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Information sources of Brazilian undergraduate dental students during the COVID-19 outbreak: a cross-sectional study

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Aim: This cross-sectional study aimed to investigate where Brazilian dental students seek information about COVID-19 by a self-administered web-based questionnaire. **Methods:** A social network campaign on Instagram was raised to approach the target population. The dental students responded to a multiple-response question asking where or with whom they get information about COVID-19. The possible answers were government official websites or health and education institutions websites, TV Programs, professors, social media, scientific articles, health professionals, and family members. The data were analyzed by descriptive statistics, and the frequency distributions of responses were evaluated by gender, age, type of institution, and year of enrollment. **Results:** A total of 833 valid responses were received. The main source of information used by the dental students were government official websites or health and education institutions websites, which were reported by 739 (88.7%) participants. In the sequence, 477 (57.3%) participants chose health professionals while 468 (56.2%) chose scientific articles as information sources. The use of social media was reported by 451 (54.1%) students, while TV programs were information sources used by 332 (39.9%) students. The least used information sources were professors, reported by 317 (38.1%) students, and family members, chosen only by 65 (7.8%) participants. **Conclusion:** Brazilian dental students rely on multiple information sources to stay informed about COVID-19, mainly focusing their information-seeking behavior on governmental and health professional's websites.

Keywords: COVID-19. Students, dental. Information seeking behavior. Social media. Schools, dental.

Introduction

COVID-19 is a virus-mediated disease caused by a member of the coronavirus family SARS-Cov-2 originated in Wuhan, Hubei, China in December 2019[1,2]. A few months after the first cases, the disease became pandemic, affecting more than 100 million people and causing over 2.5 million deaths (March 8th of 2021), according to the World Health Organization (WHO) COVID-19 dashboard[3]. In Latin American countries, Brazil has risen to the spotlight of leading nations with the highest number of cases and deaths episodes due to COVID-19, experiencing health system collapse and ranking number 3 globally. Since the first diagnosed case in Brazil, there have been more than 10 million cases confirmed along with staggering 264,000 numbers of death episodes by 8th March 2021[3].

As the cases of COVID-19 increased globally, and the pathophysiology of the disease began to be constantly studied, an avalanche of information on this issue started to be shared. By 21 August 2020, the keyword "COVID-19" yielded over 42,000 and 60,000 indexed articles on PubMed and Google Scholar, respectively, let alone over 6,5 billion results were acquired on Google search engine only in 2020. Even more impressive is the number of posts on social media platforms, which spread rapidly and easily[4,5]. This social media content has a high potential to carry on misleading information, hindering public health policies. Ultimately, it can create a global epidemic of misinformation[6-9]. Recent reports revealed that individuals who get their news from social media are more likely to have misperceptions about COVID-19, whereas those who consume more traditional news media have fewer misperceptions and are more likely to follow public health recommendations like social/physical distancing[10]. Along with these concerning findings, the information-seeking patterns can also modulate attitudes and behaviors towards this crisis[11].

Once the exposure to online health information has been associated with health-related behaviors in different populations and contexts[12-15], understanding the information-seeking behavior of dental students and their infosphere can be a necessary step toward building efficient educational planning in the context of COVID-19. These students are in direct contact with patients[16,17] and can funnel information to their niches. In this sense, educational institutions have such a role in fostering and providing the academic community with scientifically-oriented and official information to battle the current wave of infodemic, so that dental students can be better prepared to tackle any related issue[16].

In Brazil, 350 tertiary institutions are responsible for the formal dental education of up to 125,585 students across the country[18]. During the current university recess and social/physical distancing, the e-learning regimen has taken place while hands-on experience has been discontinued for a while, profoundly affecting up to the totality of these students. However, considering social inequalities regarding information access[19,20], the overload of information regarding COVID-19[9], and the infosphere as a behavioral modulator[15], identifying the information sources of dental students about COVID-19 is paramount to fight off misperceptions and misinformation among this population. Moreover, knowing from where and with whom

the dental students get informed about the pandemic will facilitate the schools to reach their attention and enforce educational policies toward this end. Thus, this study aimed to identify the source of information Brazilian dental students use regarding COVID-19.

MATERIALS AND METHODS

Ethical aspects

This research protocol was approved by the Research and Ethics Committee of the School of Dentistry of Ribeirão Preto at the University of São Paulo (CAAE: 33608320.5.0000.5419). The research was performed following the Helsinki declaration. All participants signed a written consent informing that they accepted to participate in the investigation. The study consists of a cross-sectional survey directed to a sample of undergraduate dental students. All data used for this manuscript are available in Portuguese at https://doi.org/10.7910/DVN/CMAD57 .

Survey content

This cross-sectional study is part of a broader investigation and the details on how the questionnaire was developed and administered have been published elsewhere[21]. In summary, a self-administered questionnaire about the awareness and knowledge of Brazilian dental students about COVID-19 and its impact on the undergraduate dental practice was hosted online (Google Forms). The questionnaire contained 20 mandatory close-ended items, divided into four sections: 1) demographic and academic profile (6 questions); 2) general knowledge about COVID-19 (4 questions); 3) knowledge about the preventive measures to avoid COVID-19 spread on the undergraduate dental practice (2 questions); 4) perceptions about the COVID-19 impacts on the undergraduate dental courses (8 questions). The current work covers only the part of the 4th section in which the students responded where or with whom they usually get information about COVID-19. The possible answers were government official websites or health and education institutions websites, TV Programs, professors, social media, scientific articles, other health professionals, and family members. This was asked as a multiple-response question. Thus, each participant could choose more than one option as their information source.

Recruitment and data collection

According to data from the last Brazilian Tertiary Education Census[18], there are 125,585 undergraduate students enrolled in dentistry courses in Brazil, considering public and private institutions. All these students were eligible to participate in the research. Recruitment was conducted through an Instagram® (Facebook, Menlo Park, CA) social networking campaign, which started on July 4 and lasted until July 14.

Data analysis

The data collected were extracted from Google Forms and converted to Excel (Microsoft, USA) sheets. The frequency distribution for the source of information about COVID-19 was analyzed by gender, age, and type of institution (public and private).

It was considered valid the response obtained from a questionnaire answered by a participant who signed yes to the question: "do you agree to participate in this research?", which was provided after the presentation of the consentient form. Moreover, the participants had to fill in the entire questionnaire for their answers to be considered valid.

RESULTS

Government official websites or health and education institutions websites were the answer more frequently chosen, reported by 739 (88.7%) participants. Interestingly, 477 (57.3%) students also referred to other health professionals as those with whom they seek information about the disease. A very small proportion of dental students, 65 (7.8%) in total, obtained their information from family members. More than half of the students, accounting for 468 (56.2%) respondents, used scientific articles as a source of information about COVID-19, while the use of social media was reported by 461(54.1%). Such a proportion overcame the one for TV programs and professors, accounting for 332 (39.9%) and 337 (38.1%) responses, respectively.

We observed that 88.9% of men and 88% of women sought information twice as much in official websites than in TV programs (40.3% for male participants and 38% for female participants) or professors, who were chosen only by 37% of male respondents and 42.2% of female participants (Table 1). Scientific articles were more used as information sources by men than social media (59% and 50%, respectively), which was not observed for female respondents (Table 1). Table 2 shows that official websites were more frequently used as sources of information by those who study dentistry in private institutions (91%), while the acquisition of information from scientific articles was more frequently used by students from public dental schools (60%). Moreover, comparable proportions of dental students from the public (54.2%) and private (54.1%) institutions used social media as an information source (Table 2).

Table 1. Dental students' source of information about COVID-19 by gender

Possible answers	Female		Male	
	n	%	n	%
Government official websites or health and education institutions websites	593	88.9	146	88.0
Other health professionals	374	56.1	103	62.0
Scientific articles	369	55.3	99	59.6
Social media	368	55.2	83	50.0
TV Programs	269	40.3	63	38.0
Professors	247	37.0	70	42.2
Family members	53	7.9	12	7.2
Total (multiple-response question)	667		166	

Table 3 displays that the use of official websites increased with age, being it absolute in those older than 39 years old. On the other hand, the use of social media decreased

with age, dropping from 56.6% in the group of students younger than 25 years old to 20% in the group older than 39 years old. The use of scientific articles by students aging 25 to 32 years old was more frequent (68.6%) than by those aging between 18 to 25 years old (54.4%). Likewise, the use of scientific articles doubled in the group of dental students older than 39 years (87%) in comparison to the ones aging 25 to 32 years old (43.5%). TV programs were a source of information less frequently used by students older than 32 years old, and those older than 39 years old were less likely to obtain information with their family members.

Table 2. Dental students' source of information about COVID-19 by type of institution

Possible answers	Public		Private	
	n	%	n	%
Government official websites or health and education institutions websites	347	86.3	392	91.0
Scientific articles	241	60.0	227	52.7
Other health professionals	225	56.0	252	58.5
Social media	218	54.2	233	54.1
TV Programs	175	43.5	157	36.4
Professors	166	41.3	151	35.0
Family members	28	7.0	37	8.6
Total (multiple-response question)	402		431	

Table 4 shows that the use of official websites increased as the year of undergraduate enrollment increased, reaching 91.9% in the group of students from the 5th year of dental school. On the other hand, the frequency of students who had professors as information sources decreased as the time of enrollment increased from the third to the fifth year of dental school. Moreover, while 52.1% of last-year dental students used social media to stay informed about COVID-19, only 30.8% of them saw their professors as someone with whom they could obtain information.

Table 3. Dental students' source of information about COVID-19 by age

Possible answers	18 ≤ 25		25 ≤ 32		32 ≤ 39		≥39	
	n	%	n	%	n	%	n	%
Government official websites or health and education institutions websites	627	88.4	75	87.2	22	95.7	15	100
Other health professionals	409	57.7	46	53.5	12	52.2	10	67
Social media	401	56.6	38	44.2	9	39.1	3	20
Scientific articles	386	54.4	59	68.6	10	43.5	13	87
TV Programs	286	40.3	37	43.0	6	26.1	3	20
Professors	267	37.7	33	38.4	11	47.8	6	40
Family members	58	8.2	5	5.8	2	8.7	0	0
Total (multiple- response question)	709		86		23		15	

Table 4. Dental students' source of information about COVID-19 by year of enrolment

Possible answers	First-year		Second-year		Third-year		Fourth-year		Fifth-year	
	n	%	n	%	n	%	n	%	n	%
Government official websites or health and education institutions websites	89	83.2	118	88.7	153	87.4	185	89.4	194	91.9
Other health professionals	60	56.1	74	55.6	98	56.0	117	56.5	128	60.7
Scientific articles	56	52.3	82	61.7	97	55.4	112	54.1	121	57.3
Social media	54	50.5	70	52.6	105	60.0	112	54.1	110	52.1
Professors	45	42.1	60	45.1	73	41.7	74	35.7	65	30.8
TV Programs	42	39.3	52	39.1	69	39.4	81	39.1	88	41.7
Family members	13	12.1	9	6.8	14	8.0	13	6.3	16	7.6
Total (multiple response question)	107		133		175		207		211	

DISCUSSION

The outbreak of COVID-19 has challenged individuals, communities, and educational institutions given the need for social distancing and due to the sanitary measures imposed by the pandemic[2,21]. Health care students and professionals have been strongly affected given the imminent risk of infection spread associated with their process of learning and working[22-25]. As dentists are at the top of professionals at risk[22,26], so are dental students, who have been facing a hard time trying to complete their education during these uncertain times[16,27-30]. As it has been demonstrated, the course of infection control can be shaped by how governments enact timely policies and disseminate information[11]. Thus, here we investigated where Brazilian dental students usually seek information about COVID-19. These data might aid dental schools in choosing the best platforms to display educative campaigns.

As far as we know, this is the first study to investigate information-seeking behavior of Brazilian dental students about COVID-19. Our study might be subjected to sample selection bias as we used social media to disseminate the questionnaire, allowing the participation of any dental student who had an Instagram account. In this regard, we believe that given the sanitary measures imposed by the pandemics, the use of social media to disseminate web-based surveys is an alternative to aid in recruiting difficult to reach populations. Besides that, the participants' responses might also present the social desirability bias, which consists of choosing the options that are more socially accepted as right. To avoid such an effect, we asked where or with whom the students usually seek information about COVID-19, making it clear in the way the question was written that there was not a right nor a wrong answer. Moreover, we allowed the participants to choose more than one option as the information sources more frequently used by them. By doing that, we allowed them to express their true behavior.

Regarding our results, we observed that regardless of gender, age, type of institution, and year of enrollment, dental students had government official websites or health and education institution's websites as their main source of informa-

tion about COVID-19. Thus, we stress the importance of government websites to provide information with transparency. Moreover, As dental schools in Brazil offer dental undergraduate courses to over 125,000 students[18], knowing that they are familiarized with getting informed on official websites might reveal the students' precaution in getting information through reliable online platforms. In this context, data of the national portals of the 193 United Nations Member States showed that by 8 April 2020, around 86 percent of nations (167 countries) had included information and guidance about COVID-19 in their portals[31]. However, it has been shown that a more advanced strategy is having a dedicated portal or section about COVID-19[11]. Thus, we suggest that dental schools could display a COVID-19 page on their school's website, where they could provide information about preventive measures and on the statistics about the outbreak, focusing on the local situation of the city and campus[17]. Such information helps people make informed decisions about their daily routines and build public trust[11].

Contrary to what we expected, social media did not figure among the top source of information used by dental students. Such findings are also contrary to what other investigations with university students have been showing[32]. In this regard, we decided to use Instagram to recruit the participants because the use of social media in Brazil increased significantly during the social distancing period[33]. Thus, we saw Instagram as a tool to spread our call for participants. Instagram as a recruitment tool was a choice also based on the need to reach a large population (dental students) during a time of movement restrictions and heavy sanitary measures. As we recruited the respondents via Instagram, we expected that such a tool would be more frequently reported by the students as information sources.

In this sense, even not being at the top of the most used information source, more than half of the respondents used social media to get informed about the pandemics, mainly the younger ones. These findings are an alert to dental school directors to the importance of social media in disseminating information to the students, especially during the pandemic. In this scenario, it is concerning the fast and uncontrolled spread of news, which might be associated with misinformation[6,7,9,11,13-15,34]. Moreover, social media users are more likely to believe false information. For instance[10], manipulation of information with doubtful intent might be amplified through social networks, spreading farther and faster like a virus, the so-called infodemics[11,34]. Thus, an effort should be made by dental schools to keep their social media active and updated to provide their students with trustable information, fighting fake news[17].

Interestingly, we also observed that the respondents considered other health professionals as someone with whom they obtain information. Such data represents the acknowledgment of the critical role of healthcare workers during the pandemic, as it has also been stressed by health care authorities[35]. Surprisingly, professors were one of the least chosen sources of information of the dental students, which might be associated with the social distancing imposed by the pandemics. In this aspect, it is known that COVID-19 has strongly impacted teaching and learning in dental schools, which had to move online, challenging the interaction among students and professors[17,36,37]. Corroborating with which has been shown to other uni-

versity students, family members were at the bottom of the list when evaluating with whom the students get informed about COVID-19[32]. Moreover, as it has been shown elsewhere, university students seem to seek information in scientific publications[38], as we observed in our sample of dental students. In this regard, according to the Nature Index, there have been published 67,753 scientific publications about COVID-19[39]. As the rise in publications represents the massive effort of scientists to overcome the pandemic crisis, it also signifies that it is becoming difficult to follow all daily updates, mainly for undergraduate students, who are at the beginning of their academic life. Thus, we reinforce the role of dental schools in funneling the available information, providing the students with reliable sources, and leading them to a safer return to hands-on activities.

Contrary to other studies with university students, the most used information sources of the Brazilian dental students who participated in our research where official government and educational websites, followed by other health professionals and scientific articles. However, the use of social media was also reported by a high proportion of the respondents. Therefore, we might conclude that the Brazilian dental students rely on multiple information sources to stay informed about COVID-19, mainly focusing their information-seeking behavior on governmental and health professional's websites. Moreover, as a final remark, we emphasize that knowing where the dental students seek information about COVID-19 might facilitate dental school directors to approach such public continuously, providing them with trustable information on different platforms. Once it has been shown that when individuals face risks, they seek information to reduce uncertainty, dental schools in countries such as Brazil, where the epidemic is rocketing in cases and deaths, should implement strategies to keep their students updated. Such precaution would provide students with the knowledge, guiding them to proper attitudes.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

1. Gralinski LE, Menachery VD. Return of the Coronavirus: 2019-nCoV. Viruses. 2020 Jan 24;12(2):135. doi: 10.3390/v12020135.

2. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2020 Feb ;395(10223):470-3. doi: 10.1016/S0140-6736(20)30185-9. Erratum in: Lancet. 2020 Jan 29;

3. WHO. Coronavirus Disease (COVID-19) [cited 2020 Aug 21]. Available from: https://covid19.who.int.

4. D'Souza RS, D'Souza S, Strand N, Anderson A, Vogt MNP, Olatoye O. YouTube as a source of medical information on the novel coronavirus 2019 disease (COVID-19) pandemic. Glob Public Health. 2020 Jul;15(7):935-42. doi: 10.1080/17441692.2020.1761426.

5. Li HO, Bailey A, Huynh D, Chan J. YouTube as a source of information on COVID-19: a pandemic of misinformation? BMJ Glob Health. 2020 May;5(5):e002604. doi: 10.1136/bmjgh-2020-002604.

6. Cuan-Baltazar JY, Muñoz-Perez MJ, Robledo-Vega C, Pérez-Zepeda MF, Soto-Vega E. Misinformation of COVID-19 on the Internet: Infodemiology Study. JMIR Public Health Surveill. 2020 Apr;6(2):e18444. doi: 10.2196/18444.

7. Eysenbach G. How to Fight an Infodemic: The Four Pillars of Infodemic Management. J Med Internet Res. 2020 Jun;22(6):e21820. doi: 10.2196/21820.

8. Rovetta A, Bhagavathula AS. COVID-19-Related Web Search Behaviors and Infodemic Attitudes in Italy: Infodemiological Study. JMIR Public Health Surveill. 2020 May;6(2):e19374. doi: 10.2196/19374.

9. Zarocostas J. How to fight an infodemic. Lancet. 2020 Feb;395(10225):676. doi: 10.1016/S0140-6736(20)30461-X.

10. Bridgman A, Merkley E, Loewen PJ, Owen T, Ruths D, Teichmann L, et al. The causes and consequences of COVID-19 misperceptions: understanding the role of news and social media. Harvard Kennedy Sch Misinform Rev. 2020;1(Spec Issue). doi: 10.37016/mr-2020-028.

11. Bento AI, Nguyen T, Wing C, Lozano-Rojas F, Ahn YY, Simon K. Evidence from internet search data shows information-seeking responses to news of local COVID-19 cases. Proc Natl Acad Sci U S A. 2020 May;117(21):11220-2. doi: 10.1073/pnas.2005335117.

12. Tan SS, Goonawardene N. Internet Health Information Seeking and the Patient-Physician Relationship: A Systematic Review. J Med Internet Res. 2017 Jan;19(1):e9. doi: 10.2196/jmir.5729.

13. Shen C, Wang MP, Wan A, Viswanath K, Chan SSC, Lam TH. Health information exposure from information and communication technologies and its associations with health behaviors: Population-based survey. Prev Med. 2018 Aug;113:140-6. doi: 10.1016/j.ypmed.2018.05.018.

14. Zhong Z, Hu D, Zheng F, Ding S, Luo A. Relationship between information-seeking behavior and innovative behavior in Chinese nursing students. Nurse Educ Today. 2018 Apr;63:1-5. doi: 10.1016/j.nedt.2018.01.004.

15. Morley J, Cowls J, Taddeo M, Floridi L. Public Health in the Information Age: Recognizing the Infosphere as a Social Determinant of Health. J Med Internet Res. 2020 Aug;22(8):e19311. doi: 10.2196/19311.

16. Ghai S. Are dental schools adequately preparing dental students to face outbreaks of infectious diseases such as COVID-19? J Dent Educ. 2020 Jun;84(6):631-3. doi: 10.1002/jdd.12174..

17. Prati C, Pelliccioni GA, Sambri V, Chersoni S, Gandolfi MG. COVID-19: its impact on dental schools in Italy, clinical problems in endodontic therapy and general considerations. Int Endod J. 2020 May;53(5):723-5. doi: 10.1111/iej.13291.

18. INEP - National Institute of Educational Studies and Research Anísio Teixeira, Ministry of Education of Brazil. Synopses Higher Education Statistics - Graduation [cited 2020 Aug 5]. Available from: http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-superior.

19. Rossy de Brito S, da Silva AS, Gaia Cruz A, de Abreu Monteiro M, Lankalapalli Vijaykumar N, da Silva MS, et al. Concentration of Access to Information and Communication Technologies in the Municipalities of the Brazilian Legal Amazon. PlosOne. 2016 Apr 1. doi: 10.1371/journal.pone.0152655.

20. Camerini A-L, Schulz PJ, Jeannet A-M. The social inequalities of Internet access, its use, and the impact on children's academic performance: Evidence from a longitudinal study in Switzerland. New Media Soc. 2018;20(7):2489-508. doi: 10.1177/1461444817725918.

21. Aragão MGB, Gomes FIF, Pinho Maia Paixão-de-Melo L, Corona SAM. Brazilian dental students and COVID-19: A survey on knowledge and perceptions. Eur J Dent Educ. 2021 Feb 6:10.1111/eje.12676. doi: 10.1111/eje.12676.

22. UNESCO. Education: From disruption to recovery [cited 2020 Aug 5]. Available from: https://en.unesco.org/covid19/educationresponse.

23. Ge ZY, Yang LM, Xia JJ, Fu XH, Zhang YZ. Possible aerosol transmission of COVID-19 and special precautions in dentistry. J Zhejiang Univ Sci B. 2020 May;21(5):361-8. doi: 10.1631/jzus.B2010010.

24. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. N Engl J Med. 2020 Mar;382(13):1199-207. doi: 10.1056/NEJMoa2001316.

25. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. J Dent Res. 2020 May;99(5):481-7. doi: 10.1177/0022034520914246.

26. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci. 2020 Mar;12(1):9. doi: 10.1038/s41368-020-0075-9.

27. Moraes RR, Correa MB, Queiroz AB, Daneris Â, Lopes JP, Pereira-Cenci T, et al. COVID-19 challenges to dentistry in the new pandemic epicenter: Brazil. PLoS One. 2020 Nov;15(11):e0242251. doi: 10.1371/journal.pone.0242251.

28. Desai BK. Clinical implications of the COVID-19 pandemic on dental education. J Dent Educ. 2020 May;84(5):512. doi: 10.1002/jdd.12162.

29. Iyer P, Aziz K, Ojcius DM. Impact of COVID-19 on dental education in the United States. J Dent Educ. 2020 Jun;84(6):718-722. doi: 10.1002/jdd.12163.

30. Wu DT, Wu KY, Nguyen TT, Tran SD. The impact of COVID-19 on dental education in North America-Where do we go next? Eur J Dent Educ. 2020 Nov;24(4):825-7. doi: 10.1111/eje.12561.

31. Quinn B, Field J, Gorter R, Akota I, Manzanares MC, Paganelli C, et al. COVID-19: The immediate response of european academic dental institutions and future implications for dental education. Eur J Dent Educ. 2020 Nov;24(4):811-4. doi: 10.1111/eje.12542.

32. United Nations Division for Public Institutions and Digital Government. Department of Economic and Social Affairs Economic Analysis. UN/DESA Policy Brief #61: COVID-19: Embracing digital government during the pandemic and beyond. 2020 Apr 14 [cited 2020 Aug 19]. Available from: https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-61-covid-19-embracing-digital-government-during-the-pandemic-and-beyond.

33. Khasawneh AI, Humeidan AA, Alsulaiman JW, Bloukh S, Ramadan M, Al-Shatanawi TN, et al. Medical Students and COVID-19: Knowledge, Attitudes, and Precautionary Measures. A Descriptive Study From Jordan. Front Public Health. 2020 May;8:253. doi: 10.3389/fpubh.2020.00253.

34. Digital use around the world in July 2020 - We Are Social [cited 2020 Aug 5]. Available from: https://wearesocial.com/blog/2020/07/digital-use-around-the-world-in-july-2020.

35. Eysenbach G. Infodemiology: The epidemiology of (mis)information. Am J Med. 2002 Dec;113(9):763-5. doi: 10.1016/s0002-9343(02)01473-0.

36. FDA. U.S. Food & Drug Administration. The Critical Role of Health Care Professionals During the COVID-19 Pandemic. Speech by Stephen M. Hahn, M.D. Commissioner of Food and Drugs - Food and Drug Administration 2020 Oct 8 [cited 2020 Dec 12]. Available from: https://www.fda.gov/news-events/speeches-fda-officials/critical-role-health-care-professionals-during-covid-19-pandemic-08102020.

37. Machado RA, Bonan PRF, Perez DEDC, Martelli Júnior H. COVID-19 pandemic and the impact on dental education: discussing current and future perspectives. Braz Oral Res. 2020 Jun;34:e083. doi: 10.1590/1807-3107bor-2020.vol34.0083.

38. Liu X, Zhou J, Chen L, Yang Y, Tan J. Impact of COVID-19 epidemic on live online dental continuing education. Eur J Dent Educ. 2020 Nov;24(4):786-9. doi: 10.1111/eje.12569.

39. Olaimat AN, Aolymat I, Shahbaz HM, Holley RA. Knowledge and Information Sources About COVID-19 Among University Students in Jordan: A Cross-Sectional Study. Front Public Health. 2020 May;8:254. doi: 10.3389/fpubh.2020.00254.