ORIGINAL RESEARCH

Knowledge, Awareness, Practice, Attitudes, and Their Associated Factors about COVID-19 Outbreak in Dental Students

Alexandra Cadenillas[1], Cesar Mauricio-Vilchez[2], Franco Mauricio[3], Daniel Alvitez-Temoche[4], Luzmila Vilchez[5], Frank Mayta-Tovalino[6]

Received on: 03 May 2023; *Accepted on:* 06 June 2023; *Published on:* 22 August 2023

Abstract

Aim: To determine the level of knowledge, awareness, practice, and associated factors about the coronavirus disease 2019 (COVID-19) outbreak in undergraduate dental students at a Peruvian public university.

Materials and methods: An observational, prospective, cross-sectional, and descriptive study was carried out. The population consists of all undergraduate students of the Faculty of Dentistry of the Universidad Nacional Federico Villarreal (UNFV) duly enrolled in the academic year 2021–2022. The previously validated and structured questionnaire consisting of 31 predefined answers, including the level of knowledge, awareness, practice, and attitudes in different evaluation sections, was used. The data were analyzed using Stata® 15.0 statistical software. Finally, the associated factors were analyzed by establishing the best Logit model, and a significance level of $p < 0.05$ was established.

Results: In the logistic regression analysis, no variables were found to be associated with the knowledge and awareness, practices, and attitudes of undergraduate dental students regarding the COVID-19 outbreak. The following results were obtained: sex [odds ratio (OR) = 0.49; 95% confidence interval (CI): 0.24–1.0], age (OR = 1.06; CI: 0.92–1.21), cycle (OR = 0.94; CI: 0.81–1.09), origin (OR = 0.45; CI: 0.29–60.3).

Conclusion: Peruvian dental students at a Peruvian public university had knowledge, practices, and attitudes about the COVID-19 outbreak. Furthermore, none of the associated factors examined were significant in this relationship.

Clinical significance: This research has clinical relevance because it allowed us to identify the factors that influence the level of knowledge, practices, and attitudes of undergraduate dental students in order to establish strategies to address this problem.

Keywords: Coronavirus disease 2019, Dentistry, Knowledge, Pandemic.

World Journal of Dentistry (2023): 10.5005/jp-journals-10015-2241

Introduction

Coronavirus disease 2019 (COVID-19) is a highly contagious viral disease that has infected millions of people around the world.[1,2] World Health Organization has declared this disease to be of international concern. This infection is caused by a new strain of coronavirus (severe acute respiratory syndrome coronavirus 2), which was first reported in December 2019 in China.[1] The main route of transmission is by airborne aerosols and droplets that are transmitted from person to person.

This disease has an incubation period of approximately 2–14 days. The severity of its symptoms varies from asymptomatic to life-threatening in some cases, patients are asymptomatic, and in others, even life-threatening.[3,4] Diagnosis is often difficult in asymptomatic patients, and prevention is the best way to avoid infection.[5–7]

Generally, after infection, medical students can hardly recognize the symptoms, especially in the first days of the disease. This increases transmission and is a great threat, especially for dental personnel. Therefore, dentists must be very aware of making a correct front to avoid contamination and the spread of this disease.[2]

Although the behavior of the virus was not well known in the beginning, it is now much better understood. Research has made this possible, putting healthcare workers at a lower risk of infection. From the beginning of the pandemic, healthcare professionals were the group of people who were at constant and increased risk. Especially in the dental office, a high likelihood of cross-infection was identified. For this reason, it is important to identify the factors associated with this disease to avoid contagion.[3]

In relation to dental practices, the American Dental Association recognized dentistry as a high-risk profession and recommended guidelines for controlling COVID-19 infection in the dental office. These recommendations include the use of personal protective equipment, aerosol control, use of wadding, operating room ventilation and constant hand washing, etc.[5–10]

[1]Postgraduate Department, School of Stomatology, Universidad Cientifica del Sur, Lima, Peru

[2–5]Academic Department, Faculty of Dentistry, Universidad Nacional Federico Villarreal, Lima, Peru

[6]CHANGE Research Working Group, Faculty of Health of Sciences, Universidad Científica del Sur, Lima, Peru

Corresponding Author: Frank Mayta-Tovalino, Postgraduate Department, School of Stomatology, Universidad Cientifica del Sur, Lima, Peru, Phone: +5112142500, e-mail: fmaytat@cientifica.edu.pe

How to cite this article: Cadenillas A, Mauricio-Vilchez C, Mauricio F, *et al.* Knowledge, Awareness, Practice, Attitudes, and Their Associated Factors about COVID-19 Outbreak in Dental Students. World J Dent 2023;14(6):481–485.

Source of support: Nil

Conflict of interest: None

It has been shown that the COVID-19 virus can remain on surfaces for hours and days, depending on the surface, humidity, etc.[5,11–14] It is important that health personnel and students are aware of the high risk to which they are exposed, especially dental students.[15,16] For this reason, it is very important to implement biosafety protocols for the management of infection in dental practices.

It is recommended that future professionals wear biosafety measures (masks, goggles, etc.) to protect themselves from droplets/aerosols generated during dental procedures.[17–19] However, the scientific community still does not fully understand the exact behavior of the virus, so students and health personnel are the most vulnerable.

The purpose of this research is to evaluate the level of knowledge, awareness, practice, and associated factors about the COVID-19 outbreak in undergraduate dental students at a Peruvian public university.

Materials and Methods

Study Design and Sample Size

The present study was a cross-sectional, prospective, observational design. The population size was calculated using the Open Epi software with the formula to estimate a sample for the frequency in a finite population. A hypothetical frequency (*p*) of 50% ± 5 and an absolute error of 5% was used. A minimum sample size of 235 students was determined; however, it was decided to evaluate 300 subjects from the Faculty of Dentistry of the Universidad Nacional Federico Villarreal (UNFV).

The study was carried out between November 2021 and February 2022. The Strengthening the Report of Observational Studies in Epidemiology guidelines were used for the writing of this manuscript.

Inclusion Criteria

- Students who wish to participate in the virtual survey.
- Students with internet access.
- Students of the Faculty of Dentistry UNFV correctly enrolled in the year 2021–2022.

Exclusion Criteria

- Students who do not sign the informed consent form.
- Students who are minors.
- Students who do not have digital means of communication.
- Students from other Peruvian Schools of Dentistry.

Associated Factors

The associated factors evaluated were the sex, cycle, and geographic origin of the undergraduate dental student. All these factors were analyzed and evaluated by means of a logistic regression model to determine which are intervening variables with a $p < 0.05$.

Data Collection and Measurements

Authorization was requested from the Dean's Office of the Faculty of Dentistry, UNFV. Then all students who were duly enrolled in the 2021–2022 academic year were identified. A total of 300 undergraduate students were identified and evaluated in the study. Each participant was asked to sign informed consent because participation was free and voluntary. A questionnaire previously validated by Ahmed et al.[1] was used, and data were collected using this structured questionnaire consisting of 31 predefined questions, including the level of knowledge, awareness, and practice in different assessment sections. This questionnaire previously had an internal consistency of responses with a Cronbach's α of 0.71.

The first section contains six closed questions on demographic details and in relation to education levels and occupational aspects. The second section has 11 questions focused on the level of knowledge, including etiology, awareness, transmission, incubation period, signs and symptoms, duration, treatment options, and other factors. The third section has 14 questions related to attitude and practice about COVID-19. The surveys were online *via* Google Surveys, where the links were forwarded through institutional emails. The online questionnaire link was sent through social media, including Facebook, WhatsApp, and Twitter of UNFV. Finally, all participant data was kept anonymous.

Ethical Considerations

The project was presented to the Ethics Committee of the Universidad Científica del Sur and was approved by the resolution of the Ethics Committee, 293-CIEI-CIENTIFICA-2021.

Data Analysis

The data were stored and analyzed using Stata® 15.0 statistical software (Texas, United States of America). The descriptive analysis was evaluated with frequencies and percentages of qualitative variables. Finally, the associated factors will be analyzed by establishing the best Logit model through logistic regression, where the odds ratios of the confounding variables are obtained. A significance level of $p < 0.05$ was established.

Results

It was found that the female sex was the most prevalent 175 (58.3%). In relation to the academic cycle of the dental students, the majority, 57 (19%), belonged to the tenth cycle, while only 19 (6.3%) belonged to the fifth cycle. Finally, most of the students, 254 (84.6%), belonged to the capital Lima, while only 46 (15.3%) were from the provinces (Table 1).

Table 2 shows that in relation to the level of knowledge and awareness of the students evaluated, it was found that only Q8 (which age group is most affected by COVID-19?) had a statistically significant association with sex with a $p = 0.03$. However, in the rest of the questions Q1–P7, Q9–P11, no associations were found between the level of knowledge and awareness with the sex of the students $p > 0.05$.

Table 1: Sociodemographic characteristics

Groups		*n*	*%*
Gender	Female	175	58.33
	Male	125	41.67
Origin	Lima	254	84.67
	Province	46	15.33
		Media	DS
Age		22.42	3.51
Cycle		6.09	3.02

*The variables, age and cycle were measured quantitatively (mean and standard deviation)

Table 2: Knowledge and awareness assessment of dental students

Question	*Answer*	*Female, n (%)*	*Male, n (%)*	*p**
Q1: What is the virus that causes COVID-19?	1	16 (50)	16 (50)	0.385
	2	14 (50)	14 (50)	
	3	0 (0)	0 (0)	
	4	143 (60.85)	92 (39.15)	
	5	2 (40)	3 (60)	
Q2: What is the etiology of COVID-19?	1	171 (57.97)	124 (42.03)	0.233
	2	2 (100)	0 (0)	
	3	1 (100)	0 (0)	
	4	2 (100)	0 (0)	
	5	0 (0)	0 (0)	
Q3: What do you think is the mode of transmission?	1	57 (57.58)	42 (42.42)	0.174
	2	0 (0)	2 (100)	
	3	3 (100)	0 (0)	
	4	115 (58.67)	81 (41.33)	
	5	0 (0)	0 (0)	
Q4: How did you learn about COVID-19?	1	15 (48.39)	16 (51.61)	0.442
	2	6 (66.67)	3 (33.33)	
	3	42 (60)	28 (40)	
	4	3 (100)	0 (0)	
	5	109 (58.29)	78 (41.71)	
Q5: What is the incubation period of COVID-19?	1	168 (57.53)	124 (42.47)	0.11
	2	6 (100)	0 (0)	
	3	1 (50)	1 (50)	
	4	0 (0)	0 (0)	
Q6: Do you know the signs and symptoms of COVID-19?	1	114 (54.29)	96 (45.71)	0.154
	2	0 (0)	0 (0)	
	3	3 (75)	1 (25)	
	4	57 (67.06)	28 (32.94)	
	5	1 (100)	0 (0)	
Q7: Do you know how many days COVID-19 can survive outside the body?	1	16 (47.06)	18 (52.94)	0.107
	2	44 (65.67)	23 (34.33)	
	3	52 (64.20)	29 (35.80)	
	4	24 (46.15)	28 (53.85)	
	5	39 (59.09)	28 (53.85)	
Q8: What age group is most affected by COVID-19?	1	0 (0)	0 (0)	0.03
	2	1 (50)	1 (50)	
	3	13 (92.86)	1 (7.14)	
	4	160 (57.14)	120 (42.86)	
	5	1 (25)	3 (75)	
Q9: Do you know the mortality rate of COVID-19?	1	44 (53.66)	38 (46.34)	0.416
	2	22 (52.38)	20 (47.62)	
	3	28 (60.87)	18 (39.13)	
	4	13 (76.47)	4 (23.53)	
	5	68 (60.18)	45 (39.82)	
Q10: How can we prevent COVID-19?	1	3 (42.86)	4 (57.14)	0.358
	2	3 (75)	1 (25)	
	3	4 (100)	0 (0)	
	4	163 (57.60)	120 (42.40)	
	5	1 (100)	0 (0)	
Q11: What are the available treatment alternatives for patients with COVID-19?	1	13 (59.09)	9 (40.91)	0.539
	2	8 (47.06)	9 (52.94)	
	3	5 (50)	5 (50)	
	4	8 (80)	2 (20)	
	5	141 (58.51)	100 (41.49)	

*Chi-square test

Table 3 shows that, regarding attitudes and practices, only questions P15 (do you know if the virus can affect humans more than once?), P20 (have you attended any lecture/course/workshop on COVID-19?), P23 (do you use an N-95 mask when having contact with your patients?), and P25 (do you use sodium hypochlorite as a surface disinfectant?) were associated with the sex of the students with a $p < 0.05$.

In the logistic regression analysis, no variables associated with the knowledge and awareness, practices, and attitudes of undergraduate dental students regarding the COVID-19 outbreak were found. The following results were obtained: sex [odds ratio (OR) = 0.49; 95% confidence interval (CI): 0.24–1.0], age (OR = 1.06; CI: 0.92–1.21), cycle (OR = 0.94; CI: 0.81–1.09), origin (OR = 0.45; CI: 0.29–60.3) (Table 4).

Discussion

In the present study, it was observed that 58.3% of the participants were female and 41.6% were male, while the cycle with the highest number of participants was the tenth and eighth cycles, with 19 and 14.3%. The origin of the participants was higher in the case of Lima, with 84.6%, compared to the provinces, with 15.3%. This study evidences the importance of this scenario, especially in the process and attitude that health sciences students should have during vaccination against COVID-19. On the other hand, since in Peru, most students belong to the female gender, and according to the published scientific literature, it was decided to analyze if this tendency influences the attitudes and knowledge that a deontology student has. On the other hand, the academic year was also analyzed, and no influence of this variable on the practices and attitudes of students toward COVID-19 was found.

Also, in the present investigation, a multivariate logistic regression was performed to identify the associated factors that influence the knowledge and perceptions of dental students about COVID-19. No influence was found of associated factors such as sex, age, cycle, or origin on the knowledge and perception of COVID-19, results like the studies of De Stefani et al.[5] conducted in Italy, Ahmed et al.[7] in Jordan, Papagiannis et al.[8] developed in Greece, and Consolo et al.[10] where there were no significant differences according to sex. However, in the present study, significant differences were found ($p = 0.026$) in the association of greater participation of the female sex in talks, courses or workshops on COVID-19 in addition to a significantly greater knowledge of the signs and symptoms of COVID-19 ($p = 0.006$), which is consistent with the results of the study by De Stefani et al.[5] which found in female participants a significantly higher perceived danger of COVID-19 ($p < 0.001$), confidence in treating suspected contagion ($p < 0.001$) and on the perception of not having prepared sufficiently for the resumption of clinical activities ($p < 0.001$). In the present study, significant differences were also found in the greater use of surface disinfectants such as sodium hypochlorite in the female participants ($p = 0.001$). It is important to mention that studies such as that of Quadri et al.[12] show that educational interventions have a favorable impact on the reduction of knowledge and attitude gaps in dental interns ($p < 0.001$), making them recommendable activities in educational institutions.

On the other hand, the results differ from those of Cagetti et al.,[11] who found significant differences according to the level of COVID-19 alert according to the region of origin, while the present study does not show such differences.

Table 3: Attitude and practice assessment of dental students

Question	*Answer*	*Female, n (%)*	*Male, n (%)*	*p**
Q12: Is COVID-19 contagious, and should it be contained?	Yes	151 (58.30)	108 (41.70)	0.865
	No	15 (55.56)	12 (44.44)	
	Do not know	9 (64.29)	5 (35.71)	
Q13: Do you think we should prevent its spread as it is a cause of morbidity and mortality?	Yes	170 (58.62)	120 (41.38)	0.675
	No	4 (57.14)	3 (42.86)	
	Do not know	1 (33.33)	2 (66.67)	
Q14: Do you think the virus is transmitted from animals to humans and vice versa?	Yes	35 (53.85)	30 (46.15)	0.280)
	No	106 (57.30)	79 (42.70)	
	Do not know	34 (68)	16 (32)	
Q15: Do you know if the virus can affect humans more than once?	Yes	169 (58.28)	121 (41.72)	0.042
	No	0 (0)	3 (100)	
	Do not know	6 (85.71)	1 (14.29)	
Q16: Are there vaccines available?	Yes	168 (57.73)	123 (42.27)	0.374
	No	5 (71.43)	2 (28.57)	
	Do not know	2 (100)	0 (0)	
Q17: Do you consider it a threat to our community?	Yes	164 (57.54)	121 (42.46)	0.344
	No	9 (69.23)	4 (30.77)	
	Do not know	2 (100)	0 (0)	
Q18: Have you followed the Centers for Disease Control and Prevention guidance recommendations for patient care?	Yes	144 (59.26)	99 (40.74)	0.732
	No	15 (51.72)	14 (48.28)	
	Do not know	16 (57.14)	12 (42.86)	
Q19: Have you ever encountered a patient with COVID-19?	Yes	134 (56.78)	102 (43.22)	0.075
	No	38 (69.09)	17 (30.91)	
	Do not know	3 (33.3)	6 (66.67)	
Q20: Have you attended any lectures/courses/workshops on COVID-19?	Yes	116 (64.09)	65 (35.91)	0.026
	No	58 (49.15)	60 (50.85)	
	Do not know	1 (100)	0 (0)	
Q21: Do you wash your hands before and after contact with your patients?	Yes	171 (58.36)	122 (41.64)	0.905
	No	2 (50)	2 (50)	
	Do not know	2 (66.67)	1 (33.33)	
Q22: Do you use a surgical mask when having contact with your patients?	Yes	150 (58.37)	107 (41.63)	0.953
	No	23 (57.50)	17 (42.50)	
	Do not know	2 (66.67)	1 (33.33)	
Q23: Do you wear an N-95 mask when having contact with your patients?	Yes	162 (60.67)	105 (39.33)	0.036
	No	9 (34.62)	17 (65.38)	
	Do not know	4 (57.14)	3 (42.86)	
Q24: Do you take universal infection control precautions?	Yes	165 (58.72)	116 (41.28)	0.612
	No	6 (46.15)	7 (53.85)	
	Do not know	4 (66.67)	2 (33.33)	
Q25: Do you use sodium hypochlorite as a surface disinfectant?	Yes	158 (63.20)	92 (36.80)	0.001
	No	15 (33.33)	30 (66.67)	
	Do not know	2 (40)	3 (60)	

*Chi-square test

The main strengths of this study were that it provides scientific evidence of the possible practices of Peruvian health science students regarding vaccination against COVID-19, as well as identifying attitudes and associated factors that may influence vaccination against COVID-19 in this population, which due to the nature of their activities is exposed to a high risk of contagion of this disease. In addition, educational and communication strategies can be established to provide the necessary information to students, with the purpose of absolving doubts, possible fears, or possible adverse attitudes to vaccination against COVID-19 in this important group that may be exposed to the risk of contagion. Finally, it helps to improve the scope of vaccination in Peruvian university students and in the community in general to reach higher levels of collective immunity.

This research had a theoretical strength in improving the understanding of the literature on the level of knowledge, practices, and attitudes of Peruvian dental students. Therefore, it provided the profession with solid evidence of the impact of COVID-19 on Peruvian undergraduate dental students. It also had clinical importance

Table 4: Multifactorial logistic regression analysis of perception and Knowledge of undergraduate health sciences students about COVID-19

Associated factors	*Frequency n (%)*	*OR*	*95% CI*
Gender			
Female	175 (58.33)	Ref.	
Male	125 (41.67)	0.49	0.24–0.99
Age	22.4 (3.5)	1.06	0.92–1.21
Cycle	6.09 (3.0)	0.94	0.81–1.09
Origin			
Lima	254 (84.67)	Ref.	
Provinces	46 (15.33)	0.45	0.29–60.3

because students should be informed about the management of potentially infected patients, as well as the clinical implications of this disease in the oral cavity since this has been shown to be the main source of infection. Finally, this study had a social impact since patients could directly benefit from a clear and effective protocol for dental care according to the COVID-19 context, avoiding contagion or cross-contamination between operators, students, and patients.

The main limitation of the present research study is the small number of manuscripts with national data published in the scientific evidence. Another limitation is that there may be subjectivity on the part of the students when surveyed since the variable knowledge, awareness, and practices may vary with respect to race, age, culture, level of education, etc.

Conclusion

Peruvian dental students at a national public university had knowledge, practices, and attitudes about the COVID-19 outbreak. Furthermore, none of the associated factors examined were significant in this relationship.

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