

## Recommendations for management of ocular symptoms due to prolonged use of personal protective equipment by healthcare workers

Dear Editor,

With India being the second highest country in the world affected by the coronavirus (COVID-19) pandemic, a majority of healthcare workers are spending prolonged hours in COVID-19 wards donned in a personal protective equipment (PPE).<sup>[1]</sup>

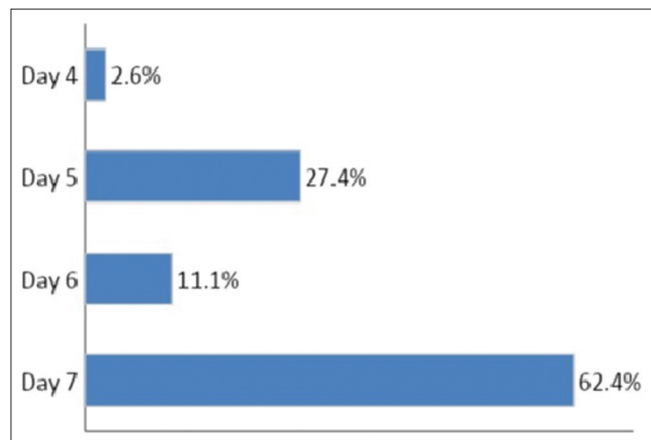
The authors noticed an increasing number of healthcare workers coming to the Ophthalmology outpatient department with complaints of ocular irritation or redness specifically after COVID-19 ward or COVID-19 intensive care unit postings. We thereby evaluated the incidence of symptoms via an online questionnaire-based survey (via Google Forms) for all healthcare workers using PPE over the duration of 1 month. The data was analyzed and the following results were obtained.

A total of 254 responses from interns, postgraduates, staff nurses, and general attenders who donned a PPE were received, cross-checked, tabulated, and analyzed. The median age of the respondents was 27 (IQR: 24,32) years. They were categorized

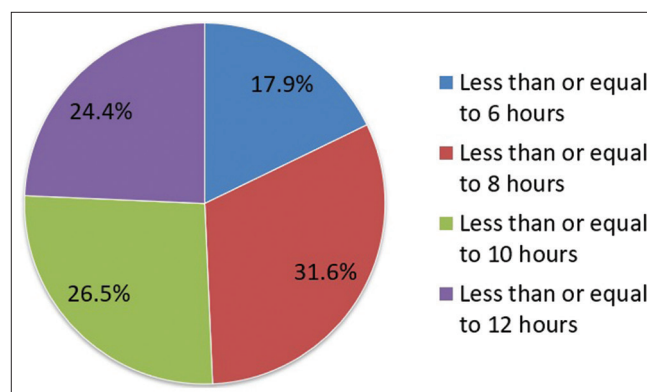
into four groups depending on the duration they were donned in a PPE, namely, less than or equal to 6 h, less than or equal to 8 h, less than or equal to 10 h, and less than or equal to 12 h as well as the number of consecutive days they were donned in. The study period ranged from 4/15/21 to 5/15/21.

In our survey, 52.7% (120) were males and 47.3% (134) were females, while 50.39% (128) were postgraduates, 22% (56) were staff nurses, 22.4% (57) were attenders, and 5.1% (13) were interns. The maximum duration donned in was less than or equal to 8 h by 31.6% (80) of the respondents followed by less than or equal to 10 h and less than or equal to 12 h by 26.5% (67) and 24.4% (62) of the respondents, respectively. Of these, 62.4% (158) respondents were donned in for 7 days consecutively, followed by 27.4% (70) who were donned in for 5 days consecutively [Figs. 1 and 2].

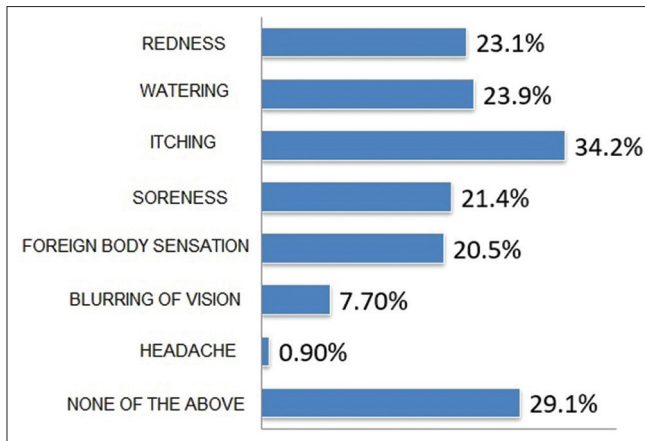
When asked about prior ocular conditions, 35.9% (91) revealed that had preexisting dry eye and 24.8% (63) said they had bouts of allergic conjunctivitis, while 24.8% (63) had no diagnosed ocular condition. Among lesser observed were refractive errors and history of prior refractive surgery. When asked specifically about ocular symptoms after doffing from their PPE, 34.2% (87) complained of ocular itching, 24.8% (63) complained of ocular irritation, 23.9% (61) complained of watering, 23.1% (59) complained of redness, 21.4% (54) complained of ocular soreness, 20.5% (52) complained of foreign body sensation, and 29.1% (74) had no specific ocular complaint [Fig. 3].



**Figure 1:** Horizontal bar diagram showing consecutive days donned in by healthcare workers



**Figure 2:** Pie chart showing number of hours donned in on each day by healthcare workers



**Figure 3:** Horizontal bar diagram showing ocular symptoms experienced by healthcare workers after doffing their PPE

Among respondents having ocular symptoms after doffing, 43.6% (111) stated their symptoms subsided in a few hours, while 26.5% (67) stated that it took a few days. When asked about whether they consulted an ophthalmologist for their symptoms, 25.6% (65) said they did, while 32.5% (83) either self-medicated or took medication as per their ophthalmologists' recommendation.

The ocular surface is neutral to mildly acidic ( $\text{pH} = 7.11 \pm 1.5$ ) and sweat, which is primarily acidic ( $\text{pH} = 6.3 \pm 1.5$ ) and may percolate onto the ocular surface.<sup>[2,3]</sup> We postulate that prolonged hours in a PPE hinders a healthcare worker from removing the sweat from the ocular surface, thereby allowing the sweat that percolates to change the pH and play a role as an ocular irritant. This is supported by the results collected where only 29.1% participants stated that they had no specific ocular complaint after doffing. Additionally, those donned in for longer hours (less than or equal to 8 and 10 h) had at least one ocular symptom.

For healthcare workers spending prolonged hours in PPE, ophthalmologists may consider prescribing preservative free artificial tears solutions after doffing to dilute the ocular surface, thereby restoring the normal ocular pH. Alongside, any preexisting ocular condition that may affect the ocular surface health should be taken into consideration as it may play a role in aggravation of symptoms. We also urge public health guidelines to contemplate including a provision for management of post-PPE doffing ocular symptoms for healthcare workers.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.ijo.in
	<b>DOI:</b> 10.4103/ijo.IJO_1414_21

**Cite this article as:** Paul A, Sainath D, Krishnagopal S. Recommendations for management of ocular symptoms due to prolonged use of personal protective equipment by healthcare workers. *Indian J Ophthalmol* 2021;69:2882-3.

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**SURVEY TO ASSESS OCULAR SYMPTOMS DUE TO PERSONAL PROTECTIVE EQUIPMENT USAGE AMONG HEALTHCARE WORKERS IN A TERTIARY HEALTHCARE HOSPITAL**

**QUESTIONNAIRE**

**PLEASE ANSWER ALL QUESTIONS**

NAME:

AGE:

SEX:

**1. WHAT IS YOUR CURRENT DESIGNATION IN THE HOSPITAL?**

- POSTGRADUATE RESIDENT
- INTERN
- STAFF NURSE
- ATTENDER

**2. WHICH COVID WARD HAVE YOU BEEN POSTED IN?**

- ASYMPTOMATIC COVID WARD
- SYMPTOMATIC COVID WARD
- CASUALTY/ACCIDENTS AND EMERGENCY DEPARTMENT
- COVID INTENSIVE CARE UNIT

**3. WHAT ARE THE TOTAL NUMBER OF DAYS OF CONSECUTIVE COVID DUTY DONE?**

- 4 DAYS
- 5 DAYS
- 6 DAYS
- 7 DAYS

**4. WHAT IS THE DAILY DURATION OF YOUR POSTING?**

- UPTO 6 HOURS
- UPTO 8 HOURS
- UPTO 10 HOURS
- UPTO 12 HOURS

**5. HAVE YOU BEEN DIAGNOSED WITH ANY OCULAR CONDITION (S) PRIOR TO YOUR POSTING?**

- DRY EYE
- V REFRACTIVE ERROR
- ALLERGIC CONJUNCTIVITIS
- HISTORY OF ANY OCULAR SURGERY
- NONE OF THE ABOVE

**6. AFTER DOFFING, HAVE YOU EXPERIENCED ANY OF THE FOLLOWING OCULAR SYMPTOMS?**

- IRRITATION
- REDNESS
- WATERING
- FOREIGN BODY SENSATION
- ITCHING

- SORENESS
- BLURRING OF VISION
- NONE OF THE ABOVE

**7. IF YOU EXPERIENCED ANY OF THE ABOVE SYMPTOMS, HOW LONG DID IT TAKE TO SUBSIDE?**

- FEW HOURS
- FEW DAYS
- DID NOT EXPERIENCE ANY SYMPTOMS

**8. IF YOU EXPERIENCED ANY OF THE ABOVE SYMPTOMS, HAVE YOU CONSULTED AN OPHTHALMOLOGIST FOR THE SAME?**

- YES
- NO
- NOT RELEVANT

**9. IF YOU EXPERIENCED ANY OF THE ABOVE SYMPTOMS, HAVE YOU USED ANY MEDICATION FOR THE SAME?**

- YES
- NO
- NOT RELEVANT

**THANK YOU FOR YOUR PARTICIPATION**