

PREVALENCE AND PATTERN OF REFRACTIVE ERRORS IN SCHOOL GOING CHILDREN OF MANGLA CANTONMENT

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ABSTRACT

Objective: To identify the prevalence of refractive errors and their different types in school going children.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Schools located in Mangla Cantonment and Combined Military Hospital (CMH) Mangla, from May 2017 to Jun 2017.

Material and Methods: Two qualified nursing assistants were sent to two schools located in Mangla cantonment, after obtaining prior permission from school authorities. They checked distance visual acuity of all the present students of these schools. The children with impaired visual acuity were then sent to a consultant ophthalmologist at CMH Mangla who obtain detailed history regarding asthenopic symptoms, ocular diseases and of wearing glasses. Their ocular examination was carried out which included refraction and slit lamp examination. Cycloplegic refraction of children less than 8 years of age was done.

Results: A total of 2491 children were included in this study. But only 235 (9.4%) children were diagnosed to have refractive error; out of which 109 (46.4%) were males and 126 (53.6%) were females. Refractive errors were more common in children of age 10 years and above i.e. 82% as compared to children less than 10 years of age (18%). In our study, myopia was the most common (42.2%) refractive error diagnosed. In children below 10 years of age, Simple astigmatism was more prevalent (40.5%) whereas in 10 years and above age group, myopia was the commonest (46.6%). Hypermetropia constituted 8.9% of total refractive error diagnosed and it was more prevalent in 10 years and above age group (9.4%). Compound astigmatism was more prevalent in 10 years and above age group (30.5%). Simple astigmatism was 11.9% of total refractive errors and it was more prevalent in below 10 years age group (40.5%). Mixed astigmatism was also found to be more prevalent in below 10 years age group (16.7%).

Conclusion: Myopia was the commonest refractive error among school going children. However prevalence of different types of refractive errors varies between different age groups.

Keywords: Astigmatism, Hypermetropia, Myopia, Visual acuity.

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INTRODUCTION

Visual impairment and childhood blindness affects undesirably the social and educational life a particular child for the rest of his life. Prevalence of childhood blindness varies from 0.3/1000 in developed countries to 1.5/1000 in developing countries¹. Uncorrected refractive error is the commonest cause of visual impairment in children²⁻⁴. According to the World Health Organization (WHO), approximately 19 million children and adolescents 5 to 15 years of age suffer from

visual impairment, out of which, about 12.8 million cases (67%) are due to uncorrected refractive errors³. The highest prevalence is reported in urban and highly developed areas in south-east Asia and China⁵. Myopia is reported as the commonest refractive error in childhood⁶. Children having myopia should be identified and treated as early as possible due to its high chances of progression and adverse ocular effects. However hypermetropic eyes must be cured due to their greater amount of asthenopic symptoms which get worse during reading and close work. Anisometropia must be addressed to prevent development of amblyopia. Since refractive errors can effectively be treated by simple visual aids, the

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amount and pattern of refractive errors should be discovered and treated to prevent blindness and to improve quality of life. The purpose of this study was to find the prevalence of refractive errors, identify their different types and to promote awareness among parents, teachers and primary health care workers.

PATIENTS AND METHODS

This cross sectional analytical study was conducted from May 2017 to June 2017, at Schools located at Mangla Cantonment and Ophthalmology OPD of Combined Military Hospital Mangla Cantonment after approval from the ethics committee of the hospital. Two trained nursing assistants visited two schools located in the Mangla cantonment during the school timings. All the present students (n=2491) of these schools were included in this study. The nursing assistants performed distance visual acuity testing of all the students by using Snellen's visual acuity chart. Before testing, the procedure for the test was explained to the children who were also requested in advance to bring their glasses, if any, to the ocular examination site. Children initially underwent assessment of presenting visual acuity, with correction if worn, then uncorrected visual acuity. The right eye was tested first and then the left, each time with occlusion of the fellow eye. The children with impaired visual acuity were referred to a consultant ophthalmologist where a thorough history was taken regarding asthenopic symptoms, ocular diseases and of wearing glasses before. Basic ocular examination was carried out which included visual acuity, slitlamp examination, pupils and fundus examination. Refraction of these children was done by consultant ophthalmologist and a qualified optometrist. Cycloplegic refraction of children less than 8 years of age was done. Parents of children having poor vision and amblyopia were called by the consultant ophthalmologist where they were counselled about visual problems and their potential impact on quality of life of their children. They were motivated to do regular follow up of their children in eye department.

Demographic data including gender, age and class of the student were noted. Best corrected visual acuity, presence and type of refractive error and presence of amblyopia were also noted. The data was analyzed using SPSS-17.

RESULTS

In this study, a total of 2491 children were included and examined. Out of these 1250 (50.2%) were males and 1241 (49.8%) were females. But only 235 (9.4%) children were diagnosed to have refractive error; out of which 109 (46.4%) were males and 126 (53.6%) were females. All the children were divided into two groups. Group-1 included children less than 10 years of age. Group-2 included children of age 10 years and above.

Refractive errors were more common in children of age 10 years and above i.e. 82% as compared to children less than 10 years of age (18%) (table-I).

In below 10 years age group simple astigmatism was the commonest refractive error

Table-I: Distribution of refractive error according to age and gender.

	Age group (Years)	
	<10 years	≥10 years
Male	14 (12.8%)	95 (87.2%)
Female	28 (22.2%)	98 (77.8%)

(40.5%) whereas in 10 years and above age group, myopia was the commonest (46.6%). In our study, myopia was 42.2% of the total refractive error diagnosed. Age wise distribution showed that it was significantly more prevalent in 10 years and above age group of children. Hypermetropia constituted 8.9% of total refractive error diagnosed and it was more prevalent in 10 years and above age group (9.4%). Compound astigmatism was the second most common refractive error (27.6%) and it was more prevalent in 10 years and above age group (30.5%). Simple astigmatism was 11.9% of total refractive errors and it was more prevalent in below 10 years age group (40.5%). Mixed astigmatism was noted in 9.4% cases of refractive errors and it was more pre-

valent in below 10 years age group (16.7%) (table-II).

Among males myopia was the most common (43%) refractive error followed by compound astigmatism (27%). Among females, myopia was the commonest (41%) refractive error followed by compound astigmatism (27.8%) (table-III).

in male (19.2%) compared to female (17.2%)⁶. Female sex is also reported to have a greater risk for development and progression of myopia¹⁰⁻¹².

In the present study, simple astigmatism was the commonest refractive error (40.5%) below 10 years age group whereas in 10 years and above age group, myopia was the commonest (46.6%). Myopia prevalence increased dramatically from

Table-II: Distribution of different refractive errors according to age group.

Type of refractive error	Age group		p-value
	Below 10 years	10 years and above	
Myopia	9 (21.5%)	90 (46.6%)	0.037
Hypermetropia	3 (7.1%)	18 (9.4%)	
Simple astigmatism	17 (40.5%)	11 (5.7%)	
Compound astigmatism	6 (14.2%)	59(30.5%)	
Mixed astigmatism	7 (16.7%)	15 (7.8%)	

Table-III: Distribution of refractive error according to gender.

Gender	Type of refractive error					p-value
	Myopia	Hypermetropia	Simple astigmatism	Compound astigmatism	Mixed astigmatism	
Male	47 (43.1%)	12 (11.1%)	9 (8.2%)	30 (27.5%)	11 (10.1%)	0.493
Female	52 (41.3%)	9 (7.1%)	19 (15.1%)	35 (27.8%)	11 (8.7%)	

DISCUSSION

Refractive error, if untreated, causes a dramatic impact on learning capability and educational potential of a child. Refractive errors are of various kinds. Myopia is a type of refractive error in which distant objects are imaged in front of retina⁶. Hypermetropia is a type of refractive error in which distant objects are imaged behind the retina⁶. Astigmatism is a defect of optical system causing rays from a point to fail to meet in a focal point resulting in a blurred and imperfect image⁶. In this cross-sectional study, 50.2% children were male and 49.8% were female. The refractive error was more in female (53.6%) compared to male (46.4%). But this difference may vary region to region. Seema *et al.* also reported little higher prevalence of refractive error as 23.7% in female and only 12.2% in males⁷. Similar results were observed by Pavithra *et al.* where prevalence in female children (9%) compared to male children (5.3%)⁸. Similar reports are seen in Qatar with prevalence of refractive error in females of 23.7% and males 15.5%⁹. However in another study the refractive error was more

21.5% (below 10 years age group) to 46.6% (10 years and above children). Similar patterns of rapidly increasing myopia prevalence in primary school children also have been observed in Guangzhou, Shandong, Hong Kong, Singapore, and Taiwan, where myopia also has reached epidemic proportions¹³⁻¹⁶. Probably children attending high-level schools experience greater homework demands and pressure from teachers, parents, and peers to study. Their higher myopia prevalence is consistent with literature regarding educational exposure as an important environmental risk factor for myopia¹⁷⁻¹⁹.

CONCLUSION

Myopia was the commonest refractive error among school going children. However, refractive errors have different distribution in different age groups. There is a need to conduct similar studies on a larger scale to establish a correlation between occurrence of refractive error and factors like parental refractive error, time spent in indoor activities like watching television and using mobiles, malnutrition and increased workload of studies etc.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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