

The Frequency of Tear Film Abnormalities Among Medical Students Of 4th Year MBBS Class

Sidrah Riaz¹, Umair Tariq Mirza², Muhammad Tariq Khan²

Abstract:

Objectives: Dry eye is a common ocular condition with potential implications for the academic performance and overall well-being of medical students. Understanding the prevalence and associated factors of tear film abnormalities among this specific group is crucial. This study aimed to investigate the frequency of tear film abnormalities among fourth-year MBBS students in a private medical college in Lahore and explore potential correlations with screen time.

Methodology: A cross-sectional survey was conducted, involving fourth-year medical students. A questionnaire was administered, informed consent was obtained, and students were trained on Schirmer tests and tear film breakup time (TFBUT) assessment. Ophthalmologists conducted the evaluations. Data were analyzed using SPSS-25, and the prevalence of dry eye was determined based on diagnostic criteria.

Results: Among 163 fourth-year medical students (91 females, 72 males), dry eye symptoms were prevalent, with burning sensation and heaviness being the most common (89%). Screen time of more than 6 hours per day was identified as a significant risk factor for dry eye ($p < 0.004$). The prevalence of dry eye among the study population was 9.36%.

Conclusion: This study underscores the importance of recognizing and addressing tear film abnormalities among medical students, particularly those with prolonged screen time. Dry eye, with its physical and mental impact, remains underdiagnosed and calls for awareness campaigns and further investigations into its relationship with excessive screen time.

Al-Shifa Journal of Ophthalmology 2022; 18(3):124-129. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.

-
1. Akhtar Saeed Medical and Dental College, Bahria town, Lahore
 2. Mohiuddin Islamic Medical College, Mirpur, AJK
-

Originally Received: 13 August 2022

Revised: 19 September 2022

Accepted: 3 October 2022

Correspondence to:

Dr. Sidrah Riaz

Associate Professor

Akhtar Saeed Medical & Dental College

Introduction:

Dry eye, characterized by an intricate disruption in the homeostasis of the tear film, represents a multifactorial ocular disorder with a worldwide prevalence spanning from 5% to 50%, a variance attributed to a multitude of contributing factors^{1,2}. This condition transcends age and gender boundaries, affecting individuals across all demographic spectrums. Nature, in its wisdom, has endowed the ocular surface with a multifaceted and versatile tear film that serves as a crucial instrument, offering lubrication, protection, corneal clarity, and nourishment³. Regrettably, dry eye remains a frequently undiagnosed pathology, yet it stands as one of the most prevalent conditions encountered in ophthalmology

clinics, necessitating meticulous attention and investigation⁴.

The contemporary definition of dry eye, as outlined in the Dry Eye Workshop (DEWS) guidelines of 2007, involves a triad of diagnostic criteria: a reduction in tear production or an increase in evaporation, ocular surface damage, and the presence of associated visual disturbances or eye discomfort¹. Managing dry eye disease can be a formidable challenge, not only for patients grappling with its vexing symptoms but also for clinicians striving to diagnose and effectively address its complexities⁵. The ramifications of dry eye extend beyond the realm of ocular discomfort, with direct implications for work productivity and, by extension, personal success and economic stability⁶. No longer relegated to the domain of the elderly, dry eye has manifested among younger populations, with a notable correlation emerging between its occurrence and elevated screen time, exacerbated by the ubiquity of digital devices^{7,8}. This phenomenon underscores the evolving landscape of dry eye pathology, prompting increased attention to its etiology, diagnosis, and management⁹. In the quest to unravel the intricacies of dry eye, two diagnostic measures have come to the fore: Tear Film Breakup Time (TFBUT), an assessment tool adept at gauging tear film stability, and the Schirmer test, which provides valuable insights into the aqueous component of the tear film. These tests, rooted in clinical evaluation, serve as indispensable tools in the endeavor to comprehend and address the multifaceted nature of dry eye disease, allowing clinicians to better tailor interventions and provide relief to the growing cohort of individuals grappling with this pervasive ocular condition.

Patients and Methods:

The study was conducted at Akhtar Saeed Medical and Dental College, Bahria town Lahore, from over a period of 2 months, after taking approval from ethical review

board committee of institution. A questionnaire was prepared for students, informed consent was taken to perform Schirmer tests and tear film break up time. The Schirmer test were performed in both eyes and tear film breakup time by ophthalmologist. The data was collected on printed form, which was filled by each student individually. All 4th year MBBS students of year 2022 were included except five (5) who had history of laser refractive surgery for correction of refractive errors. The diagnostic criteria for dry eye was taken as Schirmer test below 10mm and TBUT below 10 seconds.

The Schirmer test was performed with help of Schirmer test strip (Biovision limited, UK) in both eyes. It was placed in lower fornix without touching cornea and vertical height of wet strip was noted in millimeters and mentioned on questionnaire. Tear film breakup time (TFBUT) was performed in both eyes at room temperature (20 to 25 C) using fluorescein strip in lower fornix and slit lamp examination to note first drying spot appearance with instruction of, not to blink after initial 2 to 3 blinks. TFBUT is noted in seconds and mentioned too on printed questionnaire like Schirmer test reading. Age, gender, absence or presence of different dry eye symptoms and screen time per day is also noted. The frequency of dry eye in 4th year medical students is calculated. All 4th year MBBS students were included except 5 who had history of laser corneal procedures for correction of refractive errors. The Schirmer test reading below 20mm and tear film breakup time less than 10 seconds were taken as abnormal and labelled as dry eye.

Results

Total 326 eyes of 163 4th year medical students were included in our study, 91(55.80%) females and 72 (44.20%) males. The common symptoms of dry eyes among students were burning sensation and heaviness, each found to be present in 145 (89%). Other symptoms were redness 142

(87.10 %), foreign body sensation 139 (85.30 %), light sensitivity 126 (77.30 %), ocular pain 116 (71.20 %) and watery eyes seen in 112 (68.70 %) as shown in Table 1. The average screen time was below 3 hours in 30 (18.4%), 4 to 6 hours 82 (50.3%) and above 6 hours for 51 (31.3%) students (figure 3). About 114 (70%) students never used contact lenses, 6 (3.7%) used for refractive error correction whereas 43 (26.4%) occasionally used contact lenses for cosmetic purpose.

The tear film breakup time was normal, above 10 seconds in 133 (81.60%) right eye

132 (81%) left and below 10 seconds in 30(18.40%) right eye and 31(19%) in left eye (Table 3). The mean measurement of Schirmer test was normal, above 10 mm, in right eye 112 (68.70%) and 113 (69.30%) in left eye. The test was below normal (below 10mm) 51 (31.30%) right eye and 50 (30.70%) in left eye (Table 3). Statistically significant relationship ($p < 0.004$) was found between increased screen time (more than 6 hours) and dry eye. The frequency of dry eye in 4th year medical students was found to be 9.36%.

Table No. 1: Frequency of Dry Eye Symptoms

	Yes	No	Total
Burning Sensation	145	18	163
	89%	11%	100%
Ocular Pain	116	47	163
	71.20%	28.80%	100%
Light Sensitivity	126	37	163
	77.30%	22.70%	100%
Foreign Body Sensation	139	24	163
	85.30%	14.70%	100%
Watering from Eyes	112	51	163
	68.70%	31.30%	100%
Redness	142	21	163
	87.10%	12.90%	100%
Heaviness	145	18	163
	89%	11%	100%

Table No. 2 Tear Film Breakup Time

Schirmer Test	OD	OS
Below 10 mm	51 (31.30%)	50 (30.70%)
Above 10 mm	112 (68.70%)	113 (69.30%)
Total	163	163

Table No. 3 Results of Schirmer Test

Screen Time in Hours	Dry Eye	Normal Eye	Total
1 - 3 Hours	7	23	30
4 - 6 Hours	19	63	82
More Than 6 Hours	25	26	51
Total	51	112	163

Discussion:

The Females medical students were suffering from dry eyes symptoms more than male students. The reason behind is females' students were more in number in 4th year MBBS class than males. According to medical literature the overall prevalence of dry eye is more in ladies, which is thought to be associated with hormonal imbalance or psychological stress as shown in a recent study done in Korea 10. In another study conducted at China, dry eye was seen among population in age range of 13 to 53 years, more common in females 11,12.

The symptoms of dry eye vary in presentation and severity. The commonest symptoms are burning sensation, foreign body sensation, light sensitivity, itching, grittiness, blurred vision, heaviness or watery eyes 13,14. In our study most common symptoms were burning sensation and heaviness in eyes followed by mild redness in eyes. Similar results were also seen in another in a study, conducted in Karachi, Pakistan common symptoms of dry eye patients were blurred vision, watering and itching 15.

A constant upsurge is observed in screen time in all countries of world in last two decades specially in younger age groups rather it has become an essential tool for education, entertainment and business 16. Now a days digital screens use (TV, computers and social media) is becoming unavoidable because of increased

utilization of personal smart phones 9,17. A recent survey in neighboring country India has revealed that college going young women of age 18 to 21 years were suffering from dry eye and poor-quality sleep because of increased screen time 18. Digital screen increased time was also increased during corona pandemic when nationwide people were home bound as a compulsion 19. Different studies have shown positive relationship between increased screen timings and dry eye symptoms. Similar study done at USA in 2021 had shown increased prevalence of dry eye among office workers who had screen time more than 4 hours per day 20. Our study had found significant correlation of dry eye in young medical students with screen time more than 6 hours per day. The frequency of dry eye in 4th year medical students was found to be 9.36%. In a study conducted on office workers at Karachi, Pakistan it was around 28% 15. This study has shown range of dry eyes in young population from 28 to 90%.

Students should be encouraged to decrease screen time, take little interval between long study hours, correction of refractive error by ophthalmologists and to take steps to minimize eye strain 18,21.

The study is conducted on small group of students, for comprehensive results it needs to be conducted on larger scale.

Conclusion:

The frequency of dry eye in 4th year medical students was found to be 9.36%. The increased screen time is significant risk factor leading to dry eye in medical students. It is an important disease with physical and mental impact as it largely remains under diagnosed. There is a need of awareness campaign among medical students and to know relation between tear film abnormalities and excessive screen time.

References:

1. Matossian C, Crowley M, Periman L, Sorkin S. Personalized Management of Dry Eye Disease: Beyond Artificial Tears. *Clinical Ophthalmology*. 2022 Jan 1;39:11-8.
2. Yazdani, M.; Fiskådal, J.; Chen, X.; Utheim, Ø.A.; Ræder, S.; Vitelli, V.; Utheim, T.P. Tear Film Break-Up Time and Dry Eye Disease Severity in a Large Norwegian Cohort. *J. Clin. Med*. 2021, 10, 884.
3. Ali MH, Javaid M, Jamal S, Butt NH. Femtosecond laser assisted cataract surgery, beginning of a new era in cataract surgery. *Oman J Ophthalmol*. 2015 Sep; 8 (3): 141.
4. Ayub A, Akhtar FM, Saleem N, Ali MH, Ayub MH, Butt NH. Frequency and Risk Factors of Dry Eye Disease in Pakistani Population, A Hospital Based Study. , Vol. 33, No. 4, pak J Ophthalmol 2017. DOI: <https://doi.org/10.36351/pjo.v33i4.26>.
5. Hakim FE, Farooq AV. Dry Eye Disease: An Update in 2022. *JAMA*. 2022 Feb 1;327(5):478-479.
6. Nichols KK, Bacharach J, Holland E, et al. Impact of dry eye disease on work productivity, and patients' satisfaction with over-the-counter dry eye treatments. *Invest Ophthalmol Vis Sci*. 2016;57(7):2975–2982.
7. Barabino S. "Is dry eye disease the same in young and old patients? A narrative review of the literature., o *BMC Ophthalmology* (2022) 22:85.
8. Talens-Estarellles C, Sanchis-Jurado V, Esteve-Taboada JJ, Pons ÁM, GarcíaLázaro S. How do different digital displays affect the ocular surface? *Optom Vis Sci*. 2020.
9. Talens-Estarellles C, García-Marqués JV, Cervino A, García-Lázaro S. Use of digital displays and ocular surface alterations: a review. *Ocul Surf*. 2020;S1542–0124(20):30151–8.
10. Na KS, Han K, Park YG, et al. Depression, stress, quality of life, and dry eye disease in Korean women: a population-based study. *Cornea*. 2015;34(7):733–738.
11. Song P, Xia W, Wang M, Chang X, Wang J, Jin S, Wang J, Wei W, Rudan I. Variations of dry eye disease prevalence by age, sex and geographic characteristics in China: a systematic review and meta-analysis. *J Glob Health*. 2018 Dec;8(2):020503.
12. Rouen, Patricia A, White Mary L . Dry Eye Disease: Prevalence, Assessment, and Management. *Home Healthcare Now* 36(2):p 74-83, March/April 2018.
13. Morthen MK, Magno MS, Utheim TP, Snieder H, Hammond CJ, Vehof J. The physical and mental burden of dry eye disease: A large population-based study investigating the relationship with health-related quality of life and its determinants. *Ocul Surf*. 2021 Jul;21:107-117.
14. Stapleton F, Alves M, Bunya VY, Jalbert I, Lekhanont K, Male F, et al. TFOS DEWS II epidemiology report. *Ocul Surf* 2017;15(3):334-65.
15. Mansoori N, Qamar N, Mubeen SM, Shaid N. Dry Eye Syndrome and Associated Risk Factors among Computer Users in Karachi, Pakistan [Online]. *Annals ASH KM&DC*. 2017;22:81-7.
16. Sheppard AL, Wolffsohn JS. Digital eye strain: Prevalence, measurement and amelioration. *BMJ Open Ophthalmol*. 2018;3:e000146.
17. Vanderloo LM, Carsley S, Aglipay M, Cost KT, Maguire J, Birken CS.

- Applying harm reduction principles to address screen time in young children amidst the COVID-19 pandemic. *J Dev Behav Pediatr.* 2020;41(5):335–336.
18. Gupta PC, Rana M, Ratti M, Duggal M, Agarwal A, Khurana S, Jugran D, Bhargava N, Ram J. Association of screen time, quality of sleep and dry eye in college-going women of Northern India. *Indian J Ophthalmol.* 2022 Jan;70(1):51-58. doi: 10.4103/ijo.IJO_1691_21.
19. Bahkir F, Grandee S. Impact of the COVID-19 lockdown on digital device-related ocular health. *Indian J Ophthalmol.* 2020;68:2378–83.
20. Al-Mohtaseb Z, Schachter S, Shen Lee B, Garlich J, Trattler W. The Relationship Between Dry Eye Disease and Digital Screen Use. *Clin Ophthalmol.* 2021 Sep 10;15:3811-3820.
21. Barabino, S. Is dry eye disease the same in young and old patients? A narrative review of the literature. *BMC Ophthalmol* 22, 85 (2022).

Authors Contribution

Concept and Design: Dr. Sidrah Riaz
Data Collection / Assembly: Dr. Umair Tariq Mirza
Drafting: Dr. Muhammad Tariq Khan
Statistical expertise: Dr. Muhammad Tariq Khan
Critical Revision: Dr. Sidrah Riaz