

Evaluation of Dry Eye Symptoms in Lecturers Working in Medical Colleges of Nepal: An Online Cross-sectional Study Following SARS-CoV-2 Outbreak

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ABSTRACT

Introduction: Dry eye is one of the frequently encountered ophthalmological disorders. Following the pandemic of Coronavirus disease 2019, use of masks and electronic devices has taken an upraise globally. These factors are one of the causes for dry eye disease. This study emphasises dry eye symptoms among lecturers working in medical colleges of Nepal.

Materials and methods: This was a descriptive cross sectional study conducted among 217 lecturers working in various medical colleges in Nepal. Dry eye evaluation was done using the Ocular Surface Disease Index (OSDI) questionnaire. Analysis of data was using Microsoft Excel 2016 and IBM Statistical Package for Social Sciences (SPSS) version 26.0.

Results: One fourth (25.80%) of 217 participants experienced symptoms of dry eye disease.

Conclusion: Increasing use of mask and laptop during this pandemic era has shown to cause mild dry eye symptoms in lecturers working in medical colleges of Nepal. Proper care and precaution needs to be practised in order to minimise dry eye symptoms and its consequences.

Key words: Dry eye disease, Ocular surface disease index, SARS-Cov-2.

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INTRODUCTION

“Dry eye is a multifactorial disease of the ocular surface characterised by a loss of homeostasis of the tear film, and accompanied by ocular symptoms, in which tear film instability and hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities play etiological roles” (Craig P, 2017). Tear Film and Ocular Surface Society Dry Eye Workshop II (TFOS DEWS II) epidemiology committee showed that the reported prevalence of dry eye disease in Southeast Asia is as high as 20.0% to 52.4% (Guo B, 2010; Han SB et al, 2011; Jie Y, 2006; Lu P et al; Tian YJ et al, 2009). There has not been population based study done for dry eye disease in Nepal. A hospital-based study from Nepal Eye Hospital, Kathmandu, Nepal showed female preponderance of 2.6:1 and the most affected age group was between 30 to 40 years which was 29% (Sharma B, 2011). Patients with dry eye complain of blurred vision, foreign body sensation, pain, injection, epiphora and in severe cases loss of vision. Dry eye is especially common in elderly population and affects women more than men (Moss SE, 2008; Nicols JJ, 2005; Onwubiko et al, 2014; Sahai A, 2005). The pathogenesis of dry eyes are basically abnormalities Lid surface and lipid abnormality, aqueous tear as well as mucin deficiency, are the pathogenesis for dry eyes (Lemp MA et al, 2007). Dry eye is believed to be disturbance of Lacrimal Functional Unit (LFU), an integral system which compromises of the lacrimal glands, the ocular surface lids, and the sensory and the

motor nerves that connect them (Stern ME et al, 1998). The tear film can be destabilised if there is damage to any component of the LFU and can lead to ocular surface disease (Bacman S, 2001). The use of protective measures like mask and screen time with electronic devices has increased rapidly recently in almost all age groups for multifunctional purposes after the SARS-CoV-2 pandemic. Tear film which acts as a barrier for pathogenic invasion may be compromised with mask use as it causes barrier to evaporate more rapidly (Moshirfar M, 2020). Therefore, this study focuses on determining the prevalence and severity of dry eye disease among targeted population with prolonged use of protective equipment like face masks and with increased screen time.

MATERIALS AND METHODS

This online descriptive cross sectional study was conducted among lecturers working in medical colleges of Nepal from October 25, 2020 to December 25, 2020. The study was ethically approved by Nepal Health Research Council (NHRC) (Reference no 789/2020). Prior to data collection, participants were informed about the study and their consent was obtained online. Those with the history of diagnosed dry eye disease, past ocular surgeries, presently using topical medication including artificial tear were excluded from the study.

Calculation of sample size was done using

$$n = t^2 \times p(1-p) / m^2$$

Where,



n = required sample size

t = confidence level at 95% (Standard value of 1.96)

m = margin of error, confidence level at 5% (standard value of 0.05)

p = estimated prevalence of dry eye disease in lecturers of medical colleges 0.5(50%)
 Thus, required sample size calculated as

$$\begin{aligned} \text{Sample size (n)} &= t^2 \times p(1-p) / m^2 \\ &= (1.96)^2 \times 0.5(1-0.5) / (0.05)^2 \\ &= 384.16 \sim 385 \end{aligned}$$

Since the total number of lecturers in the different medical colleges who approved for survey were: N=495

so, applying Cochran's formula for finite population:

$$\begin{aligned} \text{Required sample size (n}_0\text{)} &= n/1+(n-1)/N \\ &= 385/1+(385-1)/495 = 216.29 = 217 \end{aligned}$$

So, the required sample size is 217. The sample size was 217 as per the calculation from Cochran's formula with a margin of error 5% and a confidence interval of 95%. The sampling method was a non-probability, convenient technique. Out of the total questionnaire sent, the participation rate was 43.83%.

A previously validated index for dry eye screening purpose: OSDI questionnaire was used for the data collection (Stapleton F et al, 2017). Our questionnaire consisted two sections. 1) Demographic information comprising with

the lifestyle questionnaire related to time and frequency of use of mask, laptops, protective glasses and sleep habit and 2) question assessing the dry eye symptoms in the participants (OSDI).

The self-administered google based questionnaire was sent to the participants through various online platforms to fill in and the data was collected.

Data analysis was carried out by entering the data on Microsoft Excel and further analysis was done using IBM Statistical Package for Social Sciences (SPSS 26.0). Frequency and percentage were calculated and further represented in tables and figures.

RESULTS

Out of the 217 participants, 56 (25.80%) (95% Confidence interval = 7.9238-10.0301) experienced some symptoms of dry eye disease. Among them, 44 (20.3%) had mild symptoms, 7 (3.2%) had moderate and very few 5 (2.3%) experienced severe symptoms. The mean OSDI score among the participants was 8.97 ± 7.87 as shown in Table 1.

Table 1: OSDI Dry eye disease scale interpretation.

OSDI Index	
Normal Range (0-12)	161 (74.2%)
Mild (13-22)	44 (20.3%)
Moderate (23-32)	7 (3.2%)
Severe (33-100)	5 (2.30%)

Among the total participants, more than half of them 135 (62.2%) were Male and 82 (36.9%) were female. In which, 120 (55.3%) of them were of age group 25-35 years followed by 85 (39.2%) were of age group 35-45 years and 9 (4.1%) of participants were of 45-55 years. Whereas, only 3 (1.4%) of the respondents were of age 56 years and above which is

presented in Table 2.

Table 3 illustrates 25.80% dry eye in a total of 217 participants with 20.3 % of them having mild dry eye symptoms. Mask use for more than 6 hours was answered by 77%. Forty six percent of the total participants had laptop use for more than 6 hours. Sleep activity for more than six hours was seen in 85.7%.

Table 2: Demographic information of the respondents.

Characteristics		Number (%)
Age	25-35	120 (55.3%)
	35-45	85 (39.2%)
	45-55	9(4.1%)
	Above 55	3 (1.4%)
Gender	Male	135 (62.2%)
	Female	82 (37.8%)

Table 3: Lifestyle activities after COVID-19 pandemic in lecturers.

Questions	Characteristics	Number (%)
How long do you wear a mask in a day?	Less than 6 hours per day	49 (22.5%)
	More than 6 hours per day	167 (77%)
	I do not wear mask at all	1 (0.5%)
How long do you use laptop/ mobile in a day ?	Less than 6 hours per day	118 (53.9%)
	More than 6 hours per day	100 (46.1%)
	I don't use them at all	0
Do you use protective glasses/ spectacles while wearing masks?	I have refractive error, so I wear glasses regularly	55 (25.3%)
	Yes	60 (27.6%)
	No	102 (47%)
Average hours of sleep per 24 hours	More than 6 hours	186 (85.7%)
	Less than 6 hours	31 (14.3%)

DISCUSSION

Ranging from 5-50% dry eye incidents have been reported globally (Stapleton F et al, 2017). Mean age group of our 55.3% participants belonged to a young age (25-35 years). Only 1.5% of candidates were with age more than 55 years. 62.2% study population were male. In one of the study done among the 254 lecturers of Mersin University, Turkey half of the participants had at least one symptom and half of them had moderate to severe dry eye (Vayısoğlu S.K, 2019). There are several articles highlighting prolonged visual display screen time exposure of more than five hours with higher OSDI scores (Simavli H et al, 2014; Gümüş K et al, 2009). Titiyal J.S, 2018 has associated increased odds of developing Dry Eye Disease with prolonged visual display users in a study done in North India. Various studies has revealed frequency of dry eye to be more in older age and females (Stapleton F et al; Farrand K.F,2017; Courtin R et al, 2016). Higher OSDI scores were reported in a group of people who wore masks for 3 to 6 hours in a study. This study also revealed deterioration in OSDI scores in previously diagnosed dry eye disease (Krolo I et al, 2021). Prolonged face mask use was associated with increased OSDI score in those with mild-moderate (13-32) OSDI values (Scalini SZ, 2021). In an online survey among 3605 participants in Italy, 26.9% showed exaggerated dry eye symptoms after face mask use (Boccardo L, 2021). In one of the study conducted in Nepal during SARS-CoV-2 pandemic, Bista PR et al. found 50.8% health workers in medical college having dry eye symptoms with 26.03% of

participants having severe dry eye symptoms through OSDI scoring. Poor sleep quality has been one of the associative factors with dry eye disease (Kawashima M et al, 2016; Magno MS, 2021).

Our study showed 25.80% dry eye with 20.3 % of participants having mild dry eye symptoms. The study population most frequently wore face masks for more than six hours (77%) and forty six percent of the total participants had laptop use for more than 6 hours. Sleep activity for more than six hours was seen in 85.7% of respondents.

CONCLUSION

With this resurgence of SARS-CoV-2, change in lifestyle habits of wearing masks and performing most of the official work via telecommunication medium has turned into compulsion. This fact can be generalised to other sectors of the general population as well. Thorough evaluation needs to be carried out in higher centres in future to tackle the post pandemic emergence of dry eye epidemic.

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