Comparative Analysis of Academic Performance of Medical Students with Eye Diseases and Healthy Eyes

Fatima Akbar Shah[1], Umair Tariq Mirza[1], Muhammad Usman Sadiq[1], Samar Fatima[2], Muhammad Shoaib[1], Sidrah Riaz[3]

Abstract:
Objectives: To examines the relationship between ocular diseases and academic performance among medical students.
Methods: Conducted as an observational comparative study at Mohiuddin Teaching Hospital, data were collected through questionnaires completed by a consultant ophthalmologist, alongside academic grades provided by the medical education department.
Results: A total of 418 medical students participated. The results show no statistically significant association between ocular disease and student grades, with a p-value of 0.267, indicating that any observed differences were likely due to chance.
Conclusion: The study suggests that factors other than eye health may play a more critical role in academic success for medical students. However, the study is limited to a single institution, and the findings should not be generalized without further research across diverse populations and settings. *Al-Shifa Journal of Ophthalmology 2025; 21(1): 37-42. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

1. *Mohiuddin Islamic Medical College Mirpur AJK.*
2. *CMH, Lahore.*
3. *Akhter Saeed Medical and Dental College Lahore.*

Correspondence to:
Fatima Akbar Shah
Mohiuddin Islamic medical College
Mirpur AJK.
fatimahakbarshah@gmail.com

Introduction:

The maintenance of perfect health status in general and eye health, in particular, is pivotal in the undergraduate years of medical students. While students in general need to have sound health[1] medical students in particular should be at the peak of perfect health status[2] since the absorptive learning at this stage affects their professional skills in later life. Medical students tend to be involved in very long study hours which puts the well-being of their eyes at stake[3] and in the long run, affects their learning and social abilities[4].

Even the students aspiring to get enrolled in medical school have been engaged in much arduous study, the result being compromised eye health. Headache due to eye strain is one very common symptom noted among medical students very obvious outcome of straining, with the eyes having a challenged status[5]. . Some students report undefined musculoskeletal pains[6] which may also be due to eye strain and inadequate posture adoption to gain optimum sight of the reading material. The use of masks during hospital visits and operating room rotations has been

postulated to be the cause of dry eye in many retrospective studies- however a study in Jordan negated its association with dry eye among medical students[7]

Refractive errors top the list of eye diseases among medical students; however, it is adequately treatable. With the advent of the use of information technology in the study designs, long hours in front of screens have popped new disease entities among this specific age group: Dry eye disease, and asthenopia which were previously common among middle-aged individuals are now being increasingly reported among students in general and medical students in particular.

Studies have shown that among primary school students, the presence of refractive errors was associated with low academic performance[8]. In a study in China, myopic children were shown to be poorer at performance than emmetropes[9]. Another study demonstrated that those students who wear refractive corrections perform better than those who go unaided pointing out the importance of identification and timely treatment of the disease[10].

Refractive errors are the most common cause of treatable blindness worldwide, the other diseases being cataracts, age-related macular degeneration, and diabetic retinopathy[11].

The high prevalence rate of refractive errors and other diseases among medical students warrants studies[12] to look into the factors causing them so as to benefit the students and authorities of medical schools to provide a conducive learning environment so that the global burden of eye disease in young individuals can be offloaded to whichever extent possible.

Methodology:

This is an observational comparative study carried out in the ophthalmology department of Mohi-ud-din Teaching Hospital after approval from the ethical review board of Mohi-ud-din Islamic Medical College. The sampling technique employed was non-probability consecutive

sampling. All the medical students who gave consent were included in the study. The data were collected on a questionnaire that was filled by a consultant ophthalmologist (at least three years of post-fellowship experience) and students' grades were entered, the data of which were provided by the medical education department. All medical students of both genders were included in the study. Those who refused were excluded from the study. The data was analyzed on SPSS version 21.0 by a qualified statistician. Mean and standard deviations were calculated for quantitative variables i.e. age. Qualitative variables like gender, class, grades, and eye diseases were expressed as frequencies and percentages.

Results:

The results show that gender distribution shows a stable pattern with more female students. Total of 134 males and 284 females (Figure I) with the mean age of 19.24 ± 1.031 years (1st year), 20.39 ± 0.937 years (2nd year), 21.29 ± 1.023 years (3rd year), 22.27 ± 0.873 years (4th year) and 23.24 ± 1.043 years (5th year) participated in the study. The p-value of 0.267 indicates that there is no statistically significant association between ocular disease status and student grades (Table 1). Typically, a p-value less than 0.05 is considered significant, so a p-value of 0.267 suggests that any observed differences are likely due to chance rather than a meaningful association. The lack of statistical significance (p-value = 0.267) implies that ocular disease status does not have a significant impact on students' grades. The academic performance of students does not significantly vary based on whether they have an ocular disease or not (Table 2). The proportions of students with ocular disease and healthy eyes are fairly consistent across the different grade categories (Table 3).
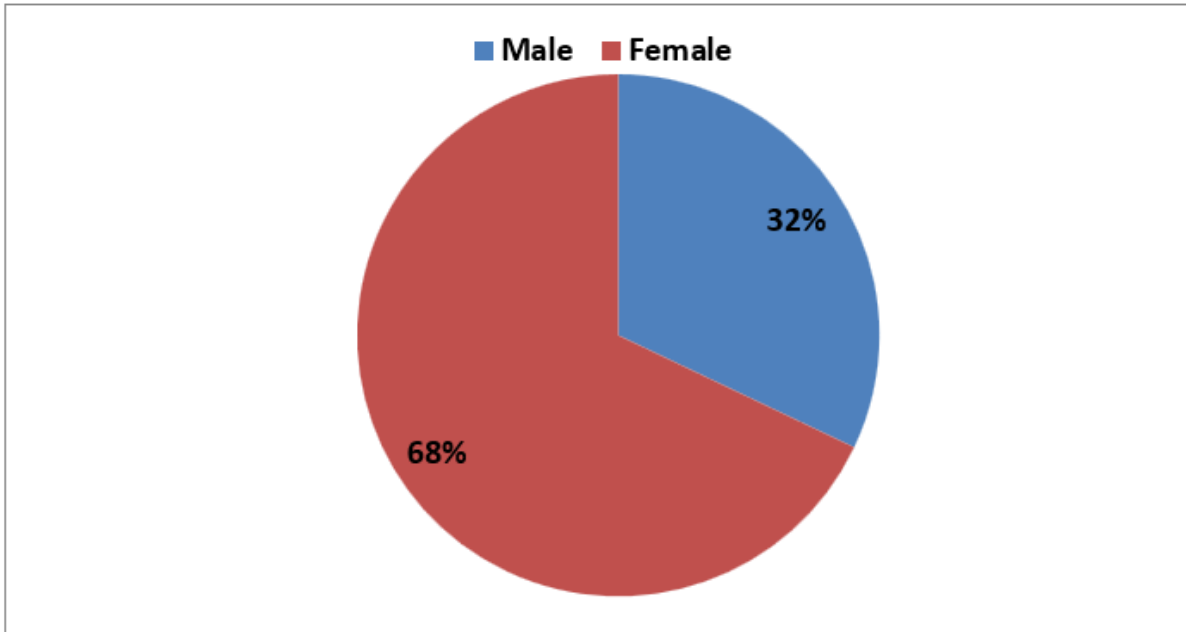
Figure 1: Gender Distribution in this study

Table 1: Association of status of Ocular disease and grade of student

Grade	Ocular Disease Status		Total	P-value
	Ocular Disease	Healthy Eyes		
Grade A- (70-84%)	55	67	122	
Grade B (55-69%)	68	121	189	0.267
Grade F (< 50%)	48	69	117	
Total	171	257	428	

Table 2: Association of different ocular diseases with Grades of Students

Ocular disease	Grade			Total	P-value
	Grade A- (70-84%)	Grade B (55-69%)	Grade F (< 50%)		
VISUAL LOSS					
Yes	26	39	24	89	0.986
No	96	150	93	339	
PAIN					
Yes	15	29	16	60	0.745
No	107	160	101	368	
ITCHING					
Yes	22	38	25	85	0.806
No	100	151	92	343	
RED EYE					
Yes	2	14	8	24	0.077
No	120	175	109	404	
Total	122	189	117	428	

Table 3: Association of Ocular Diseases with grades of students

Ocular Disease on Screening	Grade			Total	P-value
	Grade A- (70-84%)	Grade B (55-69%)	Grade F (< 50%)		
Healthy Eyes	67	121	69	257	
Myopia	37	42	30	109	
Allergic Conjunctivitis	2	4	2	8	
Astigmatism	6	6	2	14	
Dry Eye	2	1	4	7	
Blepharitis	0	1	2	3	
VKC	0	1	0	1	0.841
Convergence Insufficiency	1	5	3	9	
Color Blindness	1	1	1	3	
Myopia + Dry Eyes	1	2	1	4	
Myopia + Meibomianitis	2	3	2	7	
Astigmatism + Myopia	3	2	1	6	
Total	122	189	117	428	

Discussion:

The relationship between vision and academic performance at various educational levels has been the field of interest of many pediatricians and eye specialists for a long time, with special emphasis on visual factors associated with learning problems, while a lot of studies have been conducted in school students to find its association and obtained various results, our study specifically aimed to delve into this aspect among medical students. Among high school students it was noted in a study that the average score of academic results before the intervention was 56.39 ± 13.24 which was increased to 60.27 ± 14.94 after the intervention while in the private sector, before the intervention, the average score was 63.53 ± 17.50 which was improved to 67.12 ± 18.48. It was found to be statistically significant at *p*-value < 0.05[13]. Hence, the application of refractive correction led to the improvement of results which indicates refractive errors do have an impact on the academic performance of students. However, for medical students in our study, no significant association was obtained.

High school students who do not wear refractive corrections perform poorly. Not wearing spectacles was due to poor socioeconomic background. However, when correction was provided, those students showed a boost in their performance[14].

A study carried out in China showed that students who had poor vision performed better than those with better vision. Reading in bed, insufficient sleep, and screen time during weekdays and weekends were associated with higher odds of poor vision[15]. Since these factors were not taken into account for our study, newer studies could be aimed at finding an association between these factors and vision-related pathologies. Psychological stress is reported to be the cause of dry eye exclusively in medical students in a study carried out in Korea[16] however no association with grades was established.

A study on medical students in Nepal posits myopia to be the most common eye disease among medical students[4] however no association with academic performance has been investigated. In the literature cited above, no single and precise determinant of

academic performance has been determined. Our study has clearly proved that no association exists between eye disease and academic performance among medical students.

There could be other determinants of academic performance[17] among students other than medical issues[18] which could be researched. This study has the limitation of being localized to only one university of a specific area, where many environmental and social factors could interplay to affect the students: so, these results are not recommended to be quoted as a generalization.

Conclusion:

There is no association of any sort between the academic performance of medical students and eye disease of any type. Eye diseases do occur among the students at a significant frequency however, they do not affect the grades of the students. Students, in significant numbers, are, however, noted to have refractive errors which have an increasing trend in consecutive medical years connoting a need to investigate the cause, if any.

References:

1. Abdel Aziz K, Okasha T, Bhugra D, Molodynski A. Mental health, wellbeing and burnout among medical students in the United Arab Emirates. 2023;69(4):985-93.
2. Brew BK, Söderberg J, Lundholm C, Afshar S, Holmberg K, Almqvist C. Academic achievement of adolescents with asthma or atopic disease. Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology. 2019;49(6):892-9.
3. Alqudah AA, Bauer AJ, Aleshawi A. Refractive errors among medical students in Jordan: prevalence, types and possible risk factors. 2023;9(2):Fso839.
4. Shrestha P, Kaiti R, Shyangbo R, Dhakal K. Ocular Survey in Kathmandu University Medical Students. Kathmandu University medical journal (KUMJ). 2022;20(78):209-13.
5. Moldovan HR, Voidazan ST, Moldovan G, Vlasiu MA, Moldovan G, Panaitescu R. Accommodative asthenopia among Romanian computer-using medical students-A neglected occupational disease. Archives of environmental & occupational health. 2020;75(4):235-41.
6. Thorud HS, Mudvari PR, Falkenberg HK. Academic performance and musculoskeletal pain in adolescents with uncorrected vision problems. BMC pediatrics. 2024;24(1):202.
7. Al-Dolat W, Abu-Ismail L. Is wearing a face mask associated with symptomatic dry eye disease among medical students during the COVID-19 era? An online survey. 2022;22(1):159.
8. Thorn F, Chen J, Li C, Jiang D, Chen W, Lin Y, et al. Refractive status and prevalence of myopia among Chinese primary school students. Clinical & experimental optometry. 2020;103(2):177-83.
9. Yue Y, Liu X, Yi S, Liu B, Yi H, Li H. High prevalence of myopia and low hyperopia reserve in 4411 Chinese primary school students and associated risk factors. BMC ophthalmology. 2022;22(1):212.
10. Hark LA, Thau A, Nutaitis A, Mayro EL, Zhan T, Dabbish N, et al. Impact of eyeglasses on academic performance in primary school children. Canadian journal of ophthalmology Journal canadien d'ophtalmologie. 2020;55(1):52-7.
11. Bahakim NO, Geddawy AI, Sharma K, Alkhathlan KM, Alsheddi MIM, Al-Zogbi ASA, et al. Visual status among undergraduate students: Findings from an emerging university in Saudi Arabia. Saudi journal of biological sciences. 2021;28(8):4683-90.
12. Shrestha T, Kushwaha DK, Tiwari S, Sah UK, Raj R, Rajak S, et al. Myopia among Medical Undergraduates of a Medical College: A Descriptive Cross-

sectional Study. JNMA; journal of the Nepal Medical Association. 2023;61(259):228-31.

13. Latif MZ, Hussain I, Afzal S, Naveed MA, Nizami R, Shakil M, et al. Impact of Refractive Errors on the Academic Performance of High School Children of Lahore. Frontiers in public health. 2022;10:869294.

14. Du K, Wang H. Effect of Eyeglasses on Student Academic Performance: What Matters? Evidence from a Randomized Controlled Trial in China. 2022;19(17).

15. Wang S, Hao X, Ma X. Associations between Poor Vision, Vision-Related Behaviors and Mathematics Achievement in Chinese Students from the CNAEQ-PEH 2015. 2020;17(22).

16. Hyon JY, Yang HK, Han SB. Dry Eye Symptoms May Have Association With Psychological Stress in Medical Students. Eye & contact lens. 2019;45(5):310-4.

17. Al-Khani AM, Sarhandi MI, Zaghloul MS, Ewid M, Saquib N. A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. BMC research notes. 2019;12(1):665.

18. Yang I, Wakamatsu T, Sacho IBI, Fazzi JH, de Aquino AC, Ayub G, et al. Prevalence and associated risk factors for dry eye disease among Brazilian undergraduate students. 2021;16(11):e0259399.

Authors Contribution
Concept and Design: Umair Tariq Mirza
Data Collection / Assembly: Muhammad Usman Sadiq
Drafting: Samar Fatima, Muhammad Shoaib
Statistical expertise: Sidrah Riaz
Critical Revision: Fatima Akbar Shah