ISSN: 2573-8224

Research Article

Journal of Oral & Dental Health

Dentist's Experiences and Perceptions One Year into the SARS-CoV-2 Pandemic

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Submitted: 04 Nov 2021; **Accepted:** 11 Nov 2021; **Published:** 27 Nov 2021

Citation: *Sánchez-Pérez L, Donatelli LJP, Perea-Pérez Bernardo, Labajo-González E, Acosta-Gio AE (2021) Dentist's Experiences and Perceptions One Year into the SARS-CoV-2 Pandemic. J Oral Dent Health 5(4): 101-109.*

Abstract

The emergence of SARS-CoV-2 mobilized the dental profession to make dentistry safer. Enhanced infection control protocols intended to prevent exposure to SARS-CoV-2 will likely be compromised if infection control knowledge and practice are deficient. One year into the coronavirus pandemic, the aim of this online survey among dentists in Spanish-speaking countries and Brazil, was to assess their personal experiences with COVID-19, perceptions of risk, and infection control needs. A questionnaire designed in Google Surveys was conducted in Spanish or Portuguese from April 8 to May 24, 2021. Items included were dentists' age, sex, professional profile, and personal experience with COVID-19. Collected in a Likert-type scale, perception items covered concerns, needs, procedures, impact, and immunization. Chi² test was applied to analyze trends in perceptions versus demographics. Responses were obtained from 712 dentists (235 men and 477 women, 23 to 75 years old). Most knew someone with COVID-19, for 61% the case was a family member. Twenty percent (n=140) had suffered COVID-19. Percentages in total agreement were: "I work with fear of COVID-19" 27%; "We need to improve infection control education" 46%; "I sterilize dental handpieces" 51%; "I use aerosol generating procedures less" 26%; and "Once immunized, I'll work without fear" 6%. Dentists continued to work with fear of SARS-CoV-2; they had partially applied enhanced infection control procedures. They perceived a need for infection control education. Infection control education and training needs remain to be addressed to make dental clinics safer for providers and their patients.

Keywords: Coronavirus, COVID-19, Dentists, Education, Infection Control, Survey

Introduction

In March 2020, the World Health Organization announced a "global pandemic alert" because of the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and the coronavirus disease 2019 (COVID-19) that it causes [1]. The emergence of a novel airborne pathogen mobilized the dental profession to make dentistry safer. Diverse online surveys provide a worldwide panorama of the profession's earliest response, where fear of occupational exposure was consistently observed [2-7].

Evidence-based infection control recommendations and clear practice guidelines were fundamental for dentists to reinitiate their clinical activities. The US Centers for Disease Control and Prevention (CDC) published updated guidance for infection control, the American Dental Association advised the profession on how to minimize risks, The *Consejo de Dentistas de España* and the Brazilian Ministry of Health published protocols for safer clinical activities [8-11]. Additional resources were made available by the Organization for Safety, Asepsis and Prevention (osap.org) and the FDI World Dental Federation (fdiworlddental.org).

Reports on COVID-19 prevalence among dental healthcare professionals suggest that the enhanced infection control procedures help prevent SARS-CoV-2 exposure in dental settings [12,13]. Successful introduction of enhanced procedures requires routine compliance with recommendations. However, in some regions in-

fection control education is sub-par, challenging the adoption of optimized evidence-based infection control protocols [14-16].

One year into the coronavirus pandemic, the aim of this online survey among dentists in Spanish-speaking countries and Brazil, was to assess their personal experiences with COVID-19, perceptions of risk, and infection control needs.

Materials and Methods

Ethics and Biosafety

This cross-sectional survey followed ethical standards for protecting human subjects, in accordance with the World Medical Association's Code of Ethics (Declaration of Helsinki). The protocol was reviewed and approved by the Research Ethics Committee at the School of Legal and Forensic Medicine, *Universidad Complutense de Madrid*, Spain (IRB 002/2020). The study took place online therefore, a signed informed consent was waived. At the beginning of the questionnaire, the study's purpose was explained, and participants could "click" a box to express their consent. The survey was anonymous, responses confidential, no identifying personal data was collected, and no incentives were offered.

Survey

The link to the questionnaire was placed in a dental trade publication with wide circulation in Latin America and on two dental distributor's webpages: one in Mexico and one in Brazil. The survey was open from April 8 to May 24, 2021. Dental practitioners were also invited to participate via WhatsApp, Facebook, LinkedIn, ResearchGate, and e-mails in the authors' address books. All invitations requested that the link be shared, expecting a snowball effect.

Questionnaire

The questionnaire was designed with Google Surveys to be answered in Spanish or Portuguese. Demographics items included sex, age in years, years in practice, location of their dental practice, and field of clinical specialization. The survey included 14 closed-ended questions (response options, Yes or No) about the participant's professional profile and personal experience with COVID-19.

The survey included five sections on perceptions: 1) COVID-19/SARS-CoV-2 risk and fear, ten questions; 2) Infection control needs and sources, nine questions; 3) Changes in clinical procedures, nine questions; 4) Impact on practice, eight questions; and 5) Immunization against SARS-CoV-2, twelve questions. Responses were collected in a Likert-type scale as Totally Agree (TA), Agree (A), Neutral (N), Disagree (D) or Totally Disagree (TD).

Statistical Analysis

The participant's responses were captured in a database from which frequency tables were obtained. A categorical measures Chi^2 test was applied to determine whether the observed response distribution for each perception item (dependent variable) occurs randomly or is significantly associated with an independent variable (age, sex, and practice's location). For analysis, a contingency table was built for each demographic against a perception item (from TA to TD). Response trends were inferred from observations (responses) versus the expected values for each cell. Data were analyzed using the JMP 10 statistical package (SAS Institute Inc., Cary, NC, USA). A critical value of $P \leq 0.05$ was considered statistically significant. Results are presented as rounded percentages.

Results

Participants

At its closing on May 24, 2021, 712 dentists had participated, 656 (92%) from Spanish-speaking countries, and 56 (8%) from Brazil.

Of 47,704 (712 x 67) possible responses, there were 565 (1%) empty cells. The 712 count was reached after excluding 21 dentists who failed to answer ≥10 questions.

Participants were 235 (33%) men and 477 (67%) women 23 to 75 years-old (mean 47.8 years ± 11.8 SD; $CI_{95\%}$ 46.7 – 48.5), with 2 to 48 years in practice (mean 23 years ± 12.5 SD; $CI_{95\%}$ 22.1 – 23.9). Tiered by decade of life participants were: 8% 23 to 29 years-old (y.o.); 21% 30 to 39 y.o.; 26% 40 to 49 y.o.; 26% 50 to 59 y.o.; and 20% 60 y.o. or older. Dentists' age correlated with their years in practice (r^2=.9462, P<.001).

Country

Of 712 participants, 468 (66%) had dental offices in Mexico, 56 (8%) in Brazil, 46 (6%) in Honduras, 45 (6%) in Colombia, 30 (4%) in Argentina, 19 (3%) in Spain, and 16 (2%) in Chile. The remaining 32 dentists (5%) worked in diverse countries, 26 in eleven other Latin American countries, three in the US, two in Europe, and one in Belize.

There was a higher percentage of men among dentists working in Mexico (69%) than among dentists working in other countries (31%).

Clinical Field of Specialization

Of the 712 dentists, clinical specialties were as follows: 321 (45%) general practitioners, 88 (12%) endodontists, 62 (9%) orthodontists, 52 (7%) in children's dentistry, 52 (7%) prosthodontists and implant dentistry, 46 (6%) periodontists, 29 (4%) oral and maxillofacial surgeons, and 62 (9%) worked in "other" specialties (oral pathology, dental forensics, geriatric dentistry, public health dentistry).

Professional Profile

Among participants, 633 (89%) were in private practice, and 510 (72%) owned their dental office. Membership in a dental association was declared by 346 (49%), more men than women were affiliated (P<.01). Among participants, 249 (35%) were dental faculty. More men than women were in academia (P<.001). Work in public health institutions was declared by 150 (21%) dentists.

Dentists' Experience with COVID-19

Ninety percent of participants knew someone with COVID-19; for 76% it was a patient, and for 61% the case was a family member. There were differences (P<.01) among countries: Mexico 65%, Spain 63%, Colombia 61%, Honduras 59%, Brazil 55%, Argentina 38%, and Chile 33% in the latter case.

Of all participants, 42% had been immunized against SARS-CoV-2; 47% of the men and 39% of the women (P<.05). There were differences (P<.001) in immunization among countries: Chile 100%, Brazil 96%, Spain 77%, Argentina 72%, Colombia 51%, Mexico 32%, and Honduras 20%.

Twenty percent (n=140) of dentists in this sample affirmed that they had suffered from laboratory-confirmed COVID-19, 15% of all men and 22% of all women (P<.05), without significant differences by age or country. Among dentists who suffered from COVID-19, 119 (86%) reported COVID-19 cases in their family (P<.001).

Fifty-one percent of participants had suspected that they had COVID-19 without significant differences by age, sex or country. Among the participants, 31% stated that they were at a higher risk of severe COVID-19 because of an underlying condition, 37% among dentists working in Mexico and 24% among those in other countries (P=.001).

Nearly all participants (98%) had studied COVID-19 on the Internet.

Dentists' perceptions of risk and fear of SARS-CoV-2/COVID-19 are presented in Table 1.

Table 1: Dentists' perceptions of risk and fear of SARS-CoV-2/COVID-19

	TD	D	N	A	TA	P*		
	n (%)					AGE	SEX	CTR
COVID-19 is a real challenge to a dentist's work	42 (6)	23 (3)	43 (6)	198 (28)	393 (55)	.001	.05	.001
I fear taking the infection home	50 (7)	55 (8)	78 (11)	202 (28)	317 (45)	<.01	<.01	<.01
The fear of infection is exaggerated	207 (29)	150 (21)	120 (17)	155 (22)	73 (10)		<.05	<.05
Specific tests would show I suffer from stress	61 (9)	59 (8)	135 (19)	208 (29)	231 (32)	<.05		
Looking after patients will pose a risk to the dentist	48 (7)	29 (4)	54 (8)	163 (23)	411 (58)			<.001
My family worries about my possible occupational exposure	45 (6)	37 (5)	84 (12)	205 (29)	331 (46)			<.001
I work with fear of infection with the virus that causes COVID-19	76 (11)	86 (12)	144 (20)	202 (28)	194 (27)			<.001
My employees fear for their occupational exposure	52 (7)	51 (7)	196 (28)	224 (31)	174 (24)			<.001
COVID-19 reduced my comfort level at the dental office	56 (8)	45 (6)	87 (12)	212 (30)	302 (42)			
Once immunized I'll work without fear of exposure	216 (30)	188 (26)	174 (24)	78 (11)	44 (6)			

* using Chi^2 test;
TD=Total Disagreement, D=Disagreement, N=Neutral, A=Agreement, TA=Total Agreement.
CTR = country of practice.

"COVID-19 is a real challenge to a dentist's work" (TA 55%). Dentists 30 to 39 y.o. tended to disagree, and those 50 to 59 y.o. to TA (P=.001). Women tended to remain neutral, while men tended to express TD (P<.05). In Mexico dentists tended to TA, while those not in Mexico tended to agree (P=.001).

"I fear taking the infection home" (TA 45%). Dentists 23 to 39 y.o. tended to TA (P<.01). Women tended to TA and men to agree (P<.01). Dentists in Mexico tended to TA, while those working in other countries were inclined to agree (P<.01).

"*The fear of infection is exaggerated*" (TA 10%). Women tended to TA while men were inclined to TD (P<.05). In Mexico dentists tended to TD, while in other countries tended to agree (P<.05).
"Specific tests would show I suffer from stress" (TA 32%). Dentists 30 to 39 y.o. tended to TA, (P<.05).

"Looking after patients will pose a risk to the dentist" (TA 58%), with differences in TA by country: Mexico 67%, Honduras 63%, Brazil 45%, Argentina 33%, Colombia 32%, Spain 32%, Chile 13% (P<.001).

Dentists outside of Mexico tended to agree, while dentists in Mexico tended to TA (P=.001) with each of the following statements: *"My family worries about my possible occupational exposure," "I work with fear of infection with the virus that causes COVID-19."*

Dentists' perceptions of infection control knowledge, needs and resources are presented in Table 2.
"I needed updated information on infection control" (TA 47%). Dentists 40 to 49 and those 60 or older tended to TA, while dentists 23 to 29 y.o. tended to TD or remained neutral (P<.01). In Mexico, dentists tended to TA, and in other countries to agree (P<.05).

Table 2: Dentist's perceptions of infection control knowledge, needs and resources

	TD	D	N	A	TA	P*		
	n (%)					AGE	SEX	CTR
I needed updated information on infection control	40 (6)	35 (5)	73 (10)	220 (31)	334 (47)	<.01		<.05
We require additional training to achieve infection control.	39 (5)	50 (7)	93 (13)	236 (33)	278 (39)		<.05	
When COVID-19 appeared, I had a sound background in infection control	39 (5)	95 (13)	193 (27)	222 (31)	146 (21)			<.05
We need to improve dental education on infection control	34 (5)	34 (5)	75 (11)	222 (31)	330 (46)		<.05	< 001
I consulted information on dentistry and COVID-19 from the CDC	37 (5)	40 (6)	83 (12)	209 (29)	336 (47)		<.05	<.05
I consulted information on dentistry and COVID-19 from the ADA	67 (9)	60 (8)	111 (16)	219 (31)	237 (33)			<.001
My dental association published reliable information on COVID-19	46 (6)	51 (7)	178 (25)	214 (30)	203 (29)			<.05
I found practical information on dentistry and COVID-19 on YouTube	116 (16)	89 (13)	220 (31)	171 (24)	98 (14)			<.05
The government disseminated guidance for dentists on COVID-19	272 (38)	117 (16)	130 (18)	119 (17)	59 (8)			<.001

* using Chi^2 test;
TD=Total Disagreement, D=Disagreement, N=Neutral, A=Agreement, TA=Total Agreement.
CTR = country of practice.
CDC = US Centers for Disease Control and Prevention
ADA = American Dental Association

We require additional training to achieve infection control" (TA 39%). Men were inclined to TA or agree, while women tended to remain neutral or disagree (P<.05).

More than their colleagues in other countries, dentists in Mexico tended to TA with *having had a sound background in infection control when COVID-19 appeared (P<.05), needing to improve education on infection control (P<.001), and having consulted from the CDC (P<.05) and the ADA (P<.001).*

Dentists' perceptions of their enhanced clinical procedures are presented in Table 3.

Table 3: Dentist's perceptions of their enhanced clinical procedures

	TD	D	N	A	TA	P*		
	n (%)					AGE	SEX	CTR
We thoroughly disinfect surfaces	25 (4)	7 (1)	22 (3)	113 (16)	523 (73)	<.01		
I use aerosol generating procedures less	104 (15)	84 (12)	143 (20)	175 (25)	186 (26)	<.001		
I invested in air purifiers for my dental office	151 (21)	112 (16)	164 (23)	90 (13)	177 (25)	<.05		
With each patient, I use better PPE than before	31 (4)	25 (4)	46 (6)	131 (18)	459 (64)	<.05		<.05
I invariably sterilize dental handpieces between patients	37 (5)	55 (8)	98 (14)	149 (21)	355 (50)		<.05	<.001
We managed to control aerosols from the patient's mouth	77 (11)	93 (13)	157 (22)	187 (26)	182 (26)			<.05
Each patient must use a pre-procedural antiseptic mouthwash	21 (3)	20 (3)	56 (8)	139 (20)	455 (64)			
With each patient, I apply a pre-appointment questionnaire	36 (5)	40 (6)	83 (12)	174 (24)	362 (51)			
I trained every member of my team	32 (5)	19 (3)	93 (13)	196 (28)	352 (49)			

* using Chi² test;
TD=Total Disagreement, D=Disagreement, N=Neutral, A=Agreement, TA=Total Agreement.
CTR = country of practice.
PPE = personal protective equipment

"We thoroughly disinfect surfaces" (TA 73%). Dentists 30 to 39 y.o. tended to TA those 60 y.o. or older tended to agree, while those 23 to 29 y.o. were inclined to TD (P<.01).

"I use aerosol generating procedures less" (TA 26%). Dentists aged 60 or older tended to TA or agree, and those 30 to 39 y.o. to TD (P<.001).

"I invested in air purifiers for my dental office" (TA 25%). Dentists 50 y.o. or older tended to TA or agree, while dentists 23 to 29 disagreed or TD (P<.05).

"With each patient, I use better personal protective equipment than before" (TA 64%). Dentists 23 to 29 y.o. had varied responses from TD to agree, those 30 to 39 and 50 to 59 y.o. tended to TA (P<.05). In Mexico TA was 69%, while dentists in other countries were inclined to agree or remain neutral (P<.05).

"I invariably sterilize dental handpieces between patients" (TA 51%). Men tended to TA or agree, and women to remain neutral or disagree (P<.05). In Mexico TA was 58% compared with 39% among dentists working in other countries (P<.001).

"We managed to control aerosols from the patient's mouth" (TA 26%). Dentists working in Mexico tended to TA or agree, while those outside Mexico tended to disagree (P<.05).

Dentists' perceptions of SARS-CoV-2/COVID-19's impact on their dental practice are presented in Table 4.

Table 4: Dentist's perceptions of SARS-CoV-2/COVID-19 impact on their dental practice

	TD	D	N	A	TA	P*		
	n (%)					AGE	SEX	CTR
I temporarily suspended treating patients	78 (11)	49 (7)	73 (10)	180 (25)	318 (45)	<.05	<.05	<.05
Over the last year I worked without closing my dental office	219 (31)	169 (24)	105 (15)	99 (14)	108 (15)		<.001	
The emergence of COVID-19 altered my practice's routines	35 (5)	16 (2)	67 (9)	171 (24)	404 (57)			
I was forced to invest in infection control	41 (6)	34 (5)	61 (9)	184 (26)	374 (53)			
I worked 'as usual', without modifying my clinical routine	337 (47)	165 (23)	101 (14)	54 (8)	37 (5)			
It will be difficult for me to recover from this pandemic's financial impact	66 (9)	73 (10)	191 (27)	188 (26)	185 (26)			
Some patients asked what I'm doing to protect them	46 (6)	42 (6)	123 (17)	230 (32)	258 (36)			
Some patients expressed their fear of being infected in the dental office	62 (9)	77 (11)	120 (17)	254 (36)	189 (27)			

* using Chi² test;
TD=Total Disagreement, D=Disagreement, N=Neutral, A=Agreement, TA=Total Agreement.
CTR = country of practice.

"I temporarily suspended treating patients" (TA 45%). Dentists aged 30 to 39 years tended to TA, and those 60 or older tended to TD (P<.05). Women tended to TA or agreed, while men remained neutral, disagreed or TD (P<.05). Dentists working in Mexico varied their responses from TA to TD, while those working in other countries tended to agree (P<.05).

"Over the last year I worked without closing my dental office" (TA 15%). Men tended to TA or agree, while women were inclined to remain neutral or disagreed (P<.001).

Dentists' perceptions of immunization against SARS-CoV-2 are presented in Table 5.

Table 5: Dentists' perceptions of immunization against SARS-CoV-2

	TD	D	N	A	TA	P*		
	n (%)					AGE	SEX	CTR
Dentists should have been immunized as a priority group	30 (4)	13 (2)	38 (5)	92 (13)	533 (75)			
I'll seek to be immunized as soon as possible	35 (5)	17 (2)	102 (14)	134 (19)	411 (56)			
The vaccine is safe	47 (7)	44 (6)	197 (27)	219 (31)	196 (28)			
I fear the immunization's possible adverse effects	147 (21)	95 (13)	180 (25)	162 (23)	119 (17)			
I don't mind what vaccine I get	151 (21)	123 (17)	153 (21)	119 (17)	155 (22)		<.01	
The government considered dentists a priority group for immunization	462 (65)	77 (11)	46 (6)	55 (8)	61 (9)		<.05	<.001
I won't get immunized because I'm not in a group at risk	517 (73)	85 (12)	68 (10)	13 (2)	19 (3)	.001		
I can explain the diverse vaccines available to patients	32 (5)	49 (7)	129 (18)	227 (32)	264 (37)	<.05		
I can explain 'herd immunity' to patients	58 (8)	51 (7)	144 (20)	191 (27)	260 (37)	<.05		
Vaccine availability announces the end of this pandemic	206 (29)	183 (26)	203 (29)	70 (10)	40 (6)			
The emergence of variants will perpetuate COVID-19	25 (4)	29 (4)	87 (12)	247 (35)	313 (44)			<.01
The threat of COVID-19 will continue for years	32 (5)	33 (5)	75 (11)	273 (38)	291 (41)			<.01

* using Chi^2 test;
TD=Total Disagreement, D=Disagreement, N=Neutral, A=Agreement, TA=Total Agreement.
CTR = country of practice.

No demographic was associated with dentists' responses to: "*Dentists should have been immunized as a priority group*" (TA 75%), "*I'll seek to be immunized as soon as possible*" (TA 56%), "The vaccine is safe" (TA 28%), and "*I fear the immunization's possible adverse effects*" (TA 17%).

"*I don't mind what vaccine I get*" (TA 22%). Men tended to TA or agree, and women were inclined to TD or remained neutral (P<.01).

"*The government considered dentists a priority group for immunization*" (TA 9%). Men tended to TA or remined neutral, while women disagreed (P<.05). Dentists in Mexico were inclined to TD (P<.001).

Age was associated with participants' responses to: "*I won't get immunized because I'm not in a group at risk*" (TA 3%). Dentists 60 years-old or older TA or agreed (P=.001); "*I can explain the diverse vaccines available to patients*" (TA 37%). Dentists aged 50 y.o. or older tended to TA, while dentists 30 to 49 y.o. tended to remain neutral (P<.05); "*I can explain 'herd immunity' to patients*" (TA 37%). Dentists 30 to 39 y.o. tended to TA, while those 50 y.o. or older tended to disagree or TD (P<.05).

"*Vaccine availability announces the end of this pandemic*" (TA 6%). Different from their colleagues in other countries, dentists in Mexico tended to TA (P<.01) with "*The emergence of variants will perpetuate COVID-19*," and "*The threat of COVID-19 will continue for years.*"

Discussion

The results of this international survey reveal that: among this non-probabilistic sample of dentists the majority had firsthand knowledge of COVID-19 cases, 61% in their own family; Dentists continued to work with fear of occupational exposure to SARS-CoV-2; There's been an uptake of enhanced infection control procedures; and their perceived need for infection control education remains unaddressed.

Twenty percent of the participants stated that they had laboratory confirmed COVID-19. The questionnaire could not establish whether they had worked at their dental offices on those dates when their exposure took place. The survey could not differentiate whether the contagion was occupational, in the community or at home. Among these 140 dentists 86% had COVID-19 cases in their family.

Among 712 dentists, these 140 self-reported laboratory-confirmed cases (20%) appear to be high, but by late-August 2021, there is scarce information on the prevalence of COVID-19 and testing rates among dentists in Spanish-speaking countries. In Argentina, a 4% prevalence was reported among 358 workers at a dental hospital, lower than the prevalence among the population in Buenos Aires [17].

In the UK, before publication of guidance on enhanced infection

control, 16.3% of 1,507 dental care professionals presented antibodies to SARS-CoV-2 spike glycoprotein, compared with 7% in the regional population [18].

In France, in April 2020 the reported prevalence of laboratory-confirmed COVID-19 among 4,172 dentists was 1.9%, and 2% among the French population [12].

As of July 5, 2020, the Brazilian Health Ministry had registered 2,737 dentists with confirmed COVID-19, corresponding to 0.81% of 336,161 dentists registered with Brazil's Dental Accreditation Board (Conselho Federal de Odontologia www.cfo.org.br) [19]. In early January 2021, 11,175 Brazilian dentists (3.32%) had COVID-19, then the prevalence among the general population (212 million) was 3.6% with 7,716,405 cases [20]. The latest epidemiological bulletin reports 5,999 confirmed cases among dentists in 2021 [21].

In June 2020, a study among 2,195 dentists in the US found a prevalence of 0.9% confirmed or probable self-reported cases of COVID-19 [13]. After a six-month follow-up, the same research group reported that of 2,196 US dentists, 57 (2.6%) had confirmed or probable COVID-19 [22]. Among a general population of 331 million, the US had 36,924,023 confirmed cases (11.15%) on August 19, 2021 [23]. A prospective cohort study of 644 licensed Canadian dentists (from July 2020 to February 2021) revealed that the infection rates among dentists was lower than that reported for the general Canadian population [24].

Consistent with previous surveys, some perceptions of risk and needs were associated with demographics [2-7]. Middle-aged participants were more likely to perceive themselves stressed, and they tended to state that they needed updated information on infection control. Older participants perceived SARS-CoV-2 as a challenge to their work as dentists.

Men tended to totally disagree that COVID-19 was a challenge to their dental practice and agreed that they required additional training on infection control. Women tended to not be immunized, and to disagree that they routinely sterilized dental handpieces.

Consistent with previous reports, increased stress and reduced comfort at their dental office were common perceptions [2-6]. Among dentists who worked in Mexico, perceptions of risk, fear and educational needs tended to be significantly higher than those of participants working in other countries. Differences in perceptions may be driven by the rates of confirmed cases and deaths in each country. In the Pan-American Health Organization report for August 21, 2021, Mexico continues to head the list, with the numbers of COVID-19 cases and deaths among health care workers on this continent [25].

In this survey, dentists concentrated on surface disinfection, donning better protective equipment, and efforts aimed at controlling aerosols. However, staff training is suboptimal, and by mid-2021 only half of the participants sterilized dental handpieces in between patients, indicating that patient safety is not being fully considered.

Strengths

This international survey captured demographic data and perceptions from dentists working in Spanish-speaking countries and Brazil. All age groups, and all clinical specialties were represented. The majority worked in private practice and owned their dental office. Private practice reflects the profession's predominant service model, where owners are the decision makers. No questionnaire items were likely to be subject to memory bias. No personal information was recorded, providing the confidentiality that may have reduced possible social desirability bias.

Limitations

Participants constitute a small and non-probabilistic sample of dentists who chose to engage in the survey. Participation of dental faculty may represent a selection bias due to the authors' academic affiliations, but faculty responses were not significantly different.

The coronavirus pandemic evoked an increased professional and public interest in infection control in dentistry. These dentists expressed their perceived risk of exposure to SARS-CoV-2 in a scenario where published COVID-19 prevalence and positivity rates among dentists suggest that enhanced infection control procedures may help prevent exposure to SARS-CoV-2 in dental settings.

One year into the pandemic, the participants had ample opportunity to have studied and implemented the enhanced infection control protocols recommended by the CDC, the Spanish Council of Dentists or the Brazilian Ministry of Health [8,10,11]. Indeed, participants had accessed COVID-19 resources online. Yet, nearly half responded that they needed updated information on infection control. It's possible that where infection control education is deficient, dentists are at a disadvantage to understand, integrate, and consistently adhere to the enhanced infection control procedures.

Conclusions

One year into the pandemic, responses from 712 dentists revealed that 61% had a family member with COVID-19, and 20% had suffered COVID-19 themselves.

The results indicate the need for a continued effort to identify and address the profession's concerns and experiences with COVID-19 among (over half a million) dentists working in Spain, nineteen Spanish-speaking countries in Latin America, and Brazil.

Infection control education remains critical to ensure a clinical environment that is safe for dental healthcare providers and their patients.

Acknowledgements

We thank Dentadec (Mexico), Dental Tribune Latin America (New York), and Cristofoli (Brazil) for helping us disseminate the invitation to participate in the survey through their websites. We thank the Honduran "Colegio de Cirujanos Dentistas" for disseminating the invitation.

Liliana Donatelli is an external consultant to Brazilian Company Cristofoli.

We thank Helene Bednarsh BS, RDH, MPH for her critical review, and Ms. Claire Fortier for revising the text.

This survey was financed entirely by the research group. No third party contributed funds or ideas affecting the research design or interpretation of the results. None of the authors has a conflict of interest to declare.

Authors' Contributions Statement

Leonor Sánchez-Pérez, DDS, PhD: Conceptualization and design of the study, data curation, statistical analysis and interpretation, final approval of the version to be submitted.

Liliana J. P Donatelli Bs, MPH: Data acquisition, analysis and interpretation, final approval of the version to be submitted.

Bernardo Perea-Pérez, MD, PhD: Conceptualization, Critical review and final approval of the version to be submitted.

Elena Labajo-González, DDS, PhD: Critical review and editing, final approval of the version to be submitted.

A. Enrique Acosta-Gio, DDS, PhD: Conceptualization and design of the study, supervision, interpretation of data, writing and editing, final approval of the version to be submitted.

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