

Can COVID-19 related apprehensions influence the perception of dental faculty towards online teaching? – A cross-sectional study

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Abstract

Background: E-learning for theory sessions and face-to-face practical/clinical sessions are the new norms followed by dental colleges in Saudi Arabia during this COVID-19 pandemic. With the dental faculty being at higher risk of contracting COVID-19, it is imperative to study any possible influence of apprehensions related to COVID-19 on their perception towards online teaching.

Methods: 101 dental faculty from Riyadh province, Saudi Arabia participated in this web-based survey which included sociodemographic details and a 16-item self-made questionnaire. Exploratory factor analysis of the questionnaire yielded five factors viz. positive, and negative perception towards online teaching (PPOT & NPOT) and apprehensions related to COVID-19: fear of infection (COVID19-FF1), fear of survival (COVID19-FF2) and fear regarding dental practice (COVID19-FF3). Descriptive and inferential statistics were performed using SPSS 26.0. $P < 0.05$ was considered significant.

Results: Mean scores for the factors were PPOT: 3.1 ± 0.94 , NPOT: 3.2 ± 1.1 , COVID19-FF1/FF2/FF3: 3.4 ± 1.0 , 2.7 ± 1.1 , 3.2 ± 1.1 respectively. Dental faculty from rural areas, with family size < 5 and from clinical dental specialties showed higher PPOT. COVID19-FF3 had a positive correlation with PPOT ($P = 0.023$). Saudi nationals had higher NPOT, clinical dental faculty had higher COVID19-FF1 while basic dental faculty had higher COVID19-FF3. Number of family members, area of specialization and COVID19-FF3 were significant predictors of PPOT, whereas nationality and number of family members were significant predictors of NPOT.

Conclusion: Dental faculty had a mixed perception about online teaching with fear regarding dental practice positively influencing PPOT.

Keywords: COVID-19, Online Education, Perception, dental faculty

1. Introduction

On March 2, 2020, the first case of COVID-19 in the Kingdom of Saudi Arabia was recorded (Staff, 2020). Within a week, by March 9, 2020, the lockdown was in effect to restrict the spread of infection. All the schools and colleges were closed, and the educational institutions including dental colleges were asked to proceed with remote learning methods (Nurunnabi, 2020). Dental education includes theory classes and practical/clinical classes involving procedures practiced on mannequins by preclinical students

and hands-on experience on patients by clinical students (Tuncer, Arhun, Yamanel, Çelik, & Dayangaç, 2015). Though face-to-face lectures were replaced by online lectures with much greater ease than expected, training the students on practical and clinical sessions was a huge hurdle for both educators and students (Mukhtar, Javed, Arooj, & Sethi, 2020; Nasseripour et al., 2021). Ensuring proper education to budding dentists without compromising on educational standards became the major goal for the dental faculty during this pandemic.

The national center for E-learning was established in Saudi Arabia in the year 2005, and the control of its quality in education and training is also a part of Kingdom vision 2030 (Editor, 2018). For more than a decade, E-learning was a part of the undergraduate and postgraduate curriculum in many programs across the universities in Saudi

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Arabia (Al-Shehri, 2010) which is usually coordinated by the E-Learning Unit. In the case of dental programs, certain auxiliary courses were being conducted as e-learning courses. With the continuation of the pandemic, since September 2020 most dental colleges in the kingdom are following a hybrid model where theory session is online, but the clinical sessions are held on-site, face-to-face. Most of the universities utilize learning management systems (LMS) like Blackboard or D2L to facilitate e-learning (AlAtram, Dango, Jayakumar, & Kannan, 2020; Aldiab, Chowdhury, Kootsookos, Alam, & Allhibi, 2019).

In addition to the challenges posed by the unprecedented hybrid model of teaching in dentistry, the dental faculty are also faced with a higher risk of contracting COVID-19. The human-to-human transmission rate of COVID-19 is high which is primarily through respiratory aerosols that remain stable for prolonged periods. Since dental procedures involve the generation of respiratory aerosols, dentists are at higher risk of contracting the infection even when compared to general physicians (Fini, 2020; Mallineni et al., 2020; Passarelli, Rella, Manicone, Garcia-Godoy, & D'Addona, 2020).

The role of the faculty in continuing dental education during this pandemic is indispensable. Studies during the earlier stages of the pandemic have shown that fear and anxiety of COVID-19 were higher among dentists (Cagetti, Cairolì, Senna, & Campus, 2020; Consolo, Bellini, Bencivenni, Iani, & Checchi, 2020). The feeling of fear and excitement has been reported to influence faculty attitudes about online teaching experience (Bunk, Li, Smidt, Bidetti, & Malize, 2015). Globally, research on the influence of fear on online teaching perception is very scarce. A study conducted in UAE has demonstrated that fear of COVID-19 can influence the usefulness of technology positively in students (Al-Marouf, Salloum, Hassanien, & Shaalan, 2020). In addition, most studies conducted during the pandemic have focused on student's perspectives (Adnan & Anwar, 2020; Means & Neisler, 2021; Sujarwo, Sukmawati, Akhiruddin, Ridwan, & Siradjuddin, 2020) and there is a dearth of literature on teachers' perspective. Prior to the COVID-19 lock-down, studies have found higher levels of motivation and acceptance by the dental faculty in Saudi Arabia towards e-learning (Linjawi & Agou, 2020). To our knowledge, only a single study is available on the dental faculty's perception about online teaching while no study is available that assesses the association between dental teacher's perception of online teaching and COVID-19 related

apprehensions both globally and in Saudi Arabia (Schlenz, Schmidt, Wöstmann, Krämer, & Schulz-Weidner, 2020). Such studies are lacking among dental faculty members globally as well as in Saudi Arabia and this was found as a lacuna to conduct this study. Hence this study was undertaken to assess the perception of dental faculty on online/e learning and to study the association between COVID-19 related apprehensions and perception towards online teaching.

2. Review of Literature

(Insert Table 1 here)

The list of previous studies conducted in Saudi Arabia regarding the perception and attitude of teachers and students towards online teaching during the COVID-19 pandemic is given in table 1. Studies have also shown that dentist across the globe are more anxious with increased levels of fear of infection, fear of transmitting infection of family members, and loss of jobs due to the COVID-19 pandemic (Ahmed et al., 2020; Gasparro et al., 2020; Kinariwala, Samaranayake, Perera, & Patel, 2020; Shacham et al., 2020). There are no studies conducted in dental faculty regarding the perception towards online teaching in Saudi Arabia and this is the first study globally to study the influence of COVID-19 related apprehensions on the perception towards online teaching of the dental faculty.

3. Materials and Methods

3.1 Participants and setting:

This cross-sectional web-based questionnaire study was carried out following STROBE guidelines (von Elm et al., 2007). The minimal sample size needed for this study was calculated using Statcalc software with a 95% confidence interval and 10% confidence level which estimated 96 as minimal sample size. The study was conducted during the later phase of the COVID-19 pandemic in Saudi Arabia, i.e., during December 2020 (from December 16 - 23, 2020). Initially, a pilot study was conducted using the response from 30 participants. The responses were assessed, and minor corrections were made in the questionnaire with the help of peers and experts. Only dental faculty working within the Kingdom of Arabia were included in the study. For the main study, out of 117 respondents, 13 entries were incomplete, 3 entries were received from faculty members working in countries other than Saudi Arabia and hence were excluded from the study. The final sample size of the present study was 101.

3.2 Survey instruments:

The questions were made using google forms and the link was distributed among the dental faculty in Saudi Arabia using WhatsApp and telegram. The participants were requested to share the link further to their friends and peers engaging snowball sampling technique. Despite the wide distribution of the survey on social media, the responses were from the Riyadh province of Saudi Arabia and not from the entire kingdom.

The questionnaire was divided into 4 sections. The first section explained the aim and objectives of the study with consent to participate and move to further sections. Section 2 collected socio-demographic details such as age, gender, nationality (Saudi, non-Saudi national), place of residence (rural, urban), monthly income (10,000 to 20,000 SAR, 20,001 to 30,000 SAR, >30,000 SAR), number of members in the family (<5, 6-8, >8) and their area of specialization (basic dental science, basic medical science, and clinical dental science departments). Section 3 and 4 consisted of survey questions about the perception of the participants towards online teaching and apprehensions related with COVID-19, respectively. The participants were free to exit from the study at any point of time and the participation was purely voluntary. The self-made questionnaire in sections 3 and 4 consisted of a total of 16 closed-ended questions (English) which was designed based on earlier studies from Nambiar, (2020), Schlenz et al., (2020), and Saraswathi et al., (2020) (Nambiar, 2020; Saraswathi et al., 2020; Schlenz et al., 2020). Each item of the question was scaled from 1 to 5 indicating weaker/less favorable to stronger/more favorable perception.

3.3 Factor analysis of the questionnaire:

Since the questionnaire was self-made, an exploratory factor analysis (EFA) was performed to identify the factors and latent variables. EFA was done using principal factor analysis with Varimax rotation using SPSS for all 16 questions (Supplementary table 1). The extracted factors were analyzed for retention using Kaiser criterion (Eigen value >1) and Scree test (Brown, 2009; Ledesma & Valero-Mora, 2007; Park, Dailey, & Lemus, 2002).

A total of 5 factors were obtained which included latent variables about perception towards online teaching (2 factors) and perception towards COVID-19 (3 factors) viz. positive perception towards online teaching (Q. 1 to 4), negative perception towards online teaching (Q. 5 to 10), fear of infection (COVID19-FF1- Q 11 and 12), fear

of survival (COVID19-FF2- Q 13 and 14), fear related to dental practice (COVID19-FF3- Q 15-16). Reliability analysis was performed for each factor separately which showed moderate to high reliability. Cronbach's alpha for positive perception was 0.77, negative perception was 0.86 and for COVID-19 related apprehension was 0.53, 0.6 and 0.65 for fear 1, 2, and 3 respectively. The cumulative score ranges for each of the factors were as follows: Positive perception towards online teaching: 4 to 20, negative perception towards online teaching: 6 to 30, fear 1, 2 and 3: 2 to 10. The average scores of each of the 5 factors were utilized for statistical analysis.

3.4 Ethical consideration:

The study was approved by the research ethics committee, Majmaah University with number MUREC-Dec.08/COM-2020/I2-3

3.5 Statistical Analysis:

Descriptive statistics expressed as mean, standard deviation and percentages were performed for all the factors. Independent t-test was performed for all continuous variables (average scores of positive and negative perception towards online teaching and COVID-19 related fear factors) stratified by age, gender, nationality, and place of residence and ANOVA was performed to the same variables stratified by the number of members in the family, monthly income, and specialization of the participants. Pearson's correlation was performed between all the continuous variables which included age and the average scores of the factors. To identify predictors for perception about online teaching, linear regression analysis was performed with positive and negative perception towards online teaching as the dependent variable and sociodemographic factors along with COVID-19 related fear factors as independent variables. All statistical analysis was performed using SPSS version 26, USA and a P value less than 0.05 was considered statistically significant.

4. Results

4.1 Descriptive analysis

The response obtained from the survey were analysed using descriptive analysis. The mean and SD of the individual questions were calculated (Table 2). After exploratory factor analysis, these 16 questions were categorized into 5 factors and the mean and SD were calculated for each of these factors (Table 3). For further analysis, the mean values of these 5 factors were used.

4.2 Analysis of association

The association of various sociodemographic factors on PPOT, NPOT, COVID19-FF1/FF2/FF3 was analyzed. The association of age, gender, nationality, and place of residence with the above-mentioned factors was analyzed using an independent t-test (table 4). Similarly, the association of the number of family members, area of specialization, and monthly salary with these 5 factors were analyzed using ANOVA (table 5).

Table 4 shows the comparison of positive and negative perception towards online teaching and COVID-19 related fear factors 1, 2 and 3 stratified by age, gender, nationality, and place of residence using independent t-test. The following observations were made: No significant gender difference between male and female. With respect to nationality, Saudi faculty had higher negative response scores towards online teaching when compared to non-Saudi faculty ($P=0.011$). Faculty from rural areas had a higher positive perception towards online teaching ($P=0.028$).

Table 5 shows comparison of the average scores of PPOT, NPOT, and COVID-19 related apprehensions stratified by the number of family members, area of specialisation, and monthly salary using ANOVA. PPOT showed a significant difference among the groups of number of family members ($P = 0.001$) and area of specialisation ($P= 0.007$). Post hoc analysis for PPOT showed participants from families with less than 5 members had higher PPOT scores, followed by 6 to 8 members and those with more than 8 members. PPOT scores were higher in clinical dental science, followed by Basic dental sciences and the basic medical science faculties. There was a significant difference in COVID19-FF1 ($P= 0.018$) and COVID19-FF3 ($P= 0.019$) among the subgroups of the area of specialisation. Post hoc analysis showed COVID19-FF1 was more in people specialized in clinical dental science, followed by basic dental science and basic medical science. While COVID19-FF3 was more in people specialized in basic dental science, followed by basic medical science and clinical dental science.

4.3 Correlation analysis

Pearson's correlation analysis was done to find the relationship of PPOT and NPOT with age, COVID19-FF1/FF2/FF3 (Table 6)

Table 6 shows PPOT had a minimal but significant positive correlation with COVID19-FF3 ($r=0.226$, $P= 0.023$). There was no significant correlation between the other scores. To better understand the association between the participants' perspective towards online teaching

and COVID-19 related apprehensions, the average scores for each factor were divided into three groups (<2.5, 2.6 – 3.5, 3.6 to 5) and cross-tabulations were made. There was a significant difference in the frequency of response distribution between the three groups of perspectives towards positive and negative aspects of online teaching with a P-value of 0.016 (Figure 1). However, the association between the distribution of responses of PPOT and NPOT scores with COVID-19 related apprehension scores did not have a significant difference ($P > 0.05$) (Supplementary Table 2).

4.4 Linear regression analysis

Linear regression was performed for PPOT, NPOT separately (dependent variable) with sociodemographic factors and apprehensions related to COVID-19 (COVID19-FF1/FF2/FF3) to identify the predictor variables (Table 7 and 8).

The Omnibus test statistic for the above model was highly significant which is indicative of a reliable predictor model (Likelihood ratio chi-square = 32.55, $df=13$, $P= 0.002$). Number of family members, area of specialisation and COVID19-FF3 were significant predictors of positive perception towards online teaching (Table 7).

The Omnibus test statistic for the above model was highly significant which is indicative of a reliable predictor model (Likelihood ratio chi-square = 24.66, $df=13$, $P= 0.026$). Nationality and number of family members were significant predictors of negative perception towards online teaching. Saudi nationals were 1.092 times more likely to have a negative perception towards online teaching when compared to non-Saudi faculty. Faculty with less than 5 members in their family were 0.89 times likely to have high NPOT when compared to faculty with more than 8 members in their family (Table 8).

5. Discussion

Majority of the participants in the study were of the average age of 38.1 ± 7.9 years, males, Saudi nationals and were dwelling in urban locations. Most of them had less than 5 members in their family and belonged to clinical dental specialities and receiving a monthly salary in the range of 10,000 to 20,000 SAR. In this study, the perspective of the dental faculty towards online teaching was found to be mixed wherein the faculty had moderate positive (3.1 ± 0.94) and negative (3.2 ± 1.1) perception towards online teaching. This indicates that the dental faculty across the Riyadh province of KSA acknowledge that online teaching has both positive and negative aspects. Since acknowledging the issues is pivotal in devising

strategies and rectifications to overcome the negatives and to strengthen the positives, the results of this study would be beneficial in continuing dental education during this pandemic. Regarding COVID-19 related apprehensions, the fear of infection (3.4 ± 1.0) and fear regarding dental practice (3.2 ± 1.1) were moderate while the fear of survival was lesser comparatively (2.7 ± 1.1).

Dental faculty from rural areas had a higher positive perception towards online teaching when compared to faculty from urban residence (Table 2). This may be attributed to the fact that most dental colleges across KSA are in prime urban centers and hence the faculty from rural areas must commute longer distances which may increase the risk of exposure to COVID19 infection. Faculty with smaller family size had higher positive perception towards online teaching when compared to faculty from larger family size (Table 3). This may be owed to the fact that; smaller families impose minimal disturbance to online teaching from home when compared to larger ones with a greater number of family members. Faculty from clinical specialties had higher positive perception towards online teaching when compared to faculty members from basic dental and basic medical sciences. This could be because the faculty of clinical dental science departments are at a higher risk of contracting COVID19 due to exposure to aerosols of blood and saliva during treatment procedures and also due to closer proximity to patients in clinical setup and hence would have been driven more by the fear of infection than the faculty belonging to other non-clinical specializations.

Regarding perspective towards negative aspects of online teaching, except for nationality, other factors were not significantly different. With respect to nationality, Saudi faculty had a higher negative perception towards online teaching when compared to non-Saudi faculty. However, there was no significant difference in the positive perception and fear factors associated with COVID-19 between Saudi and non-Saudi faculties.

COVID19-FF3 and sociodemographic groups, namely the number of family members and area of specialisation were significant predictors favoring PPOT. For the faculty from family size less than 5 members, the predicted score of positive perceptions towards online teaching was 0.75 points more than those with more than 8 members in the family. For clinical dental faculty, the predicted score of positive perceptions towards online teaching was 0.632 points more than basic dental specialist. For every increase in one point of COVID-19 related fear regarding dental practice,

there was 0.216 unit increase in positive perception towards online teaching. Regression analysis showed that nationality and the number of family members were significant predictors of negative perception towards online teaching. For Saudi faculty, the predicted score of NPOT was 1.092 units more than non- Saudi faculty and for faculty with family member size less than 5, it was 0.891 units more than those with more than 8 members. Thus, family member size was again a significant predictor for NPOT acting as a dual predictor. This could be due to a large number of responses in less than 5 family members category ($n=73$) when compared to 6 to 8 members ($n=11$) and more than 8 members categories ($n=11$) as in case of more responses from Saudi faculty (62) when compared to non- Saudi faculty ($n=39$). (Table 6 & 7).

The perspective of the faculty related to students' attitude, attention, participation, and ability to grasp complex topics has been raised as a major factor in influencing the negative perception towards online teaching in the current study (Q 6, 8, 9). Studies show that the attention span of the students during online classes was lesser when compared to face-to-face lectures and that students were more susceptible to distractions during online classes [18, 19]. The results of this study would provide insights on the issues that hinder successful teaching via online medium and help in addressing and rectifying the student-related factors which are crucial. Despite the faculty having a favorable perspective towards online teaching regarding its motivational aspect ($3.24 \pm 1.1 - Q4$), the faculty related factors such as lack of computer skills (2.7 ± 1.48) (Q5) and difficulty in adapting to the online teaching methods (2.8 ± 1.7) (Q7) were also found to be the sources of a negative perception of the faculty towards online teaching. However, the average scores for both were the least when compared to others. The possible reason for this could be that, in Saudi Arabia, many of the dental faculty members were using LMS to upload lectures, and conduct discussions, and the students submitted assignments through LMS. Hence both the faculty and students were familiar and were using the online method for education even before the pandemic set in (Zakaria, Jamal, Bisht, & Koppel, 2013).

The present study also emphasized the positive perspective of the dental faculty towards online classes as a replacement for face-to-face teaching (Q1, 2). Nevertheless, face-to-face education can never be completely replaced by digital systems, while the latter can afford to augment learning. This has been augmented by Nambiar (2020) (Nambiar,

2020), whose open-ended questionnaire study showed the perspectives of students and teachers.

In the present study, 57.9% of those who got high scores (3.6-5) in negative perception towards online teaching had a moderate positive perception (2.6-3.5) and 46.9% of those who scored low in negative perception (<2.5) had a stronger positive perception (3.6-5) (Figure 1). The results of the present study indicate a multifactorial influence on the perspective of dental faculty towards online teaching.

Regarding COVID19 related apprehensions, COVID19 related fear of infection was higher in clinical dental faculty when compared to basic dental and basic medical faculty (Table 3). Earlier studies have found that dentists were more anxious and scared about contracting COVID-19 during the pandemic (Ahmed et al., 2020). Dental procedures involving ultrasonic scalers and handpieces generate aerosols of blood and saliva which expose both the patients and the dental practitioners at risk of contracting infection (Kohn et al., 2003; To et al., 2020). The primary route of transmission of SARS-CoV-2 was established to be through aerosols and droplets (Ge, Yang, Xia, Fu, & Zhang, 2020). This could be the possible reasoning behind the higher COVID19 related fear of infection by clinical dental faculty who work in proximity with patients than the basic dental and basic medical faculty. COVID-19 related fear regarding dental practice was higher in basic dental faculty when compared to clinical dental and basic medical faculty. This could be attributed to the pandemic mandated restrictions in the operation of dental clinics in the kingdom (MOH, 2020).

6. Implications

This study is the first to study the association between dental faculty's perception towards online teaching and COVID-19 related apprehensions. Fear regarding dental practice had a favorable influence on positive perception towards online teaching and negative perception on online teaching was not influenced by any of the COVID-19 related apprehensions. Hence, it is very clear that the educational administrators should strive to create better-enriched teaching and learning environment which assures benefit for faculty and student, as well as to reduce fear concerning practicing dentistry. The result of the present study provides insights into the strengths and challenges posed by online teaching to dental faculty. The study would help the dental academicians to work out strategies to further strengthen the positives and to overcome the negatives of online teaching which would

inevitably improve its efficacy. To overcome the faculty-related factors influencing negative perception towards online teaching, elaborate training of the faculty and student in online teaching is necessary which would improve the confidence to face the challenges. Sophisticated software with effective tools to improve teaching and monitoring students' attentiveness during online sessions could be used to limit the student-related factors affecting the perception towards online teaching. Conducting certified e-workshops, gaining access to premium contents like 3D videos or use of teledentistry from the dental chair, creating focus groups, pre- and post-lecture short e-tests, etc. can be adopted to improve the overall quality of e-learning. Regular faculty-student feedback should be taken as a quality control measure to improve the transparency of teaching-learning process.

7. Conclusion

The study demonstrates that the dental faculty of the Riyadh Province, KSA had a mixed perception about online teaching with moderate levels of apprehensions related to COVID-19. Sociodemographic factors viz. area of residence, number of family members, and area of specialization were associated with positive perception towards online teaching while nationality and number of family members were associated with negative perception towards online teaching. Clinical dental faculty had higher COVID-19 related fear of infection and basic dental science faculty had higher COVID-19 related fear regarding dental practice during this pandemic. Both student and faculty-related factors were found to influence the perception of the dental faculty towards online teaching.

8. Strength and Limitation:

The present study has evaluated various factors that could influence the perception of dental faculty members towards online teaching in Saudi Arabia during the COVID-19 pandemic. The study demonstrated the role of apprehensions related to COVID-19 and its influence on positive perspectives towards online teaching. The study included participants from the Riyadh Province of Saudi Arabia and hence a multicentric approach across other provinces of KSA could be the future direction. As the study is conducted online and self-administered, the study is not without response bias. Student motivation is vital for any teaching-learning outcome, and a study is currently

underway focusing on the student's perception and the role of motivation on online learning.

Supplementary Materials: Supplementary table attached.

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Table 1. Studies conducted in Saudi Arabia regarding perception and attitudes towards online teaching during the COVID-19 pandemic.

Sno	Author	Nature of sample (Sample size)	Finding
1	Alanzi et al., (Alanazi & Alshaalan, 2020)	Medical and health college faculty (220)	Positive attitude towards e-learning increased during the pandemic when compared to pre pandemic levels
2	Khalil et al., (Khalil et al., 2020)	Medical students (60)	Medical students favored online teaching though there were some challenges. Preclinical year students were more willing to opt for online teaching in the next academic years
3	Alqurshi, (Alqurshi, 2020)	Pharmacy teachers (74) and students (700)	Majority of teachers faced difficulty in online teaching of topics with complex concepts and expressed a lack of discussion between teacher and students. With regards to assessment, teachers felt alternate mode of assessment had positive effects in student performance. Students' satisfaction survey showed that more than 35% of study population expressed concerns regarding lack of interaction between their peers and teachers and about 45% of students expressed a lack of guidance with unexplored newer modes of assessments.
4	Ziaul Hoq, (Hoq, 2020)	Jubail industrial college teachers (33)	86% of the study population had positive perception towards online teaching.
5	Alhamwi et al., (Alhamwi et al., 2020)	Undergraduate dental students studying across dental college of Riyadh city (496)	Only 19% of the study population were satisfied with online teaching in dental education and the overall satisfaction was found to increase with the year of study (from 1 st year to 6 th year)

Table 2. Average scores of the individual questions in questionnaire

SNo	Question	Mean	SD
1	In the current situation, online learning was a good way to teach the theoretical part of education	3.32	1.32
2	The theoretical teaching content could be covered just as well by online teaching formats as it would have been possible in a classroom course	3.13	1.25
3	I found the students to be disciplined and attentive during online sessions	2.91	1.20
4	The online teaching method motivates me	3.24	1.10
5	Lack of computer skills makes it difficult for me to use the online teaching method effectively	2.7	1.48
6	I feel the students are finding it difficult to grasp certain complex topics through online sessions	3.4	1.6
7	I am finding it difficult to adapt to online teaching method	2.8	1.7
8	Students make lot more excuse for not attending online classes and the reliability of it cannot be assessed	3.4	1.6
9	Students show lack of interest and involvement during online classes	3.6	1.6
10	I don't think extending online teaching for longer duration would benefit dental education	3.7	1.2
11	How likely are you to contract with COVID-19	3.1	1.1
12	How concerned are you about your family members getting contracted with COVID-19	3.7	1.2
13	I worry about surviving if infected with COVID-19	2.8	1.2
14	I worry that I am already infected with COVID-19	2.7	1.4
15	I worry that the COVID-19 outbreak would affect my prospects in dental career	3.3	1.1
16	I worry about practising dentistry during the pandemic	3.2	1.2

Table 2 shows the mean and SD of all the 16 questions of the questionnaire. Note that after exploratory factor analysis these 16 questions were categorized into 5 factors viz. Positive perspective towards online teaching – Q1 to Q4, Negative perspective towards online teaching – Q5 to Q 10,

COVID-19 related fear of infection (COVID19-FF1) – Q11 and Q12, COVID-19 related fear of survival (COVID19-FF2) – Q13 and Q14, COVID-19 related fear of regarding dental practice – Q15 and Q16. Q10, Q12 had the highest mean score (3.7/5) and Q5 had the lowest mean score (2.7/5).

Table 3. Average scores of the factors

SNo	Variable	Mean ± SD
1	Positive perception towards online teaching (PPOT)	3.1 ± 0.94
2	Negative attitude towards online teaching (NPOT)	3.2 ± 1.1
3	COVID-19 related Fear factor 1 (COVID19-FF1)	3.4 ± 1.0
4	COVID-19 related Fear factor 2 (COVID19-FF2)	2.7 ± 1.1
5	COVID-19 related Fear factor 3 (COVID19-FF2)	3.2 ± 1.1

Table 3 shows the mean and SD of positive perception towards online teaching, Negative attitude towards online teaching and apprehensions related to COVID-19. COVID19-FF1

had the highest mean score and COVID19-FF2 had the lowest mean score. It is noticeable that all the scores of the 5 factors were more than average scores (>2.5/5).

Table 4. Association between gender, nationality, and place of residence with positive and negative attitudes, apprehension related to COVID-19

Independent variable	T statistic	Positive perception		Negative perception		COVID19-FF1		COVID19-FF2		COVID19-FF3	
		Mean ±SD	P	Mean ±SD	P	Mean ±SD	P	Mean ±SD	P	Mean ±SD	P
Age	< 37 years (n=54)	3.06 ±.90	0.34	3.08± 1.28	.103	3.30±1.15	0.20	2.86±1.17	0.36	3.27±1.16	0.92
	> 37 years (n=47)	3.24±.98		3.47±1.06		3.56±0.79		2.65±1.03		3.25±1.03	
Gender	Male (n=71)	3.33±.94	.201	3.25±1.16	.859	3.40±1.11	.792	2.66±1.66	.144	3.30±1.14	.552
	Female (n=30)	3.07±0.93		3.30±1.29		3.46±0.70		3.01±0.95		3.16±.98	
Nationality	Saudi (n=62)	3.0±0.86	.058	3.5±1.19	.011	3.29±1.12	.088	2.8±1.12	.088	3.34±1.20	.362
	Non-Saudi(n=39)	3.3±1.02		2.88±1.1		3.64±0.74		2.7±1.09		3.14±0.89	
Place of residence	Rural (n=21)	3.5±0.61	.028	3.41±1.18	.534	3.7±0.73	.141	3.07±0.89	.160	3.42±0.71	.453
	Urban (n=80)	3.04±0.98		3.22±1.2		3.35±1.05		2.68±1.15		3.22±1.17	

Table 5. Association between number of members in family, subject of expertise and monthly salary with positive and negative attitudes, apprehension related to COVID-19

Independent variable	ANOVA statistic	PPOT		NPOT		COVID19-FF1		COVID19-FF2		COVID19-FF3	
		Mean ±SD	P value	Mean ±SD	P value	Mean ±SD	P value	Mean ±SD	P value	Mean ±SD	P value
Number of family member	<5 (n=73)	3.34±0.95	.001	3.24±1.2	.143	3.4±0.95	.584	2.75±1.03	.066	3.2±1.07	.397
	6-8 (n=11)	2.8±0.57		3.68±1.04		3.58±0.92		2.4±1.22		3.5±1.06	
	>8 (n=11)	2.38±0.78		2.78±1.23		3.18±1.45		3.4±1.28		2.95±1.3	
Area of specialisation	Basic medical (n=23)	3.06±1.07	.007	3.4±1.2	.375	3.08±1.1	.018	2.69±1.2	.681	2.73±1.13	.019
	Basic dental (n=23)	2.68±0.98		3±0.98		3.15±1.23		2.63±1.12		3.6±1.18	
	Clinical dental (n=55)	3.39±0.78		3.28±1.26		3.68±0.77		2.85±1.08		3.34±0.98	
Monthly salary (SAR)	10K to 20K (n=52)	3.14±1.09	.978	3.02±1.18	.054	3.37±1.05	.153	2.8±1.1	.884	3.3±1.12	.672
	20K to 30K (n=39)	3.16±0.77		3.45±1.22		3.6±0.89		2.7±1.1		3.1±1.05	
	More than 30K (n=10)	3.1±0.61		3.88±0.84		2.95±1.06		2.6±1.15		3.45±1.18	

Table 6. Correlation analysis between PPOT, NPOT with age and apprehensions related to COVID-19

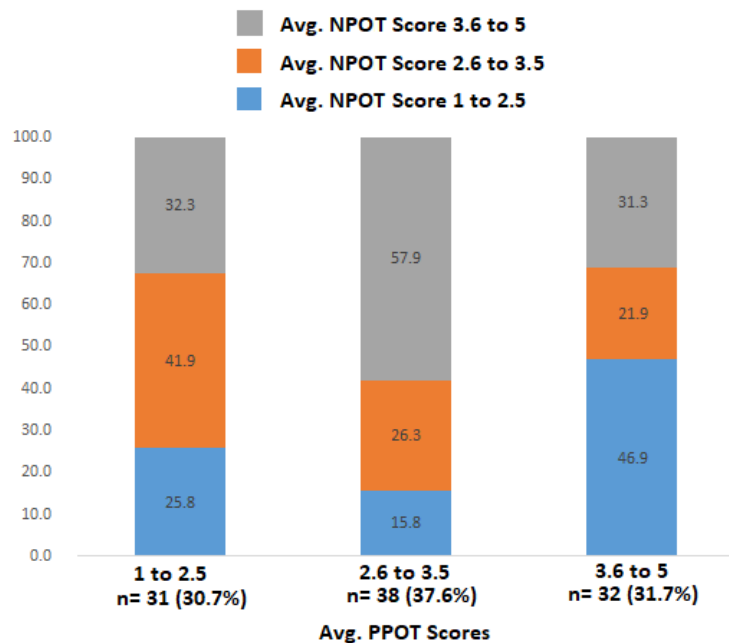
	Age	COVID19-FF1	COVID19-FF2	COVID19-FF3
Positive perception towards online teaching	Pearson Correlation	.077	.177	.075
	Sig. (2-tailed)	.443	.077	.455
Negative perception towards online teaching	Pearson Correlation	.009	.134	-.035
	Sig. (2-tailed)	.929	.182	.729

Table 7. Linear regression analysis of positive perception of the dental faculty towards online teaching

Parameter	B	Std. Error	95% Wald Confidence Interval		Wald Chi-Square	Sig.
			Lower	Upper		
(Intercept)	1.590	.6331	.349	2.831	6.309	.012
Age	.008	.0126	-.016	.033	.422	.516
Gender						
Female	.100	.1903	-.273	.473	.274	.601
Male*	0 ^a	.	.	.	.	.
Nationality						
Non-Saudi	-.058	.2530	-.553	.438	.052	.820
Saudi national	0 ^a	.	.	.	.	.
Current residence						
Rural	.225	.2176	-.202	.651	1.067	.302
Urban	0 ^a	.	.	.	.	.
Number of Family members						
< 5	.750	.3027	.157	1.344	6.146	.013
6-8	.236	.3388	-.428	.900	.486	.486
> 8	0 ^a	.	.	.	.	.
Area of specialization						
Basic dental	-.632	.2325	-1.088	-.176	7.387	.007
Basic medical	-.058	.2261	-.501	.385	.066	.798
Clinical dental	0 ^a	.	.	.	.	.
Monthly salary						
10,000 - 20,000 SAR	-.103	.3155	-.722	.515	.107	.743
20,001 -30,000 SAR	-.071	.3063	-.671	.529	.054	.817
> 30,000 SAR	0 ^a	.	.	.	.	.
COVID19 - FF1	.057	.0897	-.119	.233	.405	.524
COVID19 – FF2	-.019	.0820	-.180	.141	.056	.813
COVID19 – FF3	.216	.0852	.049	.384	6.449	.011
(Scale)	.635 ^b	.0893	.482	.837		

Table 8. Linear regression analysis of negative perception of the dental faculty towards online teaching

Parameter	B	Std. Error	95% Wald Confidence Interval		Wald Chi-Square	Sig.
			Lower	Upper		
(Intercept)	1.982	.8365	.343	3.622	5.616	.018
Age	.022	.0166	-.010	.055	1.790	.181
Gender						
Female	.021	.2515	-.472	.514	.007	.933
Male*	0 ^a	.	.	.	.	.
Nationality						
Non-Saudi national	-1.092	.3342	-1.747	-.437	10.668	.001
Saudi national	0 ^a	.	.	.	.	.
Current residence						
Rural	.472	.2875	-.092	1.035	2.690	.101
Urban	0 ^a	.	.	.	.	.
Number of Family members						
< 5	.891	.3999	.107	1.675	4.963	.026
6-8	.809	.4477	-.068	1.687	3.268	.071
> 8	0 ^a	.	.	.	.	.
Area of specialization						
Basic dental	-.291	.3072	-.893	.311	.895	.344
Basic medical	.125	.2987	-.460	.710	.175	.676
Clinical dental	0 ^a	.	.	.	.	.
Monthly salary						
10,000 - 20,000 SAR	-.521	.4168	-1.338	.296	1.561	.211
20,001 -30,000 SAR	-.520	.4048	-1.314	.273	1.654	.198
> 30,000 SAR	0 ^a	.	.	.	.	.
COVID19 - FF1	.206	.1185	-.026	.439	3.029	.082
COVID19 – FF2	-.057	.1083	-.269	.156	.275	.600
COVID19 – FF3	-.021	.1126	-.242	.200	.034	.853
(Scale)	1.109 ^b	.1560	.841	1.461		

**Figure. 1** Percentage distribution response graph between PPOT and NPOT

Supplementary tables

Supplementary table 1: Exploratory factor analysis of the latent variables

		Rotated Component Matrix ^a				
		Component				
		1	2	3	4	5
In the current situation, online learning was a good way to teach the theoretical part of education			.792			
The theoretical teaching content could be covered just as well by online teaching formats as it would have been possible in a classroom course			.847			
I found the students to be disciplined and attentive during online sessions			.734			
The online teaching method motivates me			.589			
Lack of computer skills makes it difficult for me to use the online teaching method effectively		.710				
I feel the students are finding it difficult to grasp certain complex topics through online sessions		.830				
I am finding it difficult to adapt to online teaching method		.816				
Students make lot more excuse for not attending online classes and the reliability of it cannot be assessed		.840				
Students show lack of interest and involvement during online classes		.811				
I don't think extending online teaching for longer duration would benefit dental education		.530				
I worry about practising dentistry during the pandemic				.792		
How concerned are you about your family members getting contracted with COVID-19					.740	
How likely are you to contract with COVID-19					.869	
I worry about surviving if infected with COVID-19						.793
I worry that the COVID-19 outbreak would affect my prospects in dental career				.749		
I worry that I am already infected with COVID-19						.829

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Supplementary table 2: Distribution of samples between PPOT and NPOT

Perspective towards negative aspects of online teaching		Score 1 to 2.5 n (%)	Score 2.6 to 3.5 n (%)	Score 3.6 to 5 n (%)	Chi-square Significance value	
					12.25	0.016
Perspective towards positive aspects of online teaching	Score 1 to 2.5	8 (25.8)	13 (41.9)	10 (32.3)		
	Score 2.6 to 3.5	6 (15.8)	10 (26.3)	22 (57.9)		
	Score 3.6 to 5	15 (46.9)	7 (21.9)	10 (31.3)		