Prevalence of Myopia in Medical students of Sialkot, Pakistan

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ABSTRACT

Background: Myopia is a rapidly increasing refractive error worldwide, particularly affecting young adults engaged in intensive near-work. Medical students are considered a high-risk group due to prolonged study hours, high screen exposure, and limited outdoor activity.

Objective: To assess the prevalence, risk factors, symptoms, and awareness of myopia among undergraduate medical students in Sialkot.

Material and Methods: A cross-sectional study was conducted from August to September, 2025 at Islam Medical College, Sialkot Medical College, and Khawaja Muhammad Safdar Medical College. A total of 201 students from MBBS, BDS, DPharm, and DPT programs were selected using random sampling method. Data was collected through a structured questionnaire covering demographics, myopia status, symptoms, family history, screen time, outdoor activity, and awareness of preventive measures. Data was analyzed using SPSS version 29.

Results: Out of 201 participants, 64.7% were female, and most (59.8%) were aged 20–23 years. The prevalence of self-reported myopia was 53.2%, with 51.2% using eyeglasses as the primary correction method. Common symptoms included headaches (42.8%) and blurred distance vision (41.3%). Nearly half (49.8%) reported a family history of myopia, and 36.8% had daily screen exposure of 7–8 hours. Reading (49.8%) and mobile use (37.8%) were the most affected daily activities, while 42.3% reported a negative impact on academic performance. Although 75.1% were aware of screen time as a risk factor and 76.1% knew about preventive methods, only 46.3% practiced screen-time reduction, and most reported limited success.

Conclusion: Myopia prevalence among medical students in Sialkot is high, with significant visual and academic impacts. Family history, excessive screen exposure, and reduced outdoor activity were key contributors. Despite awareness, preventive practices remain underutilized, underscoring the need for targeted educational and lifestyle interventions.

Keywords: Myopia, Medical students, Prevalence, Risk factors, Screen time

INTRODUCTION

In simple terms, myopia is a refractive error that causes impairment in the person's visual ability to see objects from a distance. It is more prevalent in developed and industrial areas and occurs in all age groups [1]. In recent years myopia has been growing in staggering numbers, with a recent study claiming that without prompt intervention, myopia will show a significant increase globally, affecting nearly 5 billion people worldwide [2]. More time spent on work that requires near vision and less outdoor activities as well as high level of education are very common factors that contribute to the development and prevalence of myopia in the general population [3].

Recent studies have shown that a higher intelligence and school work which students have to undertake leads to early development of myopia [4], bringing us to the conclusion that medical students are more prone to such a refractive error due to the nature of their studies. Across regions, medical students consistently show a higher proneness to myopia compared with age-matched fellows, likely reflecting a blend of genetic susceptibility and intense, prolonged near-work demands and poor health and lifestyle: reading, screens, busy schedules, typical of medical studies and training [5]. Reported prevalence in medical students commonly ranges from the high 30s to >70% [6], with East/Southeast Asian settings belonging to the upper end of that spectrum [7].

These findings propose that medical education may hasten both the development and progression of myopia. In addition to visual burden, uncorrected or progressive myopia can adversely impact quality of life, academic performance, and mental health, highlighting the importance of early detection and preventive strategies in this exposed population [8]. Understanding the prevalence and contributing factors as well as risk factors of myopia in medical students is therefore critical for developing targeted interventions and preventive strategies, both at the personal and institutional levels.

Medical students often exhibit high myopia prevalence due to intense near-work demands and limited outdoor exposure, consistent with environmental and genetic risk patterns widely recognized in the global myopia literature [9].

Abdul Malik et al. conducted a cross-sectional study of 110 medical students, from September to October in the year 2020, in Lahore, Pakistan [10]. 83.6% were myopic: primarily moderate to high myopia and only ~30% took outdoor breaks; ~54% had a family history.

Berhane et al. found a much lower prevalence of 16.7%, using objective refractive examinations [11]. Independent risk factors included urban residence, family history, >5–8 h/day work involving near vision, and <3 h/week outdoor activity or time spent in daylight.

Alqudah et al. conducted a study upon 700 students and reported 75% had refractive errors, with myopia being most common; 79% had a positive family history [12]. The study grouped refractive errors together, writing myopia as most common, but without separate detailed analysis. The study only highlighted simple associations with myopia or other refractive errors, making the risk analysis descriptive rather than multi-variate.

In a study conducted by Rathore et al. at Army Medical College, Rawalpindi, with a sample size of 300 students, the results yielded that 50% had myopia [13], with familial aggregation. Yet only 21% of students recognized risk factors like increased screen time or use of poor lighting.

A study conducted in 2023 by Oszczędłowski et al., concluded myopia in 27.2% of medical students and analyzed demographic/behavioral correlates [5]. The study had several limitations. Its cross-sectional design impedes any assessment of incidence or causality. Cycloplegia was not used, which may have led to imprecise measurement of refractive error. The sample consisted majority of European White medical students, which limits the external legitimacy of the findings to populations in regions with higher myopia prevalence. In addition, the study did not prospectively track adult-onset myopia or changes in axial length over time. The authors themselves highlighted the need for prospective cohort studies to explain the incidence and progression of adult-onset myopia during medical training.

A descriptive cross-sectional study of 279 medical undergraduates in Nepal reported a relatively high prevalence of myopia at 42.65% [14]. While the findings emphasize a significant visual health burden in this population, several limitations were existing. The study employed convenience sampling within a single institution, which lessens generalizability. It also relied on non-cycloplegic assessments and self-reported spectacle use, which could result in missed cases of mild or undiagnosed myopia. Furthermore, the study did not explore behavioral risk factors in depth, such as screen exposure, lighting conditions, or hours of near-work, which are highly appropriate in student populations. The analysis also did not stratify prevalence by year of study or by phase of medical training, which could have revealed trends in adult-onset or progression of myopia during medical education and training. These omissions represent important gaps for future researches.

A study conducted across various colleges in Bahrain [15], including medical students, reported that nearly one in two partakers had myopia. The research also showed that parental history of myopia was common among affected people. However, the study design had several limitations. It included students from multiple health-related disciplines, making it difficult to extract results particular to medical students. The study was also cross-sectional and relied on non-cycloplegic methods, which may lessen the accuracy of prevalence estimates. In addition, the assessment of risk factors was descriptive and not adjusted for potential factors, such as academic workload, outdoor time, or year of study. These limitations suggest the need for medical-student-specific analyses in future Bahraini or Gulf regional studies.

A recent cross-sectional study in Andhra Pradesh, India, reported a myopia prevalence of 61.6% among medical students [16], making it one of the highest estimates within the last five years. The study also highlighted significant associations with demographic and behavioral risk factors. Despite these strengths, the study was conducted in a single state, and its findings may not represent the diverse Indian medical student population. Like most previous studies, cycloplegia was not employed, which could result in misclassification of refractive error. Its cross-sectional design excluded analysis of incidence or progression across medical school years. Moreover, although it was conducted during the post-pandemic period, the study did not specifically examine how increased smartphone use or online classes added to myopia progression. The lack of stratification by severity also meant that the burden of high myopia was not investigated. These gaps stress the need for prospective, multicenter studies that track medical students longitudinally with standardized refraction and axial length measurement.

Grigore T. Popa University of Medicine and Pharmacy in Romania conducted a large questionnaire-based study [17] involving 576 medical students and found myopia prevalence of 73.8%. Interestingly, the data showed that 43.8% of sixth-year students already had myopia at admission, compared to 64% in first-year students, suggesting that the onset of myopia is shifting to earlier and younger ages. While this study underscores an alarming upward trend, it is limited by its reliance on self-reported refractive status rather than clinical examination, which may have led to recall bias. Additionally, it did not explore environmental risk factors such as screen exposure or time spent outdoors, creating a gap for future research.

In Southern Rajasthan, India, a study [18] among 150 first-year MBBS students reported a prevalence of 62.7%, with female students significantly more affected than males ($p < 0.005$). Most cases were classified as low myopia (75%), while moderate to high myopia reported to be 20.2% and 7.4%, respectively. The authors credited much of this burden to near-work activity. However, the study's small sample size and limitation to a single academic year bounds the generalizability of its findings. Additionally, it did not examine the role of family history or urbanization, which are known contributive factors.

A cross-sectional study in Jalandhar, Punjab, India, that included 590 medical students found a myopia prevalence of 70.3%. The analysis showed a statistically significant association with family history ($p = 0.003$), while other factors such as screen time, reading distance, and sleep duration did not achieve statistical significance. Although the relatively large sample size reinforces its conclusions, the study relied on self-reported data for lifestyle behaviors, which may have introduced recall bias. Moreover, its focus on a single institution reduces external validity, and the absence of longitudinal data limits causal inferences [19].

METHODOLOGY

This descriptive, cross-sectional, epidemiological study was conducted from August to September 2025 at Islam Medical College, Sialkot Medical College, and Khawaja Muhammad Safdar Medical College, Sialkot. A total of 201 undergraduate medical students were enrolled using a random sampling technique. Both male and female students from MBBS, BDS, DPharm, and DPT programs who provided informed consent were encompassed, while those unwilling to participate were excluded. Data was collected using a structured, pretested, and authenticated questionnaire designed to assess the prevalence of myopia and associated factors. The questionnaire covered sociodemographic details, vision-related symptoms, family history, screen exposure, outdoor activities, awareness of risk factors, preventive exercises, and the influence of vision problems on academic and daily life. The dependent variable was the presence of myopia, whereas independent variables included age, gender, academic year, family history, and screen time. Questionnaires were administered in person

within the respective institutions to ensure precision and completeness. Data was coded and entered into SPSS version 29 for analysis. Descriptive statistics such as frequencies and percentages were applied to summarize demographic characteristics, distribution of refractive errors, related symptoms, vision correction methods, and awareness levels.

RESULTS

Table 1 shows the sociodemographic characteristics of the participants**.** A total of 201 medical students participated in the study. The majority of respondents were female (64.7%), while 35.3% were male. Most students were in the 20–23 year age group (59.8%), with smaller proportions in the 18–19 year group (24.4%) and the 24–25 year group (15.9%). Participants were fairly evenly distributed across academic disciplines, with MBBS (26.9%), BDS (25.9%), DPharm (24.9%), and DPT (22.4%).

Table 1. Distribution of study participants by sex, age, and academic course (n = 201)

		Frequency	**Percentage**
Sex	Male	71	35.3%
	Female	130	64.7%
Age	years (18-19)	49	24.4%
	Years (20-21)	60	29.9%
	Years (22-23)	60	29.9%
	Years (24-25)	32	15.9%
Course Name	MBBS	54	26.9%
	BDS	52	25.9%
	DPharm	50	24.9%
	DPT	45	22.4%

Table 2 presents the vision-related symptoms and impacts reported by participants. Headaches (42.8%) and blurred vision at a distance (41.3%) were the most commonly experienced symptoms, followed by eye strain or fatigue (10%). More than half of the students (53.2%) reported having been diagnosed with myopia, and the majority (79.1%) had normal vision after correction (Figure 1). Eyeglasses were the most frequently used corrective method (51.2%), while (39.8%) reported no current vision correction. Over half (53.2%) indicated that their myopia had not progressed, whereas (21.9%) and (17.9%) reported slow or moderate progression, respectively. Reading (49.8%) and mobile phone use (37.8%) were the daily activities most affected by vision difficulties, and (42.3%) of students stated that their vision problems negatively influenced their academic performance.

Table 2. Frequency and percentage distribution of vision-related factors and myopia characteristics among students

		Frequency	**Percentage**
Related Symptoms to vision	Blurred vision at a distance	83	41.3%
	Headaches	86	42.8%

	Eyes strain or fatigue	20	10.0%
	Double vision	6	3.0%
	difficulty seeing at night	6	3.0%
Screen time in a day	hours (1-2)	24	11.9%
	hours (3-4)	48	23.9%
	hours (5-6)	55	27.4%
	hours (7-8)	74	36.8%
Ever Diagnosed with Myopia	Yes	107	53.2%
	No	92	45.8%
	Don't know	2	1.0%
	others	0	0.0%
Vision after correction	Normal Vision	159	79.1%
	Myopia	40	19.9%
	Hyperopia	2	1.0%
	Astigmatism	0	0.0%
Current vision correction	Eyeglasses	103	51.2%
	Contact lenses	14	7.0%
	Refractive Surgery (LASIK)	4	2.0%
	None	80	39.8%
Myopia progressed overtime	Slow	44	21.9%
	Moderately	36	17.9%
	Rapidly	14	7.0%
	Not progressed	107	53.2%
Recent visit to ophthalmologist	1 month ago	24	11.9%
	6 months ago	62	30.8%
	12 months ago	47	23.4%
	24 months ago	68	33.8%
Vision affects daily activity	Using mobile	76	37.8%

	Patients' examination	6	3.0%
	Driving	19	9.5%
	Reading	100	49.8%
Effect on academic performance	Yes	85	42.3%
	No	84	41.8%
	Not sure	32	15.9%
	Don't want to mention	0	0.0%

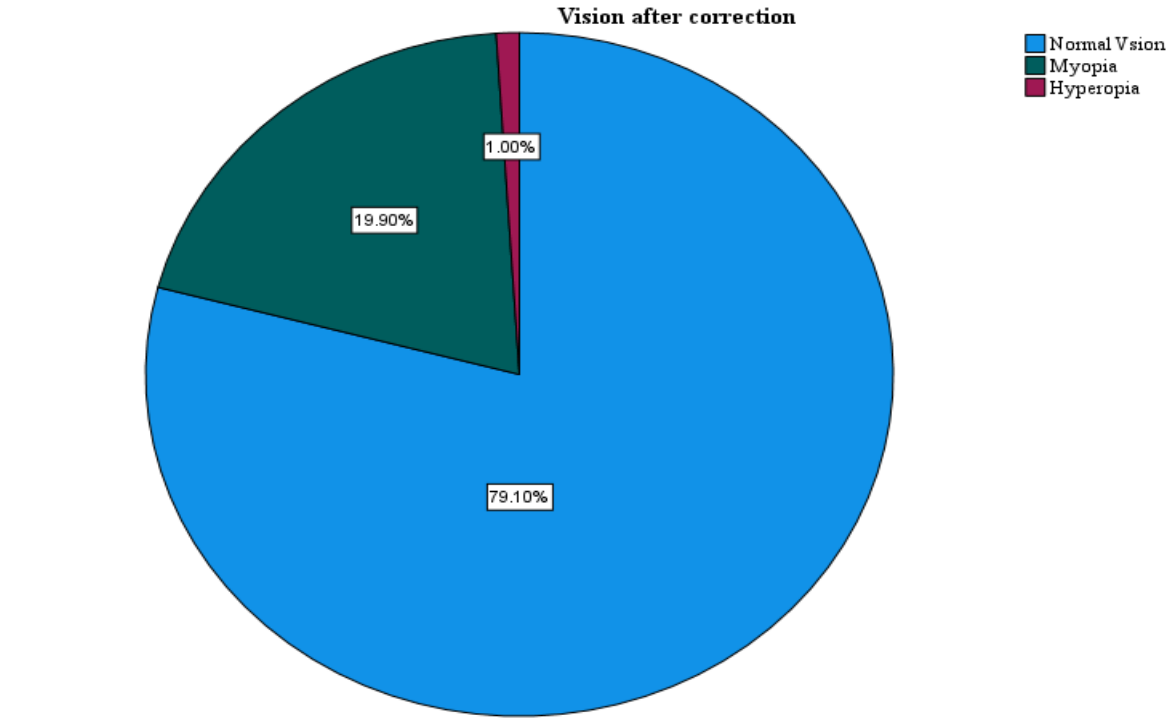

Figure 1. Distribution of vision status after correction among study participants

Table 3 outlines student's awareness and practices related to eye care. Nearly half of the respondents (50.7%) reported visiting an ophthalmologist only when experiencing vision-related problems, while 32.8% attended annual check-ups. Social media, particularly Instagram (53.7%) and YouTube (33.3%), was the most common source of information. A large proportion of participants agreed or strongly agreed that medical students are more prone to myopia (78.6%), and nearly half (49.8%) reported a family history of the condition. Awareness of screen time as a risk factor was high (75.1%), and most students (76.1%) were also aware of preventive methods. Reducing screen time (46.3%) was the most commonly practiced prevention strategy, although (52.7%) reported only limited success in doing so.

Table 3. Distribution of participants according to ophthalmic visit frequency, awareness, and preventive practices related to myopia (n = 201)

		Frequency	**Percentage**
Frequency of visit to ophthalmologist	Annually	66	32.8%
	Biannually	6	3.0%

	At the time of changing glasses	27	13.4%
	Having problem with vision	102	50.7%
Information from social media	YouTube	67	33.3%
	Facebook	10	5.0%
	Instagram	108	53.7%
	X.com	16	8.0%
Medical students prone to myopia	Strongly agree	70	34.8%
	Agree	88	43.8%
	Neutral	21	10.4%
	Disagree	22	10.9%
Family history	Yes	100	49.8%
	No	91	45.3%
	Don't know	8	4.0%
	Don't want to mention	2	1.0%
Hours in Daylight	less than 30 minutes	25	12.4%
	30-60 minutes	54	26.9%
	1-2 hours	66	32.8%
	More than 2 hours	56	27.9%
Awareness of screentime as risk	Yes, very aware	151	75.1%
	Somewhat aware	40	19.9%
	Heard about it but not sure	4	2.0%
	Not aware at all	6	3.0%
Aware of prevention Methods	Yes	153	76.1%
	No	48	23.9%
Methods of prevention followed	20-20-20 rule (eye rest every 20 minutes)	46	22.9%
	Outdoor activities	18	9.0%
	Reduce screentime	93	46.3%
	use of atropine drops or Otho-k lenses	10	5.0%

	others	34	16.9%
Tried to reduce screentime	Yes, successfully reduced	44	21.9%
	Yes, but with little success	106	52.7%
	No, but I plan to try	29	14.4%
	No, and I do not plan to	22	10.9%

DISCUSSION

Our study aimed to evaluate the prevalence of myopia among 201 medical students along with their visual health practices & associated demographic and behavioral factors. This study revealed several remarkable findings: a high prevalence of myopia (53.2%) prevalent symptoms such as headaches (42.8%) and distance blurred vision (41.3%), extensive daily screen time (majority engaging 5-8 hours) & high levels of awareness of risk factors (75.1%), albeit with limited success in behavior change (only 21.9% successively reduced screen time). These insights align with global patterns and offer important information.

With over half of participants diagnosed with myopia, our findings are congruent with studies from Lebanon (52.8%) [6], and Saudi Arabia (57.3%) [20]. Such consistency emphasizes that medical students-who often engage in prolonged near work-form a high-risk group regardless of geography and culture.

Family History: Nearly half of participants (49.8%) reported a hereditary predisposition -a pattern echoed in multiple studies. In Lebanon, having myopic siblings significantly elevated myopia risk; in Saudi samples, those with one or two myopic parents had up to triple the risk [6].

Near Work and Screen Time: The extensive screen usage (5-8 hours daily) resonates with dose-response meta-analysis findings showing that each additional hour of daily screen time raises myopia odds by 21%, and risk increases markedly up to 4 hours per day [21].

Similarly, Lebanese medical trainees' data highlighted near-work, including reading or screen time, as independently increasing myopia risk [6].

Myopic status was stable during the University period. Genetic factors play a major role in myopia. Protective measures are useful for university students [22].

During the course of the 20th century, myopia among teenagers and adults in Finland [23] significantly increased and the mean change in refraction was towards myopia. Increased education is proposed as the main reason behind these changes while our study shows the same. Gender is associated with prevalence of myopia among polish school children ranging from 9 to 16 years of age [24] while our study also shows that myopia is prevalent with gender as well, the female to male ratio being higher among the results. The recent findings revealed that myopia predominated among schoolchildren in Weifang [25]. It steadily grew through age while our study does not signify the prevalence of myopia with age.

Our respondents reported extensive daily screen time, with nearly two-thirds spending 5-8 hours per day on screens. This fits together with meta-analyses showing that each additional hour of daily screen time increases odds of myopia by approximately 21%, especially notable between 1 and 4 hours per day PMC [21].

While awareness was high-75.1% recognized screen time as a risk, and 76.1% admitted preventive methods-only 21.9% successfully reduced their screen time, with 52.7% reporting limited success. This gap between awareness and action underscores the challenges of modifying engrained habits in a challenging academic environment. It suggests the need for structured interventions, such as institutional policies promoting regular breaks (e.g., the 20-20-20 rule), and environmental facilitators to encourage manageable behavior change.

CONCLUSION

Across these studies, there is consistent evidence that medical students represent a high-risk group for myopia, primarily due to exhaustive academic demands and reduced outdoor exposure. However, significant gaps and limitations remain: early studies lacked detailed behavioral assessments, large-scale global projections excluded subgroup analyses, and more recent reviews focused more on treatment than prevalence. Even the most current research is limited by its restricted context. Future studies should adopt multicentric designs with diverse student populaces, include objective behavioral tracking, and incorporate management strategies with epidemiological findings to better address the growing burden of myopia among medical students.

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Authors' contribution: Methodology, data collection, analysis, manuscript writing: All authors,

Final approval: All authors

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