



## ORIGINAL: Evaluation of Dentists' Knowledge and Attitude towards COVID-19 in Sari in 2021

Abbas Mesgarani

Narjes Hoshyari

Mahmood Moosazadeh

Arash Alimirzaei

Fateme DoostMohammad

Department of Endodontics, School of Dentistry, Mazandaran University of Medical Sciences, Sari, Iran.

Department of Endodontics, School of Dentistry, Mazandaran University of Medical Sciences, Sari, Iran.

Gastrointestinal Cancer Research Center, Non-communicable Diseases Institute, Mazandaran University of Medical Sciences, Sari, Iran.

School of Dentistry, Mazandaran University of Medical Sciences, Sari, Iran.

School of Dentistry, Mazandaran University of Medical Sciences, Sari, Iran.

### ARTICLE INFO

**Submitted:** 07 Dec 2022

**Accepted:** 22 Apr 2023

**Published:** 01 Jun 2023

### Keywords:

Attitude;  
COVID-19;  
Dentist;  
Knowledge

### Correspondence:

Narjes Hoshyari, Department of Endodontics, School of Dentistry, Mazandaran University of Medical Sciences, Sari, Iran.

### Email:

narjeshoshyari@rocketmail.com

**ORCID:** 0000-0002-2628-9290

### Citation:

Mesgarani A, Hoshyari N, Moosazadeh M, Alimirzaei A, DoostMohammad F. Evaluation of Dentists' Knowledge and Attitude towards COVID-19 in Sari in 2021. Tabari Biomed Stu Res J. 2023;5(1):17-24.

 [10.32598/tbsrj.v5i1.10526](https://doi.org/10.32598/tbsrj.v5i1.10526)

### ABSTRACT

**Introduction:** Dental health professionals and patients are at high risk of COVID-19 exposure due to blood and saliva droplets generated during dental procedures. People's adherence for infection control is affected by their knowledge, attitudes, and practices towards COVID-19. Considering that dental practice is one of the most dangerous professions in terms of exposure to the disease, this study examines the knowledge and attitudes of dentists regarding COVID-19 in north of Iran.

**Material and Methods:** This descriptive study was based on questionnaires that were distributed among dentists in north of Iran. Demographic characteristics, knowledge of participants about COVID-19 and infection control measures and their attitudes were evaluated. The effect of pandemic on dentists' life and quality of dental services were also investigated.

**Results:** Totally, 125 dentists completed the questionnaire (99 general dentists and 26 specialists). The majority of participants (n=84, 67.2%) did not perform unnecessary dental procedures during the pandemic, and 114 (91.2%) of them changed their working hours. The most of contributors (N=207, 86%) focus on preventive care, not perform unnecessary treatments and reduce the treatment sessions at the lowest possible.

**Conclusion:** The present study concluded that majority of the participants had good knowledge and positive attitude regarding dental care and related preventive measures in the pandemic period. Although, it is suggested that dental health professionals continue to strengthen knowledge and improve attitude by health training programs.

## Introduction

Infection control in dentistry is the basics of patient protection, dental team, and overall social health. The new coronavirus pandemic, caused by SARS-COV-2, the acute respiratory syndrome coronavirus 2, has led to public concern worldwide (1, 2). The first symptoms of the disease are fever, dry cough, and fatigue.

Some patients also have indications of early neurological symptoms like headaches. For instance, in a study on patients with COVID-19, the patients indicated neurological manifestations, including headache, dizziness, and loss of consciousness (3, 4). Furthermore, digestive symptoms have also been reported as the primary or even the main symptom of

the disease based on studies and reports carried out in some cases of this disease (5). The general symptoms experienced by the majority of patients with COVID-19 are as follows: 1- coughing and sore throat, 2- fever, 3- diarrhea, 4- headache, 5- muscle and joint pain, and 6- loss of smell and taste senses (6) and in lung involvement, symptoms like shortness of breath, loss of appetite, and pain and pressure in the chest are seen among in patients with COVID-19 (7).

Since the SARS-COV2 virus is evolving and adapting to human populations, it is seen as a new variant. The mutations happening in the spike protein of this virus result in increased transmission and resistance because of neutralizing antibodies (8). On the other hand, other new weakened mutations like P323L, L37F, G251V, and Q27 were also identified, reducing the disease severity. The incidence of weakened mutations shows that its pathogenicity in humans decreases with the evolution of the virus (9). Integrating variants of the virus, mutations resulting in reduced immune system recognition, like mutations of spike protein and nucleoproteins, must be monitored and examined to preserve the immunity created by the vaccine and not to let it diminish (10).

This virus transmits directly (from other humans) and airborne particles such as aerosols and droplets. Direct transmission occurs if they are close to each other, but aerosols can infect a person from a long distance. Inhalation of aerosols containing the virus quickly enters the respiratory system and sticks there, causing disease (11). It is necessary to have efficient diagnostic methods to identify patients in the early stages of their disease. Early diagnosis stops the spread of the disease and the need to quarantine healthy individuals (12).

Diagnosis of the disease is basically through clinical symptoms, laboratory and radiological evaluations, and finally, a specific PCR test (13). Many studies have been performed to treat the disease. The effect of medicines like hydroxychloroquine, ritonavir, ribavirin, and the plasma associated with the recovery period against the virus, has

been rejected (14). Today's corona treatment focuses on anticoagulants, oxygen, antibiotics, monoclonal antibodies, steroids, and Pfizer's element called PLAXOVID, a type of oral antiviral (15). Moreover, carrier and mRNA vaccines have emerged as effective treatment methods for controlling the pandemic (16).

People's participation in implementing the principles of controlling the coronavirus infection depends on their knowledge and attitude. As dentistry is one of the most dangerous professions in terms of exposure to the disease, the present study will examine the attitude and knowledge of dentists in the north of Iran regarding the coronavirus.

## Methods

The study was analytically carried out on dentists working in clinics and offices in Sari in 2020. The study randomly selected 125 dentists. Stratified sampling was used to include general and specialist dentists in the same ratio, as 294 general dentists and 76 specialist dentists were on the list of dentists in Sari. Questionnaires were given to dentists online and collected after 24 hours after providing complete information about the objectives and importance of this study. The information from the questionnaires collected in the study remained utterly confidential. If a questionnaire was incompletely filled out, it was excluded from the study and only included if all four parts of the questionnaire were filled in.

The questionnaire has 51 questions in 4 parts in Persian. The first part had demographic questions regarding the personal information of the participants, such as age, gender, work experience in years, specialist or general, workplace (private or public), and so on. The second part contains closed-ended questions (yes/no questions) about the idea and beliefs of the participating dentists about COVID-19 and its effect on personal life, economic status, and the quality of dental services for patients, and the third part has multiple-choice questions about the dentists' outlook about the pandemic. The last part of the

questionnaire contains questions with a 5-point Likert scale that assess the dentist's attitude toward the epidemic. The contents, such as education about COVID-19, were given to the dentists online after collecting the questionnaires. The validity and reliability of the questionnaires had already been validated by another author (17).

A trained person, unaware of the names and grades of the participants, procured the outcomes. Two members of the group studied and extracted the information. The data was given to SPSS 22 and subjected to descriptive statistical analysis. Variables were described using frequency percentage, mean, standard deviation, minimum and maximum.

**Table 1. The dentists' demographic information**

Patient profile	Answer	N (%)
Age (years)	24-35	38 (30.4)
	45-36	47 (37.6)
	56-46	40 (32)
Work experience (years)	<10	45 (36)
	10-19	48 (38.4)
	20-30	32 (25.6)
Gender	Female	50 (40)
	Male	75 (60)
Marital status	Married	95 (76)
	Single	30 (24)
The number of children	Without children	49 (39.2)
	1	32 (25.6)
	2	35 (28)
	3	9 (7.2)
Area of expertise	General	99 (79.2)
	Expert	26 (20.8)
Workplace	Public clinic	83 (66.4)
	Private clinic	27 (21.6)
	Office	15 (12)

## Results

Generally, 125 dentists filled out the questionnaire (99 general dentists and 26 specialists). Over half of the participants

were 36-56 years old with more than ten years of work experience. Among them, 75 people (60%) were males, 50 (40%) were females, 95 (76%) were married, and 30 (24%) were singles. Moreover, 80% of the married participants had one or more children (*Table 1*).

Our findings indicated that 78 (62.4%) participants had self-reported symptoms of COVID-19, and 38 (30.4%) had the disease. Furthermore, 63 (50.4%) participants reported that their assistants had the disease. From the start of COVID-19, almost half of the participants (n=72, 57.6%), had increased phone calls from patients for their dental problems (*Table 2*).

Of the majority of the participants (n=84), 67.2% did not take extreme measures during the epidemic, and 114 (91.2%) of them had changed their working hours. The participants had various ideas on the changes required in the standards of dental work. For instance, 106 participants (84.8%) think that focusing on preventive measures - not doing unnecessary treatments, and reducing treatment sessions to the minimum possible, are possible solutions (*Table 3*).

Finding and preparing Personal Protective Equipment (PPE) was a problem for most dentists during the outbreak (n=106, 84.8%). Almost all participants reported that they had to buy PPE at a much higher price (n=117, 93.6%). Most participants (n=110, 88%) reported a decrease in their financial income from the outbreak of the epidemic, whereas only nine people (7.2%) received some financial assistance from government agencies. Over a third of them (n=56, 44.8%) needed another source of income for daily expenses (*Table 4*).

**Table 2. The symptoms of COVID-19 in dental clinics and increasing demand for remote consultation**

Have you experienced the following since the COVID-19 pandemic?	Yes N (%)	No N (%)	Without an answer N (%)
Increased phone calls from patients.	72 (57.6)	48 (38.4)	5 (4)
Visiting high-risk patients.	47 (37.6)	73 (58.4)	5 (4)
Have symptoms of COVID-19.	78 (62.4)	47 (37.6)	0
Have a positive COVID-19 test.	38 (30.4)	87 (69.6)	0
Your assistant has symptoms of COVID-19.	63 (50.4)	62 (49.6)	0
Your assistant has tested positive for COVID-19.	42 (33.6)	78 (62.4)	0

**Table 3. The way the dentists coordinated their work with the pandemic**

How did you deal with the disruption created by the COVID-19 pandemic?	Yes N (%)	No N (%)
A change was made to the dental work time.	114 (91.2)	11 (8.8)
I performed non-emergency procedures (at the request of the patient/because of financial problems).	41 (32.8)	84 (67.2)
The standards of the dental profession have changed (focusing on preventive care / not performing unnecessary treatments / reducing treatment sessions).	106 (84.8)	19 (15.2)
I reviewed the latest guidelines associated with COVID-19.	101 (80.8)	24 (19.2)
I adhere to the last guideline associated with dental procedures during the COVID-19 pandemic.	102 (81.6)	23 (18.4)

Seventy-two people (57.6%) of the participants canceled all treatment steps until the end of the epidemic warning stage. Almost half of the participants (45.6%) argued that dental offices should remain closed until the end of the COVID-19 pandemic (*Table 5*).

Over half of the participants (n=93), 73.6%, argued that patients must be triaged based on

the symptoms of COVID-19. Moreover, 87 (69.6%) of the participants argued that reopening dental clinics might increase the spread of COVID-19. Among all the dentists, more than half (n=106), 84.8%, argued that the standards of dental practice would change because of the COVID-19 pandemic (*Table 6*).

**Table 4. Getting assistance to overcome COVID-19**

Did you not get any help to overcome these problems?	Yes N (%)	No N (%)
I faced problems in getting PPE.	19 (15.2)	106 (84.8)
Increase in price because of PPE price.	8 (6.4)	117 (93.6)
I got help from a government agency to procure PPE.	100 (80)	25 (20)
I have a high consumption of PPE during dental procedures.	3 (2.4)	122 (97.6)
There is a decrease in income.	15 (12)	110 (88)
Receiving financial assistance from a government agency.	116 (92.8)	9 (7.2)
I used another source of income for daily expenses.	69 (55.2)	56 (44.8)
I faced financial problems.	20 (16)	105 (84)
I lost my assistant because of financial issues.	117 (93.6)	8 (6.4)
Your assistant has decided not to work during the pandemic.	109 (87.2)	16 (12.8)
I paid the salary of the assistant, although the clinic was closed.	31 (24.8)	94 (75.2)
I suggested my assistant use unemployment insurance.	114 (91.2)	11 (8.8)

**Table 5. The experiences of dentists during the epidemic**

Question	Answer	N (%)
How have you changed your treatment plans during the COVID-19 pandemic?	Nothing has changed	5 (4)
	I canceled all treatments until the end of the epidemic	39 (31.2)
	I canceled all treatment steps until the end of the epidemic alert phase	72 (57.6)
	I did emergency treatment	9 (7.2)
What kind of non-emergency treatment should you take during a pandemic?	I do not do any non-emergency treatment	23 (18.4)
	Dental cosmetic procedures	1 (0.8)
	Restorative treatment of asymptomatic caries lesion	27 (21.6)
	Pulling teeth without symptoms	8 (6.4)
	Initial examination	39 (31.2)
When should dental clinics resume regular business hours?	Selecting more than one option	27 (21.6)
	Until the end of the corona epidemic	57 (45.6)
	Until the end of the warning phase	67 (53.6)
	The clinic must open now	1 (0.8)
What is your strategy for reopening dental clinics?	Selecting more than one option	0
	I do not intend to work until the end of the COVID-19 pandemic	0
	Visiting patients who do not have symptoms of COVID-19	50 (40)
	Getting patients tested for COVID-19	1 (0.8)
	Using PPE	36 (28.8)
	Selecting more than one option	38 (30.4)

If you have more free time these days, how do you fill it?	I do not have free time	14 (11.2)
	I communicate with others	14 (11.2)
	I study	53 (42.4)
	I practice	1 (0.8)
	I research	9 (7.2)
	Selecting more than one option	34 (27.2)
Which of the following equipment was in short supply during the pandemic?	I have had no problems finding PPE	35 (28)
	Disinfectant solutions	4 (3.2)
	Face mask	21 (16.8)
	Medical gown	7 (5.6)
	Goggles or protectors	1 (0.8)
	Gloves	3 (2.4)
	Selecting more than one option	54 (43.2)

**Table 6. The symptoms of COVID-19 in dental clinics and increasing demand for remote consultation**

Have you experienced the following since the COVID-19 pandemic?	Completely agree N (%)	Agree N (%)	Agree to some extent N (%)	Disagree N (%)	Completely disagree N (%)
Telephone calls are effective for solving the dental problems of the patients.	35 (28)	21 (16.8)	46 (36.8)	21 (16.8)	2 (1.6)
I check the patient for symptoms of COVID-19, like fever, cough, muscle pain, or a history of contact with or travel to high-risk areas.	51 (40.8)	41 (32.8)	15 (12)	7 (5.6)	11 (8.8)
I use the COVID-19 test for patients.	10 (8)	51 (40.8)	34 (27.2)	9 (7.2)	21 (16.8)
The reopening of dental clinics leads to the spread of the virus.	36 (28.8)	51 (40.8)	26 (20.8)	12 (9.6)	0
The possibility of continuing the dental profession with the continuation of the COVID-19.	27 (21.6)	64 (51.25)	31 (24.8)	3 (2.4)	0
I had problems paying basic expenses.	7 (5.6)	15 (12)	32 (25.6)	71 (56.8)	0
I will have a decrease in financial income in the future with the continuation of the pandemic.	34 (27.2)	32 (25.6)	48 (38.4)	9 (7.2)	2 (1.6)
I had symptoms of anxiety and depression during the COVID-19 pandemic.	16 (12.8)	20 (16)	39 (31.2)	44 (35.2)	6 (48)
I need to talk to a psychiatrist or psychotherapist.	3 (2.4)	12 (9.6)	38 (30.4)	69 (55.2)	3 (2.4)
I follow the latest news of the COVID-19 pandemic.	35 (28)	41 (32.8)	32 (25.6)	17 (13.6)	0
The latest news on the COVID-19 pandemic is useful.	48 (38.4)	32 (25.6)	36 (28.8)	9 (7.2)	0
Following the latest news is the cause of my depression and anxiety.	10 (8)	8 (6.4)	28 (22.4)	51 (40.8)	28 (22.4)
The latest guidelines are helpful for dentistry during COVID-19.	24 (19.2)	52 (41.6)	45 (36)	4 (3.2)	0
Guidelines for the dental profession will change in the future during COVID-19.	65 (52)	41 (32.8)	14 (11.2)	3 (2.4)	2 (1.6)
PPE is effective in preventing virus transmission.	69 (55.2)	42 (33.6)	11 (8.8)	3 (2.4)	0

## Discussion

This study reveals that 62.4% of dentists and 50.4% of their assistants experienced symptoms and signs of COVID-19, and

30.4% of dentists and 33.6% of dental assistants had positive corona tests. Thus, dental clinics and office staff are at high risk of being infected with this virus. Hence, it suggests that dental tasks must be carried out with great care and in line with the principles



of infection control, and non-emergency treatments must be postponed until the end of the pandemic (18, 19).

Furthermore, the study indicates that 57.6% of dentists requested telephone and remote consultations during the pandemic. This consultation was limited to drug therapy and thus increased the use of painkillers and antibiotics. Virtual consultations are relatively effective and not effective enough based on the answers of dentists in Sari, yet they can increase the community's status if prolonged (20). It looks that the reason for all these outcomes is the nature of dental procedures and not enough infrastructure needed.

Most of the dentists that took part in the study stated that they did not carry out unnecessary treatments, reducing the time of dental work and the number of dental cares that must be performed in emergency cases, and the presence of severe dental pain and infection (21) and these services need to be accompanied by the use of appropriate PPE. Effective PPE includes gowns, gloves, face shields, glasses, masks, and antiseptic solutions (22). To the majority of dentists, using PPE is valuable and effective in preventing the transmission of viruses and contamination. The rapid increase in the need for these items caused their shortage and demanded access. The highest shortage was in the case of face masks. Based on our study, many participating dentists stated that they had problems providing PPE and its related cost, given the high consumption of PPE. They could not get help from government agencies, and this increase in PPE costs led to an increase in the cost of dental services. Additionally, they were under financial stress, and nearly half of them had to use another source for daily expenses because of the reduction of working hours, dental procedures, and the payment of assistant salaries.

Some dentists felt depression, stress, and anxiety during the Corona time; that could be because of much work, the stress associated with the correct implementation of protocols, rapid changes in protocols, and the isolation

of people. However, the feeling of the need to see a psychologist was low among these people. It has been stated that health staff suffers more emotional stress during the pandemic than the general public (23). Based on the findings, following the latest news, Corona was stated as efficient and not the cause of increased stress. This indicates that the increase in knowledge and awareness in critical situations not only does not cause anxiety but is relaxing.

Most of the participants in the study said that routine dental procedures must be delayed until the warning phase is over, and the examination should be done for people with symptoms and with PPE if the dental clinics are reopened, and it is a reasonable and reasonable suggestion to guide the patient to conduct a COVID-19 test. Some sessions must be reduced to the minimum possible so that it is possible to perform non-emergency work and dental services if the pandemic continues. Moreover, the general public must be asked to increase oral hygiene and perform preventive care. Additionally, the CDC has set a standard so that health centers and healthcare workers can carry out non-emergency tasks with minimal transfer (24). Many studies have been carried out in various areas of the world that examined the knowledge and attitude of dentists towards the new virus, COVID-19, and the necessity of training health workers has been examined (25-27).

Among the limitations of the study, one had to do with the questionnaire. Because of a lack of time, we could not design a new questionnaire and assess its validity and reliability. For instance, it is better to design questions with more details to include all dental services and to distinguish between the time of the pandemic and when we are in the peak period of the virus spread. Hence, it is recommended that cases associated with the existing problems and the dentists' suggestions on the solution to the problems during the current and future pandemics be examined in future studies.

## Conclusion

Based on our findings, the information and awareness of dentists in northern Iran on the aspects associated with the dentistry of the COVID-19 virus is favorable, and the need for government support on a large scale is felt for solving the problems. The present study concluded that majority of the participants had good knowledge and positive attitude regarding dental care and related preventive measures in the pandemic period. Although, it is suggested that dental health professionals continue to strengthen knowledge and improve attitude by health training programs

### *Ethical standards statement*

All the investigation procedures used in the current study were reviewed and approved by the Research Ethics Committee of the Mazandaran University of Medical Sciences (code: IR.MAZUMS.REC.1400.210).

### *Conflicts of interest*

The authors declare no conflict of interest.

### *Authors' contributions*

Each author has made an important scientific contribution to the study and has assisted with the drafting or revising of the manuscript.

## References

1. Amante LF, Afonso JT, Skrupskelyte G. Dentistry and the COVID-19 Outbreak. *International Dental Journal*. 2021;71(5):358-68.
2. Sobouti F, Lotfizadeh A, Misagh Toupanloo I, Mirzaeian A, Aryana M. Coronavirus disease 2019 as a challenging and transformative factor in dental education: A literature review. *Journal of Mazandaran University of Medical Sciences*. 2021;30(194):199-209.
3. Harapan BN, Yoo HJ. Neurological symptoms, manifestations, and complications associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease 19 (COVID-19). *Journal of neurology*. 2021;268(9):3059-71.
4. Sobouti F, Moallem Savasari A, Aryana M, Mesgarani A. Coronavirus as a new challenge for infection control in dentistry: A literature review. *Journal of Mazandaran University of Medical Sciences*. 2020;30(186):185-94.
5. Kariyawasam JC, Jayarajah U, Riza R, Abeysuriya V, Seneviratne SL. Gastrointestinal manifestations in COVID-19. *Transactions of The Royal Society of Tropical Medicine and Hygiene*. 2021;115(12):1362-88.
6. Han X, Li X, Xiao Y, Yang R, Wang Y, Wei X. Distinct characteristics of COVID-19 infection in children. *Frontiers in Pediatrics*. 2021 4;9:619738.
7. Guan W-j, Ni Z-y, Hu Y, Liang W-h, Ou C-q, He J-x, et al. Clinical characteristics of 2019 novel coronavirus infection in China. *medRxiv*. 2020:2020:20020974.
8. Singh J, Pandit P, McArthur AG, Banerjee A, Mossman K. Evolutionary trajectory of SARS-CoV-2 and emerging variants. *Virology journal*. 2021;18(1):1-21.
9. Nikolai LA, Meyer CG, Kremsner PG, Velavan TP. Asymptomatic SARS coronavirus 2 infection: invisible yet invincible. *Int J Infect Dis*. 2020;100:112–6.
10. Gandhi M, Yokoe DS, Havlir DV. Asymptomatic transmission, the achilles' heel of current strategies to control covid-19. *N Engl J Med*. 2020;382(22):2158–60.
11. Zhang R, Li Y, Zhang AL, Wang Y, Molina MJ. Identifying airborne transmission as the dominant route for the spread of COVID-19. *Proceedings of the National Academy of Sciences*. 2020;117(26):14857-63.
12. Carter LJ, Garner LV, Smoot JW, Li Y, Zhou Q, Saveson CJ, et al. Assay techniques and test development for COVID-19 diagnosis. *ACS Publications*; 2020:28-37.
13. Rai P, Kumar BK, Deekshit VK, Karunasagar I, Karunasagar I. Detection technologies and recent developments in the diagnosis of COVID-19 infection. *Applied microbiology and biotechnology*. 2021;105(2):441-55.
14. Mouffak S, Shubbar Q, Saleh E, El-Awady R. Recent advances in management of

COVID-19: a review. *Biomedicine & Pharmacotherapy*. 2021;143:112107.

15. Drożdżał S, Rosik J, Lechowicz K, Machaj F, Szostak B, Przybyciński J, Lorzadeh S, Kotfis K, Ghavami S, Łos MJ. An update on drugs with therapeutic potential for SARS-CoV-2 (COVID-19) treatment. *Drug Resistance Updates*. 2021;59:100794..

16. Fiolet T, Kherabi Y, MacDonald CJ, Ghosn J, Peiffer-Smadja N. Comparing COVID-19 vaccines for their characteristics, efficacy and effectiveness against SARS-CoV-2 and variants of concern: A narrative review. *Clinical Microbiology and Infection*. 2021.

17. Ahmadi H, Ebrahimi A, Ghorbani F. The impact of COVID-19 pandemic on dental practice in Iran: A questionnaire-based report. *BMC oral health*. 2020;20(1):1-9.

18. Barabari P, Moharamzadeh K. Novel coronavirus (COVID-19) and dentistry—A comprehensive review of literature. *Dentistry journal*. 2020;8(2):53.

19. Sobouti F, Dadgar S, Aryana M, Sobouti B. A to Z Steps of In-person Screening, Treatment, and Caring Procedure in Orthodontic Clinics During COVID-19 Pandemic: A Rapid Mini-review. *Journal of Pediatrics Review*. 2022;10:411-8.

20. Hirabayashi A, Kajihara T, Yahara K, Shibayama K, Sugai M. Impact of the COVID-19 pandemic on the surveillance of antimicrobial resistance. *Journal of Hospital Infection*. 2021;117:147-56.

21. Ball M, Akintola D, Harrington Z, Djemal S. Emergency dental care triage during the COVID-19 pandemic. *British Dental Journal*. 2021:1-5.

22. Estrich CG, Gurenlian JR, Battrell A, Lynch A, Mikkelsen M, Morrissey RW, Vujcic M, Araujo MW. Infection Prevention and Control Practices of Dental Hygienists in the United States During the COVID-19 Pandemic: A longitudinal study. *Journal of Dental Hygiene*. 2022;96(1).

23. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *bmj*. 2020;368.

24. CDC. Framework for Healthcare Systems Providing Non-COVID-19 Clinical Care During the COVID-19 Pandemic: Centers for Disease Control and Prevention 2020.

25. Indu M, Syriac G, Beena VT, MCherian L, Paul S, Sathyan P. Assessment of knowledge, attitude and practice regarding dental care during COVID 19 pandemic—a cross sectional study among dental health professionals in tertiary care centers of Kerala. *Age (years)*. 2020;30:31-40.

26. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, Li Y. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International journal of biological sciences*. 2020;16(10):1745

27. Maheshwari S, Gupta PK, Sinha R, Rawat P. Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study. *Journal of Acute Disease*. 2020;9(3):100.