Commentary: Myopia progression during the COVID-19 pandemic

For ages, myopia has been linked to excessive near work. Initially believed to be a disease with many genetic predispositions, myopia eventually became a disease of the more literate and educated. Reading at a close distance increases the risk of myopia and delays its stabilization. Many still argue that the time spent indoors rather than the time spent reading triggers myopia. The indoor lighting tends to have more red wavelengths and stimulates the eye’s axial growth, leading to myopia. While we have outlined risk factors for the onset of myopia, factors causing and affecting myopic progression are still unclear.

Long durations of home confinement and home quarantine used to be experimental settings that could never be implemented on children to study the effects on myopia and its progression. The COVID-19 pandemic created these artificial settings as the children were at home and in front of screens for long. The Digital Eye Strain Among kids (DESK) is a landmark study on myopia in Indian eyes. DESK study 1 highlighted that screen time of children was increased significantly during the COVID-19 pandemic; the use of digital devices increased to 3.9 h ± 1.9 h during the pandemic from 1.9 h ± 1.1 h before the pandemic. Similar increased duration in front of digital devices in children by 4.85 h per day during the pandemic was reported by Montag and Elhai.

While many studies demonstrated an increase in near work during the COVID-19 pandemic, there is a lack of scientific studies comparing myopia progression before and during the lockdown. While we always talk about excessive near work triggering myopia, we do not have enough evidence that it induces myopic progression as well. The DESK 4 study in the
current issue penned down a statistically significant increase in annual myopic progression during the “lockdown” period.\cite{3} This study included a sample size of 133, which is small but sufficient to document the progression of myopia. The other strengths of the study include a detailed questionnaire and retrospective data collection up to one year before the lockdown.

Investigators included children more than 6 years of age. Studying relatively older children is advantageous because it eliminates the effect of emmetropization. On the other hand, it is disadvantageous because the effect of increased near work on younger children is missed. Wang \textit{et al}.\cite{4} have shown that the progression of myopia appeared to be two times higher for children less than 8 years of age. Hence, the effects might be more pronounced if we study more minor children. The retrospective data collection also has its limitations. The previous refractive error measurement by a different examiner might contribute to observer bias. Axial length values and their progression in the study are missing and might supplement the hypothesis.

While we claim that increased digital devices increase myopic progression, it is important to study the nature of devices and the distance from devices that can also affect progression. While reduced sun exposure turned out to be a significant risk factor for myopia progression, this can also be a confounding factor. Sunlight stimulates the production of vitamin D3. Home confinement causing reduced vitamin D3 levels might be the reason behind myopia’s progression, which might be erroneously measured as increased near work. Pre COVID-19 literature has shown that time spent outdoors had a protective effect on myopia progression in children.\cite{5,6} Finally, a reversal of myopic progression by increased outdoor activity post lockdown will only establish this cause-effect relationship.

We still cannot point out a specific factor responsible for this progression. Reading and home confinement have a plausible association with the onset and progression of myopia but may not necessarily cause myopic progression. There might be understudied factors like waking hours, as nocturnal life also shifts our genetic makeup toward larger pupils and myopia. Until we explore these factors, the results of the present study indicate that outdoor activities should be recommended to all myopic and premyopic children.

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