DOI: 10.53469/jrve.2025.07(04).11

How to Enhance the Health Education Capabilities of Optometry Interns in Myopia Prevention and Control During Clinical Practice

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Abstract: ***Optometry interns demonstrate deficiencies in health education regarding myopia prevention and control when interacting with myopia patients and their families during clinical practice. These shortcomings are primarily reflected in three aspects: inadequate understanding of the significance of myopia prevention and control, incomplete coverage of educational content, and poor competency in addressing complex cases. In response to these issues, this paper systematically elaborates on the clinical implications of myopia prevention and control, comprehensively summarizes key educational components and critical considerations, and proposes innovative practical training methods. These methods incorporate simulated teaching exercises and real-case participation, aiming to substantially improve optometry interns' health education competencies in myopia prevention and control within clinical settings.***

Keywords: Myopia prevention and control, Clinical internship, Health education**.**

1. Introduction

In recent years, the global prevalence of myopia, particularly in Asian populations, has surged significantly, accompanied by a concerning trend toward earlier onset. This epidemiological shift has prompted most countries worldwide to prioritize myopia prevention and control as a critical public health agenda [1-4]. Concurrently, optometry has emerged as a prominent discipline in medicine, reflecting its growing importance in addressing this public health challenge. The efficacy of myopia management hinges fundamentally on whether practitioners and patients possess an accurate understanding of myopia progression and its implications [5]. Consequently, optometry interns are frequently required to deliver comprehensive and effective health education on myopia prevention and control to patients and their families during clinical practice. As frontline optometric clinicians engaged in clinical instruction, the authors have observed recurrent deficiencies in interns' ability to convey such education systematically. These gaps often manifest as incomplete coverage of essential preventive strategies, insufficient emphasis on behavioral modifications, and limited proficiency in addressing atypical or complex cases. To bridge this educational disparity, this article integrates practical experience with empirical research to explore actionable strategies for enhancing the health education competencies of optometry interns in myopia prevention and control.

2. There Should be a Correct Understanding of the Significance of Myopia Prevention and Control

Myopia, defined as a refractive error where the eye's optical power exceeds its axial length, results in parallel light rays converging anterior to the retinal photoreceptor layer under non-accommodative conditions. This refractive state manifests clinically as blurred distance vision with preserved near vision, frequent squinting for distant objects, and unstable distance visual acuity in early stages. High myopia (≥-6.00D) is often accompanied by nyctalopia, vitreous floaters, photopsia, and pathological fundus changes such as tessellated fundus or peripapillary atrophy.

The imperative for myopia control operates on dual dimensions:

1) Micro-level impacts: Optical correction dependency imposes lifelong burdens, including activity restrictions (e.g., sports, occupational choices) and economic costs.

2) Macro-level consequences: National security concerns emerge as myopia prevalence reduces military recruitment eligibility—aviators, special forces operatives, and naval personnel require uncompromised visual performance incompatible with corrective lenses.

In our doctors' view, myopia prevention and control is mainly to prevent myopia from developing into high myopia, because for people with low to moderate myopia, their eyes are generally healthy as long as they wear glasses, and their basic life, cognitive development, growth and development can be carried out normally. However, in cases of high myopia *(≥-6.00D)*, the entire eye will be "fragile", and the probability of many terrible complications (such as retinal detachment, retinal hemorrhage, cataracts, glaucoma, etc.) occurring in the eye will greatly increase. These complications can even cause blindness. In recent years, the age at which these complications occur has become younger, which is closely related to the increasing proportion of high myopia among young people [6].

3. There Should be a Comprehensive and Profound Understanding of the Specific Content of Myopia Prevention and Control

Myopia prevention and control education should be reflected in all aspects of life [5]. For the convenience of memorization during eye and vision internships, this article summarizes the knowledge and precautions of myopia prevention and control

education for children and adolescents from 12 aspects. Specifically, as follows:

1) Reading and writing posture should be correct. Remember the "three ones", which are "one fist, one foot, one inch": punch your chest one fist away from the table, keep your eyes one foot away from the book (about 33 centimeters), and keep your hand holding the pen one inch away from the tip of the pen (about 3 centimeters). At the same time, we must adhere to the "20-20-20" principle, which means that after learning to read for 20 minutes, we should look at the distance of 20 feet (6 meters) for more than 20 seconds. Reminder: Parents should provide suitable desks and chairs for their children, encourage them to adopt correct reading and writing posture, urge them to correct incorrect reading and writing posture in a timely manner, and also supervise and correct their children's bad reading and writing posture at any time. They should maintain a "one foot, one fist, one inch" posture, and the continuous eye time for reading and writing should not exceed 40 minutes.

2) Attention should be paid to ensuring sufficient lighting brightness during learning. When the light is insufficient, a desk lamp should be used to assist in lighting, and the desk lamp should be placed in front of the opposite side of the writer. When reading and writing at night, it is necessary to use both a desk lamp and a room ceiling lamp, and place the lamp correctly. Do not use colored light sources for home lighting. It is best to use LED reading and writing desk lamps with adjustable color temperature, brightness, and shading function. Reminder: The family is an important place for children and adolescents to live and study, and the lighting and illumination conditions in the home are crucial for the eye hygiene of children and adolescents. When studying at night, in addition to turning on the desk lamp for illumination, the room ceiling light should also be turned on to reduce the indoor brightness difference, so that the local lighting on the desktop and the surrounding environment remain harmonious and consistent, and avoid creating too strong brightness contrast.

3) Paper reading materials should be carefully selected. The font size should not be too small, the material should not have reflections, the handwriting should be clear, the whiteness of the paper should not be too high, and the brightness should be appropriate. The paper material and printing quality should be comprehensively considered. Reminder: Do not read reading materials with small fonts, dense lines, or unclear handwriting. Schools should use printed materials suitable for students to read, and the reading paper should be conducive to protecting eyesight.

4) Don't spend too much time reading and writing. It is best for elementary school students to sleep for 10 hours a day, middle school students for 9 hours, and high school students for 8 hours. Following the "20-20-20" eye protection principle, use your eyes up close for 20 minutes and pay attention to looking at distant objects 20 feet (6 meters) away for 20 seconds to relax your eyes. The use of electronic products for non learning purposes should not exceed 15 minutes per use, and should not exceed 1 hour per day in total. The younger the child, the less time they should use it. Reminder: Reduce prolonged close eye contact and relieve eye fatigue through distant vision, eye exercises, and other methods. Ensure that children have sufficient sleep time every day, with primary school students receiving 10 hours, middle school students receiving 9 hours, and high school students receiving 8 hours.

5) Electronic products should be carefully selected. Electronic products should have high screen resolution and suitable clarity, and the brightness should be adjusted to avoid being too bright or too dark. It is recommended to use electronic products for learning in the order of projector, TV, computer, and tablet. It is not recommended to use mobile phones for online learning, let alone playing games.

Reminder: Electronic products have become important tools for learning, work, and entertainment. Improper use of electronic products can cause eye discomfort or myopia. Children and adolescents are in a critical period of visual development, and prolonged use of electronic products poses greater risks, which should be widely concerned by parents and society.

6) The distance between the video and the screen should be moderate for online learning. The distance between the eyes and the screen should not be less than 50 centimeters. It is best to use a screen with adjustable height and clarity to ensure clarity and visibility. When using a TV or projector, the distance between the eyes and the TV screen should be at least 3 meters or 6 times the diagonal length of the TV screen. Reminder: Children and adolescents should prioritize the use of paper materials when studying. The use of electronic products for non learning purposes should not exceed 15 minutes per use, and should not exceed 1 hour per day. The younger the age, the shorter the continuous use of electronic products.

7) Balanced diet and nutrition. Nutrient intake should be balanced. Eat more foods rich in lutein and zeaxanthin, such as spinach, mustard greens, broccoli, egg yolks, corn, pumpkin, carrots, etc. These foods are helpful in preventing eye aging. Eat more foods rich in vitamin A, such as animal liver, cod liver oil, dairy and eggs, as well as red yellow and dark green vegetables and fruits rich in carotenoids, which contain vitamin A precursor and can be converted into vitamin A in the body. Reminder: Parents should encourage their children to eat nutritious diets such as fish, fruits, and green vegetables that are beneficial to their visual health. They should also eat less sugar, avoid picky eating, and ensure sufficient sleep time, which is beneficial for their children's visual health.

8) Outdoor activities are very important. Ensure at least 2 hours of outdoor activity time every day, allowing children to engage in outdoor activities under natural light, such as walking, running, playing soccer, cycling, flying kites, etc. Outdoor activities exposed to sunlight can promote dopamine release in children's eyes, thereby inhibiting axial growth and effectively preventing the occurrence and development of myopia. Reminder: Nutrition and exercise are equally important for children's visual health. Parents should encourage their children to actively participate in outdoor activities and physical exercise outside of their studies, achieving a balance between work and rest and using their eyes scientifically [2,7].

9) Regular check ups. should be conducted at least twice a year for primary school students, which can be arranged in the spring semester (April to June) and autumn semester (October to December), to monitor changes in vision in a timely manner and achieve early detection, early warning, and early intervention. Parents should establish a record of their children's visual health development, preserve examination materials, and track and record their children's visual health status. For cases where the prevention and control of myopia is not effective, it is important to actively identify the reasons and overcome them one by one.

Reminder: Prevention and control of myopia in children and adolescents is a systematic project that requires joint efforts from various parties such as the government, schools, medical and health institutions, etc. It requires the whole society to take action and jointly take care of children's eyes.

10) Glasses fitting should be precise. Children and adolescents with myopia should go to a regular ophthalmic medical institution for professional and systematic examination, and should not blindly undergo optometry and fitting. The first time fitting glasses, it is necessary to perform dilated optometry to distinguish between true myopia and pseudomyopia. Especially for children and adolescents with strong accommodation, dilated optometry can obtain accurate refractive power and effectively avoid incorrect fitting of pseudomyopia glasses. Reminder: Parents should not easily trust various advertisements promoting "quick correction of vision", as unscientific handling may lead to further deterioration of vision.

11) Correction surgery should be performed with caution. Corneal laser surgery and other myopia correction surgeries must be performed in formal ophthalmic medical institutions, and must undergo strict preoperative examinations to clarify surgical contraindications and indications before proceeding. Contact lenses must be stopped before myopia correction surgery. Generally, soft contact lenses should be stopped for one week, hard breathable corneal contact lenses should be stopped for three weeks, and corneal reshaping lenses should be stopped for more than three months. Reminder: Currently, there is no cure for myopia in medicine, and only scientific correction and improvement of eye habits can prevent myopia from worsening too quickly. Don't believe in the promotion and commercial marketing that can cure myopia. Unscientific disposal may lead to further deterioration of vision.

12) False advertising is not credible. Currently, there are no products such as "reducing prescription", "curing myopia", or "myopia killer". Any misleading statements about myopia treatment, such as "miracle tools", surgery being "risk-free", "helping to remove glasses", "restoring vision", "curing myopia", "myopia nemesis", "degree repair", etc., are considered false and illegal advertisements. Reminder: Once parents discover abnormal vision in their children, they should promptly take them to a regular ophthalmic medical institution for examination and follow medical advice for scientific correction.

In addition to the correct eye habits mentioned earlier, there are also some effective medical measures for myopia prevention and control. Wearing orthokeratology lenses and functional frame glasses for controlling myopia development, administering low concentration atropine eye drops, red light irradiation, and ear acupressure. Each has its own advantages and limitations. Wearing night time orthokeratology lenses can effectively control the development of myopia and achieve the effect of not having to wear glasses during the day, but the cost is relatively high, the hygiene requirements are high, and the care is also complicated [8-10]; Functional frame glasses that control the development of myopia, like regular glasses, can be worn during the day, but the cost is also relatively expensive [11-13]; The use of low concentration atropine eye drops has certain side effects, such as photophobia and difficulty in near vision [14-16]; The method of red light irradiation can effectively control the development of myopia, but its long-term safety still needs to be studied [17,18]; The effectiveness of using ear acupressure to control the progression of myopia needs to be discussed [19]. The above content and methods of myopia prevention and control must be memorized by heart.

4. Adopting Innovative Forms of Practical Teaching to Enhance the Myopia Prevention and Control Education Ability of Optometry Interns

In the teaching of myopia prevention and control education in clinical practice of optometry, situational simulation teaching method combined with GLTC communication model can be used to enhance the teaching effectiveness and participation of the course. This model was founded by Wang Jinfan in 2012 and included in the 2013 edition of the national planning textbook "Doctor Patient Communication". It emphasizes a four-stage communication process led by medical workers: goodwill expression, focused listening, effective dialogue, and cooperation. The implementation process can be divided into the following key steps:

Firstly, establish teaching orientation: focus on cultivating the humanistic care awareness and empathy ability of internship students, strengthen their awareness of the psychological state of patients, and systematically enhance their myopia prevention and control education ability. Next, construct teaching scenario materials: form a teaching team composed of senior clinical teachers, combine real diagnosis and treatment cases with communication difficulties reported by students, and design teaching scripts for typical clinical communication scenarios. The content covers the scene of myopia prevention and control education for special groups. Infants, preschool children, adolescents, and adult patients with high myopia.

Conduct multi-dimensional scenario exercises: simulate real diagnosis and treatment scenarios through teacher-student role-playing (covering roles such as physicians, patients, and family members). The guiding teacher guides the students to make clinical decisions and solve problems in simulated practice, with a focus on training the practical application of communication skills. Find suitable patients and actively participate in communication and education [20].

For challenging cases, especially those with poor myopia prevention and control effects and patients or their families

feeling anxious, it is important to be patient, actively identify the causes, and provide effective targeted corrective measures. For example, if the prevention and control effect is better during one period of time and worse during another period, analyze the behavioral differences in prevention and control measures between the two periods, differences in attitudes towards myopia prevention and control, and differences in time (such as spring, summer, autumn, and winter).

Finally, conduct a deep reflection and summary: organize students to conduct case studies and mutual evaluations, analyze the gains and losses in practice; The teaching team conducts professional evaluations, focusing on analyzing the room for improvement in the communication process, while affirming innovative solutions, in order to promote the construction of systematic clinical thinking among students and enhance the myopia prevention and education ability of interns in the entire process of optometry diagnosis and treatment.

5. Summary

Only by fully understanding the significance of myopia prevention and control, strengthening the specific content of myopia prevention and control, and through teaching exercises and real participation, and repeatedly pondering and thinking about the problems that occur, can the educational ability of myopia prevention and control in clinical work be truly improved for optometry interns. I hope that optometrists and interns can actively achieve the above points in clinical teaching and education, effectively enhance the myopia prevention and control education ability of optometrists, cultivate excellent reserve forces for myopia prevention and control, and make their due contributions to the goal of "jointly caring for children's eyes and giving them a bright future".

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