Volume 3, 2021, 993175

GUHES

Journal of Gazi University Health Sciences Institute

journal homepage: https://dergipark.org.tr/tr/pub/guhes

Evaluation of Undergraduate Students' Anxiety Level About Covid-19 Pandemic Process

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Article info:

Received: 09.09.2021

Accepted: 07.10.2021

Keywords:

COVID-19,
Dental Student,
Anxiety,
Education,
Online Learning

Abstract

The aim of the study was to evaluate the anxiety level of dental students about the Covid-19 pandemic process in terms of gender and education levels with a scale to be developed within the scope of the research.

441 dental students studying at Gazi University in the 2020/2021 academic year participated in the survey. The Pandemic Process Anxiety Scale was developed to determine the level of anxiety about the COVID-19 pandemic process. An online survey portal was used to participate of students. Exploratory Factor Analysis and Confirmatory Factor Analysis were performed for the construct validity of the scale. The data were analyzed with Independent Samples t-test.

The female students had significantly higher anxiety levels about the transition to face-to-face education than male students. Male students had significantly higher levels of financial and occupational anxiety for the future than females. It was observed that preclinical students had higher anxiety levels than clinical students regarding socialization and distance education process. However, the anxiety levels of preclinical students were significantly lower than clinical students regarding face-to-face education.

Clinical students and females were more anxious about face-to-face education during pandemic, whereas the preclinical students had higher anxiety levels about socialisation and distance education process.

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1. Introduction

A novel coronavirus disesase (COVID-19) was observed at Wuhan, China in December 2019 and it was noticed that COVID-19 can cause serious respiratory infections (Das, Kudpi, Mukherjee, Unnikrishnan, Rungta 2020). The COVID-19 outbreak, which threatens public health, has been affected the whole world in a short time due to its very rapid spread, and was declared as a pandemic by The World Health Organisation (WHO) on March 11, 2020 (Cucinotta, Vanelli 2020).

The infected patients may get over asymptomatically or may show different symptoms ranging from flu-like symptoms to pneumonia (Jordan, Adab, Cheng 2020). In this disease with a relatively high mortality rate, it is not nearly possible to distinguish asymptomatic individuals from healthy individuals in incubation phase without testing (Roy, Roy, Paul 2020). The suspected cases must be identificated and isolated to prevent the spread of disease. Also, it is necessary to avoid close contact and pay attention to hygiene rules in order to struggle the disease (Modi et al., 2020). Hence the health care workers are in the high risk group since they are in close contact with patients.

Dental education includes both theoretical and practical process that skills and knowledge are important. The COVID-19 outbreak has caused institutions all over the world to be closed and the theoretical education switched to online education. This mandatory measure caused many misfortunes such as delaying exams and suspending practical education. In addition to the fear of getting infection, the interruption of occupational education can increase the anxiety levels of the students. As a matter of fact, it was reported that the dental students feel anxious themselves due to COVID-19 pandemic (Özdede & Şahin, 2020).

In the current literature, there is no comprehensive study evaluating the anxiety levels of undergraduate students about the Covid-19 pandemic and a scale that can be used in accordance with the purpose of this research. The aim of the study is to evaluate the anxiety level of Gazi University Faculty of Dentistry Students about the Covid-19 Pandemic Process in terms of gender and education levels with a scale to be developed within the scope of the research.

2. Materials and Methods

This study was conducted among undergraduate students of Gazi University Faculty of Dentistry in Turkey from January to February 2021. The study was approved by the ethical committee. (Ref No: 2021-136).

In this study, 441 dental students (259 females, 182 males) studying at Gazi University, in the 2020/2021 academic year participated in the survey.

The scale was carried out as an online survey which was structured into two main parts. [Table 1] The questions in the first part were consisted of gender, year in education and age of the participants. In the second part, the Anxiety Scale of COVID-19 developed by the researchers was used. The eight-stage scale development process suggested by DeVellis (De Vellis, 2016) was taken into consideration to develop of the scale. Accordingly, a 5-point Likert-type item pool with 22 items was created for Anxiety in the Pandemic Process.

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Table 1. The survey form

Gender

( ) F ( ) M

Year in education

( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5

Age

( ) 18-20 ( ) 21-2 ( ) 24-27 ( ) 28+

1.Due to the COVID-19 pandemic, I am concerned that conducting theoretical education online may negatively affect the quality of education.
2.I am concerned that the routine practical training program is not implemented due to the COVID-19 pandemic.
3.After the pace of the pandemic slows down (in the post-peak phase), I am worried about the possibility of theoretical training at the faculty.
4.After the pandemic subsides (in the post-peak phase) I am concerned about the possibility of practical training at the faculty.
5.I am worried that I will lose years in my education during the pandemic process.
6.During the pandemic process, I am worried that I will suffer from financial loss due to the disruptions in my education.
7.I am concerned about the possibility that the quality of education of postgraduate specialization and doctoral programs may be adversely affected by the pandemic.
8.After the pandemic process, I worry that the deficiencies in education cannot be compensated.
9.I am worried about the risk of getting coronavirus disease from my classmates if I switch to routine formal education.
10.I am concerned about the risk of contracting coronavirus disease from a patient switching to routine formal education.
11.During formal education at the faculty, I am concerned about the risk of passing the COVID-19 infection to my family.
12.In view of pandemic process and the level of risks dentists are in, I am worried about the idea of changing my profession.
13.When I graduate after the pandemic process, I am worried about finding a job.
14.Considering the pandemic process and the level of risk dentists are in, I am concerned about the future of the dentistry profession.
15.I am worried that my professional self-esteem will be adversely affected due to the disruptions in education during the pandemic process.
16.I am concerned that my professional development will be affected due to the cancellation and postponement of congresses and scientific meetings during pandemic.
17.I am concerned that my social communication will be negatively affected due to the disruption of formal education during the pandemic process.
18.I worry that the bond I have established with my friends during the pandemic process is gradually decreasing.
19.During the pandemic process, I worry that I will see less and less friends I communicate with.
20. Even if I am vaccinated for the COVID-19, I am concerned about the possibility of taking theoretical training at the faculty despite preventive measures.
21. Even if I am vaccinated for the COVID-19, I am concerned about the possibility of taking practical training at the faculty despite preventive measures.
22. Even if I am vaccinated for COVID-19, I am worried about the risk of getting coronavirus disease despite preventive measures.

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Table 2. Eigenvalues obtained as a result of PPAS's EFA and Total variance explained

	Eigen Value	Explained Variance Ratio	Total Explained Variance Ratio
1	7.286	34.496	34.496
2	3.788	17.073	51.569
3	1.253	4.423	55.992
4	1.074	3.687	59.679

In order to determine the opinions of undergraduate students on the items, a Likert type rating scale was used such as 5 = strongly agree, 4 = agree, 3 = partially agree, 2 = disagree, 1 = strongly disagree. Participants filled in the scale forms on a platform that they could answer on the internet. All the recorded responses to the online survey were found to be valid and all data from all participants were included in the analysis. With the data obtained, the anxiety levels of dental students(preclinical and clinical) about their theoretical and practical training during the pandemic process were evaluated. Participants were informed about the study in the prepared form, and after the participants marked the consent of the volunteer to participate in the study, they were asked to fill of the form.

3. Statistical Analysis

It was aimed to examine the anxiety of dental students in terms of demographic variables considered within the scope of the study. It was deemed appropriate to use a scale among the types of measurement tools considered in order to reveal the levels of theoretical variables (De Vellis, 2016). When the literature was reviewed, a scale was needed for the purpose of the research. In order to be used both in this research and in subsequent research, a scale development study was carried out first. The factor structure, construct validity and reliability of the COVID-19 Pandemic Process Anxiety Scale (PPAS) applied to the students of the Faculty of Dentistry were evaluated. EFA and CFA were performed for the construct validity of the scale. The Cronbach alpha coefficient was examined to test the reliability of the measurements obtained from the dimensions of the scale. IBM SPSS 21 was used for the calculations of EFA, Cronbach Alpha and item discrimination; and LISREL 8.80 was used for CFA. Before starting the analysis, the results of the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Sphericity test were examined. The KMO measure of sampling adequacy is a statistical value used as an index for deciding whether or not the sample is sufficient for performing factor analysis and Bartlett's test of sphericity tests for the overall significance. The KMO value was found to be 0.862. Since this value is higher than 0.60, it can be said that the sample size is sufficient for EFA (Tabachnick, Fidell, 2012). The fact that Barlett test was found to be statistically significant shows that the exploratory factor analysis can be continued. (Bartlett's test of sphericity: $\chi 2$ = 2789,628, df = 190 and p <.05) EFA was conducted with 22 items using Principal Axis Factoring analysis extraction and Promax with Kaiser Normalization rotation. Unweighted Least Squares fraction method (ULS) was used while performing CFA in testing the verification of the model revealed by EFA.

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Table 3. Factor load values of PPAS as a result of EFA

Item	Factor			
	1	2	3	4
1. Due to the COVID-19 pandemic, I am concerned that conducting theoretical education online may negatively affect the quality of education.				0.414
2. I am concerned that the routine practical training program not implemented due to the COVID-19 pandemic.				0.837
3. After the pace of the pandemic slows down (in the post-peak phase), I am worried about the possibility of theoretical training at the faculty.	0.402			
4. Afer the pandemic subsides (in the post-peak phase) I am concerned about the possibility of practical training at the faculty.	0.450			-0.515
5. I am worried that I will lose years in my education during the pandemic process.		0.623		
6. During the pandemic process, I am worried that I will suffer from financial loss due to the disruptions in my education.		0.680		
7. I am concerned about the possibility that the quality of education of postgraduate specialization and doctoral programs may be adversely affected by the pandemic.		0.479		
8. After the pandemic process, I worry that the deficiencies in education cannot be compensated.				0.661
9. I am worried about the risk of getting coronavirus disease from my classmates if I switch to routine formal education.	0.988			
10. I am concerned about the risk of contracting coronavirus disease from a patient switching to routine formal education.	0.966			
11. During formal education at the faculty, I am concerned about the risk of passing the COVID-19 infection to my family.	0.697			

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Item	Factor			
	1	2	3	4
13. When I graduate after the pandemic process, I am worried about finding a job.		0.794		
14. Considering the pandemic process and the level of risk dentists are in, I am concerned about the future of the dentistry profession.		0.662		
15. I am worried that my professional self-esteem will be adversely affected due to the disruptions in education during the pandemic process.		0.676		
17. I am concerned that my social communication will be negatively affected due to the disruption of formal education during the pandemic process.			0.605	
18. I worry that the bond I have established with my friends during the pandemic process is gradually decreasing.			0.993	
19. During the pandemic process, I worry that I will see less and less friends I communicate with.			0.854	
20. Even if I am vaccinated for the COVID-19, I am concerned about the possibility of taking theoretical training at the faculty despite preventive measures.	0.407			
21. Even if I am vaccinated for the COVID-19, I am concerned about the possibility of taking practical training at the faculty despite preventive measures.	0.520			-0.404
22. Even if I am vaccinated for COVID-19, I am worried about the risk of getting coronavirus disease despite preventive measures.	0.765			

In order to test whether there is a statistical difference between the anxiety levels of the student groups according to gender and education levels (preclinical and clinical), independent samples t-test was used by meeting the parametric test assumptions. In this context, firstly, Kolmogorov Smirnov test was used for each level of independent variables (female/male and preclinical/clinic) and for each dimension to test the assumption of normality. In addition, in testing the normality assumption, a comparison was made with the value of 1.96 at the 0.05 significance level of the z statistic obtained by dividing the kurtosis and skewness coefficients to the standard errors. In addition, in testing the normality

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assumption, a comparison was made with the value of 1.96 at the 0.05 significance level of the z statistic obtained by dividing the kurtosis and skewness coefficients to the standard errors (Field, 2013). According to the results of the Kolmogorov Smirnov Test, it is seen that the p significance level of the statistical values is greater than 0.05, so the assumption of normality is provided for the scores obtained from the dimensions at each level of the independent variables (female / male and preclinical / clinical). Levene Test results regarding the homogeneity assumption of the variances of the scores obtained from the dimensions of PPAS were examined and the assumption of homogeneity of variances was provided since the p values of this test were greater than 0.05.

4. Results

4.1. Exploratory Factor Analysis Results

Kaiser's criterion and Cattell's Scree test are used to determine the number of factors to be extracted. With factor analysis, an item with factor loadings below .40 was excluded from the scale (Q16- I am concerned that my professional development will be affected due to the cancellation and postponement of congresses and scientific meetings due to the Pandemic). After that the factor analysis was rerun to get an item loaded in only one component by deleting a cross loaded item (Q12-I am concerned about the idea of changing my profession considering the pandemic process and the risk level of dentists).

Then, the eigenvalues obtained as a result of the last exploratory factor analysis and the variance rates explained are presented in Table 2, and the scree plot is presented in Figure 1. It is seen that after the fourth dimension, the graph starts to flatten. Accordingly, it can be said that the scale has four factors according to the scree plot. Four factors with eigenvalues exceeding 1.0 are extracted. [Table 2] The output reveals that EFA has extracted four components of the scale construct and the total variance explained is 60%. In the humanities and social sciences, the variance explained is usually as low as 50% to 60% (Pett, Lackey, Sullivan, 2003). According to these findings, the scale explains 60% of the variance in the property aimed to be measured. Factor loadings of each item higher than 0.40 were accepted as a criterion for the decision to take place in the scale. It can be concluded that each item serves its purpose in its dimension it is in Table 3. The first factor was named "anxiety about the transition to face-to-face education", the second factor "anxiety about finance and occupation", the third factor "anxiety about socialization" and the fourth factor "anxiety about the distance education process".

Corrected item-total score correlation for examining the discrimination index of the items in PPAS and Cronbach alpha values for the reliability of the factors (measurements obtained from dimensions) are presented in Table 4. The adjusted item-total score correlation values in each dimension are above 0.50. Items with a highly adjusted item-total correlation (at least at 0.30) are more desirable (Boateng, Neilands, Frongillo, Melgar-Quinonez, Young, 2018). Cronbach alpha values of the dimensions of the scale were found to be 0.907, 0.837, 0.893 and 0.755, respectively. Since the Cronbach alpha values are higher than 0.70, it can be said that the scores obtained from these dimensions are reliable.

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Table 4. Corrected item-total score correlation and Cronbach's alpha value of PASUKÖ dimensions

Dimensions	Trial Form	Scale	Corrected Item-Total Correlations	Cronbach Alfa
Concerns about the transition to face-to-face education	Q3	Q3	0.613	0.907
	Q4	Q4	0.719	
	Q9	Q9	0.778	
	Q10	Q10	0.742	
	Q11	Q11	0.572	
	Q20	Q18	0.674	
	Q21	Q19	0.748	
	Q22	Q20	0.807	
Financial and occupational concern for the future	Q5	Q5	0.575	0.837
	Q6	Q6	0.627	
	Q7	Q7	0.562	
	Q13	Q12	0.687	
	Q14	Q13	0.562	
	Q15	Q14	0.676	
Anxiety about socializing	Q17	Q15	0.720	0.893
	Q18	Q16	0.836	
	Q19	Q17	0.816	
Anxiety regarding the distance education process	Q1	Q1	0.562	0.755
	Q2	Q2	0.604	
	Q8	Q8	0.594	

4.2. Confirmatory Factor Analysis Results

In order to verify this four-dimensional structure revealed, Confirmatory Factor Analysis (CFA) was performed on the data obtained from different individuals. While conducting confirmatory factor analysis, model data fit was evaluated by examining t values, factor load values and fit index values. For the four-dimensional structure of PPAS, the significance level of the explanation of each latent variable by the observed variables was examined with t values (Çokluk, Şekercioğlu, Büyüköztürk, 2012). and it was observed that the calculated t values were higher than the critical t value. Thus, it was decided that the factor load for each item was statistically significant. The fit index values obtained as a result of CFA are presented in Table 5. The fact that the $\chi 2/df \leq 5$, RMSEA ≤ 0.10, SRMR$\leq$0.08 indicates an acceptable fit between the data and the model (Hu, Bentler, 1999, Schermelleh-Engel, Moosbrugger, Müler, 2003). Additionally, NNFI, CFI, GFI and AGFI values higher than 0.90 indicates a good fit (Çokluk et al., 2012, Kline, 2005). It has been observed that the scale has generally acceptable compliance.

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Table 5: CFA Results of PPAS

χ2/df	RMSEA	SRMR	NNFI	CFI	GFI	AGFI
3.05	0.097	0.079	0.92	0.93	0.96	0.94

RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual, NFI = Normed Fit Index, NNFI = Non-normed Fit Index, CFI = Comparative Fit Index, GFI = Goodness-of-Fit Index, AGFI = Adjusted Goodness-of-Fit-Index

The measurement model obtained as a result of CFA is presented in Figure 2. The correlation value between the transition to face-to-face education and the distance education process in the established single-level measurement model is negative. Thus, it can be concluded that the total score cannot be obtained by combining the dimension scores of the scale. The value showing the binary correlation of other latent variables is positive.

The standardized factor load value (λ) for each item of the scale confirms that that item (observed variable) is a good representative of the latent variable to which it depends. However, CFA results show that this measurement model verifies the construct validity of PPAS. According to the results of the reliability and validity analysis, it has been statistically proven that the measurements obtained from PPAS are sufficiently valid and reliable.

4.3. Anxiety Levels of Students Depending on COVID-19 Pandemic

In determining whether the anxiety levels of all students participating in the study differed by gender according to the dimensions of PPAS, a t-test was conducted for unrelated samples and the results are given in Table 6. It was observed that the anxiety levels regarding the transition to face-to-face education showed a statistically significant difference according to gender (P <0.05). Female students had significantly higher levels of anxiety about the transition to face-to-face education than male students. In addition, it was observed that male students had significantly higher levels of financial and occupational anxiety for the future than female students (P <0.05). However, it is seen that the anxiety about socialization and the anxiety about the distance education process do not differ statistically significantly according to the gender of the students (P >0.05).

Table 6: Independent Samples T-Test Results of the Scores of PPAS according to the gender of the students

	Gender	n	$\bar{X}$	ss	sd	t	p
Concerns about the transition to face-to-face education	F	259	24.7143	7.24832	439	2.762	0.006*
	M	182	22.7967	7.07399			
Financial and occupational concern for the future	F	259	21.6100	4.68778	439	2.114	0.035*
	M	182	20.6099	5.16539			
Anxiety about socializing	F	259	10.4672	3.16502	439	1.357	0.175
	M	182	10.0495	3.20786			
Anxiety regarding the distance education process	F	259	11.3205	2.48593	439	1.775	0.077
	M	182	10.8571	2.97530			

*: P <0.05

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Table 7: Independent Samples T-Test Results of PPAS Scores according to the education levels of the students

	Education level	N	$\bar{X}$	ss	sd	t	P
Concerns about the transition to face-to-face education	Preclinic	266	23.1203	7.74064	439	2.898	0.004*
	Clinic	175	25.1429	6.20318			
Financial and occupational concern for the future	Preclinic	266	21.0000	5.08123	439	1.040	0.299
	Clinic	175	21.4971	4.63479			
Anxiety about socializing	Preclinic	266	10.6504	3.27511	439	2.914	0.004*
	Clinic	175	9.7543	2.97348			
Anxiety regarding the distance education process	Preclinic	266	11.4812	2.83403	439	3.409	0.001*
	Clinic	175	10.5943	2.40712			

*: P <0.05

There was a statistically significant difference among anxiety levels of participants about transition to face-to-face education (P <0.05)[Table 7]. The anxiety levels of clinical students regarding the transition to face-to-face education were significantly higher than preclinical students. It was observed that the anxiety levels of the students about socialization and the distance education process showed a statistically significant difference according to their education level (P <0.05). Preclinical students had significantly higher levels of anxiety about socialization and distance education than clinical students. However, it was seen that there is no statistically significant difference in terms of students' level of anxiety towards the future finance and occupation according to their education levels (P >0.05).

5. Discussion

Dentists treat their patients in close proximity to the mouth, and most of the treatment procedures produce aerosol, saliva or blood which could result to spread of the COVID-19 infection (Ofori-Attah, 2017, Nejatidanesh, Khosravi, Goroohi, Badrian, Savabi, 2013). Therefore, the WHO declared that emergency dental treatments must be a priority (Ahmed et al., 2020).

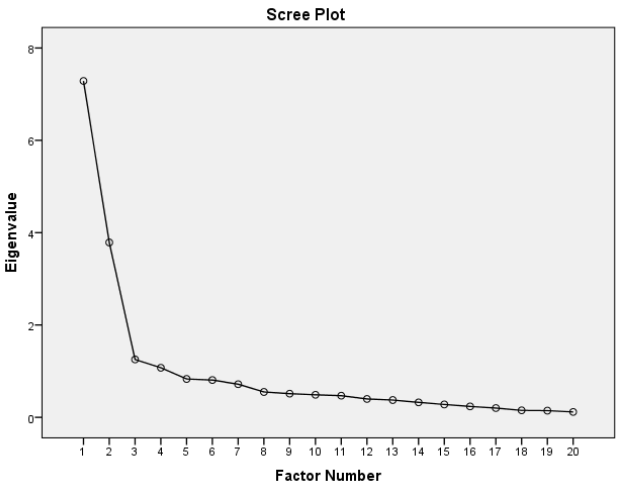

Figure 1. Scree Plot

The health care workers were vaccinated first, not only for their own benefit, but also to ensure the effect of the health system. The 4th and 5th grades dental students were included in this scope and also vaccinated.

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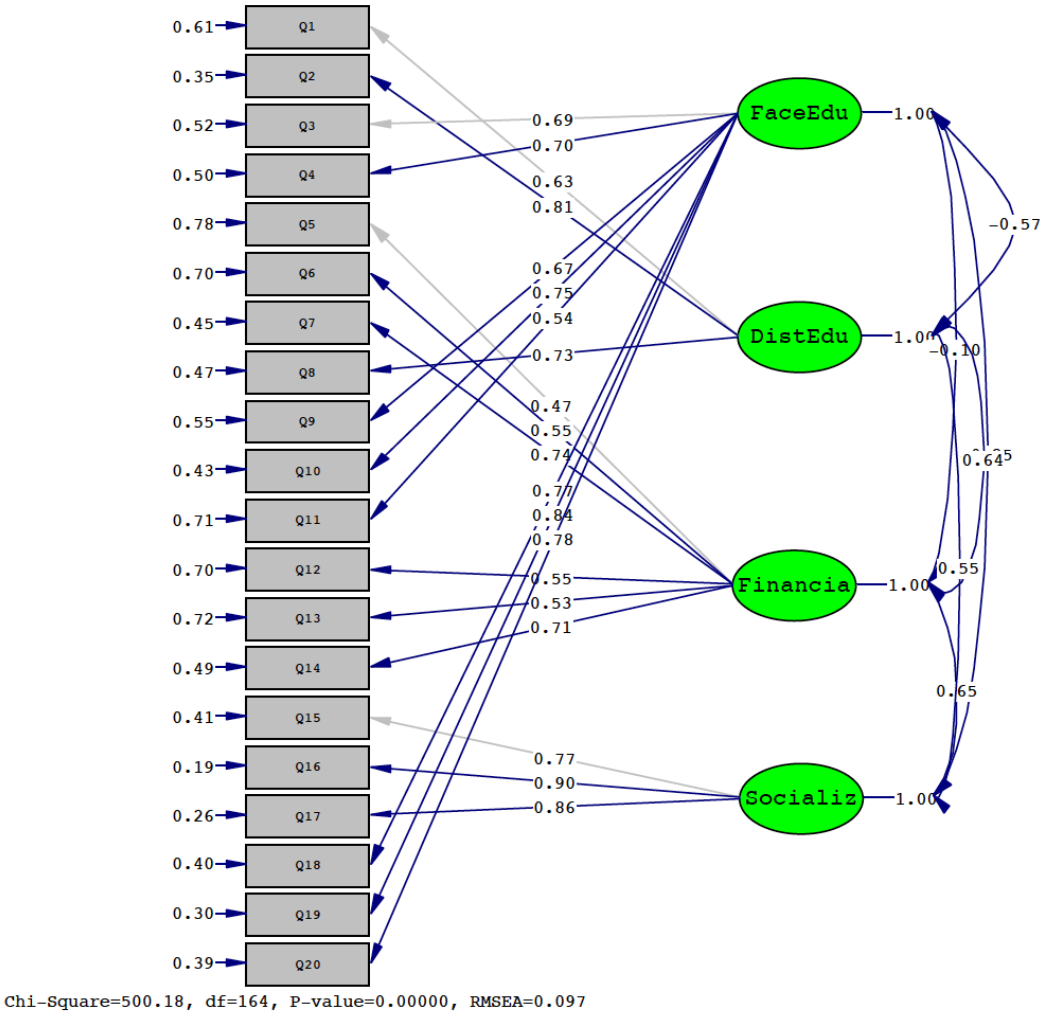

Figure 2. PASS Measurement Model

Nevertheless, there is insufficient information about the protection of the vaccine and its effect on the spread of the infection. Therefore, it is not possible to predict exactly when the pandemic will end, and it can be considered understandable to worry about their education and profession of dental students.

Dental education contains three fundamental components as theoretical education, laboratory practice, and clinical practice contrary to many professions. In the first 3 years, dental students take lessons at laboratory, while in the 4th and 5th grades, they treat patients as intern at the clinic under the supervision. However, as a part of measures, the clinics and the laboratories are closed, and theoretical lessons switched to online education. Face-to-face training of undergraduate and postgraduate dental students has been affected adversely on the worldwide due to the Covid 19 pandemic (Alzahrani, Alrusayes, Aldossary, 2020). In this study, it was observed that the anxiety levels of the clinical students were higher than preclinical students regarding transition to face-to-face education. It would be said that the higher risk of getting infection during internship at clinic may be worried the clinical students, even though they are vaccinated. Similarly,

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Ataş et.al declared that clinical students were more anxious than preclinical students to get infection (Ataş, Talo Yıldırım, 2002). Additionally, in this study, it was observed that females had significantly higher levels of anxiety about the transition to face-to-face education than males. It has been reported that depressive symptoms are reported more common in medical students compared to the general population, even more, common in the female gender (Ngasa et al., 2017, Puthran, Zhang, Tam, Ho, 2016, O'Byrne, Gaviv, McNicholas, 2010, Albert, 2015, Karp, Levine, 2018). This difference may be related that females feel stress more intensely than men and men don't want to show their anxiety generally (Divaris, et al., 2013, Jowkar, Masoumi, Mahmoodian, 2020).

The thought that the quality of education may be negatively affected in distance education, and the inability to do practical training effectively may cause a lack of motivation and anxiety. Besides, the dental students may worry about finding a job after graduation and the future their profession. In this study, preclinical students were more anxious than clinical students about the distance education process, whereas there was no significant difference between female and males. Also, the male students had significantly higher levels of financial and occupational anxiety for the future than female students.

Serious measures have been taken for social areas by governments as well to prevent of spreading the COVID-19 and the social ares have been closed such as, museums, movie theaters and restaurants (Peker, Pamukçu, Taka, Üçok, 2020). In addition, when considered necessary, the lockdown procedures were implemented. The results of this study revealed that the anxiety about socialization did not show difference according to the gender of the students. However, preclinical students had higher anxiety levels about socialization than clinical students. It may be said that socialization has become of secondary importance for clinical students during pandemic.

There are many studies showing that dental students are exposed to stress during their education (Kaczmarek, Kanaffa-Kilijanska, Frydecka, 2010, Babar et al., 2015, Davidovich, Pessov, Baniel, Ram, 2015). It is seen that the anxiety levels of dental students, who need to receive both practical and theoretical education, increase in different aspects during the covid 19 process, which is clearly evident from the scale and results we used in our study. It is important to prepare students to cope with the anxiety that arises in at online education during Covid-19. New education models must be developed for dental students and they supported for adaptation to this process.

6. Conclusion

Clinical students had higher anxiety levels than preclinical students regarding transition to face-to-face education. The variable of gender affected the anxiety level of students about transition to face-to-face education, financial and occupational concern. Regarding socialisation and distance education process, preclinical students were more anxious than clinical students.

Conflicts of interest

The authors declare no conflicts of interest.

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