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Original Article

Impact of COVID-19 Awareness on Periodontal Disease Prevention and Management

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ABSTRACT

The greatest threat and pervasive health issue in the world is COVID-19. Thousands of people have died because of it globally. The majority of infected people have moderate to serious symptoms. Controlling periodontal disease is crucial at this time when dentistry is performing below its pre-COVID-19 competence levels. The present study aimed to determine the knowledge and attitudes of Saudi dentists about COVID-19 and its association with periodontal disorders and to compare responses based on certification, employment history, and gender. This cross-sectional study was conducted using an online survey among dental practitioners. 300 dentists from Riyadh City will be used for this study. A web-based survey was developed to gauge awareness and impact. Based on the statistical analysis, the majority of participants had less than ten years of experience as general dentists, and more than half of the sample (66.2%) were female. 53.4% of them believed that telephone staging is safe, and 68.9% believed that COVID-19 may be asymptomatic. It is believed that manual scaling increases the danger of infection transmission. 43.4% believed COVID-19 had affected general periodontal practice, 69.4% avoided treating non-emergency periodontal patients during the peak of the pandemic, and 62.1% had fumigators in their clinic. The results of the current study showed that the majority of dental professionals supported preventative measures, the connection between COVID-19 and periodontitis, its consequences, and those who are more likely to have difficulties from other illnesses. When it comes to recommended mouth rinse and hand scaling as methods that might transmit illness, regular dentists and experts have different levels of experience. The majority of participants said that COVID-19 had an impact on overall practice.

Keywords: COVID-19, Periodontal health, Practice, Dental professionals

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Introduction

Around the world, coronavirus disease 2019 (COVID-19) is the most urgent and common health concern [1, 2]. It has taken hundreds of lives all across the world. Most infected individuals have mild to moderate chronic diseases. To improve their understanding of COVID-19, dentists can use a variety of online tools [3-7].

COVID-19 infections and the severity of periodontal disease (PDs) may be closely associated. Increased viral attachment and an immunological reaction may result from increased Galectin-3 levels. At the time of this COVID-19 pandemic, maintaining good oral hygiene and controlling PDs are essential [8]. Managing periodontal disease is crucial at this time when dentistry is operating under its pre-COVID-19 competence levels [9]. With the right precautions in place, maintaining periodontal health shouldn't be

negatively impacted by the COVID-19 pandemic, even though it has disrupted many facets of life [10-12].

It has always been critical to treat periodontal disease throughout the COVID-19 pandemic. According to research evaluations issued by the American Academy of Periodontology (AAP), tooth loss may eventually ensue if the situation is allowed to worsen. Additionally, when we take into account the connection between COVID-19 and periodontal disease, we can see why it is even more crucial to make an appointment with a periodontist if you exhibit any symptoms of the condition. According to one study, people with the worst forms of periodontitis, or gum disease, were more likely to experience coronavirus complications, which might result in assisted breathing, an urgent hospital stay, or even death. In addition, individuals with COVID-19 and periodontitis had greater levels of indicators such as white blood cells, D-dimer, and C-reactive protein that are linked to poorer outcomes [13].

Aside from COVID-19, periodontal disease can induce several serious illnesses and ailments. Specifically, the nature of dental treatment presents a danger to dental practitioners and dental assistants [14-16]. It is recommended that fewer operations that produce aerosols and drops be employed, as well as the usage of personal protective equipment. Moreover, clinical and equipment surfaces need to be thoroughly cleaned both before and after aftercare [17].

During the early stages of the epidemic, a survey of Saudi Arabian dentists was carried out to find out what they knew, thought, and felt about COVID-19. Saudi dentists demonstrated a favorable attitude and sufficient understanding of COVID-19. Dentists may be able to raise their level of knowledge by expanding their access to resources from oral healthcare authorities that outline the safest and most effective ways to treat patients during and after the epidemic [18-21].

There isn't a single, widely recognized treatment procedure for the COVID-19 epidemic; instead, suggestions are constantly evolving as new features of the virus become apparent. Before, during, and after dental treatment, safety measures should be followed to lower the risk of infection transmission between oral health professionals and patients [22, 23].

Benefits of the study

The results of the present investigation might be useful for future periodontal disease prevention and treatment practices, particularly about COVID-19 problems.

Scope of the study

This investigation primarily examined the skills and knowledge of Saudi dentists who work in Riyadh.

Aims of the study

- Objectives to ascertain Saudi dentists' awareness of and attitudes concerning COVID-19 and its link to periodontal disorders.
- To contrast the answers according to certification, employment history, and gender.

Materials and Methods

Study design

This cross-sectional study was conducted with Saudi dentists using a web-based survey.

Study sample

We reached out to 300 dentists in Riyadh City, but 259 of them completed our survey.

Study instrument

A web-based questionnaire was made that asked about demographics, understanding, and views concerning COVID-19 practice, COVID-19 complications, and how they relate to periodontal disease.

Instrument validity and reliability

Twenty participants completed a survey as part of a pilot project, and the data was entered into SPSS version 22 to assess reliability using Cronbach's coefficient alpha (value = 0.742). The questionnaire was sent to seasoned researchers at REU to assess its validity, and modifications were made in response to their suggestions and criticisms.

Statistical analysis

SPSS version 22 was used to analyze the collected data, performing both descriptive and inferential statistics. The significance level for group comparisons was maintained at less than 0.05. We used the chi-squared test to compare the research groups.

Results and Discussion

The gender ratio of the current study, the work experience ratio of the current study, and the designation ratio of the current study are presented in **Figures 1-3**, respectively.

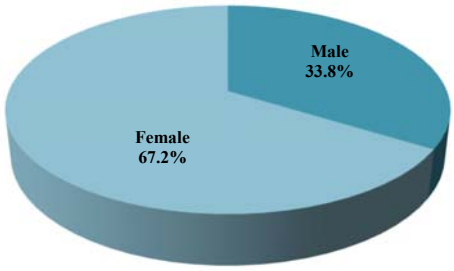

Figure 1. Gender ratio of the current study

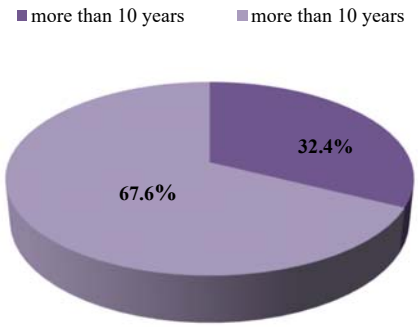

Figure 2. Work experience ratio of the current study

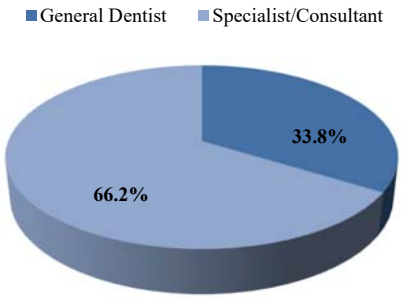

Figure 3. Designation ratio of the current study

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 the 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	
< 10 years	67.6%
> 10 years	32.4%
Designation	
General dentist	64.8%
Specialist/consultant	33.2%
Those who carry COVID-19 may not exhibit any symptoms.	
Yes	68.9%
No	18.3%
Not sure	12.8%
Telephonic staging is safe.	
Yes	53.4%
No	23.3%
Not sure	23.3%
The welcome area requires precautions.	
Yes	72.1%
No	18.7%
Not sure	9.1%
Do you know what kinds of reusable respirators are available?	
Yes	65.3%
No	34.7%
After washing your hands, do you reposition your facemask?	
Yes	73.1%
No	26.9%
Do aerosol and non-aerosol operations need to be done in different areas?	
Yes	60.3%
No	22.8%
Not sure	16.9%
Does chemically treating water reservoirs lessen the spread of infections?	
Yes	59.4%
No	18.3%
Not sure	22.4%
Disinfecting dental chairs 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%
Are COVID-19 patients more likely to experience periodontal problems if they have diabetes, a history of smoking, or are older?	
Yes	68.5%
No	17.8%
Not sure	24.7%
Could COVID-19 individuals have a higher propensity for gingival bleeding than 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%
When an epidemic is at its worst, should you avoid treating non-emergency periodontal situations?	
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%

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 are 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	
Must the aerosol and non-aerosol processes be conducted in different areas?	48	98	
Yes	25	39	.521
No	21	28	
Not sure			
Chemically treating water reservoirs reduces infection transmission.			
Yes	58	86	.489
No	19	35	
Not sure	17	44	
Disinfecting dental chairs 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?	48	71	
0.2% Chlorhexidine	32	58	.130
1% Povidone-iodine	14	36	
Not sure			
Is COVID-19 associated with periodontitis?			
Yes	42	75	
No	31	43	.322
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	
Are COVID-19 patients more likely to experience periodontal problems if they have diabetes, a history of smoking, or are older?			
Yes	54	110	.353
No	24	29	
Not sure	16	26	
Could COVID-19 individuals have a higher propensity for gingival bleeding than 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	
Ultra-sonic scaling	36	55	.093
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	
When a pandemic is at its worst, should you avoid treating non-emergency periodontal cases?			
Yes	63	129	.010
No	51	56	
Has the pandemic affected your overall periodontal practice?			
Definitely yes	24	38	
Somewhat yes	41	68	.723
Not at all	29	59	

Table 4. Comparison of responses across work experience

Variable	< 10 years	> 10 years	*P*-value
Carriers of COVID-19 could be asymptomatic.			
Yes	111	54	
No	29	25	.103
Not sure	28	12	
Telephonic staging is safe.			
Yes	85	46	
No	36	29	.038
Not sure	47	16	
Precautions are needed at the reception area.			
Yes	124	48	
No	27	28	.004
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	
No	38	26	.612
Not sure	31	18	
Chemically treating water reservoirs reduces infection transmission.			
Yes	94	50	
No	27	27	.003
Not sure	47	14	
Disinfecting dental chairs between every patient is necessary?			
Yes	118	49	
No	28	23	.057
Not sure	22	19	
Which of the following can be an effective pre-procedural mouth rinse?			
0.2% Chlorhexidine	84	35	
1% Povidone-iodine	51	39	.080
Not sure	33	17	

Is COVID-19 associated with periodontitis?			
Yes	69	48	
No	49	25	.055
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	
Are COVID-19 patients more likely to experience periodontal problems if they have diabetes, a history of smoking, or are older?			
Yes	110	54	.667
No	31	22	
Not sure	27	15	
Could COVID-19 individuals have a higher propensity for gingival bleeding than non-COVID patients?			
Yes	74	52	
No	40	20	.024
Not sure	54	18	
Which periodontal procedure is at risk of spreading infection?			
Manual scaling	75	31	
Ultra-sonic scaling	58	33	.327
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	
When a pandemic is at its worst, should you avoid treating non-emergency periodontal cases?			
Yes	119	73	.244
No	69	38	
Has the pandemic affected your overall periodontal practice?			
Definitely yes	40	22	
Somewhat yes	69	40	.809
Not at all	60	29	
Carriers of COVID-19 could be asymptomatic.			
Yes	109	56	
No	31	23	.444
Not sure	22	18	
Telephonic staging is safe.			
Yes	84	47	
No	38	27	.782
Not sure	40	23	
Precautions are needed at the reception area.			
Yes	115	57	
No	30	25	.214
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	
Separate areas should be designated for aerosol and non-aerosol procedures.			
Yes	96	50	
No	38	26	.596
Not sure	28	21	
Chemically treating water reservoirs reduces infection transmission.			
Yes	84	60	
No	33	21	.039
Not sure	45	16	
Disinfecting dental chairs 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	
1% Povidone-iodine	49	41	.079
Not sure	31	19	

Table 5. Comparison of responses across designation

Variable	General dentist	Specialist	*P*-value

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	
Are COVID-19 patients more likely to experience periodontal problems if they have diabetes, a history of smoking, or are older?			
Yes	104	60	.463
No	30	23	
Not sure	28	14	
Could COVID-19 individuals have a higher propensity for gingival bleeding than non-COVID patients?			
Yes	74	52	.416
No	40	21	
Not sure	47	25	
Which periodontal procedure is at risk of spreading infection?	68	38	
Manual Scaling	54	37	.518
Ultra-sonic Scaling	34	17	
Periodontal Surgery	06	05	
Do not ask me			
Do you possess a fumigator in your clinic?			
Yes	105	71	.353
No	77	46	
When a pandemic is at its worst, should you avoid treating non-emergency periodontal cases?	115	77	
Yes	67	40	.275
No			
Has the pandemic affected your overall periodontal practice?	53	35	
Definitely yes	81	54	
Somewhat yes	68	48	.805
Not at all			

In this study on COVID-19 knowledge and its association with dental practice and periodontal disorders, the sample power was 0.74 **(Table 1)**. The statistical analysis revealed that the majority of participants had fewer than ten years of experience as general dentists, and women comprised over half of the sample (66.2%) **(Table 2)**. 53.4% of respondents thought telephone staging was safe, while 68.9% said COVID-19 may be asymptomatic. Most people know of the many types of reusable respirators, and 72.1% think that precautions in the reception area are required. 60.3% of respondents support separate rooms for aerosol and non-aerosol medications, while 73.1% support changing the facemasks after performing hand hygiene.

Of those surveyed, 59.4% supported the idea of chemically treating water to reduce infections. 47.9% say a pre-procedural mouthwash containing 0.2% chlorhexidine is beneficial, and 69.9% think dental chairs should be disinfected. 56.6% concur that the relationship between COVID and periodontitis exacerbates the COVID condition, whereas 47% have this opinion. Individuals with COVID have greater gingival bleeding, and those with comorbid conditions such as diabetes, smoking, etc., are more likely to experience periodontal problems. It is believed that manual scaling increases the danger of infection transmission. 43.4% believed COVID had impacted general periodontal practice, 69.4% avoided treating non-emergency periodontal patients during the pandemic's height, and 62.1% had fumigators in a clinic [24].

Non-significant variations in gender were found in **Table 3**, and the results showed that both groups had less experience practicing as general dentists. Reusable respirators ought to be employed, safeguards are required, telephone staging is secure, and most of both groups agree that COVID-19 can be asymptomatic. The usage of separate rooms for aerosol and non-aerosol treatments, the need to chemically treat water, the need to disinfect dental chairs, the need to modify facemasks after hand hygiene, and the effectiveness of mouthwash containing 0.2% chlorhexidine. Both parties believe that periodontitis can lead to problems and is associated with COVID. Both populations may be more susceptible to periodontal issues if they have other medical conditions. Gingival hemorrhage is more common in COVID patients, and because of both populations, manual scaling poses a risk of COVID-19 transmission. Most members of both groups have fumigators in their clinics, abstained at the epidemic's height, and believe that the pandemic has impacted practice in general.

Table 4 looks at variations in working experience. The results showed that there were substantial disparities in designation but not in other factors. The experience of specialists is greater than that of most ordinary dentists. Telephonic staging is safe, according to participants in both groups and COVID can be asymptomatic. Both groups' members were aware of reusable respirators, agreed on safety measures, and repositioned their masks after washing their hands. Separate rooms for aerosol and non-aerosol, chemically treating water, and cleaning chairs were all agreed upon by all parties. More seasoned reasoning The second group agreed that 0.2% chlorhexidine is a more effective mouthwash than 1% povidone. Both groups believe that individuals with different illnesses are more likely to experience difficulties from COVID, which is linked to periodontics and related consequences. Increased bleeding and manual scaling are symptoms of COVID-19 patients, which can transmit infection. Both organizations avoid a pandemic and have fumigators in their clinics. According to both organizations, the epidemic has impacted general practice.

Our analysis of differences among designations in **Table 5** revealed non-significant variances. General dentists and specialists in both groups agreed that COVID is asymptomatic, that telephone staging is safe, and that the reception area has to be protected. They both know how to change facemasks and reusable respirators. Both groups consider chemically treating water, sanitizing chairs, and having separate rooms for aerosol and non-aerosol processes. While experts believe 1% povidone-iodine is useful, general dentists believe 0.2% chlorhexidine is just as effective as a mouthwash. They both believe that patients with various illnesses are more likely to experience issues from COVID, which is linked to periodontitis and associated consequences. Having fumigators at clinical, avoiding the pandemic, and believing that manual scaling has impacted practice as a whole are all risks associated with the practice.

Random sampling was employed as a sample approach in this cross-sectional survey design, which examined COVID-19 knowledge and its relationship to periodontal illnesses and practice among Saudi Arabian dentistry students. Using SPSS, descriptive analysis and chi-square were employed once the data's normality and dependability were established. The first frequency table's results showed that the majority of participants had less than ten years of experience as general dentists and that more than half of the sample was made up of female participants (66.2%). Of them, 68.9% believed that COVID-19 might not cause any symptoms, and 53.4% believed that telephonic staging was safe. 72.1% believe that measures in the reception area are necessary, and a sizable amount acknowledge various kinds of reusable respirators. 60.3% of respondents support having separate rooms for aerosol and non-aerosol treatments, while 73.1% support altering the facemasks after performing hand hygiene [25, 26]. The literature suggests that personal protective barriers should be used, aerosols and drops must be reduced, and operations that generate aerosols or drops must be eliminated. Additionally, before and during aftercare, clinical surfaces and equipment need to be thoroughly cleaned [17, 27].

Of those surveyed, 59.4% supported the idea of chemically treating water to reduce infections. 47.9% say a pre-procedural mouthwash containing 0.2% chlorhexidine is beneficial, and 69.9% think dental chairs should be disinfected. 56.6% concur that the relationship between COVID and periodontitis exacerbates the COVID condition, whereas 47% have this opinion. Patients with COVID have greater gingival bleeding, and those with comorbid conditions such as diabetes, smoking, etc., are more likely to experience periodontal problems. It's believed that manual scaling increases the likelihood of illness transmission. Although 62.1% of clinics have fumigators, 69.4% refrain from performing non-emergency periodontal procedures during the pandemic's peak, and 43.4% believe that COVID has impacted periodontal practice overall, prior research has also shown that the COVID-19 pandemic has impacted many facets of life. With the right safety precautions in place, one shouldn't experience any negative effects on their capacity to preserve periodontal health [10, 28].

Non-significant gender differences were found in **Table 3**, and the results showed that both groups had less experience practicing as general dentists overall. Precautions are required, reusable respirators ought to be employed, telephonic staging is safe, and most of the people in both groups agree that COVID-19 can be asymptomatic, that dental chairs must be cleaned, that facemasks must be modified after hand hygiene, that aerosol and non-aerosol treatments must be done in different rooms, and that water ought to be undergoing chemical treatment, and that mouthwash containing 0.2% chlorhexidine works well. The research suggests that the severity of COVID-19 infections and periodontal disease (PD) may be highly correlated. Additionally, both groups believe that periodontitis might lead to problems and is linked to COVID-19. Elevated levels of Galectin-3 might promote viral attachment and trigger an immune response. Controlling PDs and practicing proper oral hygiene are

crucial during this COVID-19 outbreak. At this time, when dentistry is functioning below its pre-COVID-19 competency levels, controlling periodontal illness is essential [9].

According to both groups, patients with various conditions may be more susceptible to periodontal problems. Patients with COVID exhibit more gingival bleeding, and because of both categories, manual scaling poses a risk of COVID-19 transmission. Both groups believe that the epidemic has impacted general practice, and the majority of them have fumigators in their clinics and have abstained throughout the peak of the pandemic. With the right precautions in place, maintaining periodontal health shouldn't be negatively impacted by the COVID-19 pandemic, according to earlier research that also noted how it influenced many facets of life [10].

Table 4 looks at variations in working experience. The results showed that there were substantial disparities in designation but not in other factors. While specialists have greater experience, most general dentists have less. According to participants in both trials, telephone staging is safe, and COVID-19 can be asymptomatic. Participants in both groups were aware of reusable respirators, used hand hygiene to adjust their masks, and agreed on precautions. Both agreed on chemically cleaning water, sanitizing chairs, and having separate rooms for aerosols and non-aerosols. More seasoned reasoning The second group agreed that 0.2% chlorhexidine is a more effective mouthwash than 1% povidone. Both groups believe that individuals with different illnesses are more likely to experience difficulties from COVID, which is linked to periodontics and related consequences. Increased bleeding and manual scaling are symptoms of COVID-19 patients, which can transmit infection. Both organizations avoid a pandemic and have fumigators in their clinics. Both parties believe that the pandemic has impacted general practice, and research has shown that the severity of periodontal disease (PD) may be directly linked to COVID-19 infections [9, 29].

We examined the variations among designations in **Table 5**, and the findings showed no appreciable shifts. Specialists and general dentists in both groups concurred that COVID is asymptomatic, that telephone staging is safe, and that precautions should be taken in the foyer. Both understand how to alter facemasks and reusable respirators. Each side envisions separate spaces for chemically processing water, washing chairs, and aerosol and non-aerosol operations. Professionals think 1% povidone-iodine is beneficial, whereas general dentists think 0.2% chlorhexidine is a good mouthwash formulation. They both think that COVID problems, which are connected to periodontitis and its consequences, are more likely to affect individuals with different conditions. Indicators including C-reactive protein, D-dimer, and white blood cells that are associated with worse outcomes were also shown to be higher in individuals with COVID-19 and periodontitis [13]. Manual scaling has been believed to have affected clinical fumigators, overall practice, and the risk of infection transmission. The data suggests that the severity of periodontal disease (PDs) may be strongly related to COVID-19 infections [9].

Limitations of the study

One way to get around the short sample size is to increase it, which is what we shall do throughout our internship.

Conclusion

The results of the current investigation showed that most dentists support preventative measures, the connection between COVID-19 and periodontitis, and its consequences. There is disagreement among general dentists and experts over the best mouthwash and the danger of infection transmission associated with hand scaling. For most participants, COVID-19 had an impact on overall practice.

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Conflict of Interest: None

Financial Support: None

Ethics Statement: This study fulfills the ethical requirements of Riyadh Elm University.

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