

The world's myopia crisis and why children should spend more time outdoors

By Ariana Eunjung Cha September 16, 2015

Myopia, or nearsightedness, is becoming a problem of epidemic proportions for the world.

Roughly half of young adults in the United States and Europe have it, double the percentage when their grandparents were the same age. In China, the trend is even more alarming -- with 80 percent to 90 percent of teens and young adults with the condition versus 10 percent to 20 percent 60 years ago.

Researchers used to think that the explanation for why some people become nearsighted (able to see close objects more clearly than those far away) and why some continue to have 20/20 vision until they are old and gray was mostly a function of our genes. These days the focus is on environmental factors -- or, more accurately, one specific type of environmental factor: How much time you spend outdoors while growing up.

In a new study published in the Journal of the American Medical Association this week, researchers report that children who spent 40 minutes more time outdoors a day were much less likely to be diagnosed with myopia. The research involved 1,903 children in grades 1 through 12 at a dozen schools in the large southern Chinese city of Guangzhou near Hong Kong.

Half of the schools added one additional 40-minute class of outdoor activities during the day, and parents were encouraged to take their children outdoors after school and during the weekends. The remaining schools, which kept their normal schedule, served as a control.

Led by Mingguang He of Sun Yat-sen University, the study team found that after three years 30.4 percent of the children in the first group had myopia versus 39.5 percent of the control group.

That's equivalent to a 23 percent relative reduction in incident myopia.

Nearsightedness is a condition that occurs when the light coming into an eye doesn't focus on the retina but in front of it, making things look blurry. It's usually only a minor inconvenience for many people in today's modern world, with options for eyeglasses, contact lenses and laser surgeons. But for some it can lead to more serious eye disease, such as cataracts or retinal

detachment. Based on studies with chicks, researchers have theorized that bright light triggers the release of dopamine, which might help keep the eyes from becoming misshapen as they develop as a child ages.

The results of the Guangzhou study, while remarkable, were not as marked as the researchers expected.

Based on previous, smaller studies they had hoped the reduction might be as high as 50 percent. That may be explained by the fact that the outdoor exposure was increased by 40 minutes while in some previous studies it has been as much as 80 minutes.

In total, researcher Ian Morgan from the Australian National University in Canberra has estimated that children need to spend about three hours per day in sunshine to reduce their risk of nearsightedness. In brightness terms that's about 10,000 lux if you're looking around through sunglasses on a cloudless day. In comparison, an overcast day or deep shade measures in at about 2,500 lux, and a classroom or office 500 lux.

The problem is that many children, especially those in the United States, where recess time in public schools can be limited to 20 minutes, and in parts of Asia, where the school day can be two or more hours longer than in Western countries, spend far less time outdoors.

"The higher prevalence of myopia in east Asian cities seems to be associated with increasing educational pressures, combined with lifestyle changes, which have reduced the time children spend outside," Morgan wrote in a paper published in [the Lancet](#) in 2012.

This theory is also supported by data that shows a rural-urban split among children who become nearsighted with the assumption being that those in the countryside tend to spend more time under the sun.

Take Nepal, for example. The prevalence of myopia in 15-year-olds is less than 3 percent in rural children but ranged from 10.9 percent in 10-year-old children, 16.5 percent in 12-year-olds, to 27.3 percent in 15-year-olds in urban children.

In an editorial accompanying the publication of the JAMA study, Michael X. Repka of the Johns Hopkins University School of Medicine said that further study is needed on the kinds of outdoor activities that might be beneficial to guide the implementation of outdoor activities in schools.

"Establishing the long-term effect of additional outdoor activities on the development and progression of myopia is particularly important because the intervention is essentially free and may have other health benefits," Repka wrote.

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