



Patient Approach Towards Dental Treatment Procedures During the COVID-19 Pandemic: A Survey

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Abstract

Aim: A paper survey was conducted to assess the approach of patients towards dental treatment procedures during the COVID-19 pandemic. The purpose of the study was to explore dental patients' perceptions of susceptibility to contracting COVID-19 in the dental clinic compared to other places, their related attitudes and beliefs regarding dental care visits and how the COVID-19 vaccination drive affected their attitude towards receiving dental care.

Methodology: A detailed questionnaire was provided to 450 patients that visited the author's dental clinic from 1st January 2021 to 31st May 2021. The variables included in the survey were dental hygiene behaviors, perceived susceptibility to COVID-19, attitudes and beliefs regarding the risk of attending dental appointments and the necessary conditions and events for them to feel comfortable returning to regular dental appointments. In all, 85.11% of respondents believed that visiting the dental office amidst the COVID-19 Pandemic posed a serious risk and increased susceptibility towards contracting the infection.

Perceptions of susceptibility, a higher valuation of dentistry, and agreement that COVID-19 is a serious infection were each positively related to attitudinal statements and beliefs reflecting caution in attending dental visits. Last, assurance from dental health professionals confirming the safety to return for routine dental care and the ongoing vaccination programs were the largest reported factors necessary for a return to routine dental visits.

Introduction

The novel coronavirus (SARS-CoV-2) pandemic has been a highly disruptive and challenging event that has significantly affected the daily life of nearly every individual in every country. Individuals infected with COVID-19, the disease caused by SARS-CoV-2, are found in >200 countries and almost all Indian states. Millions of people have been infected with it worldwide. COVID-19 is highly contagious, with a rapid rate of transmission, and can be spread by not only symptomatic patients but asymptomatic carriers as well. The known modes of transmission include droplets, surface contact, and aerosolization. While a lot has been researched about the nature of the novel COVID-19 virus, yet new facts come to light every other day about its transmission, spread and nature of the disease it causes.

Healthcare professionals are always at a greater risk of contracting the COVID-19 virus, however, clinicians interacting with multiple patients can serve as vectors for viral transmission between patients too (Chen et al. 2020) (2). Due to close physical contact with patients while examining or treating, dental professionals are at particularly high risk of being infected by, as well as transmitting COVID-19 to, their patients (Meng et al. 2020) (4). In Italy, several dental professionals were reported to have succumbed to COVID-19 as early as the initial stages of the pandemic (Chustecka 2020) (3). At present, the best protection for dental professionals and their patients is increasing awareness, avoiding unnecessary contact with people who may have symptoms of COVID-19, using appropriate personal protective equipment, and increasing attention to engaging in personal hygiene behaviors, especially handwashing (CDC 2020b).

Because of the high risk for dental professionals and their patients of contracting COVID-19, on March 16, 2020, the American Dental Association (2020) recommended that dental professionals postpone elective procedures and provide only emergency dental care. Additionally, the CDC (2020b) recommended that dental health care providers delay all elective provider visits and suspend routine dental visits. At the time of writing, although routine dental visits have resumed in most of the countries, it is unclear when or to what extent clinic operations will fully return to the pre-COVID-19

norm. In India amid rising cases of Covid-19, the Indian Dental Association in 2020 issued specific preventive guidelines for Dental Professionals on the Coronavirus Threat limiting the treatment to urgent care only and postponing all elective procedures. These guidelines are however reviewed timely and currently, most dental procedures are designated do-able.

Possible transmission routes of 2019-nCoV in dental clinics (21):

Direct or Indirect Transmission: The COVID-19 virus can be transmitted directly from person to person by air droplets; recent evidence suggested that it may also be transmitted through contact and fomites. Dental patients and professionals are always a high risk for exposure to pathogenic microorganisms, including viruses and bacteria that infect the oral cavity and respiratory tract. Dental care settings invariably carry the risk of 2019-nCoV infection due to the specificity of its procedures, which involves face-to-face communication with patients, and frequent exposure to saliva, blood, and other body fluids, and the handling of sharp instruments. The pathogenic microorganisms can be transmitted in dental settings through inhalation of airborne microorganisms that can remain suspended in the air for long periods, direct contact with blood, oral fluids, or other patient materials, contact of conjunctival, nasal, or oral mucosa with droplets and aerosols containing microorganisms generated from an infected individual and propelled a short distance by coughing and talking without a mask, and indirect contact with contaminated instruments and/or environmental surfaces.

There have been limited studies in the reviewed English literature that have examined patient attitudes towards dental treatment procedures during the COVID-19 pandemic and what factors would contribute to clinical operations in reaching pre-pandemic levels. This study aimed to explore the patient approach towards dental treatment procedures during the COVID-19 Pandemic. A secondary aim was to determine the conditions and circumstances that will influence dental patients to return to pre-COVID-19 dental appointment routines.

This study can also serve as a guide for dental and public health professionals, and patients as they seek to restore positive dental health care practices amidst the COVID-19 pandemic.

Methodology

Design and Sample:

Data for this study came from a cross-sectional survey. The survey was conducted on 450 patients that visited the author's dental clinic from 1st January 2021 to 31st May 2021. The description was

as follows: “Complete a 20-minute survey about your beliefs, attitudes, and perceptions regarding professional dental care during the COVID-19 pandemic.

The sample was limited to respondents who were ≥ 18 years old. No other exclusion criteria were applied.

Procedure

A paper survey was created in MS Word and printed and then given to patients to answer. The first item on the survey was informed consent. The entire survey took approximately 20 minutes to complete, and participants did not receive any funds for their participation.

A detailed questionnaire was provided to patients which were designed after a thorough review of the present literature available on patient feedback surveys.

The survey was pilot-tested with a small group of health professionals, including a physician, a dentist, and a nurse. Pilot-test participants were asked to provide feedback on the understandability of specific items and general survey flow. Updates to the survey were made according to the feedback in the pilot test, and the final survey was administered in January 2020.

Patient Approach Towards Dental Treatment Procedures During the COVID-19 Pandemic: A Survey

I am asking for your voluntary participation in my research survey. Please read the following information about the survey. If you would like to participate, please sign in the appropriate box below.

PURPOSE OF RESEARCH: For the partial fulfilment of my Master's degree in Hospital Administration

IF YOU PARTICIPATE, YOU WILL BE ASKED TO: Fill in the survey form

TIME REQUIRED FOR PARTICIPATION: 8- 10 mins

RISKS: None

HOW CONFIDENTIALITY WILL BE MAINTAINED: Patient details and privacy will be maintained and will not be published anywhere.

If you have any questions about this study, feel free to contact: Dr Armish Riyaz

Adult Sponsor: _____

Phone/email: _____

VOLUNTARY PARTICIPATION:

Participation in this study is completely voluntary. If you decide not to participate there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time and you may decide not to answer any specific question.

By signing this form I am attesting that I have read and understand the information above and I freely give my consent/assent to participate or permission for my child to participate.

ADULT INFORMED CONSENT OR MINOR ASSENT

Printed Name of Research Subject: _____ Parental/Guardian Permission (if applicable) Parent/Guardian Printed Name: _____

Date Reviewed & Signed: _____ Signature: _____

Date Reviewed & Signed: _____ Signature: _____

Figure 1: Consent form

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Strongly disagree	Disagree	Somewhat disagree
I am concerned about contracting Covid -19 from:							
My dental professional							
Other patients at the dental office							
Other staff at the dental office							
Compared to the rest of the population, my dentist has at greater risk of:							
Contracting COVID-19							
Transmitting COVID-19							
I feel more likely to contract COVID-19 in a dental office than:							
Grocery stores							
Restaurants							
Movie theatres							
Public transport							
Other clinics at the hospital							
Contracting COVID-19 is more risky to my overall health than:							
Not attending a check-up appointment with my dentist at all							
A dental appointment for elective procedures like fillings, crowns etc							
A dental appointment for pain, infections and swellings							
I trust my dental office is in compliance with government regulations and recommendations for appropriate dental treatment							
I will postpone all my dental visits until the COVID-19 outbreak is controlled							
I will visit if I'm aware that all staff at the dental office is vaccinated against COVID-19							
I will verify in advance the dates of last RT-PCR test for detecting COVID-19 undertaken by all the staff at the dental office							
I will myself get tested for COVID-19 before visiting the dental office							

Figure 2: Questionnaire

Data Analysis

The HBM (Health Belief Model)¹ was used in the development of the survey items. HBM emphasizes the relationship between perceptions of susceptibility for infection and severity of the ensuing illness, both of which are presumed to influence individuals' risk avoidance behaviors. Participants were asked to respond to items related to the perceived value of dentistry. A 7-point Likert scale (strongly agree to strongly disagree) was used to measure perceptions. These items were scaled together (Cronbach's alpha = 0.89) to create a composite variable reflective of the perceived value of dentistry. A strongly agree response was coded as a 3, agree as 2, and somewhat agree as 1. All other responses were coded as 0. The items were then summed. The scale was intended to reflect agreement to the statements; therefore, only positive agreement scores were used in the scale, which also prevented having negative values in the analyses.

Data were analyzed with STATA 16 (StataCorp). Means and distributions were examined. Data transformations were done to normalize variables for analyses where needed.

Results

Table 1 lists the mean agreement for each survey question used to create the composite theory variables regarding an agreement with perceived susceptibility and attitudes and beliefs of risk associated with COVID-19 and dental appointments.

Respondents indicated that contracting COVID-19 from other patients in a dental office posed the greatest risk related to dental care. They equally agreed to the fact that their dentist had a greater risk in contracting as well as transmitting COVID-19.

The majority of the respondents believed that they were more likely to contract the virus at the dental office as compared to other public places. There was also a general agreement that contracting COVID-19 was riskier to overall health than attending a dental checkup or receiving dental care.

Respondents strongly agreed that their dental office would comply with governmental COVID-19 recommendations. Not all respondents believed that they would postpone their dental visits until the COVID-19 outbreak is controlled.

Respondents agreed that factors like COVID-19 vaccination and knowledge about the staff at the dental office is regularly tested for COVID-19 would encourage them to visit the dental office regularly. Lastly, less than half of the respondents stated that they would themselves get tested for COVID-19 before visiting a dental office.

Table 2 shows results from a multivariate regression exploring factors associated with an increased agreement to statements reflecting perceptions of susceptibility.

Respondents who reported greater agreement with the statement indicating that they would likely contract COVID-19 from a dental visit were significantly more likely to have a higher agreement to statements about perceptions of susceptibility in dental settings ($P < 0.001$).

Increased agreement to statements reflecting increased attitudes and beliefs of risk related to COVID-19 and dentistry were also significantly associated with an increased agreement to statements about perceived susceptibility ($P < 0.001$), as was older age ($P = 0.01$).

Factors associated with increased attitudes and beliefs of risk for contracting COVID-19 from dental visits included increased perceptions of susceptibility ($P < 0.001$), increased perceptions of the value of dentistry ($P = 0.01$), and agreement that COVID-19 is a serious infection ($P = 0.002$; Table 3).

Other events that respondents strongly agreed would help them feel comfortable returning to the dental office included a vaccination for COVID-19. Respondents reported that information about the latest PCR- test is undertaken by staff at the dental office would encourage them and give them confidence in returning to a dental office. (Table 4)

Comparatively, many of the patients did not believe they would take a PCR test themselves before visiting the dental office.

	n	Mean ^a	SD
I am concerned about contracting Covid -19 from:			
My dental professional	450	3.7	1.7
Other patients at the dental office	450	3.3	1.8
Other staff at the dental office	450		
Compared to the rest of the population, my dentist has at greater risk of:			
Contracting COVID-19	450	3.8	1.7
Transmitting COVID-19	450	3.8	1.6
I feel more likely to contract COVID-19 in a dental office than:			
Grocery stores	450	2.4	1.7
Restaurants	450	4.7	1.8
Movie theatres	449	4.3	1.8
Public transport	440	4.2	1.6
Other clinics at the hospital	450	5.7	1.6
Contracting COVID-19 is more risky to my overall health than:			
Not attending a check-up appointment with my dentist at all	450	2.5	1.5
A dental appointment for elective procedures like fillings, crowns etc	439	2.1	1.6
A dental appointment for pain, infections and swellings	450	3.4	1.9
I trust my dental office is in compliance with government regulations and recommendations for appropriate dental treatment during the COVID-19 outbreak	450	2.4	1.2
I will postpone all my dental visits until the COVID-19 outbreak is controlled	450	3.6	1.7
I will visit if I'm aware that all staff at the dental office is vaccinated against COVID-19	450	4.5	1.9
I will verify in advance the dates of last RT-PCR test for detecting COVID-19 undertaken by all the staff at the dental office	446	2.4	1.3
I will myself get tested for COVID-19 before visiting the dental office	436	3.1	1.8

Score 1-7: 1 = strongly agree, 2 = agree, 3 = somewhat agree, 4 = neither agree nor disagree, 5 = somewhat disagree, 6 = disagree, 7 = strongly disagree. A square root transformation was used to normalise the composite susceptibility and attitude and belief variables for analyses. ^aMean level of agreement with statement.]

Table 1 lists the mean agreement for each survey question used to create the composite theory variables regarding agreement with perceived susceptibility and attitudes and beliefs of risk associated with COVID-19 and dental appointments.

Perceived Susceptibility	Coefficient	SE	t	p> t	95% CI	
Perceived likelihood of infection	-0.91	0.14	-6.43	0.000	-1.18	-0.63
Perceived value of dentistry	-0.10	0.08	-1.25	0.213	-0.25	0.06
Attitudes and beliefs	34	0.05	7.66	0.000	0.26	0.43

Table 2: Regression for Perceived Susceptibility to Contracting COVID-19 from Attending a Dental Appointment (*n* = 450)

Attitudes and Beliefs	Coefficient	SE	T	p> t	95% CI	
Perceived susceptibility of contracting COVID-19 in the dental office	0.28	0.04	7.23	0.000	0.20	0.3
Perceived value of dentistry	0.32	0.075	4.4	0.010	0.19	0.46
Perceive COVID-19 to be risky overall	0.43	0.43	1.06	0.309	-0.40	1.27

Table 3: Regression for Attitudes and Beliefs Regarding Risk of Contracting COVID-19 from Attending a Dental Appointment (*n* = 439).

Event	n	Mean	SD
COVID-19 vaccination	450	2.7	1.8
Control of COVID-19 outbreak	450	4.1	1.5
COVID-19 PCR Tests by Dental Staff	446	3.3	1.6
COVID-19 PCR Tests by patients themselves	436	4.8	1.4

Table 4: Level of Agreement with Events That Need to Occur for Patients to Feel Comfortable Returning to the Dental Office.

Score 1-7: 1 = strongly agree, 2 = agree, 3 = somewhat agree, 4 = neither agree nor disagree, 5 = somewhat disagree, 6 = disagree, 7 = strongly disagree.

Discussion

The purpose of this study was to assess the perceptions of susceptibility to contracting COVID-19 in a dental office and the related attitudes and beliefs of dental patients regarding professional dental care visits during the COVID-19 pandemic. A secondary purpose of this study was to determine the conditions and circumstances that may influence dental patients returning to pre-COVID-19 dental appointment regimens.

The results of this study indicated that attitudes and beliefs of the risk of COVID-19 were influenced by increased perceptions of susceptibility and the belief that COVID-19 is a serious infection. Results also indicated that COVID-19 vaccination and reassurance by dental professionals about the safety and frequent testing would encourage patients to receive the desired dental care.

Certain demographic variations were evident in the survey. For example, as respondents increased in age, perception of susceptibility to contracting COVID-19 was remarkably higher. This is consistent with messaging from the CDC (2020c) (18) that risk for greater morbidity and mortality is higher among older individuals with COVID-19. Hospitalizations are also highest in adults ≥ 65 y (Garg et al. 2020)(20).

An additional challenge to the psychological barrier of increased perceived susceptibility to contracting COVID-19 in dental offices could be that significant socioeconomic barriers to dental care already exist for the aged and the poor. This study, however, did not evaluate the patient's economic status and income.

Historically, these two vulnerable population groups have poor professional dental utilization and a higher incidence of unfulfilled dental needs (Raphael 2017; Zhou et al. 2017) (13,16).

As dental providers work to supply a secure environment for patients as they begin to return for care, these findings suggest that it will be paramount to work closely with geriatric and low-income populations to ensure that concerns regarding susceptibility are being addressed.

One aspect for immediate attention is for dental professionals to communicate that they are ensuring every possible precaution in their offices to prevent infection from provider to patient and from patient to patient. These were among the most concerning aspects to participants in this study.

Results from an analysis of attitudes and beliefs revealed an agreement with a cautious approach to interacting with dental professionals to guard the patient and provider. Increased perceived susceptibility, increased perception of the severity of the disease, and high perceived value or esteem for oral health and dental services were all associated with a cautious approach toward attending dental appointments.

Interestingly, the ones who value oral health would take a more cautious approach towards attending dental appointments. On initial inspection, these two attitudes could seem contrary to each other.

According to respondents, although dental health is important, staying safe from contracting COVID-19 is invariably more important.

It is quite evident that patients who reported a high perceived value or esteem for oral health and dental services also reported a higher level of attitudes and beliefs of caution.

Dental Professionals can play a pivotal role by communicating with their patients and reminding them of the importance of routine dental services to their overall well-being and that these services shall resume comprehensively as soon as possible because providers value the safety and health of their patients.

Most patients during this study believed that their dental office is complying with the government guidelines, so it is inferable that patients also consider their dental professionals as credible sources of health information. Therefore, enhanced communication by dental practitioners about preventive dental care and safety measures undertaken by them can prove beneficial.

The aim of oral public health and dental care practitioners during the pandemic should be to restore the good oral health routine of the population while not increasing the spread of COVID-19 and ensuring patient safety through high-quality service. The fact that returning to routine dental care will provide a net benefit to the population needs to be reiterated by the health professionals.

Respondents in this study reported that they would be complacent returning to dental offices following actions from healthcare providers, including vaccine status and appropriate precautions and recommendations. Another aspect of concern for the patients was to stay aware and informed about the latest PCR tests undertaken by the healthcare providers to detect any existent COVID-19 infection. Almost all patients agreed that this would help them to return their pre-pandemic dental care regimen.

Despite the patients' willingness to stay informed about the PCR tests, the majority of the patients did not agree that they would themselves get tested before visiting a dental professional. Increased awareness about the spread and safety of the community among the patients might encourage them to get tested more frequently. This measure would also help the medical fraternity to stay safe and provide effective care to the patients.

This observation reemphasizes the gravity of the COVID-19 pandemic and therefore the serious nature of perceptions and attitudes that individuals have towards the risk of contracting COVID-19. It also delivers the unique opportunity for the community of dental professionals to partner with leading public health agencies to ensure that dental well-being is not neglected and awareness in the masses about it is well propagated.

Limitations of the Study:

The findings from this study should be interpreted within the context of its limitations. Firstly, the study sample was homogeneous, with most respondents having a good annual income.

Secondly, this survey was made available in early 2021. During this time, a general flattening of the epidemic curve was being reported, and a few participants, feeling more assured about the improving trajectory of the pandemic, may have demonstrated desirability bias, therefore responding in a way that reflected more favorably upon the slowing of the pandemic. Further cross-sectional surveys at regular intervals would reflect the realistic state of the pandemic in its entirety more accurately.

Thirdly, this survey relied completely on self-report data. People aren't necessarily good predictors of their future behavior, therefore the data may not reflect actual future outcomes, such as treatment-seeking patterns.

Lastly, survey items were constructed to address the purpose of the current study. There were no previous studies of perceptions of COVID-19 and dentistry, so comparisons of the findings in this study with those in previous research may be limited.

Conclusion

Public health policies must be evidence-based. The lack of published research on COVID-19 and dentistry poses a challenge for clinicians and policymakers wishing to make empirically-based policies. This study provides early data to identify patient perceptions of risk susceptibility and attitudes toward COVID-19 in a professional dental setting. This study also provides information about the conditions and events that may influence patients' confidence to return to regular dental visits. Government and public health agencies can play a crucial role in alleviating concerns and instilling confidence that dental settings are safe. With this information from the public, dental professionals and public health agencies can work together to share messages that will consistently inform the public regarding the safety of returning to professional dental care as it relates to the reopening of states and cities. Such messaging may have to focus on the most susceptible population groups and work to address fears and concerns of contracting the virus.

References

1. Bin Mubayrik A, Al Dosary S, Alshawaf R, Alduweesh R, Alfurayh S, Alojaymi T, Tuwaym M, Alsuhaibani D, Aldaghri E. "Public Attitudes Toward Chairside Screening for Medical Conditions in Dental Settings". *Patient Prefer Adherence*. 2021;15:187-195

- 2.Chen, X, Shang, Y, Yao, S, Liu, R, Liu, H. 2020. "Perioperative care provider's considerations in managing patients with the COVID-19 infections". *Transl Perioper Pain Med.* 7(2):216–224.
- 3.Chustecka Z. More than 60 doctors in Italy have died in COVID-19 pandemic. *Medscape Medical News*; 2020. <https://www.medscape.com/viewarticle/927753>.
- 4.Hung, M, Moffat, R, Gill, G, Lauren, E, Ruiz-Negrón, B, Rosales, MN, Licari, FW. 2019. "Oral health as a gateway to overall health and well-being: surveillance of the geriatric population in the United States". *Spec Care Dent.* 39(4):354–361.
- 5.Meng, L, Hua, F, Bian, Z. 2020. "Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine". *J Dent Res.* 99(5):481–487.
- 6.Luo, J.Y.N., Liu, P.P. & Wong, M.C.M. "Patients' satisfaction with dental care: a qualitative study to develop a satisfaction instrument". *BMC Oral Health* **18**, 15 (2018).
- 7.Becker K, Brunello G, Gurzawska-Comis K, et al.: "Dental care during COVID-19 pandemic: survey of experts' opinion". *Clin Oral Implants Res* 31: 1253-1260, 2020.
- 8.Gurzawska-Comis, K., Becker, K., Brunello, G., Gurzawska, A., & Schwarz, F. (2020). "Recommendations for Dental Care during COVID-19 Pandemic". *J Clin Med*, **9**(6), 1833.
- 9.Harrel, S. K., & Molinari, J. (2004). "Aerosols and splatter in dentistry: A brief review of the literature and infection control implications". *Journal of the American Dental Association*, **135**(4), 429– 437.
- 10.Kranz AM, Gahlon G, Dick AW, Stein BD. "Characteristics of US Adults Delaying Dental Care Due to the COVID-19 Pandemic". *JDR Clin Trans Res.* 2021 Jan;6(1):8-14.
- 11.Petosa, RL, Smith, LH. 2014. "Peer mentoring for health behavior change: a systematic review". *Am J Health Educ.* 45(6):351–357.
- 12.Raifman, MA, Raifman, JR. 2020. "Disparities in the population at risk of severe illness from COVID-19 by race/ethnicity and income". *Am J Prev Med.* 59(1):137–139.
- 13.Raphael, C. 2017. "Oral health and aging". *Am Pre J Public Health.* 107(S1):S44–S45.
- 14.Semyonov, M, Lewin-Epstein, N, Maskileyson, D. 2013. "Where wealth matters more for health: the wealth-health gradient in 16 countries". *Soc Sci Med.* 81:10–17.
- 15.Shapiro, DN, Chandler, J, Mueller, PA. 2013. "Using mechanical Turk to study clinical populations". *Clin Psychol Sci.* 1(2):213–220.
- 16.Zhou, JY, Elyasi, M, Amin, M. 2017. "Associations among dental insurance, dental visits, and unmet needs of US children". *J Am Dent Assoc.* 148(2):92–99.
- 17.CDC 2020b. Interim clinical guidance for management of patients with confirmed Coronavirus disease (COVID- 19). *CDC.* <https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html>
- 18.CDC(2020c). Symptoms of Coronavirus. *CDC.* <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>
- 19.CDC (2020d). How to protect yourself & others. *CDC.* <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>

20. Garg S, Kim L, Whitaker M, et al. "Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020". *MMWR Morb Mortal Wkly Rep* 2020;69:458–464.
21. Peng, X., Xu, X., Li, Y. *et al.* "Transmission routes of 2019-nCoV and controls in dental practice". *Int J Oral Sci* **12**, 9 (2020). <https://doi.org/10.1038/s41368-020-0075-9>