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The scenario of childhood blindness and its remedy in Nepal

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Abstract

Childhood blindness represents one of the most common disabling and for children. There are approximately 1.4 million blind children worldwide and two-thirds live in developing countries like Nepal. In Nepal more than 80% of the causes of childhood blindness are preventable. The main causes of blindness are diseases related to cornea, retina, lens optic nerve, refractive errors, amblyopia, and hereditary. Most of the cases of unilateral childhood blindness are due to corneal causes. To decrease the burden of blindness, awareness program about various ocular diseases, nutritional blindness, ocular trauma, refractive errors, strabismus, and amblyopia should be provided to the community health workers and parents. School screening programs and free eye camps should be conducted and motivate the community for a regular eye checkups and follow up. Eye services should reach rural areas and for poor socio-economic conditions. Eye health education should focus on the proper nutrition of children and the harmful effects of traditional eye medicines. The objective of this study was to investigate the magnitude of childhood blindness in Nepal along with its possible causes. Similarly, this study is aimed to highlight the best possible modalities for the remedy of childhood blindness in developing countries like Nepal.

Keywords: blind school study, childhood blindness, corneal blindness, low vision, pediatric, vision impairment, school screening

Introduction

According to World Health Organization, the term "Blindness" is indicated when a child has a visual acuity of less than 3/60 in the better-seeing eye or inability to count fingers in daylight at a distance of three meters along with visual field restricted to 10 degrees from the point of fixation.¹ It is estimated that out of 1.4 million blind children worldwide, one million live in Asia.² Childhood blindness prevalence was estimated at 0.08% for South East Asian regions.³

In the world today, a child goes blind every minute and these children have a lifetime of blindness ahead.⁴ The burden of childhood blindness on the community and to an individual is huge if it is for a longer duration and that too in the productive and formative years. due to vitamin A deficiency.¹⁰ Childhood blindness causes a significant impact on the child's development, education, opportunities, and quality of life. The burden of disability in terms of blindness in children represents a major social, emotional, and economic burden to children, families, communities, and the nation in terms of loss of productivity, caring of the blind people, rehabilitation, and special education.⁵

The aim of this study was to find out the magnitude of childhood blindness in Nepal, also the causes and remedies. The study will help to understand the various ocular disorders which might lead to blindness in children along with their best possible management. Children are the future pillar of the nation, so if they suffer from blindness, neither a country can progress nor it can fulfill its goals regarding all aspects of the developments.

Method

The study was done during the period of 29 Apr 2021 to 13 May 2021. In this review, Google, Google Scholar, and PubMed were searched for various eye and vision-related

terms: blind school study, childhood blindness, vision impairment, low vision, school screening. The original journal articles from 2010 to 2020 and a few books which included chapters related to childhood blindness and its remedy were taken as references. Similarly, the reports published by the Ministry of Health and Population of Nepal on the epidemiology of blindness in Nepal and the Mid Term Review of Vision 2020: The Right to Sight, Nepal, 2011 were also retrieved for the study. Relevant full-text articles regarding childhood blindness and its remedies in Nepal were searched and included in this review.

Finding and discussion

Current scenario of childhood blindness in Nepal: In Nepal, childhood blindness is an important public health problem due to social and economic conditions.^{6,7} An estimated 80% of childhood blindness is avoidable, either preventable or treatable and 90% of blindness occurs in rural areas of Nepal.⁸ Though there has been a significant decrease in childhood blindness due to avoidable causes, much is needed to be done for the achievement of reduction of childhood blindness.⁹ In Nepal, there are 30240 blind children and another 90000 as low vision cases.¹⁰ The Rapid Assessment of Avoidable Blindness study estimated the infant mortality rate based prevalence of childhood blindness to be 0.05%.^{11,12} Previously Nepal Blindness Survey of 1981 showed childhood blindness to be <0.01 in children aged <4 y and 0.08% in children aged 5-10 y.^{13,14} According to the report from the Ministry of Health and Population Nepal in 2011, the ocular diseases causing childhood blindness are Cornea (45%), Cataract (25%), Glaucoma (10%), hereditary condition (10%), and Retinal diseases (10%).¹⁰ The three main causes for childhood blindness are Amblyopia, Strabismus, and Refractive errors. The neonatal causes of childhood blindness are mainly Ophthalmia neonatorum and Retinopathy of prematurity whereas infantile and childhood causes include Vitamin A deficiency, uncorrected refractive errors,

injuries, and infection of the eyes.¹⁰ In Nepal over a million children up to 15 y suffer from uncorrected refractive errors and over 125000 children suffer from Amblyopia. Similarly, the approximately same number of children are suffering from Strabismus could lead to permanent unilateral visual loss with loss of binocularity.¹⁰ Among the causes of blindness in children, corneal scar due to Xerophthalmia, Ophthalmia neonatorum, and other harmful traditional medications remains the commonest cause of preventable visual blindness as seen in surveys of children in inclusive schools.¹⁰ Unfortunately, hereditary and non-hereditary diseases are not preventable and in most instances untreatable at present time requiring further research. The National Vitamin A capsule distribution program has helped in reducing the prevalence of sight-threatening ocular diseases.¹⁰ Service utilization by children is low. Though the children constitute 40% of Nepal's population, they constitute only 15% of the service users¹⁰ Moreover, a girl child suffers even more exclusion among excluded children with girls in the Terai suffering the worst form of exclusion.^{15, 10}

Studies from Nepal on the causes of childhood blindness: In a study for the causes of visual impairment and blindness in children in three ecological regions of Nepal, the study mentioned that the prevalence of blindness of children in Nepal is 0.068%.^{15,8} According to the studies, blindness is more prevalent in Terai regions (0.08%), followed by Hills (0.06%) and Mountains (0.05%) respectively. In their study, the most common cause of blindness was amblyopia (42.9%) followed by congenital cataracts and corneal opacity (39%) was the most common cause of unilateral blindness in children. The other important causes of blindness were microphthalmos, retinal diseases, and strabismus. Another study conducted among students in integrated schools for the blind in Nepal reported that 40.9% of subjects had avoidable causes of visual impairment.¹⁶ Almost 23% of the affected children had corneal cause for visual impairment and its

most frequent cause being vitamin A deficiency. During the study, children under 10 y of age were also found affected though the government has vitamin A supplementary programs running for over 15 y. Other common anatomical etiologies were retina (18.4%) and lens (17.6%). Hereditary and childhood factors were responsible for visual loss in 27.9% and 22.9% of the students respectively. But the etiologies could not be determined in 46% of cases. Since more than one-third of the students were visually impaired for potentially avoidable reasons, it indicates a lack of eye health awareness and eye care services in the community.¹⁶

Another study for the causes of visual impairment in students of blind schools in Nepal highlighted that 64.1% of the children were blind due to avoidable causes, out of which 48.07% were preventable and 16.14% were treatable.¹⁷ In the study, almost 36% of the students were blind because of the corneal cause. Again, regarding corneal blindness, the major etiological factors were vitamin A deficiency, measles, and hereditary. Similarly, among all the blind students, nearly three fourth of the children had become blind <1 y of age and 52.6% were visually impaired at birth and 20.7% developed visual impairment within one year of age. Besides the corneal diseases, retinal dystrophy (20.35%), lens (12.63%), optic nerve (12.98%), and whole globe (13.33%) were the other significant causes of vision impairment.¹⁷ In another retrospective study, authors showed that nearly one in every two cases of corneal disease (47.8%) that presented to their outpatient department was of corneal ulcer and keratitis.¹⁸ Most of the subjects gave the history of injury by vegetative materials during harvesting of plants in their villages. The authors mentioned that the corneal causes of childhood blindness are mostly preventable or treatable.¹⁸ According to Nepal Blindness Study 1981, nutritional causes accounted for 17.9% of childhood blindness but later on study from an author concluded that 15.44% of the children were blind or visually impaired due to nutritional factors.^{13,17}

Table 1. Selected studies from Nepal on causes of childhood blindness

Authors	Causes of childhood blindness
1. Adhikari et al. ⁸	Amblyopia, congenital cataract, corneal opacity
2. Shrestha et al. ¹⁶	Vitamin A deficiency, Retina disorder, Lens disorders
3. Kansakar et al. ¹⁷	Corneal disorders, Retinal disorders, whole globe disorders
4. Apex Body for eye health, Midterm review of vision 2020 ¹⁰	Corneal disorders, Lens disorders, Glaucoma

Remedies and Rehabilitation of Childhood Blindness:

The studies done in Nepal on childhood blindness reveal 80-90% of causes of blindness and visual impairment are avoidable.^{9,11} So it can be recommended that future eye health programs in Nepal should focus more comprehensively on preventive actions including correction of refractive errors and surgical removal of pediatric cataracts.^{6,11} Similarly the renewed focus on providing the best possible quality of life for visually impaired children by proper low vision assessment and eye health education focusing on the general public and community health workers with governmental and institutional support is required to decrease childhood blindness.¹⁷ Detection of eye disorders with a schedule of ophthalmic examination of children including strabismus, amblyopia, corneal and retinal diseases should be done at the school entry and periodic check-up every 3 years for normal and every year for those with defects.^{19,24} Refractive error correction and glass prescription should be done at primary eye care centers.¹⁹ Prevention of Xerophthalmia and treatment of childhood glaucoma is of utmost value in preventing childhood blindness.^{20,25} Harmful traditional practices like instilling oil or ghee or milk directly into the eyes need to be avoided.² Prevention of retinopathy of prematurity (ROP) in newly born babies should be done by proper screening and monitoring, use of oxygen in the pediatric unit of the hospital.²¹ The curable childhood blindness, mainly congenital cataract, and corneal opacity, should be taken care of by the experts at a secondary and tertiary level of eye care services.²

Uncorrected refractive errors and childhood blindness were the most important priorities of the VISION 2020: Right to Sight initiative.⁶

Importance of correction and management of refractive error is significantly high for the management of visual impairment. Early detection is crucial as it may lead to amblyopia and other permanent visual impairments. The early intervention of visual disorders gives children a better opportunity to develop educationally, socially, emotionally, and physically.⁶ According to the Mid-term review of vision 2020, it is estimated that 1013141 children under 16 y of age have refractive errors which if uncorrected or lately corrected might cause lazy eyes and other complications.¹⁰ Even when glasses are prescribed to the children, children may not wear them properly and regularly because of stigma, ignorance, and negative parental attitudes.⁶ In the same way, the pediatric population is not quick in sharing their visual problems and parents might be unaware of their children's visual problems. Many school children are not getting optimum ocular health services. Timely diagnosis along with appropriate correction is very important in the pediatric age group for appropriate educational and social interactions of children.⁶

To reduce the burden of childhood blindness, the administration of Vitamin A drops under the universal immunization program and regular school eye screening to detect refractive errors should be done with the provision of free spectacles to poor people.²² Through the various communication media, awareness to prevent eye injuries and eye infections in children and educating the communities about the consumption of easily available and affordable food items rich in vitamin A should be carried out.² Training of primary and secondary school teachers to detect any defect in visual acuity in children using visual acuity chart and referring the

children to a secondary or tertiary eye care center for further management if needed should be made.¹⁹ Awareness programs on corneal ulcers and significances of vitamin A supplementation along with training of local traditional healers and drug retailers should be run at a frequent interval of time.¹⁹ Since blindness and visual impairment are more common in the Terai region with a large number of children with congenital eye diseases, more emphasis should be given to those regions.⁸ Since the ocular morbidity differs in each ecological region, our plans and programs should be based on evidence-based management.^{8,15} The causes can be hereditary or genetic, genetic and general eye health counseling must be made a part of perinatal and post-natal care with an emphasis on regular follow-up.¹⁷ Some ocular disorders like Toxoplasmosis, Rubella, Cytomegalovirus, and Herpes simplex infection can be due to intrauterine causes.² So particular attention should be paid during pregnancy and childbirth time. Similarly, the establishment of a pediatric ophthalmology unit, pediatric refraction, and low vision rehabilitation should be done in every eye hospital.²³ Regarding corneal blindness reduction in children, the provision of grants for the establishment of eye banks and eye donation centers should be considered in time.^{26,17}

Conclusion

In Nepal, the majority of the causes of childhood blindness are avoidable, either preventable or treatable which indicates a lack of eye health awareness and eye care services in the community. Most of the blind children live in the rural areas of Nepal where ocular health services are still not reachable. Blindness secondary to refractive errors suggests that eye care services and facilities in various regions of our country are inadequate. Most of the children are presented late, living a visually impaired life before the interventions. The causes of childhood blindness and their prevalence vary according to the region and socio-economic condition of the children in Nepal. Among the children, the

main causes of blindness were corneal, retinal, hereditary, refractive errors, and amblyopia which needs early intervention for their career development. Moreover, eye health education focusing on the general public and community health workers and the establishment of a pediatric ophthalmology unit in every eye hospital is required to decrease childhood blindness in Nepal.

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Conflict of Interest

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