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EDITORIAL

Changing paradigm in the management of childhood myopia

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The prevalence of myopia has been on the rise in recent decades. Global myopia prevalence is projected to increase to 49.8% and high myopia prevalence to 9.8% in 2050 if no effective interventions are undertaken to control its onset and progression [1]. High-income Asia-Pacific countries are expected to have the highest myopia prevalence of 66.4% in 2050, followed by East and Southeast Asian countries [1].

Myopia is a major public health concern worldwide due to its significant impact on ocular health and the economy. Each additional one dioptre (D) of myopia is associated with a 20%, 21%, 30% and 58% increase in the risk of open-angle glaucoma, posterior subcapsular cataract, retinal detachment and myopic maculopathy respectively [2]. These pathologies significantly increase the risk of visual impairment and blindness in a myope's lifetime. In fact, degenerative myopia is a major cause of irreversible blindness in many Asian and some Western countries. Both corrected and uncorrected myopia are associated with a negative impact on a person's quality of life in various aspects of daily living such as activity limitation as well as social and emotional well-being [3].

Economically, uncorrected myopia cost ~US$244 billion of potential lost productivity worldwide in 2015 [4]. The increasing myopia prevalence is associated with a mounting global cost of myopia correction with spectacles, contact lenses and refractive procedures, where the annual prevalence-based direct costs for myopia was found to range from US$14–26 in the United States to US$56 in Iran and US$199 in Singapore per capita [5].

Traditionally, the management of myopia has involved lifetime optical correction of the full refractive error with single-vision lenses or refractive surgery and addressing myopia complications as they arise. This approach of symptomatic management of myopia-induced visual impairment is universally accepted by patients worldwide. More recently, several behavioural, pharmacological and optical interventions have been shown to be effective in retarding myopia progression.

A recent meta-analysis of five randomised control trials (RCTs) with 3014 subjects found that outdoor time was associated with fewer new myopia cases (pooled risk ratio [RR], 0.76; 95% confidence interval [CI], 0.67–0.87), slower myopic shift in terms of refractive error (pooled mean difference [MD], 0.17D; 95% CI, 0.16–0.18D) and smaller change in axial length (pooled MD, −0.03 mm; 95% CI, −0.03 to −0.03 mm) [6]. Another meta-analysis of 12 RCTs and 15 cohort studies involving 5069 children aged 5–15 years on the efficacy of varying doses of topical atropine in slowing myopia progression found the weighted MD in myopia progression between atropine and control groups were 0.73D, 0.67D and 0.35D per year for high-dose (0.5–1.0%), moderate-dose (>0.01 to <0.5%) and low-dose (0.01%) atropine respectively [7]. Topical atropine demonstrated a significant dose-dependent effect on both refractive change and axial elongation, with higher concentrations of atropine resulting in less myopia progression and less axial elongation [7].

Orthokeratology treatment has been shown to be associated with less axial elongation compared with controls after 1 year (standardised MD [SMD], −0.857 mm; 95% CI, −1.146 to −0.568 mm; $p < 0.001$) and this myopia control effect lasted up to 2 years (SMD, −0.701 mm; 95% CI, −1.675 to −0.272 mm; $p < 0.001$) [8]. A meta-analysis of four RCTs showed that peripheral defocus lenses can delay the progression of myopia in myopic children compared with single-vision lenses, and the difference was statistically significant (WMD, 0.21D; 95% CI, 0.01 to 0.41; $p = 0.04$) [9].

Interesting, some studies evaluating combination therapy with two or more modalities have shown better efficacy of myopia control compared to stand-alone treatment. For example, combination treatment with low-dose atropine and orthokeratology has synergistic effects compared to orthokeratology treatment alone [10–15].

Despite mounting evidence supporting the efficacy of various myopia control interventions, the adoption of these measures by eye care practitioners and patients has been slow. In a 2015 global survey, most eye care practitioners still prescribed single-vision spectacles or contact lenses as the primary mode of correction for myopic patients [16]. While 80% of 130 Singapore eye care practitioners who responded to a 2020 survey recommended myopia control interventions to their patients, only 33.1% actively did so at the first visit [17].

In response to the increasing prevalence of myopia and its associated personal and economic impact, the World Council of Optometry (WCO) passed a standard of care resolution on myopia management in April 2021 [18]. It aims to raise awareness of myopia as an international epidemic and highlight the need to embrace evidence-based approaches focused on mitigation, measurement and management. Although the resolution is targeted primarily at optometrists, we believe it applies equally to ophthalmologists and other stakeholders.

The WCO resolution emphasises that simply correcting myopia with single-vision lenses is no longer considered sufficient. Instead, it considers myopia management an obligation rather than just an option and proposes a paradigm shift from passive to active management of myopia. This encompasses early identification and intervention to prevent or delay the onset of myopia or slow its progression.

The components of the newly proposed evidence-based standard of care for myopia management includes [18]:

(1) Mitigation—educating and counselling parents and children during early and regular eye examinations on lifestyle factors that prevent or delay onset of myopia.
(2) Measurement—evaluating the status of patients during regular comprehensive vision and eye health examinations (e.g., refractive error and axial length whenever possible).
(3) Management—addressing patients' needs by correcting myopia while also providing evidence-based interventions

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(e.g., contact lenses, spectacles, pharmaceuticals) that slow the progression of myopia, for improved quality of life and better eye health presently and in the future.

In conclusion, new insights from numerous recent studies have prompted a reassessment of the management of childhood myopia. While more research on myopia prevention is necessary to guide practitioners on the optimal management of myopia, there is an urgent need to raise the awareness of a paradigm shift in the management of myopia where early and active management of myopia with evidence-based myopia control interventions should be implemented. This should be part of a long-term, multifaceted, systematic strategy to reduce the burden of myopia at both the individual and population level.

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KSC, JTWAE and KGAE drafted, critically reviewed and approved the final version of the manuscript. All authors agreed to be accountable for all aspects of the work.

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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