



Original Article

Frequency of Dry Eye in Migraine Patients

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ARTICLE INFO

Key Words:

Dry Eye, Migraine, Schirmer Test

How to Cite:

Asif, D., Ali Shah, S. Z., Shahid, T., Pervaiz, A., Batool, R., Ziarat, A., & Anwar, H. (2023). Frequency of Dry Eye in Migraine Patients: Frequency of Dry Eye. Pakistan Journal of Health Sciences, 4(12).
<https://doi.org/10.54393/pjhs.v4i12.1117>

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Received Date: 13th October, 2023Acceptance Date: 19th December, 2023Published Date: 31st December, 2023

ABSTRACT

Dry eye disease and migraine are prevalent conditions in the general population. While there is evidence of symptoms overlapping, few studies have quantified the occurrence of dry eye in migraine patients. The study was conducted to find the frequency of dry eye syndrome among individuals with migraines. **Objective:** To evaluate the "frequency of dry eye disease in migraine patients". **Methods:** This descriptive cross-sectional study included 217 clinically diagnosed migraine patients between the ages of 18 to 29 at the University of Lahore Teaching Hospital. The study took place over four months, from February 2023 to May 2023. Dry Eye Disease was assessed using the dry eye symptoms questionnaire (Speed II Questionnaire) and Schirmer test 1 as the primary diagnostic tool. **Results:** The analysis included calculating descriptive statistics (percentages and means) and presenting results in tables and figures for clarity and understanding. Out of 217 migrainous patients, 38.2% of participants had normal eyes. Among the rest, 17.1% showed Mild, 2.3% Moderate dry eye. The Schirmer Test showed that 41.9% had suffered from severe dry eye. Overall, the study showed that 133 patients (61%) suffered from dry eye. **Conclusions:** The study's conclusion highlighted a notable rise in dry eye disease among migraine patients, in line with previous research. This underscores the need for further exploration into the underlying mechanisms and therapeutic interventions for individuals dealing with both conditions.

INTRODUCTION

Dry Eye Disease is a disorder of the tear film that happens when tears are not producing normally [1]. Dry Eye is caused by aqueous tear deficiency or evaporative tears. If this condition remains untreated, it can lead to pain, ulcers, and corneal scarring. Inflammatory diseases, environmental factors, hormonal imbalance and contact lens use all may cause dry eye [2]. The worldwide incidence of dry eye disease was estimated to be 11.59%. Dry eye symptoms affect 9.5% of women and 6.8% of men. The global prevalence of dry eye was 28.1% in women and in men 24.9% [3]. The mechanisms of the dry eye include tear film hyperosmolarity and corneal and lacrimal gland inflammation. Tears are important for not only keeping the eye moist but also protecting it from various kinds of bacterial and other infections [4]. Traditionally, the tear film is described as consisting of three components: the

aqueous layer, the mucin layer, and the lipid fatty layer [5]. The primary source of the aqueous tear layer is the main lacrimal glands, while minor contributions come from the goblet cells [6]. The Lipid Layer, primarily composed of lipids, forms the layer that's on the outside of the tear film is, serving to reduce surface tension [7]. Abnormal tear film refers to a disruption or imbalance in the composition and function of tears, which can cause various ocular discomforts and visual disturbances. When there is an abnormality in any of these layers or an imbalance in their proportions, it can lead to an abnormal tear film [8]. Artificial tears, gels, and ointments are treatments that restore inadequate tears in mild to moderate illnesses [9]. DED produces difficult and visual disruption, by affecting the tear film. Patients having dry eyes present with the symptoms of stinging, pain, blurring of vision, dryness,

grittiness, sensation, frequent blinking, eye fatigue and sensation of light [10]. If tear production worsens in the afternoon, it induces irritation, itching and especially itching in swollen eyelids [11]. In severe condition, eyes become more persistent and have little or no relief from artificial tears vision become worse and patients feel pain in their eyes [12]. Tests like TBUT and Schirmer's test are used to assess dry eye diseases [13]. Migraine is a highly prevailing and complex condition characterized by an occasional, severe, often unilateral throbbing or pulsating headache related to nausea, photophobia, phonophobia, and sometimes aura [14]. Migraine is a complex neurologic and vascular syndrome with a wide medical range of signs and symptoms, including ocular abnormalities [15]. The second most common cause of disability in life years worldwide is migraine [16]. Migraine attack has been classically divided into four stages prodromal, aura, headache and postdrome [17]. Dry Eye Symptoms are more common in people suffering from long-term and painful migraines. The concentration of salt is also lower in their tears and these two conditions also share a common mechanism [18]. The Clinical comorbidity among migraine and dry eye symptoms, particularly the incidence of photophobia, suggests a pathophysiological connection between the two diseases [19]. The relationship between dry eye disease and migraine is that both conditions may share common underlying mechanisms related to inflammation and nerve sensitization [20]. Additionally, nerve sensitization in the trigeminal nerve, which is responsible for transmitting pain signals from the face to the brain, has been linked to both dry eye disease and migraine [21].

METHODS

This study employed a cross-sectional descriptive design and was carried out at the University of Lahore Teaching Hospital. The research spanned from February 2023 to May 2023 and included 217 participants. A sample size of 217 participants was determined using the formula: $n = 1 - d/2 P(1-P)/d^2$ with values $n = (1.96)^2 (0.17)(1-0.17) / (0.05)^2$. The participants were selected using a convenient sampling method. Permission for this research was taken from Research ethics committee (REC) faculty of allied health sciences the University of Lahore on August-08-2023 with Reference number REC-UOL-135-08-2023. To be eligible for inclusion, individuals had to be clinically diagnosed with migraines at the University of Lahore Teaching Hospital and be between the ages of 18 to 29 years. On the other hand, exclusion criteria encompassed students no younger than 18 years or older than 29 years, those using medications known to induce dry eyes, individuals with ocular or systemic conditions contributing to dry eye symptoms, regular computer users, and contact lens

wearers. Data collection began by inviting eligible participants and written consent was taken beforehand after explaining the procedure. Tear production was assessed through the Schirmer test. In this test, a Schirmer strip was put in the lower conjunctival fornix, and measurements were recorded in millimeters of wetting after a 5-minute period. Subsequently, the data collected from the Schirmer tear test underwent comprehensive analysis using appropriate statistical methods. The primary objective of conducting the analysis was to determine the prevalence of dry eye symptoms within the study population. This study adds to our understanding of dry eye symptoms in clinically diagnosed migraine patients within the specified range and is valuable for further research and potential improvements in patient care. SPSS (Social Package for Social Sciences) version 23.0 software was used to analyze data. No statistical test was applied as there was no hypothesis to test. The outcomes are presented in the form of percentages and ratios for categorical variables such as name, age, gender, and the presence or absence of dry eye. These will be deemed statistically significant.

RESULTS

Three age categories were used to group 217 migrainous patients, both male and female. 34% were patients that were in the age group 18 – 21. 51% were patients that ranged between 22 – 25. 15% of patients were between the age of 26 – 29 years old. Among the 217 patients suffering from Migraine, 56% were female and 44% were male. Out of 217 migrainous patients, 38.2% of participants had normal eyes. Among the rest, 17.1% showed Mild, 2.3% Moderate dry eye. Schirmer Test significantly showed that 41.9% had been suffering from severe dry eye (Table 1).

Table 1: Frequency of Dry-Eye Symptoms in Migraine Patients

| Schirmer Test Results | Frequency (%) |
|-------------------------------|---------------|
| Normal Eye (15mm - 35mm) | 83 (38.2) |
| Mild Dry Eye (10 mm - 15mm) | 37 (17.1) |
| Moderate Dry Eye (5mm - 10mm) | 5 (2.3) |
| Severe Dry Eye (<5mm) | 91 (41.9) |
| 8.00 mm | 1 (0.5) |
| Total | 217 (100) |

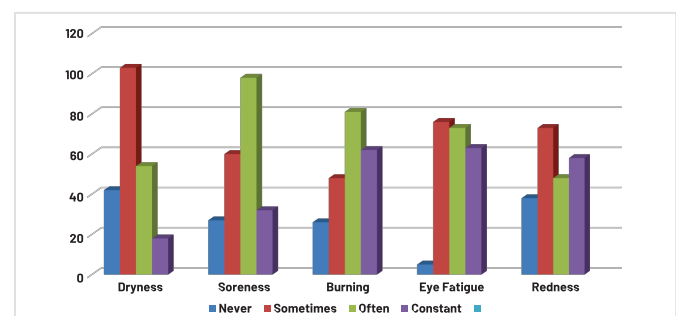


Figure 1: The level of incidence of each symptom among migraine

patients

All symptoms have occurred often (Grey Bar is higher in most of the symptoms). Patients with migraine tend to have a higher tendency to develop these problems than non-migrainous patients. There could be multiple reasons for this.

DISCUSSION

Our observational cross-sectional study aimed to determine the frequency of dry eye in clinically diagnosed migraine patients by performing Schirmer test-1 in a tertiary care hospital. The Schirmer test was performed using Schirmer tear strips. It was concluded that the participants with migraine had DED. Schirmer test reading was graded as 15-20mm; normal, 10-15mm; mild, 5-10; moderate and less than 5 had severe DED. Irritation, grittiness, burning, foreign body sensation and light sensitivity were the indicators of dry eye. It showed that DED had a great impact on the quality of eyesight and also the comfort of life. So, it was considered that participants with migraine had DED as compared to those who had simple headaches. Another comparable study was carried out to check the relationship between migraine and dry eye. A dry eye questionnaire (DEQ-5) was used in the clinic to evaluate the manifestations of dry eye as well as ocular surface diseases. Tests that were performed to investigate the dry eye were PRT (phenol red thread) and Schirmer tear strips test whereas our study conducted the dry eye questionnaire and Schirmer test 1 only for the determination of dry eye. Similarly, in their study, to investigate the migraine a questionnaire HIT-6 was used. Our study took clinically certified migraine patients. They observed that DED and migraine are quite prevailing conditions among the general inhabitants. Both lower the standard of living. Their findings were concluded to be the same as our study that participants with migraine had DED [22]. Another retrospective case-control study involving a substantial patient population from the University of North Carolina found that people with migraines were more likely to have concurrent dry eye disease [23]. This statistical evidence suggests a significant link between migraines and dry eye, although the exact nature of this connection remains uncertain. On the other hand, our observational-cross-sectional study performed at a tertiary-care hospital focused on clinically diagnosed migraine patients using the Schirmer test. This study provided more direct clinical evidence, showing that participants with migraines indeed had dry eye, with specific symptoms indicating its presence. The convergence of findings from both studies underscores the potential impact of migraines on the development of dry eye syndrome, emphasizing the importance of further research to elucidate this relationship and its potential implications for patient care.

In our study, we investigated the frequency of dry eye syndrome among 217 clinically diagnosed migraine patients, finding that 61.3% of them suffered from dry eye. In addition, the Miami VA study investigated the symptoms and indicators of dry eyes in people with and without migraines. It found that although ocular surface metrics were similar between the groups, those suffering from migraines had more severe dry eye symptoms and distinct symptom profiles. This implies that migraineurs' sensations of dry eyes could be caused by nerve dysfunction. The Miami VA study focused on symptom profiles and possible nerve dysfunction as a contributing cause, highlighting the need for additional research and treatment approaches [24]. Our study focused on the prevalence of dry eye in migraine patients. A meta-analysis was carried out in a different study to evaluate the correlation between dry eye illness and migraine. Seven studies were included in the analysis, and the results showed that individuals with migraine had an odds ratio of 1.55, which was considerably higher than the risk of dry eye in those without migraine. According to the study's findings, there is a significant correlation—albeit one with differing intensities across various populations—between migraine and dry eye [25]. Our study's objective was to ascertain the prevalence of dry eye syndrome in migraine patients with a clinical diagnosis between the ages of 18 and 29 at the University of Lahore Teaching Hospital. It was discovered that 61.3% of the individuals with migraines experienced varied degrees of dry eye. This outcome is consistent with earlier studies. When these two studies are combined, Likewise, another study sought to assess the occurrence of dry eye and primary Sjögren syndrome (SS) among individuals with migraines. Their investigation involved 46 migraine patients and 50 healthy subjects, revealing that dry eye symptoms and manifestations were notably more prevalent and severe in the migraine group. Intriguingly, they did not identify any instances of primary SS in the participants. Furthermore, the duration of migraine exhibited an inverse relationship with tear function test results but a direct correlation with ocular surface disease index scores [26]. In our study, the objective was to assess the frequency of dry eye disease in individuals with migraines. This descriptive cross-sectional study included 217 clinically diagnosed migraine patients. The results indicated that 41.9% of these migraine patients suffered from severe dry eye as assessed by the Schirmer test and dry eye symptoms questionnaire. This aligns with previous research and highlights the need for further exploration into underlying mechanisms and potential therapeutic interventions for individuals experiencing both conditions.

CONCLUSIONS

The study concluded that migraine patients have a higher frequency of dry eyes. Future studies should look into the underlying processes of this connection as well as potential treatment techniques to help patients with both illnesses.

Authors Contribution

Conceptualization: HA, TS

Methodology: HA, DA, RB

Formal analysis: SZAS, HA

Writing-review and editing: AP, HA, AZ, DA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

All authors have read and agreed to the published version of the manuscript.

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