

## Eschewing Myopic Attitude Towards Eye Health

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**In many East Asian countries, myopia is a major public health concern that affects between 80 and 90 per cent of high school graduates, of which about 10 to 20 per cent have sight-threatening pathologic myopia. Thus, early intervention is crucial in the control of myopia and the onus is to be equally distributed between the stakeholders of the eye healthcare ecosystem. Studies have shown that the increased intensity of educational pressures in young children has coincided with the rapid rise in myopia cases in Asian countries in recent decades. Let's explore the available early interventions that could effectively tackle the rising incidents of myopia, especially in the young.**



Uncorrected myopia remains the leading cause of distance vision impairment globally, and its rising prevalence could cost billions of dollars in lost productivity in the coming decades. A hallmark study by the Brien Holden Vision Institute (BHVI) in Australia predicts that by 2050, over half the world's population or 52 per cent will be myopic.

Direct costs of myopia in Asia alone have been estimated at \$328 billion every year, with an additional \$244 billion in productivity losses associated with myopia.

Studies have shown the increased intensity of educational pressures in young children has coincided with the rapid rise in myopia cases in Asian countries in recent decades. In many East Asian countries, myopia is a major public health concern that affects between 80 and 90 per cent of high school graduates, of which about 10 to 20 per cent have sight-threatening pathologic myopia.

In particular, with quarantine practices in place during the onset of COVID-19 and children attending online classes over electronic devices, the rise in myopia has been sharp. According to a recent study, more children have developed myopia as an unexpected side-effect of the pandemic.

Although higher prevalence of myopia tends to occur in high-income countries who place a high priority on academic performance such as South Korea, Singapore, China, and Japan, the numbers in East and Southeast Asia are rising rapidly too.

On this note, **Ken Tong, President, Singapore Optometric Association** says, “An increase in myopia compromises the structure and health of the eye, meaning a greater risk of eye disease and vision loss. As such, myopia control methods must be implemented to curb preventable eye diseases from progressing. If there is no intervention in a myopic child’s visual system, myopia will continue to worsen and present greater threats to eye health over an individual’s lifetime.”

## China

A study by The Faculty of Medicine at The Chinese University of Hong Kong (CUHK) in 2021 showed that the unprecedented level of quarantine, prohibiting outdoor activities and restricting daily routines to indoor activities, has triggered a “myopia boom” in school children in Hong Kong.

The Department of Ophthalmology and Visual Sciences conducted a prospective population-based study to evaluate the impact of the COVID-19 pandemic on myopia incidence and progression among school-aged children in Hong Kong and found a 2.5-fold increase in myopia incidence.

According to **Professor Calvin C.P. PANG, S. H. Ho Research Professor of Visual Sciences, CUHK** “High myopia (-6.00 diopters or above) can lead to sight-threatening complications, including glaucoma, macular degeneration, retinal detachment and cataract. Wearing glasses or having laser refractive surgery can help improve vision, but cannot resolve the eyeball elongation problem or reduce the risk of complications, therefore prevention should be given top priority.”

In sync with these findings, researchers from the Hong Kong Polytechnic University (PolyU) found that not only did the rate of myopia progress faster in school children, but the rate of astigmatism also increased by nearly 50 per cent, in the last two years.

As a result, PolyU has signed a five-year Memorandum of Understanding (MoU) with C-MER Eye Care Holdings to advance optometry development and eye and vision health in Hong Kong and Mainland China.

About 60 students of PolyU’s School of Optometry will receive up to three weeks of clinical training in C-MER hospitals, clinics and optical centres in Hong Kong and other Greater Bay Area (GBA) cities every year; while researchers and specialists from the School and C-MER will collaborate on scientific studies about myopia management and ageing eyes.

In addition, the Centre for Eye and Vision Research (CEVR) has been launched in 2022 with the collaboration between PolyU and the University of Waterloo in Canada. This development is supported InnoHK, the flagship innovation and technology initiative of the HKSAR Government, focusing on myopia and eye growth, ocular drug discovery and delivery, vision enhancement, tear film and ocular surface, and advanced optometric technology.

French firm EssilorLuxottica has joined forces with representatives from both the central and local governments in China to promote the idea of ‘spending more time outdoors in order to stay away from myopia’. The company has also launched two key products, MiSight and Diffusion Optics Technology, to prevent and control myopia for children and youth in the country.

## Singapore

Myopia is the most common eye condition affecting children in Singapore today. More than half of the children in Singapore develop myopia by the age of 12 years old. A 2021 global study with Singaporean researchers, linking the use of digital smart devices with myopia in children, has revealed that high levels of smart device screen time were associated with almost a 30 per cent higher risk of myopia, and when excessive computer screen time was added, this increased to almost 80 per cent.

In conjunction with public health programmes, a locally developed mobile application called Plano has been established in Singapore to manage the use of smartphones and tablets among children. The first spin-off from the Singapore Eye Research Institute (SERI) - Singapore National Eye Centre (SNEC) Ophthalmic Technologies Incubator Programme, Plano has partnered with US-based Jobson Optical Group to produce new educational content designed specifically for eye care professionals worldwide.

**Dr Mohamed Dirani, Managing Director, Plano**, says, “Myopia is a worsening global issue and there is a pressing need to act as a global community to implement strategies at all levels to reduce the burden of myopia. Through education and awareness, innovative solutions that help parents to control their children’s screen time, and ensuring that children undergo regular and timely eye exams, we can intervene early to prevent myopia.”

## **Korea**

According to a recent report, the prevalence of myopia in children and adolescents in Korea ranges from 50 per cent in children aged 5–11 years to 78.8 per cent in children aged 12–18 years. This prevalence is comparable to that in China (70.9 per cent in children aged 6–18 years), and higher than that in Japan (43.5 per cent in 12-year-old children and 66 per cent in 17-year-old children).

In an interesting development, South Korea-based firm Seoul Semiconductor has revealed that SunLike, a natural lighting technology, can improve myopia. Developed through years of R&D, Seoul Semiconductor has been conducting experiments with Seoul National University, Basel University, and Harvard University since 2017. The company has recently collaborated with SERI to further confirm this observation.

“It is important to select natural light that has been optimised for human DNA for millions of years. SunLike technology can reduce myopia and help people fall asleep well at night when cells are regenerated”, says **Chung Hoon Lee, Chief Executive Officer, Seoul Semiconductor**.

Adding on, MiSight 1 day, child-friendly daily disposable contact lenses proven to slow the progression of nearsightedness in children aged 8-12 at the initiation of treatment, by US-based CooperVision has recently been approved in the country.

Adding his thoughts on nipping myopia in the bud, **Hamish Thrum, Senior Director, Myopia Asia Pacific (APAC), CooperVision** says, “Low levels of myopia may not ring alarm bells for many parents. However, because myopia is a progressive condition, the younger the child is when myopia sets in, the higher the risk of severe sight-related complications later in life, if the myopia is untreated. Even a 1.00 diopter increase in myopia has been associated with a 67 per cent increase in the prevalence of myopic maculopathy. Conversely, slowing myopia by just 1.00 diopter should reduce the individual’s likelihood of myopic maculopathy by 40 per cent.”

## **Japan**

Back in 2019, a research team at the Keio University School of Medicine had conducted Japan’s first prevalence study on myopia in 20 years. The study looked at approximately 1,400 elementary and junior high school students in the Tokyo area and found a possible correlation between myopia and dry eye.

Results showed that the prevalence of myopia in 689 elementary school students was 76.5 per cent, while the prevalence of high myopia was 4 per cent. In 727 junior high school students, the prevalence of myopia was 94.9 per cent, higher than existing reports abroad, and the prevalence of high myopia was 11.3 per cent.

Determined to fight this growing burden of eye health, researchers at Keio University are currently exploring the use of violet light to stop myopia progression.

On the other hand, the Education Ministry in Japan plans to conduct a near sightedness survey involving 9,000 students amid concerns over the increasing use of digital devices and their potential impact on children’s health.

Besides these surveys, Japan is indeed riding high on innovation by developing unique smart glasses to slow down or even reverse myopia. Kubota Pharmaceutical has designed a special pair of glasses that aims to treat and control the progression of myopia with its built-in mechanism to project an image onto the retina. The device is currently undergoing clinical trials and will be soon launched in Asian markets.

Another Japanese player Menicon has launched a treatment plan for myopia control in multiple countries such as the United Kingdom, France, Spain, Italy, Austria, Australia, and Singapore. The comprehensive treatment plan for childhood myopia features two contact lenses that are CE-approved specifically for myopia control: Menicon Bloom Night, a specially designed orthokeratology contact lens, and Menicon Bloom Day, an extended depth of focus soft daily disposable contact lens.

## **Australia & New Zealand**

Like many other Asian countries, cases of myopia have increased among children in Australia and New Zealand as well in the past two years. In fact, surveys are showing that 91 per cent of Australian parents were not aware of the role excessive screen time could play in myopia development and 73 per cent did not know that genetics might also play a role.

Addressing this concern, the regulatory body Therapeutic Goods Administration (TGA) has listed a new medication by Aspen Pharmacare in 2022 to slow the progression of myopia in children and young teenagers.

"Childhood myopia is an emerging public health concern. We are providing a low dose atropine eye drop treatment to Australia that has been studied in children and adolescents, 4 to 14 years, to slow the progression of myopia", says **Trevor Ziman, Chief Executive Officer, Aspen Asia Pacific.**

On the other hand, New Zealand has launched its first mobile optometry clinic to improve access to eye healthcare, since cost is a significant barrier in the country.

## **India**

Myopia in India and its understandings are still evolving. The diverse nature of the country has differing prevalence rates, and the technological advancement has unequivocally added many novel insights including factors such as genetics, imaging, morbidities, and management. However, due to lack of public awareness, social stigmatisation, and lack of personal care, the intended goals have not been achieved yet.

"Myopia is the most important cause of visual impairment in children and as per a study by All India Institute of Medical Science, 17 per cent of children or 1 out of 6 children in India between the ages of 5 and 15 years are suffering from myopia", says **Nikhil K Masurkar, Executive Director, ENTOD Pharmaceuticals**

The company, ENTOD Pharmaceuticals, has very recently got the approval to carry out phase 3 trials across India for their 0.05 per cent atropine eye drops from the Drugs Controller General of India (DCGI). This higher strength of low-dose atropine eye drops is not available commercially anywhere in the world, and ENTOD Pharmaceuticals would be the first company to launch this in India subject to a successful demonstration of safety & efficacy in clinical studies.

Low-dose atropine has emerged as an effective approach to slow the progression of myopia in children and has recently garnered a lot of interest from ophthalmologists.

## **Countermeasures and Strategies**

Myopia, although a fairly innocuous eye defect, has the potential to transform into a major, life-changing disorder that affects a person's efficiency and lifestyle immensely. The rise of myopia in children across the Asian subcontinent is that of concern and alarm, especially the deterioration observed since the pandemic. It appears crucial and cost-effective to take urgent and effective actions to halt further progression and to prevent the emergence of expected challenges. This could be achieved through various countermeasures and strategies, such as human resources building, appropriate distribution of eye care health professionals and collaboration among the countries within APAC.

Introduction of advanced technologies and experience from developed countries could be one of the fastest ways to help promote the eye care services capacity in the developing and underdeveloped parts of the region.

**Dr Manbeena Chawla**

**(With inputs from Sakura Koner)**