

Frequency of High Myopia among Students of University of Lahore

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ABSTRACT

Purpose: The Purpose of the study was to investigate the frequency of high myopia in students at the University of Lahore.

Methods: This cross sectional study was conducted from February, 2023 to May, 2023 at University of Lahore after ethical approval. Total sample size consisted of 1004 participants, included students aged 17 to 30 years comprising both undergraduate and master's level while exclusion criteria considered conditions like corneal opacity, contact lens use, hyperopia and a history of eye surgeries. Data collection instruments included a structured questionnaire covering various aspects of participant's lives and a vision assessment involving visual acuity measurements using the Snellen chart and auto refraction with a Topcon auto-refractometer. Data was entered and analyzed in SPSS.

Results: The mean age of students was 20.97 years, minimum age of 18 years and maximum of 28 years. Among the 540 myopic students, 306 were female and 234 were male. Among the 60 high myopic students, 32 were female and 28 were male. Approximately 70% of students had family history of myopia and high myopia. The mean age of high myopic students was 21.12 years, with a mean refractive power of -7.8542D in OD and -8.0625D in OS. Close-up work was the primary activity for approximately 66.7% (40 out of 60) of high myopic students.

Keywords: Myopia, Hyperopia, Emmetropia, Frequency, Refractive Errors

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INTRODUCTION

The human eye in its emmetropic state accurately focuses parallel rays of light from infinity onto the retina.¹ However, myopia commonly known as nearsightedness disrupts this process causing the focal point of parallel rays to fall in front of the retina. Myopia prevalent among students enables clear vision for nearby objects but blurs distant ones.² High myopia associated with pathological complications has witnessed a global increase with Asian countries^{3,4} reporting high rates among young adults and the USA and Europe observing significant rates in older adults.⁵⁻⁸

The significance of this study lies in its potential impact on public health, academic performance and quality of life.

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Myopia's negative influence on academic performance and overall well-being necessitates interventions promoting eye health and optimal visual acuity. Investigating potential risk factors contributes to preventive strategies by identifying modifiable factors such as lifestyle habits, environmental influences and genetic predispositions.

Given the global rise in myopia and the lack of specific data on its frequency among University of Lahore students this study fills a crucial gap. Bridging this knowledge void it provides local data for future research and comparative analysis. Additionally, the study's findings can inform policy development and the implementation of eye health programs in educational institutions.

The main outcome of the study is the frequency of high myopia among University of Lahore students with high myopia defined by a spherical equivalent of -6.00 diopters or higher. Secondary outcomes include gender differences in the frequency of high myopia and the identification of potential risk factors. Risk factors encompass modifiable elements like close-up work activities, outdoor exposure and lifestyle habits along with non-modifiable factors like family history and genetics.

The University of Lahore, Lahore lacks extensive studies on the frequency of high myopia among its students necessitating an investigation into this issue and associated risk factors. This research aims to answer key questions about the prevalence of high myopia, gender differences and potential risk factors among students. Its objectives include determining the frequency of high myopia, examining gender disparities and identifying associated risk factors in this specific population.

METHODS

After ethical approval vide no. REC/UOL/131-07-2023, researchers adopted a population-based observational approach, utilizing a cross-sectional design for efficient data collection from February, 2023 to May, 2023. The research was conducted in Lahore, Pakistan. This study

focused on the diverse student population at the University of Lahore. The study population included students aged 17 to 30 years comprising both undergraduate and master's level students with a total participation of 1004 students categorized into emmetropic, myopic and high myopic groups.

A multi-stage sampling method was employed, with a calculated sample size of 1004 students to ensure representation and account for possible attrition. Exclusion criteria considered conditions like corneal opacity, contact lens use, hyperopia and a history of eye surgeries. Data collection instruments included a structured questionnaire covering various aspects of participant's lives and a vision assessment involving visual acuity measurements using the Snellen chart and auto refraction with a Topcon auto-refractometer.

The reliability and validity of the study were maintained through established protocols including proper calibration of optometric instruments, a systematic data collection process and adherence to ethical principles. Ethical considerations included informed consent, participant anonymity, data protection, voluntary participation, research ethics approval and confidential reporting of results. Data was entered and analyzed in SPSS.

RESULTS

The mean age was 20.97 years and the gender distribution showed 52.0% males and 48.0% females. Among the 1004 students, 60 had high myopia (6.0%), 404 were emmetropic (40.2%) and 540 had myopia (53.8%). The mean age and refractive power for high myopic students were 21.12 years, $-7.8542D$ in OD and $-8.0625D$ in OS respectively. Myopic students with a mean age of 20.84 years had a refractive power of $-2.0995D$ in OD and $-2.0829D$ in OS. Among the 540 myopic students, 54.1% had a family history of high myopia and myopia indicating a significant link. Within the group of 60 high myopic students, 70% had a positive family history, suggesting a potential genetic component in high myopia development.

Table 1: Distribution of refractive errors

Refractive error	Frequency (n)	Percentage
High Myopia	60	6.0%
Myopia	540	53.8%
Emmetropia	404	40.2%
Total	1004	100%

Table 2: Gender wise distribution

Refractive Status and Gender				
		Gender		Total
		Female	Male	
Refractive Status	Emmetropia	184	220	404
	Myopia	32	28	60
	High Myopia	306	234	540
Total		522	482	1004

Table: Family History in High Myopic students

	Frequency	Percentage	Cumulative Percentage
Negative	18	30	30
Positive	42	70	100
Total	60	100	

Figure 1: Frequency of Refractive Status;

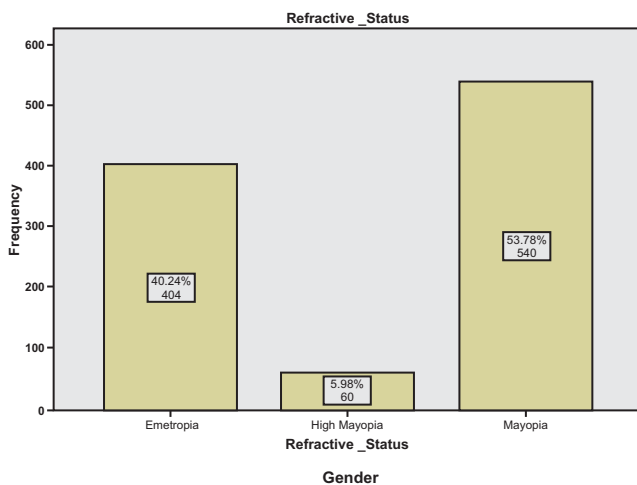


Figure 2: Gender difference in total students

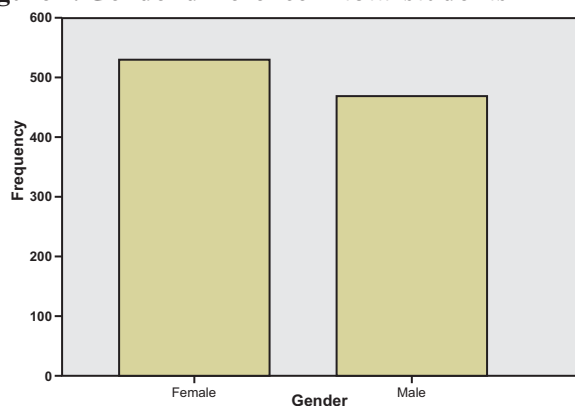
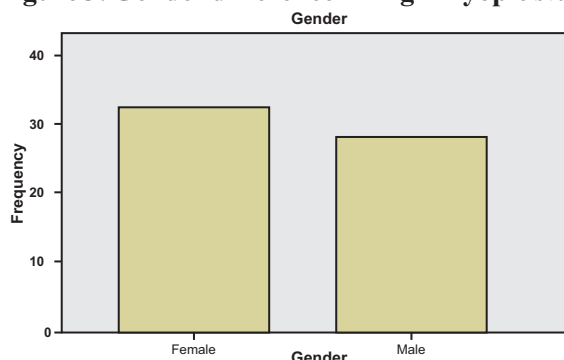


Figure 3: Gender difference in High Myopic students



DISCUSSION

The study population consisting of 1004 students from the University of Lahore was diverse with a balanced gender distribution. The average age of 20.97 years suggests a relatively young adult population crucial for understanding myopia development during the critical teenage and early adulthood years.

The frequency rates of myopia (nearsightedness) and high myopia (extreme nearsightedness or pathological myopia) among the university students in this study were significant. Among the total sample, 53.8% were identified as myopic, indicating a high frequency of myopia in this population according to the previous study worldwide prevalence of myopia (nearsightedness) and high myopia (extreme nearsightedness or pathological myopia). Other studies revealed that the frequency of myopia in students of University of Lahore is higher than the prevalence of myopia (nearsightedness) from age twenty years to twenty nine years in Europe and Asia is reported as 20% to 35% and 45% to 50%, respectively. In a study conducted in China, reported that the prevalence of myopia among university students is higher as 82.2% than the frequency of myopia among students of University of Lahore.

Furthermore, 6.0% of the students were classified as having high myopia, representing a lower prevalence in Asia, with some studies reporting rates as high as 20% among schoolchildren⁹ and, also lower in Taiwan reported a prevalence of high myopia 6.8% and higher prevalence than European and North American countries, with rates ranging from 1.3% to 3.8% among students in different countries. A study organized in

Saudi Arabia also indicates that the prevalence or frequency of high myopia among students of University of Lahore is lower than 8.1%. Further, a study conducted in Pakistan indicates that frequency of high myopia is higher among students of University of Lahore reporting prevalence of 1.8% among university medical students. In a study conducted in China, reported the prevalence of high myopia among university students is 10.2% that is higher than the frequency of high myopia among students of University of Lahore.

These findings underscore the need to address the growing prevalence of myopia (nearsightedness) and high myopia (extreme nearsightedness or pathological myopia) among university students. The mean age of the high myopic students was 21.12 years, suggesting that high myopia tends to develop and progress during early adulthood.

The discussion on risk factors focuses on environmental factors such as close-up work and outdoor activities. Prolonged close-up work particularly exceeding 6 hours per day emerged as a potential risk factor for high myopia and myopia development. Additionally, reduced engagement in outdoor activities was associated with a higher prevalence of myopia. These findings align with existing research indicating that excessive near work and limited outdoor activities contribute to myopia progression. Interventions promoting breaks during close-up work and encouraging outdoor activities may be crucial in mitigating high myopia and myopia frequency and progression.

The age and gender distribution revealed interesting patterns with a higher prevalence of myopia among females. This aligns with existing literature suggesting hormonal and genetic influences on myopia development. The study highlights the need for personalized approaches in managing myopia based on age and gender differences.

Close-up work, such as reading and computer use emerged as a potential environmental risk factor. Myopic students tended to spend more than 6 hours per day on close-up work, indicating a positive association

with high myopia and myopia. High myopic individuals exhibited even longer durations of close-up work. This finding suggests that limiting continuous close-up work and encouraging regular breaks may be effective strategies in managing and preventing high myopia and myopia.

The study also explored the influence of family history on high myopia and myopia development. A positive family history was significantly associated with myopia among myopic students and a high proportion of high myopic students had a positive family history. These findings support existing evidence suggesting a genetic predisposition to high myopia and myopia. Understanding the genetic factors involved in high myopia and myopia development can inform targeted interventions and personalized management strategies.

Data was collected from a university so it cannot be generalized on whole population making this a major limitation. Multicentre data collection and analysis may reveal exact picture of high myopia among certain age groups.

CONCLUSION

This study sheds light on the prevalence and risk factors associated with high myopia and myopia among University of Lahore students. Notably, the high prevalence of myopia (53.8%) and significant frequency of high myopia (6.0%) underscore the urgency for targeted interventions. Environmental risk factors such as prolonged close-up work and reduced outdoor activities were linked to myopia development emphasizing the need for interventions promoting visual habits and outdoor engagement.

Conflict of Interest: None to declare

Author Contributions: Muhammad Arbaz Shah: Concept, Design, Data Collection

Awais Ishfaq: Data Collection, Literature Review, Article draft

Ahmad Mukhtiar Malik: Data Collection and Analysis

Mahreen Fatima: Literature and Critical Review

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