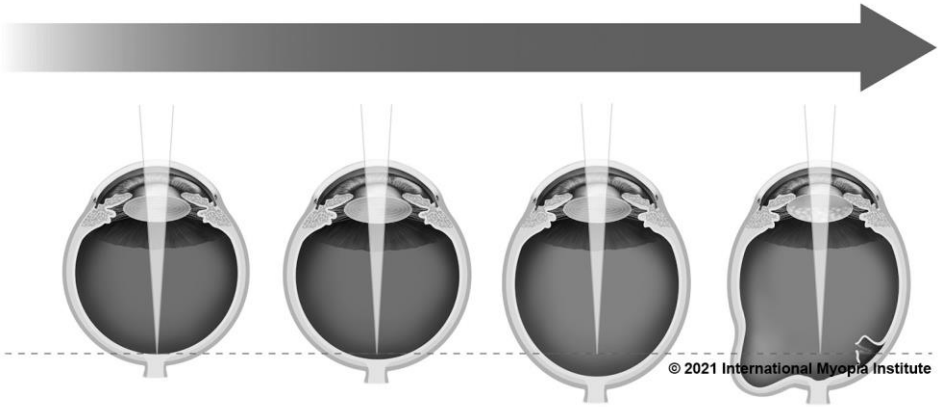

IMI CLINICAL SUMMARY

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The prevalence of myopia and high myopia has been increasing in many parts of the world, in particular East and South East Asia. Genetics alone cannot explain the dramatic change over the last fifty years and environmental risk factors have a key role in myopia development and progression.

KEY FINDINGS:

EDUCATION AND NEAR WORK (MODIFIABLE RISK FACTORS)

- More education is associated with more myopia. But the mechanism involved is not clear, although the visual tasks of reading and writing (near work) may be contributors.
- Children with superior academic performance tend to be more myopic.
- Countries identified as having a myopia epidemic tend to have early onset of educational pressures with homework starting even in the pre-school years.
- Epidemics of myopia appeared well before the widespread use of digital devices. Associations with myopia are now commonly reported, but whether use of digital devices is just a new form of near work is uncertain.

TIME OUTDOORS (MODIFIABLE PROTECTIVE RISK FACTOR)

- There is considerable evidence showing that increased time outdoors delays the onset of myopia. It may also slow the progression of myopia, but the evidence is mixed.
- The mechanism may involve stimulation by brighter light outdoors of retinal dopamine release that inhibits axial elongation. Other postulated mechanisms require further investigation, although a role for Vitamin D has been excluded.
- School-based interventions to increase time outdoors have been validated in randomised clinical trials and have been implemented across the school system in Taiwan, with evidence of initial improvement in levels of reduced visual acuity, a proxy in school-children for myopia.

BASIC BIRTH PARAMETERS (LARGELY NON-MODIFIABLE RISK FACTORS)

- No basic difference related to gender, although more recent studies tend to report more myopia in girls.
- Epidemiological evidence shows major differences between ethnic groups in the prevalence of myopia (higher prevalence of myopia in East and Southeast Asia), but more detailed analysis shows that these differences may be mediated by environmental exposures.
- Having myopic parents is a risk factor for myopia. Myopic parents may pass on a myopiagenic lifestyle, in addition to shared genes.
- Associations between myopia and birth order have been reported in several cohort studies, with first born children tending to be more myopic.

OTHER FACTORS (MORE STUDIES NEEDED)

- Height, intelligence, physical activity, sleep, socioeconomic status, smoking, diet, urban versus rural differences, pollution, housing, circadian rhythms, allergic conjunctivitis, hay fever, Kawasaki disease, febrile diseases, fertility treatment.

CONCLUSION

Education (analogous to intense nearwork) and **time outdoors** are the **two major causal risk factors for myopia** identified so far. Evidence-based approaches to address risk factors and control myopia, such as increased time outdoors and, possibly, decreased nearwork duration should be recommended. Ensuring children receive **two hours per day outside during daylight hours**, particularly in the **preschool and early primary school years** is justified by the available evidence. **Limiting homework** at these ages is also recommended.

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REFERENCE

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