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Myopia Epidemiology Data from Recent Studies

Samuel Kyei*

Clinical Epidemiology and Biostatistics, Faculty of Medicine and Health, School of Medical Sciences, Örebro University, Campus USÖ, Södra Grev Rosengatan 30, Örebro 703 62, Sweden

Abstract

More and more people are being affected by myopia, a widespread refractive defect. Myopia development could result in a variety of significant issues, including blindness. This review analyses the risk factors related to myopia and summarises the epidemiological studies on myopia conducted after 2018. Myopia prevalence varies by age, location, and length of observation. In addition to East Asia, other regions of the world have also experienced an increase in myopia. Myopia in children is becoming more common and gets worse as they get older. Together with myopia, the prevalence of high myopia has grown. In myopia patients, racial dependency and family aggregation are frequently observed. Myopia has been shown to be protected against by more outdoor activity, although near-distance work and higher education levels have the reverse effect. It is debatable if urbanisation or gender has an effect on myopia. Because there is insufficient data, it is still unclear how nutrition, digital screens, Kawasaki illness, pregnant women who smoke during pregnancy and myopia are related. Knowing the many myopia-affecting elements aids in deciphering the mechanism of myopia creation and in developing practical myopia prevention and control techniques to safeguard people's health, particularly that of adolescents.

Keywords: Adolescence; Epidemiology; Myopia; Multiple sclerosis; Clinical trails

Introduction

Not only is uncorrected refractive error the second greatest cause of blindness worldwide, but it is also the main contributor to preventable visual impairment in children. By the end of this decade, an estimated 2.5 billion people may be affected by myopia, the primary symptom of refractive error. In many places, including eastern China, myopia is frequently treated like a "simple" refractive mistake rather than a medical condition. Yet, it unavoidably raises the risk of blinding conditions like glaucoma, cataracts, macular degeneration, and retinal detachment. Around 15 years ago, myopic macular degeneration had already made myopia the most common cause of severe visual impairment and blindness in the senior Chinese population of Taiwan and the main cause of monocular irreversible blindness in Japan. A person's quality of life is substantially impacted by the loss of visual acuity brought on by uncorrected myopia or permanent vision loss, in addition to its detrimental effects on functional vision [1].

The limitations that affected people face are likely to further restrict their freedom of choice and add to their financial and physical hardships. Also, the expense of optical devices or other refractive modalities as well as the requirement for regular and on-going management of the condition by an eye-care professional are both included in the economic and financial impact of myopia on families. For urban migrant Chinese households, the price of eyeglasses alone dissuades parents from correcting their children's refractive errors, leading to a rise in myopia and declining functional vision that would undoubtedly harm the young people's futures. Controlling myopia should be stressed as a key global public health goal because it has been reported that the potential global productivity loss associated with the burden of visual impairment was estimated at US$244 billion from untreated myopia in 2015 [2].

Pathologic myopia is characterised by an eye's axial length exceeding 26 mm or by a refractive error of at least 6 diopters (D), and it is linked to issues in the posterior segment as a result of excessive axial length enlargement. It has been noted that myopic maculopathy, including diffuse and patchy chorioretinal atrophy, lacquer cracks, myopic choroidal neovascularization (CNV), myopic subretinal haemorrhage (mSH), and posterior staphyloma, is a significant contributor to visual impairment and legal blindness globally, particularly in Asian nations [3]. Subretinal bleeding is a frequent observation in cases of newly developed lacquer cracks as well as recently diagnosed myopic CNV. Myopic CNV, which affects 5% to 11% of cases, is the most prevalent central vision-threatening condition in patients with high myopia. After active CNV has been identified, prompt treatment, such as anti-VEGF therapy, is advised. However, the prognosis is typically better for mSH linked to lacquer cracks, commonly known as simple haemorrhage. Consequently, it is critical to distinguish between the two types of subretinal bleeding and make a proper diagnosis [4].

Discussion

In this study, 25 eyes that had been tentatively identified by FA as having myopic CNV with subretinal haemorrhage were examined. On OCTA, the characteristic CNV network was evident in 22 out of 25 individuals, or 88% of the total. Unfortunately, the initial CNV diagnosis in the final 3 cases out of 25 (or 12%) was ignored. These 3 examples were ultimately determined to be simple bleeding linked to lacquer cracks by integrating the OCTA, SD-OCT, and ICGA appearance. The self-limiting results also lend weight to the ultimate diagnosis. This finding proved that fluorescein leakage can also be caused by lacquer cracks within recent myopic subretinal haemorrhage [5].

The dye leakage linked with lacquer cracks on FA has not yet been studied; earlier researchers believed it to be a closed defect brought

***Corresponding author:** Samuel Kyei; Clinical Epidemiology and Biostatistics, Faculty of Medicine and Health, School of Medical Sciences, Örebro University, Campus USÖ, Södra Grev Rosengatan 30, Örebro 703 62, Sweden, E-mail: samuel.kyei@oru.se

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on by an avascular barrier, such as scar tissue. Within two weeks after the onset of visual problems, three patients in this study who had fluorescein leaking connected to lacquer cracks underwent an initial examination. SD-OCT was also used to find apparent faults of the RPE-BM-CC complex that seemed to be lacquer cracks. We hypothesise that the amount of RPE-BM-CC complex damage and the timing of the bleeding affect fluorescein leakage within simple myopic haemorrhage. Dye leaking on FA may be caused by early-onset bleeding linked to lacquer crack paired with a secondary, rather significant rupture of the RPE-BM-CC complex, which might easily lead to a false-positive diagnosis of myopic CNV and should be taken into consideration in clinical practise [6].

It is well known that lacquer cracks, a defining feature of pathologic myopia, are mechanical breakdowns in the RPE-BM-CC complex brought on by excessive axial elongation. Lacquer cracks often manifest as yellowish linear lesions in the posterior pole of the eye. On FA, lacquer cracks typically appear as a window flaw. With subretinal bleeding, lacquer cracks that have just begun to form may be visible. With pathologic myopia, subretinal haemorrhage without CNV is also thought to be an indication of newly forming lacquer cracks [7]. As suggested by Klein and Curtin, fluorescein leakage from the choriocapillaris might be anticipated if lacquer fractures are real RPE-BM-CC complex flaws. Similarly, it is hypothesised that observable rupture of the RPE-BM-CC complex on SD-OCT may be possible if the defect in the RPE-BM-CC complex generated by a lacquer crack is severe enough. There have been several cases of high myopia eyes with reported discontinuities of the RPE-BM-CC complex at the location of lacquer cracks on SD-OCT.

FA typically provides confirmation of the clinical diagnosis of myopic CNV. It has been suggested that FA should be performed in any case of suspected new-onset myopic CNV because exudative features of myopic CNV are more obvious on FA than on SD-OCT. According to Garcia-Layana et al., detecting CNV activity throughout therapy using OCT after a myopic CNV diagnosis was established has a 97% sensitivity rate. In fact, it is typically advised to do both FA and SD-OCT in dubious instances to boost the diagnosis accuracy [8]. Myopic CNV has been successfully diagnosed using OCTA with high sensitivity and specificity (>90%). In their study, found no instances of false-positive CNV identification by OCTA in patients who had never received therapy and even proposed that FFA is no longer required if myopic CNV is discovered by OCTA. This study showed that FA alone would not be the best tool for initial CNV detection in severe myopia with subretinal haemorrhage. Multimodal imaging, including OCTA, SD-OCT, and ICGA, precluded the preliminary diagnosis of myopic CNV in 3 eyes [9].

There are various restrictions on our study that must be taken into account. First off, just a small number of patients were involved in this study. Second, because every patient came from the same hospital, there can be a prejudice against referrals. Thirdly, selection bias could exist because this was a clinic-based observational study. Although it is simple to mistake active CNV for fluorescein leakage from lacquer cracks, this work is the first to document this phenomenon [10].

Conclusions

The ruptured RPE-BM-CC complex caused by lacquer cracks can also manifest as fluorescein leakage, which needs to be noted in clinical practise, especially in cases with new-onset subretinal haemorrhage, according to a series of highly myopic patients we observed who had fluorescein leakage within recent subretinal haemorrhage.

In conclusion, myopia has a significant negative impact on society in addition to its negative effects on people's physical and mental health. Teenagers with myopia are more prone to experience anxiety than those without myopia. Understanding the many elements that influence the occurrence and progression of adolescent myopia is helpful for understanding how it develops as well as for developing practical myopia prevention and control strategies to safeguard young people's health.

Conflicts of Interest

None

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