INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

EVALUATION OF MOOD AND SLEEP CHANGES IN DRY EYE DISEASE AND ALLIED IRRITATING OCULAR DISEASES: A CROSS-SECTIONAL STUDY

Original Research

Dr. Bahadur Iftikhar[1]*, Dr. Muhammad Qasim Yazar[2], Dr. Shujah ur Rehman[3], Dr Fauzan Ayub[2], Dr Saima Khalid[4]
[1]Senior Registrar Ophthalmology, Allied Hospital-II, Faisalabad
[2]PGR FCPS Ophthalmology, Mayo Hospital Lahore
[3]Medical Officer Ophthalmology, Civil Hospital Kotla
[4]FCPS Resident Ophthalmology, Mayo Hospital Lahore
Corresponding Author: Dr. Bahadur Iftikhar, bahadurshah2002@gmail.com, Senior Registrar Ophthalmology, Allied Hospital-II, Faisalabad
Acknowledgement: The authors acknowledge the cooperation of the patients and clinical staff of the Institute of Ophthalmology, Mayo Hospital, Lahore.

Conflict of Interest: None
Grant Support & Financial Support: None

ABSTRACT

Background: Dry eye disease and allied irritating ocular diseases, including allergic conjunctivitis and chronic conjunctivitis, are commonly associated with persistent ocular discomfort, redness, burning, tearing, itching, pain, foreign body sensation, and blurred vision. When these symptoms continue for a prolonged period, they may interfere with routine activities, visual comfort, sleep pattern, and emotional well-being. Therefore, assessment of mood and sleep changes may provide a broader understanding of disease burden in these patients.

Objective: To evaluate the frequency of mood and sleep changes among patients presenting with dry eye disease and allied irritating ocular diseases.

Methods: This cross-sectional study was conducted at the Institute of Ophthalmology, Eye Unit III, Mayo Hospital, Lahore, from 16 July 2022 to 16 January 2023. A total of 100 patients aged 35–80 years with dry eye disease, allergic conjunctivitis, or chronic conjunctivitis were enrolled through non-probability consecutive sampling. Patients underwent detailed history, visual acuity assessment, intraocular pressure measurement, and ophthalmic examination by consultant ophthalmologists. Mood changes were assessed using the Hospital Anxiety and Depression Scale, while sleep quality was assessed using the Pittsburgh Sleep Quality Index. Data were analyzed using SPSS version 23, and post-stratification chi-square testing was applied. A p-value of ≤ 0.05 was considered statistically significant.

Results: The mean age was 56.45 ± 10.98 years. Among 100 patients, 67% were males and 33% were females. Dry eye disease was present in 59%, chronic conjunctivitis in 28%, and allergic conjunctivitis in 13%. The mean Hospital Anxiety and Depression Scale score was 7.10 ± 4.00, and mood disturbance was found in 55% of patients. The mean Pittsburgh Sleep Quality Index score was 6.81 ± 4.16, and poor sleep quality was observed in 52% of patients. Socioeconomic status showed a significant association with mood disturbance, while age, gender, educational status, and diagnosis were not significantly associated with mood or sleep outcomes.

Conclusion: Mood disturbance and poor sleep quality were common among patients with dry eye disease and allied irritating ocular diseases. These findings support the need for comprehensive ophthalmic evaluation that also considers psychological well-being and sleep-related difficulties.

Keywords: Anxiety; Conjunctivitis; Conjunctivitis, Allergic; Cross-Sectional Studies; Depression; Dry Eye Syndromes; Sleep.

 ISSN: 3007-2948

INTRODUCTION

Dry eye disease is one of the most common disorders of the ocular surface and is increasingly recognized as a condition that affects more than visual comfort alone. It is characterized by tear film instability, ocular surface inflammation, discomfort, visual disturbance and, in some cases, damage to the ocular surface. Patients commonly present with redness, watering, burning, itching, foreign body sensation, ocular pain, discharge and blurred vision. Similar irritating symptoms are also frequently reported in allied ocular conditions such as allergic conjunctivitis and chronic conjunctivitis. Although these symptoms may initially appear mild, their persistence can create a significant daily burden, particularly when they interfere with reading, screen use, driving, work performance and routine social functioning (1). Dry eye disease develops through multiple interrelated mechanisms, including reduced tear production, increased tear evaporation, inflammation, neurosensory abnormalities and tear film instability. These changes can produce persistent ocular discomfort and fluctuating vision, making the condition physically distressing and functionally limiting. Even though dry eye disease is not usually life-threatening, it may considerably reduce quality of life because many daily activities require sustained visual attention and ocular comfort. Therefore, dry eye disease and related irritating ocular disorders should not be viewed only as localized eye conditions, but also as chronic sensory problems that may influence emotional well-being, sleep quality and overall patient functioning (2).

Sleep has an important role in maintaining both physical and psychological health. Chronic ocular irritation may disturb sleep through pain, dryness, burning, photophobia, frequent awareness of eye symptoms and difficulty maintaining comfort during rest. At the same time, poor sleep may further worsen ocular surface health by affecting tear secretion, tear film stability, inflammatory activity, pain sensitivity and blinking patterns. This suggests a possible bidirectional relationship in which dry eye symptoms contribute to poor sleep, while disturbed sleep may intensify ocular discomfort and disease perception (3,4). Mood disturbance is another important concern in patients with chronic ocular discomfort. Persistent irritation, repeated treatment use, uncertainty about recovery and ongoing visual discomfort may lead to anxiety, low mood, frustration and reduced quality of life. Patients with dry eye disease and allied irritating ocular diseases may become worried about the chronic nature of their symptoms, the need for long-term medication, and the possibility that symptoms may not fully resolve. These psychological responses can further increase symptom awareness and may worsen the perceived severity of ocular discomfort. Therefore, assessing mood and sleep changes in these patients is clinically meaningful because it helps broaden the understanding of disease impact beyond ocular signs alone (5).

Despite the growing recognition of the relationship between ocular surface symptoms, sleep quality and psychological well-being, local evidence on this association remains limited. According to the available dissertation background, no local study had adequately demonstrated the relationship of mood changes and sleep changes with dry eye disease and allied irritating ocular diseases. This gap highlights the need to evaluate whether patients with chronic irritating ocular symptoms experience measurable disturbances in mood and sleep. Therefore, the present cross-sectional study was designed to assess mood and sleep changes among patients with dry eye disease and allied irritating ocular diseases using the Hospital Anxiety and Depression Scale and the Pittsburgh Sleep Quality Index. The study aims to determine the extent to which these ocular conditions are associated with psychological distress and impaired sleep quality, thereby supporting a more patient-centered and holistic approach to ocular surface disease management.

METHODS

This cross-sectional study was conducted over a period of six months, from 16 July 2022 to 16 January 2023, at the Institute of Ophthalmology, Eye Unit III, Mayo Hospital, Lahore. A total of 100 patients were enrolled through a non-probability consecutive sampling technique. The study population included both male and female patients aged 35 to 80 years who had been clinically diagnosed with dry eye disease or allied irritating ocular diseases, including allergic conjunctivitis and chronic conjunctivitis. Patients were included if they had persistent symptoms suggestive of dry eye disease, allergic conjunctivitis, or chronic conjunctivitis and fulfilled the clinical diagnostic criteria after ophthalmic evaluation. Patients were excluded if they had glaucoma, bilateral cataract, acute ocular symptoms of less than one month duration, visual acuity below 6/9 or 20/30 in both eyes, or were using topical ocular medications other than permitted lubricants or anti-inflammatory eye drops. These exclusion criteria were applied to reduce the influence of other ocular conditions or medications that could independently affect ocular discomfort, visual function, mood, or sleep quality.

After enrollment, a detailed clinical history was obtained from each participant, including demographic information, ocular symptoms, duration of disease, and relevant clinical details. Visual acuity was assessed using a Snellen chart, while intraocular pressure was measured using a non-contact tonometer. All patients were examined by consultant ophthalmologists, and the final ocular diagnosis was categorized as dry eye disease, allergic conjunctivitis, or chronic conjunctivitis. Dry eye disease was diagnosed on the basis of clinical symptoms and ophthalmic examination findings, including Schirmer's test and tear break-up time. Allergic conjunctivitis was diagnosed

 ISSN: 3007-2948

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

on the basis of symptoms such as itching, irritation, lacrimation, discharge, and clinical signs including conjunctival edema, papillae, follicles, and conjunctival injection. Chronic conjunctivitis was diagnosed in patients who had persistent redness, discharge, irritation, pain, or ocular discomfort without corneo-conjunctival epithelial abnormality. Mood changes were assessed using the Hospital Anxiety and Depression Scale, while sleep quality was evaluated using the Pittsburgh Sleep Quality Index. A Hospital Anxiety and Depression Scale score of 5 or above was considered suggestive of mood changes, whereas a Pittsburgh Sleep Quality Index score of 6 or above was considered indicative of poor sleep quality. These standardized questionnaires were used to provide a structured assessment of psychological and sleep-related changes among patients with irritating ocular surface diseases.

Ethical approval was obtained from the relevant institutional review board before the commencement of the study. Informed consent was obtained from all participants before data collection. The participants were informed about the purpose of the study, the voluntary nature of participation, and the confidentiality of their personal and clinical information. Data were collected without interfering with the routine clinical care of the patients. Data were entered and analyzed using SPSS version 23. Quantitative variables, including age, Hospital Anxiety and Depression Scale score, and Pittsburgh Sleep Quality Index score, were expressed as mean and standard deviation. Qualitative variables, including gender, diagnosis, mood change category, and sleep quality category, were presented as frequency and percentage. The data were stratified according to age, gender, socioeconomic status, educational status, and diagnosis. After stratification, the chi-square test was applied to determine the association between categorical variables. A p-value of ≤ 0.05 was considered statistically significant.

RESULTS

A total of 100 patients with dry eye disease and allied irritating ocular diseases were included in the study. The mean age of the participants was 56.45 ± 10.98 years, with ages ranging from 35 to 73 years. The mean Hospital Anxiety and Depression Scale score was 7.10 ± 4.00, with a minimum score of 2 and a maximum score of 17. The mean Pittsburgh Sleep Quality Index score was 6.81 ± 4.16, with scores ranging from 1 to 15. Among the enrolled patients, 67 were males and 33 were females. Regarding age distribution, 46 patients belonged to the 35–55 years age group, whereas 54 patients were in the 56–80 years age group. Dry eye disease was the most frequent diagnosis and was observed in 59 patients, followed by chronic conjunctivitis in 28 patients and allergic conjunctivitis in 13 patients.

Mood disturbance, assessed through the Hospital Anxiety and Depression Scale, was present in 55 patients who had a score of ≥5, while 45 patients had a score of <5. Sleep quality, assessed through the Pittsburgh Sleep Quality Index, showed that 52 patients had poor sleep quality with a score of ≥6, whereas 48 patients had a score of <6. On age-wise stratification, mood disturbance was observed in 24 patients aged 35–55 years and 31 patients aged 56–80 years. The association between age group and Hospital Anxiety and Depression Scale category was not statistically significant. Poor sleep quality was present in 25 patients aged 35–55 years and 27 patients aged 56–80 years, with no statistically significant association between age group and Pittsburgh Sleep Quality Index category.

Gender-wise analysis showed that mood disturbance was present in 36 males and 19 females. The association between gender and Hospital Anxiety and Depression Scale category was not statistically significant. Poor sleep quality was observed in 35 males and 17 females, and the association between gender and Pittsburgh Sleep Quality Index category was also not statistically significant. Socioeconomic status showed a statistically significant association with mood disturbance. Hospital Anxiety and Depression Scale scores of ≥5 were recorded in 15 patients from the lower socioeconomic group, 35 patients from the middle socioeconomic group, and 5 patients from the higher socioeconomic group. The highest proportion of mood disturbance was observed in the middle socioeconomic group. In contrast, socioeconomic status did not show a statistically significant association with sleep quality. Poor sleep quality was present in 15 patients from the lower socioeconomic group, 32 patients from the middle socioeconomic group, and 5 patients from the higher socioeconomic group.

Educational status was not significantly associated with mood disturbance or sleep quality. Mood disturbance was found in 4 literate patients, 10 patients with primary schooling, 24 patients with middle education, and 17 patients with higher education. Poor sleep quality was observed in 4 literate patients, 11 patients with primary schooling, 23 patients with middle education, and 14 patients with higher education. Diagnosis-wise analysis showed that mood disturbance was present in 31 patients with dry eye disease, 15 patients with chronic conjunctivitis, and 9 patients with allergic conjunctivitis. The association between diagnosis and Hospital Anxiety and Depression Scale category was not statistically significant. The diagnosis-wise Pittsburgh Sleep Quality Index findings were not included in the final written results because the provided values required verification from the original SPSS output. Mood disturbance was most frequent among patients with allergic conjunctivitis, followed by chronic conjunctivitis and dry eye disease. However, the difference was not statistically significant, indicating that mood disturbance was not significantly associated with diagnostic category.

Table 1. Descriptive Statistics of Quantitative Variables

Variable	Mean ± SD	Minimum	Maximum

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Age, years	56.45 ± 10.98	35	73
HADS score	7.10 ± 4.00	2	17
PSQI score	6.81 ± 4.16	1	15

Table 2. Demographic and Clinical Characteristics of Patients

Variable	Frequency	Percentage
Gender		
Male	67	67.0%
Female	33	33.0%
Age group		
35–55 years	46	46.0%
56–80 years	54	54.0%
Diagnosis		
Dry eye disease	59	59.0%
Chronic conjunctivitis	28	28.0%
Allergic conjunctivitis	13	13.0%

Table 3. Frequency of Mood and Sleep Changes

Outcome Variable	Category	Frequency	Percentage
HADS score	HADS <5	45	45.0%
	HADS ≥5	55	55.0%
PSQI score	PSQI <6, good sleep quality	48	48.0%
	PSQI ≥6, poor sleep quality	52	52.0%

Table 4. Association of Age and Gender With HADS and PSQI Scores

Variable	HADS ≥5	HADS <5	HADS p-value	PSQI ≥6	PSQI <6	PSQI p-value
Age 35–55 years	24, 52.2%	22, 47.8%	0.600	25, 54.3%	21, 45.7%	0.664
Age 56–80 years	31, 57.4%	23, 42.6%		27, 50.0%	27, 50.0%	
Male	36, 53.7%	31, 46.3%	0.716	35, 52.2%	32, 47.8%	0.946
Female	19, 57.6%	14, 42.4%		17, 51.5%	16, 48.5%	

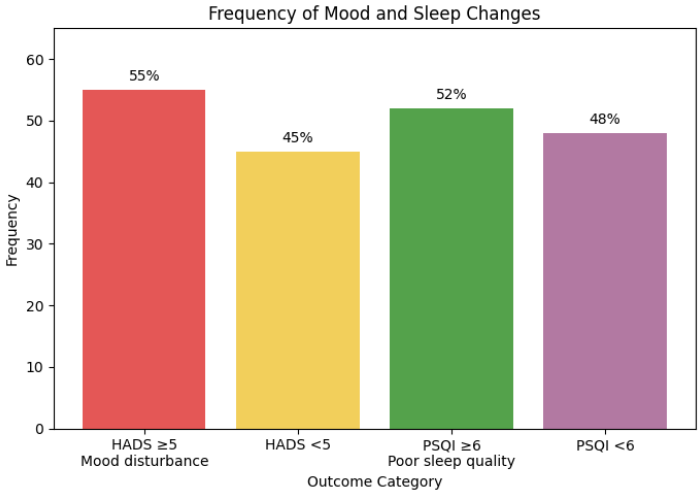
Table 5. Association of Socioeconomic Status, Educational Status, and Diagnosis With HADS and PSQI Scores

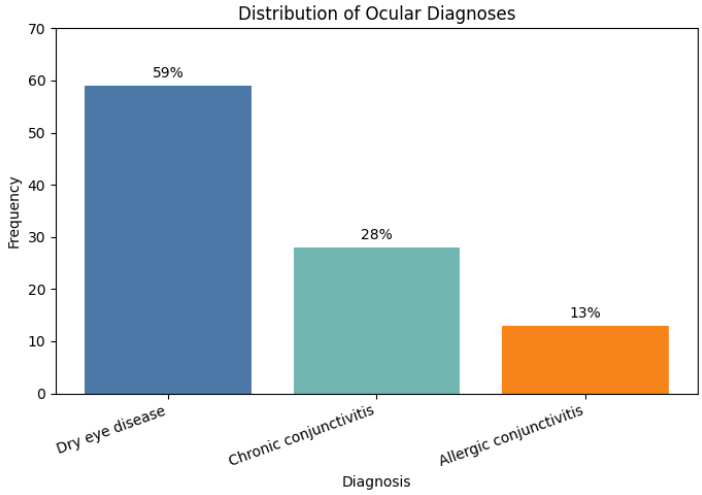
Variable	HADS ≥5	HADS <5	HADS p-value	PSQI ≥6	PSQI <6	PSQI p-value
Socioeconomic status						
Lower class	15, 46.9%	17, 53.1%	0.043	15, 46.9%	17, 53.1%	0.141
Middle class	35, 66.0%	18, 34.0%		32, 60.4%	21, 39.6%	
Higher class	5, 33.3%	10, 66.7%		5, 33.3%	10, 66.7%	

Educational status						
Literate	4, 44.4%	5, 55.6%	0.152	4, 44.4%	5, 55.6%	0.255
Primary schooling	10, 40.0%	15, 60.0%		11, 44.0%	14, 56.0%	
Middle education	24, 68.6%	11, 31.4%		23, 65.7%	12, 34.3%	
Higher education	17, 54.8%	14, 45.2%		14, 45.2%	17, 54.8%	
Diagnosis						
Dry eye disease	31, 52.5%	28, 47.5%	0.540	Verify from SPSS	Verify from SPSS	Verify
Chronic conjunctivitis	15, 53.6%	13, 46.4%		Verify from SPSS	Verify from SPSS	Verify
Allergic conjunctivitis	9, 69.2%	4, 30.8%		Verify from SPSS	Verify from SPSS	Verify

Table 6: Diagnosis-Wise Association With Mood Disturbance

Diagnosis	**HADS ≥5, Mood Disturbance**	**HADS <5, No Mood Disturbance**	**Total**	**p-value**
Dry eye disease	31 (52.5%)	28 (47.5%)	59	0.540
Chronic conjunctivitis	15 (53.6%)	13 (46.4%)	28	
Allergic conjunctivitis	9 (69.2%)	4 (30.8%)	13	
Total	**55 (55.0%)**	**45 (45.0%)**	**100**	





DISCUSSION

The present study evaluated mood and sleep alterations among patients diagnosed with dry eye disease and allied irritating ocular diseases, including allergic conjunctivitis and chronic conjunctivitis. The findings showed that psychological and sleep-related disturbances were common in this patient group, as 55% of patients had a Hospital Anxiety and Depression Scale score of ≥5 and 52% had a Pittsburgh Sleep Quality Index score of ≥6. These results indicated that more than half of the study population experienced some degree of mood disturbance or poor sleep quality in the presence of chronic ocular irritation. This finding supported the concept that dry eye disease and related ocular surface disorders should not be viewed only as localized eye conditions, but also as chronic symptomatic disorders with broader effects on emotional well-being, sleep quality and daily functioning (6). Dry eye disease was the most frequent diagnosis in the study, affecting 59% of the participants, followed by chronic conjunctivitis in 28% and allergic conjunctivitis in 13%. This distribution was clinically relevant because dry eye disease is often chronic, recurrent and symptomatically distressing. Patients may experience repeated episodes of burning, dryness, foreign body sensation, irritation, fluctuating vision and ocular discomfort, even when active treatment is being used. These symptoms can affect routine activities such as reading, driving, working, watching television

and using digital screens. Previous literature has also suggested that the chronic and repetitive nature of dry eye symptoms may contribute to impaired quality of life and increased psychological burden (7,8).

Sleep quality was notably affected in the study population, with a mean Pittsburgh Sleep Quality Index score of 6.81 ± 4.16. This reflected an overall tendency toward poor sleep quality among patients with irritating ocular surface diseases. Several mechanisms may explain this finding. Ocular discomfort may directly interfere with sleep initiation and sleep maintenance due to burning, dryness, pain, photophobia or awareness of eye irritation during rest. Some patients may also experience symptoms at night or immediately after waking, which can disturb normal sleep rhythm. In addition, chronic irritation may increase anxiety and stress, which may further impair sleep. Previous research has suggested that poor sleep may also worsen ocular surface disease by influencing tear secretion, tear film stability, inflammatory activity, ocular surface repair and pain sensitivity, creating a possible reciprocal relationship between poor sleep and dry eye symptoms (9,10). Mood disturbance was also frequent, as reflected by a mean Hospital Anxiety and Depression Scale score of 7.10 ± 4.00 and a positive mood disturbance category in 55% of the patients. This finding highlighted that emotional distress was an important concern among patients with chronic irritating ocular conditions. Persistent ocular symptoms may lead to worry, irritability, reduced confidence in treatment and repeated health-seeking behavior. Patients may become concerned about the chronicity of symptoms, the need for long-term medication and the possibility of incomplete relief. Such emotional distress may increase symptom awareness and may contribute to a lower quality of life. These findings were consistent with previous studies reporting associations between dry eye disease, anxiety, depressive symptoms and reduced psychosocial well-being (11).

Age was not significantly associated with either mood disturbance or poor sleep quality in the present study. Although dry eye disease is commonly more frequent in older age groups, the findings suggested that mood and sleep alterations may occur across different adult age groups once chronic ocular irritation is present. Similarly, gender did not show a statistically significant association with Hospital Anxiety and Depression Scale or Pittsburgh Sleep Quality Index categories. In this study, the frequency of mood disturbance was 53.7% among males and 57.6% among females, while poor sleep quality was observed in 52.2% of males and 51.5% of females. These findings suggested that the symptomatic burden of chronic ocular irritation may affect both genders in a broadly comparable manner, although larger studies may be required to explore subtle gender-related differences (12). Socioeconomic status showed a statistically significant association with mood disturbance, while its association with sleep quality was not statistically significant. Mood disturbance was most frequent among patients from the middle socioeconomic group. This finding may be explained by the combined effect of occupational responsibilities, treatment expenses, financial pressure, family obligations and concerns about productivity. Patients in the middle socioeconomic group may experience a greater functional impact from chronic eye symptoms because they often remain actively engaged in work, family care and social responsibilities. However, the absence of a significant association between socioeconomic status and Pittsburgh Sleep Quality Index score suggested that sleep disturbance may have been more closely related to symptom chronicity and ocular discomfort than to socioeconomic position alone (13,14).

Educational status was not significantly associated with either mood disturbance or poor sleep quality. However, patients with middle-level education showed relatively higher frequencies of both mood disturbance and poor sleep quality. This pattern may have reflected differences in awareness of symptoms, treatment expectations, occupational exposure, digital screen use, health-seeking behavior or perception of chronic illness. As this association was not statistically significant, it could not be interpreted as a definite relationship. Future studies with larger and more balanced educational subgroups would be useful to determine whether education level modifies the psychological or sleep-related impact of irritating ocular surface diseases (15). Diagnosis was not significantly associated with Hospital Anxiety and Depression Scale category. Although allergic conjunctivitis showed the highest proportion of patients with Hospital Anxiety and Depression Scale scores of ≥5, the difference did not reach statistical significance. This finding suggested that mood disturbance may not be limited to dry eye disease alone. Chronic conjunctivitis and allergic conjunctivitis may also produce persistent itching, redness, discharge, pain, irritation and ocular discomfort, which can affect emotional well-being and daily activities. Therefore, the broader category of irritating ocular surface disease may be clinically important when assessing mood and sleep disturbance, rather than restricting concern only to dry eye disease (16,17).

The findings of the present study were generally supported by previous literature reporting that dry eye disease may be associated with poor quality of life, anxiety, depressive symptoms and sleep disturbance. Chronic dryness and ocular irritation can persist for long periods, fluctuate unpredictably and create repeated concern for patients. This persistent symptom burden may explain why ocular surface disease can influence psychological well-being even when the condition is not life-threatening. The findings also strengthened the argument that ocular surface symptoms should be assessed through a patient-centered approach, because clinical signs alone may not fully reflect the burden experienced by the patient (18). The clinical implication of this study was that mood and sleep symptoms should be considered during the assessment of patients with dry eye disease and allied irritating ocular diseases. Routine ophthalmic evaluation commonly focuses on visual acuity, tear film stability, Schirmer's test, tear break-up time, ocular surface staining and topical treatment response. However, patients may continue to experience poor sleep, anxiety, low mood or emotional distress even when ocular findings appear mild or moderate. Simple screening tools such as the Hospital Anxiety and Depression Scale and the Pittsburgh Sleep Quality Index may help identify patients who require additional counseling, reassurance, lifestyle modification, sleep hygiene advice or referral for psychological assessment when clinically indicated (19).

A strength of the study was that it addressed an important but often under-recognized aspect of ocular surface disease by evaluating both mood and sleep changes in patients with chronic irritating ocular symptoms. The use of structured tools, including the Hospital Anxiety and Depression Scale and the Pittsburgh Sleep Quality Index, provided a systematic method for assessing psychological and sleep-related outcomes. The inclusion of allied irritating ocular diseases also broadened the clinical relevance of the study beyond dry eye disease alone (20).

The study had some limitations that should be considered while interpreting the findings. It was conducted at a single center with a relatively small sample size of 100 patients, which limited the generalizability of the results. The cross-sectional design allowed assessment of association but did not establish causality between ocular symptoms, mood disturbance and poor sleep quality. Mood and sleep were assessed through questionnaires rather than formal psychiatric evaluation or objective sleep assessment, such as polysomnography. In addition, the severity of dry eye disease and allied ocular conditions was not analyzed in detail in relation to mood and sleep outcomes. Important clinical variables such as duration of symptoms, intensity of ocular discomfort, treatment history, screen exposure, systemic comorbidities and medication use may also have influenced the results but were not fully explored in the final analysis. Future research should include larger multicenter studies with more balanced diagnostic groups and detailed grading of ocular disease severity. Longitudinal studies would be useful to determine whether improvement in ocular surface disease leads to measurable improvement in sleep quality and mood status. Further studies should also assess the relationship between objective ocular parameters, symptom severity scores, psychiatric screening tools and sleep quality indices. Such work would help clarify whether integrated ophthalmic, behavioral and psychological care can improve overall outcomes in patients with dry eye disease and allied irritating ocular diseases.

CONCLUSION

The study concluded that mood disturbances and poor sleep quality were common concerns among patients with dry eye disease and allied irritating ocular diseases. These findings indicate that chronic ocular irritation may affect not only visual comfort but also emotional well-being and sleep patterns. Socioeconomic status showed an important association with mood changes, while age, gender, educational status, and clinical diagnosis did not show a significant relationship with mood or sleep outcomes. The study highlights the need for a more holistic clinical approach in which patients with chronic irritating ocular surface symptoms are assessed not only for ophthalmic findings but also for psychological distress and sleep-related difficulties, allowing timely counseling, supportive care, and referral when needed.

AUTHOR CONTRIBUTION

Author	Contribution
Dr. Bahadur Iftikhar	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Dr. Muhammad Qasim Yazar	Methodology, Investigation, Data Curation, Writing - Review & Editing
Dr. Shujah ur Rehman	Investigation, Data Curation, Formal Analysis, Software
Dr Fauzan Ayub	Software, Validation, Writing - Original Draft
Dr Saima Khalid	Formal Analysis, Writing - Review & Editing

REFERENCES

1. Chen Z, He Q, Shi Q, Xu Y, Yang H, Wei R. Anxiety and depression in dry eye patients during the COVID-19 pandemic: Mental state investigation and influencing factor analysis. Front Public Health. 2022;10:929909.

2. Gu Y, Cao K, Li A, Wang J, Guo Y, Hao Y, et al. Association between sleep quality and dry eye disease: a literature review and meta-analysis. BMC Ophthalmol. 2024;24(1):152.

3. Gupta PC, Rana M, Ratti M, Duggal M, Agarwal A, Khurana S, et al. Association of screen time, quality of sleep and dry eye in college-going women of Northern India. Indian J Ophthalmol. 2022;70(1):51-8.

4. Ayoubi M, Cabrera K, Mangwani S, Locatelli EVT, Galor A. Associations between dry eye disease and sleep quality: a cross-sectional analysis. BMJ Open Ophthalmol. 2024;9(1).

5. Zeng H, Yang X, Liao K, Zuo X, Liang L, He D, et al. Circadian disruption reduces MUC4 expression via the clock molecule BMAL1 during dry eye development. Exp Mol Med. 2024;56(7):1655-66.

6. Rolando M, Arnaldi D, Minervino A, Aragona P, Barabino S. Dry eye in mind: Exploring the relationship between sleep and ocular surface diseases. Eur J Ophthalmol. 2024;34(4):1128-34.

7. Yang B, Fan Z, Sun L, Zhang T, Zhang SY, Jin L, et al. Effect of Anti-Allergic Therapy on Sleep Quality of Children with Allergic Conjunctivitis and Their Parents. Ocul Immunol Inflamm. 2024;32(7):1294-301.

8. Qin G, Luan X, Chen J, Li L, He W, Eric Pazo E, et al. Effects of insomnia on symptomatic dry eye during COVID-19 in China: An online survey. Medicine (Baltimore). 2023;102(46):e35877.

9. Li J, Zhang SY, Fan Z, Liu R, Jin L, Liang L. Impaired sleep quality in children with allergic conjunctivitis and their parents. Eye (Lond). 2023;37(8):1558-65.

10. Ayoubi M, Cabrera K, Mangwani-Mordani S, Locatelli EV, Galor A. Associations between dry eye disease and sleep quality: a cross-sectional analysis. BMJ open ophthalmology. 2024 Jan 4;9(1).

11. Wang S, He X, Li Q, Zhang Y, Hu J, Zong R, et al. Obstructive Sleep Apnea Affects Lacrimal Gland Function. Invest Ophthalmol Vis Sci. 2022;63(3):3.

12. Ohshima H, Mishima K. Oral biosciences: The annual review 2023. J Oral Biosci. 2024;66(1):1-4.

13. 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. PLoS One. 2021;16(11):e0259399.

14. Ren Y, Tian J, Shi W, Feng J, Liu Y, Kang H, Chen B, He Y. Evaluation and correlation analysis of ocular surface disorders and quality of life in autoimmune rheumatic diseases: a cross-sectional study. BMC ophthalmology. 2023 May 22;23(1):229.

15. Magno MS, Utheim TP, Snieder H, Hammond CJ, Vehof J. The relationship between dry eye and sleep quality. Ocul Surf. 2021;20:13-9.

16. Hanyuda A, Sawada N, Uchino M, Kawashima M, Yuki K, Tsubota K, et al. Relationship between unhealthy sleep status and dry eye symptoms in a Japanese population: The JPHC-NEXT study. Ocul Surf. 2021;21:306-12.

17. An Y, Kim H. Sleep disorders, mental health, and dry eye disease in South Korea. Sci Rep. 2022;12(1):11046.

18. Ayaki M, Negishi K, Kawashima M, Tsubota K. Starting Time of Presbyopic Eyeglasses Wear and Lifestyle. Front Public Health. 2022;10:856999.

19. Le Guyader M, Antoni D. Under-recognized toxicities of cranial irradiation. Cancer Radiother. 2021;25(6-7):713-22.

20. An Y, Kim H. Sleep disorders, mental health, and dry eye disease in South Korea. Scientific Reports. 2022 Jun 30;12(1):11046.

