e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(5); 1893-1896

Original Research Article

Visual Impairment Among School Going Paediatric Group Children in Rural Areas of Bihar and Jharkhand: A Population Based Study

Chandra Shekhar Pandey[1], Pradeep Karak[2]

[1]Assistant Professor, Department of Ophthalmology, Nalanda Medical College and Hospital, Patna
[2]Associate Professor, & Head, Department of Ophthalmology, Nalanda Medical College and Hospital, Patna

Received: 14-02-2024 / Revised: 20-03-2024 / Accepted: 17-04-2024
Corresponding Author: Dr. Pradeep Karak
Conflict of interest: Nil

Abstract:

Background and Objectives: The study aims to ascertain the prevalence and cause of low vision/ blindness in children of the rural population of the Indian states of Bihar and Jharkhand and justify the investment done on a population based survey for the particular age group.

Material and Methods: The documentation of 1500 children was done with respect to their demographic data and ophthalmological examination.

Results: The prevalence of childhood blindness was observed to be 0.2% with a predilection to female sex. The most common cause of visual impairment was uncorrected refractive errorwith incidences of blindness caused due to correctable condition of congenital cataract.

Conclusion: Keeping in view of the life expectancy of 68 years in India, it can be reasonably stated that the number of years of visual impairment that can be shunned by these children oriented population based programs will have a significant impact on the burden being posed.

Keywords: Blindness, Childhood, Rural, Visual Impairment.

Introduction

Epidemiologically, the prevalence ofblindness in children varies according to thesocio-economic development and under-5mortality rate of the country in question. The countries in high-income group have a childhood blindness prevalence of 0.3 per 1000 children, while the low-income countries have five times higher prevalence of 1.5 per 1000 children [1]. As per Saxena et al. (2015) [2], the prevalence of blindnessin paediatric age group of < 15-year-old in India was 0.8 per 1000 children. The prevalence of childhood blindness is low as compared to that of adults, but the total burden causes considerable loss by affectingthe education, probability of getting a job and social welfare of so many children [3]. It is difficult to pinpoint the cause of blindness and low vision in children. This can be attributed to a variety of reasons, suchas low prevalence, rare clinical/ genetic conditions affecting the eye of a child and the high cost to conduct a population-based survey for a large sample size. These factorshave led to extraction of data by surveying abiased source of blind schools or by reviewing the national registries documenting the childhood blindness.Many countries from Asia, Europe, Africa and USA have documented their findings onchildhood blindness by utilising the data from above mentioned banks [4-11]. Though these surveys do provide data on large sample size but for predicting prevalence of blindness in children the data must be verified to have included all the demographic and potential factors to prevent bias [2,3]. The community-based eye care programme enabled the collection of data for a population based survey. This led to exclusion of selection bias and was formidable and economic as the primary objective was to provide care to the population. Reports from Australia for children > 6 yrs and > 12 yrs in age, from India for children < 15 yrs in age, fromChina for children in the age group of 5 – 7 yrs and 7 - 15 yrs are present in the literature under refractive error study in children (RESC) domain [12-16]. The previous Indian studies mainly covered the southernpart of the country [14], therefore, this study was performedas a population-based survey of visual impairment in schoolgoing children presenting with visual acuity < 6/60 in the better eye, with a prime objective to ascertain the prevalence and cause of low vision/ blindness in children of the rural population of the Indian states of Bihar and Jharkhand.

Material and Methods

Total of six districts from the two states of Bihar and

Jharkhand were selected randomly for the survey. A cross-sectional study on school going children in rural parts of these six districts was conducted from February 2018 to February 2020. From each district 250 students were examined making a total of 1500 children. Informed consentwas taken from parents/ guardian of the children after explaining them the importance, requirement and benefit of the study. The documentation work was divided into two groups. The first, was responsible to document the name, gender, date of birth and family contact of the children to be examined. The second group comprised of ophthalmologistwho measured corrected distance and near visual acuities with logMAR charts, external eye examination included eyelid checking and assessment of pupillary reaction, anterior segment examination using hand held flash light and slit lamp, Goldmann applanation tonometer was appliedto measure intraocular pressure and gonioscopy, dilatation of pupil was done to examine lens, vitreous, and posterior segment unless contraindicated because of risk of angleclosure. Statistical analysis was done using statistical software package SPSS for Windows, version 22 (SPSS Inc, Chicago, Illinois, USA). To compare gender-based prevalence adjusted odds ratio (OR) was utilised.

Ninety-five percent confidence intervals (CI), which accounted for the design effect attributable to clustering, were calculated for all pointprevalence estimates and for risk ratios. A statistically significant observation was reported when p-value was less than 0.05.

Results

Out of 1500 examined children, three were blind makingthe prevalence 0.2% (95% CI 0.05 to 0.39). The age rangeof these three was 4-9 years, two were female and one male.Of these three, two (one male and one female) were from rural parts of Bihar and one from rural lands of Jharkhand. The most common cause of visual impairment among the sample of this study was refractive error, accounting foralmost 82.0% of the cause for low vision.

Table 1: Causes of blindnesspresenting visual in children. Blindness defined as 60 in the better eye acuity <6/

Cause	Number (%age) of blind children
Refractive error	18 (81.8 %)
Corneal opacity	2 (9.09 %)
Congenital Eye anomaly	1 (4.54%)
Amblyopia	1 (4.54%)
Total	22 (100%)

Two children (9.1%) from rural parts of Jharkhand presented with corneal opacity, the reason for which was notdetermined in one of them while in the other it was predictedto be due to vitamin A deficiency which followed a bout of fever due to malaria as per the history provided by the family.One (4.5%) children each presented with amblyopia whichhad occurred due to nystagmus and a congenital anomaly ofthe eye in the form of iridial coloboma (Table 1).

Discussion

The present study observed 0.2% prevalence of childhood blindness in school going children of rural parts of Indian state of Bihar and Jharkhand. This data is comparable with south Indian data reported by Dandona and Dandona (2003) [17], and both these data are ten times higher than that reported by Lu et al. (2009) [3] in rural population of China. This huge difference can be attributed to the fact that the sample size of the Beijing study of visualimpairment in children was 20 times larger than the present study. The correctable refractive error amounts for the largest contributor (~ 82.0%) of visual impairment in the school going children of the present study. This fact is consistent with various reports in the literature from different parts of the world. Robaei et al. (2005) reported that 74.0% of childhood blindness in 6 year children of Australian population is due to uncorrected refractive error, while that in Chinese population was observed to be 80.3% by Lu et al.(2009) [3]. Prevalence of childhood blindness in urban population was reported to be more than the rural population in north Indian study population of Murthy et al.(2002) [18], study population of Dandona et al. (2002) [17]in south India, southern China population study of He et al. (2007)[18], the Beijing study population of Lu et al. (2009)[3], and Ip et al. (2008) [19] study population of 12 year oldsin Australia. The present study cohort lacks the data for children in urban population. The refractive error can easily be corrected with use of appropriate lens being made accessible to these children andthus reducing the burden of childhood blindness. Apart from refractive error, other condition leading to low vision in childhood as assessed by the present study which could be easily corrected includes congenital cataract. Dandona and Dandona also reported similar findings along with a prevalence of 16.6% for childhood blindness observed due to preventable causes such as blindness due to amblyopia after cataract surgery, and blindness caused by vitamin A deficiency. Dissemination of inclusive education can act as abeneficial intervention for children presenting with blindness or low vision visual impairment

due to untreatable causes. Though the prevalence (0.2%) of blindness in the present study data was low, among the children with untreatable blindness, the gender wise majority belonged to female. A relatively small sample size is in consideration, but similar reports from southern India, Beijing study and Gobi Desert have been made [14,20,21]. This could have been because of the negligence in getting the females enrolled in blind schools as reported by Rahi et al. (1995) mentioning the fact that 60.0% of the children were male in the blind schools of nine states of India [22]. The results of the present study support the suggestions given in previous literature by Lu et al. (2009) [3] and Ip et al. (2008) [19] that these screening programs can significantly impact the burden of visual impairment in children by early detection of preventable or correctable causes for the same. The mean life expectancy of an individual in India as per the Registrar General & Census Commissioner, India, is 68 years, hence, it can be reasonablystated that the number of years of visual impairment that canbe shunned by these children oriented population basedprograms will have a significant impact on the burden beingposed [1]. The limitations of the study were the failure to carry out refraction in all the children in order to state whether the subjects had myopia or hyperopia, and as previously mentioned about the lack of data from the urban areas of Bihar and Jharkhand about childhood blindness. Also, due to the low prevalence of childhood blindness, a study with much larger sample size is required to indicate the cause andprevalence of the issue.

Conclusion

Despite the limitations, this study presents with the data that can be utilized to plan the strategies enabling the execution of the programs leading to betterment of visual health of the children from the rural setting of the Indian states requiring special attention.

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