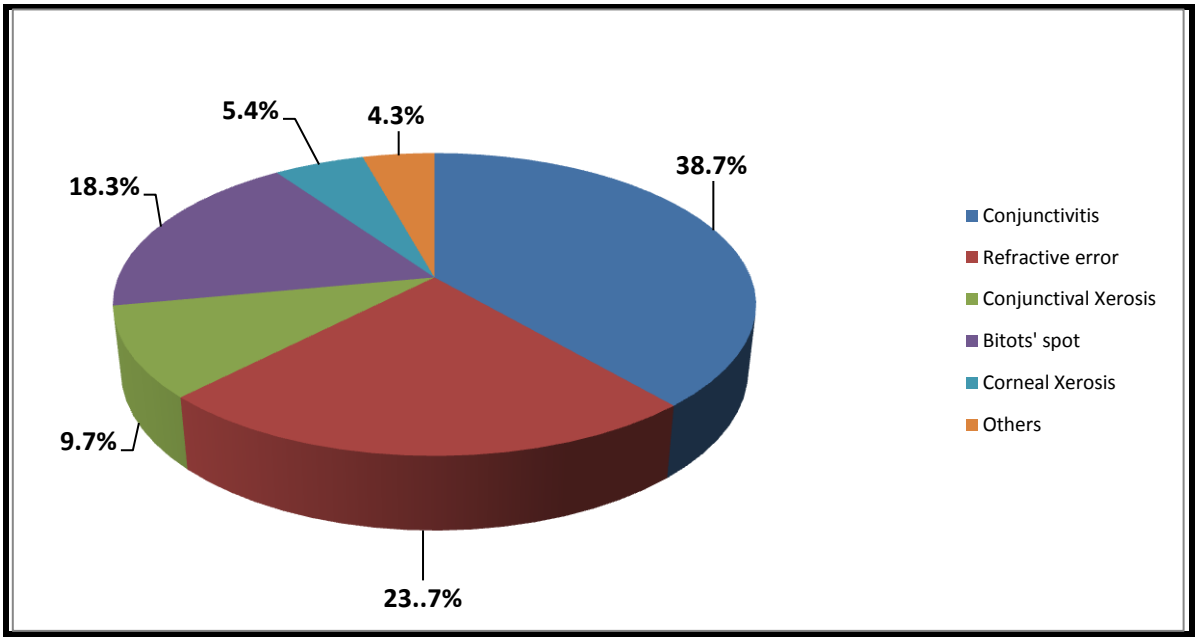


Figure 2: Pie chart shows distribution of children according to types of morbidity (N=93)



Others = Anophthalmas, Congenital cataract

Discussion

In the present study, a total of 180 Tribal school children aged 5 – 15 years group were examined. There were 86 males and 94 females. The overall Prevalence of ocular morbidity in this study was 51.7% with 21.7% in males and 30.0% in females. Similar, higher Prevalence of ocular morbidity has been reported from Haryana by Khurana *et al*[11] (58.8% in 4-18 years), from Rajasthan by Desai *et al*[12] (71.7% in 4-16 years) and from Hyderabad in South India by Kalikivayi *et al*[13] (43.5% in 3-16 years). The study conducted by Deshpande *et al*[14], prevalence of ocular morbidities among school children in rural area of North Maharashtra in India showed 27.6%. Similar study conducted by Neha *et al*[15] in rural parts of central India, found a prevalence of 30.6%. Study done by Kumar *et al*[16], ocular morbidity amongst Primary School children in Delhi, prevalence was 22.7%. Another study reported a prevalence of 26.5% among school children in north India.[17] In a study from rural area of Tanzania, Africa, lower prevalence of 15.6% of ocular morbidity was reported in children aged 7-19 years.[18] A study conducted by Naik *et al* in rural schools of Ahmednagar, Maharashtra, reported lower prevalence 10.5% of ocular morbidity among school children aged 6 – 15 years.[19] Bansal *et al* also found the lower prevalence 13.3% among children aged 5 – 16 years in Kolar District in South India.[20] Shrestha *et al* in their study in Nepal, found 19.6% prevalence of ocular morbidity.[21] A study by Ayanniyi *et al* prevalence of 19.9% ocular morbidity among primary school children in Ilorin, Nigeria.[22]

In the present study, Allergic conjunctivitis were found to be most important and accounted for 38.7% of total ocular morbidity followed by Vitamin A deficiency 33.4% which included Bitot's Spots (18.3%) and Conjunctival Xerosis (9.7%) and Corneal Xerosis (5.4%). Refractive error accounted for 23.7% of total ocular morbidity. Neha *et al* found higher refractive error which accounted for 50.5% of total ocular morbidity followed by Vitamin A deficiency which included Bitot's Spots (21.2%) and Conjunctival Xerosis (11.1%).[15] Deshpande *et al* also found that the main causes were refractory errors (36.6%), Vitamin A deficiency (25.6%) which are treatable.[14] Bansal *et al* reported higher prevalence of refractive error 89.5% followed by Conjunctivitis 5.9% and Vitamin A deficiency 5.6%.[20] Naik R *et al* found very low prevalence of refractive error and Vitamin A deficiency.[19] Kumar *et al* also found that the major morbidity was refractive errors.[16] Gupta *et al*[23], Das *et al*[24] in Kolkata and Desai *et al*[12] in Jodhpur also reported a similar prevalence of refractive errors 22%, 25.1% and 20.8%, respectively. International studies conducted by Shrestha *et al* reported a similar prevalence of refractive error 21.9%.[21] Lu *et al* also found a comparable refractive error prevalence of 11.07% in China.[25] However, low prevalence of refractive errors of 2% has been reported from Eastern India by Datta *et al* among primary school children of 5-13 years.[26]

Thus the results are relevant with other studies but Prevalence of ocular morbidity among Tribal school children is far more as compared to other studies. Hence, need of intervention is emphasized.

Strength of the study lies in the fact that early detection of treatable causes of ocular morbidity will help in child health development. Also, the fact that parents are being counselled will help in penetrating the thought better in the society.

The limitation of the study is due to the site, children were examined at rural schools hence thorough examination was not possible.

Conclusion

It was concluded that high prevalence of ocular morbidity among Tribal school children was observed in rural area of Siliguri Sub-Division. Allergic conjunctivitis, Vitamin A deficiency and refractive errors were the most common ocular disorders. Prevention, early recognition and prompt treatment of ocular diseases by regular screening of students would definitely reduce ocular morbidity, so that they can attain their full

potential in the course of their education. There is a need to educate people collectively through health facilities, media, government and non-governmental organizations with emphasis on the importance of ocular health.

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