



Type of astigmatism in subjects with nystagmus of age 5-15 years

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Abstract

Purpose: (1) To determine type of astigmatism in nystagmus subjects of age 5-15 years.

(2) To determine the magnitude of astigmatism in nystagmus subjects of age 5-15 years.

Study Design: Cross-sectional study

Sampling Technique: Non-probability convenient sampling

Place and duration of study: Pediatric outdoor patient department of AlIbrahim eye hospital (AIEH) Karachi, Pakistan from May to October, 2018.

Material and Method: This study included 52 eyes of 26 subjects age ranged from 5 to 15 years. Retinoscopy i.e. cycloplegic and non-cycloplegic both were performed. Cycloplegic retinoscopy was the preferred and acceptable option for young subjects as well as for nystagmus subjects.

Result: It was found that all the 52 eyes of 26 nystagmus subjects had astigmatism i.e. 100% astigmatism. Compound myopic astigmatism has been present most frequently i.e. 20 eyes (38.46%) had compound myopic astigmatism, 16 eyes (30.77%) had compound hyperopic astigmatism, 14 eyes (26.92%) had mixed astigmatism and only 02 eyes (3.85%) had simple myopic astigmatism. The average amount of astigmatism was found to be 2.45 ± 1.08 DC for right eyes and 3.09 ± 2.11 DC for left eyes.

Conclusion: Astigmatism was 100% in nystagmus subjects and compound myopic astigmatism was the most common type.

Keywords: astigmatism, nystagmus, idiopathic congenital nystagmus (ICN)

Introduction

Nystagmus is involuntary, symmetrical, synchronous, repetitive oscillatory movement of one or both eyes in a horizontal, vertical, or rotary manner [1]. Most authors argue that congenital nystagmus should be replaced with the term 'infantile nystagmus' as it is often not present at birth and develops in early infancy [2]. Nystagmus starts with a slow movement of the eye away from the visual target and second movement brings the eye back to the visual target. If the second movement is slow, the nystagmus is said to be pendular and if this second movement is quick, the nystagmus is called jerk nystagmus [3].

Astigmatism is about 13% among refractive conditions that results in blurred vision due to the inability of the ocular system to form a clear image on the retina [4]. Various studies showed that uncorrected astigmatism has increased the risk of amblyopia and myopia [5-8].

According to the first population based epidemiological study, which was carried out in Leicestershire in the year 2009, the prevalence of nystagmus was found to be 24.0 per 10,000 population [9]. There is significantly larger incidence of strabismus and amblyopia of the eye with the greater amplitude of nystagmus [10]. Another study showed that astigmatism is more common in subjects with idiopathic congenital nystagmus (ICN) than in the general population (65.37% vs. 11.47%) [11] while astigmatism is intensely common in subjects with congenital nystagmus [12]. The astigmatism and nystagmus in Down syndrome is found to

be 8.1% and 13.5%, respectively [13]. A study conducted in Pakistan in which severe visual impairment was about 2.3% and the most common cause was a refractive error (89.3%) followed by amblyopia (5.0%), strabismus (1.8%) and nystagmus (0.6%) [14] while other studies showed the prevalence of nystagmus to be 0.10% [15] and 1.7% [16]. With-the rule (WTR) astigmatism occurs frequently [17, 18] and more common in subjects with nystagmus [19]. The corneal topography of nystagmus subjects showed that With-the-Rule astigmatism was predominant and corneal in origin [20]. The duration of nystagmus, age [21], effects on vision and associated with other neurological symptoms is important initial questions while taking a history of patients [22].

This study will be helpful in considering visual difficulties of nystagmus subjects.

Materials and Method

Ethical approval was given by Research Ethical Committee (REC) of Isra Postgraduate Institute of Ophthalmology. A cross-sectional study was carried out at Al-Ibrahim Eye Hospital Karachi from May to November 2018. Patients were selected from the Pediatric outdoor patient department of Al-Ibrahim eye hospital, according to the inclusion and exclusion criteria. Instruments/equipments used in examining the subjects included VA charts, trial box, trial frame, cycloplegic drugs i.e. Mydracil, Cyclopentolate, Retinoscope, Ophthalmoscope and an Autorefractometer.

All the respondents underwent visual acuity assessment with Snellen acuity chart, and Cardiff cards. The subjects who were using distance correction, their visual acuity was taken with correction. Then the presence of astigmatism (i.e. type and magnitude) was observed by doing retinoscopy i.e. both cycloplegic and non-cycloplegic retinoscopy. Cycloplegic retinoscopy was preferred and acceptable option for young subjects as well as for nystagmus subjects. Cycloplegia was achieved by using 1% Cyclopentolate. And in subjects who had a history of fever and fits and/or pseudophakic, non-cycloplegic retinoscopy was performed by using 1% Tropicamide drops as well as dry retinoscopy was also performed in some subjects. Self-prepared proforma was used for data collection. After performing all tests the presence of astigmatism i.e. type and magnitude in nystagmus subjects was determined. Data analysis was done on Statistical package for social sciences (SPSS) version 20.0. All continuous variables were presented as Mean \pm Standard Deviation. The entire categorical variables were shown as frequency and percentages. Statistical charts were presented in the form of Bar chart & Pie chart.

Results

A total of 52 eyes of 26 subjects presented at pediatric OPD of Al-Ibrahim eye hospital, diagnosed with nystagmus were further examined. This study included 20 boys and 6 girls (Figure 1). The mean age was found to be 9 ± 2.34 ranging between 5 to 15 years of age. It was found that most of the subjects 12(46.2%) were lying in the age group of 9 to 11 years (Figure 2). Cycloplegic retinoscopy was done in 73% nystagmus subjects and in 27% nystagmus subjects non-cycloplegic retinoscopy was performed (Figure 3). It was

Found that all the 52 eyes of 26 nystagmus subjects had astigmatism i.e. 100% astigmatism. Compound myopic astigmatism has been most frequently present i.e. 20 eyes (38.46%), 16 eyes (30.77%) had compound hyperopic astigmatism, 14 eyes (26.92%) had mixed astigmatism and only 02 eyes (3.85%) had simple myopic astigmatism (Figure 4). The average amount of astigmatism was found to be 2.45 ± 1.08 DC for right eyes and 3.09 ± 2.11 DC for left eyes. (Figure 5, 6 & Table 1). Also, it was found that most of the subjects had their +cylinder at 90° (i.e. With-the-rule astigmatism) and it was found that among 52 nystagmus eyes 31 eyes had their axis of astigmatism at 90° , 15 eyes had axis at 180° , and 6 eyes had oblique axis.

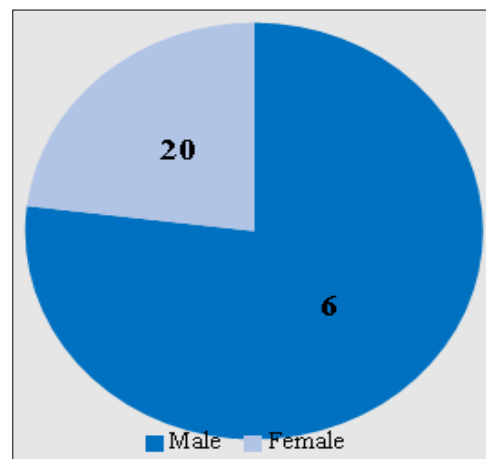


Fig 1: Gender wise distribution of sample

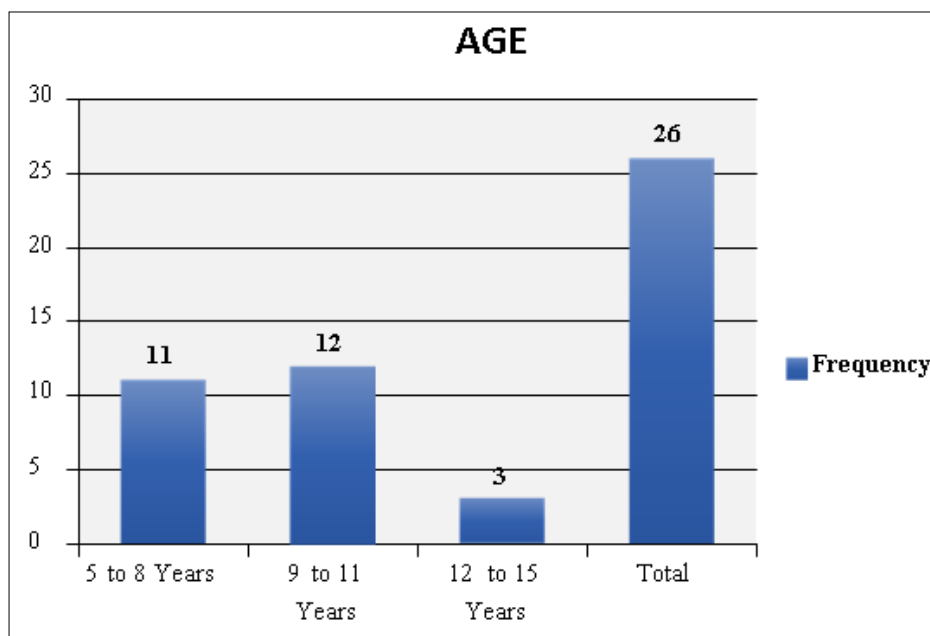


Fig 2: Age wise distribution of sample

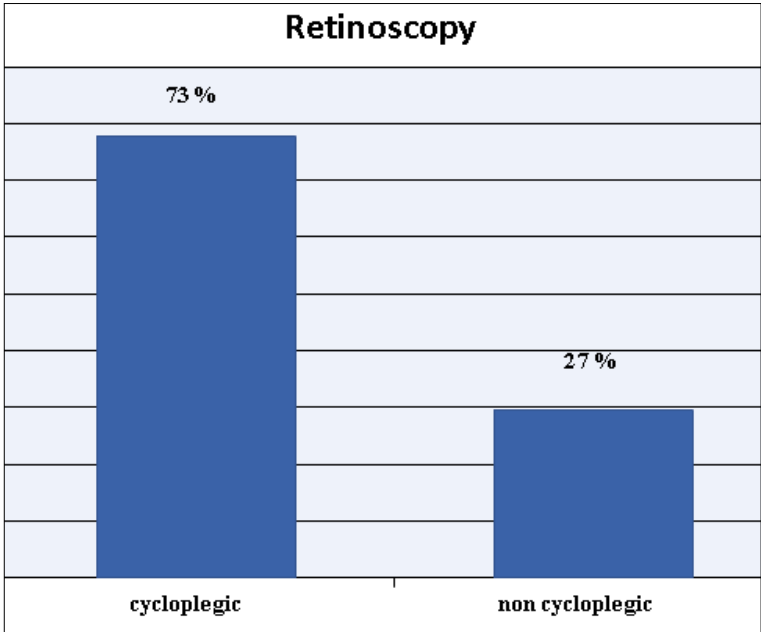


Fig 3: Dry and Wet Retinoscopy

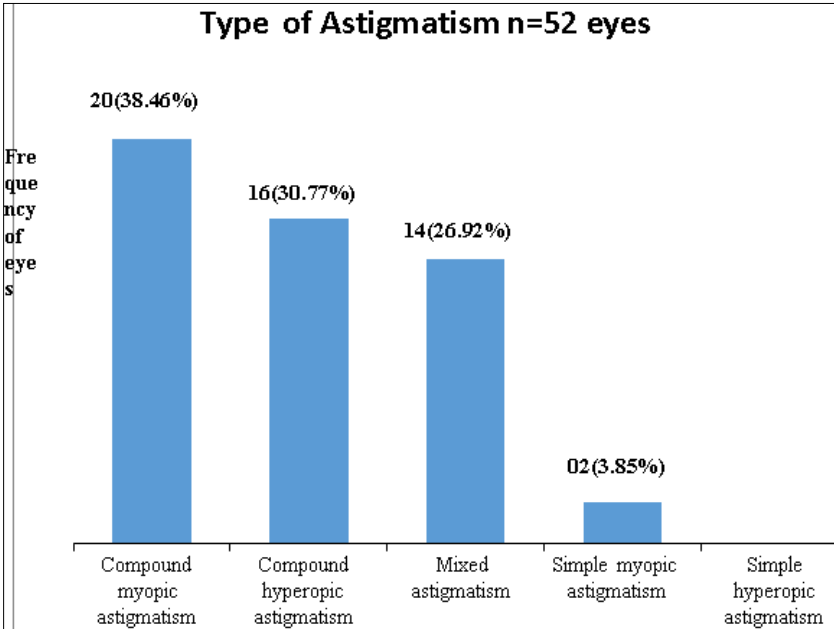


Fig 4: Type of astigmatism

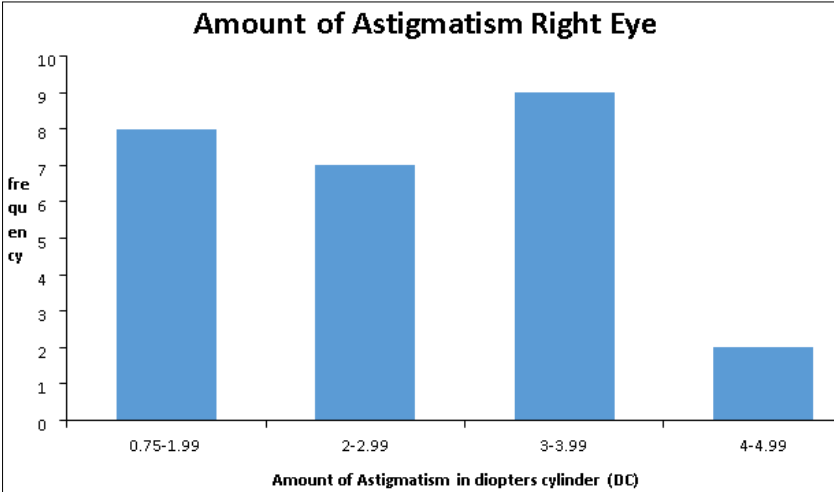


Fig 5: Amount of astigmatism in Right eye

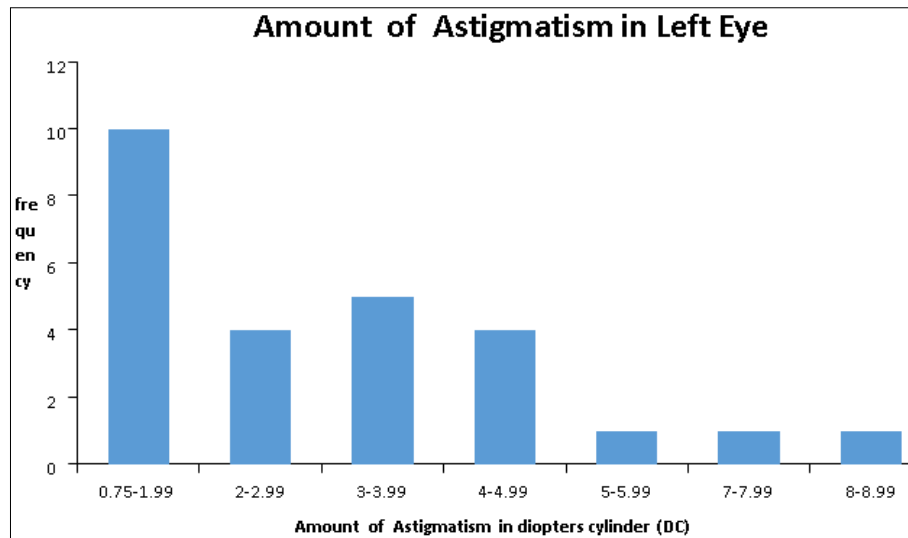


Fig 6: Amount of Astigmatism in Left Eye

Table 1: Mean value of Astigmatism

	Number of subjects	Minimum Amount of astigmatism	Maximum Amount of astigmatism	Mean	Std. Deviation
Amount of astigmatism in right eye	26	0.75	4.25	2.45	1.08858
Amount of astigmatism in left eye	26	0.75	8.50	3.09	2.11160

Discussion

This study showed that 38.46% had compound myopic astigmatism when compared to a study conducted at Eye OPD of Mayo Hospital, Lahore, Pakistan, where a high prevalence of myopic astigmatism was found to be i.e. 57.14% [1]. The difference between the two studies was even more noticeable in the age ranges, that there were no defined age criteria in the previous study while the present study was carried out among children from 5 to 15 years old. Several differences in objectives, methodology and subject selection could be causes of the observed differences.

Several other previously published studies reported high prevalence of WTR (With-The-Rule) astigmatism in children and adults with INS (Idiopathic Nystagmus Syndrome) and congenital nystagmus [9, 12, 17, 19, 21]. Some studies reported that both the prevalence and magnitude of WTR astigmatism increases with age in children with INS and there is little emmetropization demonstrated during the first 8 years of life [23].

The magnitude of astigmatism reported herein i.e. (mean for right eyes 2.45 ± 1.09 DC and for left eyes 3.09 ± 2.11 DC) was very close to that as reported by Campos *et al.* i.e. (mean for right eyes 2.44D and for left eyes 2.74D) [12]. Also some other previously conducted studies reported that significant amount of astigmatism was found in nystagmus subjects i.e. >2.00 DC [11, 24].

A unique contribution of this study was that to determine the particular type of astigmatism, a complete and precise classification of astigmatism was used based on the focus of principal meridians i.e. categorizes into five categories, whereas, a study conducted at Mayo Hospital (Lahore) in which for the purpose of ease, astigmatism was categorized into three types. All the other previous studies used conventional classification based on the orientation of axis, i.e. WTR (With-the-rule) or ATR (Against-the-rule) astigmatism.

Conclusion

Astigmatism of 2.45 1.08DC for right eyes and 3.09 2.11DC for left eyes was present in nystagmus subjects and compound myopic astigmatism was being the most frequently occurred type.

Recommendations

Nystagmus subjects had a high prevalence of astigmatism and also there was a significant amount of astigmatism found in nystagmus subjects which may be one of a reason of their decreased visual acuity. Therefore, these findings should be taken into account while considering visual difficulties of nystagmus subjects and astigmatic component should be taken into greatest considerations.

Conflict of Interest: None

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