

Prevalence of mental retardation and congenital ocular anomalies in paediatric age group at a tertiary hospital in north Bihar

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Abstract

Background: Congenital ocular anomalies constitute a major cause of childhood blindness. According to W.H.O., in 2006, childhood blindness accounted for 3% of global blindness. Although prevalence of global childhood blindness is 10 times lower than that of the adult, the magnitude of the ocular morbidity is high because of the expected years to be lived in blindness. Half of the 1.4 million cases of childhood blindness are avoidable. Early diagnosis and management of congenital ocular anomalies can help to prevent avoidable childhood blindness to some extent. **Materials and Methods:** A hospital based observational study on 1225 cases in the age group of 0-14 years was conducted in a tertiary hospital of Bihar to find out the prevalence of congenital ocular anomalies, to determine the prevalence of various types of congenital anomalies, prevalence of mental retardation associated with these anomalies, various demographic and environmental factors associated with these anomalies and the prevalence of blindness in the said group. Results obtained were analysed with standard statistical procedures. **Results and observations:** The prevalence of congenital anomalies in the paediatric age group was 6.9%. Congenital cataract was the commonest anomaly (34.11%). Positive family history, use of medications and infections during pregnancy, gestational genital bleeding, 1st and 2nd birth rank, preterm delivery and systemic anomalies were associated with high prevalence of congenital ocular anomalies. The prevalence rate of blindness in the said group was found to be 9.41% in the present study. **Conclusion:** Congenital ocular anomalies are associated with various demographic and environmental factors. Mental retardation is present in many cases which often remain undiagnosed. Early diagnosis and management of the treatable cases will help to reduce the mental and visual morbidity.

Key Words: congenital ocular anomalies, mental retardation, childhood blindness, demographic and environmental factors.

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Received Date: 10/10/2019 Revised Date: 06/11/2019 Accepted Date: 02/12/2019

DOI: <https://doi.org/10.26611/1071231>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:

04 December 2019

INTRODUCTION

Congenital anomalies are “gross morphological changes outside the range of the variations characteristic of the species, which are evident at or about the time of birth and are due to arrest or aberration of the process of development.”² Genetic and environmental factors play important role in congenital ocular anomalies but most of the cases the underlying cause remain unexplained. The present study is an attempt to find out the proportion of congenital ocular anomalies in paediatric age group and the prevalence of mental retardation among them. Various environmental and demographic factors known to influence such anomalies are also discussed.

How to cite this article: Anirban Chakrabarti, Nivedita Choudhury. Prevalence of mental retardation and congenital ocular anomalies in paediatric age group at a tertiary hospital in north Bihar. *MedPulse – International Journal of Psychology*. December 2019; 12(3): 57-61. <http://www.medpulse.in>

OBJECTIVES

The present clinical study was done at a tertiary hospital in north Bihar with the following objectives:

- To find out the prevalence of congenital ocular anomalies in paediatric age group attending the Out Patient Department of Ophthalmology.
- To find out the prevalence of mental retardation among them.
- To determine the prevalence of different types of congenital anomalies.
- To find out the environmental and demographic factors known to influence such anomalies.
- To find out the prevalence of blindness due to congenital ocular anomalies in the said group.

MATERIALS AND METHODS

Study design:

This was a hospital based non interventional cross-sectional study conducted on 1225 patients attending the Out Patient Department of Ophthalmology and Psychiatry.

Study period:

Two years (from 15th October, 2017 to 14th October, 2019).

Inclusion criteria

- Age: 0-14 years.
- Children with all congenital ocular anomalies.

Exclusion criteria

- Patients with acquired ocular disorders, trauma and infections.
- Blindness was defined as best corrected distant visual acuity of $<3/60$ in the better eye or corresponding visual field loss to <10 degrees.¹
- Mental retardation was assessed and graded in the Psychiatry OPD using the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM - IV)¹¹
- Socio economic grading was done according to updated Prasad's Socio-Economic Classification for 2013.³
- All the selected patients were subjected to detailed history taking, systemic and comprehensive ocular and mental status examinations. Some children were examined under general anaesthesia.

Data analysis

Cases were recorded according to proforma and documentation with photography was done in selected

cases. Collected data were tabulated and analysed using standard statistical procedures (SPSS 25).

RESULTS AND OBSERVATIONS

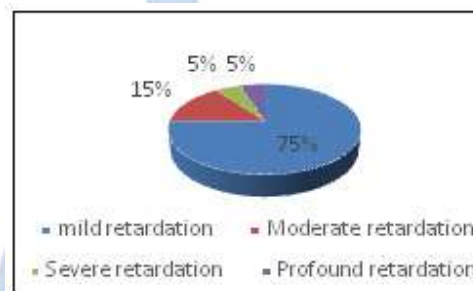
Out of 1225 patients, 85 cases of congenital ocular anomalies were diagnosed (6.9%). 56 cases (65.8%) were males and 29 cases (34.1%) were females. Rural cases were 60 (70.6%) and urban cases were 25 (29.4%). History of consanguineous marriage was present in 6 cases (7%). History of prenatal infection was present in 7 cases (8.2%). History of medication during pregnancy was present in 19 cases (22.4%). Positive family history was found in 11 cases (12.9%). History of preterm birth was present in 5 cases. Congenital cataract was the commonest anomaly (34.11%). Slightly higher percentage was found in females (34.48%) compared to males (33.93%). Whole globe anomalies accounted for 25.80%, colobomatous disorders of uvea were present in 22.35%, congenital corneal anomalies were present in 7.06%, congenital glaucoma were present in 9.41% cases and albinism was present in 1 case (1.18%). Congenital glaucoma in females accounted for 13.80% whereas it accounted for 7.14% in males. Highest prevalence of congenital ocular anomalies was present in 0-5 years age group (38.80%), followed by 5-10 years age group (32.94%) and 10-14 years age group (28.24%). Sex distribution in the said age group was insignificant. Extra ocular systemic anomalies were found in 13.78% in the present study. Patient with mental retardation and systemic anomalies were referred to the department of Psychiatry for evaluation. 20 cases had some degree of mental retardation according to DSM IV criteria.¹¹ In this group 15 cases (75%) with mild, 3 cases (15%) with moderate, 1 case (5%) each with severe and profound mental retardation were present. Socio-economic distribution of cases revealed 60% prevalence in lower group, 35% in middle group and 5% in upper group. 7.9% cases belonged to Hindu community, 8.5% Muslim community and 3.2% to other communities. Majority cases (22%) occurred when the maternal age at conception was between 21-25 years. Systemic anomalies were associated with 13% cases. Congenital cataract was commonest in birth rank 1 (23.04%). Congenital glaucoma, globe anomalies and uveal coloboma were common in birth rank 2. Definite history of prenatal exposure to radiation could not be attained in any case in this study. Among the 85 cases, 8 cases had best corrected visual acuity $<3/60$ in the better eye. So, the hospital prevalence rate of childhood blindness due to congenital ocular anomalies was found to be 9.41% in the present study.

Table 1: Prevalence of congenital ocular anomalies, demographic and environmental factors

Sl no	Categories	Number of cases	Percentage (%)
1	Total no. Of cases	1225	100
2	No. Of cases with congenital anomalies	85	6.9
3	Male	56	65.8
4	Female	29	34.2
5	Rural cases	60	70.6
6	Urban cases	25	29.4
7	H/o Consanguineous marriage	6	7
8	H/o bleeding per vagina	22	25.9
9	H/o medication during pregnancy	19	22.4
10	Positive family history	11	12.9
11	H/o preterm birth	5	5.9
12	H/o prenatal infection	7	8.2

Table 2: Congenital anomalies and association with mental retardation

Grade of mental retardation	No. of cases	Percentage
Mild	15	75%
Moderate	3	15%
Severe	1	5%
Profound	1	5%

**Figure 1:** Prevalence of mental retardation in congenital ocular anomalies**Table 3:** Age and sex distribution of cases

Group	Age (years)	Male	Percentage	Female	Percentage	Total	Percentage
1	0-5	21	37.50%	12	41.38%	33	38.80%
2	5-10	18	32.14%	10	34.48%	28	32.94%
3	10-14	17	30.36%	7	24.14%	24	28.24%

Table 4: Socio-economic distribution of cases

Lower	Percentage	Middle	Percentage	Upper	Percentage	Total	Percentage
51	60%	30	35%	4	5%	85	100%

DISCUSSION

The present study revealed the prevalence of congenital ocular anomalies in paediatric age group to be 6.9%. Singh *et al* (1979) found the incidence to be 10.5% per 1000 live births.⁴ Our study revealed prevalence of childhood blindness to be 9.41%. Dondona R and Dandona L (2001) in Andhra Pradesh found 16.7% of non-treatable and non-preventable childhood blindness is due to congenital ocular anomalies.⁵ High prevalence of congenital ocular anomalies in the present study may be due to selection of the study group from hospital compared to selection of study group from the

community. Rural cases constituted 70.6% and lower class constituted 60%. Poor maternal nutrition during pregnancy, high rate of illiteracy and lack of health awareness are probable factors in this segment of population. Maternal age range of 21-25 years was associated with highest percentage of congenital anomalies. This may be due to high fertility rate found in this age group. However, prevalence of Down's syndrome with congenital cataract was high in maternal age more than 40. The present study showed that prevalence rate of mental retardation with congenital ocular anomalies was 1.6%, mild mental retardation in

75%, moderate mental retardation in 15%, severe mental retardation in 5% and profound mental retardation in 5% cases. Donald E Greydanus and Helen D Pratt (2005)¹² found associations of different congenital syndromes like Down's Syndrome and neurofibromatosis which have several congenital ocular anomalies with variable mental retardation (IQ 50-60) in case of Down's syndrome and average IQ 90 in cases of neurofibromatosis. This association is quite significant compared to prevalence of mental retardation in general population which is estimated to be 3% (mild), 0.4% (moderate) and 0.1% (severe) mental retardation.¹² In the present study it was found that congenital cataract was commonest in birth rank 1 (23.04%). Congenital glaucoma, globe anomalies and uveal coloboma were common in birth rank 2. Murty⁶ found that birth rank 1 was associated with 50% cases of congenital cataract. Dutta L.C. and Bhattacharjee H (1982) found the incidence of congenital cataract is common in first birth rank and drops down up to 5th birth rank.⁷ 5.9% cases had history of preterm delivery. Singh *et al* (1979)⁴ found congenital anomalies were common in preterm births. Neonatal hypoglycaemia in preterm births may be the cause of congenital cataract. 25.9% cases had h/o bleeding PV in pregnancy. Nishimura H (1969)⁸ found positive correlation between genital bleeding during pregnancy with congenital ocular anomalies. Foetal hypoxia due to retro placental bleeding may be the cause of such anomalies. 8.2% cases gave h/o prenatal infection. Correlation between maternal TORCH infection and congenital ocular anomalies has been documented in literature.⁹ Family history was positive in 12.9% cases. Out of the 11 cases, 5 cases were of congenital cataract and 2 cases were of congenital glaucoma. Singh *et al* (1979)⁴ found positive family history in 14.3% cases of congenital ocular anomalies. Extra ocular systemic anomalies were found in 13.78% in the present study which correlates with the findings of Singh *et al* (1979)⁴ who observed 19% association with systemic anomalies. Consanguineous marriage has a positive association with congenital ocular anomalies. In 1992 a study in Saudi Arabia involving 607 children showed 8% association.¹⁰ In the present study 22.4% cases used medications during pregnancy. Use of medications during pregnancy had been reported by several authors to be associated with congenital ocular anomalies. Alcohol, cocaine, benzodiazepines, thalidomide, anticonvulsants, opioids and vitamin have documented ocular teratogenic effects.⁹

SUMMARY

The prevalence of congenital ocular anomalies in the paediatric age group is 6.9%. Congenital cataract is the

commonest anomaly (34.11%) followed by whole globe anomalies (25.80%), uveal coloboma (22.35%), congenital corneal involvement (7.06%), congenital glaucoma (9.41%) and albinism (1.18%). Positive family history, use of medications and infections during pregnancy, gestational genital bleeding, first and 2nd birth rank, preterm delivery and systemic anomalies are associated with high prevalence of congenital ocular anomalies. The prevalence of mental retardation was

CONCLUSION

Congenital ocular anomalies are associated with mental retardation and various demographic and environmental factors. The present study is an initiative to detect the prevalence of congenital ocular anomalies, their associations with mental retardation and various demographic and environmental factors associated with them. Early detection and management of treatable cases will help to reduce long term permanent visual disabilities and ensure better quality of life in the children, who are the future of our nation.

ACKNOWLEDGEMENT

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Source of Support: None Declared
Conflict of Interest: None Declared