



## Original Research Article

## Prevalence and profile of ocular morbidity in down syndrome children in a tertiary centre

Naheed Akhtar<sup>1,\*</sup>, Anam Khalid<sup>2</sup>, Uzma Firdaus<sup>2</sup><sup>1</sup>Dept. of Pediatric Ophthalmology, Institute of Ophthalmology, Paediatric Ophthalmologist, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India<sup>2</sup>DEIC, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

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## ABSTRACT

**Objective:** To find out prevalence and profile of ocular morbidity in Down Syndrome children in a district early intervention centre of a tertiary centre.**Study Design:** A retrospective cross sectional study was conducted in DEIC of JNMCH, AMU, for a period of 2½ years (March' 17 – Aug' 19).**Materials and Methods:** Complete ophthalmological workup was done for 55 patients of down syndrome in (0-16 years) age group.**Result:** Prevalence of ocular morbidity was 61.81% Peak prevalence (100%) was found in (13-16 years) age group Refractive error was commonest morbidity (30 %) followed by Strabismus (21%).**Conclusion:** Refractive error was the common est ocular morbidity Screening and early intervention in Down syndrome patients is utmost important because of high prevalence of ocular disorders.© 2019 Published by Innovative Publication. This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by/4.0/>)

## 1. Introduction

Down syndrome has always been a bane for the child as well as the parents. In a largely populated country like ours roughly 32,000 of them are born every year. Prenatal detection is available only in few selected centres and with age of parents going up in this era the incidence may well pick up.

Down syndrome is not only a health hazard but also a big economic, social and mental burden to the family. It is associated with many blinding complications like congenital cataract, strabismus and refractive errors to name a few. Properly ganging these ailments due to proper screening can at least take care of visual health of these babies. No proper survey or screening has been done in North India specially highlighting the blinding complications of these Down syndrome children. Hence we undertook this study to assess the magnitude of Down

syndrome, focussing on its preventable blinding come associations and how to tackle menace.

## 2. Materials and Methods

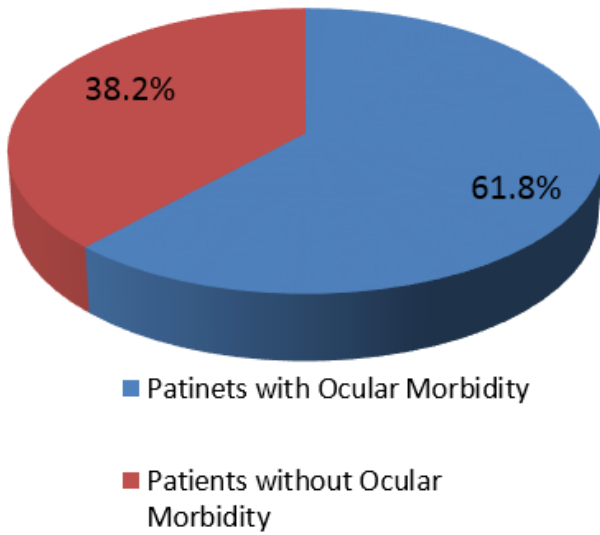
A retrospective cross-sectional study was conducted in paediatric patients of Down syndrome in a District Early Intervention Centre (DEIC) of North India. A total of 55 patients between 0 to 16 years were included in the study. Data was collected between March 2017 to August 2019. Each patient had undergone complete ophthalmic workup including visual acuity test by Lea paddles, Lea symbols, E-Charts, Snellen's Chart or Log MAR visual acuity chart along with cycloplegic refractive. Hirschberg's test, cover – uncover test and prism bar cover/reflex test were done for strabismus evaluation.

Each patient underwent torchlight and slit lamp examination for the anterior segment and dilated posterior segment examination. Documentation was done in standard proforma for management. We used “Epitools” for the calculation of prevalence.

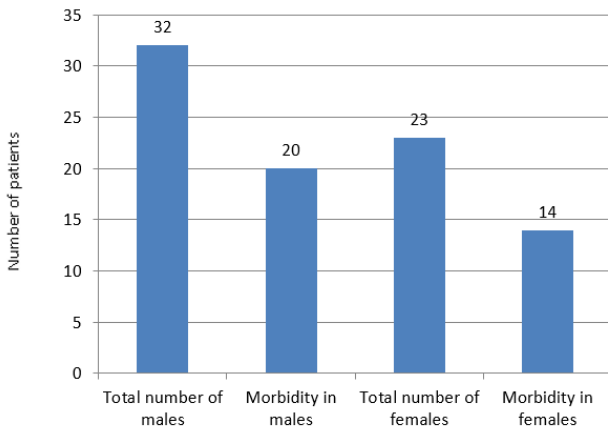
\* Corresponding author.

E-mail address: [nakhtar.io@amu.ac.in](mailto:nakhtar.io@amu.ac.in) (N. Akhtar).

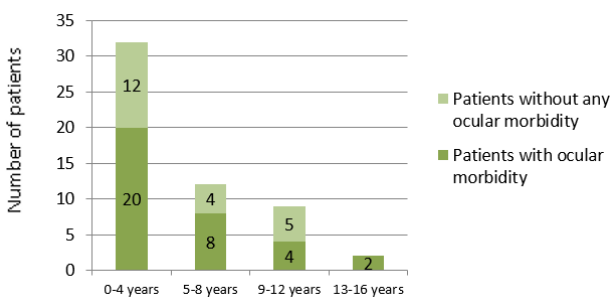
**3. Observations**



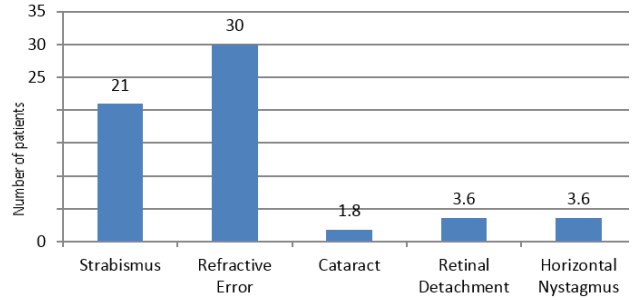
**Fig. 1:** Prevalence of ocular morbidity in total patient



**Fig. 2:** Prevalence of ocular morbidity on gender basis



**Fig. 3:** Prevalence of ocular morbidity with age distribution



**Fig. 4:** Prevalence of different ocular morbidity

**4. Discussion**

A total of 55 patients between (0-16 years) were studied out of which 32 were males and 23 females. The prevalence of ocular morbidity in total studied population was 61.81% which is similar to study (61%) by Roizen et al.<sup>1</sup> However a much higher prevalence (97.4%) was reported by Arsen Akirie<sup>2</sup> in his study. Our study had 62.5% prevalence of ocular morbidity in males while 60.8% in females.

In our study maximum prevalence of ocular morbidity was found in 13-16 years age group. Also Roizen et al. found an increased prevalence of ocular morbidity with increasing age i.e. 38% till 1 year and 80% in 5-12 years age group.

Refractive error was found to be having highest prevalence i.e. 30% in our study. A similar prevalence of refractive error (32%) was reported by Nanda et al.<sup>3</sup> and of 25% by Cregg et al.<sup>4</sup> Among morbidities, high prevalence of refractive error was also reported by Arsen, Caputo,<sup>5</sup> Shapiro<sup>6</sup> and Berk et al.<sup>7</sup> Our study showed highest prevalence (16.3%) of hypermetropia amongst refractive errors. Also high prevalence of hypermetropia followed by myopia (9.07%) and astigmatism (5.4%) was reported in Down’s syndrome patients by Arsen,<sup>2</sup> Caputo,<sup>5</sup> Shapiro<sup>6</sup> and Berk et al.<sup>7</sup>

High prevalence of hypermetropia in our study and other studies may be attributed to abnormal refractive development in children with Down syndrome as reported by Olav H Haugen.<sup>8</sup> Also increase in refractive error with age in these patients is proposed to occur because of failure of emmetropisation. We found prevalence of strabismus as 21% which is similar to its prevalence 21.8% as reported by Berk et al.<sup>7</sup> Wong and Ho<sup>9</sup> (20%) while prevalence of strabismus by other studies is 29% by Cregg et al.,<sup>4</sup> 32% by Nanda et al.<sup>3</sup> and 32.5% by Arsen et al. However Caputo<sup>5</sup> reported a much higher prevalence (57%) in his study. Also we found esodeviation (1 4.5%) more common than exodeviation (9.09%). Late onset of strabismus may be linked to potential failure of emmetropisation and also to uncorrected hyperopia in Down syndrome children. Developmental delay in these children along with high prevalence of refractive errors can lead to amblyopia, This

amblyopia can further lead to strabismus. Lubic A et al.<sup>10</sup> in their study found that esodeviation was mostly associated with hyperopia (40%) of Down syndrome patients.

Other ocular morbidities we found were retinal pathologies (3.6%), horizontal nystagmus (3.6%) and cataracts (1.8%).

To the best of our knowledge our study is first of its kind in North India as it was conducted in district early intervention centre. The patients studied were mostly referred from periphery which can contribute to a concentrated disease population and high prevalence of morbidity. Our study is lacking in a control group which can be one limitation.

Our study emphasizes on the fact that there is high prevalence of ocular morbidity in Down syndrome patients. This visual handicap in these already compromised children will affect their quality of life and increase economic and social burden of the nation.

Our proposal is that screening of these children by paediatric ophthalmologist should be practiced as a routine to facilitate early intervention of these ailments. More of rural population should be channelized to these centres as rural areas are also short of prenatal screening programmes.

## 5. Conclusion

Our study highlights the high prevalence of ocular disorders in Down syndrome children. Early detection and intervention of these disorders in these already deprived children will reduce social, economic and psychological burden of the society. This will prevent irreversible visual loss in these children and assure better quality of life. Our study brings forth the magnitude of this problem and how it can be tackled efficiently.

## 6. Source of funding

None.

## 7. Conflict of interest

None.

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## Author biography

**Naheed Akhtar** Assistant Professor

**Anam Khalid** Optometrist

**Uzma Firdaus** Assistant Professor

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