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## Review Article

### CHILDHOOD CORNEAL BLINDNESS IN JHARKHAND: A REVIEW

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#### ABSTRACT

Childhood blindness is one of the priority targets of vision 2020. It is a global problem especially in developing countries as nearly two third of childhood blindness is preventable and many a times it goes unnoticed and irreversible. Thus it is an outstanding problem in the field of ophthalmology, posing a great challenge to the medical profession in general and ophthalmologist in particular. Corneal blindness is one of the leading causes of childhood blindness in India. It is responsible for about 55-60% of total childhood blindness, of which 73% belongs to low socioeconomic group. About 50-70% of the corneal blindness in children is either treatable or largely preventable. Corneal scarring due to Vitamin A deficiency, Measles, Ophthalmia neonatorum and use of harmful traditional practices are some of the important causes of corneal blindness in India. Various studies have been conducted by different authors to quantify the prevalence and enumerate the causes of blindness in children. This study helps to address the issue of corneal blindness in particular as it is reversible cause in most of the circumstances provided the preventive measures taken in time.

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#### INTRODUCTION

Corneal blindness is one of the important contributing factors of childhood blindness. It is a great challenge not only to Ophthalmologist but paediatrician also, as in contrast to blindness in the adult, childhood blindness in children is a lifetime sentence. Perhaps more disturbing is the fact that nearly 50-70% of corneal blindness in children is preventable<sup>1</sup>. Many a times it goes unnoticed and becomes irreversible.

##### Definition of blindness

A child is defined by UNICEF as an individual less than 16 year of age.

Blindness is defined by world health organization (WHO) as a corrected visual acuity less than 3/60 in the better eye or actual visual field of less than 10 degree<sup>2,3</sup>.

A person is referred as visually impaired when the vision in better eye is 6/60 to 3/60.

The visual impairment is further graded as

1. Low: 6/9 to 6/60 in the better eye
2. Moderate: 6/60 to 3/60 in the better eye
3. Severe: 3/60 to perception to light in the better eye

#### Data on prevalence of corneal blindness in India

Although no survey has been done in India to measure exact magnitude of the prevalence of corneal blindness in children. Yet based on different studies there are approximately 2 million blind children in India. Probably 20-100 new blind children per year per million of total population gets added to this blind population every year in India. It has been observed by different workers that corneal blindness is responsible for about 55-60% of total childhood blindness in India of which 73% belongs to low socioeconomic group. Further highest incidence was found in children upto 5 years of age group. Govt. of India (1995) in its survey has found that corneal blindness is responsible for 3% of total blindness<sup>4</sup>.

Factors responsible for higher prevalence of corneal blindness

##### 1. Prevalence of potentially blinding conditions:

- Vitamin A deficiency
- Malnutrition
- Infection
- Harmful traditional eye remedies
- Quack practices
- Superstitions, belief and ignorance
- Underutilization of available manpower

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2. Inadequate preventive measures for control of conditions responsible for corneal blindness:
  - Measles
  - Congenital rubella
  - Ophthalmia neonatorum
3. Lack of knowledge and concern about eye care
4. Lack of proper infrastructure and paucity of trained Ophthalmic personnel to diagnose treat and prevent the blindness
5. Underutilization of available manpower
6. Rural/urban imbalance in availability of specialized eye care

### Implications of corneal blindness

Corneal blindness produces an enormous effect on health and economy of an individual, family, society and nation as a whole, as the number of blind years (active productive life) is much greater compared to blindness in adults. Thus in place of contributing to the economy, they are in fact burdening on the family. The economic burden of corneal blindness in India is enormous as having an agriculture based economy most of the child become unable to be a productive member of the community. On the contrary they take away 10% of the productive time of one of the economically productive member of the family<sup>5</sup>. Early onset blindness adversely affects the psychomotor, social and emotional development. Further blind children have a higher death rate. The biggest paradox in the whole episode is that about 50-70% of the corneal blindness in children is either treatable or largely preventable.

### Causes of corneal blindness

There is a marked regional variation in the various causes of corneal blindness in different part of the world. In the poor countries, corneal scarring due to Vitamin A deficiency, Measles, Ophthalmia neonatorum and use of harmful traditional practices predominates.

In the present study, in this part of world, out of 450 cases of blindness, there were 93 cases (20.6%) of childhood blindness of which contribution of corneal blindness was 60%. Corneal disease, either due to corneal opacity, degeneration, staphyloma, was the second most common cause of visual impairment.

The various causes responsible for corneal blindness were as follows:

1. Refractive error including squint and amblyopia (22%)
2. Malnutrition and Vitamin A deficiency causing of corneal scarring (20%)
3. Injury leading to corneal scarring (8%)
4. Infections e.g. Measles, Ophthalmia neonatorum etc. leading to corneal scarring (8%)
5. Others like conjunctival conditions i.e. Microcornea, Megalocornea, Keratocornea and others (2%)

The above list suggests that blindness due to causes like vitamin A deficiency, Trauma, Refractive errors, Neonatal infections are treatable.

### Treatment of corneal blindness

1. Refractive errors

Children can be helped through a combination of spectacles and low vision aids to improve their vision, enabling them to read the normal print. Additionally, contact lenses, corneal refractive surgeries, and IOL can improve the vision. Squint can be corrected by eye exercises, spectacles or surgery. These measures also prevent these children from being affected with irreversible blindness.

2. Treatment of Vitamin A deficiency: Vitamin A deficiency is a major contributor to childhood morbidity and mortality. It predisposes the child to develop night blindness, Bitot's spot, corneal xerosis and corneal ulcers ultimately leading to blindness. The child with severe form will present with measles, malnutrition, malabsorption, stunting, and other physical ailments. Types of strategies adopted for the prevention and control of Vitamin A deficiency are given below:

- a. Short term approach: comprises periodic administration of Vitamin A supplement which as per WHO recommendation is as follows

Infant 6-12 month of age or any child with weight <8 kg	1 lakh IU orally 3-6 month
Children over 1 year and below 6 years	2 lakh IU orally 6 months
Infants less than 6 months, not on breast feed	50000 IU orally till they attain 6 month
Lactating mothers	20,000 IU orally once at delivery or during next 2 months

A revised schedule is followed in our country since 1972 under the programme named as child survival and safe motherhood

- 1<sup>st</sup> dose 1 lakh IU At 9 month of age with measles vaccine
- 2<sup>nd</sup> dose 2 Lakh IU At 18 month of age with booster of DPT/OPV
- 3<sup>rd</sup> dose 2 Lakh IU at 2 years

Recently, The National Programme for Prophylaxis against Blindness in Children due to Vitamin A Deficiency, of the Government of India, has made a provision for administering *mega doses of vitamin A*. It recommends for at least nine doses of vitamin A to be given to all children aged 9 to 59 months. The first dose of 100,000 International Unit (IU) is administered with measles vaccination at 9 months and subsequent doses of 200,000 IU each, every six months. It also recommends for one dose of vitamin A on measles case identification, irrespective of whether it has previously been administered prophylactically or given as routine immunization<sup>6-10</sup>.

- b. Medium term approach : It includes food fortified with Vitamin A
- c. Long term approach: This should be the ultimate aim. It implies promotion of adequate intake of Vitamin A rich foods such as green leafy vegetables, papaya, drumsticks etc.
3. Measles : By expanded programme of immunization
4. Corneal scarring/opacity: Can be corrected by keratoplasty
5. Early and prompt management of corneal injuries.

**Strategies for the prevention of corneal blindness**

1. Health promotion-By information education and communication.

**Measures can be taken are**

- a. Marriage counseling: Marriage between blood relatives or those who have a familial or genetic predisposition should be avoided
- b. Care of pre, intra and post natal period of mother- By provision of proper diet, vaccination, avoidance of alcohol and smoking, avoidance of exposure to infectious disease like rubella etc
- c. Care of new born baby-By
  - Avoiding birth injuries
  - Instillation of antibiotic in the eyes
  - Eye check of the child soon after birth.

2. Health education:

The following measures prevent eye disease and blindness

- Breast feeding
  - Diet rich in Vitamin A
  - Immunization against measles
  - Good hygiene and facial cleanliness
  - Avoidance of using traditional practices, harmful to eyes
3. Early diagnosis and treatment of Eye disease:
    - a. All new born babies should have their eyes examined at or shortly after birth
    - b. All children who are premature or with likelihood of developing familial inheritance disease should be examined by an expert eye surgeon
    - c. All infants should undergo eye check up by 6 months of age to evaluate central macular fixation and binocularity of vision
    - d. All school going children at the time of admission should have an eye check up
    - e. Any obvious deformity of eye should be examined carefully
  4. Referral services
    - a. Proper referral system from field workers to super specialist eye surgeons should be established for quick and immediate relief of the child
    - b. Prompt and timely reference of eye cases to eye specialist
  5. Interdepartmental Co-ordination:
    - a. It is imperative that ophthalmologist, Obstetrician and Paediatrician should work in close connection along with paramedical staff, social workers etc. so that the patient should be promptly and timely referred to an eye specialist.
  6. Training of Eye surgeon and Paramedical Staff:
    - a. All government and private sector eye personnel including eye surgeons, opticians, operation theatre assistants, staff nurse & field workers should upgrade their knowledge and skill through continued medical education programme.

7. Total ban on ophthalmic practices by quacks and sale of harmful eye medicines including surmas.
8. Government strategies:
  - a. Government of India has started National Programme for Prevention and care of blindness (NPCB), through which district blindness control societies (DBCS) are functional in almost all districts in India. It co-ordinates Government and Private sectors along with non Government voluntary organizations to prevent and cure blindness specially childhood blindness.

**Rehabilitation:** Through:

- Special education
- Low vision care
- Proper vocational training

**DISCUSSION**

Incidence or prevalence and causes of childhood blindness are usually obtained by population based survey. However large number of sample size is needed to have an accurate data. Thus it was perceived that the children coming from all regions of the state of Jharkhand in this tertiary care eye hospital seeking redressal of their eye problem may be taken as an indicator for prevalence of and cause of blindness in children.

The incidence of the childhood blindness in this eastern part of India was found to be 1.7% (best corrected visual acuity <3/60), while prevalence of visual impairment was 21.1%, Dorairaj *et al*<sup>11</sup> and Dandona and Dandona *et al*<sup>12</sup> in their population based survey found the prevalence of childhood blindness as 1.06/1000 and 1.7/1000 respectively. Vasudha kemmamu *et al*<sup>13</sup> also found an incidence of 1.6/1000. The National average of prevalence of childhood blindness in India is 0.8/1000<sup>14</sup>. The higher rate of blindness may be attributed to poor healthcare delivery system, poor transport facility & belief of local population in getting delayed or no treatment and indigenous treatment by unqualified doctors.

There is marked regional variation in prevalence of visual impairment in India. This may be due to imbalance in social, economic and available healthcare infrastructure in different parts of the country. The prevalence of visual impairment in this study is found to be 21.1%, while the various writers reported incidence in the range of 15.41%<sup>15-19</sup>.

**Table 1**

Study	Prevalence of Visual impairment
Present Study (2016)	21.1%
Patel <i>et al</i> (2011)	19.7%
Gao <i>et al</i> (2011)	19.2%
Bhattacharjee <i>et al</i> (2006)	36.1%
Dorairaj <i>et al</i> (2008)	35.7%
Gogate <i>et al</i> (2007)	41.3%
Dandona and Dandona <i>et al</i> (2003)	16.7%
Titiyal <i>et al</i> (2003)	27.4%

The study done by Dandona and Dandona *et al*<sup>20</sup> showed female to outnumber male in contrast to our study (Boys 58.8%), which can be due to higher number of male population in this region and also girls being less privileged in getting treatment.

## CONCLUSION

Corneal blindness causing blindness in children is a priority target of VISION 2020. The right to sight aims to reduce the global prevalence rate of blindness in children from 0.75- 4.0 per 1000 children by the year 2020. These goals can be achieved with the available knowledge and skill, a little more effort, a better healthcare delivery system, proper planning of community awareness programme and multidisciplinary collaboration.

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