



Ocular disorders in children with autism in special schools

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ABSTRACT

Aim: To identify the ocular abnormalities and assess the visual function in autistic children.

Materials and Methods: This was a cross sectional study of autistic children aged between 5 to 25 years attending special schools. After obtaining prior permission, relevant medical history was taken and detailed ocular examination including visual acuity assessment and cycloplegic retinoscopy was carried out. Necessary refractive correction was given and children requiring further evaluation were referred to nearby tertiary hospitals.

Results: 40 autistic children were examined with a mean age of 12.8 + 4.41 years. Ocular abnormalities were seen in 21 children (52.50%). The most common ocular abnormality seen was refractive error (50%) followed by strabismus (7.50%). A total of 20 children (50%) were prescribed spectacles and 5 children (12.50%) children were referred for further evaluation.

Conclusion: The prevalence of ocular abnormalities is higher in children with autism than in general population. As these children depend on their visual sense to compensate for their primary disability, early detection of ocular abnormalities and timely intervention are essential to mitigate their visual impairment. Therefore, parents of autistic children and teachers in special schools have to be made aware about the importance of early screening.

Keywords: Autism, Refractive error, Visual impairment.

INTRODUCTION

Autism is an important public health concern all over the world, especially in developing countries like India. Autism Spectrum Disorder (ASD) is a developmental neurological disorder characterized by difficulty in social interaction, verbal and non-verbal communication and repetitive behaviour^[1]. It includes individuals with profound mental retardation and little or no speech or communication

compared to more verbal, functionally able children. The exact etiology is unknown but multiple causes have been attributed to ASD^[1].

The ocular problems in autistic children are often overlooked, as the main focus always remains on the primary disability^[2]. Additionally, the ocular examination in autistic children is a challenge and needs higher level of patience and skill.

Higher incidence of ophthalmologic abnormalities has been observed in children with disabilities like autism [2][3][4][5] but only very few studies have been carried out in this regard. Therefore, the present study aims to identify the ocular abnormalities and assess the visual function of children with autism.

MATERIALS AND METHODS

This study was conducted on children with autism, aged 5 – 25 years, who were studying in special schools in the district of Thiruvananthapuram, Kerala during the period from January – May, 2017. Prior permission was sought from the principals of the schools. Parents were informed and their presence was requested during the examination of the children. Relevant details regarding the disability and family history were recorded. A team consisting of ophthalmologist, refractionist and ophthalmic technician examined the autistic children.

Ocular examination was carried out in diffuse illumination to observe head posture and facial anomalies. In children who could read and cooperate, Snellen's E-chart was used for assessing visual acuity. For other children, visual acuity was tested using picture charts or HOTV charts. Near vision testing was done at 33cm followed by distant vision testing at 6 metres. Hirschberg light reflex test and cover uncover test was used to evaluate visual axis and strabismus. Ocular movements were tested and presence of nystagmus was checked. Anterior segment was examined using torch light and magnifying loupe to rule out abnormalities of eyelids, conjunctiva, cornea, anterior chamber, iris and lens. Direct and consensual pupillary light reflexes were also checked.

In children aged 12 years and above, subjective correction of refractive errors was attempted. Cycloplegic retinoscopy was done in all children aged 5-12 years and in those who were not cooperative for subjective refraction by using 0.3% cyclopentolate eye drops after ascertaining that the child didn't have seizures. In children having history of seizures, 0.5% homatropine eye drops were used. The type of refractive error was

recorded. A detailed fundus examination after dilatation was done by direct ophthalmoscope. Spectacle prescription was given to all children with refractive errors. Children requiring further evaluation were referred to the nearby tertiary hospital.

For the purpose of this study, significant refractive error was considered as follows:

Hypermetropia $\geq +1.00$ DS, Myopia > -0.50 DS and Astigmatism $\geq \pm 0.50$ DC. The data was analysed using Statistical Package for the Social Sciences version 16.

RESULTS

A total of 40 children diagnosed with autism, aged 5 to 25 years, who were studying in special schools were enrolled in the study. The mean age was 12.8 ± 4.41 years. Out of these, 29 (72.5%) were in the age group of 5-15 years and 11 (25.5%) were in the age group of 16 – 24 years. Figure [1] shows the distribution according to age. 4 children (10%) had a positive birth history of adverse antenatal, natal or post-natal events. Males comprised 77.5% as compared to 22.5% females giving a Male-Female Ratio of 3.4:1. [Figure 2]

Figure 1: Age Distribution

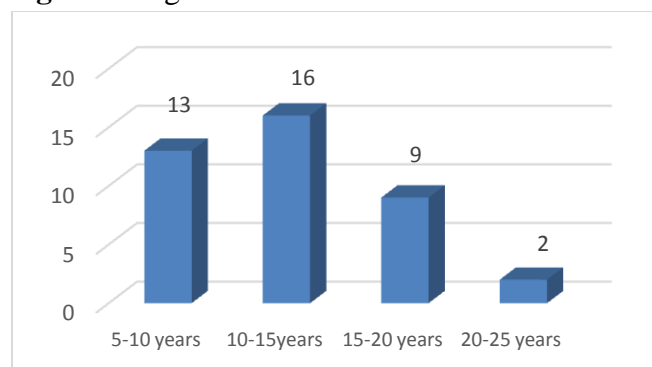
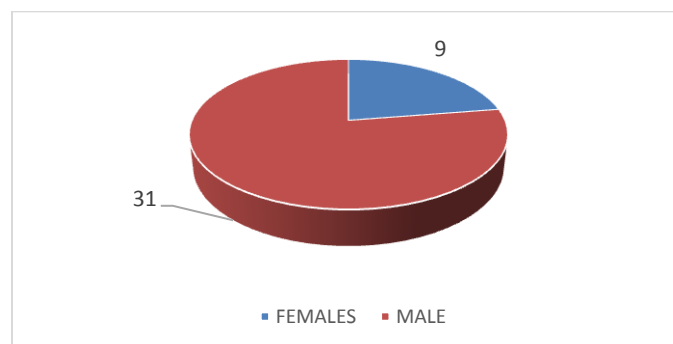


Figure 2: Gender distribution



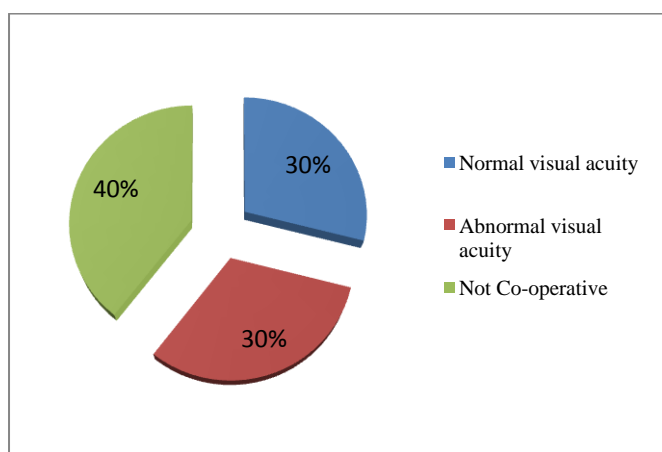
Out of 40 children, ocular abnormalities were present in 21 children (52.5%). The most common ocular manifestation observed in the study was refractive error which was present in 20 children (50%), followed by Strabismus in 3 children (7.5%). Table [1] shows the distribution of ocular findings.

Abnormal distant visual acuity (log mar 0.1-1) was seen in 12 children (30%), Normal distant visual acuity (log mar 0) in 12 children (30%) and 16 children (40%) did not co-operate for vision testing. Figure [3] shows the distribution of distant visual acuity in worse eye.

Table – 1: Distribution of ocular findings

Ocular Disorder	Frequency	Percentage
Refractive Errors	20	50%
Strabismus	3	7.5%
Corneal Opacity	2	5%
Eccentric Pupil	1	2.5%

Figure-3: Distribution of distant visual acuity



Refractive errors were seen in 20 (50%) children. Out of them, refractive error was present in both eyes in 16 children (80%) whereas 4 children (20%) had refractive error in only one eye. Among 16 children with bilateral refractive error, 6 children (37%) had Myopia in both eyes, 5 (31.25%) had Astigmatism in both eyes and 2 (12.5%) had Hypermetropia in both eyes. In 3 children (18.75%), two had myopia in one eye and the other eye had astigmatism (1 had compound myopic astigmatism and 1 had mixed astigmatism) and the remaining one child had simple myopic astigmatism in one eye and hypermetropia in the other eye.

Among 80 eyes of 40 children, refractive error was present in 36 eyes. The most common type of refractive error was Myopia (44.44%) followed by Astigmatism (38.88%) and then Hypermetropia (16.66%). Figure [4] shows the distribution of refractive error. In eyes with myopia, low degree of Myopia (-0.50D to -3 D) was noted in 37.50% and moderate degree of myopia (-3D to -6 D) in 62.50% [Figure 5]. However, high degree of myopia was not observed.

Figure- 4: Distribution of Refractive Error

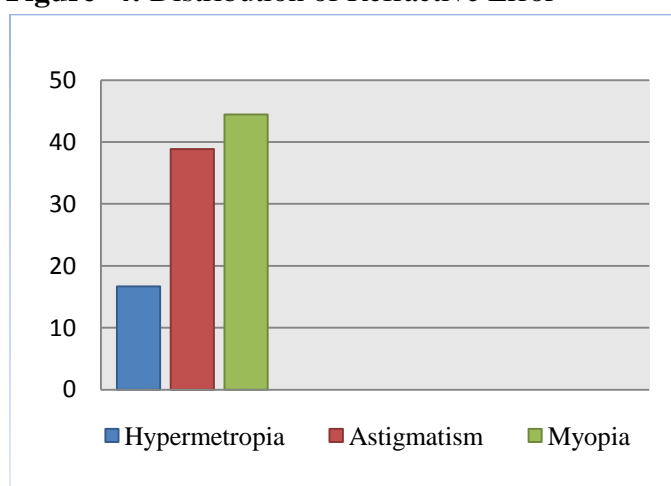
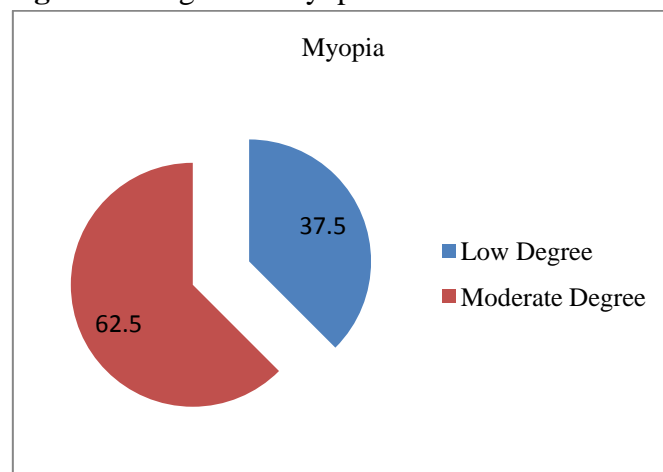


Figure-5: Degree of Myopia



Astigmatism was the next type of refractive error observed. Simple myopic astigmatism (64.28%) was the commonest type of astigmatism noted. Table [2] shows the distribution of astigmatism. Compound hypermetropic astigmatism was not observed in any of the eyes. Further, Hypermetropia ranging from 1D to 4D was observed in 16.66%. Three children had Anisometropia.

Table-2: Distribution of Astigmatism

Type of Astigmatism	Percentage
Simple myopic astigmatism	64.28%
Simple hypermetropic astigmatism	14.28%
Mixed astigmatism	7.14%
Compound myopic astigmatism	14.28%
Compound hypermetropic astigmatism	Nil

Spectacles were prescribed to all the twenty children having refractive errors. A total of five children (3 having strabismus & 2 with corneal opacity) were referred to nearby hospital for further evaluation and management.

DISCUSSION

Children with autism are faced with many challenges including poor communication skills and intellectual disabilities which affect their overall development and have a negative impact on the quality of their life. In these children, vision is one of the important senses which has more value as they heavily depend on visual inputs for their understanding and communication with the outer world. Thus, even a minor visual problem, needs to be identified and addressed at the earliest. Unfortunately, children with disabilities like autism are at a higher risk of visual impairment^[6].

Autism is often diagnosed by the age of 3 years and is generally 4 times more frequent in males than females^[7]. The present study had children from 5 to 25 years of age and male to female ratio was 3.4: 1.

Our study showed the presence of ocular abnormalities in 52.5% of children with autism. A similar observation was noted in a study by Black et al in which 52 % of autistic children had ocular problems^[5]. In a study done by Gurvinder Kaur et al in special schools of North India, it was found that 25.7 % of autistic children had ocular problems^[8].

In our study, the most common ocular abnormality noted was refractive error (50%) followed by strabismus (7.5%) and corneal opacity (5%). But, in the study by Black et al, strabismus was the most common ocular abnormality (41%) followed by refractive error (27%) and amblyopia (11%)^[5]. In another study by Denis et al, refractive error (70%) was the commonest finding followed by Strabismus (60%)^[9]. In the study done by Gurvinder Kaur et al,

Strabismus, Nystagmus and Refractive Error were present in 20%, 20% and 8.6% respectively^[8].

The present study showed that among refractive errors, Myopia was the commonest (44.44%), followed by Astigmatism (38.88%) and Hypermetropia (16.66%). In a study by Ezegwui et al, Hypermetropia and Astigmatism were the major refractive errors observed in autistic children. Gurvinder Kaur et al, in their study observed that Hypermetropia was the commonest refractive error^[8]. Similar findings were observed in a study by Denis et al which showed Hypermetropia (70%) followed by Astigmatism (30%)^[9]. Ikeda et al in their study remarked that significant refractive error, strabismus and amblyopia in that order of occurrence were found in children with autism^[10]. In our study, refractive error ranged from -5.50 to +4.00 DS. Another study showed that refractive error ranged between -4.25 DS and +3.25 DS.^[11]

As per our study, out of 20 children (50%) with refractive error, Bilateral Astigmatism was present in 5 children (25%) and Unilateral Astigmatism was present in 4 children (20%). In the study by Denis et al, Bilateral Astigmatism was present in 40% and Unilateral Astigmatism was present in 20%^[9].

The present study showed the presence of ocular problems in 52.5% of children with autism. The most common ocular disorders identified were refractive errors and strabismus which resulted in visual impairment in these children. The literature search also shows that these ocular problems are common in autistic children.

The visual acuity assessment in these children was a challenge due to the flawed verbal and non verbal communication skill of autistic children. Also the common visual acuity testing charts (Snellens chart, HOTV chart) require interaction between the child and examiner. Accordingly, spectacles were prescribed based on retinoscopic findings. Googate et al in a study on ocular disorders in children with learning disorders dispensed spectacle prescription based on retinoscopy findings when subjective refraction was not possible^[3].

The fact that the majority of the causes of visual impairment like refractive errors, strabismus, etc.

are easily treatable signifies the need for regular examination of autistic children. The parents and teachers can be motivated for regular ophthalmic examination of these children. The ophthalmologists can play an important role in this regard by conducting regular screening camps in special schools. This initiative may prove to be a starting point for the establishment of educational, social and psychological well being of these children.

LIMITATION

As the study was conducted in special schools, the participants may not be representative of the children with autism in general population. Also, the study was conducted in children aged 5-25years and hence findings cannot be applied to children < 5years. Another limitation is the small sample size and the inability to do subjective refraction in these children.

CONCLUSION

The prevalence of ocular abnormalities was higher in children with autism than in general population. Significant refractive errors were noted in these children leading to visual impairment. As autistic children use their visual sense to compensate for their primary disability, an early screening and ophthalmic intervention can help in the overall performance of these children. Therefore, parents of autistic children and teachers in special schools have to be made aware about the importance of early screening.

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