

Myopia Management in Daily Routine – A Survey of European Pediatric Ophthalmologists

Umgang mit Kurzsichtigkeit in der täglichen Praxis – eine Umfrage unter europäischen Kinderaugenärzten

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ABSTRACT

Purpose Assessment of diagnostic and therapeutic strategies currently used in routine practice for myopia management in Europe.

Methods Online survey study including 11 main questions. The questionnaire was sent to members of the European Paediatric Ophthalmology Society (EPOS). The following items and questions were surveyed: I. Profession and workplace of the survey participants. II. Preventive measures and recommendations for myopia management, a) regarding reading distance and near work, b) optical tools, i.e., application of Defocus Incorporated Multiple Segments (DIMS) glasses, near additions, or contact lenses, and c) the application of atropine eye drops. III. Application of additional diagnostic tools.

Results Forty-eight individuals completed the survey. Of the respondents, 88 % (n = 42) affirmed that they generally gave advice on strategies for myopia prevention and management strategies. Almost all study participants (n = 41; 85%) recommend outdoor time as a preventive measure. The recommendation on near distance is given less frequently, with 28 (58%) participants confirming that they do recommend a “safe” reading distance, and 15 (31%) negating this. Eight (17%) survey participants recommend using near addition glasses, while 36 (75%) do not. Similarly, 35 (73%) respondents do not apply DIMS glasses and 8 (17%) apply them. Fourteen (29%) participants recommend myopia-reducing contact lenses while 30 (63%) do not, and 29 (60%) confirmed that they applied atropine eye drops to slow myopia progression while 14 (29%) do not prescribe these eye drops. The majority of respondents (n = 25; 86%) who prescribe atropine eye drops use atropine 0.01% eye drops.

Conclusions Prevention and therapeutic management of childhood myopia is an essential part in the daily routine of pediatric ophthalmologists. Substantial agreement was found for the protective role of outdoor time (85%). The only common therapeutic approach is the administration of atropine eye drops (60%).

ZUSAMMENFASSUNG

Hintergrund Analyse des gegenwärtigen diagnostischen und therapeutischen Managements der Kurzsichtigkeit in der täglichen Praxis in Europa.

Methoden Eine Online-Umfrage wurde mit Mitgliedern der Europäischen Pädiatrischen Augenärzte Gesellschaft (EPOS) durchgeführt.

Ergebnisse 48 Studienteilnehmende füllten den Fragebogen aus. 42 (88%) der Kinderaugenärzt*innen beraten ihre Patient*innen hinsichtlich Myopieprävention und -management. Nahezu alle Teilnehmer*innen (n = 41; 85%) empfehlen zur Myopieprävention einen Aufenthalt im Freien. Weniger häufig wird der Leseabstand adressiert; 28 Augenärzt*innen (58%) empfehlen die Beachtung des Leseabstands, während 15 (31%) keine Empfehlung abgeben. Eine Nahaddition halten 8 (17%) der Ärzt*innen für sinnvoll, während 36 (75%) diese nicht empfehlen. Spezielle Myopiegläser, wie Defocus Incorporated Multiple Segments (DIMS) Gläser, werden von 8 (17%) Teilnehmenden befürwortet, während 35 (73%) diese nicht verschreiben. Spezielle Myopie reduzierende Kontaktlinsen werden von 14 (29%) Ophthalmolog*innen verschrieben, 30 (63%) verordnen diese nicht. Eine lokale Anwendung von Atropin verordnen 29 (60%) der Teilnehmenden, während 14 (29%) diese Therapieoption nicht anwenden. Die Mehrheit der Befragten (n = 25; 86%), welche Atropin-Augentropfen anwenden, verordnet Atropin-Augentropfen in der Konzentration von 0,01%.

Schlussfolgerung Prävention und Management der Kurzsichtigkeit im Kindesalter gehören zu den Tätigkeitsschwerpunkten pädiatrischer Ophthalmologen/-innen. Grosse Übereinstimmung (85%) besteht hinsichtlich der präventiven Wirksamkeit eines Aufenthalts im Freien. Zur Progressionsminderung verschreibt die Mehrheit (60%) Atropin-Augentropfen.

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Background

Overall, about one-third of the global population is affected by myopia, making it the most common refractive disorder of the eye [1]. Recent research shows the prevalence of myopia still rising, with extreme prevalence of up to 80–90 percent in certain urban Asian areas, as well as not neglectable numbers in Europe [2–5]. As a study from 2018 showed, the pooled estimated prevalence for Europe was 27% (95 CI = 22.4–31.6) [6]. With this high and still increasing prevalence, myopia and its related complications have become relevant in clinical practice as well as in eye health in general. Especially high myopia, with its associated elevated risk for pathologies, such as myopic maculopathy and retinal detachment, which can cause irreversible visual impairment and even blindness, has become a topic of high relevance [7]. But even lower degrees of myopia bear a high burden of disease [8]. Overall, this has led to the statement that myopia's effect on eye health is comparable to the effect of hypertension on the cardiovascular system, and myopia is being officially recognized as a significant global public health issue [1, 9–13].

At a World Health Organization (WHO) meeting on myopia in 2015, the International Myopia Institute (IMI) was formed, which published several reports, white papers, and clinical summaries declaring the relevance of myopia and summarizing current control options [14]. Besides optimization of behavioral and environmental factors [15–26], optical and pharmacological interventions for myopia control, such as orthokeratology (Ortho-K) lenses [27–29], bifocal/multifocal soft contact lenses (MFSCl) [30], novel spectacle lens designs [31], and atropine eye drops, are used [32–35].

Despite these new myopia management options, no consensus on their use for myopia in childhood has been established yet. Because many of the treatment options are still in the process of being established in clinical routine, there is a need for research on how myopia is being managed in clinics today. The goal of this

survey study was to address this need by assessing the methods used momentarily for myopia control in routine practice.

Methods

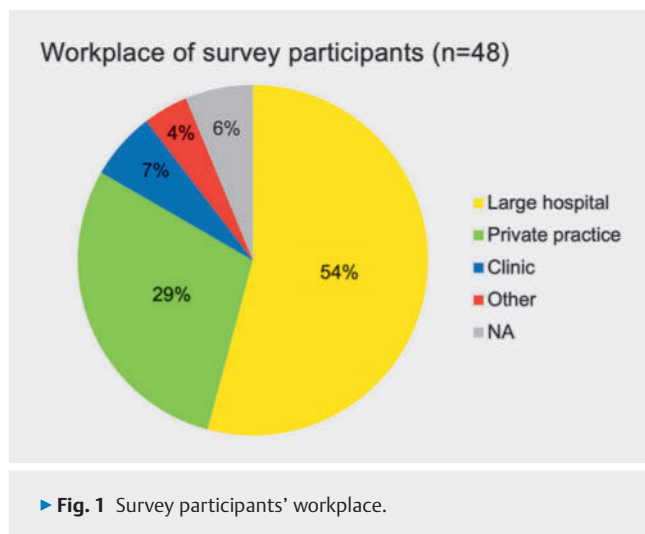
This online survey study included a questionnaire with a total of 11 main questions, requiring a time expenditure of ca. 6–8 minutes to complete. The invitation to participate in the survey was sent via e-mail to members of the European Paediatric Ophthalmology Society (EPOS) with a link to the survey. Ninety-nine EPOS members were addressed via e-mail. The invitation e-mail was sent on 25 June 2021 and the survey link remained available for 1 month to participate.

This was a structured, but non-standardized survey among clinical practitioners regarding their approach to myopia control. Since no sensitive patient data was collected, no approval of the local ethics committee was requested. The questionnaire (see supplementary material) was created by the authors based on their knowledge of myopia management and treatment methods used in practice today.

The following items and respective question areas were inquired: I. Profession and workplace of the survey participants, as well as general knowledge about the prevalence of myopia in the participants' country. II. Preventive measures and recommendations for myopia management tools, a) regarding outdoor time, reading distance, and near work, b) optical tools, i.e., application of Defocus Incorporated Multiple Segments (DIMS) glasses, near additions, or contact lenses, and c) the application of atropine eye drops. III. Application of additional diagnostic tools and frequency of clinical examinations.

Results

I. A total of 48 individuals participated in the survey between 25 June 2021 and 13 July 2021, and 43 (90%) of the participants answered all survey questions. Of the participants, 45 (94%)



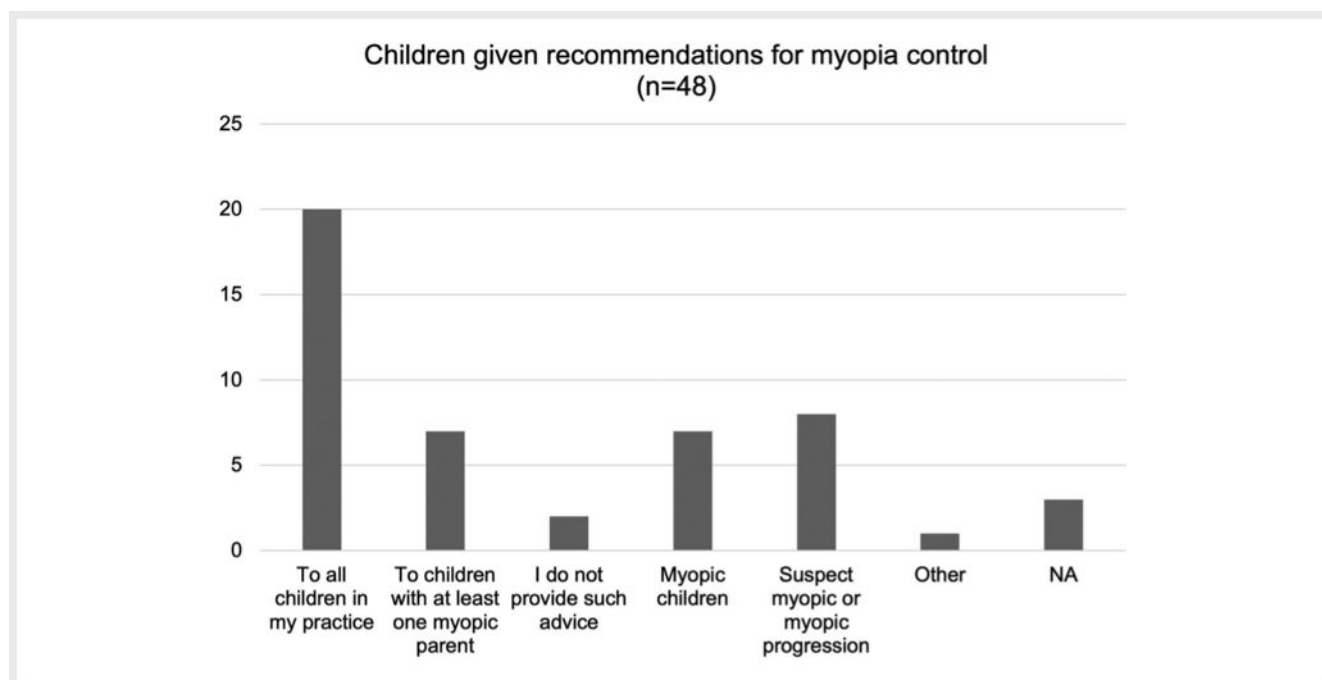
stated they were ophthalmologists. The majority declared working in larger hospitals (n = 26; 54%), whereas a bit over a quarter work in private practices (n = 14; 29%), see ► **Fig. 1**. Half of the participants (n = 24) answered that there was no data on the current prevalence of myopia in their country, 11 (23%) declared not to be aware of any data on myopia prevalence, and 7 (15%) responded that they knew about prevalence data in their country. By the latter, a range of 15–75% prevalence values was reported.

II. Of the respondents, 88% (n = 42) affirmed that they give advice about myopia prevention and management strategies.

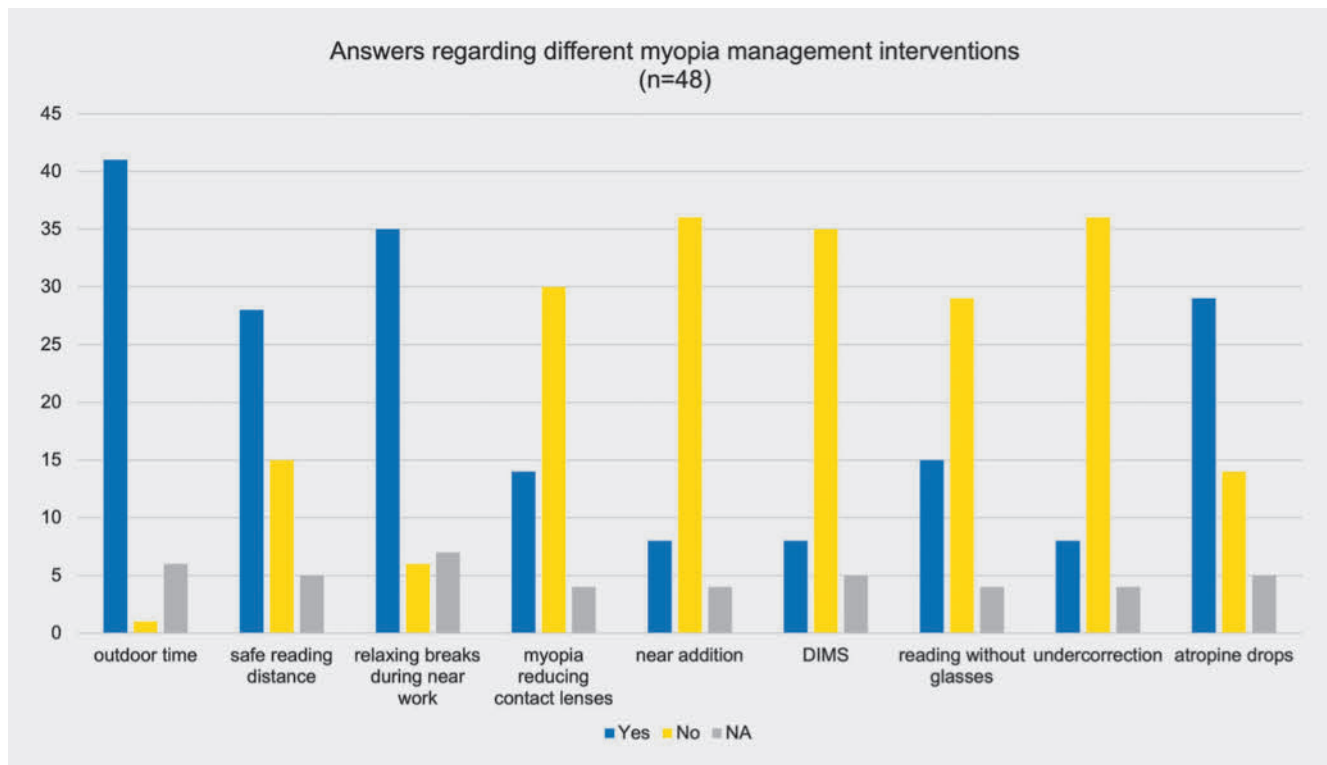
► **Fig. 2** illustrates the responses to the question regarding which children preferentially are given advice or prevention measures: little less than half (n = 20; 42%) of the survey participants give advice to all children in their clinics, 7 (15%) give recommendations on myopia control tools to children with at least one myopic parent, and 8 (17%) answered they provide information only to suspect myopic or children with myopic progression.

► **Fig. 3** summarizes the results of the main questions of this analysis. a) With the exception of one survey participant, who declared to not recommend outdoor time, almost all others (n = 41; 85%) recommend outdoor time as a preventive measure. Of these 41 survey respondents, 17 (42%) specified that they recommend at least 2 hours of outdoor time per day. The recommendation regarding near distance is given less frequently, with 28 (58%) participants confirming they do recommend “safe” reading distance, and 15 (31%) negating this. The answers regarding what a “safe” reading or near work distance is varied between 20–50 cm, with 24 (86%) of the respondents indicating they recommend a “safe” reading distance and specified that a distance of at least 30 cm is necessary. Most participants (n = 35; 73%) affirm they recommend taking regular breaks during “near work” time periods. Fifteen (43%) of these 35 specified they give the recommendation to take a break after 20 min of “near work”.

b) The answers about the utilization and recommendation of optical tools, such as near addition (bifocal/progressive) glasses were more heterogeneous: 8 (17%) survey participants do advise using near addition glasses or progressive glasses, while 36 (75%) do not. Similarly, 35 (73%) respondents do not apply DIMS glasses. Eight respondents (17%) recommend or do apply them.



► **Fig. 2** Specifications on the characteristics of children receiving information and recommendation for myopia control tools (absolute count of answers depicted on the y-axis).



► Fig. 3 Summary of answers regarding different myopia management tools (absolute count of answers depicted on the y-axis).

The proportion of participants who recommend myopia-reducing contact lenses was slightly higher, with 14 (29%) participants recommending myopia-reducing contact lenses, while 30 (63%) declare they do not recommend the use of any sort of myopia-reducing contact lenses. The most recommended contact lenses were Ortho-K lenses (9 of 14 participants who recommend using myopia-reducing contact lenses). Undercorrection of myopia is mostly not recommended, with 36 participants (75%) declaring so.

c) Regarding the application of atropine eye drops for myopia control, 29 (60%) survey participants confirmed prescribing atropine eye drops to slow myopia progression, while 14 (29%) do not. All 29 participants who recommend atropine drops declared to be ophthalmologists at the beginning of the questionnaire. Nearly all survey participants (28 of 29, 97%) who prescribe atropine eye drops take the decision of doing so depending on the myopia progression rate over 1 year. Of the respondents (n = 25) who prescribe atropine, 86% use atropine 0.01% eye drops. Four out of 29 prescribe atropine 0.02% eye drops and 3 out of 29 indicated they also use atropine 0.05% eye drops. The answers regarding minimal acceptable patient's age for atropine eye drops ranged from 2 to 10 years, with 18 (62%) survey respondents specifying a minimal age of at least 5 years. Of the 29 participants prescribing atropine drops, 10 (34%) stated that their patients reported adverse events after using atropine eye drops. Out of these 10 doctors, 8 specified that their patients complained about photophobia and near visual disturbances. Also, individual cases of allergy, dry cough, and pain were also reported. Of the participants

prescribing atropine eye drops, 25 (86%) obtain the drops via a pharmacy. Most participants could not indicate the cost of atropine eye drops, with the few answers given varying between 2 and 50 euros for a 10-mL flask. The answer to the question regarding patient load and the number of patients treated yearly with atropine was, in most cases (48%), less or equal to 20 patients.

III. Before starting treatment, 32 (67%) of all survey respondents perform refraction in cycloplegia, and 18 (38%) measure axial length in their patients. The majority (n = 22, 46%) of the participants see their patients 6 months after the start of treatment. Fifteen (31%) use the IOLMaster® as a specific myopia management instrument, while other diagnostic tools such as the Myopia Master or Myah are rarely applied.

Discussion

In 2015, the WHO published a much-noticed report about myopia, identifying it as the refractive error with the most significant risk for ocular pathology leading to legal blindness [36]. A later report in 2019 encouraged every eye care practitioner to take action to address myopia progression [37]. The IMI and other expert groups are establishing clinical guidelines for myopia interventions and management. However, momentarily, a consensus or even clear myopia control guidance is missing. The results of this survey study highlight the lack of information among clinical experts and show different clinicians' approaches in the use of available myopia control tools and recommendations. Seeing the fact that most of the survey participants could not indicate the preva-

lence of myopia in their respective countries, there seems to be a clear need for strengthening general knowledge on myopia. This seems in line with Wolffsohn et al., who conducted a large scale survey among eye care practitioners around the globe regarding awareness and interventions for myopia control, observing that the general concern about myopia in Europe is lower compared to Asia [19,38]. Despite the signs of a general lack of concern and awareness, it seems that most ophthalmologists are at least aware of the effectiveness of modulating environmental factors, such as recommending increased outdoor time and reduced prolonged near work activities. Regarding optical versus pharmacological myopia management instruments, the survey indicates that ophthalmologists preferentially use atropine eye drops for myopia control. This stands in contrast to previously published data by Wolffsohn et al. from the IMI, who found Ortho-K as being perceived the most effective method for myopia control [38]. This discrepancy may be explained by the fact that in the present survey, the participants were mostly ophthalmologists, whereas in Wolffsohn's survey, 72.4% of the respondents were optometrists and only 18.6% ophthalmologists. Regarding the different optical instruments, there seems to be less of a clear opinion. Myopia-reducing contact lenses and spectacles were not of great value to the survey participants at the time of survey conduction. It can be debated that there was not yet such a high degree of familiarity with the DIMS glasses (e.g. MiYOSMART) in the summer of 2021, when the survey was conducted.

The presented survey has several limitations. Most importantly, the small number of survey participants limits its generalizability. Furthermore, the questionnaire is an author's customized summary of questions, without any proof of validity or standardization. Nevertheless, it provides valuable information from different European eye care practitioners who volunteered in contributing information to the community without any further interests. The survey and this publication may further raise awareness among stakeholders and eye care practitioners about the management options to slow myopia progression in children. Also, collecting data from European pediatric ophthalmologists might encourage national authorities and eye care practitioners' societies to articulate evidence-based recommendations and guidelines for childhood myopia management.

Conclusion

In conclusion, preventive and therapeutic management of myopia should be essential in the daily routine of pediatric ophthalmologists, but consensus and clear guidelines are needed. This survey shows a large agreement about the protective role of outdoor time (85%) and the most common interventional approach is the administration of atropine eye drops (60%).

CONCLUSION BOX

Already known:

- Myopia and especially high myopia represent a high burden of disease worldwide. Clear guidelines for myopia management in children at risk of developing high myopia are missing.

Newly described:

- The analysis of current common practices among European Paediatric Ophthalmologists shows that there is a large agreement regarding the protective role of outdoor time. However there is little or no consensus regarding interventions, both for medical, such as atropine drops, and optical interventions.

Conflict of Interest

The authors declare that they have no conflict of interest.

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