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ORIGINAL ARTICLE

PREVALENCE OF DRY EYE SYMPTOMS AMONG HEALTH WORKERS OF NATIONAL MEDICAL COLLEGE AND TEACHING HOSPITAL FOLLOWING CORONA VIRUS DISEASES-19 PANDEMIC

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ABSTRACT

Introduction: *With the outspread of global pandemic novel Corona virus disease, use of face masks is taken as a vital deed against severe acute respiratory syndrome coronavirus-2. The aim of this study was to evaluate prevalence of dry eye symptoms among health workers.*

Materials and Methods: *A total of 169 health workers meeting the inclusion criteria were selected by simple random sampling from respective department. Data were obtained by providing with questionnaire established by the researcher and Ocular Surface Disease Index (OSDI) to the participants from November 1, 2020 to March 31, 2021 at National Medical College and Teaching Hospital.*

Results: *The mean age of the patient was 31.74±7.34 years (range 19-56). On the basis of OSDI score, 27(15.9%) had mild, 15(8.87%) had moderate, and 44(26.03%) had severe dry eye symptoms respectively. Duration of mask wear and Visual Display Unit (VDU) usage were two variables that were statistically correlated with OSDI ($p<0.01$). The OSDI was not statistically correlated with age, glass wear and sleep duration.*

Conclusion: *With the emergence of novel Corona virus, measures like mask wear, online classes using VDU are must during these pandemics. With the increasing use of controlling measures, it is prime responsibility of ophthalmic faculty to start awareness regarding proper use of these measures among citizens to prevent Dry Eye Symptoms.*

Keywords: *Dry Eye Symptoms; Ocular Surface Disease Index; Health workers; Visual Display Unit*

INTRODUCTION

With the outspread of global pandemic COVID-19, use of face masks is taken as a vital deed against SARS-CoV-2.[1] This widespread use of masks has led to some issues like complaints of headache, breathing difficulties, skin irritation, sweating and fogged glasses.[2,3]

Mask associated dry eye (MADE) was first coined informally by an American Ophthalmologist D.E White on June 2020 who reported this condition in his blog.[4] The pathogenesis of dry eyes are abnormalities of the tear film, which includes aqueous tear deficiency, mucin deficiency, increased evaporation due to lipid layer abnormalities and lid surfacing abnormalities like meibomian gland dysfunction, blepharitis et. cetera. Disturbance of Lacrimal Functional Unit (LFU), an integral system which compromises of the lacrimal glands, eyelids, and the sensory and the motor nerves that connect them can lead to Dry Eye Disease.[5] Damage to any component of the LFU can destabilize the tear film and this can lead to ocular surface disease that expresses itself as dry eye.[6]

The main aim of this study was to observe Mask Associated Dry Eye among health workers who are regularly using face masks and to associate factors like age, sex, glass use, number of sleep hours and VDU usage like laptops, mobiles, tablets.

METHODOLOGY

This was a prospective, cross-sectional; a hospital based study conducted from November 1, 2020 to March 31, 2021 at National Medical College and Teaching Hospital, Birgunj, Nepal. A total of 169 health workers willing to take part in the study were included. The exclusion criteria are those having significant ocular and systemic disease that can cause dry eye disease (i.e, Diabetes Mellitus, Sjögren syndrome, diuretic drug user), history of

contact lens use, topical eye medication use, any history of ocular surgery (refractive surgery, cataract surgery) in the past. This study was approved by Institutional Review Committee of National Medical College and Teaching Hospital, Birgunj, Nepal. This study was carried out in accordance with the Declaration of Helsinki. Consent was taken from each participant before they were asked to fulfill the Proforma. With the questionnaire provided to the participants based on a review of the literature, they were asked about their socio demographic profiles, duration of usage of glass, mask and electronic devices.[7] They were also asked about mean time spent per day during sleeping. OSDI score were used to grade the dry eye disease. Classification of OSDI scores was done with value of 0-12 as normal, 13-22 as mild, 23-32 as moderate and 33-100 as severe dry eye symptoms.[7] The data were entered in SPSS, version 20. Correlation test were used to analyze different variables with OSDI score. P-value< 0.01 was considered statistically significant.

RESULTS

A total of 169 health workers fulfilling the inclusion criteria were included. The mean age of the patient was 31.74± 7. 34 years (range 19-56). Eighty-six (50.89%) were female and 83 (49.11%) were male. [Table 1]

Table 1: Demographic profile

Male	Female
83 (50.89%)	86 (49.11%)

The average time spent wearing glasses was 7.91±3.81 hours and mask wear was 11.30±4.33 hours whereas duration of visual display device usage was 9.90±1.16 hours and mean sleep duration was 7.13±1.16 hours. [Table 2]

Table 2: Average hours spent

	Glass Use	Laptop Use	Mask Use	Sleep duration
Mean hour	7.91 ± 3.81	9.90± 1.16	11.30±4.33	7.13± 1.16

According to OSDI scores, 27(15.9%) of the participants had mild disease followed by 15 (8.87%) cases of moderate and 44(26.03%) cases of severe disease respectively.

Mean OSDI score was statistically correlated with duration of mask wear and usage of visual display devices (p<0.01) whereas it was not statistically correlated with age, glass wear and sleep duration. [Table 3]

Table 3: Correlation of OSDI with mask wear and Visual Display Unit Usage

	Mean OSDI Score	VDU use	Mask Use	P-value
Mean hour	16.89 ± 19.37	9.90± 1.16	11.30±4.33	<0.01

DISCUSSION

This is the first prospective, cross-sectional; a hospital based study: To see prevalence of dry eye symptoms after COVID-19 pandemic among health-workers in National Medical College and Teaching Hospital, Birgunj, Nepal.

In this study, the prevalence of dry eye was slightly higher in females as compared to male (53.49% and 46.51%). In a hospital based study done in Nepal Eye Hospital, the female to male ratio was 2.6:1.[8] The prevalence of dry eye was found twice as high in women than in men in a study.[9]

The use of digital device has increased rapidly recently in almost all age group for multifunctional purposes. Questionnaires are of precise importance in DES evaluation as they are quite simple for formulation and more than that we have rare validated instruments for dry eye measurements.[10]

In a Dry eye symptoms evaluation of health workers during the novel corona virus outbreak time by Long et al., they found out that most of the doctors and nurses did not experience the symptoms. The vapour created in the protective glass during the long time continuous wearing of N95 for 4-5 hours might contribute to improvement of DES.[11] Tear film acts as a barrier for pathogenic invasion but may be compromised if mask use causes barrier to evaporate more rapidly and has also been mentioned in transmission of worrisome novel corona virus. The mucosa of ocular and upper respiratory tract is connected by Naso-Lacrimal Duct and share same entry for some respiratory virus. Pathogens which are exposed to ocular mucosa may get transported to nasal and nasopharyngeal mucosa by constant tear rinsing through the duct system causing respiratory tract infection.[12]

One of the review articles showed a marked increase in dry eye symptoms among uniform mask users. With the increased use of face masks, there is increased convection of air blowing towards the eyeball, causing evaporation of tear film leading to ocular surface irritation and inflammation.[13]

Out of 169 participants: 86(51.07%) had dry eye symptoms according to OSDI scores. Out of which 27(15.9%) had mild, 15(8.87%) moderate and 44(26.03%) severe respectively. In a survey done by Giannaccare, OSDI values greater than fifteen was seen in 57% which was similar to our study (86, 51.07%).[14] In the present study, age and gender were not statistically correlated with dry eye symptoms which was quite similar to study by Giannaccare.[14] However most of the study showed significant finding amongst female and elderly population,[15,16] but few studies reported no significance in gender as well.[17,18]

In the current study: 129(76.33%) participants were using mask for more than 8 hours and 69 (out of 129) participants had dry eye symptoms. There was significant positive correlation between mask use and OSDI scores. In a four year old Incident rate (IR) and Prevalence (PR) rate study done on patient using Continuous Positive airway pressure mask and nasal mask therapy,the IR and PR were significantly greater than reported prevalence report of Dry Eye Disease.[19] In a recent online survey, 18.3% had experienced mask associated dry eye symptoms which was not significant.[18]

Regarding VDU users, 54 (56.84%) had dry eye symptoms with highest OSDI scores out of 95 participants who were using electronic devices for more than 8 hours. Similarly, higher OSDI records were found in VDU users working for more than 8 hours in a dry eye evaluation study done by Gumus et al.[20]

Similar results were reported with significantly higher OSDI scores in those with 7-8 hours of computer use daily.[21-23]

Similar finding has been reported in many studies.[24,25] In a study done among Japanese workers who used VDU for more than 8 hours per day had higher risk of Dry Eye Disease (OR=1.94; 95%CI,1.22-3.09, p=0.05).[24] Important heterogeneity was observed (I^2 = 98.8%, p < 0.0001), in a meta-analysis for prevalence in dry eye disease among VDU user.[25] There was a positive correlation of OSDI with daily computer usage time in a study done by Simavli et al. This study also found out correlation of OSDI with other clinical and demographical parameter like TBUT, ocular staining pattern, gender.[26]

Glass use in this study was not significant for dry eye symptoms where one of the survey had similar finding[18] whereas in a dry eye symptom evaluation among lecturers by OSDI there was a significance of p=0.03 of glass use and dry eye symptoms.[17]

In current study, the association of sleep hours and dry eye symptoms was not significant where most of the study had significant correlation between sleep deprivation and dry eye symptoms.[27] Lee W. et al found strong association between duration of sleep hours (<4hours) and dry eye symptoms Korean adults.[28]

We all have come to know that use of face masks, maintaining hygiene, keeping social distancing and a new array of hope through vaccination has been an important factor for decelerating the pandemic surge. It is important to discuss the factors that may daunt people from using these measures. Thus, providing better guidance of using these anti-COVID measures is indeed vital at this critical moment of surge of second wave of this dreadful pandemic coming back with new strain of viral mutation which is more aggressive than the first one.

Limitations of the present study: For more significant outcome, objective analysis like Schimer's Test, Tear film Breakup Time, Ocular Surface Staining should be performed in a large number of population and moreover it is important to carry out a longitudinal study to observe better outcome in future.

CONCLUSION

With the emergence of Global pandemic of corona virus, use of masks, laptops have increased drastically against the virus transmission. Duration of mask wear and VDU usage was statistically significant with OSDI in this study. Thus, the impact done on ocular surface due to inappropriate and excess use of these measures is coming as a new ophthalmic burden. Eye protection and management of dryness and irritation is an important consideration among citizens following long term mask and laptop use.

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