

# Is Myopia a Public Health Problem in India?

Rohit Saxena, Praveen Vashist, Vimla Menon

Dr. RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

## ABSTRACT

Myopia, a form of refractive error is a leading cause of visual disability throughout the world. In India uncorrected refractive errors are the most common cause of visual impairment and second major cause of avoidable blindness. Due to this the public health and economic impact of myopia is enormous. Although school vision screening programme is very successful in many states, still a significant number of school going children remain unidentified and the unmet need for correcting refractive errors in children appears to be significant.

**Keywords:** Avoidable blindness, myopia, refractive error, school screening

## Introduction

Myopia, commonly referred to as short sightedness is a form of refractive error and is a very common cause of visual disability throughout the world. The condition may present as blurred distance vision, eye rubbing and squeezing of the eyes. School myopia commences around 5-15 years of age and tends to stabilize in the late teens and is mainly thought to be idiopathic. High myopia may be associated with myopic macular degeneration, cataract, glaucoma, peripheral retinal changes (such as lattice degeneration, retinal holes and tears) and retinal detachment.

## Prevalence of myopia

Although, the prevalence of myopia varies by the country, age and by ethnic group it is a major cause of visual impairment in both the the developed and the developing world.<sup>(1)</sup> The prevalence of myopia has been reported to be as high as 70-90% in some Asian population with Taiwan reporting a myopic prevalence of 84% among 16-18 - years - old high school students.<sup>(2,3)</sup>

The earliest survey conducted in India in the 1970's by Jain *et al.*, has shown a prevalence of myopia of 4.79% among the school children in Chandigarh. It was higher in urban population (6.9%) in comparison to rural population (2.77%).<sup>(4)</sup> Murthy *et al.*,<sup>(5)</sup> assessed the prevalence of refractive error and related visual impairment in school going children 5-15 years of age, in an urban population in New Delhi and reported a prevalence of 7.4% of myopia.

Uncorrected refractive errors are the most common cause of visual impairment and second major cause of avoidable blindness in India. According to the World Health Organization (WHO)-NPCB survey in 1989, 1.49% population in India is blind of which 7.35% is due to refractive errors.<sup>(6)</sup> The proportion of blindness due to refractive error increased to 19.7% in the NPCB-National Blindness Survey even though the overall prevalence of blindness was reduced to 1.1%.<sup>(7)</sup> Three fourth of visual impairment was attributed to refractive errors in the same survey.

As part of the WHO initiative for correction of uncorrected refractive errors, refractive error studies were conducted in children aged 5-15 years in different countries including India.<sup>(8)</sup> In the study, conducted in 2001, the prevalence of myopia at an urban location (Delhi) was 7.45%<sup>(5)</sup> and 4.1% at a rural location (Mahmoodnagar in Andhra Pradesh).<sup>(9)</sup>

In a study in Andhra Pradesh, Dandona *et al.*,<sup>(10)</sup> reported

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## Address for correspondence:

Dr. Rohit Saxena, Dr. RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India.  
E-mail: rohitsaxena80@yahoo.com

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that refractive error is the main cause of moderate visual impairment among the younger groups and is a major public health problem in India.

### Causes of myopia

The risk of developing myopia may be influenced by genetic predisposition along with environmental risk factors. Premature and low birth-weight infants have a higher risk of developing myopia later in life and nutrition and height of the child may also affect the development of myopia. The prevalence of myopia shows significant racial differences. The ethnic and racial difference in the prevalence of myopia can be explained on the basis of common genetic pool. However, as no significant change in the gene pool over the past decades has been documented in Hong Kong, Taiwan, Japan, and Singapore, the increase in myopia prevalence observed over the past few decades in these countries suggests an environmental risk factor. Suspected environmental factors include early age close work as seen in the higher prevalence of myopia among persons who are more educated, higher educational level of the parents and the individual, higher intelligence and socio-economic status.

Numerous theories attribute close-up work to increase in axial (anterior-posterior) length of the eye causing myopia. Studies supporting this view have shown that increased prevalence of myopia is observed in certain occupations, such as microscopy, sewing, and carpet weaving that requires a large amount of time spent in close-up work. However, contrary view states that people with myopic vision will prefer the occupation, which requires near work especially, if they have been uncorrected in childhood.

The increase in number of myopic persons in progressive generations can be attributed to increasing near tasks such as working on computer, video games, and television watching. In the studies conducted in India, the difference in myopia prevalence found between the rural and urban population also points towards the same.

### Myopia-public health problem

The public health and economic impact of myopia is enormous. In the United States alone, the cost of correcting refractive errors with spectacles or contact lenses is estimated to be 2 billion dollars per year. Though, there are no available cost estimates for India, but the estimates appear to be similar if not higher. The increase in prevalence of myopia has also led to increase in myopia related complications like retinal detachment, posterior staphyloma, CNVM, and amblyopia. There is no well-established or universally accepted treatment for the prevention of myopia onset or progression. Thus, myopia definitely appears to be a condition with social, educational, and economic consequences.

Due to the high magnitude of uncorrected refractive errors, myopia is considered as one of the important public health problems, especially in the urban population in India. It has been given high priority under the National Programme for Control of Blindness. The school vision-screening programme is fully sponsored by the Government of India and free spectacles are provided to poor children. The programme is aimed to eliminate blindness due to refractive error by providing refractive error services at primary level with the availability of qualified paramedical ophthalmic assistants in the vision centre for every 50,000 population by the year 2020.

Unfortunately, though this well-designed partly centrally sponsored school vision screening programme is very successful in many states, still a significant number of schoolschools going children remain unidentified and the unmet need for correcting refractive errors in children appears to be significant. An uncorrected refractive error leads to learning difficulties and reduced performances in school, ultimately affecting the psycho-social development of the child. Sensitivity and skill is required in detection and evaluation of these children, who rather remain withdrawn and show low interest in socializing and interaction. Though, very real for the affected child the problem may not be suspected by the teacher or the parents. The importance of picking up these children with uncorrected error is magnified when one considers the ease of managing these children. A proper refraction with good well-fitting optical devices can prevent long term disability and improve the personality of the child. Though the initiatives have been taken under the national programme for Control of Blindness, there is need that this programme should be integrated with the Serve Shiksha Abhyaan (SSA) programme and there should be mandatory school vision screening at regular interval in all the schools. Large-scale visual acuity screening programs must be launched to detect low vision due to myopia early and an annual checkup to update the spectacle prescriptions. Public and school-based health education programs may also be targeted at the very young.

Though, there are no studies from India, based on the data from other Asian countries, overemphasis on academic performance and paucity of structured outdoor activity in the schools may be a factor contributing to the high myopia incidence rates in the very young. Thus, myopia prevention strategies should be considered including reassessments of current educational systems in our country. A possible alternative could be to target the school children and to make them aware of the harmful effects of unhealthy behavior like prolonged hours of near activity without any outdoor games. By increasing the awareness of myopia and its possible preventive interventions it will also be possible to identify those

children who have not been identified. However, to improve the life-style of these children a well-structured health education programme needs to be formed that will be practical and acceptable to the school going children and results in modification of their life-style.

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