

## Impact of the second wave of COVID-19 pandemic on the mental health and training of ophthalmology residents doing COVID duties in Gujarat.

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### Abstract

**Background:** To study the impact of the second wave of the COVID-19 pandemic on the attitude and practice of vaccination, mental health and training of the ophthalmology residents doing COVID duties in Gujarat. **Materials and methods:** In this prospective study, online survey (Google Forms) was conducted during the second wave of COVID-19 pandemic from May 13 to May 17 2021 amongst the ophthalmology residents doing COVID duties in Gujarat. It was designed to understand their attitudes and practices towards COVID-19 vaccination, their mental health using the Patient Health Questionnaire (PHQ-9) and their perceived impact of the second wave of the pandemic on their ophthalmology training. **Results:** 148 residents responded to the survey. Mean age was  $25.86 \pm 1.4$  years and 73 (49.32%) were males. 112/148 (75.67%) had been vaccinated against COVID-19. The mean PHQ-9 score was  $10.61 \pm 4.5$  (range of 1 to 24). 130 (87.83%) participants had some degree of depression. Depression was significantly more in students from government medical colleges ( $p=0.013$ ). Mean duration of covid duty performed was  $26.54 \pm 17.63$  days. 83/101 (82.18%) residents who had done COVID duties during both waves of the pandemic, found the second wave more stressful. 109/148 (73.65%) residents found COVID duties during the second wave had hampered their training in ophthalmology. **Conclusion:** With the constant threat of ongoing COVID-19 pandemic, an accessible psychological support system and effective e-learning process amongst the ophthalmology trainees, thereby boosting their self-confidence should be encouraged.

**Key words:** second wave, ophthalmology residents, vaccination, mental health, training, COVID 19

### Introduction

Coronavirus disease 19 (COVID-19) caused by severe acute respiratory syndrome - coronavirus 2 (SARS-CoV2), an unprecedented medical emergency, continues to create havoc across the world even more than a year since the declaration of the pandemic on 11 March 2020, by the World health organization (WHO). <sup>1</sup> The end of the first wave, observed in January 2021, was mainly due to

unrelenting efforts of the medical fraternity as well as government interventions. India also began its vaccination program on 16 January 2021 and by April 2021 had average of administration of 3-4 million doses per day.<sup>2</sup> However, with a sudden surge in the number of confirmed cases in March 2021, a second wave of the pandemic was noted with a steady increase in the daily number of cases. This second wave of the pandemic had greater repercussions than the first with shortage of essential medicines, hospital beds, oxygen cylinders and COVID-19 vaccines in different parts of the country.<sup>2</sup> Gujarat was one of the hot spots during the second wave, contributing a high number of cases reported in the country. There was also a surge in the patients affected by post COVID mucormycosis with increased hospital admissions. In the midst of this national crisis, several medical students and specialty subject trainees were deployed to manage patients infected with COVID-19 and mucormycosis, to reduce the burden on a crippled health care system. Several ophthalmology residents, though not trained in direct COVID patient care, too were posted in emergency triage areas, COVID care wards and intensive care units (ICU) to manage the heavy load of COVID-19 patients, increasing their responsibility. The precarious situation during the second wave of the pandemic brought with it tougher decisions, more deaths of patients, delay in treatment due to non-availability of ventilator beds and a shortage of medicines that possibly could leave the doctors stressed and emotionally and mentally vulnerable.<sup>3,4</sup> Simultaneously, for a surgically intensive specialty of ophthalmology, the surgical training was also compromised due to reduction of elective surgeries and lost opportunities due to their reassignment to COVID duties.<sup>5</sup> In addition, the disruption in clinical teaching with the augmented use of virtual platforms caused a limitation in their learning of concepts. The impact of these deficient experiences is likely to have longstanding effects on their career and could delay their personal and professional goals.<sup>3</sup> Though studies reporting the impact of first wave of COVID-19 pandemic on the attitude of vaccination, mental health and training of doctors, ophthalmologists and ophthalmology trainees, globally and in India have been published, there is no study till date reporting the impact of the more severe second wave of the pandemic on the practice of vaccination, mental health and ophthalmology training of the residents in ophthalmology doing COVID duties.<sup>6,7,8,9</sup> This study explores the impact of the second wave of the pandemic on the attitude and practice of vaccination, mental health and training of the ophthalmology residents doing COVID duties in Gujarat.

## Material and Method

The prospective study was approved by the Institutional Review board and adhered to the tenets of Helsinki Declaration. The study was designed using purposive sampling to include ophthalmology resident doctors doing COVID duties in Gujarat. It was done to understand their attitude towards vaccination and effect of the second wave of the pandemic on their mental health and ophthalmology training, which possibly might help in designing corrective policies if needed. The participation in the study was voluntary and completely anonymous. Residents not giving consent to participate in the study and who had not done COVID duty during the second wave of the COVID19 pandemic were excluded from the study.

An online survey (Google Forms), consisting of 42 questions, was conducted during the second wave of COVID-19 pandemic over 5 days (May 13 to May 17, 2021). An invitation to participate in the study was circulated amongst them through multiple groups on social media, namely WhatsApp and Telegram. The validated questionnaire consisted of six parts. The first part included the socio-demographic information of the participants (age, gender, marital status, place of residence), second part included their current training status (course in ophthalmology, year of residency, type and location of institute in which training is being taken- government/private), while the third part recorded their attitude and practices towards vaccination. A standardized "Patient Health Questionnaire-9" (PHQ-9) was incorporated in the fourth part of the survey to assess the mental health of the trainees. PHQ-9 is a self-report measure used to determine the severity of depression over the prior two weeks.<sup>10</sup> Fifth part recorded the details of the COVID duties including mucormycosis duties done by the residents during

the second wave of the pandemic. The sixth part of the questionnaire recorded their perceived impact of the second wave of the pandemic on their ophthalmology training.

The data entry was done in the Microsoft Office EXCEL spreadsheet. The final analysis was done using the Statistical Package for Social Sciences (SPSS) software version 21.0 (IBM Inc, Chicago, Illinois, USA). Presentation of the categorical variables was done in the form of number and percentage (%). Data normality was checked using the Kolmogorov-Smirnov test. Association of variables which were quantitative and not normally distributed in nature were analyzed using Mann-Whitney Test (for two groups) and Kruskal Wallis test (for more than two groups). The association of the variables which were qualitative in nature was analyzed using Chi-Square test. For statistical significance, p value less than 0.05 was considered statistically significant.

## Results

Of the 156 responses recorded in the survey, eight (5.12%) responses were excluded from the study due to negative consent of the participants. The mean age of the 148 responders of the survey was 25.86±1.4 years (range- 23 to 32 years). All the participants were from different cities in the four zones of Gujarat, namely the Central, North, South and Saurashtra. The socio-demographic and academic training information of the participants is as per Table-1.

**Table 1: Socio-demographic and academic training information of the study population**

Baseline characteristics	Frequency	Percentage (%)
<b>Marital status</b>		
Married	22	14.86
Single	126	85.14
<b>Gender</b>		
Female	75	50.68
Male	73	49.32
<b>Course in Ophthalmology</b>		
Diploma Ophthalmology	31	20.95
DNB Ophthalmology	7	4.73
MS Ophthalmology	110	74.32
<b>Type of Institution</b>		
Government Medical College	108	72.97
Private Medical College	40	27.03
<b>Place of Residency</b>		
Central Gujarat	100	67.57
Saurashtra	32	21.62
North Gujarat	06	4.05
South Gujarat	10	6.76

In all, 44 first year, 57 second year, 19 third year and 28 senior residents participated in the survey. Of these, 77 (52.02%) stayed in hostel, 65 (43.91%) at home and 6 (4.05%) at other rented facility during their COVID duties. Of the 148 residents, 112 (75.67%) residents had been vaccinated against COVID-19, of which 72 (48.65%) had taken both doses. Amongst the 36 residents who had not taken the vaccine, the reasons cited were doubts about the vaccine efficacy in 19 (52.78%), presence of comorbidity in 8(22.22%), fear of side-effects in 7 (19.44%) and non-specific reasons in 9 (25%). Amongst them, 16/36 (44.44%) respondents showed willingness to take the vaccine in the near future. Table-2 shows correlation between socio-demographic characteristics and approach towards vaccination. None of the socio-demographic and professional training variables proved to be statistically significant in relation to the approach towards getting vaccinated. Of the 77 doctors, 63(81.82%) residents staying in

hostel had taken at least one shot of the vaccine, as compared to 44/65(67.69%) residing at home ( $p=0.116$ ).

**Table 2: Correlation between socio-demographic characteristics and approach towards vaccination. (Numbers in brackets indicate percentages)**

Baseline characteristics	Not taken vaccine(n=36)	Taken vaccine(n=112)	Total	P value
<b>Marital status</b>				
Married	8 (36.36)	14 (63.64)	22	0.154 <sup>‡</sup>
Single	28 (22.22)	98 (77.78)	126	
<b>Gender</b>				
Female	15 (20)	60 (80)	75	0.214 <sup>‡</sup>
Male	21 (28.77)	52 (71.23)	73	
<b>Year of residency</b>				
First year	9 (20.45)	35 (79.55)	44	0.879 <sup>‡</sup>
Second year	14 (24.56)	43 (75.44)	57	
Third year	5 (26.32)	14 (73.68)	19	
Senior resident	8 (28.57)	20 (71.43)	28	
<b>Place of residency</b>				
Central Gujarat	23 (23)	77 (77)	100	0.874 <sup>†</sup>
Saurashtra	8 (25)	24 (75)	32	
North Gujarat	2 (33.33)	4 (66.67)	6	
South Gujarat	3 (30)	7 (70)	10	

\* Mann Whitney test, † Fisher's exact test, ‡ Chi square test

The mean PHQ-9 score was  $10.61 \pm 4.5$  (range of 1 to 24). One hundred and thirty (87.83%) participants had some degree of depression, 36(24.32%) had mild, 69 (46.62%) had moderate, 22(14.86%) had moderately severe and 3(2.03%) had severe depression. Table 3 shows correlation between socio-demographic and professional training characteristics and severity of depression.

**Table 3: Correlation between socio-demographic and professional training characteristics and severity of depression (Numbers in brackets indicate percentages)**

Baseline Characteristics	Depression Grade					Total	P value
	None n=18	Mild n=36	Moderate n=69	Moderately severe	Severe n=3		
<b>Marital status</b>							
Married	4 (18.18)	3 (13.64)	9 (40.91)	5 (22.73)	1 (4.55)	22	0.284 <sup>†</sup>
Single	14(11.1)	33 (26.19)	60 (47.62)	17 (13.49)	2 (1.59)	126	
<b>Gender</b>							
Female	9 (12)	20(26.67)	34 (45.33)	10 (13.33)	2 (2.67)	75	0.924 <sup>†</sup>
Male	9 (12.33)	16 (21.92)	35 (47.95)	12 (16.44)	1 (1.37)	73	
<b>Course in ophthalmology</b>							
DO	1 (3.23)	6 (19.35)	18(58.06)	6 (19.35)	0	31	0.619 <sup>†</sup>
DNB	1 (14.29)	2 (28.57)	3 (42.86)	1 (14.29)	0	7	
MS	16 (14.55)	28 (25.45)	48 (43.64)	15 (13.64)	3 (2.73)	110	
<b>Year of residency</b>							
First year	9 (20.45)	12 (27.27)	18(40.9)	4 (9.09)	1 (2.27)	44	0.014 <sup>†</sup>
Second year	2 (3.51)	13 (22.81)	36 (63.16)	6 (10.53)	0 (0)	57	
Third year	3 (15.79)	6 (31.58)	5 (26.32)	4 (21.05)	1 (5.26)	19	
Senior resident	4 (14.29)	5 (17.86)	10 (35.71)	8 (28.57)	1 (3.57)	28	

† Fisher's exact test, <sup>§</sup>Kruskal Wallis test

Moderate depression was found to be more common amongst the second-year resident doctors while moderately severe depression in the third year and senior residents ( $p=0.014$ ). Out of 148, only three had severe depression (one first year, one third year and one senior resident) and all were staying at hostel. No statistically significant association was found between the course of ophthalmology and the severity of depression ( $p=0.619$ ). No significant statistical association was found between place of stay during the COVID posting and depression ( $p=0.714$ ). Forty-nine (63.64%) participants were afraid of their family getting infected because of their COVID duty ( $p=0.124$ ). Depression was significantly more common in students from government medical colleges ( $p=0.013$ ) as shown in table 4.

**Table 4: Association of depression score with type of institution (numbers in brackets indicate percentages)**

Depression score	Government medical	Private medical college, n=40	Total	P value
<b>Depression Severity</b>				
Minimal	15 (13.89)	3 (7.50)	18 (12.16)	0.013 <sup>†</sup>
Mild	32 (29.63)	4 (10)	36 (24.32)	
Moderate	48 (44.44)	21 (52.50)	69 (46.62)	
Moderately severe	11 (10.19)	11 (27.50)	22 (14.86)	
Severe	2 (1.85)	1 (2.50)	3 (2.03)	
<b>Total score</b>				
Mean $\pm$ SD	9.95 $\pm$ 4.38	12.4 $\pm$ 4.38	10.61 $\pm$ 4.5	0.002*
Range	1-22	3-24	1-24	

\* Mann Whitney test, <sup>†</sup> Fisher's exact test

**Table 5: Association of impact of second wave of the pandemic on ophthalmology training with year of residency (numbers in brackets indicate percentages)**

Response	Year of residency				Total	P value
	First year	Second year	Third year	Senior resident		
<b>Used virtual platform for ophthalmology training?</b>						
No	22 (50)	10(17.54)	8 (42.11)	8 (28.57)	48(32.43)	0.006 <sup>‡</sup>
Yes	22 (50)	47 (82.46)	11(57.89)	20 (71.43)	100(67.57)	
<b>Found online teaching helpful?</b>						
No	10(29.41)	14(23.72)	7 (30.43)	10 (31.25)	41(27.71)	0.848 <sup>‡</sup>
Yes	24 (70.59)	45(76.28)	16(69.57)	22(68.75)	107(72.29)	
<b>How has COVID duty affected Ophthalmology training?</b>						
Low patient load in clinic	0	16 (32)	0	7 (21.87)	23 (15.54)	0.012 <sup>†</sup>
Reduced surgical work	9 (20.45)	10 (20)	5 (22.72)	7 (21.87)	31 (20.94)	
Reduced interactive learning	35 (79.55)	24 (48)	17 (77.28)	18 (56.26)	94 (63.52)	
<b>Have COVID duties hampered your training in ophthalmology?</b>						
No	6 (13.64)	20 (35.09)	4 (21.05)	9 (32.14)	39 (26.35)	0.083 <sup>‡</sup>
Yes	38 (86.36)	37 (64.91)	15 (78.95)	19 (67.86)	109(73.65)	

<sup>†</sup> Fisher's exact test, <sup>‡</sup> Chi square test

The mean duration of covid duty performed in the second wave of the COVID-19 pandemic was 26.54  $\pm$  17.63 days (range of 7-120 days). No statistically significant association was found between the duration of COVID duty and the severity of depression ( $p=0.648$ ). Eighty-one (54.73%) residents were infected with COVID-19 during their duty. Of these, 63 (77.78%) had taken the vaccine( $p$ -value=0.512), 26/63

had taken single dose and 37/63 had taken both doses. The mean PHQ score in the 81 residents infected with COVID-19 was 11 with 75 students reporting some type of depression ( $p=0.095$ ). Of the 148 resident doctors, 101 had done COVID duties during the first wave of the pandemic too. Amongst them, an overwhelming 83/101 (82.18%) residents found the COVID duties during the second wave to be more stressful than that during the first wave of the pandemic. Also, majority residents (109 (73.65%)) found that COVID duties during the second wave had hampered their training in ophthalmology. The association of the impact of the second wave of the pandemic and their COVID duties on the ophthalmology training of the residents (year of residency wise) is as per table 5.

## Discussion

COVID-19 pandemic is bound to have a major impact on healthcare workers including the ophthalmology trainees, especially when they are also performing COVID duties. Understanding the experiences and perceptions from their point of view will help to systematically and effectively manage the issues they face. This study highlights the higher stress levels, depression and anxiety related to a halt in their ophthalmology training apart from their COVID duties brought by the second wave of pandemic. The survey recorded 75.67% vaccination, which was comparable to previous studies reported from Poland and France.<sup>12,13</sup> A study in Egypt reported only 21% healthcare workers agreeing to be vaccinated against COVID-19.<sup>14</sup> In our study, the commonest concern for not taking the vaccine was doubt about its efficacy unlike that found in the survey in Poland where it was fear of adverse effects. The reason for this doubt may be the accelerated approval of the new COVID-19 vaccine raising concerns about its safety and efficacy. A majority of those vaccinated were staying at hostel away from their family (81.82%), in contrast to the survey done in Poland, where people living alone were less likely to get vaccinated.<sup>12</sup> This reinforces the fact that the ophthalmology trainees, doing COVID duties are cautious and well aware of the risks they face and prefer to take the vaccine for their safety and protection. A healthcare workers' perception and attitude to vaccine plays an essential role in the general populations' vaccination behavior.

Overall, the present study reported a prevalence of depression to be 87.83%, which is quite high compared to 25.97% reported from Gujarat in a survey carried out amongst practicing and trainee ophthalmologists in India<sup>7</sup> and in Saudi Arabia (50.5%).<sup>11</sup> The pooled prevalence of depression among health care workers reported in a recent meta-analysis was 35.4%.<sup>15</sup> Anxiety and depression was reported among ophthalmologists and ophthalmic nurses working in close proximity with COVID infected patients in Wuhan.<sup>16</sup> The mean PHQ-9 score was 10.61 in the present study, more than 3.98 reported previously by Khanna et al, suggesting that the second wave of the pandemic had more severe impact on the mental health of the ophthalmologists.<sup>7</sup>

The ophthalmology trainees working as frontline workers in COVID pandemic face a greater degree of psychological challenge and are more prone to infection due to close proximity with the infected patients. Severity of depression was higher in third year and senior ophthalmology resident doctors. The third year MS residents had their final examinations postponed and were deployed to do COVID duties, causing major stress related to the uncertainty of the exams as well as results and future career plans. Senior residents are also likely to be worried about the loss of their surgical work opportunities during the pandemic causing insecurity and low self confidence amongst them. Similar to a study reported previously from India, a higher proportion of residents doing COVID duties were from government medical colleges and depression was found to be more common amongst them due to higher workload and demanding work schedules in government hospitals.<sup>7</sup> The increased amount of stress noted in the second wave of the pandemic is also likely due to surge in the post COVID mucormycosis hospital admissions with increased duties of the resident doctors. The government should develop strategies to provide personalized mental health care to the residents, especially those doing COVID duties, by a dedicated team of psychologists and psychiatrists, to alleviate their fears. Psychological counselling

sessions before the start of the COVID duties along with regularly available accessible mental health care team for them should be considered.

Of the 100 residents, 83 resident doctors using online platform for learning found it beneficial, which is higher than that found in the study done during first wave of COVID-19.<sup>7</sup> This highlights that, while not completely replacing the inter-person interactions, the online platform offers considerable advantage in teaching and learning process of the students, though identification of the gaps in the training and creating novel learning methods to overcome them is the need of the day. For this, every tool at our disposal should be used creatively, applying modern digital solutions and adopting emerging virtual technologies for virtual teaching and learning.<sup>17,18</sup>

Since this survey was conducted amongst a targeted population of ophthalmology trainees in Gujarat doing COVID duties, with similar ages and experiences, it resulted in a homogenous data with more reliable results. However, this is also a limitation of the study as the study population is not representative of the general population and it has no control population.

## Conclusion

A significant impact on the mental well-being during the second wave of the COVID-19 pandemic was observed amongst the ophthalmology resident doctors. Given the highly unpredictable course and duration of the ongoing pandemic and the allocation of resources towards its management, the state and national ophthalmic societies, along with the Government should be cognizant of the mental health issues, the ophthalmology trainees face as a direct effect of their COVID duties as well as the potentially devastating impact of the pandemic on their training. Accessible psychological support programs and e-learning, boosting the self-confidence of the trainees should be encouraged.

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