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The prevalence of Refractive Errors Among Medical Students and The possible Associated Risk Factors: A Systematic Review

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ABSTRACT
Refractive errors are a global health problem especially in students with high education such as Medicine. Therefore, the prevalence of Refractive errors in medical students in addition to the contributing risk factors have been discussed by numerous studies worldwide. In this systematic review we provide data about the prevalence of refractive errors including myopia, hyperopia and astigmatism and the possible associated factors: family history, gender, physical activity, diet, types of lights and others.

Keywords: *Refractive errors, Myopia, astigmatism, hyperopia, risk factors, Medical students*

1. INTRODUCTION

Refractive errors (RF) defined as a condition in which parallel rays of lights from the external world do not focus on the retina at the resting state of accommodation, leading to a blurry vision. Myopia, Hyperopia, and Astigmatism are the most prevalent types of refractive errors. Refractive errors are a significant public health concern, affecting individuals of all ages and leading to a decreased quality of life [1].

Worldwide, Refractive errors considered to be the second most common cause of visual loss in 2010 [2] , and unfortunately the prevalence of RE particularly myopia tend to have high prevalence and accordingly the risk of complications, such as myopic macular degeneration, retinal detachment, cataract and open angle glaucoma are dramatically increasing[3].

There is a sufficient evidence to support the association of myopia with having higher level of education and academically active professions such as Medicine. Medical students are a group that is particularly susceptible to refractive errors as they spend long hours reading and studying in comparison to non-medical students[4].

Undressed refractive errors can affect many aspects including reduced life quality, educational and employment opportunities[5]. Therefore, Understanding the associated risk factors of refractive errors among medical students is crucial for developing effective preventive and treatment strategies, as prevention or correction treatment is possible in 80% of the causes of visual impairment[5].

Identifying the risk factors linked with refractive errors can help targeting interventions to reduce the impact of this condition in the medical students. Furthermore, the risk factors should be assessed carefully before students choose a specialty that may need very good vision.

In light of this, this systematic review aims to highlight the possible underlying causes of refractive error among medical students by evaluating many articles worldwide.

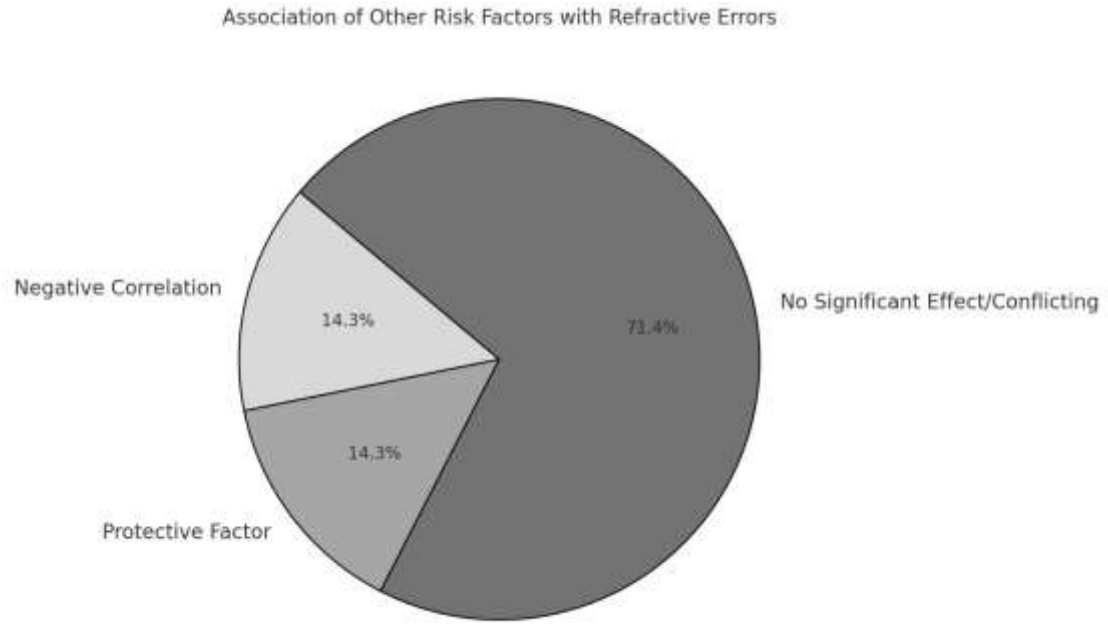
2. METHODS

2.1 Search Strategy

We searched two databases including Pub Med and Research-gate during the period of time from October 28th to 31st, 2024 using the keywords: refractive errors, "medical students", prevalence, myopia, hyperopia, astigmatism. Around 162 articles were detected from both databases

2.2 Inclusion And Exclusion Criteria:

Figure 1



Researches done on medical students, discussing the prevalence or the associated risk factors of refractive errors in this population of cross sectional , case control and cohort study designs were identified, yielding 162 articles. Duplicates were identified and removed and we have excluded all researches that included other than medical students in the same study or not providing the full text. Consequently, 32articles are discussed in this systematic review[2,4,6-35].

2.3 Data Analysis

All the data were carefully reviewed regarding Refractive Errors Among Medical Students for statistical analysis a p-value

set to less than 0.05 to determine significance.

3. PREVALENCE OF REFRACTIVE ERRORS

Table1

Study	Country	Study Year	Sample Number	Study Design	Prevalence of Myopia	Prevalence of Hypermetropia	Prevalence of Astigmatism
Khan A et al [2]	Multan, Pakistan	2020	200	Cross-sectional	91%	4.2%	4.2%
Wardana M et al [4]	Indonesia	2023	114	Cross sectional	68.4%	0%	31.6%
Karki P et al [6]	Nepal	2013	253	Cross sectional	68.5%	1.8%	29.6%
Shi X et al [7]	Tianjin, China	2016-2017	3654	Cross sectional observational cohort study	92.52%	1.26%	64.16%
Gao H et al [8]	Tianjin, China	2017 - 2020	3573	Cross sectional	95%	1.3%	Detailed in the original article
Berhane M et al [9]	Northwest, Ethiopia	2021	492	Cross sectional	16.7%	-	-
Munoli K [10]	Southern India	2023-2024	425	Cross sectional	18.6%	9.6%	9.6%
Rizyal A et al [11]	Nepal	2018	210	Cross sectional	42.9%	1.4%	7.1%
Sarker S et al [12]	West Bengal, India	2022	294	Descriptive observational study with cross sectional design	66.5%	5%	30%
Sleiman K et al[13]	Lebanon	2020	345	Cross sectional	55.9%	-	-
Alquadh A et al[14]	Jordan	2017	700	Cross sectional	myopia alone 41.7% Myopia and astigmatism 40.9%	4.9%	8.4% Astigmatism alone Astigmatism and Hyperopia 4.1%
Satapathy S et al [15]	Odisha, India	2020	200	Cross sectional	86.9%	2.31%	10.77%
Dey A at al [16]	West Bengal, India	2013-2014	580	Cross sectional	63.03%	24.85%	12.12%
Tahir F et al [17]	Sialkot, Pakistan	2019	150	Cross sectional	59.3%	0.7%	54.7%
Abuallut I et al [18]	Jazan, Saudi Arabia	2021	447	Cross sectional	33.8%	4.5%	10.5%
Wang L et al [19]	China	2011-2013	11,138	Two Cross sectional censuses	70.5% in 2011 and 69.2% in 2013	-	-
Kumar N et al [20]	India	2017	100 Case	Case control	-	-	-

			100 control				
Woo W et al [21]	Singapore	2000	157	Cross sectional	89.8%	1.3%	82.2%
Kshatri J et al [22]	India	2015	506	Cross sectional	54.5%	8.6%	36.9%
Karthika D N et al [23]	India	2017	350	Prospective study	70.45%	6.8%	28%
Megbelavin E et al [24]	Nigeria	2010	83	Cross sectional	63.6%	16.7%	19.7%
Ishiko S et al [25]	Japan	2011-2020	995	Retrospective observational study	89.5%	-	-
Jacobsen N et al [26]	Denmark	2005-2007	143	Prospective cohort study	32% to 42.7%	-	-
Midelfart A et al [27]	Norway	1989	133	Cross sectional	50.3%	-	-
Krishnakumar M et al [28]	India	2014	100	Cross sectional	54%	-	-
Bussa et al [29]	India	2015-2018	200	Retrospective study	48%	-	17 students
Tufail N et al [30]	Pakistan	2020	386	Cross sectional	85.2%	11.6%	3.2%
Al-Rashidi S et al [31]	Saudi Arabia	2018	162	Cross sectional	53.7%	3.7%	1.2%
Alhibshi N et al [32]	Saudi Arabia	2020	374	Cross sectional	66.7%	31.1%	35.6%
Shrestha T et al [33]	Nepal	2022	279	cross sectional	42.65%	-	-
Shrestha P et al [34]	Nepal	2022	284	Cross sectional	25%	-	27.1(including myopic and hyperopic astigmatism)
Rattan S et al [35]	Iraq	2022-2023	350	Cross sectional	40%	10%	32%(including myopic/hyperopic astigmatism)

The prevalence of refractive errors tends to be high among medical students which might be attributed to many environmental and genetic contributors, it ranges between 21.4% in Nepal [6] and 89.9% in China [7]. Myopia is the most dominant type of RE in this population with the highest prevalence in China 96.2% in 2020[8] and the lowest in Northwest Ethiopia 16.7%[9] followed by 18.6% in Karnataka, India[10].

4. RESULTS

After removing duplicates, a total of 162 articles related to refractive errors in medical students were identified. These articles were screened for inclusion criteria, and 32 full-text articles were selected for indepth review, meeting our criteria for discussion in this systematic review. This included studies of cross-sectional, case-control, and cohort designs that focused exclusively on medical students and provided full-text access. These studies will be summarized regarding those risk factors

4.1 Family History of Refractive Errors

Many papers included in this article have the same consensus in regard to the association between having a family history of refractive errors and developing it [11-13]

Parental history was found to be as high as 66.92%[15] and 79%[14] of medical students with RE. A study held in Pakistan showed that 81.4% of the students having their family members wearing spectacles[17] . Students who have a family history of RE from both parents are typically twice as likely to develop myopia than those with no family history[18]. Furthermore, Myopia prevalence rises with the number of myopic parents" the prevalence of myopia if both parents were myopic was over 90%, nearly 80% if one parent was myopic and less than 70% with no myopic parents, P<0.001)[19]. It was found that refractive errors are more elevated in students having myopic mothers than myopic fathers[20].

Number of siblings was also discussed in an article done in Lebanon which concluded a statistically significant relation between RE and number of myopic siblings of medical students with a P-value of 0.001[13].

The odds ratio of being a myopic student who had positive family history were found to be 2.31 greater than those with no parental history[9]. Although having at least one myopic parents was assessed to have similar results with an OR of 2.26, this is not observed to be significant statistically P=0.016[21].

4.2 Gender of the students

Difference in sex has a notable correlation in the development of RE in medical students especially myopia with a P-value of 0.006[20] and P=0.02[13]. Many articles have concluded that females are more likely to develop RE than males[22],[2]. Female gender was significantly associated with myopia(P=0.004)[7] and in RE overall, P=0.007 [18]. Nevertheless, myopia was more common in females in a study of 200 students, astigmatism was observed to be higher in males[15].

A cross sectional study done on 425 medical students in India showed that REs were slightly more in males than females[10] which was not in the line with the aforementioned results. This is consistent with Dey A at al[16] that observed 65% of the participants with REs were males compared to 35% females.

No statistically substantial results regarding the link between students gender and the prevalence of REs were found in Nigeria P=0.35[24], Japan P=0.635[25], Denmark P=0.373[26], Singapore[21] or specifically in relation to myopia prevalence[8],[27],[28].

***RE: Refractive Error**

4.4 Reading and Studying

As medical students tend to spend intensive hours on reading and studying, a research conducted in 2020 revealed that students dedicating more than 5 hours to study showed a higher prevalence of refractive errors with a Chi-square=9.4183

4.3Age of Medical Students

Age has a profound connection with the emerging of REs in a studies carried out in Denmark P=0.022[26] and India P<0.0037[10]. The later study also assessed the association with hyperopia and it was significant as well with a Pvalue less than 0.008.Some researches conducted inconsistent results regarding students age and RE development showing insignificant link between the two, P=0.7[13] and P=0.195[20]. Furthermore, years spent in medical school were not established to be influential[11].

Researches	The age of highest prevalence of RE
Khan A et al	Age groups of 18-19 years old
Munoli K et al	Among students ranging from 18-23 years old, myopia was the most common type in all ages except for 20 year old students
Dey A et al	Students of 18-23 years old have the highest prevalence of myopia
Abuallut I et al	The highest prevalence of REs was among the students of 21-23 years old(56.4%)
Jacobsen et al	Progression towards myopia was more in younger ages, p=0.022

and P=0.0021[15]. Similar results were seen in a cohort study done in 2005-2007 showing that increased daily hours of studying can intensify the risk of developing REs, P=0.024. However, that was not significant in regard to the hours spent on reading[26]. In contrary, another study demonstrated that reading hours exhibit a profound correlation with RE[20]. Some reading habits were also discussed and showed to have some positive association with RE, such as reading while lying[19]. In addition to that, approximately 35% of medical students had the tendency of reading in moving vehicles[23].

4.5 Physical Activity

Physical activity is known to be beneficial for many health related problems, and apparently REs are no exception, students who engage in less sports were having higher prevalence of REs[2].

Similar results were seen in other conducted studies which demonstrated that physical activity was shown to be preventive[26] and medical students who engaged in <3 hrs of outdoor activities per day were having 1.65 fold higher probability to develop myopia compared to their counterparts who spent 3hrs or more on outdoor activities daily[9]. A study done on 200 medical students in India showed that 25 of myopic students do outdoor sports while 54 do not, and 66 of emmetropic students do outdoor sports and 38 do not[29]. In another Indian study, it was observed that among 162 myopic students, around 74.1% were not engaging in any type of sports consistently[12]. Further research reported no connection between physical activities and refractive errors in such population[20].

4.6 Electronics Use

The integration of computers and digital devices has become a requisite in some societies. Students tend to use electronic devices in various aspects of their life.Excessive use of electronic devices such as Mobile phone[2] and Computer[19] was associated with refractive error development. Here are some associations regarding various types of electronics

Study	The association with RE
Satapathy S e al[15]	Computer and mobile use, P=0.0001 for each
Khan A et al[2]	Avg hrs spent on laptop/desktop, P= 0.004 Avg hrs spent on Mobile phone, P=0.02
Sarker S et al[12]	There was a relation with avg screen time
Tufail N et al [30]	20.6% of medical students reported using mobiles for 4hrs
Tahir F et al[17]	64.5% of the students use their mobiles up to 5hrs
Kumar N et al[20]	Hrs of watching TV per week was associated WITH RE p=0.001
Alqudah A et al[14]	more than 75% of medical students with RE spend more than 5hrs on electronic devices

***RE: Refractive Error**

A study established in Saudi Arabia concluded some contrary results, the prevalence of RE in medical students who play for less than 1hr was higher compared to students who play for >1hr/day, 53.9% and 36.6%, respectively[18]. Moreover, hrs spent on video games per day have no association with REs, p=0.076[9] and no significant difference found regarding RE and PC or computer use[26],[22] or

mobile use/TV[22].

4.7 Sleeping Habits

Our sleep has a huge impact on our bodies including our eyes. It is found that duration of sleep is associated with REs, medical students who sleep more than 8hrs a day exhibit less RE than students with shorter sleep durations, P=0.001, Chisquare=116.5979[15]. Unlike other studies, sleep duration had no effect on REs[22] and sleeping 7 hrs or less had a P-value of 0.08[13].

According to a study done on 11,138 medical students, it showed that participants who stay up late up to 10 pm have higher prevalence of REs [19]. Compared to a study carried out in Northwest Ethiopia which included a smaller sample of 492 students, staying up late has no association with REs[9].

4.8 Near Work

Near work activities found to be linked to RE, this can be explained by idea of engaging in near work activities increases the demand on accommodation leading to eye problems especially myopia[2]. Hours spent on near work activities are considered statistically significant regarding RE development, P=0.01[13]. Furthermore, spending more than 7hrs on near work increased the odds of developing myopia by 4.35 folds, compared to participants who spent 4 hrs or fewer [9]. Tahir F et al[17] also showed some association as 41.9% of students with RE reported 5-10 hrs spent on near work

4.9 Place of Residency

Prevalence of myopia was greater among urban dwelling women[19]. The likelihood of being myopic was 1.56 times greater among participants who were former city residents compared to those who were residing rural areas[9]. This is in contrast to studies done in India and Saudi Arabia which reported no notable association between students' RE and their place of residence, P=0.85[20] and 0.24[18] respectively.

It is also found that no association was observed between students' RE and private or governmental housing[21].

4.10 Lights

Numerous studied have explored the interaction between the type or intensity of lighting used by medical students and REs. It was observed that inadequate light was found to have a significant association with RE[20],[2] and avoiding dim lights was even protective[19]. However, in another study done in 2020, it revealed that myopic students tend to use dim lights more than non-myopic ones but there was no significant association between using dim lights while studying and RE, P=0.23[13].

Regarding screen lights, out of 79 students who had myopia, 47 were exposed to excessive brightness while 32 do not and out of 104 emmetropes, only 4 used too much brightness[29]. Some data were collected about the type of lights used by emmetropes showing that 81.7% use fluorescent lights while 18.3% use reading lamp[17]. However, Kshatri J et al[22] concluded the absence of connection between corrected refractive errors and the type of lights used by medical students

4.11 Distance

Distance from TV is associated with high prevalence of myopia, OR=1.14[18]. Around 40.2% of students with RE were watching TV from 2-3meters, 18.4% from less than 2m and 21.8% from 3-4m[17]. And regarding the distance at which ammetropes read: 23.1% read at 33cm, 62.4% at half of arm length and 14% read at full arm length[17] . Working distance was not found to be linked to RE according to Berhane M et al, p=0.23[9]

4.12 Other Risk Factors

2D:4D ratio

Krishnakumar M et al[28] aimed to explore the relationship between myopia and second to forth finger length ratio(2D:4D ratio) "a proxy marker of parental sex steroid exposure" among medical students. It revealed a negative correlation between digit ratio and myopia indicating that prenatal exposure to testosterone was associated with myopia

Eye exercise

Regular practice of eye exercise was associated with lower prevalence of RE[2],[19].

Taking Breaks

Taking regular breaks (around 30 mins) between reading was of no significance, p=0.4[13]. Taking a study break after one hour was also insignificant, p=0.08[9]. Nevertheless, a Chinese study involving a larger sample showed that taking a break after one hour of reading is protective for myopia[19].

Contact lenses

Using contact lenses had positive association with hyperopia with OR=2.1 [18].

BMI

BMI was found to have a significant association with REs [12] while Kumar N et al[20] stated that there is no link. Additionally, in a study done in Norway in 1989, no notable difference was found between myopic and non-myopic participants regarding the body height [27]

Diet

Diet of medical students was not significant[20]. However, regular use of dietary supplements was associated with RE in a study done in Pakistan which revealed 79.8% of medical students with RE do not use supplements [2].

Family Income

Average family income was not associated with RE development [9].

Conclusion

Refractive errors among medical students tends to have high prevalence globally , effective preventive measures should be taken by students such as taking extra care towards electronic gadgets use, hours of near work, etc. regular eye checkups are required for

such population .

Limitation

This study had some limitations. First, most included studies had small sample sizes, and several studies had small risk of bias. Therefore, further large studies are necessary to clarify the effect of various causes and interventions regarding refractive errors

among medical students

REFERENCES

[1] Lanca, C., Pang, C. P., & Grzybowski, A. (2023). Editorial: Refractive errors: public health challenges and interventions. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1289173

[2] 2. Khan, A. R., Ali, B., Khan, B., Islam, Z. U., Perveen, S., & Batool, Y. (2021). Refractive Errors among Medical Students - A Crosssectional Study. *Int J Sci Stud*, *8*(10), 23–29. 3. Haarman, A. E. G., Enthoven, C. A., Tideman, J. W. L., Tedja, M. S., Verhoeven, V. J. M., & Klaver, C. C. W. (2020). The complications of myopia: A review and meta-analysis. *Investigative Ophthalmology & Visual Science*, *61*(4), 49. https://doi.org/10.1167/iovs.61.4.49

[3] Wardana, M. K., Permatananda, P. A. N. K., Sedani, N. W., Cahyawati, P. N., & Aryastuti, A. A. S. A. (2023). Comparison of eye fatigue incidence between male and female medical students with refraction error. *Keluwih: Jurnal Kesehatan Dan Kedokteran*, *5*(1). https://doi.org/10.24123/kesdok.v5i1.5926

[4] Maqbool, S., Rizwan, A. R., Manzoor, I., Qais, A., Furqan, A., & Rehman, A. (2021). Prevalence of refractive errors among medical students and identification of associated factors. *Life and Science*, *2*(4), 5.

[5] https://doi.org/10.37185/lns.1.1.184 6. Karki, P., Sijapati, M. J., Basnet, P., & Basnet, A. (2018). Refractive errors among medical students. *Nepalese Medical Journal*, *1*(1), 21–23.

[6] https://doi.org/10.3126/nmj.v1i1.20394 7. Shi, X.-Y., Ke, Y.-F., Jin, N., Zhang, H.-M., Wei, R.-H., & Li, X.-R. (2018). The prevalence of vision impairment and refractive error in 3654 first year students at Tianjin Medical University. *International Journal of Ophthalmology*, *11*(10), 1698– 1703. https://doi.org/10.18240/ijo.2018.10.19

[7] Gao, H.-J., Zhang, H.-M., Dang, W.-Y., Liu, L., Zhu, Y., He, Q., Wang, X., Chen, Y.-H., Gao, F., Wang, Q.-X., Rong, H., Niu, S.-L., & Wei, R.-H. (2022). Prevalence and inconformity of refractive errors and ocular biometry of 3573 medical university freshman students for 4 consecutive years. *International Journal of Ophthalmology*, *15*(5), 807–812. https://doi.org/10.18240/ijo.2022.05.18

[8] Berhane, M. A., Demilew, K. Z., & Assem, A. S. (2022). Myopia: An increasing problem for medical students at the university of Gondar. *Clinical Ophthalmology (Auckland, N.Z.)*, *16*, 1529– 1539. https://doi.org/10.2147/opth.s365618

[9] Munoli, K., Harpanalli, S., Holkar, S., Malkhed, S. M., Girish, B., & Vannura, K. R. (2024). Prevalence of Refractive errors among medical students of Raichur Institute of Medical Sciences, raichur, Karnataka, India. *Cureus*, *16*(4), e58915. https://doi.org/10.7759/cureus.58915

[10] 12. Rizyal, A., Sunrait, J. S., & Mishal, A. (2019). Refractive errors and its associated factors among undergraduate medical students in Kathmandu. *Nepal Medical College Journal*, *21*(1), 26–30.

[11] https://doi.org/10.3126/nmcj.v21i1.24844 13. Sarkar, S., Tanmay, Riddhi, Anibrata, & Goswami, P. (2024). A Study on Prevalence and Risk Factors of Refractive Errors among Undergraduate Medical Students in a Tertiary Care Hospital of West Bengal. *International Journal of Pharmaceutical and Clinical Research*, *16*, 21–26.

[12] Sleiman, K., Damaj, A., Ali, H. M., Akiki, D., & Bleik, J. (2023). Myopia prevalence and risk factors among medical trainees in Lebanon. *Saudi Journal of Ophthalmology: Official Journal of the Saudi Ophthalmological Society*, *37*(3), 241–246. https://doi.org/10.4103/sjopt.sjopt_178_2 2

[13] Alqudah, A. A., Bauer, A. J., & Aleshawi, A. (2023). Refractive errors among medical students in Jordan: prevalence, types and possible risk factors. *Future Science OA*, *9*(2), FSO839. https://doi.org/10.2144/fsoa-2022-0075

[14] 16. Satapathy, S. P., Panda, B., & Panda, S. C. (2020). Prevalence and associated risk factors of refractive errors among medical students in Western Odisha: a crosssectional study. *International Journal of Scientific Reports*, *6*(10), 405. https://doi.org/10.18203/issn.2454-2156.intjscirep20204032 17. Dey, A. K., & Chaudhuri, S. K. (2014). Prevalence of refractive errors in medical students. *Int J Health Sci Res*, *4*(8), 98–102. 18. Tahir, F., Tahir, I., Tahir, F., Tariq Bangash, M., & Shahadat Khan, R. (2021). Prevalence of Refractive Errors and their Underlying Factors amongst students of Islam Medical College, Sialkot. *Pakistan Journal of Medical and Health Sciences*, *15*(10), 2695–2698. https://doi.org/10.53350/pjmhs21151026 95

[15] Abuallut, I. I., Alhulaibi, A. A., Alyamani, A. A., Almalki, N. M., Alrajhi, A. A., Alharbi, A. H., & Mahfouz, M. S. (2020). Prevalence of refractive errors and its associated risk factors among medical students of Jazan

University, Saudi Arabia: A cross-sectional study. *Middle East African Journal of Ophthalmology*, *27*(4), 210–217. https://doi.org/10.4103/meajo.MEAJO_24 0_20
[16] Wang, L., Du, M., Yi, H., Duan, S., Guo, W., Qin, P., Hao, Z., & Sun, J. (2017).
[17] Prevalence of and Factors Associated with Myopia in Inner Mongolia Medical Students in China, a cross-sectional study. *BMC Ophthalmology*, *17*(1), 52. https://doi.org/10.1186/s12886-017-0446-y
[18] Kumar, N., Jangra, B., Jangra, M. S., & Pawar, N. (2018). Risk factors associated with refractive error among medical students. *International Journal of Community Medicine and Public Health*, *5*(2), 634. https://doi.org/10.18203/2394-6040.ijcmph20170241
[19] Woo, W. W., Lim, K. A., Yang, H., Lim, X. Y., Liew, F., Lee, Y. S., & Saw, S. M. (2004).
[20] Refractive errors in medical students in Singapore. *Singapore Medical Journal*, *45*(10), 470–474.
[21] Kshatri, J., Panda, M., & Tripathy, R. (2016). Prevalence, progression and associations of corrected refractive errors: a cross-sectional study among students of a Medical College of Odisha, India. *International Journal of Community Medicine and Public Health*, 2916–2920. https://doi.org/10.18203/2394-6040.ijcmph20163383
[22] 24. Associate Professor, Department of Ophthalmology, MediCiti Institute of Medical Sciences, Medchal, Mandal, Ghanpur, Telangana- 501401, India., Karthika, D. N., Kumari, D. R., Senior Resident, Department of Ophthalmology, MediCiti Institute of Medical Sciences, Medchal, Mandal, Ghanpur, Telangana- 501401, India., Kumar, D. A., & Professor & Head, Department of Ophthalmology, MediCiti Institute of Medical Sciences, Medchal, Mandal, Ghanpur, Telangana- 501401, India. (2018). Refractory errors in medical students in a teaching hospital in rural Telangana. *Tropical Journal of Ophthalmology and Otolaryngology*, *3*(3), 58–62. https://doi.org/10.17511/jooo.2018.i03.09
[23] Megbelayin, E. (2014). Refractive errors and spectacle use behavior among medical students in a Nigerian medical school. *British Journal of Medicine and Medical Research*, *4*(13), 2581–2589. https://doi.org/10.9734/bjmmr/2014/7518
[24] Ishiko, S., Kagokawa, H., Nishikawa, N., Song, Y., Sugawara, K., Nakagawa, H., Kawamura, Y., & Yoshida, A. (2021). Impact of the pressure-free yutori education program on myopia in Japan. *Journal of Clinical Medicine*, *10*(18), 4229. https://doi.org/10.3390/jcm10184229
[25] Jacobsen, N., Jensen, H., & Goldschmidt, E. (2008). Does the level of physical activity in university students influence development and progression of myopia?--a 2-year prospective cohort study. *Investigative Ophthalmology & Visual Science*, *49*(4), 1322–1327. https://doi.org/10.1167/iovs.07-1144
[26] Midelfart, A., Aamo, B., Sjøhaug, K. A., & Dysthe, B. E. (1992). Myopia among medical students in Norway. *Acta Ophthalmologica*, *70*(3), 317–322.
[27] https://doi.org/10.1111/j.1755- students. *Kathmandu University Medical* 3768.1992.tb08571.x *Journal (KUMJ)*, *20*(78), 209–213.
[28] Krishnakumar, M., Atheeshwar, S., & 36. Rattan, S. A., Muayad Ridha, R., Qhatan Chandrasekar, M. D. (2014). Myopia and Majeed, B., Zaki Hussien , Z., & Ali digit ratio in medical college students. *PloS* Abdullah, N. (2024). Awareness and *One*, *9*(2), e89800. knowledge about RefractiveSurgery among https://doi.org/10.1371/journal.pone.008medical students in Baghdad: Doi: 9800 10.36351/pjo.V40i2.1726. *Pakistan Journal* Bussa, Manjula & Ravi, Babu & *of Ophthalmology*, *40*(2).
[29] Nehakamalini, P. (2019). Study on https://doi.org/10.36351/pjo.v40i2.1726
[30] Incidence and Progression of Refractive Errors in Medical Students. Nepalese Journal of Ophthalmology. 11. 167-171. 10.3126/nepjoph.v11i2.27823.
[31] Tufail, N., Abbas, H., Sarfraz, A., Ashraf, S., & Majrooh, M. A. (2021). Prevalence and determining factors of refractive errors among medical students in FMU, Faisalabad. *Pakistan Journal of Medical and Health Sciences*, *15*(11), 2934–2935. https://doi.org/10.53350/pjmhs21151129 34
[32] Al-Rashidi, S. H., Albahouth, A. A., Althwini, W. A., Alsohibani, A. A., Alnughaymishi, A. A., Alsaeed, A. A., AlRashidi, F. H., & Almatrafi, S. (2018). Prevalence refractive errors among medical students of Qassim University, Saudi Arabia: Cross-sectional descriptive study. *Open Access Macedonian Journal of Medical Sciences*, *6*(5), 940–943. https://doi.org/10.3889/oamjms.2018.197
[33] Alhibshi, N., Kamal, Y., Aljohany, L., Alsaeedi, H., Ezzat, S., & Mandora, N. (2021). Attitude toward refractive error surgery and other correction methods: A cross-sectional study. *Annals of Medicine and Surgery (2012)*, *72*(103104), 103104. https://doi.org/10.1016/j.amsu.2021.1031 04
[34] Shrestha, T., Kushwaha, D. K., Tiwari, S., Sah, U. K., Raj, R., Rajak, S., Lamsal, A., Joshi, S., Dulal, A., & Chaudhary, A. (2023). Myopia among medical undergraduates of a medical college: A descriptive crosssectional study. *JNMA; Journal of the Nepal Medical Association*, *61*(259), 228–231. https://doi.org/10.31729/jnma.8078
[35] 35. Shrestha, P., Kaiti, R., Shyangbo, R., & Dhakal, K. (2022). Ocular survey in Kathmandu University medical