

# Clinical Prescribing Philosophies Survey for Hyperopia in Riyadh

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## ABSTRACT

**Introduction:** The prescribing philosophies of medical practitioners differ from group to group and place to place. To study the differences might be useful in developing standards of practice to improve outcomes.

**Aim:** In this survey-based study, Riyadh optometrists were surveyed to evaluate the prescribing philosophies for asymptomatic hyperopic children.

**Materials and Methods:** The optometrists were selected from the reputed hospitals of ophthalmology/optometry clinics in Riyadh. They were given the survey of Lyons SA. Sixty surveys were given to the responsible authorities of eight hospitals for the distribution to their optometrists. The survey questionnaire included questions about the amount of hyperopia and

anisometropia in asymptomatic children. The questions were included for three age groups; 6 months, 2 years, and 4 years.

**Results:** A total of 26 surveys (43.3%) were returned and analysed. For six-month-old infants the majority of Riyadh optometrists reported that they prescribe for more than 3D (38.5%), and for more than 5D (27%) of hyperopia. As for two-year-old children 73% of Riyadh optometrists reported to prescribe for asymptomatic hyperopia more than 3D. Majority of Riyadh optometrists (73%) reported that they would consider prescribing for more than 3D of hyperopia for asymptomatic four-year-old children.

**Conclusion:** A general understanding of the prescribing philosophies of optometrists in Riyadh found a lack of consensus on prescribing philosophies for hyperopic children.

**Keywords:** Children, Infants, Prescription, Refractive error

## INTRODUCTION

Prescribing for refractive error in infants and young children needs special care than that of older children and adults. Visual acuity levels in children are typically lower than among adults. The correction of hyperopia, particularly in young children is not as straightforward as the correction of myopia because patients are able to accommodate to see clearly, and patient's abilities to accommodate vary widely [1-4]. Prescribing glasses for children can be challenging because most guidelines for spectacle treatment in children are based upon clinical experience rather than randomised, masked clinical trials. The guidelines that have been published are either based on the agreement between eye care practitioners on the prescribing philosophy, or a literature review with consideration of some factors [5-9].

Past studies had concluded that children are born with refractive error, mostly hyperopia that is reduced by the age of 6 years through a process called emmetropisation [10]. It has also been stated by Mutti DO that hyperopia is challenging in the clinic, due to the difficulty in deciding when to prescribe and how much correction should be prescribed [11]. If medium to high amount of hyperopia is not corrected, then it may lead to other vision problems. However, giving full correction may inhibit emmetropisation [12]. In a study done by Hee KY, it was found that full correction of hyperopia may inhibit emmetropisation during early and late childhood [13].

It has been found that there is some lack of consensus between eye care practitioners on the prescribing philosophies for hyperopic children [1]. The purpose of this research was to explore the prescribing philosophies of optometrists in Riyadh for symptom-free hyperopic children.

## MATERIALS AND METHODS

In this survey-based study, sixty optometrists in reputed hospitals of ophthalmology/ optometry clinics in Riyadh were given the survey

of Lyons SA [1]. To use this survey for this research, permission from Lyons SA was obtained through email. The survey included questions related to prescribing philosophies for the prescription of amount of hyperopia and anisometropia in asymptomatic children. The questions were included for three age groups; 6 months, 2 years, and 4 years. These surveys were given to the responsible authorities of eight hospitals for the distribution to their optometrists.

The names of the hospitals participated in this study were King Abdul Aziz University hospital; ophthalmology department, King Khaled Eye Specialised Hospital, The eye center (Tabbara), The Eye Consultants Ophthalmic Center, Binrushd ophthalmic center, Eye world center, Magrabi Eye Hospital; Al Hayat National hospital branch, and King Fahad Rd branch. The study was completed in four months from January to April 2017. Ethical approval (Ethics Number: CAMS 068-37/38) was obtained from the Research ethics committee at King Saud University.

The practitioners were given a scenario of a parent bringing her child for a routine exam and that they have no visual complaints, and medical and family history is unremarkable. They were asked to assume that the results have been consistent at two different occasions and the refractive error is measured by cycloplegic refraction [see Annexure 1].

## STATISTICAL ANALYSIS

The percentage of optometrists that chose each of the choices was calculated for each question separately using Microsoft Excel 2016 software program.

## RESULTS

Out of sixty surveys distributed to different hospitals, only 26 (43.3%) optometrists responded. Some of the optometrists did not answer every question which resulted in different totals for some questions. The optometrists were asked about the number of patients younger than two years of age, they examine in a month. Even though only

16 answered this question, it can give an idea on the practitioner's experience with children. Mostly Riyadh optometrists reported that they examined 20 or fewer patients under two years of age. The data is given in [Table/Fig-1].

No. of patients	Percentage of optometrists n (%)
Fewer than 5	6 (37.5%)
5-10	1 (6.2%)
11-20	5 (31.3%)
21-49	0
50-99	3 (18.8%)
100-500	1 (6.2%)
Total	16

**[Table/Fig-1]:** Optometrists who examined a given number of children younger than 2 years of age.

Practitioners were asked about which level of bilateral asymptomatic hyperopia they would consider prescribing for different age groups; six months, two years, and four-year-old children. For all the age groups majority of the Riyadh optometrists reported that they prescribe for more than 3D of hyperopia [Table/Fig-2].

Amount of Rx in D	Six-month-old n (%)	Two-year-old n (%)	Four-year-old n (%)
>1	3 (11.5)	2 (7.7)	4 (15.4)
>3	10 (38.5)	19 (73.1)	19 (73.1)
>5	7 (27)	3 (11.5)	3 (11.5)
>7	3 (11.5)	1 (3.8)	0
>9	3 (11.5)	1 (3.8)	0
Total	26	26	26

**[Table/Fig-2]:** Optometrist who prescribed glasses for bilateral asymptomatic hyperopia more than the given amount in all age groups.

The survey also questioned the practitioners about their philosophy for prescribing the full or less than the full prescription of asymptomatic bilateral hyperopia in six-month-old infants. Optometrists were asked whether they prescribe the full or less than the full amount of the cylinder and sphere components for the prescription [Table/Fig-3]. Approximately, 54% of the Riyadh optometrists reported that they would prescribe less than the full cycloplegic amount of hyperopia and less than the full amount of astigmatism.

Amount of prescription	n (%)
The full cycloplegic amount of hyperopia and astigmatism	5 (19.2)
The full cycloplegic amount of hyperopia and less than the full astigmatism	1 (3.8)
Less than the full amount of cycloplegic hyperopia and the full astigmatism	6 (23.1)
Less than the full amount of cycloplegic hyperopia and less than the full astigmatism	14 (53.8)
Total	26

**[Table/Fig-3]:** Optometrists to prescribe full or less than full amounts of the hyperopic and astigmatic portions for a six-month-old bilateral asymptomatic hyperope.

The survey queried about a particular rule of thumb for prescribing the less than the full amount of sphere or cylinder portions in a six-month-old infant's prescription. The practitioners were asked if they would prescribe certain amounts of fractions or another unspecified rule of thumb to cut the prescription. These questions were conditioned questions meaning that if the practitioner does not cut any amount from the prescription, they will not answer these questions. Due to these conditioned questions the total number of optometrists (n) is different in [Table/Fig-4]. The majority of Riyadh optometrists (28%) agreed on not using a fractional rule to cut the hyperopic portion of an infant's prescription; they rather preferred cutting a certain

amount of hyperopic power. On the other hand, they preferred cutting a fractional amount from the astigmatic portion of the prescription and the majority of Riyadh practitioners (47.8%) would cut half of the cylinder portion.

Fractional amount of Rx	Hyperopia n (%)	Astigmatism n (%)
¼	4 (16)	3 (13)
½	3 (12)	1 (4.3)
¾	4 (16)	11 (47.8)
¾	3 (12)	4 (17.4)
¾	4 (16)	0
Other	7 (28)	4 (17.4)
Total	25	23

**[Table/Fig-4]:** If less than full amount of hyperopic sphere and/or cylinder is prescribed, the fractional amount to be prescribed by each practitioner group and its percentage for six-month-old infants.

Lastly, the optometrists were asked about the amount of asymptomatic bilateral hyperopic anisometropia they would prescribe for in different age groups [Table/Fig-5]. For all the stated age groups majority of the optometrists agreed on prescribing for more than 3D of hyperopic anisometropia.

Amount of Rx in D	Six-month-old n (%)	Two-years-old n (%)	Four-years-old n (%)
>1	1 (3.8)	3 (11.5)	8 (30.8)
>3	19 (73.1)	20 (76.9)	15 (57.7)
>5	3 (11.5)	3 (11.5)	3 (11.5)
>7	3 (11.5)	0	0
>9	0	0	0
Total	26	26	26

**[Table/Fig-5]:** Number and percentage of optometrists who would consider prescribing for hyperopic anisometropia, more than the given amount in all age groups.

## DISCUSSION

The prescribing philosophies of Riyadh optometrists were gathered for asymptomatic bilateral hyperopia in three age groups (six months, two years and four-year-old children) and it was found that the majority of Riyadh optometrists would prescribe for 3D hyperopia or more. Regarding the philosophies in whether to prescribe the full or less than the full amount of the cycloplegic refraction (sphere and cylinder) in six-month-old infants the Riyadh optometrists reported that they prescribe less than the full amount of both hyperopia and astigmatism. However, when comparing to previous studies by Lyons SA in US and Reiter C in Germany, which included ophthalmologists, there was an obvious difference between ophthalmologists and optometrists in the prescribing philosophy for the astigmatic portion of the correction [1,14]. The ophthalmologists in both studies agreed to prescribe less than the full amount of hyperopia and the full amount of astigmatism.

In a guideline suggested by Leat SJ, it was advised to give partial astigmatic correction for children under 3 or 4 years of age by which time emmetropisation has been completed [9]. This guideline agrees with the optometrist. Lastly, there was a difference in the prescribing philosophy of bilateral hyperopic anisometropia in two and four-year-old children between the Riyadh optometrists and US optometrists/ophthalmologists from a previous study done by Lyons SA [1] and German ophthalmologists from a previous study done by Reiter C et al., which used the same survey as this study [14]. The Riyadh optometrists reported that they would prescribe for hyperopic anisometropia more than 3D on the other hand, the practitioners from previous studies reported that they would prescribe for hyperopic anisometropia more than 1D in those age groups. In

an article written by Donahue SP, it was reported that hyperopic anisometropia more than 1.5D should be corrected in preschool children to prevent anisometropic amblyopia [8].

### Limitation(s)

This study faced some limitation, the biggest being the sample size. There were a lot of difficulties faced during the data collection such as rejection of some hospitals to distribute the survey in their facility.

### CONCLUSION(S)

A general understanding of the prescribing philosophies of optometrists in Riyadh was established for the amount of hyperopia and anisometropia in asymptomatic children. Further studies need to be done to examine the consequences of these philosophies and compare them to philosophies of the practitioners in other countries to establish a more unified guideline in prescribing for those children.

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### REFERENCES

[1] Lyons SA, Jones LA, Walline JJ, Bartolone AG, Carlson NB, Kattouf V, et al.

- A survey of clinical prescribing philosophies for hyperopia. *Optom Vis Sci.* 2004;81(4):233-37.
- [2] Rabaei D, Rose K, Ojaimi E, Kifley A, Huynh S, Mitchell P. Visual acuity and the causes of visual loss in a population-based sample of 6-year-old Australian children. *Ophthalmol.* 2005;112 (7):1275-82.
- [3] William RB. Evidence-based spectacle prescribing for infants and children. *J Modern Optics.* 2007;54(9):1367-77.
- [4] He M, Zeng J, Liu Y, Xu J, Pokharel GP, Ellwein LB. Refractive error and visual impairment in urban children in southern china. *Invest Ophthalmol Vis Sci.* 2004;45(3):793-99.
- [5] Kuo A, Sinatra RB, Donahue SP. Distribution of refractive error in healthy infants. *J AAPOS.* 2003;7(3):174-77.
- [6] Kleinstejn RN, Jones LA, Hullett S, Kwon S, Lee RJ, Friedman NE, et al. Refractive error and ethnicity in children. *Arch Ophthalmol.* 2003;121(8):1141-47.
- [7] Kathleen FE. Working with the kids is alright. *Review of optom.* 2016. Available from: <https://www.reviewofoptometry.com/article/working-with-the-kids-is-alright>.
- [8] Donahue SP. Prescribing spectacles in children: A pediatric ophthalmologist's approach. *J Optom Vis Sci.* 2007;84(2):110-14.
- [9] Leat SJ. To prescribe or not to prescribe? Guidelines for spectacle prescribing in infants and children. *Clinical and experimental optometry.* 2011;94(6):514-27.
- [10] Flitcroft D. Emmetropisation and the aetiology of refractive errors. *Eye.* 2014;28(2):169-79.
- [11] Mutti DO. To emmetropise or not to emmetropise? The question for hyperopic development. *Optom. Vis Sci.* 2007;84(2):97-102.
- [12] Rosalyn S, Susan L, Carol W. *Assessing Children's Vision.* 10<sup>th</sup> ed. Oxford: Butterworth-Heinemann; 1999.
- [13] Hee KY, Jung YC, Dae HK, Jeong-Min H. Changes in refractive errors related to spectacle correction of hyperopia. *PLOS One.* 2014;9(11):01-05. Available from: <https://doi.org/10.1371/journal.pone.0110663>.
- [14] Reiter C, Leising D, Madsen EM. Survey of German clinical prescribing philosophies for hyperopia. *Optom Vis Sci.* 2007;84(2):131-36.

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### Annexure 1

A parent brings her child to you for a general examination. She heard on the radio that she should have her child's vision examined early in life. The child's medical health is unremarkable and has no visual complaints or symptoms. The mother reports an unremarkable family visual history. During your examination, your findings reveal a refractive error as measured by cycloplegic refraction. There are no signs of strabismus. Assume the refractive results have been consistent at two different occasions.

Please circle one answer:

1. I would consider prescribing glasses for a child who is 6 months old, if the child had more than .....D of bilateral hyperopia.
  - » 1D                      3D                      4D                      5D                      7D                      9 or more
2. How would you prescribe glasses for this child?
  - » I would prescribe the full cycloplegic amount of hyperopia and the full amount of astigmatism
  - » I would prescribe the full cycloplegic amount of hyperopia and less than the full amount of astigmatism
  - » I would prescribe less than the full cycloplegic amount of hyperopia and the full amount of astigmatism
  - » I would prescribe less than the full cycloplegic amount of hyperopia and less than the full amount of astigmatism
3. If you would prescribe less than the full cycloplegic amount of hyperopia, how would you choose the amount?
  - » ¼ the full amount
  - » the full amount
  - » ½ the full amount
  - » the full amount
  - » ¾ the full amount
  - » ..... D (fill in the blank) less than the full amount
4. If you would prescribe less than the full cycloplegic amount of astigmatism, how would you choose the amount?
  - » ¼ the full amount
  - » the full amount
  - » ½ the full amount

- » the full amount
- »  $\frac{3}{4}$  the full amount
- » ..... D (fill in the blank) less than the full amount
5. I would consider prescribing glasses for a child who is two-years-old, if the child had more than .....D of hyperopia.
- » 1D                      3D                      4D                      5D                      7D                      9 or more
6. » How would you prescribe glasses for this child?
- » I would prescribe the full cycloplegic amount of hyperopia and the full amount of astigmatism
- » I would prescribe the full cycloplegic amount of hyperopia and less than the full amount of astigmatism
- » I would prescribe less than the full cycloplegic amount of hyperopia and the full amount of astigmatism
- » I would prescribe less than the full cycloplegic amount of hyperopia and less than the full amount of astigmatism
7. If you would prescribe less than the full cycloplegic amount of hyperopia, how would you choose the amount?
- »  $\frac{1}{4}$  the full amount
- »  $\frac{1}{3}$  the full amount
- »  $\frac{1}{2}$  the full amount
- »  $\frac{2}{3}$  the full amount
- »  $\frac{3}{4}$  the full amount
- » .....D (fill in the blank) less than the full amount
8. If you would prescribe less than the full cycloplegic amount of astigmatism, how would you choose the amount?
- »  $\frac{1}{4}$  the full amount
- »  $\frac{1}{3}$  the full amount
- »  $\frac{1}{2}$  the full amount
- »  $\frac{2}{3}$  the full amount
- »  $\frac{3}{4}$  the full amount
- » .....D (fill in the blank) less than the full amount
9. I would consider prescribing glasses for a child who is four-years-old, if the child had more than ..... D of hyperopia.
- » 1D                      3D                      4D                      5D                      7D                      9 or more
10. How would you prescribe glasses for this child?
- » I would prescribe the full cycloplegic amount of hyperopia and the full amount of astigmatism
- » I would prescribe the full cycloplegic amount of hyperopia and less than the full amount of astigmatism
- » I would prescribe less than the full cycloplegic amount of hyperopia and the full amount of astigmatism
- » I would prescribe less than the full cycloplegic amount of hyperopia and less than the full amount of astigmatism
11. If you would prescribe less than the full cycloplegic amount of hyperopia, how would you choose the amount?
- »  $\frac{1}{4}$  the full amount
- »  $\frac{1}{3}$  the full amount
- »  $\frac{1}{2}$  the full amount
- »  $\frac{2}{3}$  the full amount
- »  $\frac{3}{4}$  the full amount
- » ..... D (fill in the blank) less than the full amount
12. If you would prescribe less than the full cycloplegic amount of astigmatism, how would you choose the amount?
- »  $\frac{1}{4}$  the full amount
- »  $\frac{1}{3}$  the full amount
- »  $\frac{1}{2}$  the full amount
- »  $\frac{2}{3}$  the full amount
- »  $\frac{3}{4}$  the full amount
- » .....D (fill in the blank) less than the full amount
13. I would consider prescribing glasses for a child who is six-months-old, if the child had more than.....D of hyperopic anisometropia.
- » 1D                      3D                      4D                      5D                      7D                      9 or more
14. I would consider prescribing glasses for a child who is two-years-old, if the child had more than ..... D of hyperopic anisometropia.
- » 1D                      3D                      4D                      5D                      7D                      9 or more
15. I would consider prescribing glasses for a child who is four-years-old, if the child had more than ..... D of hyperopic anisometropia.
- » 1D                      3D                      4D                      5D                      7D                      9 or more