

PERCEPTIONS AND CLINICAL PRACTICES OF EYE CARE PRACTITIONERS IN RELATION TO CHILDHOOD MYOPIA IN PAKISTAN

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ABSTRACT

PURPOSE: To assess the knowledge of eye care practitioners regarding childhood myopia, its prevalence, ethnicity, parental history and association with vision threatening diseases as well as management strategies for childhood myopia.

METHODS: This descriptive cross-sectional study was conducted among 228 eye care practitioners including optometrists, postgraduate residents' ophthalmology, pediatric ophthalmologists and consultant ophthalmologists in Pakistan. Participants provided information about their location of primary practice, management and treatment approaches for childhood myopia in their clinical practice. SPSS 25 software was used for data analysis. This study was conducted from September to November 2020.

RESULTS: Out of 228 eye care practitioners, 59.7% were male and 36.9% were female. This study showed that 89.5% of eye care practitioners considered that spending time in outdoor activities decrease the progression of myopia. 51.8% reported that use of electronic devices accelerate myopia progression in children. The most common method to diagnose childhood myopia was cycloplegic refraction and subjective refraction. Single vision spectacles (87.7%) were prescribed by majority of the practitioners in their daily practice. Topical atropine 0.01% (66.2%) was most effective therapeutic intervention to stop myopia progression in children. However practitioners had limited knowledge of peripheral defocus soft contact lenses (3.5%) and ortho-k lenses (25.4%).

CONCLUSION: Although most of the eye care practitioners were aware of the efficacy of myopia control methods, but still majority of the eye care practitioners in Pakistan were prescribing single vision spectacles to myopic children. It is essential to develop highly effective and conventional therapeutic treatment to lessen the myopia related complications and vision loss.

KEYWORDS: Myopia, Clinical practice, Atropine.

INTRODUCTION

Refractive error is a vision problem that occurs when eye does not bend light rays properly on retina resulting in blurred image. Myopia, hypermetropia, astigmatism and presbyopia are the types of refractive error.¹ Myopia is a worldwide significant public health issue.² Myopia usually appears in childhood and it gets worse over a period of time if remains untreated. After its onset, progression of myopia is fast in children and young children have risk of developing high myopia in the future.^{3,4}

The World Health Organization's (WHO) defines

myopia (Nearsightedness) as "Myopia is a state refractive error during which light rays entering the eye parallel to the visual axis are brought to a focus before the retina when accommodation is relaxed. This is due to extremely curved cornea or eyeball being too long from front to back".⁵

Myopia causes a considerable personal and social burden because of the need for correction of refractive errors to avoid visual impairment. Globally uncorrected distance refractive error is expected to affect 108 million people.⁶ It is the leading cause of moderate and several visual

impairment (42%) and a major cause of blindness (3%).⁷ Due to increasing prevalence of myopia in recent decades,⁸ it is fast becoming a major public health concern.

Prevalence of uncorrected refractive errors in Pakistan is 23.97% among male population and 20% among female population.⁹ 51.5% of school going children have high myopia in a recent study from one of the largest cities of Pakistan.¹⁰

The estimated annual cost of optical correction of myopia for Singaporean children is documented at US \$755 million. More than 65% of the total costs covered optometry visits, spectacles or contact lenses. The higher cost in adults is due to fact that they may have developed ocular complications in later life due to pathological myopia or undergo refractive surgery.¹¹

Family history of myopia and ethnicity are known risk factors for myopia¹² and association with age and sex also have been defined. Many descriptive studies describe these risk factors in detail.¹³

Various treatment for myopia control are prescribed on a daily basis and the impact of varying the schedule of treatment is an area which has not been explored.¹⁴ Spectacle intervention does not appear to significantly affect the progression of myopia and has no effect on axial length.¹⁵ However atropine and ortho-k lenses helps to retard myopia progression in children.¹⁶

The goal of present study is to determine the level of awareness, attitude and clinical practices of eye care professionals regarding childhood myopia in Pakistan. We aimed to explore the perception and best practices for myopia management that are being prevailing in our national set up. This study will help us to share our recommendations with the policy makers e.g. need of increased public and ophthalmological practitioners, education & campaigns to raise parents and teacher's awareness and implementation of updated myopic management practice.

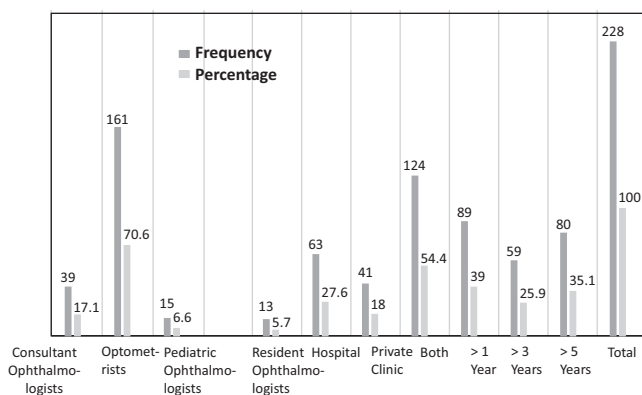
MATERIALS AND METHODS

An internet-based cross-sectional survey was distributed among various eye care professionals in Pakistan including optometrists, resident ophthalmology, pediatric ophthalmologists and consultant ophthalmologists. The descriptive cross sectional study was utilized. The size of obtained sample was 228. The demographic details were also noted which included gender, location of practice and experience. The survey questionnaire comprised of various questions to assess generalized awareness about disease prevalence, if the practitioners had updated knowledge of myopia management, what was their preferred management style and what was the obstacles in adopting new management strategies. For data analysis we used statistical package for social sciences (SPSS version 25). Qualitative variables were presented as frequency and percentage. Graphs and Bar charts were made for descriptive analysis. The research protocol was approved by the Ethical Review Board of College of Ophthalmology and Allied Vision Sciences.

RESULTS

Survey questionnaire was sent to 228 eye health practitioners. Out of 228 eye care practitioners 70.6% (n=161) were optometrists, 17.1% (n=39) were consultant ophthalmologists, 6.6% (n=15) were pediatric ophthalmologists and 5.7% (n=13) were PGRs. 54.4% (n=124) eye care practitioners were working in hospitals and private clinics, 27.6 % (63) in hospitals and 18.0% (41) in private clinics. Approximately 35.1% (80) reported that they had experience of > 5 years (Fig: 1).

Figure - 1: Number of Eye Care Practitioners Participating in this Study



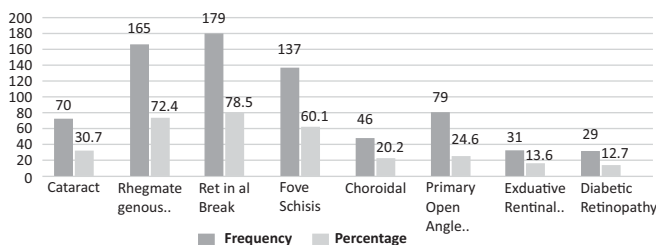
A vast majority (86.6%) of eye care practitioners were concerned about increasing prevalence of pediatric myopia in their clinical practice. 79.4% of ECPs reported that they were using myopia control strategies in children in their clinical practice (Table 1).

Table - 1:

	Frequency(%)	Frequency(%)
	Yes	No
Are you concerned about increasing number of frequency myopia in your clinical practice?	198 (86.8)	30 (13.2)
Do you record parental myopia history when dealing with myopic patients?	189 (82.9)	39 (17.1)
Do you measure accommodation amplitude in all myopic patients in clinical practice?	75 (32.9)	153 (67.1)
Do you measure pupil size in all myopic patients?	57 (25)	171 (75.0)
Do you apply myopia control strategies in children in your clinical practice?	181 (79.4)	47 (20.6)
Do you think unavailability of clinical equipment is barrier in myopia management?	183 (80.3)	45 (19.7)

The most common approach of practitioners to diagnose myopia was both cycloplegic and subjective refraction (57%). Most of the participants indicated that retinal break (78.5%), foveoschisis (60.1%), rhegmatogenous retinal detachment (72.4%), cataract (30.7%) and primary open angle glaucoma (34.6%) were the most common complications associated with high myopia (Fig: 2).

Figure - 2: Complications Associated with High Myopia



87.7% of ECPs were prescribing spectacles to correct myopia but had knowledge of progressive addition glasses (49.8%), atropine low dose 0.01% (66.2%) and orthokeratology (25.4%) (Table 2). The main hesitance of practitioners to prescribe other correction methods rather than spectacles was that outcome was unpredictable (40.4%), safety concerns (58.3%), and inadequate knowledge (69.7%), time consuming (60.5%) and cost effective (61.4%).

Table - 2: Most Preferred Treatment Options for Pediatric Myopia in Clinical Practice of Practitioners

	Frequency	Percentage
Spectacles	200	87.7
Atropine low dose 0.01	151	66.2
Progressive addition glasses	114	50
Ortho-k lenses	58	25.4
Visual hygiene	88	38.6
Bifocal lenses	54	23.7
Peripheral defocus soft contact lenses	8	3.5
Atropine moderate dose 0.1-0.5	28	12.3
Bifocals with prisms	14	6.1
Atropine High dose >0.5	29	12.7
Total	228	100

DISCUSSION

Myopia usually occurs between 5 to 15 years of age.¹⁷ Our study revealed that 78.9% of the eye health care practitioners in Pakistan are also aware of the fact. A positive parental family history has strong association with myopia.^{8,18} A study conducted in Australia to assess the knowledge of

practitioners regarding myopia¹⁹ in which 50% of the participants agreed that genetic and environmental factors were associated with myopia while in our study 55.7% of the eye care practitioners were agreed that shortsightedness is caused by combination of genetics and environmental factors.

Increasing outdoor activities prevent the onset of myopia in children. 57.9% of eye care practitioners were agreed that vision of a myopic child can be improved with outdoor activities. 51.8% reported that use of electronic devices accelerate myopia progression in children. A randomized study was conducted among school children in China and Taiwan in which they were motivated to participate in outdoors activities for up to 11 hours weekly. As a result 50% reduction in progression of myopia was noticed in these children.²⁰

High myopia is a risk factor for several ocular complications that can lead to severe vision loss. Most of the participants indicated that retinal break (78.5%), foveo-schisis (60.1%), rhegmatogenous retinal detachment (72.4%), cataract (30.7%) and primary open angle glaucoma (34.6%) are the most common complications associated with high myopia. However, in above mentioned study¹⁹ approximately 50% of respondents selected that cataract was the common complication related to pathological myopia. However 32% of the participants were unaware of foveo-schisis and choroidal neovascularization (42%).

Cycloplegic refraction is considered a preferable option in childhood ocular examination to rule out impact of accommodation. A recent study from Australia to assess the prevailing practices in childhood management of myopia among optometry community reported that most of the practitioners preferred non-cycloplegic refraction (> 90 per cent of respondents) over cycloplegic (< 20 per cent of respondents).¹⁹ Contrarily to that in our study 57% of eye care practitioners were agreed that they perform both cycloplegic and

subjective refraction to diagnose childhood myopia in their routine examination of myopic child.

Spectacles are considered the safest and commonest treatment option offered.²¹ A recent study about update in myopia management reported that 67.5% of ECPs were prescribing single vision spectacles to correct myopia.²² However In our setup spectacles are found to be a most offered treatment option. This study has shown that majority of the respondents prescribe single vision spectacles (87.7%) for myopia management in their clinical practice. It is concluded from questionnaire that progressive addition spectacles (49.8%), atropine low dose 0.01% (66.2%), ortho-k lenses (25.4%) and visual hygiene (38.6%) are the effective treatment options for myopia in children. Peripheral defocus soft contact lenses (3.5%), atropine high dose (1.3%) and multifocal soft contact lenses (0.4%) are least effective.

Surgical correction of myopia is indicated if it is stabilized.²³ Laser refractive surgeries effectively treat all levels of myopia.²⁴ About 52.2% eye care practitioners considered that refractive surgery can be performed on myopic patients when their myopia is stabilized.

This study shows that 79.4% practitioners are adopting myopia control strategies in their clinical practice. Query related to adapting updated refractive correction practices, around 70% of the respondents admitted lack of knowledge about new modalities, 40% agreed that outcome is unpredictable and more than 60% found that these modalities are not cost effective in our clinical set ups. The field of myopia management is rapidly developing. Myopia is preventable condition which is treated by prescribing best correction and clinicians should focus on most appropriate treatment for myopia control in children.

CONCLUSION

This study provides clinical behavior of eye care

practitioners related to myopia management in children. Most of the eye care practitioners perform cycloplegic refraction and dilated retinal fundus examinations on initial presentation. Most respondents are aware of vision threatening complications associated with high myopia. Single-vision distance spectacles are prescribed by majority of the eye care practitioners in their clinical practice but most of them are aware of others interventions for myopia management such as ortho-k lenses, low-dose atropine and progressive addition glasses. There is growing number of children who are at risk to develop myopia. As epidemic of myopia has become general health concern so it is very important to develop interventions that delay or stop myopia progression.

RECOMMENDATION

Eye care practitioners should be a part of health care associations and NGOs that promote public awareness of childhood myopia. Online sessions and seminars should be conducted to address the evidence-based management plan for myopia so that practitioners should choose best myopic treatment for pediatric patients. It is very important to get parents on board before applying myopia control strategies in young children.

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REFERENCES

1. Naidoo KS, Leasher J, Bourne RR, Flaxman SR, Jonas JB, Keeffe J, et al. Global vision impairment and blindness due to uncorrected refractive error, 1990–2010. *Optom Vis Sci.* 2016;93(3):227-34.
2. Wu PC, Huang HM, Yu HJ, Fang PC, Chen CT. Epidemiology of Myopia. *Asia Pac J Ophthalmol (Phila).* 2016;5(6):386-93.
3. Saw SM. How blinding is pathological myopia? *Br J Ophthalmol.* 2006;90(5):525-6.
4. Gwiazda J, Hyman L, Dong LM, Everett D, Norton T, Kurtz D, et al. Factors associated with high myopia after 7 years of follow-up in the Correction of Myopia Evaluation Trial (COMET) Cohort. *Ophthalmic Epidemiol.* 2007;14(4):230-7.
5. Flitcroft DI, He M, Jonas JB, Jong M, Naidoo K, Ohno-Matsui K, et al. IMI—Defining and classifying myopia: a proposed set of standards for clinical and epidemiologic studies. *Investig Ophthalmol Vis Sci.* 2019;60(3):20-30.
6. Bourne RR, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, et al. Causes of vision loss worldwide, 1990–2010: a systematic analysis. *Lancet Glob Health* 2013;1(6):e339-e49.
7. Naidoo KS, Fricke TR, Frick KD, Jong M, Naduvilath TJ, Resnikoff S, et al. Potential lost productivity resulting from the global burden of myopia: systematic review, meta-analysis, and modeling. *Ophthalmology.* 2019;126(3):338-46.
8. Morgan I, Rose KJPir, research e. How genetic is school myopia? *Prog Retin Eye Res* 2005;24(1):

- 1-38.
9. Abdullah AS, Jadoon MZ, Akram M, Awan ZH, Azam M, Safdar M, et al. Prevalence of uncorrected refractive errors in adults aged 30 years and above in a rural population in Pakistan. *J Ayub Med C*. 2015;27(1):8-12.
 10. Siddiqui AA, Chaudhary MA, Ullah MZ, Hussain M, Ahmed N, Hanif A. Prevalence of refractive errors by age and gender in patients reporting to ophthalmology department. *The Professional Med J*. 2020;27(09):1989-94.
 11. Zheng Y-F, Pan C-W, Chay J, Wong TY, Finkelstein E, Saw S-M. The economic cost of myopia in adults aged over 40 years in Singapore. *Invest Ophthalmol Vis Sci*. 2013;54(12):7532-7.
 12. Logan NS, Shah P, Rudnicka AR, Gilmartin B, Owen CG. Childhood ethnic differences in ametropia and ocular biometry: the Aston Eye Study. *Ophthalmic Physiol Opt*. 2011;31(5):550-8.
 13. Pan CW, Ramamurthy D, Saw SM. Worldwide prevalence and risk factors for myopia. *Ophthalmic Physiol Opt*. 2012;32(1):3-16.
 14. Kang P. Optical and pharmacological strategies of myopia control. *Clin Exp Optom*. 2018;101(3):321-32.
 15. Santodomingo-Rubido J, Villa-Collar C, Gilmartin B, Gutiérrez-Ortega R. Myopia control with orthokeratology contact lenses in Spain: refractive and biometric changes. *Invest Ophthalmol Vis Sci*. 2012;53(8):5060-5.
 16. Bullimore MA, Berntsen DA. Low-dose atropine for myopia control: considering all the data. *JAMA Ophthalmol*. 2018;136(3):303-10.
 17. Saw SM, Tong L, Chua WH, Chia KS, Koh D, Tan DT, et al. Incidence and progression of myopia in Singaporean school children. *Invest Ophthalmol Vis Sci*. 2005;46(1):51-7.
 18. Konstantopoulos A, Yadegarfar G, Elgohary M. Near work, education, family history, and myopia in Greek conscripts. *Eye (Lond)*. 2008;22(4):542-6.
 19. Douglass A, Keller PR, He M, Downie LE. Knowledge, perspectives and clinical practices of Australian optometrists in relation to childhood myopia. *Clin Exp Optom*. 2020;103(2):155-66.
 20. CW Klaver C, Polling JR, Group EMR. Myopia management in the Netherlands. *Ophthalmic Physiol Opt*. 2020;40(2):230-40.
 21. Morgan IG, Ohno-Matsui K, Saw S-M. Myopia. *The Lancet*. 2012;379(9827):1739-48.
 22. Wolffsohn JS, Calossi A, Cho P, Gifford K, Jones L, Li M, et al. Global trends in myopia management attitudes and strategies in clinical practice. *Cont Lens Anterior Eye*. 2016;39(2):106-16.
 23. Worst JG, van der Veen G, Los LI. Refractive surgery for high myopia. The Worst-Fechner biconcave iris claw lens. *Doc Ophthalmol*. 1990;75(3-4):335-41.
 24. Dirani M, Couper T, Yau J, Ang EK, Islam FM, Snibson GR, et al. Long-term refractive outcomes and stability after excimer laser surgery for myopia. *J Cataract Refract Surg*. 2010;36(10):1709-17.