

Knowledge, Attitude, and Perception Among the Dental Students During the COVID-19 Pandemic in Kosovo

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Abstract

Background: The current pandemic of the coronavirus disease COVID-19 has affected almost all countries of the world. Dental students are exposed to a high risk of contracting COVID-19 due to direct contact with patients. Thus, the objectives of this study were to determine the knowledge, perceived risk, and preventive behaviors regarding COVID-19.

Methods and Results: A total of 157 dental students from the first to the fifth year of studies, regardless of gender, were included in this cross-sectional study. Data were collected using a questionnaire distributed to dental students at the College to ensure unbiased responses. The questionnaire, based on information provided by WHO and the CDC on SARS-CoV-2 and COVID-19, contains sociodemographic questions and 19 questions exploring knowledge about the definition, symptoms, source of infection, routes of transmission, treatment, vaccination, and stress related to COVID-19.

Most of the dental students recognized the acronym COVID-19 (51%) and knew all the symptoms of the disease (62.4%), as well as the way of transmission (100.0%). Moreover, 85.4% of them had a lot of knowledge about the preventive measures against COVID-19, and 99.4% thought that dentists were a group at risk of infection. About 64.3% of students had been infected with COVID-19, but most of them (63.5%) were treated only with vitamins and paracetamol. Regarding vaccination, 94.9% of dental students were vaccinated: 75.8% of them had received two doses of the vaccine, 13.4% of them three doses, while 6.4% had received only one dose. A small percentage were not vaccinated at all (5.1%), and the reason for this was their allergies and fear of vaccines (37.5%). Nevertheless, several dental students felt that they did not have enough information about the vaccine and its safety (34.4%). The pandemic affected the depression of 49.0% of dental students, and a large percentage of them felt tired of the continued news about COVID-19 (91.7%).

Conclusion: The findings show a very high number of dental students who had good knowledge about the COVID-19 pandemic. However, we recommend informing and educating dental students about the COVID-19 pandemic and the importance of vaccination, but also about mental health care. (*International Journal of Biomedicine*. 2023;13(1):161-167.)

Keywords: COVID-19 • knowledge • attitude • dental students

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Abbreviations

COVID-19, coronavirus disease of 2019; **CDC**, Centers for Disease Control and Prevention; **PPE**, personal protective equipment; **SARS-Cov-2**, severe acute respiratory syndrome coronavirus 2; **WHO**, World Health Organization.

Introduction

The coronavirus (COVID-19) infection spread completely around the world, and authorities in 227 countries and territories have reported about 666.9 million Covid19 cases and 6.7 million deaths since China reported its first cases to the WHO in December 2019.⁽¹⁾ Within a week of the disease's appearance, over 107 nations around the world had closed all schools, affecting the lives of more than 862 million students around the world.⁽²⁾

The COVID-19 pandemic and the various measures introduced to slow its spread have significantly affected the day-to-day lifestyle and mental well-being of the general public; however, many higher education students have found themselves in a unique situation, perhaps isolated in a household with others they do not know well.⁽³⁾

The impact of COVID-19 on the dental community is evident. Dental education programs and academic activities have also suffered from the ramifications of the pandemic.⁽⁴⁾ Students face an increasingly uncertain environment, where financial and health shocks (for example, lack of resources to complete their studies or fear of becoming seriously ill), along with the transition to online learning, may have affected their academic performance, educational plans, current labor market participation, and expectations about future employment.⁽⁵⁾

Students have been impacted by the COVID-19 pandemic in multiple ways: threats to their own and their family's health, the closure of schools and pivoting to online learning, a long summer of physical distancing, and then the challenge of returning to school in the fall of 2020.⁽⁶⁾

Since dentistry students are in close contact with people affected during this pandemic, they must have sufficient knowledge of COVID-19, and it is believed that this will affect their preventive behaviors.⁽⁷⁾ When the first case of COVID-19 in Kosovo was announced in March 2020, dental students had insufficient awareness, and they did not have sufficient knowledge of this viral infection. This knowledge involves using all barriers, such as facemasks, eye protection with lateral shields, and protective clothing, adequate disinfection of clinical premises, and proper sterilization of the dental equipment and instruments.^(8,9)

The high prevalence of anxiety, fear, stress, and depressive symptoms among the students might be due to the disruption created by the COVID-19 pandemic in their academic life. This sudden disruption has a long-term effect on their future career, health, and personal life.⁽¹⁰⁾

This current study is directed toward determining the level of knowledge, attitude, and perception among dental students during the COVID-19 pandemic.

Materials and Methods

Study Design and Sampling Procedures

A cross-sectional study was conducted in a sample of dental students (n=157) attending Alma Mater Europaea, Campus College "Rezonanca" (Pristina, Kosovo) to investigate the perceptions of the students regarding theoretical knowledge and stress as a result of the COVID-19 pandemic. Therefore,

students were invited to participate anonymously in completing a questionnaire between October 2022 and November 2022, after the start of work at the College after the COVID-19 pandemic. Regarding the gender distribution, 81(51.6%) were females and 76(48.4%) were males. Students' distribution per year of studies was as follows: the first year 38(24.2%), the second year 29(18.5%), the third year 31(19.7%), the fourth year 34(21.7%), and the fifth year 25(15.9%).

Data Collection and Ethical Considerations

Data were collected using a questionnaire distributed to dental students at the College to ensure unbiased responses. The questionnaire, based on information provided by WHO and the CDC on SARS-CoV-2 and COVID-19, contains sociodemographic questions and 19 questions exploring knowledge about the definition, symptoms, source of infection, routes of transmission, treatment, vaccination, and stress related to COVID-19.

Before answering the questions, the respondents were informed that their participation in the questionnaire survey was voluntary and anonymous. Ethical approval of the study was obtained from the Ethic Committee of the Alma Mater Europaea, Campus College "Rezonanca," Prishtina, Kosovo (AD-4012/22,12.07.2022). Completing and submitting the questionnaire was considered to be a student's informed consent to participate in this study.

Survey Instrument

The questionnaire was constructed in Albanian for the present study and then translated into English. For the English version, a pilot study was conducted on ten dental students to test the questionnaire to ensure both the understanding of the meaning of the questions and the accuracy of their translation into English.

A face-to-face validation was conducted by asking ten dental students to answer the questionnaire. This phase was conducted to test and judge the items of the study instrument in terms of clarity of wording, readability, and likelihood of respondents answering the questions. The questionnaire was edited accordingly after the face-to-face validation. A pilot study was then carried out among 20 dental students as a preliminary analysis to evaluate the reliability of the questionnaire using Cronbach's alpha.

The questionnaires were divided into four sections and had a total of 19 questions. The first section contained demographic details like gender, age group, areas, and years of studies. Sections 2, 3, and 4 assessed the dental students' general knowledge about COVID-19 (7 questions; Q1-Q7), knowledge of whether they had been affected by COVID-19, diagnosis, treatment, and vaccination doses (9 questions; Q8-Q16), and information about the stress they had due to COVID-19 (3 questions; Q17-Q19).

The inclusion criteria for this study were dental students in the private College of Alma Mater Europaea Campus College "Rezonanca". The exclusion criteria were respondents who submitted incomplete survey questionnaires or denied consent to participate.

Statistical analysis was performed using Microsoft Excel (MS Office 2010 Microsoft Corp., Redmond, WA, USA) and statistical software package SPSS version 21.0 (SPSS Inc,

Armonk, NY: IBM Corp). Baseline characteristics were summarized as frequencies and percentages for categorical variables. Group comparisons were performed using chi-square tests or, alternatively, Fisher's exact test. A probability value of $P < 0.05$ was considered statistically significant.

Results

Sociodemographic Data

Of all the students, 72(45.9%) belonged to the age group of 19-20 years, 60(38.2%) to the age group of 21-22 years, 17(10.8%) to the age group of 23-24 years, while only 8(5.1%) students were over 25 years old. According to the residents, 128(81.5%) of the students were from urban areas, and 29(18.5%) of the students were from rural areas. Students' distribution per year of studies is presented in Table 1.

Table 1.

Sociodemographic characteristics of dental students.

Variables	n	%
Gender		
F	81	51.6
M	76	48.4
Age group		
19-20	72	45.9
21-22	60	38.2
23-24	17	10.8
25 +	8	5.1
Area		
Urban	128	81.5
Rural	29	18.5
Year of studies		
1	38	24.2
2	29	18.5
3	31	19.7
4	34	21.7
5	25	15.9
Total	157	100.0

Dental Students' Knowledge of Covid-19

The students' knowledge about COVID-19 is presented in Table 2. In all the questions asked, it is apparent that the students gave correct answers. Only one student did not know what the acronym COVID-19 was, while the majority of students (51.0%) were aware that the acronym COVID-19 represents coronavirus, a disease caused by an influenza virus, or a disease caused by SARS-CoV-2 ($P < 0.0001$) (Table 2).

About 62.4% of respondents were able to identify all of the possible symptoms of COVID-19 infection at the time the study was conducted. Most of the participants considered respiratory complications in the lungs (19.1%) and temperature and cough (18.5%) as important symptoms of the disease ($P < 0.0001$).

All participants gave correct answers regarding the fact that COVID-19 is a contagious disease and transmitted from the infected person to other individuals, whereas 85.4% thought that effective preventive measures were washing hands with an alcohol-based disinfectant, wearing a mask, and avoiding social contacts ($P < 0.0001$).

Table 2.

Dental students' knowledge of COVID-19.

Variables	n	%	P-value
Q1. What do you identify with the acronym COVID-19?			
A coronavirus	26	16.6	<0.0001
Disease caused by an influenza virus	4	2.5	
Disease caused by SARS-CoV-2	46	29.3	
All previous answers are correct	80	51.0	
I do not know	1	0.6	
Q2. What are the symptoms of COVID-19?			
Temperature and cough	29	18.5	<0.0001
Gastrointestinal symptoms	0	0.0	
Respiratory complications in the lungs	30	19.1	
All previous answers are correct	98	62.4	
I do not know	0	0.0	
Q3. Is COVID-19 a contagious disease?			
Yes	157	100.0	NA
No	0	0.0	
I do not know	0	0.0	
Q4. How is COVID-19 transmitted?			
From the infected person to others	157	100.0	NA
Through contact with domestic animals	0	0.0	
Through food	0	0.0	
I do not know	0	0.0	
Q5. Which of these measures prevents the spread of the virus?			
Washing hands with an alcohol-based disinfectant	3	1.9	<0.0001
Wearing a mask	14	8.9	
Avoiding social contacts	5	3.2	
All previous answers are correct	134	85.4	
I do not know	1	0.6	
Q6. Currently, how can patients be treated?			
According to the doctor's instructions	118	75.2	<0.0001
With antibiotics	3	1.9	
With antivirals	2	1.3	
Vaccinations	34	21.6	
I do not know	0	0.0	
Q7. Do you think that dentists are among the groups at risk of infection with COVID-19?			
Yes	156	99.4	<0.0001
No	1	0.6	
I do not know	0	0.0	

Regarding the treatment of COVID-19, the results show that the majority of students (75.2%) considered that the treatment should be based on the doctor's instructions, and only 1.3% thought that the treatment should be conducted by using antivirals ($P < 0.0001$).

However, regarding the fact that dentists are among the groups at risk of infection with COVID-19, 99.4% of dental students agreed ($P < 0.0001$).

Data Related to Infection, Diagnostic Method, Treatment and Vaccination of Dental Students

As shown in Table 3, about 64.3% of students had been infected with COVID-19 ($P < 0.0001$): while 39.6% of them were diagnosed by testing in a public hospital and 60.4% in a private clinic ($P = 0.0001$). Despite this, fortunately, the majority of students (62.4%) were treated only with vitamins and paracetamol ($P = 0.047$). More than half of the students expressed that they are not afraid of the Omicron variant. 94.9% were vaccinated against COVID-19: 75.8% received

two doses of the vaccine, 13.4% three doses, while 6.4% had only received one dose ($P<0.0001$). A small percentage of dental students (5.1%) were not vaccinated at all, and the reason for this is that they are allergic or afraid of the vaccine against COVID-19 (37.5%).

The majority of students did not know or estimate that vaccination would not be mandatory every 6 months (37.6%) and also agreed that they had sufficient information about the vaccine and its safety (49.0%) ($P<0.0001$).

Table 3.

Data related to infection, diagnosis method, treatment, and vaccination of dental students.

Variables	n	%	P-value
Q8. Have you been infected with COVID-19?			
Yes	101	64.3	<0.0001
No	56	35.7	
Q9. If you have been infected with COVID-19, where were you diagnosed?			0.0001
With a test in a public hospital	40	39.6	
With a test in a private clinic	61	60.4	
Q10. If you have had COVID-19, what have you been treated with?			0.047
I was hospitalized	3	3.0	
With antibiotics	19	18.8	
Only with vitamins and paracetamol	63	62.4	
I have not received any therapy	16	15.8	
Q11. Are you afraid of the Omicron variant of the COVID-19 virus?			<0.0001
Yes	27	17.2	
No	120	76.4	
I do not know	10	6.4	
Q12. Are you vaccinated against COVID-19?			<0.0001
Yes	149	94.9	
No	8	5.1	
Q13. If you are vaccinated, how many doses of the vaccine did you receive?			<0.0001
Just one dose	10	6.4	
Two doses	119	75.8	
Three doses	21	13.4	
No dose	7	4.5	
Q14. If you have never been vaccinated against COVID-19, why did you do this?			0.882
I'm allergic	3	37.5	
I am afraid of vaccines in general	2	25.0	
I am afraid of the vaccine against COVID-19	3	37.5	
Q15. Do you think that the vaccination will be done every 6 months, for a longer time (several years)?			<0.0001
Yes	39	24.8	
No	59	37.6	
I do not know	59	37.6	
Q16. Do you think you have enough information about the vaccines against COVID-19 and their safety?			<0.0001
Yes	77	49.0	
No	54	34.4	
I do not know	26	16.6	

Information Related to the Stress Dental Students Have Due to COVID-19

From the results given in Table 4, we could not find any significant difference regarding the depression of dental

students during the pandemic period. As can be seen, 49.0% of dental students had shown depressed behavior, while 51.0% denied that they felt depressed. Of all students surveyed, 91.7% were tired of hearing news about COVID-19, and 58.6% thought the world would not be the same because of the COVID-19 pandemic ($P<0.0001$).

Table 4.

Information related to the stress dental students have due to COVID-19.

Variables	n	%	P-value
Q17. Have you felt depressed due to isolation during the pandemic period?			0.811
Yes	77	49.0	
No	80	51.0	
Q18. Are you tired of the pandemic and hearing the news about COVID-19?			<0.0001
Yes	144	91.7	
No	13	8.3	
Q19. Do you think that the world will not be the same because of the COVID-19 pandemic?			<0.0001
Yes	92	58.6	
No	46	29.3	
I do not know	19	12.1	

Discussion

COVID-19 still poses a problem for dentists and all medical professionals because they are at persistent risk of infection. For this reason, it is very important that beginning with students, their knowledge about COVID-19 is constantly evaluated.

However, more than two years have passed since the world's population has been affected by COVID-19, so there are still not many studies that evaluate the knowledge of students regarding this disease. Dentistry students are future professionals; therefore, they should definitely have knowledge about the spread of pandemic diseases, because they are in direct contact with the oral cavity of patients, with dental materials and contaminated dental instruments, and in this way, can contribute to the spread of the pandemic disease.⁽¹¹⁾ Therefore, in this study, we analyzed dental students' knowledge of the novel coronavirus and identified gaps in current knowledge and misunderstanding among the dental student population.

Our study revealed encouraging results among dentistry students in Kosovo, where most of them had knowledge related to what COVID-19 is, its symptoms, way of transmission, and treatment. These results reveal that students actually demonstrated overall good knowledge of COVID-19. This finding is consistent with previous studies regarding students' knowledge of COVID-19.⁽¹¹⁻¹³⁾

Above all, it is important that dentists know the preventive measures against COVID-19. Most of the students in our research (85.4%) gave correct answers regarding preventive measures. The same results were presented by Khader Y et al.,⁽¹⁴⁾ who found that most dentists reported cleaning and disinfecting hands and surfaces that came into

contact with patients known to have COVID-19 or suspected of it, and wearing personal protective equipment (PPE) could help prevent transmission from patients with known or suspected COVID-19.

Dental healthcare workers are considered to be the frontline in the current pandemic.⁽¹⁵⁾ The main reason they are at risk is because of the proximity with the patient during the treatment when it is well known that the disease is also spread through respiratory droplets that we breathe through our nose and mouth.^(16,17) All students in our study agreed that dentists belong to the group of health professionals most at risk from COVID-19. Other authors have given the same opinion in their studies.^(15,18-20)

However, many measures have been used to prevent the transmission of COVID-19 in dental environments, starting from the use of PPE, ventilation of the dental environment after each patient, meticulous hand hygiene, and sterilization procedures aimed at deactivating, destroying or removing pathogens from any surface or instrument. In addition, patients complete screening questionnaires for COVID-19, and the patient's body temperature is measured before each visit to the dentist.⁽²¹⁾ While patients were treated only in urgent cases, and all patients with any symptoms consistent with COVID-19, with a positive test, or possible previous exposure were postponed for at least 2 weeks.⁽¹⁶⁾

In Kosovo, not only government hospitals but also numerous private clinics have the ability and license to perform laboratory diagnostics of COVID-19. According to the results of our study, a large percentage of students (64.3%) were infected with COVID-19, and the largest percentage were diagnosed in a private clinic (61.5%). Our results are higher than other studies regarding the infection of dental students with COVID-19.^(22,23) Fortunately, most of the dental students were treated only with symptomatic therapy. Infections among dental students were due to the nature of the dental practice, which exposes students to bodily fluids from the patient, including blood and saliva, and the way the virus is transmitted through contact with respiratory droplets from an infected individual.⁽²⁴⁾

After two years had passed since the pandemic was present in the world, the Omicron variant began to spread as a mutation of COVID-19. This variant was unknown, and cases increased dramatically, again causing travel restrictions to prevent transmission of the disease and fear among the world's population.^(25,26) Despite this, our study shows that most dental students were not afraid of the Omicron variant. This is probably related to what was said above that most students infected with COVID-19 were treated with symptomatic therapy, so they did not take the spread of a new variant of Omicron as a concern.

When working with patients, dentists and dental students must follow strict workplace protocols to prevent the spread of disease. Vaccination against COVID-19 remains the most valuable solution to this day. Although it has been documented that conspiracy beliefs and misconceptions about immunity have limited student acceptance of the vaccine, our study nevertheless shows a high vaccination rate among dental students (94.9%) with two doses of the vaccine. High results

regarding the vaccination of dental students were also given by Schmidt J. et al.,⁽²³⁾ where the vaccination rate among students was 93.8%, and 75.4% of respondents supported mandatory COVID-19 vaccination for healthcare professionals. Kateeb E et al.⁽²²⁾ found that 57.8% of dental students in Palestinian educational institutions were willing to be vaccinated against COVID-19 when it became available. On the other hand, a small number of dental students were not vaccinated, and the reasons for this were an allergy, fear of the vaccine against COVID-19 (42.8%), and lack of information about the vaccine (34.4%). Other studies also found that insufficient knowledge about vaccines was a predictor of COVID-19 vaccine hesitancy among healthcare workers globally.^(27,28)

The pandemic has impacted global communities in different ways. Besides the influence on physical health, it also affects people psychologically because of the risk of developing pandemic fatigue.⁽²⁹⁾ Most of the dental students in our study did not indicate that they felt depressed due to isolation during the COVID-19 pandemic (51%), although a slightly lower percentage admitted that isolation during the pandemic had caused them depression (49.0%). On the other hand, almost all dental students were tired of constantly hearing news about the pandemic, and they thought that the world would not be the same because of it. Our results are similar to a study by Ali S et al.⁽³⁰⁾ regarding the dental students being tired of hearing about COVID-19.

The main strength of the current study is that this is the first study conducted among dental students in Kosovo regarding knowledge of the COVID-19 pandemic. Therefore, the knowledge obtained from this study is important for public health and for preventive measures that public and private faculties should implement. Another strong point of this study is that it shows dental students' knowledge of the COVID-19 pandemic is quite high, indicating dental professionals' knowledge about preventive measures against it.

This study also has some limitations. First, this study is limited to only private dental college students. Second, the sample size is relatively small, and the results are not generalizable to other private and public dental colleges. Therefore, it is recommended that further studies be conducted using larger samples in different dental and medical educational institutions in Kosovo.

Conclusion

The current investigation found that most of the dental students in Kosovo had good knowledge about the etiology and way of transmission, clinical features, treatment modalities, and dental preventive measures against COVID-19. Most students knew that vaccination was the best method to prevent the spread of the pandemic. However, some students hesitated in this direction due to their lack of knowledge about the vaccine. Also, dental students showed fatigue from the amount of information related to COVID-19.

We recommend using this opportunity to educate students further to widen their knowledge not only about preventing the spread of the pandemic but also about the importance of vaccination against COVID-19.

Competing Interests

The author declares that there is no conflict of interest in this work.

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