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Artículo de Investigación

Clinical and psychological behavior of dentists during the COVID-19 pandemic

Comportamiento clínico y psicológico de los dentistas durante la pandemia de COVID-19

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ABSTRACT

Introduction: The practice of the dentistry is inherently associated with multiple professional risks, making biosafety a constant priority. During the COVID-19 pandemic, these risks were significantly heightened for all healthcare providers—particularly dentists due to their close proximity to patients.

Objective: To assess the clinical and psychological effects experienced by dentists while providing care during the pandemic period.

Method: Two surveys were applied to 107 dentists to investigate the clinical and psychological effects.



Results: The bivariate and multivariate statistical analyses revealed that psychological responses were significantly influenced by clinical behaviors. A total of 60.7% of participants reported disruption of daily activities, reflecting a substantial impact that triggered emotional, psychological, and economic crises. Additionally, 46.7% identified the risk of contagion as their primary concern—a threat especially critical for dental professionals due to their frequent exposure during aerosol-generating procedures.

Conclusions: Dentists who practiced during the COVID-19 pandemic experienced significant adverse effects on both personal and occupational well-being. Key concerns included the risk of infection, improper use of personal protective equipment (PPE) and uncertainty regarding the pandemic's duration.

RESUMEN

Introducción: La práctica de la profesión odontológica se encuentra asociada directamente a una serie de riesgos, por lo que la bioseguridad es una preocupación constante. Durante la pandemia de COVID-19, los riesgos a los que estuvieron expuestos los involucrados en la atención a la salud, en especial los odontólogos, fueron acentuados.

Objetivo: Determinar las afectaciones psicológicas que sufrieron los odontólogos en la atención brindada durante la cuarentena.

Método: Se aplicaron dos encuestas a 107 odontólogos para indagar sobre las afectaciones clínicas y psicológicas.

Resultados: La mayoría de los encuestados fue afectado en el comportamiento psicológico durante la cuarentena por COVID-19. Se evidenció mediante análisis estadísticos bifactoriales y multivariantes que el comportamiento psicológico dependía del comportamiento clínico. El 60,7% de encuestados tuvieron afectación en su actividad, lo que indica que la repercusión a este nivel fue muy considerable, generando crisis emocionales psicológicas y económicas. El 46,7% de encuestados manifestó que lo que más les preocupó fue el riesgo de contagio, que, si bien todas las personas estuvieron expuestas, en el caso de los profesionales odontólogos fue mucho más crítico, por la cercanía al tratar a los pacientes.

Conclusiones: Se concluyó que los odontólogos que trabajaron durante el período de cuarentena por la COVID-19 sí presentaron repercusiones en su bienestar personal y laboral. La principal preocupación fue el riesgo de contagio, el mal uso de los dispositivos de seguridad y la incertidumbre al desconocer cuándo terminaría la pandemia COVID-19.

INTRODUCTION

In December 2019, a severe pneumonia outbreak started in Wuhan, Hubei province, China. Initial epidemiological studies showed that it was spreading rapidly and behaving most aggressively in adults between the ages of 30 and 79 years, with an overall case fatality rate of 2.3%. The disease, known as COVID-19, spread to other Asian countries and continents. On March 11, 2020, the World Health Organization (WHO) declared the occurrence of the COVID-19 pandemic, urging all countries to take health control measures.⁽¹⁾

Coronavirus can cause illnesses ranging from the common cold to more serious conditions.⁽²⁾ Therefore, it is highly contagious and is rapidly transmitted from person to person through respiratory secretions, close contact and respiratory droplets of more than five microns that can be transmitted up to two meters away.⁽³⁾

Due to their exposure to these fluids, dentists were among the professions most at risk for COVID-19 infection. Therefore, it was necessary to establish a clinical protocol to be applied in the work environment to avoid new infections and the progressive spread of the virus. In daily clinical practice, the oral fluids of the patient, the contamination of the material and the surfaces of the dental unit can act as sources of contagion for the dentist and their assistant, as well as the patient themselves. Saliva and blood droplets deposited on surfaces or inhalation of aerosols generated by rotary instruments and ultrasound headpieces constitute a risk of contagion.⁽⁴⁾

Concern about coronavirus transmission in dental practice was widely recognized worldwide, leading to the restriction of oral health services to essential and urgent care only.^(5,6)

Due to this problem, dental professionals took extreme biosecurity measures against the transmission of COVID-19. In this regard, various international and national organizations called for a voluntary suspension of elective activities in dental practice, reserving only those activities related to emergencies.⁽⁷⁾

Despite the available guidelines for patient management in dentistry, the severity of the COVID-19 pandemic presented clear challenges for dentistry worldwide.⁽⁸⁾ Therefore, knowing the protocols for protection against COVID-19 was extremely important. According to the WHO, biosafety was the standard considered fundamental in the face of these biological risks, which implied hand hygiene with adequate technique, use of personal protective equipment (PPE) such as masks, gloves, protective eyewear or face shields, and caps, sterilization and disinfection of medical equipment, cleaning and disinfection of the environment.⁽⁹⁾

In addition, another significant consequence of COVID-19 was that health personnel reported being extremely worried about contracting the infection

during their clinical activity, which triggered psychiatric and neurological manifestations, including anxiety, depression, sleep disorders, headaches, dizziness, impaired sense of smell or taste, myalgia and delirium.⁽¹⁰⁾ This shows that the emergence of COVID-19 had a very negative impact on the professional activity of the dentists.⁽¹¹⁾

During the fight against the COVID-19 infection, healthcare personnel experienced various psychological responses that affected the quality of care and their clinical understanding and decision-making skills. This had a significant impact on their well-being and quality of life. Therefore, it was important to protect dentists' mental health for the proper control of the epidemic and to ensure their overall well-being.⁽¹²⁾

Thus, the objective of this research was to evaluate the clinical and psychological behavior of dentists in the province of Tungurahua and analyze their reactions to the professional restrictive measures during the COVID-19 pandemic.

METHODS

The type of research conducted corresponds to a quantitative, descriptive, and correlational cross-sectional study. The sample consisted of 107 professionals from the Tungurahua Dental Association. It was calculated using the Epi Info version 7 statistical calculator, with a margin of error of 5% and a confidence level of 95%.

The inclusion criteria applied were that the dentists should be actively registered with the Tungurahua College of Dentists, that they should have practiced their profession during the quarantine period due to the COVID-19 pandemic; that they should agree to participate voluntarily in the study, and give their informed consent.

For the procedure, a digital survey was applied to assess the clinical and psychological behavior of dentists during the pandemic period, which was elaborated on based on two studies. The clinical part was taken from Salgarello,⁽⁶⁾ and the psychological part was based on Bellini.⁽¹¹⁾ The survey questions were based on demographic variables directly related to work experience, dental specialty and professional practice during pandemic.

Once the information was collected, a statistical analysis was conducted using SPSS Statistics (version 29) with the CHAID (Chi-square automatic interaction detector) decision tree algorithm.

RESULTS

According to the results obtained, it was verified that the majority of the respondents were men with an age range of 31-50 who were, for the most part, general dentists or owners of private dental offices who worked during the COVID-19 pandemic in the city of Ambato. They dedicated an average weekly time of 30-40 hours and did not work in more than one office during the pandemic.

On the other hand, it was observed that dentists' protective measures were, in most cases, based on reducing the number of patients in the waiting room, the use of disinfectants, and KN94 or KN95 masks, or their combinations. (Table 1)

Table 1. Protocols and security measures implemented for COVID-19 prevention

Dentist's protective measures		N (%)
Measures used to prevent COVID-19 infection	Disinfectants and masks	26 (24.3)
	Protective equipment	13 (12.1)
	Reduction in patients in waiting room	33 (30.8)
	Medical history screening (exclude COVID-19 symptoms)	2 (1.9)
	Screening anamnesis (identify suspected cases)	1 (0.9)
	Body temperature measurement	13 (12.1)
	Cleanliness of the work area	10 (9.3)
	Ventilation in the environment	9 (8.4)
Personal protection devices used against COVID-19 infection	Surgical mask KN94 or KN95	68 (63.6)
	Disposable gown	2 (1.9)
	Fluid-resistant disposable gown	36 (33.6)
	Protective goggles	1 (0.9)
Type of mask used in COVID-19	Surgical mask KN94 plus surgical mask	18 (16.8)
	Surgical mask KN95 plus surgical mask	68 (63.6)
	KN94 mask only	4 (3.7)
	KN95 mask only	16 (15)
	Surgical mask only	1 (0.9)

Before the COVID-19 pandemic, the number of patients seen per day ranged from 11 to 20; during the pandemic, this number was significantly reduced to between 3 and 5 patients. (Table 2)

Regarding emergency dental care, 91.6% of respondents reported seeing less than 50% of patients with urgent dental problems before the pandemic, while during it, 58.9% saw a similar percentage of patients.

In addition, 55.1% of respondents indicated that they saw at least 50% of patients by prescription. Likewise, dental caries was the most common type of emergency during the COVID-19 pandemic, reported by 53.3% of respondents.

Table 2. Clinical behavior of dentists during COVID-19 pandemic

Clinical behavior of dentists		n (%)
Number of patients/days before the COVID-19 pandemic	Less than 5	3 (2.8)
	6-10	34 (31.8)
	11-20	67 (62.8)
	20 or more	3 (2.8)
Number of patients/days during the COVID-19 pandemic	1-2	13 (12.1)
	3-5	71 (66.4)
	6-10	22 (20.6)
	11 or more	1 (0.9)
Patients with urgent dental problems before the COVID-19 pandemic	None	1 (0.9)
	Less than 50%	98 (91.6)
	At least 50% of patients	7 (6.5)
	All patients	1 (0.9)
Patients with urgent dental problems during the COVID-19 pandemic	None	3 (2.8)
	Less than 50%	63 (58.9)
	At least 50%	27 (25.2)
	All patients	14 (13.1)
Pharmacologic prescribing only	None	1 (0.9)
	Less than 50%	46 (43)
	At least 50%	59 (55.1)
	All patients	1 (0.9)
Types of emergencies during the COVID-19 pandemic	Dental caries	57 (53.3)
	Pulpitis	20 (18.7)
	Dental trauma	8 (7.5)
	Prosthesis adjustment	1 (0.9)
	Pericoronaritis	16 (15)
	Infection	5 (4.7)



Similarly, 60.7% of those surveyed were affected in their professional activity by the COVID-19 pandemic, which indicates that the repercussions at this level were considerable, generating emotional, psychological, and economic crises. (Table 3)

In addition, 46.7% of respondents stated that what worried them most during the COVID-19 pandemic was the risk of contagion, which, although all people were exposed, was particularly critical for dental professionals due to the proximity involved in treating patients. This condition naturally affected their psychological behavior.

For 55.1% of respondents, the frequency of their worries lasted approximately 2 days, but for a considerable 15.9%, these worries lasted more than half the time.

Table 3. Psychological behavior of dentists during COVID-19 pandemic

Psychological behavior of dentist		n (%)
Impact of COVID-19 on occupational activity	No, not at all	1 (0.9)
	A little bit	29 (27.1)
	Enough	65 (60.7)
	Too much	12 (11.2)
Concerns during COVID-19 pandemic	Financial	3 (2.8)
	Risk of infection with covid-19	50 (46.7)
	Poor use of personal protective devices	29 (27.1)
	Uncertainty	21 (19.6)
	Fear of patients	4 (3.7)
Frequency of concerns during COVID-19 pandemic	No, not at all	20 (18.7)
	Maximum 2 days	59 (55.1)
	More than half the time	17 (15.9)
	Almost every day	11 (10.3)
What worried you most during COVID-19 pandemic?	Not knowing when it would end	31 (29)
	Need for new procedures and devices	51 (47.7)
	Office closures	18 (16.8)
	Possibility of losing a job or laying off employees	7 (6.5)

In addition, a statistical correlation was made between clinical and psychological behavior (table 4). Thus, it was possible to verify that, according to the variable

“frequency of psychological distress,” dentists who attended a greater number of patients in the office during the pandemic were more psychologically affected than those who attended fewer patients ($p=0.001^{**}$). Furthermore, dentists who saw more emergencies during the COVID-19 pandemic were more psychologically affected ($p=0.01^{**}$). It was also observed that dentists who did not use PPE during the COVID-19 pandemic were more psychologically distressed ($p=0.04^*$).

On the other hand, in the variable “Impact on professional activity,” greater psychological impact was found in dentists who attended more patients during the pandemic, managed more dental emergencies, and treated patients with poor oral hygiene ($p=0,05^*$). Therefore, one of the most significant concerns was the risk of infection by COVID-19.

Likewise, in the psychological behavior variable “Concerns during the COVID-19 pandemic”, significant associations were observed, particularly among public sector dentists who lacked adequate materials, equipment and clinical chairs ($p=0.02^*$). In turn, higher numbers of dental emergencies compared to the pre-pandemic period, and uncertainty regarding proper mask use were also associated with increased concerns ($p=0.04^*$).

Finally, in the variable “What worried you most during the COVID-19 pandemic?” it was observed that weekly work hours were a key concern: dentists who worked more hours per week reported greater worry compared to those who worked fewer hours ($p=0,03^*$).

Table 4. Correlations between psychological and clinical behavior of dentists during COVID-19 pandemic

Psychological variables	Clinical variables	Chi-Square	Degrees of freedom	Significance (2-tailed) p-value
Frequency of psychological affectation	Nº of patients/day before COVID-19	17.275	9	0.04*
	No. of patients/day during COVID-19	29.088	9	0.001**
	Types of emergencies during COVID-19	21.807	9	0.01**
	Protective devices	17.023	9	0.04*
	Type of concern during COVID-19	19.258	9	0.02*
Psychological impact on professional activity	Nº of patients/day during COVID-19	16.919	9	0.05*
	Patients with urgent dental problems before COVID-19	108.325	9	0.000**
	Patients with urgent dental problems during COVID-19	42,012	9	0,000**
	Clinical level of patient hygiene	27.755	6	0.000**
	Type of concern during COVID-19	52.270	12	0.000**
Concerns during COVID-19 quarantine	Type of use during COVID-19 pandemic	20.306	8	0.009**
	No. of clinical chairs	11.308	4	0.02*
	Patients with urgent dental problems before COVID-19	42.363	12	0.000**
	Type of mask	27.092	16	0.04*
What worried you most during quarantine COVID-19?	Average weekly working hours during COVID-19 pandemic	14.709	9	0.03*

* Statistically significant dependence at the 95% confidence level.
 ** Statistically significant dependence at the 99% confidence level.

CHAID segmentation analysis

The CHAID (Chi-square Automatic Interaction Detector) decision tree segmentation technique was used to create a classification model based on flowcharts. Cases were classified, and the values of the dependent variable (criterion) from the "Psychological Behavior" domain were predicted using independent variables (predictors) from the "Clinical behavior" domain.

As shown in figure, the response categories for the dependent variable "Effect of COVID-19 on Professional Activity" were as follows: not affected at all (1); affected a little (2); affected quite a bit (3); and affected very much (4). The strongest predictor selected from the pool of clinical variables was "average weekly working hours during the COVID-19 pandemic" based on level of psychological distress.

The predictor "average weekly working hours during the COVID-19 pandemic" was statistically significant across several categories: "30-40 hours," "20-30 hours," and "more than 40 hours." Within this subgroup, the majority (80.3%) reported being affected quite a bit, while 15.8% reported being affected very much.

Additionally, the same predictor was significant for the "less than 20 hours," category. This group stood out, with 83.9% reporting minimal psychological distress.

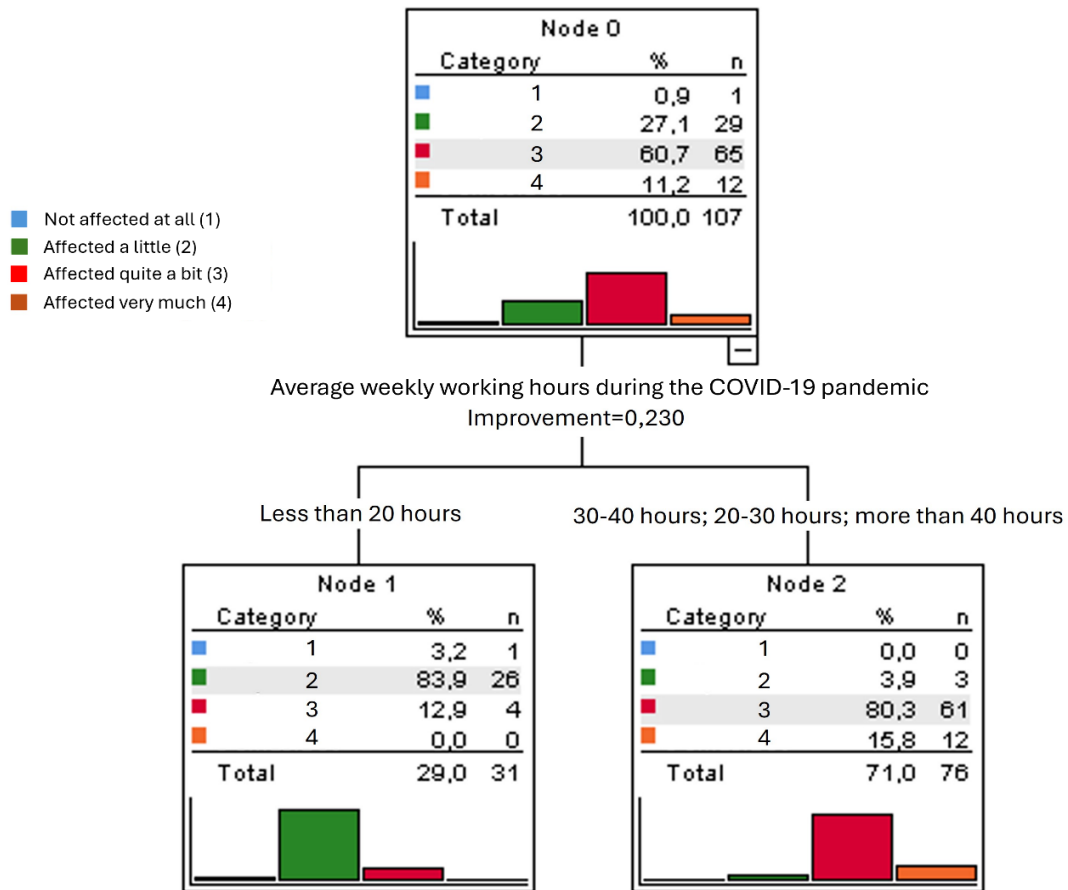


Fig. CHAID segmentation analysis between psychological and clinical behavior of dentists during COVID-19 pandemic.

DISCUSSION

The pandemic caused by COVID-19 was considered a significant problem because it directly affected the clinical behavior and mental health of the general population, particularly dentists while delivering care. Today, most dentists recall that period with considerable concern due its far reaching consequences. Therefore, the objective of this research was to analyze the clinical and psychological behavior of professionals affiliated with the College of Dentists of Tungurahua during the COVID-19 pandemic.

Dávila-Torres et al.⁽¹³⁾ note that dental procedures performed with high—or low-speed rotary instruments create bioaerosols that may contain fungi, bacteria and viruses. These bioaerosols can persist in the environment in quantities sufficient to possess a potential infection risk. Dentists are healthcare providers at high risk of contagion, which increases the likelihood of experiencing mental and emotional stress related to potential disease acquisition.

Accordingly, it was observed that during clinical care, dentist implemented various safety protocols, including: use of disinfectants and masks (24.3%), reduction of patients in the waiting room (30.8%), body temperature screening 12.1%, cleaning of the work area 9.3%, and environmental ventilation (8.4%). Similar measures have been reported in other studies to safeguard the health of all individuals in dental settings, always in conjunction with proper disposal protocols.⁽¹⁴⁾ Ali and Raja⁽¹⁵⁾ further emphasize that protective measures not only reduce infection risk but also provide emotional reassurance for both patients and dentists. However, prolonged use of personal protective equipment (PPE) can hinder dental practice due to breathing difficulties, sensations of suffocation, heat stress, and the inability to use visual aids such as loupes or surgical microscopes. Discomfort and increased fatigue may impair professional performance, as recently demonstrated in other studies.⁽⁶⁾

Moreover, 55.1% of the dentists opted to prescribe pharmacological treatment to patients prior to in-person consultation. Over 50% of respondents managed dental emergencies via telephone, providing provisional pharmacological recommendations. Similarly, Martínez-Camus and Yévenes-Huaiquinao⁽¹⁶⁾ found that only 20% of dentists preferred a face-to-face consultations during the pandemic.

Indeed, multiple factors contributed to dentist's concerns, including contagion risk and uncertainty about new clinical protocols. Notably, financial losses during the pandemic had severe global repercussions for dental practices, particularly in countries heavily affected by COVID-19 infection.⁽¹¹⁾

Of particular importance is the CHAID segmentation analysis, which revealed that longer working hours were associated with higher levels of stress, fear and psychological distress among surveyed dentists. This finding is critical, as mental health conditions can negatively impact professional performance.⁽¹³⁾

Preti et al.⁽¹⁷⁾ also confirmed that healthcare workers, especially front-line personnel involved directly or indirectly in caring for COVID-19 patients, experienced elevated levels of stress, depression and anxiety due to overwhelming work demands and pressures that challenged their coping capacities. Consequently, anxiety can reduce staff morale, increase absenteeism, and diminish job satisfaction and quality of care, sometimes leading to burnout syndrome.^(18,19)

Thus, it is essential to recognize that good mental health enables individuals to engage in healthy behavior and maintain their own safety and well-being, as well as that of others.⁽²⁰⁾

CONCLUSIONS

In conclusion, although this study is grounded in observations from the COVID-19 pandemic, its findings can help strengthen infection control measures in dental practice and inform evidence-based strategies to support the mental health of healthcare professionals.

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Conflict of interest

The authors declare no conflict of interest.

Authors' contributions

Gabriela Vaca-Altamirano: study conception, design, analysis and interpretation of results and manuscript drafting.

Emily Rodriguez: data collection and manuscript drafting.

Carmen Salinas-Goodier: analysis and interpretation of results and manuscript drafting.

Irvin Tubon: study conception, design, analysis and interpretation of results and manuscript drafting.