

## MAGNITUDE OF DRY EYE AMONG MEDICAL STUDENTS AND ITS IMPACT ON THEIR MENTAL HEALTH: A QUESTIONNAIRE BASED SURVEY

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### ABSTRACT

#### BACKGROUND

Dry eye is a common disease affecting worldwide. Dry eye is defined as a multifactorial disease of tears and ocular surface that results in discomfort, visual disturbance and tear film instability with potential damage to the ocular surface and is due to increased osmolarity of tear film and inflammation of ocular surface according to International Dry Eye Workshop (2007). Medical students are often affected with dry eyes due to use of projectors, computers for study and also due to use of mobiles.

#### METHODS

A cross sectional, questionnaire based survey was conducted among 350 medical students of our college. Proforma included demographic details, contact lens use, hours of electronic devices usage, extraocular and ocular symptoms. Dry eye was subjectively analysed by a validated questionnaire of ocular surface disease index (OSDI) and hospital anxiety and depression scale was analysed.

#### RESULTS

The mean age of student was 22.71±2.31 years. Sixty percent had symptoms of watering. Headache being the most common extraocular symptom. Out of 350, 147 had normal OSDI, 98 had mild, 50 had moderate and 55 had severe. Hours of electronic device usage were directly proportional to OSDI. Results were statistically significant.

#### CONCLUSIONS

Our study highlighted the problem faced by young population these days and making them aware of computer vision syndrome and also its impact on their mental health.

#### KEYWORDS

Dry Eye Disease, Medical Student, Anxiety, Depression, Computer Vision Syndrome

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#### BACKGROUND

Dry eye disease (DED) had become a more prevalent condition affecting worldwide. It is defined as a multifactorial

disease of tears and ocular surface that results in discomfort, visual disturbance and tear film instability with potential damage to the ocular surface and is accompanied by increased osmolarity of tear film and inflammation of ocular surface according to International Dry Eye Workshop (2007).<sup>1</sup> It is a widespread condition covering a considerable percentage of population. Prevalence of dry eye have been estimated in various studies, that varies between 5% to 30% or more in different age groups across different countries and worldwide. Approximately 25 to 30 million people are affected by dry eye all over the world.<sup>2</sup> Similarly, other studies have also shown that dry eye affects 3-34% of the

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global adult population.<sup>3</sup> As, DED results from decreased tear production, increased evaporation of tears and inflammation, resulting in symptoms like dryness, discomfort, irritation, itching, fatigue, foreign body sensations, sensitivity to light in eyes, pain, and burning, mucous discharge and tear film alterations caused by tear deficiency and/or increased tear. Severe cases may present as oedematous eyes, redness, corneal epithelium damage, and even diminution of vision. Various procedures are used to diagnose DED including Schirmer test, phenol red thread test, tear film break up time (TBUT), tear meniscus height, epithelial staining with rose Bengal and lissamine green, tear osmolarity, impression cytology. These tests have different specificity and sensitivity. Tear osmolarity determination is the most reliable test to diagnose dry eye but is expensive to perform and time consuming. Schirmer test is one such test which is simple to perform and does not require slit lamp or any other equipment and can be performed easily in OPD. Schirmer introduced the test in 1903 and since then it has been modified by many investigators. Schirmer 1 test is the most popular of the variants and is carried out with and without anaesthesia. When performed with anaesthesia, it measures basic tear secretion and when performed without anaesthesia it measures both reflex and basal tear secretions.<sup>4</sup> It was noticed that medical students often having dry eyes due to frequent use of projectors, computers for study and also due to use of mobiles or smart phones. So, this study is done to screen the medical student for dry eyes and also to find out the impact of dry eyes on their mental health.

We wanted to find out the magnitude of dry eye in medical students and how it affects their mental health.

**METHODS**

A cross sectional, questionnaire based study was conducted among 350 medical students of People’s college of medical sciences and research center, from March 2019 to May 2019. Well-designed proforma was prepared consisting of demographic details, contact lens use, and duration of electronic devices usage, extraocular and ocular symptoms. Along with validated questionnaire of ocular surface disease index (OSDI) and hospital anxiety and depression scale (HADS) for subjective analysis of the dry eye disease. Those who were willing to participate in the study were enrolled, informed consent was taken and study purpose was explained after which they were asked to fill the details and answer of the given questionnaire. To determine severity of dry eyes given values was calculated by OSDI formula i.e.  $OSDI = \frac{\text{sum of score}}{\text{number of questions answered}} \times 25$ . It was graded according to standard grading system i.e. Grade 1= 0-12 (Normal), Grade 2 = 13-22 (Mild), Grade 3= 23-33 (Moderate), Grade 4= >33 (Severe). Anxiety and depression score was graded by 0-7 (Normal), 8-10 (Borderline abnormal), 11-21 (Abnormal).

**Inclusion Criteria**

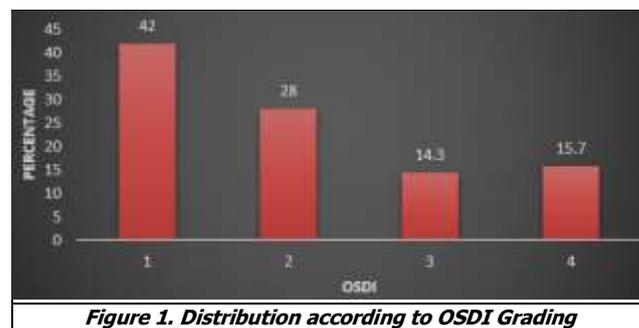
All undergraduate medical students those who are willing to participate.

**Exclusion Criteria**

Those who are not willing to participate in the study and participants with any ocular surface disorders.

**RESULTS**

The present study was conducted among 350 medical students of our medical college. The mean age was  $22.71 \pm 2.31$  years. Out of 350 students, 48.9% (171) were males and 51.1% (179) were females. In our study 15.1% students were contact lens users. Majority of participants in the study, presented with ocular symptoms of watering (60%) followed by ocular fatigue (54.3%), burning sensation (44%) and pain (32.6%). With respect to extra ocular symptoms, headache was the most common symptoms in 58.9% participants followed by neck pain and shoulder pain in 19.4% and 13.1% participants.



**Figure 1. Distribution according to OSDI Grading**

In our study, maximum participants (42%) were found to have OSDI grade 1 i.e. normal followed by grade 2, 4 and 3 in 28%, 15.7% and 14.3% respectively (Figure 1). We also studied for frequency of anxiety and depression disorder, 61.7% students fall under normal category whereas 22% student had borderline and rest having abnormal results for anxiety disorder. Also, maximum student (71.4%) had normal study results for depression, whereas 14.9% and 13.7% had borderline and abnormal results respectively.

Hours of Usage	OSDI Grade				Total
	1	2	3	4	
<2	43	3	1	1	48
2-4	85	58	9	1	153
5-8	19	32	29	11	91
>8	0	5	11	42	58
Total	147	98	50	55	350

**Table 1. Association Between Hours of Usage of Electronic Devices with OSDI**

Table 1 represents the association between hours of usage of electronic devices with OSDI. Out of 58 patients using electronic devices for more than 8 hours, OSDI was grade 4 in 42 patients, followed by OSDI grade 3 in 11 patients. Representing severe degree of dry eye. Test of significance showed highly significant association between hours of usage and OSDI ( $p < 0.01$ ).

OSDI Grade	Anxiety Grade			Total
	Normal	Borderline	Abnormal	
1	114	21	12	147
2	68	18	12	98
3	26	15	9	50
4	8	23	24	55
Total	216	77	57	350

**Table 2. Association Between OSDI and Anxiety**

We also studied the association between anxiety and depression with OSDI. Out of 147 and 99 patients with OSDI grade 1 and 2 respectively, 12 patients each had abnormal results for anxiety and out of 50 and 55 patients with grade 3 and 4 OSDI, abnormal results was present in 9 and 24 patients respectively. Hence it was observed that as the OSDI was increased, severity of anxiety also increased. Test of significance found statistically significant association between OSDI and anxiety ( $P < 0.01$ ). (Table 2)

OSDI Grade	Depression Grade			Total
	Normal	Borderline	Abnormal	
1	134	8	5	147
2	80	13	5	98
3	31	16	3	50
4	5	15	35	55
Total	250	52	48	350

**Table 3. Association between OSDI and Depression**

It was also observed that as the OSDI grade increased, severity of depression also increased. Test of significance found statistically significant association between OSDI and Depression ( $P < 0.01$ ). (Table 3)

**DISCUSSION**

Dry eye can be present in any age group but more common in adult population. It is especially more prevalent in computers or electronic device users. Medical students are prone to dry eye due to prolonged use of laptops, computers, mobile phones and projectors for their academic activities. Also, the use of these devices are common in this age group.

In our study, the mean age was  $22.71 \pm 2.31$  years. Maximum students (42%) were found to have OSDI grade 1 followed by grade 2, 4 and 3 in 28%, 15.7% and 14.3% respectively. In study conducted by Tuladhar S et al, mean age of students was  $21.73 \pm 1.42$  years. They found mild dry eye in 19.5%, moderate in 13% and severe dry eye in 13.5% of medical students.<sup>5</sup> Various hospital based studies showed prevalence of dry eyes as 18.4% and 40.8%.<sup>6,7,8</sup> Similarly the prevalence of dry eye is 25% in Canada<sup>9</sup> and 33% in Japan.<sup>10</sup> Dry eye has been seen more among computer and smart phones users now-a-days. A study by Sandip D. Patil et al<sup>11</sup> showed that dry eye is seen among 25% electronic device users. Also, majority of students in our study, had complain of watering (60%) followed by ocular fatigue (54.3%), burning sensation (44%) and pain (32.6%). With respect to extra ocular symptoms, headache was the most common symptoms in 58.9% students followed by neck pain and shoulder pain in 19.4% and 13.1% respectively. This can be due to prolonged use of computers, mobiles, etc. Subraty and Korumtolee, reported

59.5% prevalence of computer vision syndrome.<sup>12</sup> Sen and Richardson, in their study reported a higher prevalence of 46% to 87% for the various eye symptoms.<sup>13</sup> In study conducted by Logaraj M et al, about 43.3% medical students reported headache.<sup>14</sup> Lower prevalence of 29.9% was reported by Talwar et al.,<sup>15</sup> while Sen and Richardson, reported 61% among undergraduates<sup>13</sup> similar to our study. Nearly 32.3% of medical students reported burning sensation in study done by Logaraj M et al.<sup>14</sup> Lower prevalence of 28.9% was reported by Talwar et al.,<sup>15</sup> while Sen and Richardson, reported 55% among undergraduates,<sup>13</sup> that too similar to our study that is 44%. Study of medical students is generally based on computers, lap tops and mobile phone, so the dry eye is becoming more prevalent among them. It was also found in various literatures that dry eye disease may affect the mental state of the individual. In our study, we reported 22% and 16.2% student of borderline and abnormal anxiety disorders. Also, 14.9% and 13.7% had borderline and abnormal results for depression grading respectively.

**CONCLUSIONS**

As the dry eye disease is spreading more ubiquitously these days worldwide, the need to diagnose the condition and treat it effectively has become necessary. It also affects the mental health causing anxiety and depression; thus prompt treatment for dry eye disease is a key factor to avoid complications. To the best of our knowledge, this study is the first to highlight dry eye disease among medical students along with its association with the mental health. Various studies have been conducted in the past but none of them showed an association between dry eye and dysfunction of mental state in medical students. In our study, we tried to highlight the problem faced by young population these days and also make them aware of computer vision syndrome and its impact on their mental health.

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