



COVID-19 Times and Dental Students: Challenges and Adapting with New Normal

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Abstract

Background Dental students were adversely impacted by coronavirus disease-2019 (COVID-19) leading to changes in their personal and professional lives. They have been under stress and adapting to new technologies and scenarios at the workplace. With the omicron threat looming, new challenges await them. The study aims to assess perceptions, stress, and coping mechanisms adopted by dental students during COVID-19 times, and to invite suggestions to improve the professional scenario.

Methodology A cross-sectional self-administered questionnaire-based study was planned for third- and final-year undergraduate and postgraduate dental students from dental colleges around the Chandigarh region. Convenient sampling was done. Thirty-item questionnaire was sent via email and WhatsApp groups in the form of Google Form. *p*-Value less than 0.05 was taken as statistically significant.

Results Overall, 389 students participated, with majority (93.8%) being 21 to 25 years of age, females (75.6%), and undergraduates (90.2%). Also, 35% had a positive COVID-19 family history. Social media was the most common source (81.1%) of information regarding the pandemic. The majority received online teaching (84.83%) and gave online exams (58.6%). Altered sleep patterns (81.5%) and increased screen time (82%) were reported. Being female (stress score 11.15; $p < 0.001$; Mann–Whitney *U* test), final-year undergraduate (stress score 11.1; $p < 0.017$; Kruskal–Wallis test), and positive COVID-19 family history (stress score 11.83; $p < 0.002$; Mann–Whitney *U* Test) was associated with significantly higher mean stress scores. Watching movies (30%) and sharing a stressful feeling with family (47%) were the most common coping mechanisms. Students suggested flexible work schedules, more offline work with better safety protocol, and counselors for the future.

Conclusion Decreasing number of stressors and increasing involvement in the coping mechanism will help students to better embrace the impact of the COVID-19 pandemic.

Keywords

- ▶ COVID-19
- ▶ dental students
- ▶ stress
- ▶ coping mechanisms
- ▶ online teaching

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Introduction

Coronavirus disease-2019 (COVID-19) pandemic has shaken the whole world with its rampant spread leading to millions of casualties across the globe since the reporting of its first case in Wuhan, China, in the month of December 2019.^{1,2} With countries recovering from the second wave and the anticipation of the third wave, the guidelines for the new normal keep on changing every now and then. In all, it has not only affected the physical dimension of one's health but also isolated one on mental and social fronts.^{3,4} The challenge now is not only to acquaint oneself with the sequential changes taking place during the pandemic but also to deal with its turmoil in terms of fear, emotional breakdowns, depression, and ostracization. Besides the loss of normalcy, the closure of the educational and higher professional institutions has put students in a dilemma related to their careers and education and induced a lot of stress.^{5,6} These unprecedented times have been a major blow to the professions like dentistry, which require practical hands-on training. Dentists form one of such groups that require not only academic training but also hands-on training on patients under the guidance of their teachers.

In India, we have approximately 315 dental colleges with thousands of students enrolled.⁷ Dentistry courses are known to be rigorous academically involving a lot of hands-on/practical training on patients. The postgraduate course is of 3-year duration with extensive patient work. The past 2 years of the COVID-19 pandemic have resulted in temporary closure and reopening of the colleges with no or limited patient work for students. The teaching modules have also shifted from offline to online mode.^{8,9} The exams have been postponed or are being conducted online. The panic contagion has not only further affected their education, training, and future prospects but also induced fear of contracting COVID-19 and enhanced stress and anxiety levels.^{6,8-16} Coronavirus is abundantly present in nasopharyngeal and salivary secretions of the affected patients.¹⁷ The dental setups are at high risk for contracting Coronavirus as the treatment procedures result in the production of aerosols; close contact with the patient; exposure to saliva, blood, and other body fluids; and long patient appointments.¹⁸⁻²¹ Despite dealing with all the uncertainty on the professional front, finding safe accommodation also has adversely impacted the dental students. The pandemic-related personal and financial issues also add up to their stress.^{10,14,15}

As in some individuals, reactions to stressors/multiple feelings in their professional life and on the personal front can differ from the normal resolution. Little is known about their experiences, perceptions, fears, and coping mechanisms. The previously done studies in other countries have recorded the psychological impact among dental students and future directions in their scenario. With the threat of new variants like delta and now omicron looming around, it becomes imperative that we understand these challenges and their management so that the past does not repeat itself in the future.

In India, only one study has been done so far that recorded the perceived stress among dental professionals in Chhattisgarh before and during the COVID-19 outbreak.¹⁰ To the best of the authors' knowledge, none of the studies have focused on recording the stressors and their management by the dental students in the Indian setup. Since different states have different guidelines, it is important to record such stressors at the local or regional level. Chandigarh is one of the eight Union Territories of India. The region boasts of many educational institutions and there are seven dental colleges and hospitals within the 35 km vicinity of Chandigarh. A study was therefore designed to record the perceptions related to the effects of COVID-19 among dental students, assess mean stress levels and the coping mechanisms adopted by them, and invite suggestions from the students for the college management and faculty for better management of education and stress-related issues.

Materials and Methods

Study Design and Setting

A cross-sectional, questionnaire-based study was planned.

Study Population

The study population consisted of third- and final-year undergraduate and postgraduate students of dental colleges located in the Chandigarh region within a 35 km vicinity of Chandigarh. So all the dental colleges located in the jurisdiction of these areas constituted the study population.

Sampling Frame and Inclusion Criteria

The sampling frame included all the students studying in different dental colleges located in the Chandigarh region within 35 km vicinity of Chandigarh. Convenience and snowball sampling was done. Participation was voluntary and participants were free to discontinue the survey at any stage. The contact details of the students were accessed through the administrative wings of respective colleges and the students.

Questionnaire (Annexure 1) and Procedure

A pretested, anonymous, structured, and self-administered questionnaire in the English language was designed by investigators as an online Google Form. The questionnaire was prepared by taking into consideration the questionnaires used in previously done studies. It was pilot tested on 30 students to check its feasibility and face validity. The internal consistency of the questionnaire was also checked and it was found to be good (0.82). After final corrections, it consisted of 30 items and 5 sections. The questionnaire link was sent via WhatsApp to all the students. Two reminders were sent on the second and fifth days and the link was closed after 1 week.

Section 1 included title, the purpose of the study, and sociodemographic information of study participants (age, gender, class [undergraduate and postgraduate, including which year], source of information regarding COVID-19, and family history of COVID-19). Section 2 consisted of eight

questions asking participants to share their current educational scenario, changes in screen time, and changes in sleep patterns. Section 3 consisted of 12 situations wherein the study participants were required to rate their level of stress associated with each situation on 4-point Likert scale ranging from not stressful (1) to highly stressful (4). For scoring stress, the scores were given as 0 for no stress, 1 for mild and moderate stress, and 2 for high stress. The overall stress score ranged from 0 to 28. For comparison purposes, 0 to 9 was classified as mild, 10 to 18 as moderate, and 19 to 28 as severe stress. Section 4 consisted of three questions related to stress management (activities, sharing feelings, and help from respective dental colleges for managing stress). The final section included two open-ended questions on suggestions for college authorities to improvise teaching and stress management.

Statistical Analysis

The data were entered in an Excel Sheet and analyzed using the *Statistical Package for Social Sciences* (SPSS 22, IBM Corporation, New York, United States). Descriptive statistics were done to calculate frequency and percentages for categorical data. Mean stress scores were calculated for stress-related factors. Nonparametric tests like the Mann-Whitney *U* test, Kruskal-Wallis test, and chi-squared test were used to assess the association between mean stress scores and age, gender, and level of study. Further regression analysis was also done. A *p*-value of less than equal to 0.05 was taken as statistically significant.

Results

A total of 389 third- and final-year dental undergraduates and postgraduates completed the questionnaire. ► **Table 1** shows the sociodemographic distribution of the study participants. In all, majority (93.8%) were 20 to 25 years old and

female dental students (75.6%). Among 351 (90.2%) undergraduate students, 167 (47.57%) were in their third year and 184 (52.52%) were in their fourth year while 38 (9.8%) were postgraduates. Students were also asked about their source of information about COVID-19 pandemic. Multiple sources were used by students to update themselves about the pandemic. Social media (Facebook, Twitter, Instagram) was most popular (81.1%) followed by television/radio (63%), print media (51.7%), and medical literature (31.4%). The history of COVID-19 in the family was also enquired and those who responded positively were 136 (35%).

► **Table 2** shows the experience and management of college-related activities by the students including their screen and sleep time. Most of the third-year undergraduate students (*N* = 134) were not going to the college, while the majority of the postgraduate students (*N* = 18) visited the college occasionally. During the pandemic times, 58.6% gave online exams. Among these, 83.25% reported that their experience was overall good with no or little hiccups. The online form of teaching was most common in use and 330 participants attended their courses through the online medium. However, only 176 were satisfied with this method. Among the online mode of teaching, PowerPoint slides and showing relevant clinical photos (*N* = 290) were the most commonly used methods. Participants also witnessed changes in sleep patterns with the majority (82%) reporting altered (increased or decreased) sleep. In the altered sleep, increase in sleep time (68% participants) was observed. Besides, 81.5% of the study participants reported an overall increase in screen time.

Graph 1 shows the overall mean stress scores of dental students based on different sociodemographic variables recorded. Different groups exhibited overall moderate stress (between 10 and 18). However, higher stress scores were recorded in the younger age group (20–25 years, stress score 10.72), females (score 11.15), and final-year undergraduates (score 11.1).

Table 1 Sociodemographic variables of study participants

Variable		Number (%)	
Age	20–25 years	365 (93.8)	
	26–30 years	24 (6.2)	
Gender	Male	95 (24.4)	
	Female	294 (75.6)	
Class	Undergraduate students	3rd year	167 (49.2)
		4th year	184 (47.3)
	Postgraduate students	1st, 2nd, and 3rd years	38 (9.8)
Sources of information regarding coronavirus disease-2019 (COVID-19)	Print media (newspapers, magazines, etc.)	201 (51.7)	
	Television/Radio	245 (63)	
	Social media (Facebook, Twitter, WhatsApp, etc.)	315 (81.1)	
	Medical journals/literature	122 (31.4)	
Did you or anyone in your family suffer from COVID-19?	Yes	136 (35)	
	No	253 (65)	

Table 2 Management of college schedule and work during coronavirus disease 2019 times as per class

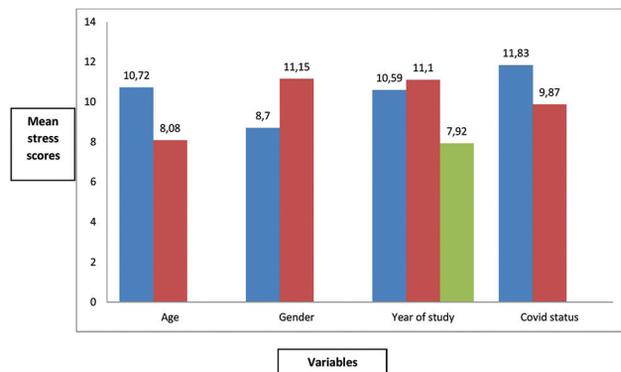
Sl. no.	Variable	Response	Undergraduate		Postgraduate
			Third year	Fourth year	
Q1.	Going to college	Yes, regularly	18	38	17
		Yes, occasionally	15	87	18
		No	134	59	3
Q2.	Form of teaching mostly received	Online	150	156	24
		Offline	17	28	14
Q3.	Satisfaction with online teaching	Satisfied	78	78	20
		Not satisfied	89	106	18
Q4.	How college/institute managed clinical work?	Online demonstration on models/typodonts	77	56	14
		Teaching through presentation including clinical pictures	136	133	21
		Occasional visit to the college	15	34	23
Q5.	Online exams during these times	Yes	129	85	14
		No	38	101	24
Q6.	Experience with online exams	Good	44	22	4
		Somewhat good	65	48	6
		Bad	20	14	4
Q7.	Sleep alteration	Increased	107	97	13
		Decreased	37	54	11
		No change	27	37	14
Q8.	Screen time	Increased	141	151	25
		Decreased	8	10	2
		No change	21	26	11

Higher stress scores (11.83) were also seen in those students who themselves or their families or near and dear ones were suffering from COVID-19. Kruskal–Wallis and Mann–Whitney *U* tests were used to check the significant association between various groups and it was found that stress scores

were significantly higher among females ($p < 0.001$), final year participants ($p < 0.017$), and those with positive COVID-19 history ($p < 0.002$). *p*-Values were also calculated for each stress-related question asked among different sociodemographic variables to identify individual factors contributing to stress (–Table 3). Further regression analysis (–Table 4) was done to see which among these significant variables is contributing to mean stress scores. Being female and having positive COVID-19 history emerged to be significant, with *p*-values of 0.021 and 0.002, respectively.

According to **Pie Chart 1** (stress management, section 4), watching movies (30%) was the most common stress management activity, followed by physical exercise (25%), spending time with the family (25%), meditation/yoga (17%), and others. **Pie Chart 2** (stress management, section 4) shows that students shared their stressful feelings with family (47%) and friends (46%) almost equally. The majority (94%) said they did not receive any help from their respective institutes to manage or reduce stress.

Two open-ended questions asked the students to give suggestions regarding how college authorities can improve teaching in the future during pandemics and how the stress and mental health issues of students can be addressed. The students suggested more clinical demonstrations using new educational technologies and software.



- Age (1: 21-25 years, 2: 26-30 years) $p < 0.056$, Mann Whitney test
- Gender (Male: M, Female: F) $p < 0.001^{**}$, Mann Whitney test
- Class (Third year: 3 UG, Fourth year: 4 UG, Post Graduate: PG) $p < 0.017^{**}$, Kruskal Wallis test
- Covid status (Yes: Y, No: N) $p < 0.002^{**}$, Mann Whitney test

Graph 1 Overall mean stress scores of dental students based on different sociodemographic variables.

Table 3 p-Values for stress-related questions among different variables

Sl. no.	Stress-related factors	Age	Gender	Class	COVID-19 status
1	How did you feel most of the time	0.282	0.019	0.322	0.005
2	Fear of getting COVID-19	0.340	0.670	0.617	0.001
3	Not able to meet friends/family	0.914	0.115	0.036	0.004
4	Difficulty studying at home	0.186	0.002	0.174	0.118
5	Uncertainty about exams/preparations	0.024	0.003	<0.001	0.085
6	Inability to do clinical/practical work	0.003	<0.001	<0.001	0.210
7	Not able to discuss doubts with teachers	0.021	0.037	0.217	0.281
8	Increased load of assignments	0.192	0.033	0.658	0.004
9	Reopening of college	0.006	0.349	<0.001	0.094
10	Difficulty in finding safe accommodation	0.759	0.305	0.309	0.869
11	Doing procedure on patients	0.086	0.006	0.038	0.009
12	Uncertainty about future career	0.434	<0.001	<0.001	0.013
	Overall	0.056	0.001	0.017	0.002

Abbreviation: COVID-19, coronavirus disease 2019.

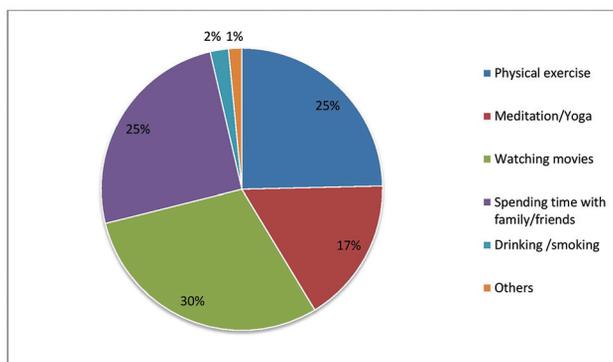
Table 4 Regression analysis showing overall significant variables for mean stress scores questionnaire

Total stress ^a	B	Standard error	Wald	df	Significance	Odds ratio	Interval of odds ratio	
							Lower bound	Upper bound
≥Median intercept	-1.127	0.481	5.483	1	0.019	-	-	-
Age 20–25 years 26–30 years	-0.101 0 ^b	0.651 -	0.024 -	1 0	0.877 -	0.904 -	0.252 -	3.238 -
Gender Female Male	0.569 0 ^b	0.246 -	5.334 -	1 0	0.021 -	1.766 -	1.090 -	2.862 -
Class 3rd year UG 4th year UG PG	0.583 0.669 0 ^b	0.546 0.538 -	1.139 1.544 -	1 1 0	0.286 0.214 -	1.791 1.952 -	0.614 0.680 -	5.223 5.604 -
COVID-19 Yes No	0.702 0 ^b	0.223 -	9.888 -	1 0	0.002 -	2.018 -	1.303 -	3.125 -

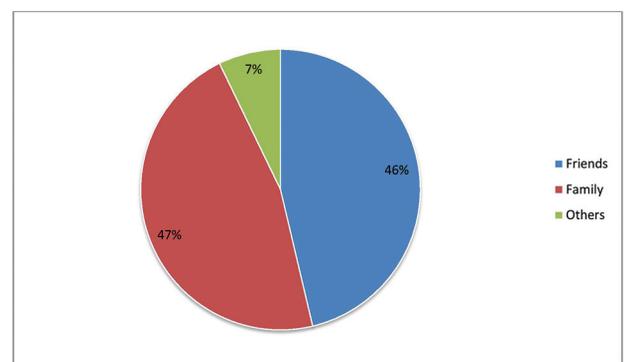
Abbreviations: COVID-19, coronavirus disease-2019; PG, postgraduate; UG, undergraduate.

^aThe reference category is: <Median.

^bThis parameter is set to zero because it is redundant.



Pie Chart 1 Stress management activities by dental students during coronavirus disease-2019 times.



Pie Chart 2 Sharing of stressful feelings by dental students in coronavirus disease-2019 times.

Offline classes with adequate barriers and safety protocols must be in place to adapt to the newer scenarios. For stress and mental health issues, students suggested that the colleges should have a counselor, dedicated stress or grievance management committee, and telephonic reach 24 hours a day. The deadlines for the projects should be flexible and announced well before time, and staff should be trained to be more empathetic and cooperative toward them.

Discussion

COVID-19 has generated a lot of uncertainties for dental students in almost all the spheres of their life. The ever-changing norms have pushed them to physical and emotional burnout. The high-risk nature of their work has made them adopt and adapt new work and coping practices.^{16,22} The present study assessed dental students' work-related and associated practices, stress factors, coping mechanisms, and possible future suggestions.

With the advent of the Internet and social media, people tend to rely on these sources for any type of information. The same has been reflected in our study wherein social media like Facebook and Twitter remained the most common source of information regarding COVID-19. Though investigators feel that students should have relied more on scientific literature for COVID-19-related information, however, late publications and being more active on social media might be the reasons for the students not relying on it.

Work-Related Factors

The study also tried to enquire about the management of college schedules and work during COVID-19 times (► **Table 2**). As observed by the time of data collection, not many were going to college regularly. The fear of spreading COVID-19 and sporadic incidents after the reopening of colleges deterred many dental colleges from operating regularly with all the students. It also induced fear in students, and in their parents to send their ward to college even when the choice was given. Online mode of teaching with PowerPoints and clinical photos was most commonly used. Similar results were reported by other studies.¹⁵ However, final-year undergraduates in the present study were not satisfied with this method. It is understandable, as the final year is the time when students tend to do a lot of clinical work, though studies have also shown that teaching didactic dental subjects by videoconferencing has worked out to be as effective as traditional face-to-face seminars.^{23,24} However, clinical subjects require practical skills gained through patient work. With the backdrop of facing the pandemic anxiety syndrome, fear of contracting the virus while working on patients, and fear of carrying infection back home, has been a major deterrent in acquiring the required skills even in scenarios where they were allowed to do patient work.^{13,15,21} Majority of the students in the present study appeared online for the exams and they rated their experience as good. This might be because of the fact that they might have been more confident in taking exams in the same mode as they were taught and by the time exams happened they had adjusted well to the online system.

The pandemic-led uncertainties and stress might be one of the reasons for the altered sleep pattern, as observed in the participants. The increase in screen time witnessed in the present study can be attributed to the fact that a lot of teaching was now happening online. Also, watching movies was one of the main stress buster activities performed by the students.

The present study identified that females, final-year undergraduates, and individuals with positive COVID-19 history had significantly higher mean stress scores (**Graph 1**). Similar studies have also reported high anxiety and depression scores.^{5,12,14,15} Final-year students in India usually have a lot of clinical work to do and due to the closure of the institutions, they were not able to hone their clinical skills leading to stress. Third-year students usually have less clinical work compared with final year, and they might be hoping to recover from lost work in the final year once the pandemic slows down or is over. In the Chandigarh region, postgraduate students were still attending colleges more frequently to maintain necessary emergency services in their respective departments. Also, since the course spans over 3 years, they might be hoping to recover from the lost clinical time.

The study also tried to identify individual significant stress-related factors across different groups (► **Table 3**). Uncertainty about exam preparation, inability to do clinical work, doing procedures on patients, fear of getting COVID-19, and uncertainty about the future came out to be significant ones inducing stress.

Fear of getting COVID-19, doing patient procedures, and uncertainty about the future were also reported as stressful in other studies.^{11,13,15,21} Since no protocols were initially placed for the management of exams, teaching, and patient work, these induced stress among participants. The newer methods and technologies, challenges involved in learning them, managing technical glitches, changes in schedule, and high risk associated with the profession for contracting COVID-19 led to these stressful factors. The investigators hope that identifying individual factors will pave the way for tailor-made guidance for specific groups.

Stress Management and Coping

In the present study, watching movies, doing physical exercise, and yoga and meditation came out to be the most common stress management activities (**Pie Chart 1**). This is in sync with earlier studies reporting that physical exercise, yoga, and meditation produce feel-good hormones and relax one's mind leading to reduced stress.²⁵⁻²⁷ A study done by Agius et al also reported physical exercise as the most common coping strategy.¹⁵ Family and friends play an important role in striking a balance in one's life and the same has been reflected in our study where 93% relied on them to share their feelings (**Pie Chart 2**). The study highlights the role of our near and dear ones, especially in rough times. They can be effectively incorporated into stress management activities.

Suggestions

Based on our study, students suggested allowing flexibility in the study group to read and attend lectures at their own convenient times. Special interactive sessions can be

arranged for students who are less participating and struggling to provide one-on-one interaction with the students. Online chat system with an anonymous chat section where students who fear being judged by peers and have not understood the procedure can ask a question that can be addressed instantaneously. The syllabus can be divided on the basis of clinical and nonclinical topics and offline sessions can be arranged for those needing clinical exposure or demonstration. Adequate safety protocol while working with patients must be in place. These protocols have been suggested by other studies as well.¹⁶ Stress management programs/counseling centers in dental institutes are the need of the hour to tackle the impact of stress during pandemics on students. Regular screening of symptoms by routine interaction with clinical psychologists can avert depression and related symptoms. There is also a need to establish a mental health support system that can address special needs during the pandemic. Education on coping strategies and stress management may be helpful. The special faculty development programs should be organized on creative teaching methodologies with the use of technology.

Conclusion

Two main strategies can be used to help stressed students, namely decreasing the number of stressors and increasing the ability to cope with stress. The first strategy includes several components, such as reducing fear of failure and workload pressure due to examinations and requirements. The second strategy includes increased involvement in coping techniques, such as deep breathing exercises. There is also a need for more research to identify the most effective stress management program.

Conflict of Interest

None declared.

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Annexure 1

COVID-19 Times and Dental Students: Adapting with the New Normal

The study intends to know about the scenario being faced by the students at personal and professional front, situations related to stress and its management methods during the coronavirus disease 2019 (COVID-19) times.

Please take a few minutes to fill up this questionnaire. You can answer by ticking (*) against the appropriate response. The information obtained will be purely used for academic purposes and will be kept confidential.

Consent—By filling and submitting this form, I give my consent to participate in this study.

Section 1—Demographic information

Age _____ years

Gender -

- Male
- Female
- Others

Class -

Undergraduate -

- Third year
- Fourth year

Postgraduate -

- First year
- Second year
- Third year

What are your sources of information regarding COVID-19? (Select all that apply)

- Print media (Newspaper, posters, pamphlets)
- Television/ Radio
- Social Media (Facebook, Twitter, Instagram)
- Medical journals/ medical literature
- Others, _____ (specify)

Did you or anyone in your family suffer from COVID-19?

- Yes
- No

Section 2

Q1. Were you going to college during these times?

- Yes, regularly
- Yes, occasionally
- No

Q2. What form of teaching did you mostly receive/ are receiving during these times?

- Online
- Offline

Q3. How satisfied were you with the online teaching method?

- Satisfied
- Not satisfied

Q4. How did your college/ institute manage your clinical work?

- Online demonstration on models/ typodonts
- Teaching through presentation including clinical pictures
- Occasional visit to the college
- Any other.....specify

Q5. Did you take online exams during these times?

- Yes
- No

Q6. How was your experience while taking online exams?

- Good; you did not feel any anxiety
- Somewhat good; you felt less anxious than you used to feel during offline exams
- Bad; you felt a lot more anxious than you used to feel during offline exams

Q7. Did you experience any change in sleep time?

- Increased sleep
- Decreased sleep
- Disturbed sleep
- No change

Q8. Apart from online classes, did you experience any change in your screen time?

- Increased
- Decreased
- No change

Section 3

Stress-related factors

The following questions will perceive the situations that may have led to stress during these COVID-19 times.

Select an appropriate answer ranging from 1 to 4, where,

1. Not stressful
2. Slightly stressful
3. Moderately stressful
4. Highly stressful

Q1. How do you feel most of the time? 1 2 3 4

Q2. Fear of getting COVID-19 by yourself /family/friends 1 2 3 4

Q3. Not able to meet friends or family 1 2 3 4

Q4. Difficulty in studying at home 1 2 3 4

Q5. Uncertainty about exams/ exams preparation 1 2 3 4

Q6. Inability to do pre-clinical/ clinical work 1 2 3 4

Q7. Not able to discuss doubts with teachers properly 1 2 3 4

Q8. Increased load of assignments, projects 1 2 3 4

Q9. Reopening of college 1 2 3 4

Q10. Difficulty in finding safe accommodation after reopening of college 1 2 3 4

Q13. Doing procedures on patients 1 2 3 4

Q14. Uncertainty about future career 1 2 3 4

Section 4

Stress management questions

Q1. What all activities did you pursue to reduce/ manage stress? (Select all that apply)

- Physical exercise
- Meditation/ yoga/ religious practices
- Watching movies
- Spending time with family/ meeting with friends
- Drinking/ smoking
- Others _____ (specify)

Q2. Whom do you talk to about your stressful feelings?

- Family
- Friends
- Teacher
- Counsellor
- Others _____ (specify)

Q3. Did you receive any help from your college/ institute to reduce/ manage stress?

- Yes
- No

Section 5

Q4. Any suggestions for college authorities to improve teaching.

Q5. Any suggestions for college authorities regarding management of stress and mental health issues of students.