



SEVERITY OF MASK ASSOCIATED DRY EYE AMONG HEALTH CARE WORKERS AND PATIENTS ATTENDING THE TERTIARY CARE CENTRE IN COVID19 ERA

Ophthalmology

Dr Santosh Singh Patel

Professor & HOD, Department of Ophthalmology, AIMMMCR, Durg, Chhattisgarh.

Dr Rajesh Kumar Sahu*

Associate Professor, Department of Ophthalmology, GMC Mahasamund, Chhattisgarh.
*Corresponding Author

Dr Sakshi Sahu

Resident, Pt JNMMC, Raipur, Chhattisgarh.

Dr Reshu Malhotra

Associate Professor, Department of ophthalmology, Pt JNMMC, Raipur.

ABSTRACT

During the COVID-19 pandemic, for prevention of disease transmission led to a worldwide increase in face mask utilization. But there had been a corresponding increase in ocular irritation and dryness among regular mask users. The aim of this study is to compare the severity of mask associated dry eye among health care workers vs patients attending the Tertiary Care Centre. A cross sectional observational analytical study conducted in 450 individuals, equally divided into Group A :Non mask users, Group B : mask users, Group C: Health care workers. The association of MADE with type of mask used, most commonly surgical mask wearing subjects had mask associated dry eye i.e., Group B (79.38%) and Group C (85.86%) respectively. Based on MADE severity, most common were grade 1 MADE (44.67%) and (51.33%) for group B & C respectively.

KEYWORDS

dry eye disease, face mask, OSDI score

INTRODUCTION

During the COVID-19 pandemic a lot of stress was given to safety measures. Face masks were considered the most crucial aspect in limiting the spread of COVID-19 in the community. However, there was a growing concern about dry eyes in patients due to the prolonged use of face masks. This entity was given the name of MADE: Mask Associated Dry Eye^{1,2}. Several studies have reported disruption of ocular surface along with increased dry eye symptoms during COVID-19 pandemic.^{3,4}

Mask-Associated Dry Eye, occurs because exhaled air, creates conditions that accelerate the evaporation of the tear film on the ocular surface and cause instability of tear film.^{5,6} This leads to dry spots, irritation, and discomfort. In the Tear Film and Ocular Surface Workshop II (TFOS DEWS II) study, dry eye was defined as a multifactorial ocular surface disease characterized by loss of tear homeostasis and subsequent tear instability, hyperosmolarity, ocular surface inflammation and damage, and neurosensory abnormalities.⁷ Dry eye disease (DED) can be associated with many different clinical symptoms such as ocular pain, dryness, burning, stinging, and foreign body sensation. The study aims to investigate the impact of different face masks on dry eye disease among healthcare workers and patients during the COVID-19 pandemic.

MATERIALS AND METHODS

A cross-sectional observational analytical study conducted after taking Ethical approval at the Department of Ophthalmology, Dr. B.R.A.M. Hospital, Raipur, CG aimed to investigate the impact of mask usage on dry eye disease (DED) among healthcare workers and patients during the COVID-19 pandemic.

The sample size taken by Consecutive Sampling was 450 participants, divided into three groups: Group A (non-mask users), Group B (mask users), and Group C (mask-using healthcare workers).

The data collection method involved the use of a Google form-based questionnaire and interviews about mask usage and the Ocular Surface Disease Index (OSDI) questionnaire, along with examination of patients coming to the Ophthalmology OPD who were willing to participate.

The outcome variables included OSDI questionnaire scores, Schirmer's I test readings, fluorescein sodium corneal staining, and tear film breakup time. A scoring system was developed for Mask-Associated Dry Eye (MADE), categorizing it into grades based on the cumulative scores from these variables. The operational definitions included criteria for dry eye, OSDI score categories (normal, mild, moderate, severe), Schirmer's I test results, tear film breakup time, and fluorescein corneal staining based on the National Eye INSTITUTE (NEI) scale.

Table 1: Grading System For Mask Associated Dry Eye

Dry Eye	OSDI score	Schirmer's test	TBUT	Fluorescein Sodium staining test (NEI Scale)	Individual Score for Each Test by Our System
Normal	0-12	>15mm	>10sec	0-3	0
Mild	13-22	10-15mm	=10 sec	4-7	1
Moderate	23-32	5-10mm	5-10 sec	8-11	2
Severe	33-100	<5mm	<5sec	11-15	3

Each test normal, mild, moderate and severe grade is given a score of 0,1,2,3 respectively. The score of these 4 tests is added to get a cumulative score that ranges from 0- 12.

RESULT

Regarding the type of masks used, most participants in both Group B (64.67%) and Group C (66.00%) used surgical masks. N95 or KN95 masks were used by 21.33% in Group B and 32.00% in Group C. Cloth masks were used by a smaller percentage, 14.00% in Group B and 2.00% in Group C.

The use of eyeglasses and face shields in addition to face masks was also associated with a higher prevalence of MADE, with the highest incidence observed in Group C (health workers). In both groups B & C, some cases were using eyeglasses i.e. 18.00% and 46.00% respectively. 02.67% and 22.00% cases were using face mask with face shield respectively for patients and health worker group.

Based on OSDI score, In Group A: Most cases were found to have Normal i.e. 124(82.67%) In Group B, Most cases were found to have Mild Dry Eye i.e. 70(46.67%) In Group C, Most cases were found to have Mild Dry Eye i.e. 82(54.67%). Based on Schirmer's test, In Group A, Most cases were found to have Normal i.e. 145(96.67%) In Group B, Most cases were found to have Mild Dry Eye i.e. 72(48.00%) In Group C, Most cases were found to have Mild Dry Eye i.e. 84(56.00%).

On the basis of TBUT score In Group A, Most cases were found to have Normal i.e. 145(96.67%) In Group B, Most cases were found to have Mild Dry Eye i.e. 72(48.00%) In Group C, Most cases were found to have Mild Dry Eye i.e. 84(56.00%).

In accordance with NEI scale In Group A, All cases were found to have Normal In Group B, Most cases were found to have Mild Dry Eye i.e. 68(45.33%) In Group C, Most cases were found to have Mild Dry Eye i.e. 79(52.67%)

Based on MADE severity (Table 2), most common were grade 1 i.e., 67

(44.67%) and 77 (51.33%) for group B & C respectively. But for Group A most common were normal people i.e., 127 (84.67%) followed by grade 1 i.e., 22 (15.33%) respectively (Table 3)

In association of MADE with type of mask used in both groups (Table 3), most commonly surgical mask wearing cases showing mask associated dry eye i.e., 77/97 (79.38%) and 85/99 (85.86%) for group B & C respectively. But for group B cloth mask showing more cases of MADE i.e., 17/21 (80.95%) compared to group B i.e., 01/03 (33.33%) respectively. (Table 4)

Table 2: Severity Of MADE In All Three Groups

MADE	Group A		Group B		Group C	
	N	%	N	%	N	%
Grade 0	127	84.67	47	31.33	25	16.67
Grade 1	23	15.33	67	44.67	77	51.33
Grade 2	00	00.00	30	20.00	40	26.67
Grade 3	00	00.00	06	04.00	08	05.33
p-value	The chi-square statistic is 5.8218. The p-value is 0.120612. The result is not significant at $p < 0.05$					

Table 3: Association of MADE With Type Of Mask Used In Both Groups

Variable	Group B			Group C		
	N	MADE	%	N	MADE	%
Cloth mask	21	17	80.95	03	01	33.33
Surgical masks	97	77	79.38	99	85	85.86
N95 or KN95 mask	32	09	28.12	48	39	81.25
Total	150	103	68.67	150	125	83.33

DISCUSSION:

The most common age group was 21- 40 years i.e., 282 (62.67%) which was comparable to study conducted by Bista PR et al⁸ where mean age of the patient was 31.74 ± 7.34 years. Based on OSDI score, most cases were showing OSDI score 13-22 i.e., mild dry eye i.e., 70 (46.67%) and 82 (54.67%) for group B & C respectively. But for Group A normal score, 0-12 shown by most cases i.e., 124 (82.67%) Bista PR et al⁹ study shown 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. In present study, based on Average hours/day of wearing a facemask, most common cases were using face mask for >3 h - <6 h/ day i.e., 88 (58.67%) for group B and 77 (51.33%) for group C respectively. 97 (64.67%) for group B and 69 (46.00%) for group C accepted that they haven't fit the mask well. Gupta A et al⁹ study showing About one-third of participants (38.5%) had worn a Cloth mask, 15.4% N95 with valve, 30.8% N95 without valve and 15.4% surgical mask. Azzam SH et al¹⁰ study shown that All participants had normal Schirmer test results. Both masks caused dryness according to TBUT, MGL, and OSDI scores. According to the DEWS II definition, 14 (46.7%) and 16 (53.3%) patients had DED in groups 1 and 2, respectively ($P = 0.606$). In addition, there was a significantly higher MGL in the upper lid compared to the lower lid in all participants (22.7 vs. 7.4, $P < 0.001$). Comparing the two groups, TBUT ($P = 0.042$) and fluorescein staining ($P = 0.038$ for right eye and $P = 0.015$ for left eye) were significantly higher in the N95 mask group.

CONCLUSION:

The study highlighted the association of severity and frequency of dry eyes in an individual wearing mask for along period of time. The finding reflects that the frequency of the dry eyes along with the severity will increase with the increasing duration of wearing the mask. Moreover, it also suggests that ill fitting surgical mask and cloth mask and is the probable predisposing factor for the increase in dry eye symptoms. Health Care Workers were found to have higher frequency of Mild and Moderate Dry Eye compared to patients that wore mask due to longer hours of use of mask and increased tendency to use mask with eye glasses and face shield. They also faced more symptoms like burning, photophobia and foreign body sensation or faced worsening in symptoms of dry eye.

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