



## Spectacle use, diet, and COVID-19

Dear Editor,

The eye (other than the respiratory system) is considered an important route of infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes Coronavirus disease 2019 (COVID-19). Literature has shown that people typically touch their face about 23 times every waking hour<sup>[1]</sup>. The eye is rich in the angiotensin-converting enzyme-2 receptor, the SARS-CoV-2 gateway<sup>[2]</sup>. Studies have shown that SARS-CoV-2 was detected in tears of patients with COVID-19, and some ophthalmologists were infected by this route during routine treatment<sup>[3–6]</sup>. Though the WHO guidelines advocate the usage of goggles or a face shield, the protection provided by them has not been studied extensively. But any protection could, in theory, decrease the susceptibility to acquiring the virus.

A recent study from China concluded that those who used eyeglasses were less prone to contracting COVID-19<sup>[7]</sup>. An observation in our department and among colleagues/friends who tested SARS-CoV-2 positive also supported this. Additionally, the authors also observed that those following a vegetarian diet were less likely to contract the virus. In order to better understand the relationship between spectacle use, diet, and COVID-19, an observational study was conducted in the Rohtak district of Haryana, India. The ethical waiver was obtained from the Biomedical Research Ethics Committee, Pandit B.D. Sharma, PGIMS, Rohtak. Procedures followed the ethical standards of the responsible committee on human experimentation (institutional and national) and the Helsinki Declaration.

Those presenting to healthcare workers (HCWs) of our hospital or institution were to be tested for SARS-CoV-2 and volunteered to participate in our study. At the time of answering our questions, all were unaware of their SARS-CoV-2 status. Nasopharyngeal and

throat swab samples were tested by real-time reverse transcriptase-polymerase chain reaction assays (Covisure 4 Gene Kit, Trivivron Healthcare, India) to detect SARS-CoV-2 infection. They were specifically asked about the length of time that they wore eyeglasses (if at all) during daily activities. Persons wearing spectacles for over 8 hours daily irrespective of the type of refractory error were considered 'regular users'. Their dietary habits were also recorded. Those consuming meat other than plant products were categorized as non-vegetarian while those consuming egg and milk products and no meat were considered vegetarians. Those wearing contact lenses or severely ill were excluded. Participants were not provided with any incentive or compensation to participate in the study.

Of the 922 individuals, 549 (59%) were males and 373 (41%) females. The age range was 1 month to 105 years with a median of 31 years. Among them, 231 were HCWs and 691 were non-healthcare workers (NHCWs). Thirty-eight percent of HCWs and 75 percent of the NHCWs were vegetarian. Fifty-five percent of HCWs and 23 percent of NHCWs used eyeglasses. Overall there were 564 SARS-CoV-2 negative and 358 positive patients. On analysis, neither dietary habits ( $P=0.45$ ) nor use of eyeglasses ( $P=0.191$ ) appeared to affect susceptibility to SARS-CoV-2 as can be seen in **Table 1** below. Additionally, gender ( $P=0.103$ ) also showed no association with the SARS-CoV-2 status, but either male NHCWs ( $P=0.01$ ) or older subjects ( $P=0.026$ ) were affected more likely; and HCWs were more susceptible than the general population ( $P=0.001$ ).

The higher incidence among HCWs and the elderly comes as no surprise. Our study showed that none of the factors (dietary habits, eyeglasses, or gender) appeared to affect susceptibility to SARS-CoV-2,

Received: 06 August 2021; Revised: 21 September 2021; Accepted: 08 October 2021; Published online: 13 January 2022

CLC number: R511, Document code: B

The authors reported no conflict of interests.

This is an open access article under the Creative Commons Attribution (CC BY 4.0) license, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited.

**Table 1 SARS-CoV-2 infection in the study group**

Groups	SARS-CoV-2 negative (n)	SARS-CoV-2 positive (n)	P-value
<b>Diet<sup>a</sup></b>			
Vegetarian	376	230	0.45
Non-vegetarian	188	128	
<b>Diet<sup>b</sup></b>			
Vegetarian	48	40	0.13
Non-vegetarian	65	78	
<b>Spectacle<sup>a</sup></b>			
Spectacle user	166	120	0.22
Non-spectacle user	398	238	

SARS-CoV-2: severe acute respiratory syndrome coronavirus 2; <sup>a</sup>the entire study group; <sup>b</sup>the healthcare workers group. P-values were calculated by Chi-square test.

which is contrary to the study published in *JAMA Ophthalmology* (2020)<sup>[7]</sup>. That study only considered SARS-CoV-2 positive inpatients, which could have been biased by extrapolating to the entire population, and their finding could be merely due to chance alone. Another setback of the study is that the confounding role of physical distancing and handwashing practice has not been studied. This observational study cannot be used to deduce that there is a fundamental relationship between spectacle use and SARS-CoV-2 infection. Finally, the ineffectiveness of eyeglasses could be due to the inadequate protection offered by spectacles from the sides. There could be a relation between the severity of the disease and use of eyeglasses, which we have not studied. A similar view has been presented in an invited commentary in the same journal<sup>[8]</sup>.

The eye could be an infection route for SARS-CoV-2, but our findings reiterate that more attention is paid to preventive measures such as mask usage, frequent hand washing, and social distancing, apart from eyewear sanitation that may be the weak link in the chain.

Yours Sincerely,  
Pradyumna Krishna Majumdar<sup>1,✉</sup>, Vikas Bhardwaj<sup>1</sup>,  
Sarika Sharma<sup>1</sup>, Sarita Majumdar<sup>2</sup>

<sup>1</sup>Department of Orthopaedics,

<sup>2</sup>Department of Nursing,  
Post Graduate Institute of Medical Sciences,  
Rohtak, Haryana 124001,  
India.

✉Tel: +91-80592-20723,

E-mail: pradyumnakm@gmail.com.

## References

- [1]Kwok YLA, Galton J, McLaws ML. Face touching: a frequent habit that has implications for hand hygiene[J]. *Am J Infect Control*, 2015, 43(2): 112–114.
- [2]Holappa M, Vapaatalo H, Vaajanen A. Many faces of renin-angiotensin system - focus on eye[J]. *Open Ophthalmol J*, 2017, 11: 122–142.
- [3]Wu P, Duan F, Luo C, et al. Characteristics of ocular findings of patients with coronavirus disease 2019 (COVID-19) in Hubei province, China[J]. *JAMA Ophthalmol*, 2020, 138(5): 575–578.
- [4]Seah IYJ, Anderson DE, Kang AEZ, et al. Assessing viral shedding and infectivity of tears in coronavirus disease 2019 (COVID-19) patients[J]. *Ophthalmology*, 2020, 127(7): 977–979.
- [5]Lu C, Liu X, Jia Z. 2019-nCoV transmission through the ocular surface must not be ignored[J]. *Lancet*, 2020, 395(10224): e39.
- [6]Guan W, Ni Z, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China[J]. *N Engl J Med*, 2020, 382(18): 1708–1720.
- [7]Zeng W, Wang X, Li J, et al. Association of daily wear of eyeglasses with susceptibility to coronavirus disease 2019 infection[J]. *JAMA Ophthalmol*, 2020, 138(11): 1196–1199.
- [8]Maragakis LL. Eye protection and the risk of coronavirus disease 2019: does wearing eye protection mitigate risk in public, non-health care settings?[J]. *JAMA Ophthalmol*, 2020, 138(11): 1199–1200.