Dear Editor,

The myopia epidemic has become a major worldwide problem. It is predicted that 50% of the people in the world will have myopia by the year 2050, as per the Brien Holden Institute prediction model. The COVID-19 pandemic engulfed precious years of children and deprived them of a normal childhood routine.

The National Education Policy (NEP), 2020 in India was on the road just before the pandemic and was ensuring reduction of excessive strenuous academic schedule to a flexible one with concept-based education.

The growing eyes of children were suddenly exposed to long hours of the digital screen because of prolonged school closures. While staying at home and digital schooling online was instrumental in protecting children and their families from COVID-19, it may had an unintended side effect: a negative impact on the eye health of young students. Home confinement during the pandemic, restricted outdoor activities, increased near work, prolonged digital schooling, no exposure to sunlight and restricted indoor activities in the home also led to an increase in myopia incidence.

The pandemic reinforced the urgent need for quality educational services throughout the world, but unfortunately led to a rise in various problems including myopia, digital eye strain, and various accommodative anomalies besides COVID-related psychosocial problems. The second wave put untold pressure on digital education and obviously on growing eyes, leading to a slow and hidden increase from simple myopia towards high myopia.

We did a retrospective analysis of new onset of high myopia cases during 2020–22 from electronic medical records of patients who previously had simple myopia in the department of pediatric ophthalmology. We found 20 children with shift of myopia from simple to high myopia who came for checkup just before the opening of schools. All were healthy children with no other ocular or systemic problem and all had varied hours of exposure to laptop and mobile for online classes during the pandemic.

The mean (SD) age was 10.80 ± 3.4 years (range 5–15) years, with spherical equivalence (SE) of 2.5 ± 1 (range – 1.5 to – 4.5D)
before the pandemic, and after 18 months, the mean SE was 6 ± 1.5 (range −5.5 to −7.5 D). Fifteen patients were males, and five were females.

All cases underwent cycloplegic refraction and had -3.5 ± 0.75 D (mean) increase in SE in 18 months, which is not routine myopic progression seen in pediatric patients. The limitation with this observational series was the low number of cases and no documentation of axial length.

Various population-based studies reported increasing myopia in school-going children after the first pandemic wave.\textsuperscript{[3–4]}

Xu et al. included 1,001,749 students, aged 7 to 18 years, from different schools in an intervention study to assess the impact of COVID-19 lockdowns on myopia progression and incidence from 2019 to 2020. The overall myopia prevalence increased from 52.89% to 59.35%, with high myopia increasing from 4.11% to 4.99%. The six-month myopia progression among all school children also increased from −0.23 D before quarantine to −0.343 D after quarantine (\textit{P} < 0.001), and the half-year incidence rate of myopia increased from 8.5% to 13.62% (\textit{P} < 0.001). These results indicated an approximately 6.46% increase in myopia during the duration of COVID-19 quarantine.\textsuperscript{[6]}

Various pediatric school-based, photo screening–based studies during the pandemic suggested that home confinement during the pandemic was associated with a substantial myopic shift for younger school-aged children (6–8 years). Wang et al.,\textsuperscript{[7]} in a prospective cross-sectional study based on photo screening test in 123,535 children, reported that home confinement was associated with substantial myopic shift in children aged 6–8 years. According to their study, the prevalence of myopia increased 1.4 to 3 times in 2020 compared with the previous five years (2015–2020). The refractive status of younger children is more plastic and more susceptible to environmental changes compared to teens, and therefore, younger children are more susceptible to show more myopic progression.

Zhang et al.,\textsuperscript{[8]} in their study of two separate longitudinal cohort of children, reported a 2.5-fold increase in myopia incidence during the COVID-19 pandemic. They also reported the estimated annual change in spherical equivalent refraction was 0.80 D in the COVID-19 cohort compared to −0.41 D in the pre-COVID-19 cohort.\textsuperscript{[9]}

Similarly, Tao Cai et al.\textsuperscript{[7]} reported progression of myopia by 1/3\textsuperscript{rd} during COVID-19 in a cross-sectional study of 115 myopic children.\textsuperscript{[5]}

Researchers have assessed various myopia prediction models based on different models, machine learning, artificial intelligence and datasets, including baseline refraction or biometric data, lifestyle data, genetic data, and data integration in different ethnic populations.\textsuperscript{[7–12]} Various studies in different populations have estimated a 0.5–1-D increase in myopia per year in younger children.\textsuperscript{[3]}

The Brien Holden vision calculator is most widely used in myopia clinics to predict myopia progression and to start anti-myopia therapy based on predictive models.\textsuperscript{[3]} The myopia prediction calculator varies according to ethnicity, location and may be not applicable in predicting myopia progression in the COVID era.

Younger children refractive status may be more sensitive to environmental change, and younger the age, the greater the progression and the likelihood of high myopia.\textsuperscript{[4]}

The anti-myopia measures such as glasses, atropine drops, environmental modifications are a must for preventing progression of simple myopia to high myopia.

The pandemic fast-tracked the future into the present, where the world is redefining a new future, and there is continuous revolution in technology and innovation in digital education. It is important to ensure that technology and digital revolution in education be kept on vigilant check. Even as these megatrends in digital education define a new tomorrow, the future of myopia is gravely threatened by the challenges of environmental behavioral changes and is trending towards high myopia in generation X.

We are clearly at an inflection point in history today which calls for a paradigm shift in new myopic models and myopic progression models that innovatively integrate environmental behavior and increased online activities as core outcomes. It is crucially important today to usher in a new era of high myopia.

The increased incidence of complications of high myopia are already known which increases financial burden on parents and the country. The need of refractive surgery and medical and surgical management of high myopia complications definitely add to these financial aspects.

The school management, stake holders, health policy makers should be vigilant on virtual activities of children. The government, stakeholders and parents need to be purpose-driven and responsible to make a multidimensional contribution in preventing shift of simple myopia to high myopia in this COVID era.

International myopia groups and pediatric ophthalmologists should attend to this potential health crisis, and appropriate attention should be advocated to this COVID-driven myopia.

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