

The Prevalence of Visual Impairment and its Attributes Among Medical Students in Oman: A Cross-Sectional Study

Mazin S. Al-rudaini^{1*}, Sanam Anwar², Shatha Al Rushaidi³,
Taif Al Harmali³, Nasreen Al Kindi³, Manar Al Balushi³,
Maryam Al Balushi³ and Ariyam Al Hattali³

¹Department of Medicine, College of Medicine and Health Sciences,
National University, Suhar, Oman.

²Department of Public Health and Epidemiology,
College of Medicine and Health Sciences, National University, Suhar, Oman.

³College of Medicine and Health Sciences, National University, Suhar, Oman.

*Corresponding author E-mail: mazinsaleh@nu.edu.om.

<https://dx.doi.org/10.13005/bpj/3510>

(Received: 23 June 2026; accepted: 10 August 2026)

Eye health problems are increasingly common among medical students due to prolonged screen exposure, intensive academic demands, and limited preventive practices. Although several global and regional studies have investigated this issue, data on medical students in Oman remain limited. In this cross-sectional study assessed the prevalence of visual impairment and its associated risk factors among medical students at the National University of Science and Technology. Data was collected from 607 students using a structured questionnaire and analyzed with SPSS version 28. A total of 607 medical students participated (mean age: 21.24 ± 2.27 years), of whom 89.1% were female. The prevalence of visual impairment was 31.3% (95% CI: 27.6–35.0), with many affected students relying on corrective glasses. High screen exposure was common, with 59.0% of students reporting more than 4 hours of daily screen use for studying and 35.4% for entertainment. Visual impairment was significantly associated with a positive family history, poor sleep quality, and prolonged screen use without regular breaks ($p < 0.05$). It was also significantly associated with poorer academic performance and reduced class participation ($p < 0.001$). In conclusion, visual impairment was highly prevalent among medical students (31.3%), yet only about half of affected students used corrective glasses. Significant risk factors included a positive family history, poor sleep quality, and prolonged screen use without regular breaks. These findings highlight the need for targeted visual health promotion and preventive strategies among medical students.

Keywords: Eye health; Medical students; Oman; Prevalence; Visual impairment.

Eye health is a fundamental component of overall well-being and productivity. However, the prevalence of visual impairment has increased in recent years, particularly among medical students who are exposed to prolonged screen use. Modern medical education relies heavily on digital

technologies and electronic learning resources, which have greatly improved access to educational materials but have also increased screen exposure. Prolonged use of digital devices has been associated with several ocular conditions, including dry eye disease, digital eye strain, and refractive errors, as

well as symptoms such as headache, blurred vision, and eye fatigue.^{1,2} These visual problems may negatively affect medical students' visual comfort, quality of life, and academic performance.³

Recent studies have reported a high prevalence of digital eye strain among medical students, with rates exceeding 70%, primarily attributed to prolonged screen exposure and poor ergonomic practices.^t Dry eye disease is another common ocular condition in this population. Cross-sectional studies have reported dry eye disease prevalence ranging from 25% to over 50% among medical students, with variation influenced by environmental and behavioral factors.⁵⁻⁶ Major risk factors include prolonged screen use, reduced blink rate, poor sleep quality, and environmental conditions such as low humidity and air-conditioned environments.² Furthermore, systematic reviews have highlighted the growing global burden of dry eye symptoms, emphasizing the importance of early detection and preventive strategies for high-risk populations.^w

Myopia is also highly prevalent among university students worldwide. Studies from different regions have reported prevalence rates exceeding 50%, with some cohorts demonstrating even higher rates, largely attributed to prolonged near-work activities and limited outdoor exposure.^x Similarly, a post-COVID-19 study from India found that a substantial proportion of medical students experienced symptoms consistent with dry eye disease, including blurred vision, headache, and eye fatigue, suggesting that the transition to online learning may have increased the risk of visual health problems.³

Within the Gulf region, emerging evidence indicates a growing burden of visual disorders among university students. Studies from Saudi Arabia and the United Arab Emirates have reported myopia prevalence ranging from approximately 40% to 60%, highlighting the effects of sustained near-work activities and increasing reliance on digital learning resources.^y ^{Ò'p} In Oman, a recent study reported a high prevalence of computer vision syndrome among university students, underscoring the impact of digital learning environments on ocular health.¹¹ Despite these findings, awareness of visual health and the adoption of preventive practices remain inadequate

among medical students, reflecting important gaps in knowledge and health education.¹²

Given the increasing burden of dry eye disease, digital eye strain, and refractive errors among medical students, a comprehensive assessment of these conditions and their associated risk factors is warranted. Therefore, this study aimed to determine the prevalence of visual health problems among medical students and identify the factors associated with their occurrence. Understanding these determinants is essential for developing targeted interventions to promote visual health, enhance academic performance, and improve the well-being of future healthcare professionals.

MATERIAL AND METHODS

An observational cross-sectional study was conducted at College of Medicine and Health Sciences, National University, Suhar, Oman, to estimate the prevalence of visual impairment among medical students at different academic years (year 1 to 6) including its contributing factors. This study also investigated whether medical school's demands contribute to developing visual impairment.

Around 600 medical students were involved in this research, which is higher than the calculated sample size (390). This sample size was identified to determine the prevalence of visual impairment among medical students with 95% confidence level and 5% margin of error. The higher numbers of medical students included in this study is regarded as sufficient to provide enough statistical power for assessing the connection between visual health outcomes and the possible risk factors.

After obtaining the ethical approval, data was collected using self-completed questionnaire distributed to students in both digital and paper formats. This method enables students to complete the questionnaire easily and ensures its availability for all students participating in the research. Prior to data collection, a pilot study was performed among 30 randomly picked students to determine the clarity, consistency and practicality of the questionnaire. Responses obtained from the pilot test was used to strengthen and finalize the questionnaire before

the actual data collection. The students participated in the pilot study excluded from the final study sample. The questionnaire collected data on the participants' sociodemographic characteristics, history of diagnosed visual impairment, and use of corrective glasses. It also included information on factors associated with visual impairment, such as family history, duration of digital screen exposure, use of eye lubricants, and other relevant eye health practices. Data collection was conducted from January to February 2026. Students' participation was voluntary and unforced, informed consent taken, and the responses' confidentiality was preserved. Partially filled forms are omitted.

Independent variables included in the study were age, gender, nationality, academic year (year 1 to 6), amount of time spent using digital screens and protective visual-care habits, while the dependent variable was the visual impairment among medical students who participated in this research. Lifestyle habits, the level of electronic device usage and study related environmental conditions were possible confounding variables.

The data was entered and analysed using SPSS version 28. Data analysis involved both descriptive and inferential statistical methods. Descriptive statistics were used to present the data as frequency and percentages for categorical variables; while mean along with standard deviation was used for continuous variables. Chi square test was used as the test of significance. A p-value below 0.05 was considered as statistically significant.

Ethical clearance

The study was approved by the Ethics and Biosafety Committee in the College of Medicine and Health Sciences, National University, Oman, (Ref. No. NU/COMHS/EBC0019/2026). Student's consent was taken from all the students included in this study.

RESULTS

Sociodemographic characteristics

Total number of students who participated in the study was 607. Mean age of students in the study was 21.24 ± 2.27 years. Out of which 60% were less than 21 years and only 40% were more than 21 years of age. Most of the participants were females (89.1%) compared to only 10.9% males. Most of the students (85.7%) were of Omani nationality and few (14.3%) were of non-Omani nationality. With regards to academic level, most of the participants were from Final year 6 (26%), followed by year 1 and 2 (25.2% and 23.4% respectively) and least number of students were from year 5 (2.7%) (Table 1).

Mean age of students at wearing glasses was 5.03 ± 4.46 years. A total of 190 students were wearing glasses and 417 did not wear glasses. This number correlates with the number of students who were diagnosed with visual impairment (31.3%).

Prevalence of Visual impairment

Prevalence of visual impairment among medical students was 31.3% (95% CI: 27.6 – 35.0) while 68.7% (95% CI: 65 – 72.4) were not having visual impairment.

Table 1. Sociodemographic characteristics of the study sample

Variable		Frequency (n=607)	Percentage (%)
Gender	Female	541	89.1
	Male	66	10.9
Age (years)	≤ 21	364	60
	> 21	243	40
Nationality	Omani	520	85.7
	Non-Omani	87	14.3
Academic year	Year 1	153	25.2
	Year 2	142	23.4
	Year 3	84	13.8
	Year 4	54	8.9
	Year 5	16	2.7
	Year 6	158	26

Characteristics of Visual impairment

Many students (47.4%) were wearing glasses and 10% were wearing both glasses and lenses. When asked about the type of glasses, 47.4% were wearing corrective glasses while 12.9% were wearing blue light protection glasses. Family history of visual impairment was present in 70.5% of students (Table 2).

Daily screentime for purpose of study was found to be maximum more than 4 hours in 59% students while less than 1 hour screen time was found only in 1.3% students only. Similarly, the daily screen time for entertainment was found to be maximum more than 4 hours in 35.4% students while only 4.8% students had screentime less than 1 hour.

When asked about the visual symptoms in the past 2 weeks, out of 607 students, 547 students ticked at least one of the options of different visual symptoms. Sixty students either skipped the question or never had any visual symptoms in the past. It is seen that the symptom "Headache" has the highest score; 69.5% of the students mentioned it as the visual symptom in the past 2 weeks. This was followed by symptom 'dryness of eyes' in 46.8% students.

Attributes of Visual impairment

Visual impairment was more (34.8%) in students with family history of visual impairment compared to 24.4% students without family history and this difference was statistically significant ($p < 0.05$). Visual impairment students had more

difficulty seeing display or teacher during lectures (42.3%) and only few (18.3%) of students with visual impairment did not have this difficulty and this difference was statistically significant (p value < 0.001). More students with visual impairment had difficulty reading small or fine text but this finding was not statistically significant ($p > 0.05$). Visual impairment was significantly associated with blurred vision (34.1%) while only 26.4% with visual impairment had clear vision ($p < 0.05$).

More students with visual impairment had poor impact on their studies and class participation (41.8%) while students with visual impairment and no effect on class participation were low (26.3%) and this difference was highly statistically significant with a p value < 0.001 . More students with visual impairment had inadequate hours of sleep (36.4%) compared to only 26.9% having more than 7 hours of sleep but this difference was not statistically significant ($p > 0.05$). But quality of sleep was poor in 33.7% of visually impaired students while only 20.4% got good sleep and this difference was statistically significant ($p < 0.05$).

Visual impairment was more in students who did not take regular breaks during prolonged screen use (34.5%) compared to those who took break (25%) and this association was statistically significant ($p < 0.05$). Students with visual impairment were more likely to use eye lubricant drops (51.1%) compared to 24.6% who never used eye drops and this difference was highly statistically significant ($p < 0.001$) (Table 3).

Table 2. Visual impairment characteristics of the study sample

Variable		Frequency (n=607)	Percentage (%)
Diagnosed with visual impairment	Yes	190	31.3
	No	417	68.7
Wearing glasses or contact lenses	Glasses	288	47.4
	Contact lenses	20	3.3
	Both	61	10
	None	238	39.3
Types of eyeglasses	Corrective glasses	288	47.4
	Protective glasses	78	12.9
	Both	18	3
	None	223	36.7
Family history of visual impairment	Yes	428	70.5
	No	131	21.6
	Don't know	48	7.9

Table 3. Attributes of visual impairment among medical students in Oman

Variable	Visual impairment present (n=190)		Visual impairment absent (n=417)		*p value
	Frequency	Percentage	Frequency	Percentage	
Family history of visual impairment	Yes	149	34.8	279	65.2
	No	32	24.4	99	75.6
Difficulty seeing display during lectures	Don't know	9	18.7	39	81.3
	Never	32	18.3	143	81.7
	Sometimes	117	35.5	213	64.5
	Frequently	22	42.3	30	57.7
Difficulty reading small text	Always	19	38	31	62
	Never	43	27	116	73
	Sometimes	108	31.4	236	68.6
	Frequently	25	37.3	42	62.7
Changes in vision after long hours on digital screens	Always	14	37.8	23	62.2
	Blurred	132	34.1	255	65.9
	Clear	58	26.4	162	73.6
	Yes	82	41.8	114	58.2
Vision impact on class participation	No	108	26.3	303	73.7
	< 5 hours	28	36.4	49	63.6
	5 to 6 hours	86	34.1	166	65.9
	6 to 7 hours	58	27.5	153	72.5
Average hours of sleeping	> 7 hours	18	26.9	49	73.1
	Good	20	20.4	78	79.6
	Natural	114	33.2	229	66.8
	Poor	56	33.7	110	66.3
Regular breaks during prolonged screen use	Yes	51	25	153	75
	No	139	34.5	264	65.5
Use of eye lubricant drops	Daily	24	51.1	23	48.9
	On dryness	111	33.0	225	67.0
	Never	55	24.6	169	75.4

* P-value less than < 0.05 considered be statistically significant

DISCUSSION

Our study found a prevalence of visual impairment of 31.3% among medical students, which was lower than that reported in some regional and international studies. For example, a study conducted in Sana'a, Yemen, reported a substantially higher prevalence of self-reported visual impairment (57.9%) among medical students.¹³ In contrast, studies from Lebanon and the United Arab Emirates reported a lower prevalence of 18.3% among university students, suggesting variability across populations and study settings.¹⁴ Our findings are comparable to those reported in Brazil, where the prevalence of visual impairment among undergraduate students was 37.3%.¹⁵ These differences may reflect variations in lifestyle factors, including screen time, academic workload, and awareness of eye health, as well as differences in study populations, diagnostic criteria, and research methodologies. Although the prevalence observed in our study was moderate compared with some previous reports, visual impairment remains an important health concern among medical students and highlights the need for increased awareness and preventive strategies.

In this research, familial predisposition of visual impairment revealed to be a strong attribute with 34.8% of students having a positive family history being visually impaired compared to 24.4% with negative family history ($p=0.012$). These results emphasize that genetic component is the most common aetiology of visual impairment among young populations. Recent studies have validated that parental myopia is a prominent determinant of myopia in youth as the risk increases if both parents manifested symptoms.¹⁶ According to Sanfilippo *et al.*,¹⁷ twin study has proven that refractive errors are predominantly genetic, influencing about 88% of the variability in refraction among people. In addition to the evidence for a genetic basis of visual impairment, a retrospective study executed in Turkey demonstrated that the incidence of visual impairment was notably higher in those with a familial history of visual problem.¹⁸ The obvious statistical significance association observed in our research might be linked to the larger sample size.

The use of eye lubricant drops was substantially correlated with visual impairment in this research, with a raised proportion of visually

impaired students' usage on daily basis ($p=0.001$). Furthermore, usage on dryness was reported by 33% of reduced eyesight students versus 67% of those without visual impairment. This result indicates that the use of eye drops lubricants is to improve the symptoms rather than prevention purposes. This interpretation is reinforced by the fact that eyes dryness was the second most frequent ocular symptom in our study, affecting 46.8% of the medical students. A meta-analysis highlighted that prolonged screening time and sustained visual tasks are recognized as causative factors of dry eye disease.¹⁹ These patterns are highly relevant to this research population. Only 24.6% of visually impaired students reported negative history of eye lubricants usage; suggesting that majority of students are heavily reliant on lubricants drops to manage the discomfort. This noteworthy lubricant dependence points to a considerable strain of ocular dryness among Omani medical students, that tends to exceed the findings reported in a cross-sectional study held in Korea among 188 medical students. The prevalence of dry eye disease between Korean students was 27.1%.²⁰ The higher reliance on lubricant drops in our population may indicate additional environmental impacts such as the weather in Oman and largely device-driven academic requirements.

Students who had insufficient resting intervals during prolonged screen use demonstrated significantly higher prevalence of visual impairment (34.5%), in comparison to students who took adequate resting intervals (25%) ($p=0.017$). This data illustrates the contribution screen-use behaviour in determining the progression and severity of visual impairment among medical students. The 20-20-20 rule is advisable to alleviate and delay symptoms onset. Individuals look at an object at least 20 feet away for 20 seconds every 20 minutes of digital usage duration. This strategy has been widely encouraged as a basic and effective way to prevent progressive ocular deterioration.²¹

Visual impairment was statistically correlated with blurred vision subsequent to prolonged digital exposure with 34.1% of students reporting screen driven blurred vision being visually impaired. On the other hand, just 26.4% who suffered from clear vision after screen exposure among those whose visual ability stayed clear ($p=0.048$). Sheppard and Wolffsohn¹ documented

that blurred vision is one of the most encountered symptoms of digital eye strain. Furthermore, that individuals with existing ocular defects are more predisposed to suffer from blurry and hazy vision. Moreover, cross-sectional study among office employees with visual impairments experienced more repeated episodes of blurry vision compared to members with normal eyesight.²² From all of this we can sum up that people with refractive errors are particularly more prone to have ocular discomfort.

Multiple studies from Madinah, Saudi Arabia and Sana'a universities illustrated more than half of the students have visual impairment despite having regular sleep time.^{9,13} Similarly, our study noted no significant association between average sleeping hours and visual impairment, suggesting other shared environmental or cultural factors that may contribute to the problem. Contrary, findings from Ethiopian study on graduated students proposed the likelihood of experiencing dry eye symptoms due to lack of sleep.²³ This highlights the need of adequate studies to prove the relationship between sleeping hours and visual impairment.

On the other hand, a significant relation between sleep quality and ocular impairment was seen in our study ($p=0.04$). According to reports, participants who get sufficient sleep noted fewer vision symptoms. This is consistent with studies from Middle East; higher proportion of dry eye disease and visual fatigue was related to disrupted sleep.⁵ Likewise, global studies showed that lacking sleep quality leads to poor tear stability, higher visual strain, and disruption of eye surface recovery.⁶ These results suggest the impact of lifestyle choices on visual health and sleep pattern as adjustable risk factor.

Most of the students who have visual impairment in our study had trouble in seeing the display throughout the lectures, suggesting it as a predictor for visual impairment. Comparably, local findings highlighted that reduced ability to see the screen and extended sight distance enhanced visual impairment.¹¹ Also, research from Saudi Arabia revealed that looking at far objects including lecture display was difficult for students with untreated vision impairments indicating that personal characteristics like refractive errors have a hand in.²⁴ Global study found long screen-display exposure decreases contrast sensitivity and visual acuity, making it harder to see displayed

presentations.^{1,3} This suggests that the environment settings such as the design of lecture halls contribute significantly to vision health.

Even though the association between difficulty reading small text and visual impairment in our research was statistically insignificant, a notable pattern of increasing ocular complaints was linked with raised levels of struggling in reading small content. This corresponds with Asian studies showing that long term near work and higher education requirement, increased the vulnerability to ocular fatigue and near-sightedness.²⁵ In consistent, a reported study from Saudi Arabia demonstrated that students with visual strain found it hard to read small text.² In our research, differences in reading practices and sample size may be the cause for absence of statistical significance.

Limitations of the study

This study has several limitations. First, it is a cross-sectional design which not allow causal relationships to be established. Second, because the data were based on students' self-reports, the findings may be subject to recall and reporting bias. Third, as the study was conducted at a single institution, the generalizability of the findings to other medical students or regions in Oman may be limited. Finally, no clinical ophthalmic examinations were performed to confirm self-reported visual conditions, making it difficult to assess or control for potential confounding factors.

Recommendation

Students should be made aware of good practices for visual health like decreasing screen time, using eye lubricant drops, taking regular breaks during prolonged screen use, wearing corrective glasses continuously and taking adequate hours of sleep so that it does not affect their studies, academic performance and perhaps their quality of life itself.

CONCLUSION

Visual impairment was common among medical students, with a prevalence of 31.3%, although only about half of the affected students reported using corrective glasses. High daily screen time for both academic and recreational purposes was frequently reported. Visual impairment was significantly associated with a positive family

history, poor sleep quality, and the habit of not taking regular breaks during prolonged screen use. Students with visual impairment also reported greater difficulties with class participation and academic performance. In addition, only about half of the students with visual impairment reported regular use of eye lubricants and it was statistically significant. These findings highlight the need for increased awareness of eye health and further longitudinal studies to better understand the factors associated with visual impairment among medical students.

ACKNOWLEDGEMENT

The authors sincerely thank all the medical students who participated in this study and generously gave their time to complete the survey. The authors also express their sincere appreciation to the College of Medicine and Health Sciences at the National University for its support and facilitation of the data collection process.

Funding Sources

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of interest

The authors do not have any conflict of interest.

Data Availability Statement

This statement does not apply to this article.

Ethics Statement

This research did not involve human participants, animal subjects, or any material that requires ethical approval.

Informed Consent Statement

This study did not involve human participants, and therefore, informed consent was not required.

Clinical Trial Registration

This research does not involve any clinical trials.

Permission to reproduce material from other sources

Not Applicable.

Author contributions

Mazin Al-rudaini: Concept, Design, Leading contribution in writing, and Proofreading the manuscript; Sanam Anwar: Data analysis, Writing

the results and proofreading the manuscript; Shatha Al Rushaidi: Literature review, Data collections, Writing the discussion, and Proofreading the manuscript; Taif Al Harmali, Nasreen Al Kindi: Literature review, Data collections, Writing the discussion, and Proofreading the manuscript; Manar Al Balushi: Literature review, Data collections, Writing the discussion, and Proofreading the manuscript; Maryam Al Balushi: Literature review, Data collections, Writing the discussion, and Proofreading the manuscript; Ariyam Al Hattali: Literature review, Data collections, Writing the discussion, and Proofreading the manuscript.

REFERENCES

1. Sheppard AL, Wolffsohn JS. Digital eye strain: prevalence, measurement, and amelioration. *BMJ Open Ophthalmol.* 2018;3:e000146. doi:10.1136/bmjophth-2018-000146
2. Zarban NA, Alammari OB, Abu Sabah S, et al. Prevalence and risk factors of dry eye disease in association with the increased use of electronic devices among university students in western Saudi Arabia. *Cureus.* 2024;16(1):e51554. doi:10.7759/cureus.51554
3. Bhatnagar KR, Dixit SG, Pandey L, Prakash S, Shiromani S, Singh K. Digital eye strain among medical students associated with shifting to e-learning during the COVID-19 pandemic: an online survey. *Indian J Ophthalmol.* 2024;72(1):98-104. doi:10.4103/IJO.IJO_492_23
4. Alkousheh H, Alkousheh Y, Qawaqzeh R, et al. The hidden cost of digital learning: a cross-sectional study assessing the prevalence of computer vision syndrome among medical students in Jordan. *BMJ Open.* 2025;15(1):e093939. doi:10.1136/bmjopen-2024-093939
5. Abdulmannan DM, Naser AY, Ibrahim OK, et al. Visual health and prevalence of dry eye syndrome among university students in Iraq and Jordan. *BMC Ophthalmol.* 2022;22(1):265. doi:10.1186/s12886-022-02485-w
6. Wróbel-Dudzińska D, Osial N, Stępień PW, Gorecka A, ́arnowski T. Prevalence of dry eye symptoms and associated risk factors among university students in Poland. *Int J Environ Res Public Health.* 2023;20(2):1313. doi:10.3390/ijerph20021313
7. Chen H, McCann P, Lien T, et al. Prevalence of dry eye and meibomian gland dysfunction in Central and South America: a systematic review and meta-analysis. *BMC Ophthalmol.* 2024;24(1):50.

- doi:10.1186/s12886-023-03249-w
8. Wei S, Sun Y, Li S, et al. Refractive errors in university students in Central China: the Anyang University Students Eye Study. *Invest Ophthalmol Vis Sci.* 2018;59(11):4691-4700. doi:10.1167/iovs.18-24363
 9. Makhdoum H, Alrehaili A, Albelawi A, et al. Prevalence of myopia and its related factors among university students in Madinah, Saudi Arabia. *Cureus.* 2023;15(11):e49656. doi:10.7759/cureus.49656
 10. Alsaadi MA, Aouda MS, Almheiri MD, et al. Factors associated with the prevalence of refractive errors among medical students in the United Arab Emirates. *F1000Res.* 2025;14:954. doi:10.12688/f1000research.170570.1
 11. Almuqrashi A, Al-Noumani H, Al-Abri F, Al-Hinai H, Bani Oraba H. The prevalence of computer vision syndrome and associated factors among university students in Oman: a cross-sectional study. *BMC Public Health.* 2025;25(1):2668. doi:10.1186/s12889-025-23823-9
 12. Al Darrab A, Owais FB, Al Jarallah OJ, et al. Awareness of common eye diseases among college students at a Saudi university. *J Pioneering Med Sci.* 2024;13(1):131-137. doi:10.61091/jpms202413123
 13. Aldoais T, Badi M, Al-Saqati AMA, et al. Prevalence and factors associated with visual impairment among medical students in a university setting in Sana'a City, Yemen. *J Community Health Manag.* 2025;19(3):195-202. doi:10.59628/jchm.v19i3.1730
 14. Ghemrawi R, Kerek R, Kayed K, Aldulaymi R, Ramadan A, Khair M. Association between visual impairment and sleep duration in college students: a study conducted in the United Arab Emirates and Lebanon. *J Am Coll Health.* 2023;71(1):228-234.
 15. Tissot JD, Silva BG, Menezes AM. Validation study on self-reported visual impairment among undergraduate students at the Federal University of Pelotas. *Cien Saude Colet.* 2021;26:1977-1986.
 16. Mutti DO, Mitchell GL, Moeschberger ML, Jones LA, Zadnik K. Parental myopia, near work, school achievement, and children's refractive error. *Invest Ophthalmol Vis Sci.* 2002;43(12):3633-3640.
 17. Sanfilippo PG, Hewitt AW, Hammond CJ, Mackey DA. The heritability of ocular traits. *Surv Ophthalmol.* 2010;55(6):561-583. doi:10.1016/j.survophthal.2010.07.003
 18. Goktas O. Factors associated with eye disorders and diseases: a retrospective study. *Pak J Med Sci.* 2025;41(1):176-181. doi:10.12669/pjms.41.1.9728
 19. Stapleton F, Alves M, Bunya VY, et al. TFOS DEWS II epidemiology report. *Ocul Surf.* 2017;15(3):334-365. doi:10.1016/j.jtos.2017.05.003
 20. Hyon JY, Yang HK, Han SB. Dry eye symptoms may have association with psychological stress in medical students. *Eye Contact Lens.* 2019;45(5):310-314. doi:10.1097/ICL.0000000000000567
 21. Talens-Estarells C, Cerviño A, García-Lázaro S, Fogelton A, Sheppard AL, Wolffsohn JS. The effects of breaks on digital eye strain, dry eye, and binocular vision: testing the 20-20-20 rule. *Cont Lens Anterior Eye.* 2023;46(2):101744. doi:10.1016/j.clae.2022.101744
 22. Ranasinghe P, Wathurapatha WS, Perera YS, et al. Computer vision syndrome among computer office workers in a developing country: an evaluation of prevalence and risk factors. *BMC Res Notes.* 2016;9:150. doi:10.1186/s13104-016-1962-1
 23. Tilahun MM, Alemayehu HB, Eticha BL, et al. Symptomatic dry eye disease and associated factors among postgraduate students at Hawassa University, Sidama Region, Ethiopia. *Sci Rep.* 2025;15(1):17356. doi:10.1038/s41598-025-97928-x
 24. Albasheer O, Jareebi MA, Alnami RM, et al. Computer vision syndrome among Saudi university students: a cross-sectional analysis of risks and discipline variations. *Healthcare (Basel).* 2025;13(21):2798. doi:10.3390/healthcare13212798
 25. Manchikanty SRCM, M JSR, C U, et al. A cross-sectional study on the prevalence, risk factors, and impact of myopia among medical students in Andhra Pradesh, India. *Cureus.* 2025;17(7):e88760. doi:10.7759/cureus.88760