Refractory errors in medical students in a Teaching Hospital

Errores refractarios en estudiantes de medicina en un hospital docente

Wisam Chasib sarhan Alhamadani[1].

[1]Alfayhaa Teaching Hospital, Basrah Health Directorate, Ministry of Health, Basrah, Iraq
Correspondence: medicalresearch22@yahoo.com

ABSTRACT

Refractive errors are contributing as a major public health problem. The increasing prevalence rates of myopia have reaching to epidemic levels in several areas. This study was aimed to determine the prevalence rates of refractive errors in medical students. A prospective study was conducted in the Department ofOphthalmology, over a period of one year from Jan 2020to Dec 2020. Medical students were randomlyselected, as a total of 250 subjects. All were undergoing an ophthalmic examination. Of 250 students, 148(59.2%) cases of RE were documented. Most common cases were female (89, 60.1%), whereas male was (59, 39.9%). Of these, 98 students have myopia (66.2%), 42 cases have astigmatism (28.4%) and 8 cases have hypermetropia (5.4%). The late stage of classes (6^{th}) has the most frequent RE cases. Myopia was the predominant RE among themedical students. Advance class and female are predisposing factors.

Keywords: astigmatism, myopia, hypermetropia, medical students, refractive errors

Introduction

Refractive error (RE) is the condition of the non-accommodating eye's optical system is unable to focus parallel rays of light on the retina. The sense of sight is utilized the most, and it is affected the most. RE are one of the commonest reasons for visiting an ophthalmologist. RE is the second most common cause of blindness [1]. About of 200 million peoples have uncorrected Refractive errors, world-wide [1]. This is significantly impacted learning, which can cause studying failure. The most common RE type is myopia. The prevalence rate of myopia in Asian countries have reached epidemic levels [2]. Also, authors found the prevalence rates of RE were high in the highly educated population [3]. Otherwise, myopes cases have been recorded to achieve higher intelligence test scoring and educational levels than those are not myopes [4]. Medical students are a select population with a high education level, hence, they are at high risk for myopia [5]. Adult-onset myopia is also thought to be a common occurrence in medical students [6,7]. Uncorrected RE rank next to cataract in reasons of global visual impairment. It has a significant impact on learning and academic success [8]. A high RE prevalence rate was seen among students.

Many studies conducted on RE have primarily focused on school going children. Very few is known about the RE in medical students. So, we have enrolled medical students, as the refractive errors are frequently more prevalent among them.

Methods

Study design

A prospective study was conducted in the Department ofOphthalmology, over a period of one year from Jan 2020to Dec 2020. Medical students were randomlyselected, as a total of 250 subjects. An informed consent was obtained from the stu-

dents. All were undergoing an ophthalmic examination, history of ophthalmic and systemic problems. Assessing visual acuity by Snellen's chart (far vision) and Jaeger's chart (near vision). Assessment of RE done by auto-refractometer. When visual acuity less than 6/6 in uni- or bilateral eyes, then do Pinhole testing for the presence of a RE.

Inclusion criteria

- Students from first to sixth year
- Age of 18 – 28 years
- Both sexes

Exclusion criteria

- DM
- Eye abnormality
- Past history of eye diseases
- Trauma to eye
- Retinopathy
- Prematurity
- Connective tissue or systemic diseases

Statistical Analysis

Significance was assigned at $P < 0.05$ level for all parameters. Categorical variables were compared with the χ^2 test. The *t*- test was used for continuous variables.

Results

Of 250 students, 148(59.2%) cases of RE were documented. Most common cases were female (89, 60.1%), whereas male were (59, 39.9%). Of these, 98 students have myopia (66.2%), 42 cases have astigmatism (28.4%) and 8 cases have hypermetropia (5.4%), (table 1). Table 2 listed the frequency of RE according to medical students' stages. The late stage of classes (6^{th}) has the most frequent RE cases.

Table 1. Refractive error.

RE	No.	%
Myopia	98	66.2
Astigmatism	42	28.4
Hypermetropia	8	5.4

Table 2: RE according to students' stages.

Class	Myopia (n=98)	Astigmatism (n=42)	Hypermetropia (n=8)
1^{st}	10	3	1
2^{nd}	13	3	1
3^{rd}	20	6	1
4^{th}	18	8	2
5^{th}	16	10	1
6^{th}	21	12	2

Discussion

The long and hard study regimens of medical college involved extensive near-work such as reading and writing, this is suggested that the amount of near-work could cause myopia [5,9-12]. However, it is now generally agreed that multifactorial of heredity and environment have important roles to cause RE. Also, ethnic variations and different genetic predispositions may play a such roles. Besides, students with a high education state as well as above average intelligence, may lead to the high prevalence rates of myopia [11].

According to recent theory blurred retinal image that occur during prolonged near work lead to myopia. This blurring of retinal images stimulates biochemical and structural changes in the sclera and choroid that lead to axial elongation [13].

Myopia is a multifactorial with genetic and environmental factors, as well as — parental history of myopia is an important risk factor for its development which was reported in various studies [14-17]. The present study has also observed a marginal increase in the amount of near work done by those with refractive errors which was in correlation with the findings observed by Wu et al [2].

Almuamar concluded myopia is the predominant RE detected among medical students. The occurrence of myopia was found to be higher among high classes. Female students showed a higher rate of RE [18].

Conclusion

Myopia was the predominant RE among the medical students. Advance class and female are predisposing factors.

Declaraciones

Los autores declaran no tener conflictos de interés de ninguna clase, que el trabajo ha sido aprobado por el comité de ética responsable en el lugar de trabajo y no declaran medios de financiación del trabajo realizado. El artículo fue remitido con el consentimiento de todos los autores para su evaluación y publicación.

Declarations

The authors declare that they have no conflicts of interest, that the work has been approved by the ethics committee responsible in the workplace, and do not declare means of financing of the work carried out. The article was sent with the consent of all authors for their evaluation and publication.

References

1. Resnikoff S, Pascolini D, Mariotti SP, Pokharel GP. Global magnitude of visual impairment caused by uncorrected refractive errors in 2004. Bull World Health Organ. 2008 Jan;86(1):63-70. doi: 10.2471/blt.07.041210. PMID: 18235892; PMCID: PMC2647357.
2. Wu Y, Yi H, Liu W, Jia H, Eshita Y, Wang S et al. Risk factors for myopia in Inner Mongolia medical students in China. Open Journal of Epidemiology. 2012;2: 83-89.
3. Recko M, Stahl ED. Childhood myopia: epidemiology, risk factors, and prevention. Mo Med. 2015 Mar-Apr;112(2):116-21. PMID: 25958656; PMCID: PMC6170055.
4. Gan J, Wang N, Li S, Wang B, Kang M, Wei S, Guo J, Liu L, Li H. Effect of Age and Refractive Error on Local and Global Visual Perception in Chinese Children and Adolescents. Front Hum Neurosci. 2022 Jan 28;16:740003. doi: 10.3389/fnhum.2022.740003. PMID: 35153705; PMCID: PMC8831691.
5. Akrami A, Bakmohammadi N, Seyedabadi M, Nabipour I, Mirzaei Z, Farrokhi S, Assadi M. The association between schoolchildren intelligence and refractive error. Eur Rev Med Pharmacol Sci. 2012 Jul;16(7):908-11. PMID: 22953639.
6. Fledelius HC. Myopia profile in Copenhagen medical students 1996-98. Refractive stability over a century is suggested. Acta Ophthalmol Scand. 2000 Oct; 78 (5): 501-5.
7. Krishnakumar M, Atheeshwar S, Chandrasekar MD. Myopia and digit ratio in medical college students. PLoS One. 2014 Feb 21;9(2):e89800. doi: 10.1371/journal.pone.0089800. PMID: 24587043; PMCID: PMC3931827.
8. Megbelayin EO. Barriers to uptake of prescribed refractive spectacles amongst Nigerian students. Int. Res.J. Basi Clin. Stud. 2013;1(5):71-77.
9. Ding BY, Shih YF, Lin LLK, Hsiao CK, Wang IJ. Myopia among schoolchildren in East Asia and Singapore. Surv Ophthalmol. 2017 Sep-Oct;62(5):677-697. doi: 10.1016/j.survophthal.2017.03.006. Epub 2017 Mar 28. PMID: 28359704.
10. Saw SM, Nieto FJ, Katz J, Chew SJ. Estimating the magnitude of close-up work in school-age children: a comparison of questionnaire and diary instruments. Ophthalmic Epidemiol. 1999 Dec;6(4):291-301. doi: 10.1076/opep.6.4.291.4184. PMID: 10544343.
11. Kinge B, Midelfart A, Jacobsen G, Rystad J. The influence of near-work on development of myopia among university students. A three-year longitudinal study among engineering students in Norway. Acta Ophthalmol Scand. 2000 Feb;78(1):26-9. doi: 10.1034/j.1600-0420.2000.078001026.x. PMID: 10726783.
12. Saw SM, Wu HM, Seet B, Wong TY, Yap E, Chia KS, Stone RA, Lee L. Academic achievement, close up work parameters, and myopia in Singapore military conscripts. Br J Ophthalmol. 2001 Jul;85(7):855-60. doi: 10.1136/bjo.85.7.855. PMID: 11423462; PMCID: PMC1724036.

13. Diether S, Gekeler F, Schaeffel F. Changes in contrast sensitivity induced by defocus and their possible relations to emmetropization in the chicken. Invest Ophthalmol Vis Sci. 2001 Nov;42(12):3072-9. PMID: 11687557.
14. Chaudhry R, Ali H, Sheikh NH. Frequency and underlying factors of myopia among medical students. Biomedica2011;27:154-60.
15. Jyothirmai T, Meenakshi V, Padmavathi VS. A Study on Refractive Errors Among Medical Students Attending Ophthalmology Department. IOSR-JDMS 2017; 16(10): 57-61.
16. Onal S, Toker E, Akingol Z, Arslan G, Ertan S, Turan C, Kaplan O. Refractive errors of medical students in Turkey: one year follow-up of refraction and biometry. Optom Vis Sci. 2007 Mar;84(3):175-80. doi: 10.1097/OPX.0b013e3180335c52. PMID: 17435530.
17. Gopalakrishnan S, Prakash MVS, Kumar Jha KR. A Study of Refractive Errors among Medical students in AIMST University, Malaysia. Indian Med J. 2001;105: 365-374.
18. Almuamar HAH. Refractive errors in medical student of Misan University. International Journal of Psychosocial Rehabilitation, 2020; 24(10):5054-5061.

RESUMEN

Los errores de refracción contribuyen como un gran problema de salud pública. Las crecientes tasas de prevalencia de la miopía han alcanzado los niveles de epidemia en varias áreas. Este estudio tuvo como objetivo determinar las tasas de prevalencia de errores de refracción en los estudiantes de medicina. Se realizó un estudio prospectivo en el Departamento de Oftalmología, durante un período de un año desde enero de 2020 hasta diciembre de 2020. Los estudiantes de medicina fueron seleccionados al azar, como un total de 250 sujetos. Todos se sometieron a un examen oftálmico. De 250 estudiantes, se documentaron 148 (59.2%) casos de RE. La mayoría de los casos comunes eran mujeres (89, 60.1%), mientras que los hombres eran (59, 39.9%). De estos, 98 estudiantes tienen miopía (66.2%), 42 casos tienen astigmatismo (28.4%) y 8 casos tienen hipermetropía (5.4%). La etapa tardía de las clases (sexto) tiene los casos RE más frecuentes. La miopía fue la RE predominante entre los estudiantes de medicina. La clase anticipada y la mujer son factores predisponentes.

Palabras clave: astigmatismo, miopía, hipermetropía, estudiantes de medicina, errores de refracción