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ORIGINAL ARTICLE

Knowledge, Perspectives and Practice Patterns of Eye Care Providers in Pakistan Regarding Myopia

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ABSTRACT

Aim: To survey eye-care professionals in Pakistan, including optometrists, ophthalmologists, and residents from either, on their knowledge, opinions, and clinical practice patterns. We also looked to see if their myopia-related practice habits were in accordance with current standards of care and guidelines.

Methods: An online survey was created and shared with eyecare providers from all provinces in Pakistan. The responses were collected over a span of 8 weeks.

Results: 173 professionals took part in the survey and 146 were able to complete the survey (based on their response to specific questions). Most common method of refraction was cycloplegic refraction, and most tended to under-correct myopia. Only 1/4th of clinicians were measuring axial length and 21% never performed binocular testing and checked lag of accommodation in myopes. Most common method of myopic fundus examination was dilated fundus biomicroscopy and criteria for peripheral fundus examination was myopia greater than 6 diopters. Almost half have not attended a course/ workshop on myopia (control) in past 6 months and 1/4th tended to rarely read a myopia related journal article.

Progression of more than 1 diopter a year was criteria for initiation of control strategies for most clinicians and 0.01% atropine was the preferred initial concentration and almost half of them believed the control strategies to be moderately effective.

Conclusion: A substantial proportion of eyecare providers do not appear to be aware of current concepts and do not incorporate recent guidelines into their practices regarding myopia management.

Keywords: Practice patterns, Eye care providers, Myopia

INTRODUCTION

Myopia has emerged as a major health concern due to the alarming rate at which its prevalence is increasing throughout the world. According to WHO, myopia is defined as a spherical equivalent objective refraction error of ≤ - 0.5 D and about half of the world population is estimated to become myopic by the year 2050. High myopia is defined as a spherical equivalent refractive error of ≤ –5.00 D and is estimated to affect about 10% of world population by the year 2050.[1]. Although myopia is a refractive error and is conventionally managed by optical or surgical correction, high myopia can result in visual morbidity.

The risk of myopic complications increases with age and progression of refractive error. [2] The most common cause of irreversible visual impairment in working age group is myopia. As the incidence of myopia surges globally, more children will develop myopia and progress to be in the high myopic category, it is expected that the adult population in near future will suffer from considerable myopic visual morbidity. The pathological consequences of myopia can range from vision impairment from uncorrected refractive error, reduced quality of life, increased risk of cataract and open angle glaucoma to the potentially blinding conditions of retinal detachment and myopic macular degeneration (MMD). [3] MMD causes irreversible central vision loss and its risk increases with increase in axial length in high myopia.[4] According to a study, 55.7 million people will be visually impaired from MMD out of which 18.5 million will be blind by the year 2050 if newer interventions for myopia control are not introduced in clinical practice.[5]

Both environmental and genetic factors have been recognized to cause myopia and its progression. The children of myopic parents are at a greater risk of developing myopia. While genetic factors cannot be modified, environmental interventions can be implemented. It has been well documented that environmental factors play a significant role in the progression as well as the onset of myopia. While outdoor activity prevents the onset and slows down the progression of myopia, it is widely accepted that excessive near work is positively associated with myopic progression. Hence, environmental and lifestyle modifications are a major tool that can be utilized by clinicians in myopia management.[6] Moreover, the lack of awareness regarding myopia progression and its management in the parental age group needs to be addressed.

The increased prevalence of myopia has not only made it a global health burden but also a great challenge for clinicians. The best practice for the management of myopia must be adapted by the eye care practitioners and the myopia control strategies which are supported by evidence should be available to patients. The therapeutic goal is to halt the progression of myopia in turn reducing the incidence of related complications. A wide range of these strategies has been studied and proven to be effective in myopia control including use of bifocals and multifocal lenses, atropine therapy, orthokeratology and soft contact lenses. There is also increasing evidence that the traditional approach of under-correcting myopic patients results in a faster progression of the refractive error.[6] Other myopia control strategies have also been suggested to be effective, however, larger clinical trials are needed to prove their efficacy.

While studies are being conducted globally to address the myopia boom and the resulting vision impairment, their application in clinical practice still is crucial. The management and control methods chosen and advocated to the patient and parental population by the clinicians govern the outcomes of myopic control. This study explores the strategies being employed to manage myopia and its progression by eye care practitioners in Pakistan as well as their awareness of myopic complications and control strategies.

MATERIAL AND METHODS

An online survey was created and delivered to eye care providers including optometrists, ophthalmologists, ophthalmology residents and optometry residents. While other eye care providers (i.e., orthoptists, ophthalmic technologists, refractionists or opticians)

were excluded. The survey questions collected data about the demographics, clinical settings, knowledge and practice patterns of the participants about myopia.

In round one, the survey stopped if the provider did not belong to one of the four categories. Also, it self-terminated if the health care professional was not currently seeing myopia patients. Afterwards they were opened to completing the survey. Microsoft excel was used for data handling, management and analysis. Data are presented as counts and percentages across the professions involved.

RESULTS

The survey was completed by 173 clinicians, including 74 (42.8%) optometrists, 76 (43.9%) ophthalmologists, 17 (9.8%) ophthalmology, and 6 (3.5%) optometry postgraduate residents in training. Among participants, 88 (50.9%) were in academic settings, while 49 (28.3%) were in non-academic hospitals, 27 (15.6%) in independent, and 9 (5.2%) in a group private practice setting. Of the 173 participants, 125 (71%) were from Punjab, while 29 (16.8%) were from KPK, 15 (8.7%) from Sindh, 4 (2.3%) from Baluchistan, and 2(1.2%) from other parts of the country. Based on years in practice, 77 (44.5%) had less than 5-years' experience, 49 (28.3%) had 5-10 years' experience, while 47 (27.2%) had more than 10-years of experience. Median [IQR, Min-Max] number of patients seen in a typical week by optometrists 100 [60-300, 15-700], 200 [95-300, 20-700] ophthalmologists, 55 [35-127 ,5-250] optometry PGRs and 150 [80-240, 30-300] by ophthalmology PGRs. Ophthalmologists were seeing twice as many patients as optometrists (P=0.008). Overall, the respondents believed myopic patients made up 34% of their patient population. Myopes made highest proportion patients of optometric practices 46.6 (range 28.6-60) percent, followed by optometry residents 30(range 19.2-30) %, ophthalmology residents 24 (range 15-37.5) %, and ophthalmologists' practices 20(range 12.5-32.8) %. (Table 1 shows the demographics of participants and their summary responses)

Table 1: Summary data and demographics of participants

	Optometrist	Ophthalmologist	OptomPGR	Ophthalmol PGR	Total
Academic	71.2/ 170.4	44.8/ 213.6	15.8/ 59.0	39.4/ 148.4	
Hospital	101.7/ 271.3	70.7/ 256.7	50/ 250	20/ 240	
Independent	42.4/ 100.6	29.1/ 161.4	None	None	
Group Practice	63.6/ 154.3	45.0/ 225.0	None	None	
Awareness about Myopia Control					
No/ Yes (%No)	8/ 66 (12.1)	13 / 63 (20.6)	1/ 5 (20)	5 / 12 (41.7)	27/ 146 (18.5)
Myopia Correction					
UC/FC [UC%]	50/ 24 (67.6%)	44/ 32 (57.9%)	3/3 (50%)	8/9 (47%)	105/ 173 (60.7%)
Do you measure AL in your myopic patients?					
Yes/ No (%Yes)	18/48	10/ 53	0/5	2/10	30/116
Do you perform binocular testing and check lag of accommodation in your myopia cases?					
Not at all Sometimes	12 54	14 49	1 4	3 9	30 146
Baseline Fundus Exam					
BIO/DFE/nDFE	8/38/20	9/47/7	0/5/0	1/10/1	18/100/28
Peripheral Fundus Exam (Criteria)					
All cases	8	23	1	1	
Deg Myopia	9	4	1	1	
P path	10	5	1	1	
Myopia >6 D	39	31	2	9	
Last time attended a course/ workshop on myopia progression/ control					
Past month	7	7	0	0	14
< three moths	8	14	1	2	25
< six months	10	9	1	3	23
> six months	41	33	3	7	84
How often do you read a journal article about myopia?					
Once a week	14	7	0	0	21
Once a month	18	14	3	1	36
Once in 3 months	13	26	2	5	46
Rarely	21	16	0	6	43
Criteria for beginning Myopia control					
>1D progress	33	53	3	7	78
0.7 D or more	19	10	2	2	33
0.5 D or more	14	17	0	3	34
Typical start concentration of atropine					
0.01	42	43	3	9	97
0.02	6	5	0	0	11
0.05	11	11	1	2	25
0.1	7	4	1	1	13

Regarding patients' concern about the progression, 99 (57%) were highly concerned while 68 (39%) were somewhat concerned, 5(2.9%) were probably concerned, and 1 (0.6) were not at all concerned.

Of 173 respondents, 101 (58.4%) of clinicians were highly concerned about the progression, while 60 (34.7%) were somewhat concerned, 10 (5.8%) neutral, and 2 (1.2) had no concerns about the progression in their patients.

Twenty-seven (15.6%) of total respondents (N=173) were unaware of myopia control strategies. There were 8 (10.8%) of 74 optometrists, 13 (17.1%) of 76 ophthalmologists, 1 of 6 (16.7%) optometry residents, and 5 (29.4%) of 17 ophthalmology residents who didn't have myopia control awareness. Myopia control awareness in clinicians when stratified across their primary settings 73 (83%) in academic settings, 42 (85.7%) in non-academic hospitals, 9 (100%) in private group practice and 22 (81.5%) in independent practice settings were aware of myopia control strategies.

Preferred method of refraction was cycloplegic-refraction by 56 (38.4%) followed by non-cycloplegic autorefraction (nCycloAR) 52 (35.6%), CycloAR 24(16.4%) and nCycloRef 14(9.6%). The preferred method of refraction by optometrists was CycloRef n= 32(48.5%), nCycloAR by 27 (42.9%) ophthalmologists, CycloRef

by 4 (80%) optometry residents and 6 (50%) of the ophthalmology residents. (Figure 1)

Among 173 clinicians, 105 (60.7%) correct myopia by at least 0.25 D in all cases, while 68(39.3%) were giving full correction. More optometric practitioners, 50(67%) had a trend to under-correct compared to 44 (57.9%) of ophthalmologists, 3(50%) of optometry residents and 8(47%) ophthalmology residents. (Figure 1)

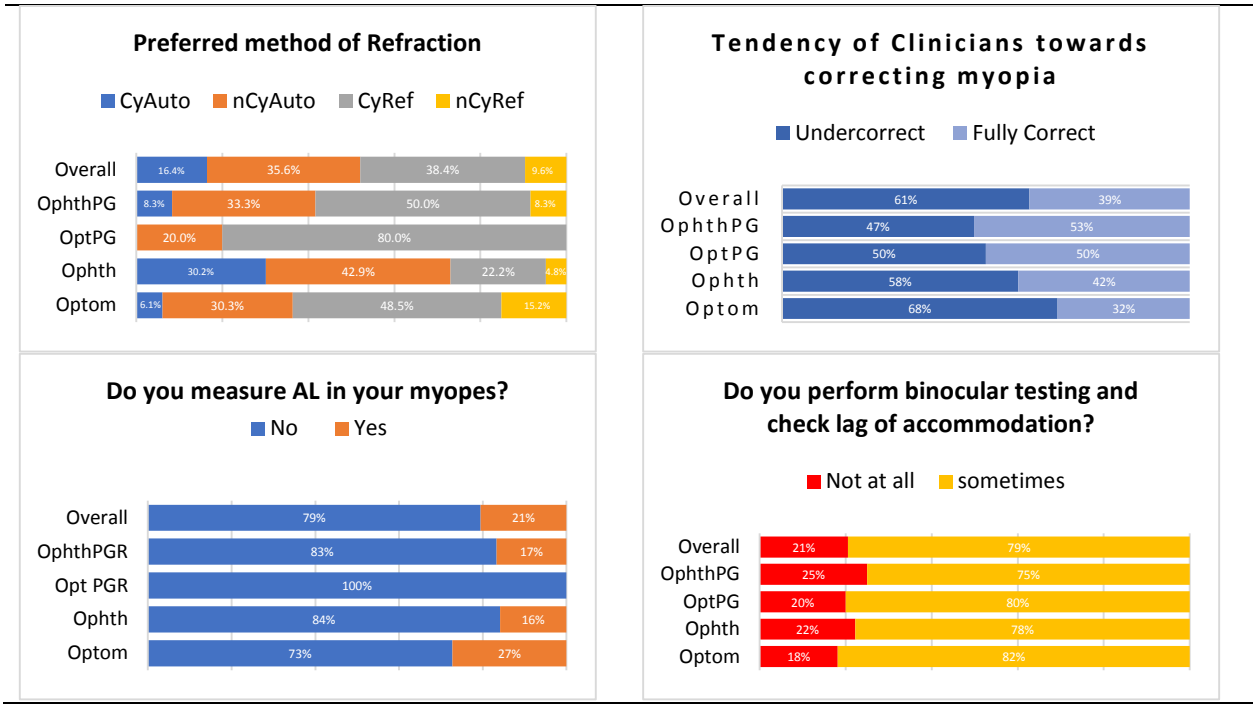

Figure 1: Shows the preffered method of refraction, tendency for undercorrection, axial length (AL) measurements, and testing for binocular functions and lag of accommodation.

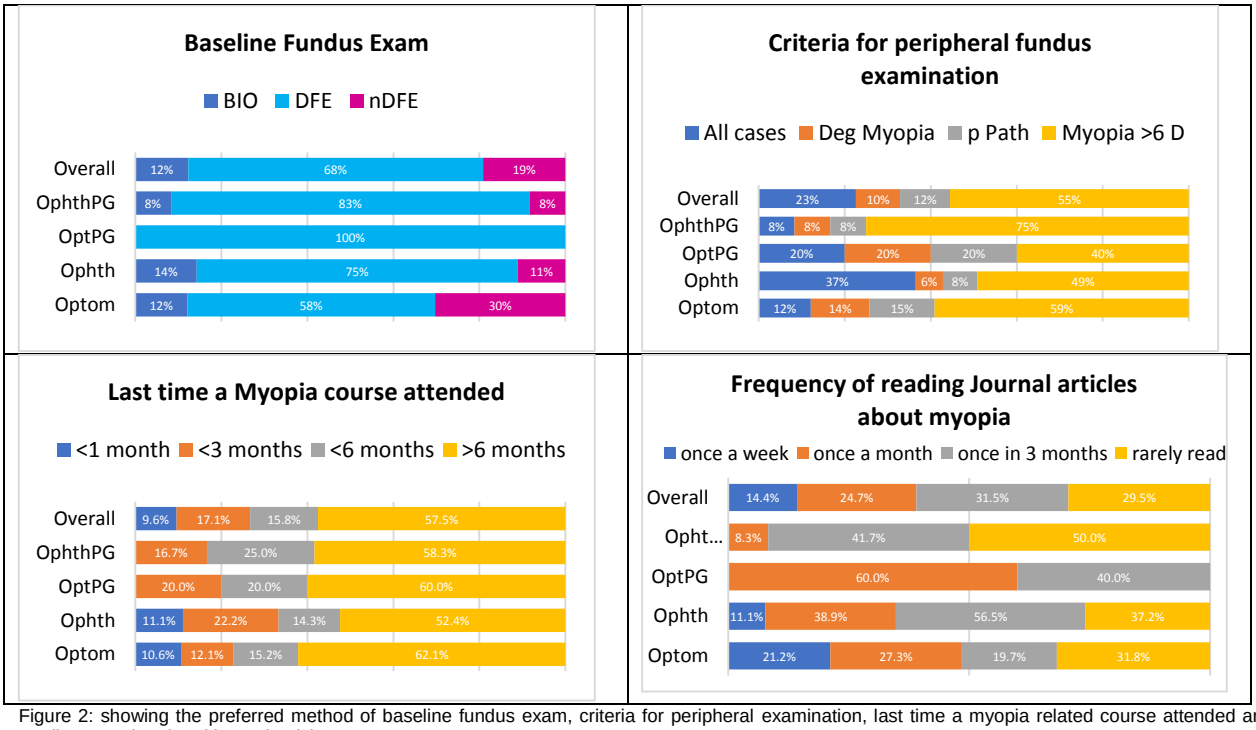

Figure 2: showing the preferred method of baseline fundus exam, criteria for peripheral examination, last time a myopia related course attended and habit of reading myopia related journal articles.

116 (79.5%) of 146 participants were not measuring axial length (AL) in their myopic patients, including 53 (84%) of

ophthalmologists, 48 (72.7%) of optometrists, 5 (100%) of optometry residents and 10 (83.3%) of ophthalmology residents. (Figure 1)

Those performing binocular vision and lag of accommodation testing at least at baseline in their myopes included 54 (81.8%) of optometrists, 49 (77.8%) of ophthalmologists, 4(80%) of optometry residents and 9(75%) of ophthalmology residents, making a total of 116(79.5%) of 146 all providers. (Figure 1)

Dilated slit-lamp fundus biomicroscopy was the most preferred method for retinal examination by 100 (68.5%) followed by non-dilated fundus biomicroscopy (nDFE) by 28 (19.2%) and binocular indirect ophthalmoscopy (BIO) by 18 (12.3%) respondents. The criteria for examining peripheral fundus were myopia >6D for 81(55.5%), every case for 33(22.6%), suspected or known cases of peripheral pathologies for 17 (11.6%), and degenerative myopia 15 (10.3%). (Figure 2)

84 (57.5%) clinicians including 41 (62%) of optometrists, 33 (52%) of ophthalmologists, 3(60%) of optometry residents and 7(58%) of ophthalmology residents had attended a course/ workshop on myopia. Only 14 (9.6%) clinicians, including 7 optometrists (10.6%) and 7 (11.1%) of ophthalmologists, had attended a course within a month. Whereas, most providers, 46 (32%), read myopia-related journal articles once in 3 months or rarely 43 (29%).

Total 145 clinicians responded to questions about criteria for initiating myopia control. 78 (53.8%) considered >1 D annual progression an indicator for beginning control while ≥0.75 D by 33 (22.8%) and ≥0.5 D by 34(23.4%) providers. More ophthalmologists, 17 (27.4%) compared to 14(21.2%) optometrists, were likely to consider myopia control at ≥0.5 D annual progression. The preferred beginning concentration of atropine was 0.01% among 97 (66.4%) clinicians. After initiation of myopia control, 68 (46%) clinicians were reviewing patients on 3-monthly follow-ups while 33 (48%) were following up biannually and the rest of the 7 (5%) clinicians used to see patients annually.

Most of the clinicians, 66(45%), believed myopia control was moderately effective compared to 28(19%) slightly effective, 26(18%) very effective and 20 (14%) extremely effective. Only 7(5%) considered myopia control as not at all effective.

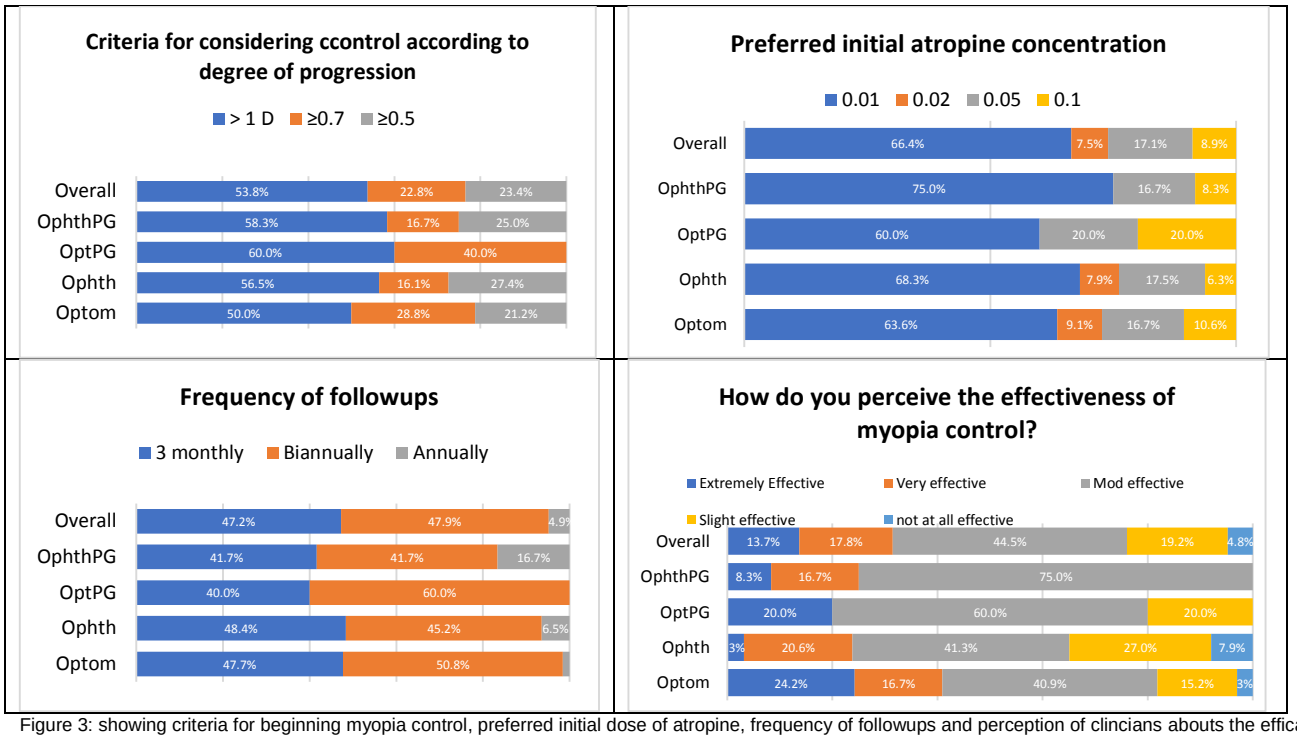

Figure 3: showing criteria for beginning myopia control, preferred initial dose of atropine, frequency of followups and perception of clincians abouts the efficacy.

DISCUSSION

Major aim of this survey was to investigate the knowledge and understanding of Pakistani eye care providers, including optometrists, ophthalmologists, optometry and ophthalmology residents, in relation to myopia and their self-reported clinical practice patterns related to diagnosis, and management of myopia. The study also looked at national eye care practitioners' current knowledge and practice trends about myopia control. Responses came in from of diverse range of practices with different work environments and backgrounds. Responses were received from a diverse range of practitioners. Respondent demographics were broadly representative of eye care providers practicing in Pakistan. Respondents with complete surveys included ophthalmologists, optometrists and postgraduate residents in optometry and ophthalmology from all provinces of Pakistan as well as Kashmir. They also represented diverse practice settings including university teaching hospitals, non-teaching hospitals, private group practices and independent clinics.

While cycloplegic retinoscopic refraction is still the gold standard of refraction especially in younger population, there are diverse ways clinicians refract their patients including non-cycloplegic automated refraction and retinoscopy and cycloplegic automated refraction and retinoscopy. Non cycloplegic refraction overestimates myopic refractive errors and may lead to inaccurate refractive corrections.[7] The current survey data reflected that when combined (automated and retinoscopic refraction) only 54.8% of all respondents had been performing cycloplegic refraction. Most ophthalmology residents (80%) had been performing cycloplegic refraction and this population was least among ophthalmologists who preferred to perform noncycloplegic refractions mostly.

Longer near visual activity is regarded as a major factor in development and progression of myopia and under-correction of myopia had been practiced as a measure to slow down myopia by reducing the accommodative demand in past. However, concrete evidence suggests that under correcting myopia is associated with faster progression compared to fully corrected eyes.[8-10] As

expected, 61% of all clinicians who took part in the survey tended to always under correct myopia and most optometrists had been under-correcting myopia and least of the ophthalmology residents used to under-correct it.

Besides refractive error values, axial length (AL) is an important biomarker in gauging the progression and management of progressive myopia and most myopia control expert groups warrant AL measurements at baseline and later visits.[11] However, AL measurements are usually not employed in clinical practices as evidence by our survey and similar studies from elsewhere in the world.

Fundus examination is part of routine comprehensive examination. As myopia is associated with myriad of retinal changes including myopic degeneration, maculopathy, glaucoma and most serious retinal detachment. Myopia-related midperipheral retinal changes are highly associated with the spherical equivalent.[12,13] A dilated fundus exam (DFE) may reveal these changes promptly and help planning the management accordingly. Around 80% of total respondents had been performing DFE including 12% of those doing binocular indirect ophthalmoscopy. Among all clinicians only 23% said that they performed peripheral fundus examination in all their cases while criteria for peripheral exam for most of the clinicians was myopia >6 D.

Regarding the myopia related educational activities most (57.5%) have not attended a myopia related course/ workshop/ lecture within past 6 months and 1/4th of the participant responded that they rarely read a journal article on myopia. Those who rarely read an article and did not have attended course/ workshop within past 6 months made 23.6% (n=34).

Most of the respondents advocated myopia control if annual progression surpasses 1 diopter while 0.75 diopter and 0.50 D annual progression was a threshold to consider control by 1/4th of clinicians each. The current evidence suggests initiation of control programs as early as possible to reduce the complications associated with myopia progression. Besides the preferred initial concentration of atropine was 0.01% for 2/3rd of the participants. Recent literature suggests that 0.01% concentration isn't effective in a clinically meaningful way and 0.02% or higher should be initial dose preference. Post initiation of control programs almost half were reviewing their patients every 3 months and other were following up biannually except for 5% clinicians who did follow-ups annually.

Almost half of the responded considered control strategies to be moderately effective compared to 4.8% believing these to be not at all effective (including 7.9% of ophthalmologists vs 3% of optometrists.

The findings of current survey suggest that a considerable proportion of the eye care providers in Pakistan are not up to the mark about diagnosis and management of the myopia specially about myopia control. This necessitates broader initiatives to educate the clinicians and develop standards of care for myopia management.

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