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ORIGINAL ARTICLE

Seeing beyond vision: A comparative study of intelligence, academics, and lifestyle in myopic and non-myopic medical students.

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ABSTRACT… Objective: To compare intelligence (IQ), academic performance, and lifestyle factors between myopic and non-myopic undergraduate medical students, while also evaluating demographic, familial, and environmental risk factors associated with myopia. **Study Design:** Cross-sectional study. **Setting:** CMH Lahore Medical College Lahore. **Period:** February to April 2025. **Methods:** Involving 302 undergraduate students (180 myopic, 120 non-myopic) from medical, dental, nursing, and allied health programs in medical college, Lahore, Pakistan. Participants were selected via non-probability convenience sampling. Data were collected on eyesight status, academic grades (matriculation, intermediate, and GPA), IQ levels, lifestyle habits (screen time, outdoor activities, posture), and familial myopia history. Statistical analyses included chi-square tests and independent sample t-tests, with a significance threshold of $p < 0.05$. **Results:** No significant differences were found between myopic and non-myopic students in IQ levels (myopic: 94.3 ± 23.1 vs. non-myopic: 96.2 ± 24.0; $p = 0.419$) or academic performance (GPA: 3.30 ± 0.50 vs. 3.29 ± 0.51; $p = 0.864$). Lifestyle factors, including screen time, study hours, and outdoor activities, also showed no significant associations ($p > 0.05$). A weak positive correlation was observed between myopia and paternal eyesight weakness ($p = 0.048$), but maternal myopia and family history of hypertension were not significant. Poor posture during studying was more prevalent among myopic students, though statistically insignificant ($p = 0.174$). **Conclusion:** Myopia prevalence was high (60%) among students, but no significant links were found with IQ, academics, or most lifestyle factors. The study highlights the need for awareness about eye health and debunks stereotypes linking myopia with intelligence.

Key words: Academic Performance, Intelligence (IQ), Lifestyle Factors, Myopia, Medical Students, Refractive Error.

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INTRODUCTION

Myopia, commonly known as short-sightedness, is a refractive issue where light rays converge in front of the retina due to an elongated eyeball or a cornea that is too curved.[1] In the year 2020, approximately 46.1% of the population aged 10 to 39 in South-East Asia was affected by myopia, while in Pakistan, about 36.5% of the population is myopic.[2] Myopia, the most common type of refractive error, not only affects vision but also imposes a considerable financial burden on individuals due to the high costs associated with spectacles, lenses, and other ocular correction methods.[3]

While the exact mechanisms behind the onset and progression of myopia remain unclear, it has been linked to genetic, environmental, and lifestyle influences. It occurs more frequently in girls than in boys. Those with one or two myopic parents are 2-3 times more likely to develop myopia compared to those without myopic parents.[4] Various environmental factors have been investigated for their role in causing myopia, including prolonged exposure to low lighting, insufficient outdoor activities, and digital eye strain stemming from the use of smartphones, tablets, computers, televisions, or other screens.[5]

Studies suggest that students with myopia tend to have higher Intelligence Quotients (IQ) than their non-myopic peers, indicating a possible connection between the genetic inheritance of intelligence and myopia.[6] Intelligence is considered a broad mental ability encompassing reasoning, problem-solving, and learning, which require mental perception, focus, memory, language skills, and planning.

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IQ is assessed through a combination of various tests that involve answering questions based on accessible information, thereby evaluating an individual's reasoning, knowledge, vocabulary, visual spatial skills, working memory, and perceptual abilities. The IQ test results are represented as scores ranging from 0 to 190, where scores of 0-39 indicate severe impairment and those of 145 or more signify genius-level intelligence.[7]

Additionally, research has established a correlation between myopia and educational attainment. There is a positive relationship between the number of years of education an individual receives and the likelihood of developing myopia.[8] Typically, higher academic performance is associated with a more rapid progression of myopia. Academic grades and results from achievement tests are often viewed as indicators of cognitive ability, reflecting a student's overall academic skills and intelligence, typically measured on a four-point scale.[9]

Some previous studies show comparisons between IQ and academic success suggest that these two factors do not have a strong relationship and that a student's diligence can offset a lack of intelligence to achieve better grades. While some research indicates a connection between the two, their relationship with myopia remains ambiguous.[5,10]

The aim of our research was to evaluate and compare IQ scores and academic performance among undergraduate students based on their myopic status within our population. Additionally, it sought to examine different demographic, familial, social, and academic aspects between myopic and non-myopic students. The study also aimed to raise awareness of the risk factors associated with myopia and to promote early detection and management strategies.

METHODS

We recruited undergraduate students from the medical, dental, nursing and allied health fields for this cross-sectional study design. Through non-probability convenience sampling, which was based on voluntary participation, both male and female students between the ages of 19 and 25 were included. The study eliminated participants with uncorrected refractive defects, those who had already undergone corrective surgery for myopia, those who gave insufficient information, and those who failed to give informed consent.

A sample size of 300 people was enrolled, above the previously determined criterion of 270, in order to guarantee solid results. With a 95% confidence interval and a design effect of 1.0, the sample size was calculated using the OpenEpi software, an online sample size calculator. The computation was predicated on a prior study that found 84% of medical students had myopia.

The study was conducted from February 2025 to April 2025 at several institutions connected to Avicenna Medical & Dental College in Lahore, Pakistan, with institutional ethical approval (684/ERC/CMH/LMC).

RESULTS

The demographic data of participants are shown in Table-I as frequency (N) and percentages (%). The age at which myopia was diagnosed varied among different groups with the majority falling between 11 to 15 years (21.2%), followed by 16 to 20 years (18.2%). The distribution of current dioptre measurements among the myopic reveals that 9.9% had less than 1 dioptre, and 26.5% fell within the 1 to 3 dioptre range. Additionally, 13.9% ranged between 3.1- 5 dioptres.

The comparison between myopic and non-myopic individuals with respect to gender showed no statistical significance (p-value 0.210), as indicated in Figure-1.

FIGURE-1

Gender comparison between myopic and non-myopic

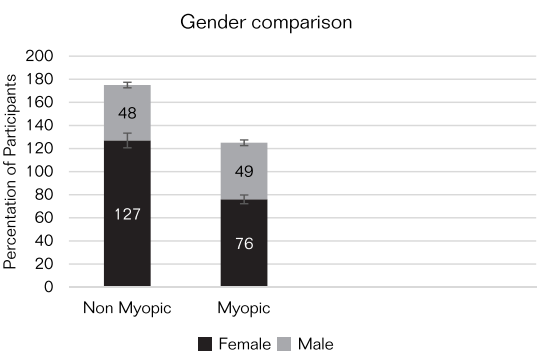

Table-II shows the comparison of various risk factors and their p-values among myopic and non-myopic individuals, the majority being insignificant. Table-III shows the comparative analysis of time distribution related to lifestyle factors in myopic and non-myopic individuals, which is again non-significant. Table-IV shows the insignificant difference between academic grades in matriculation and intermediate examination of myopic and non-myopic students. Table-IV shows the insignificant difference between GPA and IQ levels between myopic and non-myopic students.

Table-III shows the comparative analysis of time distribution related to lifestyle factors in myopic and non-myopic, which is again non-significant.

Table-IV shows the insignificant difference between academic grades in matriculation and intermediate examination of myopic and non-myopic students. Table-V shows the insignificant difference between GPA and IQ levels between myopic and non-myopic students.

TABLE-I

Demographic characteristics of study participants

Variables		Frequency (N)	Percentage (%)
Total Participants		300	(100%)
Eyesight Status	Myopic	180	60%
	Non Myopic	120	40%
Gender	Male	97	32.3%
	Female	203	67.6%
Enrollment Program	MBBS	97	32,3%
	BDS	47	15.6%
	Nursing	75	25%
	Allied Sciences	81	27%
Age Distribution	19-21 years	242	80.6%
	22-25 years	58	19.3%

TABLE-II

Comparison of risk factors and lifestyle factors between myopic and non-myopic

Variables	Groups				
	Myopic		Non-Myopic		*P-Value/ Likelihood ratio
	No N (%)	Yes N (%)	No N (%)	Yes N (%)	
Vitamin A intake	57 (19%)	113 (37.6%)	32 (10.6%)	98 (32.6%)	0.110
Maternal Eyesight Weakness	69 (23%)	104 (34.6%)	52 (17.3%)	75 (25%)	0.166
Paternal sight weakness	57 (19%)	113 (37.6%)	50 (16.6%)	77 (25.6%)	0.084/0.048*
Family History of Diabetes	86 (28.6%)	82 (27.2%)	77 (25.6%)	53 (17.6%)	0.574
Family History of Hypertension	75 (25%)	104 (34.6%)	57 (19.5%)	64 (23.2%)	0.389
Take rest after 30 minutes continuous reading	77 (25.6%)	95 (31.6%)	40 (13.3%)	88 (29.3%)	0.250
Bad Posture while studying/reading	37 (12.3%)	130 (43.4%)	42 (14%)	91 (30.1%)	0.174
Smoking	169 (56.3%)	10 (3.3%)	112 (37.3%)	67 (22.3%)	0.453
Awareness about eye exercise protocol	98 (32.6%)	75 (25%)	75 (25%)	52 (17.3%)	0.221
Perform Eye exercise	130 (43.4%)	26 (8.6%)	121 (40.3%)	23 (7.6%)	0.243

*Pearson Chi-Square test of independence

TABLE-III

Comparative analysis of time distribution and lifestyle factors in myopic and non-myopic

		1-4 Hrs.	5-8 Hrs.	9-12 Hrs.	13-16 Hrs.	P-Value*
Groups		N (%)				
Time given to studies / 24 hrs.	Myopic	103 (34.1%)	55 (18.2%)	13 (4.3%)	2 (0.7%)	0.904
	Non Myopic	82 (27.2%)	37 (12.3%)	9 (3.0%)	1 (0.3%)	
Time spent on computer/24 hrs.	Myopic	134 (44.4%)	30 (9.9%)	4 (1.3%)	5 (1.7%)	0.127
	Non Myopic	100 (33.1%)	19 (6.3%)	9 (3.0%)	1 (0.3%)	
Time spent on mobile/24 hr.	Myopic	83 (27.5%)	62 (20.5%)	23 (7.6%)	5 (1.7%)	0.802
	Non Myopic	62 (20.5%)	47 (15.6%)	14 (4.6%)	6 (2.0%)	
Time spent outdoors/24 hrs.	Myopic	87 (28.8%)	63 (20.9%)	18 (6.0%)	5 (1.7%)	0.778
	Non Myopic	63 (20.9%)	47 (15.6%)	17 (5.6%)	2 (0.7%)	
Sleeping hrs. / 24 hrs.	Myopic	17 (5.6%)	124 (41.1%)	29 (9.6%)	3 (1.0%)	0.673
	Non Myopic	9 (3.0%)	99 (32.8%)	20 (6.6%).	1 (0.3%)	

*Pearson Chi-Square test of independence

TABLE-IV

Comparison of academic grades between myopic and non-myopic individuals

		Academic Grades				
		A+	A	B	C	
Groups		N (%)				P-Value*
Matric Result	Myopic	103 (34.1%)	55 (18.2%)	9 (3.0%)	2 (0.7%)	0.688
	Non Myopic	85 (28.2%)	36 (12%)	9 (3%)	1 (0.3%)	
Intermediate Result	Myopic	91 (30.1%)	60 (19.9%)	19 (6.3%)	1 (0.3%)	0.418
	Non Myopic	79 (26.2%)	36 (12%)	14 (4.6%)	1(0.3%)	

*Pearson Chi-Square test of independence

TABLE-V

Comparison of IQ Level and cGPA between myopic and non-myopic

Groups	N	IQ Level Mean ± SD	Std. Error Mean	95% C.I Difference (Lower-Upper)	P-Value*	GP Mean ± SD	Std. Error Mean	95% C.I Difference (Lower-Upper)	P-Value*
Myopic	180	94.3 ± 23.1	1.76	90.8 - 97.7	0.419	3.30 ± 0.50	0.03	3.2-3.3	0.864
Non-Myopic	120	96.2 ± 24.0	2.11	92.3-100.7		3.29 ± 0.51	0.04	3.2-3.3	

*Independent Sample test

DISCUSSION

The statement "People who wear glasses are smarter" implies that there is a direct relationship between myopia and intelligence, meaning that people who need corrective eyewear are more intelligent. We must stress again, though, that this is a stereotype and that there is no scientific proof for it. Only physical appearance or traits like wearing spectacles or having bad eyesight can be used to measure intelligence because it is a complex and multidimensional feature.[11] According to our study, 57% were myopic. We discovered a non-significantly greater frequency of myopic females, which is counter to previous findings that suggest males are more myopic and consistent with others.[6]

We discovered a weak positive correlation and relationship between myopia and paternal eyesight deficiency. Maternal myopia was more common in myopic people than in non-myopic people, despite the fact that there was no statistically significant difference. This suggests that there is a genetic link between parental myopia and the chance that their children will also have myopia.[2]

Similarly, people with a family history of hypertension were more likely to have myopia than people without the condition, but this difference was not statistically significant. There is currently no evidence linking diabetes-related myopia to a family history of hypertension. Nonetheless, research has looked into associated medical issues that could aggravate eye disorders.[12] While research has looked at how passive smoking affects myopia, no study has assessed the direct link between smoking and myopia. However, the majority of individuals in our study did not smoke, therefore the difference between the myopic and non-myopic groups was negligible.[13]

Regarding awareness of eye training procedures, there was no difference between the two groups. Due to ignorance, most students did not engage in any kind of eye exercise, which resulted in a negligible difference between the groups. This is somewhat consistent with research that indicates eye exercises for myopia are ineffective at controlling or delaying the condition's progression.[14] People who are myopic were more likely to adopt bad posture, albeit this difference was not statistically significant. This supports the study's conclusions that higher myopia levels are linked to more improper upper body posture, like slouching or forward head posture.[15]

Regarding the average amount of time spent on computers, mobile devices, studying, outdoor activities, and sleep over a 24-hour period, we did not find any significant variations between the two groups. The association between screen time and the development of myopia has been the subject of conflicting research, with the majority of studies finding no discernible link.[16] Spending time outside, however, may help lower the incidence of myopia and halt the advancement of axial length changes, according to research. Increased exposure to natural light, which may control eye growth, and the ability to see at a distance, which lessens eye strain from extended near work, are thought to be the causes of this impact.[8,9]

Our primary goal was to determine whether myopic and non-myopic kids differed in any way in their academic performance, IQ, or GPA, but this difference was sadly negligible. This contradicts other research that demonstrates a favorable correlation and is consistent with others that found no meaningful difference.[17,18] Additionally, we wanted to inform students about the various lifestyle choices that can lead to the onset and progression of myopia. By raising awareness, we intend to promote healthy lifestyle choices and preventative actions that can lower the incidence of myopia. This entails encouraging proper eye care habits, cutting back on screen time, making sure there is enough light for learning, and stressing the value of routine eye exams and exercises.[14]

The results of our study indicate that among college students, myopia is not a major predictor of cognitive capacity or academic achievement. The majority of students did not engage in any kind of eye exercise, and there was no difference in their awareness of the protocols. On the other hand, myopic people were more likely to adopt bad posture. People with a family history of hypertension were more likely to have myopia than people without the condition.[6]

This study's importance stems from its thorough assessment of the risk factors and drivers of myopia in undergraduate students. Additionally, it is the first study to examine the relationships between IQ, academic standing, and lifestyle characteristics in undergraduate students in Lahore, Pakistan.

CONCLUSION

Our analysis showed statistically insignificant differences between myopic and non-myopic individuals in terms of gender distribution, blood groups, myopic risk factors, time distribution, lifestyle factors, academic grades, GPA, and IQ levels, despite the fact that myopia is more common among undergraduate university students. These results imply that although myopia is common,

there is no significant correlation between it and the evaluated lifestyle, academic, and demographic characteristics of this group. Nonetheless, the study raised awareness of eye exercises and healthy living choices.

LIMITATION

The cross-sectional design, non-probability sampling, student self-reported data, and single university selection are some of the study's drawbacks. Furthermore, using non-specialized measurement tools may have hampered the accuracy of myopia classification, and removing myopic patients who have undergone corrective surgery may ignore pertinent data. Longitudinal designs, wider sample, and sophisticated diagnostic techniques should all be incorporated into future research.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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3	**Muhammad Hassaan Zia:** Designing, data collection.
4	**Farrukh Hayat Khan:** Data collection.
5	**Farhat Yasmin Minhas:** Literature search, analysis.
6	**Saba Iqbal:** Proof reading.