



Frequency of Refractive error in children with strabismus at tertiary Care Hospital Gadap Town, Karachi.

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ABSTRACT... Objectives: This was conducted to determine frequency of various refractive errors with types of strabismus among the age group of 5-15 years children visited in the tertiary eye care hospital Gadap town, Karachi. **Study Design:** Cross Sectional Analytical Study. **Setting:** Al-Ibrahim Eye Hospital. **Period:** May 2019 to November 2019. **Material & Methods:** This study was conducted on 300 strabismic subjects with a mean age of 5 to 15 years by non-probability convenience sampling. All respondents underwent visual acuity assessment by Snellen chart with and without correction, pinhole method, and fundus examination by retinoscope, Cardiff card, cover/uncover test, cycloplegic refraction by cyclopentolate 1%, and ocular movement examination. **Results:** Out of 300 patients, 43(14.3%) subjects were diagnosed as strabismus with refractive error. 20(46.5%) were boys, while 23(53.5%) were girls with a mean age of 9.62 ± 3.1 . The hyperopic 20(46.5%), 17(39.6%) myopic, and 6(13.9%) had astigmatism. **Conclusion:** Strabismus was more frequently observed in females than in males. Hyperopia was in Strabismic respondents than myopic and astigmatism. The esotropia was commonly seen in hypermetropia, Exotropia, in Myopia. The vertical and alternate not frequently seen are these respondents. Hence it is necessary to diagnose the children as early as possible to prevent them from other ocular manifestations.

Key words: Esotropia, Exotropia, Refractive Error, Strabismus.

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INTRODUCTION

Refractive error is the eye condition, causing problems in the convergence of light rays over the retina. Different types of refractive errors are found, in which most common types are Myopia, hypermetropia, astigmatism, and presbyopia.¹ Myopia is the type of refractive error in which the light rays focus in front of the retina while accommodation is at rest. In contrast, in hypermetropia, the rays focused behind the retina while the accommodation is at rest. Alternatively, the rays of light have no single fixation on the retina, which is called astigmatism.²

The worldwide prevalence of refractive error is about 44.4% in which 83.0% is hypermetropia, 13.3% is Myopia, and 3.6% is astigmatism, and 38% is diagnosed with strabismus, while the prevalence of refractive error in Pakistan is 3.3%.³⁻

⁴ Strabismus is the condition of childhood in which the eyes of children are not in alignment. It is the most common ocular disorder affecting the population of children.⁵ Strabismus not only the disorder of childhood, but it also affects the adult population, but it is less common. In adults, it can be the cause of secondary conditions that could be some sort of surgical procedure, the disorder of thyroid or due to neurological disease.⁶ Strabismus may result in severe consequences like visual impairment.⁷ Strabismus are of different types, but the commonest is Esotropia, Exotropia, Hypertropia, hypotropia and paralytic strabismus. Esotropia is the condition in which one of the eyes turned inwards that is convergent in the direction of the nasal side while diverging one eye outwards, referred to as Exotropia. When one of the eyes becomes in an upward direction, others are known as Hypertropia, and the downward

direction is known as hypotropia.

On the other hand, the paralytic strabismus is the consequence of the particular type of head trauma or ischemia results in impairment of 3rd, fourth or sixth cranial nerves.⁸ This study was conducted to determine the frequency of refractive error in strabismus within the age group of 5 to 15 years in children visited in tertiary eye care hospital Gadap town, Karachi. Basic purpose of the study is to evaluate the ratio of refractive error among children, and then we will use this data to established the prevalence of the disease and plan to work for public health and community awareness programs for the early diagnosis of the disease and literate the parents about the importance of refraction in early ages for proper diagnosis.

MATERIAL & METHODS

The cross-sectional study was conducted, from May 2019 to November 2019 on 300 strabismic subjects at the orthoptic department of Al Ibrahim Eye Hospital, Malir, and Karachi. Data were collected through a non-probability convenient sampling method, after taken ethical approval form concerned authority. Informed consent form had taken from the guardians, and all the information was kept confidential.

A pilot study was conducted on seven subjects that resulted in a structured close-ended questionnaire. The study were included children of both genders with a mean age of 5 to 15 years were select for this study. All new or follow up cases were incorporated. The children above 15 years and below 5 years were excluded, and those who had other physiological, pathological or traumatic finding. To diagnose refractive error and strabismus, all the respondents underwent visual acuity assessment with Snellen chart, Cardiff card, cover/uncover test; cycloplegic refraction was done using cyclopentolate 1%, examination of ocular movement, visual acuity with and without correction, visual acuity with pinhole and fundus examination. The tools used in this study include Snellen chart, near chart, Cardiff card, lea grating, torch, pinhole, auto-refractometer and retinoscope.

The data was collected and presented in the form of frequency and percentage. The data was analyzed by SPSS version 21,0.

RESULTS

With the history and examination of 300 patients, 43(14.3%) subjects were diagnosed as strabismus with refractive error. Out of these, 20(46.5%) were boys, while 23(53.5%) were girls. The mean age was found to be 9.62 ± 3.1 ranging between 5 to 15 years of age. Out of 43(14.3%) strabismic subjects with refractive error, 17(39.6 %) were myopic, 20(46.5 %) were hyperopic and 6(13.9%) had astigmatism.

Most of the 29 (54.7%) respondents had visual acuity 6/6 to 6/18 in the right eye without correction, and 30(56.6%) had visual acuity 6/6 to 6/18 in the left eye without correction. Out of 43 respondents, 13(24.5%) had visual acuity less than 3/60 in the right eye, and 2(3.77%) had visual acuity less than 3/60 in the left eye. 37(70.0%) respondents had near visual acuity lies between N.6 to N.12 in the right eye, while 38(71.6%) respondents had near visual acuity in between N.6 to N.12 in the left eye.

Refractive Error	Frequency	Percentage (%)
Hyperopia	20	46.5%
Myopia	17	39.6%
Astigmatism	6	13.9%
Total	43	100%

Table-I. Distribution of refractive errors.

Gender	Astigmatism (n=6)	Hyperopia (n=20)	Myopia (n=17)
Male	2(33.3%)	8(40.0%)	10(58.8%)
Female	4(66.6%)	12(60.0%)	7(41.1%)
Mean Age	9.62 \pm 3.1		

Table-II. Gender wise distribution of refractive errors

	Hypermetropia (n=20)	Myopia (n=17)	Astigmatism (n=6)
Esotropia	15 (75%)	2 (11.8 %)	3 (50%)
Exotropia	3 (15 %)	14 (82.3 %)	2 (33.3 %)
Vertical	0 (0.0%)	0(0.0%)	1(16.7%)
Alternate	2(10%)	1(5.9%)	0(0.0%)
Total	20(100%)	17(100%)	6(100%)

Table-III. Association of refractive error and strabismus.

DISCUSSION

During childhood refractive errors are commonly seen, that come to be a significant problem if it remained uncorrected for long time. Uncorrected refractive errors turn out to be a principal cause of blindness.⁹ Comprehensive evaluations for prevalence of strabismus with refractive error in crosswise study reports are usually not possible because of diverse measurement approaches and descriptions.¹⁰ The motive of this study was to evaluate the children having strabismus with refractive error for the appropriate planning and prevention from further damage. In present study 14.3% subjects were found to be having the refractive error along with strabismus. Again the elevated prevalence can be due to the research nature and variation of sample size and the difference between various races.¹¹

One of the recent studies done in an account for strabismus found the most common type diagnosed in people as esotropia and Exotropia compared with other types. Brazil and the Asian population were found with Exotropia compared with esotropia.¹² In the present study, similar findings were noticed along with that association of refractive error with strabismus showed that esotropia was most commonly observed in hypermetropic subjects.

Another study found the percentage of esotropia about 63.03% while Exotropia about 24.53% in 1174 strabismic patients and association of these subjects with amblyopia. The esotropia was more commonly noticed approximately twice than Exotropia and amblyopia was noticed in about half of the Strabismic subjects. Hence it is necessary to detect strabismus early to minimize the ratio and to prevent the amblyopia in strabismus.¹³ In present study the esotropia was noticed in hypermetropic subjects about 75% while in myopic and astigmatism it was 11.8% and 50% respectively. The percentage of Exotropia was noticed about 15 %, 82.3 %, 33.3 % in hypermetropic, myopic and astigmatism respectively. The study on the basis of strabismus and refractive error on Chinese children suggests that the children diagnosed with Exotropia having association with Myopia. It

is thought that most probably the reason could be high need of accommodation increase the risk of Myopia.¹⁴ Similar findings were observed in present study. In accordance with prevalence rate among white British population the esotropia of constant or intermittent variety can be noticed. The probabilities of esotropia found to be high with raised frequency of hyperopic refractive error among Pakistani children as well as in white British.¹⁵

Another study performed in the Rawalpindi shows that strabismus is the condition commonly seen among pediatric age groups that result in functional but cosmetic problems. The reasons behind this could be the visual immaturity in which maximum chances of deviation is possible. Thus early treatment is necessary, and if not treated in its premature state, ultimately, these deviations convert into amblyopia, which is difficult to reverse. Meanwhile, as time passes, it can also lead to other problems like double vision and confusion. That, in turn, has a significant impact on socioeconomic status because the misalignment of the eye creates a hindrance to getting the job. The subjects found with the refractive error were about 56%, in which astigmatism, more commonly seen is 35.33%. Other type like simple hypermetropia and Myopia was also seen at percentage of 15 and 4.64 respectively. Total incidence of evident strabismus was about 3.9%, with abundant occurrence of Combatant type.¹⁶

In comparison with that in current study out of 300 patient 14.3% was found with strabismus along with refractive error. The percentage of refractive error was 46.5, 39.6 and 13.9 in hyperopia, Myopia and astigmatism respectively. According to, the age-wise distribution in Pakistan, 45% of population is children under, the age of 15 years and the ocular misalignment was found about 5.4%.¹⁷

CONCLUSION

From the data of the study, we concluded the higher percentage of females children were more affected than male. As compare to myopic and astigmatism, the hyperopia was more commonly found in association with strabismus. Esotropia



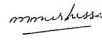


were usually observed in hypermetropia, while was frequently witnessed in myopia than astigmatism. The actual fact is to diagnose the children at their early ages to prevent from any ocular manifestations in future.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Asiya Saleem	Conceptualization and Manuscript writing.	
3	Munawar Hussain Ghulam Ali	Critical review.	
4	Abdul Sattar Abro	Data analysis.	
5	Mazhar-ul-Haque	Critical Review.	
6	Hina Khan	Manuscript writing.	