

COVID-19 AWARENESS, ITS RELATION WITH PERIODONTAL DISEASES, AND PRACTICE AMONG DENTAL PROFESSIONALS IN RIYADH, SAUDI ARABIA

Badr Soliman Alhussain^{1*}, Asmaa Khaleel Alhazmi², Maream Abdulaziz Almotairi³, Norah Abdulaziz Saleh Algaber³, Reem Abdulrahman Razzaz³, Zahra Saleh Alwaal³

¹Department of Restorative Dentistry, PSMC, Riyadh, Saudi Arabia. bader.hussain@riyadh.edu.sa

²College of Dentistry, Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia.

³Faculty of Dentistry, Riyadh Elm University, Riyadh, Saudi Arabia.

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is the most pressing and prevalent health issue worldwide. Globally, it has claimed thousands of lives. The majority of people who are infected suffer mild to moderate illnesses. Periodontal disease management is vital during this period when dentistry is operating below its pre-COVID-19 capacity levels. This is a cross-sectional study conducted among Saudi dental professionals using an online survey. 300 dentists from Riyadh city will be utilized in this study. An online questionnaire was constructed to measure the awareness and effects. The statistical analysis reported that more than half the sample comprised female participants (66.2%), and the majority of participants were with working experience of few than 10 years working as general dentists. 68.9% of them thought COVID-19 could be asymptomatic, and 53.4% think telephonic staging is safe. Manual scaling is thought to have a higher risk of spreading infection. 62.1% possess fumigators in a clinic, 69.4% refrain in peak pandemic from performing non-emergency periodontal cases, and 43.4% thought COVID had affected overall periodontal practice. In the present study, findings revealed that the majority of dental experts believe in precautions, COVID-19 relevance to periodontitis, its complications, and people at higher risks of complications with other diseases. The difference in experience exists in general dentists and specialists on preferred mouth rinse manual scaling as a procedure at risk of spreading infection. COVID-19 affected overall practice according to a majority of participants.

Key words: COVID-19, Periodontal health, Practice, Dental professionals.

Introduction

Coronavirus disease 2019 (COVID-19) is the most pressing and prevalent health issue worldwide. Globally, it has claimed thousands of lives. The majority of people who are infected suffer mild to moderate illnesses. There are numerous online resources available for dentists to enhance their knowledge regarding COVID-19 [1, 2].

Periodontal disease (PDs) severity may be closely related to Covid-19 infections. Increased Galectin-3 levels may increase viral attachment and prompt an immunological response. In this period of the Covid-19 pandemic, it is essential to maintain rigorous oral hygiene and keep PDs under control. Periodontal disease management is vital during this period when dentistry is operating below its pre-COVID-19 capacity levels [3]. Although the COVID-19 pandemic has affected many aspects of life, one should not see an adverse impact on their ability to maintain periodontal health with the proper safety measures in place [4, 5].

Throughout the COVID-19 era, treating periodontal disease has always been paramount. In literature reviews published by the American Academy of Periodontology (AAP), it

described that if the condition is allowed to get worse, it can result in eventual tooth loss. Furthermore, when we consider the relevance of COVID-19 to periodontal disease, we understand why it is even more important to schedule an appointment with a periodontist if you have any signs of periodontal disease. One study revealed that those with the most severe cases of gum disease, i.e., periodontitis, had a higher risk for coronavirus complications, which may require assisted ventilation, immediate admission to the hospital, and even death. A higher level of markers associated with worsened outcomes was also observed for patients with COVID-19 and periodontitis, such as c reactive protein, D-dimer, and white blood cells [6].

Several severe diseases and conditions can be caused by periodontal disease, apart from COVID-19. In particular, dental care poses a risk to dental professionals and dental assistants because of its characteristics [7]. Procedures that generate aerosols and drops should be reduced, personal protection barriers should be used, and processes that create aerosols or drops should be reduced. Additionally, instrument surfaces and clinical surfaces must be adequately disinfected before and after aftercare [8].

A survey of dental professionals was conducted in Saudi Arabia during the early outbreak period to assess dentists' knowledge, attitudes, and perceptions regarding COVID-19. Saudi dentists showed adequate knowledge of and a positive attitude toward COVID-19. By increasing dentists' access to materials provided by dental health care authorities, which specify the best and safest approaches to deal with patients during and after the outbreak, dentists might be able to improve their level of knowledge further [9, 10].

During the COVID-19 outbreak, there is no universally accepted protocol for treatment; recommendations continually change as more characteristics of the virus emerge. To reduce the risk of spreading infection among dental health workers and patients, precautions should be taken before, during, and after dental treatment [11].

Benefits of the study

The findings of this study may be helpful for future practice related to the prevention and treatment of periodontal diseases, especially concerning COVID-19 complications.

Scope of the study

This study focused mainly on the knowledge and practice of Saudi dental professionals residing in Riyadh city.

Aims of the study

- To determine the knowledge and attitude of Saudi dentists towards COVID-19 and its association with periodontal diseases.
- To compare the responses based on gender, work experience, and designation.

Materials and Methods

Study design

This is a cross-sectional study conducted among Saudi dental professionals using an online survey.

Study sample

300 dentists from Riyadh city were contacted; however we received completed responses from 259.

Study instrument

Online questionnaire was constructed consisting of questions related to demographic data followed by questions including knowledge and attitude towards practice during COVID-19, complications of COVID-19, and their association with periodontal disease.

Instrument validity and reliability

A pilot study was conducted by sending the survey to 20 participants, and the data was inserted in SPSS version 22 to determine the reliability by using Chronbach's coefficient alpha (value: 0.742). The validity of the questionnaire was tested by sending it to experienced

researchers in REU, and changes were made according to their feedback and comments.

Statistical analysis

Collected data were analyzed using SPSS version 22, where descriptive as well as inferential statistics were conducted. Comparisons between groups were made with the value of significance kept under 0.05. A Chi-square test was done to compare the study groups.

Results and Discussion

Power of sample

Table 1. Power of sample

Mean	1.63
Std Deviation	0.49
Sample size	259
Alpha	0.05
Sample mean	1.70
Standard Error of Mean	0.03
Critical Value	1.68
Beta	0.26
Power	0.74

Table 2. Frequencies of responses

Variable	Frequency Percentage
Gender	
Male	33.8%
Female	66.2%
Work Experience	
Less than 10 years	67.6%
More than 10 years	32.4%
Designation	
General Dentist	64.8%
Specialist/Consultant	33.2%
Carriers of COVID-19 could be asymptomatic	
Yes	68.9%
No	18.3%
Not sure	12.8%
Telephonic staging is safe	
Yes	53.4%
No	23.3%
Not sure	23.3%

Precautions needed at the reception area	
Yes	72.1%
No	18.7%
Not sure	9.1%
Are you aware of the various types of reusable respirators?	
Yes	65.3%
No	34.7%
Do you adjust your facemask after performing hand hygiene?	
Yes	73.1%
No	26.9%
Separate areas should be designated for aerosol and non-aerosol procedures?	
Yes	60.3%
No	22.8%
Not sure	16.9%
Chemically treating water reservoirs reduces infection transmission?	
Yes	59.4%
No	18.3%
Not sure	22.4%
Disinfecting dental chair between every patient is necessary?	
Yes	69.9%
No	16.9%
Not sure	13.2%
Which of the following can be an effective pre-procedural mouth rinse?	
0.2% Chlorhexidine	47.9%
1% Povidone-iodine	34.7%
Not sure	17.4%
Is COVID-19 associated with periodontitis?	
Yes	47%
No	27.4%
Not sure	25.6%
Is there a possibility of periodontal complications associated with COVID-19 patients?	
Yes	56.6%
No	17.7%
Not sure	24.7%
COVID-19 patients with diabetes, a smoking history, and high age have a higher risk of periodontal complications?	
Yes	68.5%
No	17.8%
Not sure	24.7%
Patients with COVID-19 may show increased gingival bleeding tendency as compared to non-COVID patients?	
Yes	51.1%
No	21.5%
Not sure	27.4%

Which periodontal procedure is at risk of spreading infection?	
Manual Scaling	43.8%
Ultra-sonic Scaling	37%
Periodontal Surgery	18.7
Do not ask me	0.5
Do you possess a fumigator in your clinic?	
Yes	62.1%
No	37.9%
Do you refrain from performing non-emergency periodontal cases during the peak of a pandemic?	
Yes	169.4%
No	30.6%
Has the pandemic affected your overall periodontal practice?	
Definitely yes	21.9%
Somewhat yes	43.4%
Not at all	34.7%

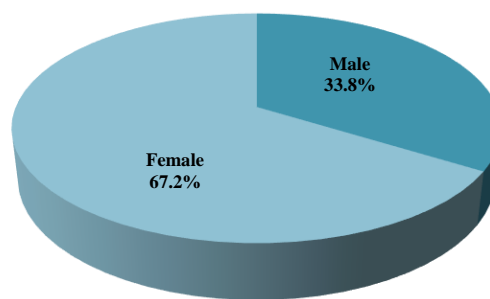


Figure 1. Gender ratio of the current study

■ more than 10 years ■ more than 10 years

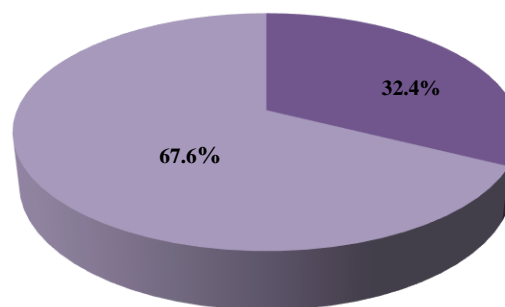


Figure 2. Work Experience ratio of the current study

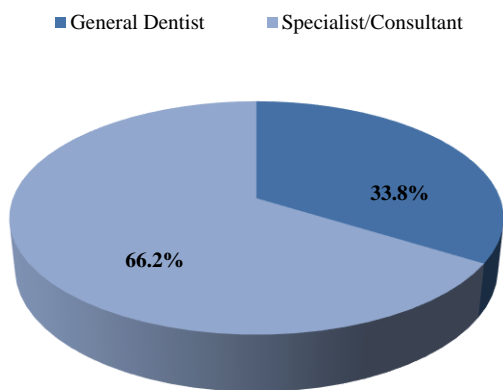


Figure 3. Designation Ratio of the current study

Table 3. Comparison of responses across Gender

Variable	Male	Female	p-value
Carriers of COVID-19 could be asymptomatic			
Yes	59	106	.821
No	21	33	
Not sure	14	26	
Telephonic staging is safe			
Yes	49	82	.354
No	20	45	
Not sure	25	38	
Precautions needed at the reception area			
Yes	61	111	.694
No	19	36	
Not sure	14	18	
Are you aware of the various types of reusable respirators?			
Yes	72	111	.269
No	42	74	
Do you adjust your facemask after performing hand hygiene?			
Yes	72	118	.506
No	42	57	
Separate areas should be designated for aerosol and non-aerosol procedures?			
Yes	48	98	.521
No	25	39	
Not sure	21	28	
Chemically treating water reservoirs reduces infection transmission?			
Yes	58	86	.489
No	19	35	
Not sure	17	44	
Disinfecting dental chair between every patient is necessary?			
Yes	62	105	.459
No	19	32	
Not sure	13	28	

Which of the following can be an effective pre-procedural mouth rinse?			
0.2% Chlorhexidine	48	71	.130
1% Povidone-iodine	32	58	
Not sure	14	36	
Is COVID-19 associated with periodontitis?			
Yes	42	75	.322
No	31	43	
Not sure	21	47	
Is there a possibility of periodontal complications associated with COVID-19 patients?			
Yes	47	91	.298
No	25	30	
Not sure	22	44	
COVID-19 patients with diabetes, a smoking history, and high age have a higher risk of periodontal complications?			
Yes	54	110	.353
No	24	29	
Not sure	16	26	
Patients with COVID-19 may show increased gingival bleeding tendency as compared to non-COVID patients?			
Yes	40	86	.046
No	30	31	
Not sure	24	48	
Which periodontal procedure is at risk of spreading infection?			
Manual Scaling	40	66	.093
Ultra-sonic Scaling	36	55	
Periodontal Surgery	13	38	
Do not ask me	06	05	
Do you possess a fumigator in your clinic?			
Yes	68	108	.547
No	46	77	
Do you refrain yourself from performing non-emergency periodontal cases during the peak of a pandemic?			
Yes	63	129	.010
No	51	56	
Has the pandemic affected your overall periodontal practice?			
Definitely yes	24	38	.723
Somewhat yes	41	68	
Not at all	29	59	

Table 4. Comparison of responses across Work Experience

Variable	Less than 10 years	More than 10 years	p-value
Carriers of COVID-19 could be asymptomatic			
Yes	111	54	.103
No	29	25	
Not sure	28	12	
Telephonic staging is safe			
Yes	85	46	.038

No	36	29	
Not sure	47	16	
Precautions needed at the reception area			
Yes	124	48	.004
No	27	28	
Not sure	17	15	
Are you aware of the various types of reusable respirators?			
Yes	109	74	.021
No	79	37	
Do you adjust your facemask after performing hand hygiene?			
Yes	124	76	.179
No	64	25	
Separate areas should be designated for aerosol and non-aerosol procedures?			
Yes	99	47	.612
No	38	26	
Not sure	31	18	
Chemically treating water reservoirs reduces infection transmission?			
Yes	94	50	.003
No	27	27	
Not sure	47	14	
Disinfecting dental chair between every patient is necessary?			
Yes	118	49	.057
No	28	23	
Not sure	22	19	
Which of the following can be an effective pre-procedural mouth rinse?			
0.2% Chlorhexidine	84	35	.080
1% Povidone-iodine	51	39	
Not sure	33	17	
Is COVID-19 associated with periodontitis?			
Yes	69	48	.055
No	49	25	
Not sure	50	18	
Is there a possibility of periodontal complications associated with COVID-19 patients?			
Yes	82	56	.005
No	34	21	
Not sure	52	14	
COVID-19 patients with diabetes, a smoking history, and high age have a higher risk of periodontal complications?			
Yes	110	54	.667
No	31	22	

No	27	15	
Not sure			
Patients with COVID-19 may show increased gingival bleeding tendency as compared to non-COVID patients?			
Yes	74	52	.024
No	40	20	
Not sure	54	18	
Which periodontal procedure is at risk of spreading infection?			
Manual Scaling	75	31	.327
Ultra-sonic Scaling	58	33	
Periodontal Surgery	30	21	
Do not ask me	05	05	
Do you possess a fumigator in your clinic?			
Yes	103	73	.008
No	85	38	
Do you refrain yourself from performing non-emergency periodontal cases during the peak of a pandemic?			
Yes	119	73	.244
No	69	38	
Has the pandemic affected your overall periodontal practice?			
Definitely yes	40	22	.809
Somewhat yes	69	40	
Not at all	60	29	

Table 5. Comparison of responses across Designation

Variable	General Dentist	Specialist	P-value
Carriers of COVID-19 could be asymptomatic			
Yes	109	56	.444
No	31	23	
Not sure	22	18	
Telephonic staging is safe			
Yes	84	47	.782
No	38	27	
Not sure	40	23	
Precautions needed at the reception area			
Yes	115	57	.214
No	30	25	
Not sure	17	15	
Are you aware of the various types of reusable respirators?			
Yes	119	74	.269
No	73	43	
Do you adjust your facemask after performing hand hygiene?			
Yes	120	80	.232
No	62	37	

Yes			
No			
Separate areas should be designated for aerosol and non-aerosol procedures?			
Yes	96	50	.596
No	38	26	
Not sure	28	21	
Chemically treating water reservoirs reduces infection transmission?			
Yes	84	60	.039
No	33	21	
Not sure	45	16	
Disinfecting dental chair between every patient is necessary?			
Yes	111	56	.227
No	30	21	
Not sure	21	20	
Which of the following can be an effective pre-procedural mouth rinse?			
0.2% Chlorhexidine	82	37	.079
1% Povidone-iodine	49	41	
Not sure	31	19	
Is COVID-19 associated with periodontitis?			
Yes	67	50	.155
No	49	25	
Not sure	46	22	
Is there a possibility of periodontal complications associated with COVID-19 patients?			
Yes	80	58	.107
No	37	18	
Not sure	45	21	
COVID-19 patients with diabetes, a smoking history, and high age have a higher risk of periodontal complications?			
Yes	104	60	.463
No	30	23	
Not sure	28	14	
Patients with COVID-19 may show increased gingival bleeding tendency as compared to non-COVID patients?			
Yes	74	52	.416
No	40	21	
Not sure	47	25	
Which periodontal procedure is at risk of spreading infection?			
Manual Scaling	68	38	.518
Ultra-sonic Scaling	54	37	
Periodontal Surgery	34	17	
Do not ask me	06	05	

Do you possess a fumigator in your clinic?			
Yes	105	71	.353
No	77	46	
Do you refrain yourself from performing non-emergency periodontal cases during the peak of a pandemic?			
Yes	115	77	.275
No	67	40	
Has the pandemic affected your overall periodontal practice?			
Definitely yes	53	35	.805
Somewhat yes	81	54	
Not at all	68	48	

In this study about COVID-19 awareness and its relation to periodontal diseases and practice in dentistry, the power of sample was 0.74 (**Table 1**). The statistical analysis reported that more than half sample comprised of female participants (66.2%), and the majority of participants were with working experience of fewer than 10 years working as general dentists (**Table 2**). 68.9% of them thought COVID-19 could be asymptomatic, and 53.4% think telephonic staging is safe. 72.1% think precautions at the reception area are needed, and a significant proportion was aware of different types of reusable respirators. 73.1% believe in adjusting the facemask after performing hand hygiene, and 60.3% hold a view about separate rooms for aerosol and non-aerosol procedures.

About treating water chemically for infection reduction, 59.4% agreed with the notion. 69.9% believe in disinfecting dental chairs, and 47.9% think 0.2% chlorhexidine is effective pre-procedural mouth rinse. 47% hold a view of the relation between COVID and periodontitis, and 56.6% agree that this relation complicates the COVID condition. Patients having other diseases like diabetes, smoking, etc., have higher risks of periodontal complications, and those with COVID show increased gingival bleeding. Manual scaling is thought to have a higher risk of spreading infection. 62.1% possess fumigators in a clinic, 69.4% refrained during the peak of the pandemic from performing non-emergency periodontal cases, and 43.4% thought COVID had affected overall periodontal practice.

In **Table 3**, non-significant gender differences have been reported, and findings reported that both groups have lesser experience in the majority and working as general dentists. The majority of both groups agree that COVID can be asymptomatic, telephonic staging is safe, need of precautions, awareness regarding reusable respirators, facemask adjusting after hand hygiene, separate rooms for aerosol non-aerosol procedures, treating water chemically, disinfecting dental chairs, and 0.2% chlorhexidine as an

effective mouth rinse. Both groups think that periodontitis is related to COVID and can cause complications. Patients with other diseases can have a higher risk of periodontal complications, according to both groups. COVID patients show increased gingival bleeding, and manual scaling is at risk of spreading COVID because of both groups. The majority of both groups have fumigators in a clinic and have refrained themselves during the peak pandemic and think that pandemic has affected overall practice.

In **Table 4**, differences across working experience have been examined, and findings revealed significant differences across designation while non-significant across other items. The majority of general dentists have a lesser experience, while specialists have more experience. Participants of both groups think COVID can be asymptomatic and telephonic staging is safe. Both group participants agreed on precautions, were aware of reusable respirators, and adjusted their masks after hand hygiene. Both agreed on separate rooms for aerosol and non-aerosol, chemically treating water, and disinfecting chairs. More experienced thought 1% povidone was an effective mouth rinse while the second group agrees on 0.2% chlorhexidine. Both groups think COVID is associated with periodontics, and its complications and patients with other diseases are at higher risk of complications. Patients with COVID show increased bleeding and manual scaling as an infection-spreading procedure. Both groups have fumigators in their clinics and refrain from a pandemic. Both groups think the pandemic has affected overall practice.

In **Table 5**, we examined differences across designation, and findings reported non-significant differences. Both groups' general dentists and specialists agreed on COVID as asymptomatic, telephonic staging as safe, and precautions needed at the reception area. Both of them are aware of reusable respirators and adjust facemasks. Both groups think of separate rooms for aerosol and non-aerosol procedures, chemically treating water, and disinfecting chairs. General dentists think 0.2% chlorhexidine is as effective as a mouth rinse, and specialists think 1% povidone-iodine is effective. Both of them think COVID is related to periodontitis, and its complications and patients with other diseases are at higher risk of complications. Manual scaling is the risk of spreading infection, having fumigators at clinical, refraining from the pandemic, and thinking it has affected overall practice.

In the present study based on COVID-19 awareness and its relation to periodontal diseases and practice among dental students in Saudi Arabia, and cross-sectional survey design was used using random sampling as a sampling technique. After ensuring the reliability and normality of data, Descriptive analysis and chi-square were used through SPSS. In the first frequency table, findings revealed that more than half the sample comprised female participants (66.2%), and a majority of participants were with working experience of fewer than 10 years working as general

dentists. 68.9% of them thought COVID-19 could be asymptomatic, and 53.4% think telephonic staging is safe. 72.1% think precautions at the reception area are needed, and a significant proportion was aware of different types of reusable respirators. 73.1% believe in adjusting the facemask after performing hand hygiene, and 60.3% hold a view about separate rooms for aerosol and non-aerosol procedures literature also reports that generate aerosols and drops should be reduced, personal protection barriers should be used, and processes that create aerosols or drops should be reduced. Additionally, instrument surfaces and clinical surfaces must be adequately disinfected before and after aftercare [8, 12].

About treating water chemically for infection reduction, 59.4% agreed with the notion. 69.9% believe in disinfecting dental chairs, and 47.9% think 0.2% chlorhexidine is effective pre-procedural mouth rinse. 47% hold a view of the relation between COVID and periodontitis, and 56.6% agree that this relation complicates the COVID condition. Patients having other diseases like diabetes, smoking, etc., have higher risks of periodontal complications, and those with COVID show increased gingival bleeding. Manual scaling is thought to have a higher risk of spreading infection. 62.1% possess fumigator in a clinic, 69.4% refrain during the peak of the pandemic from performing non-emergency periodontal cases, and 43.4% thought COVID had affected overall periodontal practice, and previous studies also reported that the COVID-19 pandemic had affected many aspects of life, one should not see an adverse impact on their ability to maintain periodontal health with the proper safety measures in place [4, 13].

In **Table 3**, non-significant gender differences have been reported, and findings reported that both groups have lesser experience in the majority and working as general dentists. The majority of both groups agree that COVID can be asymptomatic, telephonic staging is safe, need of precautions, awareness regarding reusable respirators, facemask adjusting after hand hygiene, separate rooms for aerosol non-aerosol procedures, treating water chemically, disinfecting dental chairs, and 0.2% chlorhexidine as an effective mouth rinse. Both groups think that periodontitis is related to COVID and can cause complications, and literature also reported that periodontal disease (PDs) severity might be closely related to Covid-19 infections. Increased Galectin-3 levels may increase viral attachment and prompt an immunological response. In this period of the Covid-19 pandemic, it is essential to maintain rigorous oral hygiene and keep PDs under control. Periodontal disease management is vital during this period when dentistry is operating below its pre-COVID-19 capacity levels [3].

Patients with other diseases can have a higher risk of periodontal complications, according to both groups. COVID patients show increased gingival bleeding, and

manual scaling is at risk of spreading COVID because of both groups. The majority of both groups have fumigators in a clinic and have refrained themselves during peak pandemic and think that the pandemic has affected overall practice previous studies also reported that the COVID-19 pandemic had affected many aspects of life, one should not see an adverse impact on their ability to maintain periodontal health with the proper safety measures in place [4].

In **Table 4**, differences across working experience have been examined, and findings revealed significant differences across designation while non-significant across other items. The majority of general dentists have a lesser experience, while specialists have more experience. Participants of both groups think COVID can be asymptomatic and telephonic staging is safe. Both group participants agreed on precautions, were aware of reusable respirators, and adjusted their masks after hand hygiene. Both agreed on separate rooms for aerosol and non-aerosol, chemically treating water, and disinfecting chairs. More experienced thought 1% povidone was an effective mouth rinse while the second group agrees on 0.2% chlorhexidine. Both groups think COVID is associated with periodontics, also to its complications, and patients with other diseases are at higher risk of complications. Patients with COVID show increased bleeding and manual scaling as an infection-spreading procedure. Both groups have fumigators in their clinics and refrain from a pandemic. Both groups think the pandemic has affected overall practice, and studies reported same as periodontal disease (PDs) severity may be closely related to Covid-19 infections [3, 14].

In **Table 5**, we examined differences across designation, and findings reported non-significant differences. Both groups' general dentists and specialists agreed on COVID as asymptomatic, telephonic staging as safe, and precautions needed at the reception area. Both of them are aware of reusable respirators and adjust facemasks. Both groups think of separate rooms for aerosol and non-aerosol procedures, chemically treating water, and disinfecting chairs. General dentists think 0.2% chlorhexidine is an effective mouth rinse, and specialists think 1% povidone-iodine is effective. Both of them think COVID is related to periodontitis, and its complications, and patients with other diseases are at higher risk of complications studies reported a higher level of markers associated with worsened outcomes was also observed for patients with COVID-19 and periodontitis, such as c reactive protein, D-dimer, and white blood cells [6]. Manual scaling is the risk of spreading infection, having fumigator at clinical, refrain themselves in the pandemic, and thinking it has affected overall practice and literature reported periodontal disease (PDs) severity may be closely related to Covid-19 infections [3].

Limitations of the study

The small sample size is a limitation that can be overcome by increasing the sample size which we will carry out during our internship.

Conclusion

In the present study, findings revealed that the majority of dental professionals believe in precautions, COVID-19 relevance to periodontitis, and its complications. Difference of opinion exists in general dentists and specialists on preferred mouth rinse—manual scaling as a procedure at risk of spreading infection. COVID-19 affected overall practice according to the majority of participants.

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Conflict of interest: None

Financial support: None

Ethics statement: This study fulfils the ethical requirements of Riyadh Elm University.

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