

Environmental factors and Outdoor Activity to Control Myopia

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(Received 10 November, 2022; Accepted 30 January, 2023)

ABSTRACT

Myopia and its control are going to be the biggest challenge in the upcoming decades in the optometry and ophthalmology field. Northeast Asia and South East Asian Countries are already suffering huge damage due to visual impairment caused by myopia, in the upcoming decades, the countries which are not affected by this epidemic are also going to fall prey to this optical condition. Currently, there is no valid and concrete evidence of medicine and optical factors to control this eye-related epidemic but with small environmental modification can halt this progression and can stop a person going blind unnecessary by performing more work on outdoor activity. This article will discuss the prevalence and also evidence-based examples of how small lifestyle management can stop your eyes from becoming visually handicapped.

Key words: Out door Activity, Near Work, Myopia

Introduction

Myopia is an increasingly public issue globally. Almost 29.5% of males and 27.5% of females have myopia (Pan *et al.*, 2015). It is projected that by the end of 2050, more than 50% of the world's population will suffer from short-sightedness or myopia and more than 30% of this population will have high myopia (Holden *et al.*, 2016).

Out of all the continents Asia happens to be worse affected. The prevalence found in China is less than 0.4 billion. The Chinese teenage population has up to 90% of myopia. The research done on this topic indicates that East Asia has the highest percentage of myopia. Population in Japan China Singapore and the Republic of Korea has about 50% prevalence. The number is lower in Australia South and North America and Europe (Dolgin, 2015). Myopia which has not been treated is one of the main reasons that lead to the impairment of vision.

In the case of a greater extent of myopia, the person can also experience blindness in later days as seen in the case of the Tajimi in Japan. Similar cases have also been seen in China and Shanghai. Wong *et al.*, (2014) in their research-The Beijing Eye Study have indicated that pathologic myopia is one of the major reasons that leads to Vision impairment. This condition can also lead to serious damage to the retina and can also damage to the other parts of the human eye.

Doctors have concluded that myopia and its more serious versions can adversely affect as high as 27% of the world population where the number will be no less than 1893 million people. In more moderate cases the minimum number of people who can be affected by the condition will be about 2.8% which is 170 million people. These figures are relevant to the year 2010. It has been found through intensive research that populations in the countries of the Japan Republic of Korea, China, and Singapore can have a prevalence which is as high as 50%. In comparison

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to this number, the population of Europe, Australia, and North and South America have a lower prevalence of this disease. It has been further concluded that East Asia is the region that has the highest prevalence of this condition. The data from these findings and the figures as presented by United Nations indicates the influence of the factors of time and age. These numbers tell that the condition of myopia is likely to affect as much as 52% of the entire Global population by 2050.

Certain Eye Specialists have concluded that myopia is a condition that could be triggered by hereditary issues. Again there are other schools of doctors who believe that myopia is a disease that can happen due to environmental trigger factors. A lot of research has been done regarding this illness on animals as well as humans full stop the finding that has been attained in the last 40 years indicate that myopia as a disease can happen both due to genetic issues as well as due to environmental factors (Morgan, 2003; Young, 2009; Baird, *et al.*, 2010, Wojciechowski, 2011).

Excessive near work may cause myopia (Ghosh *et al.*, (2014); Woodman, (2011) hypothesized that too much near work increases axial length is the related influence of biomechanical factors which increases the growth of axial length and which causes myopia.

Researches indicate that the number of hours you spent in outdoor locations can influence the rate of increase of myopia. In this context, Morgan has a find that the huge percentage of myopia increase in East Asia can be the direct result of different social and environmental factors. He has further pointed out that the pattern of extremely intensive studies and very few hours spent outdoors is the likely reason for this condition. Specialists in this perspective have further opined that variation in different seasons can lead to increased progression of the condition. In a conclusion, it has been summarized that a greater number of hours spent outdoors can reduce the progression of the condition.

A greater economic burden is likely to appear due to increased expenditure on myopia care. The situation will only go from bad to worse as there can be a greater increase in the prevalence of the condition where the numbers can go from 2.8% to that 9.7% by the year 2050. It is expected that the number of cases of high myopia can increase as much as four times in the times to come. The population of young adults in Asia already has an incidence of 38% suffering from high myopia. The annual cost of treating

the condition in Singapore, especially among young patients is no less than US\$ 765 million.

Environmental impact and hours spent outdoors

Several investigations have been carried out so that the effect of hours spent outdoors and changes in behaviour can be studied on the progress of myopia found in children. The evidence that has been found in this context indicates that children who spend greater time under the sun outdoors can get greater protection from myopia. The same can be said about children who have a family history of myopia.

Researchers expected that children while working outdoors which will be about more than a couple of hours every day will experience a lower risk of myopia even if they have parents where both the mother and father is suffering from myopia. Hence doctors have concluded that the number of hours children spent outdoors is very important in this relation. In fact hours spent on household work or in other kinds of sports have not been found to be very effective to prevent myopia amongst children.

Wu *et al.* (2011) have opened that the rate of new cases of myopic patients in one year has been quite less and has been reduced by about 50%. This occurred when the number of hours spent amongst general population was increased by approximately 80 minutes extra per day. The rate of progression of myopia among children have been found to be much reduces when children were spending extra hours under the Sun. Nearly 23% decrease was recorded in the number of cases of myopic children when children were allowed to spend extra 40 minutes per day under the sun. This condition remained for consecutive 3 years.

The reason why time spent outdoors has been found to prevent myopia is not really very well understood and requires more examination. Rose *et al.* (2008) in this context explain that outdoor locations offers brighter light which helps to stimulate release of Greater index of dopamine from the human retina. This phenomena can help to stop the axial increase in the human eye to prevent the progression of myopia. This finding has been supported by the fact that differences in season can lead to progression in myopia where winter has a greater adverse effect on the condition as compared to the summers.

Nearly 4000 children who are between the age group of 6 and 12 did participate in a research pertaining to myopia in Sydney. This research estab-

lished that children of the age of 12 years who spent a greater amount of time outdoors did have greatest hyperopic refractions. The opposite of this also happened to be true. A similar finding was not available from the group of 6 year old children. In this case relationship between myopia and indoor sports have not been very well established. Hence in this context the question will still persist that how is the benefit of outdoor time established in relation to myopic progression?

It has been established that instead of wavelength brightness is of Greater importance which is why exposure to UV can be related more strongly with myopia. This is a clear indication of the impact of outdoors hours on the condition. The light which is found in outdoors is 500 times greater than indoor light.

To increase the outdoor time for children can be really challenging since there school hours demands a good percentage of the daily schedule. This is a very common condition which is found in different parts of the world with respect to their weather conditions. Outdoor activity can also be extremely beneficial to manage problems like obesity and chronic cardiac diseases especially in the group of school going children.

More researchers are required to understand the impact of time spent in outdoor locations. These surveys must be done with simpler methods for clear results. A lot of work is also needed to address different educational cultural and social barriers which creates hindrance in spending outdoor time. In different parts of the world both children and their parents are often busy attending to extremely intensive extracurricular activities and education where they indulge in a couple of hours of afternoon nap without fail.

Acknowledgement

I want to thank Dr. Sanjay De, HOD Pharmacy and Dr. Sajal Kr Jha Dean, Adamas University School of Medical Science for their continuous support to complete this article.

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