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ORIGINAL ARTICLE

Baseline Ophthalmic Data of School Children Aged 15 Years or Younger in Leh, Jammu And Kashmir, India

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ABSTRACT

Due to extreme cold climate and its remoteness, Ladakh remains one of the least accessible parts of the India. Consequently, epidemiological data about this region is scarce.

Purpose: This study was carried out to present baseline ophthalmic data of school children aged 15 years or younger from two schools at Leh, Jammu and Kashmir, India, which is climatically situated in a high altitude cold desert.

Design: School-based cross sectional study.

Methods: Trained ophthalmic assistants performed visual acuity measurements using Snellen chart and examination of external eye with torchlight, for children aged 15 years or younger, from two selected schools with the largest student strength. Any student with visual acuity of 20/40 or below in either eyes or any other obvious abnormality, were referred to the local eye centre at the Military Hospital. At the hospital, an ophthalmologist further examined subjects. Examination by an ophthalmologist involved repeated visual acuity measurements with Snellen chart, refraction under cycloplegia with 1 % cyclopentolate eye drops, slit-lamp anterior segment examinations, and dilated fundus examinations.

Results: An ophthalmic assistant screened 843 (90.06%) of 936 children enumerated, and identified 91 (10.79%) children as requiring further clinical examination.

Refractive errors (5.69 %) were found to be the major cause for ocular morbidity in children in this region. Conjunctival inflammatory diseases are the other important cause of ocular morbidity in this population.

Conclusions: Refractive errors and conjunctival inflammatory conditions are the major ocular cause of ocular morbidity among the school children in Leh.

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Introduction

While the health problems of school children vary from one place to another, surveys carried out in India indicate that the main emphasis will fall on malnutrition, infectious diseases, diseases of eye, skin and ear and dental caries [1].

All of these problems need attention. However, eye care needs special emphasis in so far as visual impairment, and eye disorders with blinding potential need to be detected and remedied in time, as they would not only affect the learning abilities of the child, but may lead to permanent disablements.

There are an estimated 200,000 blind children in India [2-4]. Studies have reported that Refractive error is the leading cause of moderate visual impairment and the second major cause of blindness in the southern state of Andhra Pradesh. An estimated 3.7 % of this population has moderate visual impairment, and 0.3 % is blind due to refractive error [5],[6]. Another study has further pointed out that 46.69 % of the ocular morbidity is directly attributable to refractive errors [7].

To address this problem, facilities do exist to screen the children for eye disorders in developing countries under the programs initiated by the World Health Organization [6], but many areas remain out of its purview due to apathy of the local authorities or the remoteness of the areas.

Ladakh, with its headquarters at Leh, is a geographically vast region (96901 Sq. Km which includes 37555 Sq. Km under the occupation of China). It has remained outside the realm of epidemiological research in the ophthalmic field.

Ladakh region, situated at an average altitude of about 4000-5000 meters above sea level, is a vast mountainous territory, which extends from Zanskar in the south to Karakoram, Nun-Kun and Nangaparbat in the north. This region experiences extreme climatic conditions with very severe winters, with minimum temperature dipping to -30°C.The total population of the region in 2001 was 2, 25,000, with a population density of about 2 persons per square kilometers and a low sex ratio of 888 females per 1000 males. Less than 20% of the population lives in urban areas, and the overall literacy is 54%.This part of the world remains closed from the rest of the world for almost six months a year. Therefore, it is economically the least developed region of the Jammu and Kashmir state of India [8].

It is because of this reason that statistics relating to visual impairment and refractive errors from this region is practically non-existent in the literature. The people of Ladakh are a mixture of Mongoloid and Aryan races, and bear a close resemblance with the Tibetans in facial features, food habits, religion, cultural customs and social beliefs. Daily life is hard, since it is governed by deep-rooted traditional and cultural norms. Thus, the poverty, topography, extreme climatic conditions and traditional values impact the health of the people of Ladakh in one way or the other.

In this large area, access to ophthalmic care for the population is difficult, except for a couple of referral hospitals and eye camps when they are organized by government agencies including army / voluntary organizations during good weather only.
It is in this background, that a screening of school children were carried out during Mar-Apr 2004 at Leh, to obtain a base line ophthalmic data on visual disorders on children aged 15 years and below in a high altitude and extreme cold climate area of our country. To the best of our knowledge, no such data is currently available in the literature from this area.

Material and methods

A descriptive study was carried out on the data generated during the screening of school children carried out during Mar- Apr 2004 at Leh, for obtaining a base line data on refractive errors on children below 15 years of age from this high altitude region.

Two schools with largest strength, where students from all the regions of Ladakh viz., Central Ladakh (Leh valley), Suru valley, and Zanskar, Changthang and Nubra valley study, were selected for the purpose of the study.

A trained ophthalmic assistant performed visual acuity measurements and examination of the external eye with torchlight, for children aged 15 years or younger and using Snellen chart. He referred any child with ocular problem or with uncorrected visual acuity of 20/40 or worse in either eye, to the ophthalmologist. A single ophthalmologist again repeated the visual acuity measurements with Snellen chart, performed cycloplegic refraction, slit-lamp anterior segment examinations, and dilated posterior segment examinations on the referred children at our ophthalmology department.

An ophthalmic assistant examined a total 843(90.06%) of 936 children enrolled. Amongst them, 91were referred for examination by an ophthalmologist. Findings of the study are presented as results.

Enumeration and clinical data were collected using prepared data collection forms.

Prevalence of significant visual impairment (visual acuity of 20/40 or worse) was calculated for uncorrected visual acuity. Myopia was defined as spherical equivalent refractive error of at least –0.5D, and hyperopia as + 2.0D or more.

Results

Study Population

Of 936 children enrolled for examination, the ophthalmic assistant examined 843..The participation rate was (90.06%). Distribution of the examined children by age and gender is shown in [Table/Fig 1].A total of 470 males and 373 female children were examined. The M: F ratio was 1.26:1. Out of them, 91 (10.79 %) were referred for examination by an ophthalmologist.

(Table/Fig 1) Age-Sex Distribution (N=843)

	Male	Female	Total
≤ 5 years	8	8	16 (1.90%)
6-10 years	227	156	383 (45.40%)
11-15	235	209	444 (52.7%)

Visual Acuity

Patients with uncorrected visual acuity of 20/40 or worse in either eye, underwent refraction under cycloplegia. Amongst the children, 795(94.3%) had visual acuity better than 20/40 in either eye. 48(5.69 %) children had visual acuity of 20/40 or worse, at least in one of the eyes. In this group of children with subnormal visual acuity, the male /female ratio was 0.77:1(21 /27) [Table/Fig 2] gives the details of children with subnormal vision. Causes of subnormal visual acuity were refractive errors, cataract, corneal opacity, and squint.

(Table/Fig 2) Visual Impairment And Sexes

	Male	Female	Total
≥ 20/30	445	350	795 (94.3%)
≤ 20/40 one or both eyes	25	23	48 (5.69%)
Total	470(100%)	373(100%)	843(100%)

Refractive Errors

Uncorrected refractive errors constituted the most important cause of subnormal vision. Among the 48 children (5.1 % population) with visual acuity ≤ 20/40, 33 (3.91%) had refractive errors below +/- 1.0 D. 6(0.71 %) had refractive errors between +/-1.25 to +/- 3.0 D. 9 (1.06 %) children had refractive errors above +/- 3.0D.

Myopia with or without astigmatism, was found to be the commonest (35/48) form of ametropia. Myopia accounted for 4.1 % of the study population.

As regards refractive error blindness, we did not find any such case among the school children in our series.

Other Ocular Abnormalities

Among other ocular abnormalities and causes of visual impairment, amblyopia due to strabismus or refractive error was noticed in 4 cases. Corneal opacities were found in four cases. Strabismus was noticed in two cases. Mild ptosis was found in one child. Two children with pseudophakia following traumatic cataract removal were also among the cases with subnormal vision. Details of subnormal vision due to other ocular abnormalities are given in [Table/Fig 3] also.

Rest of the referred children (43) suffered from conjunctival inflammatory diseases, in particular allergic conjunctivitis.

(Table/Fig 3) Other Ocular Abnormalities

Diagnosis	Number
Corneal opacities	4
Strabismus	2
Amblyopia	4
Ptosis	1
Pseudophakia	2

Discussion

In the present study, the sample was drawn from children aged 15 years or younger from the school population of the two largest schools in Leh, Ladakh. The reason behind selecting this group, was that the school-going children are in a better position to co-operate with the vision testing using Snellen chart and ocular examination. Therefore, accuracy of the vision testing is rendered more reliable.

The overall examination participation was 90.06%, because of the children being absent from school on the day of exam for various reasons. As such, the paramedic did visit the school on two other occasions to net the left out children in the eye exam process.

Baseline presenting visual acuity of 20/40 or worse in at least one eye, was found in 48(5.69%) children. This number decreased to 25 (2.96 %), with best-corrected vision. The baseline visual acuity of 20/40 or less in the better eye in the urban population of New Delhi was found to be 4.9 %. [9] In another study by Dandona R et al. [10], baseline visual acuity of 20/40 or worse in the better eye in rural Andhra Pradesh in India was (2.6%). Our study conducted on a smaller sample in a school setting has a comparatively higher prevalence. It is evident that data obtained from school children alone, are not representative of the population at large, and therefore this is a drawback of all school-based studies. Nonetheless, our study conducted on a seemingly smaller population, does represent 0.37 % of the total population of Ladakh, that is just about 2,25,000. In addition, as the whole population below 15 years from the selected schools were studied by the ophthalmic assistant, the possibility of selection bias is unlikely.

Nonetheless, the results cannot be generalized for the population at large, for which a separate study would be desirable.

In out study population, we did not come across any cases of childhood blindness, because most of these children are taken care at the school for challenged children at ASHA clinic run by the Indian Army.

Since we did not encounter any cases of blindness, we are not in a position to comment on its prevalence or cause.

Prevalence of refractive error (5.69 %) and myopia (4.1%) are higher than those reported in the larger series from southern India [4],[5]. Therefore, prima facie there is a need for provision of eye check-up for school children in this far flung region.

In addition, there is also a need to evolve a model for cost-effective screening for ocular morbidity and delivery of eye care for school children.

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