

Original Research

Evaluation of correlation between ocular manifestations and severity of mental retardation

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ABSTRACT:

Ocular manifestations are common in mentally retarded children. Because of population growth these problems are increasing day by day. The aim of the present study was to evaluate the correlation between ocular manifestations and severity of mental retardation among mentally retarded children. **Material and methods:** The present study was undertaken in the department of ophthalmology and paediatrics, S.N. Medical College, Agra. Two hundred and forty mentally retarded children between the ages of 3 months to 15 years of either sex were scrutinized to find out the prevalence of ocular manifestations in cases of mental retardation. A complete case history was taken. **Results:** In our study the undifferentiated group of 120 mentally retarded children, 18 of them were found to have strabismus, 34 refractive errors, 10 congenital cataract, 8 optic atrophy, 4 nystagmus, 4 cranial nerve palsies, 2 ptosis, 2 angular dermoids and twenty one were color vision deficient. On application of statistical test, the association between the severity of mental retardation and ocular manifestations was found to be highly significant. **Conclusion:** Our study concluded that the association between the severity of mental retardation and ocular manifestations was found to be highly significant. Children with mental retardation should undergo annual ophthalmological check up. Early detection and correction of ocular problems will prevent visual impairment in future.

Key words: Strabismus, ocular manifestations, mentally retarded children, nystagmus.

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INTRODUCTION:

Vision plays a significant role in the development of a child. Uncorrected vision affects the child's performance at various levels. It adds socio-economic burden on the family. Ocular problems are frequently seen in mentally retarded children.¹⁻³ World Health Organization (WHO) estimates the prevalence of mental retardation in the general population (across all ages) to be 2%, being 3% in individuals below the age of 18 years.⁴ Despite the magnitude of the problem, affected individuals are underserved due to a lack of awareness about their problems, even among healthcare providers.⁴ The presence of more than one disability in an individual can have a multiplicative rather than an additive effect on their life experience.⁵ The aim of the present study was to

evaluate the correlation between ocular manifestations and severity of mental retardation among mentally retarded children.

MATERIAL AND METHODS:

While selecting cases, special consideration was given to children with the history or observations of any of the following features which are usually associated with mental retardation:

1. Delayed neuromuscular development and other milestones.
2. Convulsions and tremors.
3. Subnormal alertness and responsiveness to environment.
4. Irritability and restlessness.

5. Lack of concentration.
6. Learning problems.
7. Speech defects.
8. Defective hearing and/or vision.
9. Paresis and paralysis of muscles.
10. Emotional lability.
11. Abnormal behaviour and mannerism.
12. Teeth grinding and drooling
13. Abnormal psychological appearance.

These cases were assessed for their intellectual levels on the following intelligence tests:

1. Vineland Social Maturity Scale.
2. Seguin Form Board Test.
3. Stanford Binet test (Allahabad Hindi Version)

1. Vineland Social Maturity Scale:

This scale was administered to those children who were not able to take any test of intelligence. It consisted of social maturity graded in age levels in years, starting from 0-1 to 25 years. The information given by the parent regarded social maturity was noted and level of social age was assessed.

2. Seguin Form Board Test:

This test consisted of 10 blocks of different shapes placed in a grooved board. For assessment of intelligence these blocks were removed in three piles (as the standard method). Three trials were given to the child to replace the block to its appropriate place. Time for each trial was recorded by the stop watch and corresponding to the shortest time taken his mental age was noted from table of norms. Subsequently I.Q. was calculated.

3. Stanford Binet test:

This test was originally constructed in 1905. It was adopted by the Bureau of Psychology, Allahabad in 1959. Indian adaptation of the test was used in the study. In this test, objects, pictures and drawing have been used largely at younger age. At older age levels, printed, verbal and numerical materials have been used increasingly. The test was used in children above the age of two years. Mental age was calculated by adding the credits from the basal age upto the ceiling age.

A complete record of history and examination was made.

Ocular examination:

External examination of the Eye:

First of all a general examination was done in good illumination noting any obvious sign which may be present such as orbital deformity, skull deformity, facial asymmetry, ptosis, squint etc.

Most retardates exhibited unusually fine cooperation if they were not intimidated or frightened. Whenever possible, a member of the child's family, preferably a parent was present to offer moral support. A few minutes invested in

developing rapport with the child was amply rewarded during ensuing examination.

In most of the cases anterior segment of the eye was examined by using torch having good focus and corneal loupe, only a few cases when it was indicated, slit lamp examination was also supplemented.

Visual acuity:

Visual acuity was measured by Standard Snellen's chart. The children who were unable to read the Snellen's chart, were given a white card on which a broken ring "C" was drawn and were asked to indicate direction of selected broken ring.

For very young child and/or severely retarded child standard chart with calibrated hand pictures was used. The children were asked to indicate direction by pointing their hand or finger, up, down, right or left.

In toddlers and very retarded children vision was tested by response to toys of various sizes, recording the distance at which response was elicited.

Ocular motility:

Ocular motility was tested simply by attracting the child's gaze in various directions. Movement of each eye individually (duction) and two eyes together (Version, conjugate movements) were assessed. Alignment was judged by symmetry of corneal light reflexes and by response to alternate occlusion of each eye.

Colour vision:

Ishihara pseudo isochromatic plates were used to detect colour vision deficiency. In a room which lit adequately by day light, the plates were held at 75 cm, from the mentally retarded children and tilted so that the plane of the paper was at right angle to line of vision. The numerals which are seen on plates 1 -25 are stated and each answer should be given without more than 3 seconds delay.

In all subjects plates 26-38 covered with transparent tissue paper were also used and the binding lines between 2X's were traced with soft camel brush. Tracing time for each plate was noted.

Type of colour deficiency was read from the booklet provided with the ishihara pseudo isochromatic plates.

The patient should wear glasses if a refractive error exists.

Examination of the Fundus:

Both direct and indirect methods of ophthalmoscopy were used. Pupil was dilated with either of these mydriatics, 1 percent atropine ointment twice daily for 3 days, homatropine 2 percent or phenylephrine 5 percent or 10 percent eye drops. Children who were too young or uncooperative were sedated prior to ophthalmoscopic examination.

Cycloplegic refraction:

Mentally retarded children with complaints of diminished vision and children with less visual acuity than normal having clear media were subjected to cycloplegic

refraction. Atropine 1 percent eye ointment or drops three times a day for three days was prescribed and child was called on fourth day for refraction. Reflecting mirror retinoscope and streak retinoscope were used for refraction.

The mentally retarded children were studied during atleast two sessions. During the first session, an examination of the visual acuity, of the anterior segment and of the orthoptic status was performed. Prior to second session, the child's pupils were dilated with a cycloplegic agent so that during this session cycloplegic refraction and thorough fundoscopic examination was performed. If any further tests were required or if the child had been uncooperative, a third visit was scheduled.

A statistical analysis of the data was done to find out any correlation between the severity of mental retardation and ocular manifestations.

RESULTS:

In our study the undifferentiated group of 120 mentally retarded children, 18 of them were found to have strabismus, 34 refractive errors, 10 congenital cataract, 8 optic atrophy, 4 nystagmus, 4 cranial nerve palsies, 2 ptosis, 2 angular dermoids and twenty one were color vision deficient.

Table 1: Mentally retarded children with different ocular manifestations.

Mentally retarded children	Number (120)
Strabismus	18
refractive errors	34
congenital cataract	10
optic atrophy	8
Nystagmus	4
Cranial nerve palsies	4
Ptosis	2
angular dermoids	2
color vision deficient	21

Thirty mentally retarded children with developmental cranial anomalies presented with congenital cataract in 4 cases, optic atrophy in 4 cases and proptosis in 6 cases.

Out of 18 cases with down's syndrome, strabismus was found in 10 cases and optic atrophy in 4 cases.

Fourteen cases of cerebral palsy presented with strabismus in 6 cases and congenital cataract in 4 cases. Out of 8 cases of arachnodactyly, 4 cases were having subluxation of lens. Sixteen cases of prematurity presented with strabismus in 6 cases and refractive errors in 6 cases. Four cases of Laurence Moon Beidl syndrome presented in 2 cases with a typical retinal pigmentary dystrophy.

On application of statistical test, the association between the severity of mental retardation and ocular manifestations was found to be highly significant.

Table 2: Mentally retarded children with developmental cranial anomalies

Mentally retarded children with developmental cranial anomalies	No.
congenital cataract	4
optic atrophy	4
proptosis	6

Down syndrome children with developmental anomalies	No.
strabismus	10
optic atrophy	4

Table 3: Cerebral palsy children with developmental anomalies

Cerebral palsy children with developmental anomalies	No.
Strabismus	6
congenital cataract	4

Table 4: Arachnodactyly children with developmental anomalies

Arachnodactyly children with developmental anomalies	No.
Subluxation of lens	4
congenital cataract	4

Table 5: Premature children with developmental anomalies

Premature children with developmental anomalies	No.
Strabismus	6
Refractive errors	6

Table 6: Laurence Moon Beidl syndrome with developmental anomalies

Laurence Moon Beidl syndrome with developmental anomalies	No.
Typical retinal pigmentary dystrophy	2

DISCUSSION:

Visual disorders are frequently seen in mentally retarded children.¹⁻³ In our study the undifferentiated group of 120 mentally retarded children, 18 of them were found to have strabismus, 34 refractive errors, 10 congenital cataract, 8 optic atrophy, 4 nystagmus, 4 cranial nerve palsies, 2 ptosis, 2 angular dermoids and twenty one were color vision deficient. Thirty mentally retarded children with developmental cranial anomalies presented with congenital cataract in 4 cases, optic atrophy in 4 cases and

proptosis in 6 cases. Out of 18 cases with down's syndrome, strabismus was found in 10 cases and optic atrophy in 4 cases. Fourteen cases of cerebral palsy presented with strabismus in 6 cases and congenital cataract in 4 cases. Out of 8 cases of arachnodactyly, 4 cases were having subluxation of lens. Sixteen cases of prematurity presented with strabismus in 6 cases and refractive errors in 6 cases. Four cases of Laurence Moon Beidl syndrome presented in 2 cases with a typical retinal pigmentary dystrophy. On application of statistical test, the association between the severity of mental retardation and ocular manifestations was found to be highly significant.

Joshi RS et al concluded that 51.45% had ocular problems. Strabismus (10.37%) and refractive error (20.75%) were the common ocular problems seen in this study. An association was found between the severity of mental retardation and ocular problems ($P < 0.005$). However, no association was seen between the severity of mental retardation and strabismus and refractive error.⁶

Gogate P et al concluded that a total of 60% had moderate-to-severe learning disabilities (IQs < 50), and the mean IQ was 45.4. Two hundred and thirty-eight (45.3%) had ocular disorder; 143 (27.3%) had an uncorrected refractive error, followed by strabismus in 83 (15.8%), nystagmus in 36 (6.8%), optic atrophy in 34 (6.5%), and congenital anomalies in 13 (2.5%), 103 children had more than one abnormality. Only 12 of the 143 students with refractive errors were using spectacles. A total of 132 (48.7%) children with a history of perinatal insult had ocular problems. Ocular disorders were also common in those with a history of epilepsy, Down's syndrome, and cerebral palsy.¹

Koslowe *et al.* showed the result that in the children having Down syndrome have found out significant correlation between strabismus with the increased level of mental disability. However, no correlation was seen with refractive error.⁷

Bankes found 49% mentally handicapped children had some form of refractive error.⁸

A study of patients with Down's syndrome in Turkey, reported 11 patients (19%) had strabismus and of them 10 (18%) had esotropia with a higher prevalence of hypermetropia.⁹

Another recent study from Turkey showed a higher prevalence of strabismus and refractive errors in Down's syndrome.¹⁰

CONCLUSION:

Our study concluded that the association between the severity of mental retardation and ocular manifestations was found to be highly significant. Children with mental retardation should undergo annual ophthalmological check up. Early detection and correction of ocular problems will prevent visual impairment in future.

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