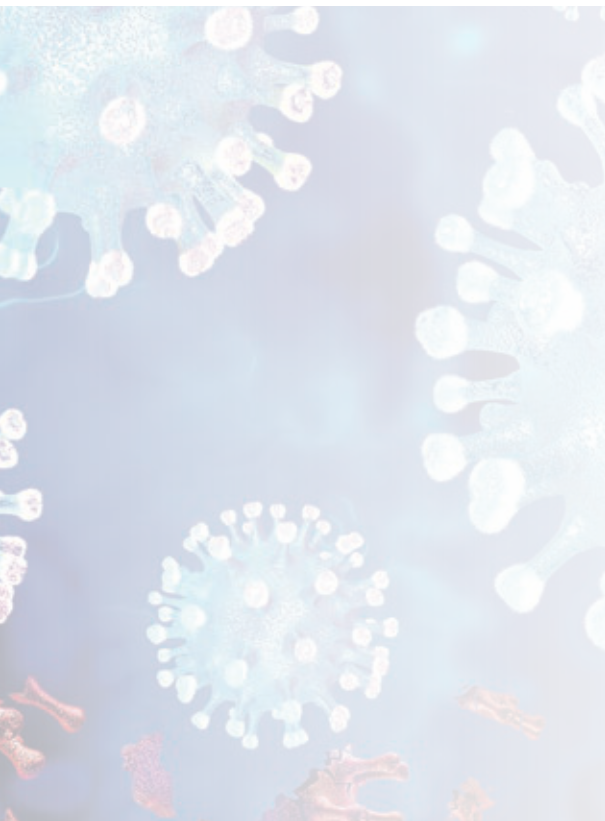


# IMPACT ON TEXAS DENTISTS DURING THE COVID-19 PANDEMIC, 2020-21

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## ABSTRACT

**BACKGROUND.** The novel coronavirus (COVID-19) has significantly affected dentists in clinical settings around the world.

**METHODS.** This was a cross-sectional study of Texas dentists who were actively practicing during the pandemic. The study included 2,143 dentists who were emailed and asked to participate in a web-based survey. The survey was conducted from May 15, 2021, to June 30, 2021. The form was a 43-item questionnaire that was used to record responses to questions related to dentists' opinions, knowledge and challenges. Approximately one-third of the respondents (n=375) completed and returned the survey. Statistical analysis using SPSS and Microsoft Excel was performed to evaluate the data.

**RESULTS.** The results showed that most of the respondents were in solo practice and were general dentists. The average years in practice was 30 years, and 77% were in urban areas. The greatest challenges during the pandemic seemed to be related to personnel and staffing concerns. Emotionally, 51% of dentists experienced worry, followed by anxiety, and depression. Additionally, 19% suffered personal loss. There was a significant financial impact to staff due to loss of income, childcare, and health insurance benefits. The dentists tried to curb the transmission of the virus in various ways such as providing regular care, telehealth, screening, and testing incorporated as a part of patients' treatment plans. Respondents felt that vaccinations greatly improved the dental practice environment for patients and staff. Knowledge played an important role in understanding the nature of the disease. Dentists obtained information on COVID-19 primarily from state or national agencies, professional dental societies, or the media to better understand and prepare. Some dentists closed their clinics for the first 3 months, and others modified their services only providing emergency care.

**CONCLUSION.** Based on study results, it was apparent that dentists were active in responding to viral spread and were vigilant about adhering to infection control protocols and management of patient appointments in their respective practices. It was challenging to cope emotionally during the initial days of the pandemic as they handled the stress of the pandemic as well as management of their practices, particularly financially. Gradually, by knowledge through different sources and their own daily experiences in patient care paired with the recovery efforts within the state, dentists were able to plan appropriately and handle the challenges. This information is helpful going forward to better define the role of dentists as essential workers recognizing the training and expertise that dentists would bring should a response of the magnitude seen with the COVID-19 pandemic is needed in the future.

## KEYWORDS

coronavirus, COVID-19, dentistry, dental practice, survey, Texas

## INTRODUCTION

The COVID-19 pandemic reached Texas in March 2020. Texas public health officials reported as of March 2021 a total of 6.6 million cases, with 5.4 million confirmed cases and 1.1 million probable cases. A total of 84,513 deaths have been reported and more than 60.9 million COVID-19 tests have been completed.<sup>1</sup> Texas has been prominent in its national standing with high levels of COVID-19 infection rates.<sup>14</sup> Dental professionals have faced a variety of challenges during the current pandemic such as fear of contracting the virus, increased financial hardship, new guidelines for infection control, less revenue, and shortage of PPE.<sup>2</sup> The coronavirus pandemic impacted almost 198,000 active dentists and dental specialists in the USA.<sup>3-5</sup> The pandemic resulted in demand for higher levels of precautions and equipment to avoid infection. The US dental practice setting was feared to put practices at higher risk for transmission of the coronavirus due to proximity of the patient and provider, its ambulatory setting, closed spaces, staff and patients, and creation of aerosols during dental procedures.<sup>15</sup>

The Centers for Disease Control (CDC) recommended more stringent infection control and prevention practices during the COVID-19 pandemic in addition to universal precautions already in place for dental healthcare delivery.<sup>6-8,13</sup> Dentists have historically been diligent in following cross-infection control protocols and have been regulated to ensure the safety of patients and staff while practicing. The coronavirus resulted in national panic, an initial lock down across the country, and a declaration that dentists were not essential health care providers because they were not included in a list of those recognized as essential. Dentists were required to quarantine the same as other non-healthcare sectors of the population. In addition, there was increased demand for personal protective equipment (PPE) and other special equipment/garments that were not easily accessible to dental practitioners. During the emerging COVID-19 pandemic, assessment of risk presented a great deal of challenge especially for dentists as there was little evidence available.<sup>9-11</sup> COVID-19 has significantly affected dentists around the world in clinical and research settings. The purpose of this study was to gain insight into the effects of the pandemic on and experiences of dentists specifically related to their knowledge, opinions, and challenges. This study shows how dental practitioners were impacted by the pandemic personally and professionally as well as by potential lingering effects, that going forward may impede success in practice, patient care, and oral health outcomes.

## METHODS

This was a cross-sectional study of dentists practicing across Texas. The study included 1) dentists aged 25 years or older, 2) who were actively practicing dentistry in Texas, and 3) who have been in practice since 2018, or had retired because of the pandemic. The study received a total of 202 completed responses from the 2,143 dentists surveyed.



THIS STUDY SHOWS  
HOW DENTAL  
PRACTITIONERS WERE  
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PANDEMIC **PERSONALLY**  
**AND PROFESSIONALLY**  
AS WELL AS BY  
POTENTIAL LINGERING  
EFFECTS, THAT GOING  
FORWARD MAY IMPEDE  
SUCCESS IN PRACTICE,  
PATIENT CARE,  
AND ORAL HEALTH  
OUTCOMES.

# QUESTIONNAIRE

A 43-question survey was sent by email to active dental practitioners in Texas. The questionnaire took approximately 15 minutes to complete. It included multiple choice questions and open-ended questions that were divided into the following sections: background, opinions, knowledge, and challenges. The questions were in English only with check boxes provided for multiple choice questions and drop-down boxes for further clarification as needed. The surveys were emailed with an introductory letter from the principal investigator. Dentists interested in participating were first directed to the consent page to agree or decline participation. If they declined, the survey would close. The dentists received an automated participation reminder via email 1 week after the survey launch. If a response was not received after 1 week of the survey launch, the second and final reminders were sent at the end of the second week of the survey. Participants had the opportunity to decline participation at any stage by closing the survey. Participant information was kept confidential and secured on computers and drives that were password protected, encrypted, and/or kept in locked offices of the investigators. To assist with validation of the survey, we solicited participation of 5 dentists who agreed to review the survey on the first week of February 2021 and provide their feedback on each of the questions.

## Sample Size Calculation

At the time of the survey, there were 14,283 dentists actively practicing dentistry in Texas. Using a confidence interval of (CI): 95% with  $\alpha = 5\%$ , we needed  $N = 375$  responses to prove significance. The study included 2,143 or 15% of the available addresses to collect responses. About 10% of surveys were anticipated to be incomplete, which is approximately a 25% response rate. This study recruited around 10-15% of participants over the target number needed. Demographic data as well as information on opinions, knowledge, and challenges were collected.

The responses obtained from the survey were coded within Microsoft Excel and labeled. All statistical analyses were conducted in SPSS software from October 2021 to December 2021. The open-ended questions in the survey were categorized into themes in each question, and percentages were calculated for those themes.

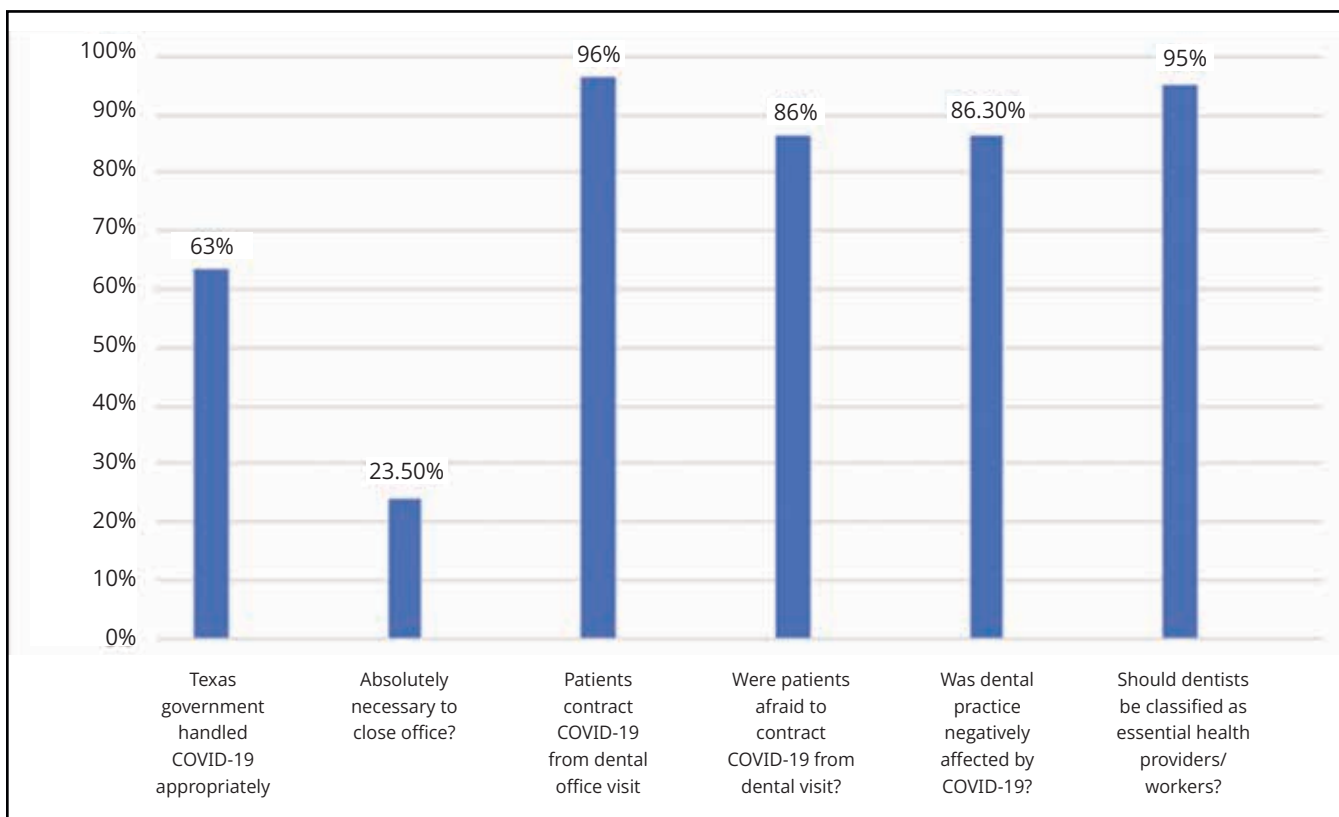
## RESULTS

The results showed that most of the respondents, 76.1%, were in solo practice, and 28.7% were general dentists. The average years in practice was 30 years, and 77% were in urban areas (Table 1). The respondents (63%) mentioned that the Texas state government handled the pandemic response appropriately. According to 86% of the respondents, patients were afraid of contracting COVID-19 in the dental office and felt that their dental practices were adversely impacted

**TABLE 1:** DEMOGRAPHIC DATA FOR PRACTICING TEXAS DENTISTS

Solo Practice		76.1%
Scope of Practice: General Dentistry		28.7%
Multiple sites: No		90.0%
Years in Practice: Average		30
Practice location: Urban		77%
Practice Employment: Average FTE		
	Dentists	2.3 FTE
	Hygienists	2.6 FTE
	Assistants	4.7 FTE
	Administrative Staff	3.5 FTE

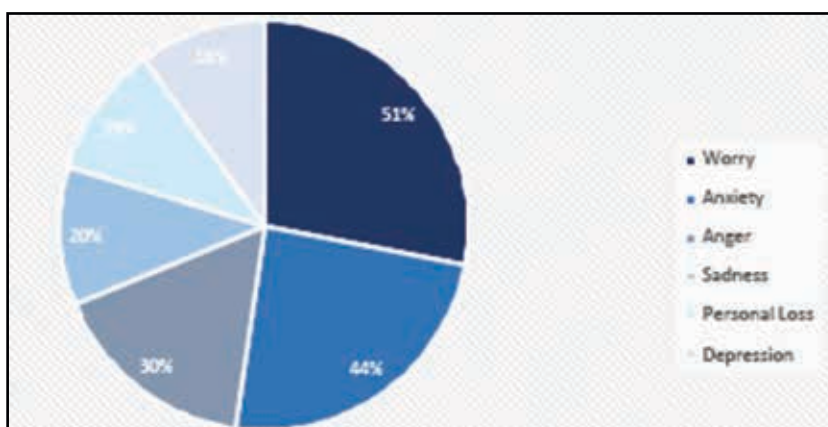




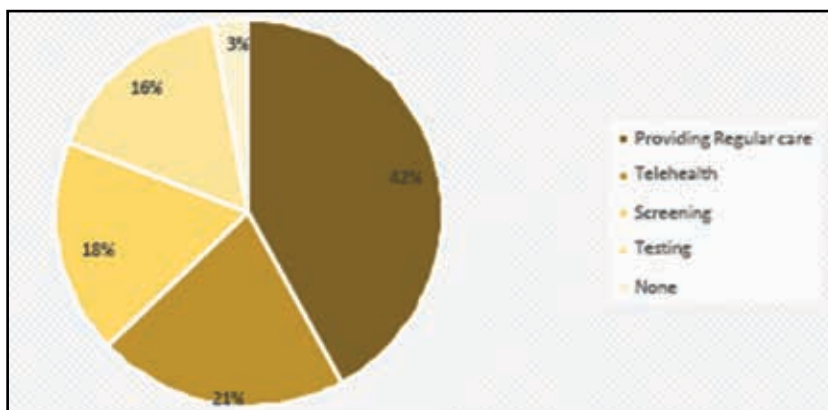
**FIGURE 1.** *Opinions on the pandemic and dental practice.*

by the pandemic (Figure 1). Ninety-five percent also felt that they should be classified as essential health care workers (Figure 1). Throughout the pandemic, there were many misconceptions about the virus and information dissemination was often unclear. The greatest challenges experienced by dentists seemed to be related to personnel and staffing concerns. Emotionally, 51% of the dentists experienced worry, 44% anxiety, and 18% depression.

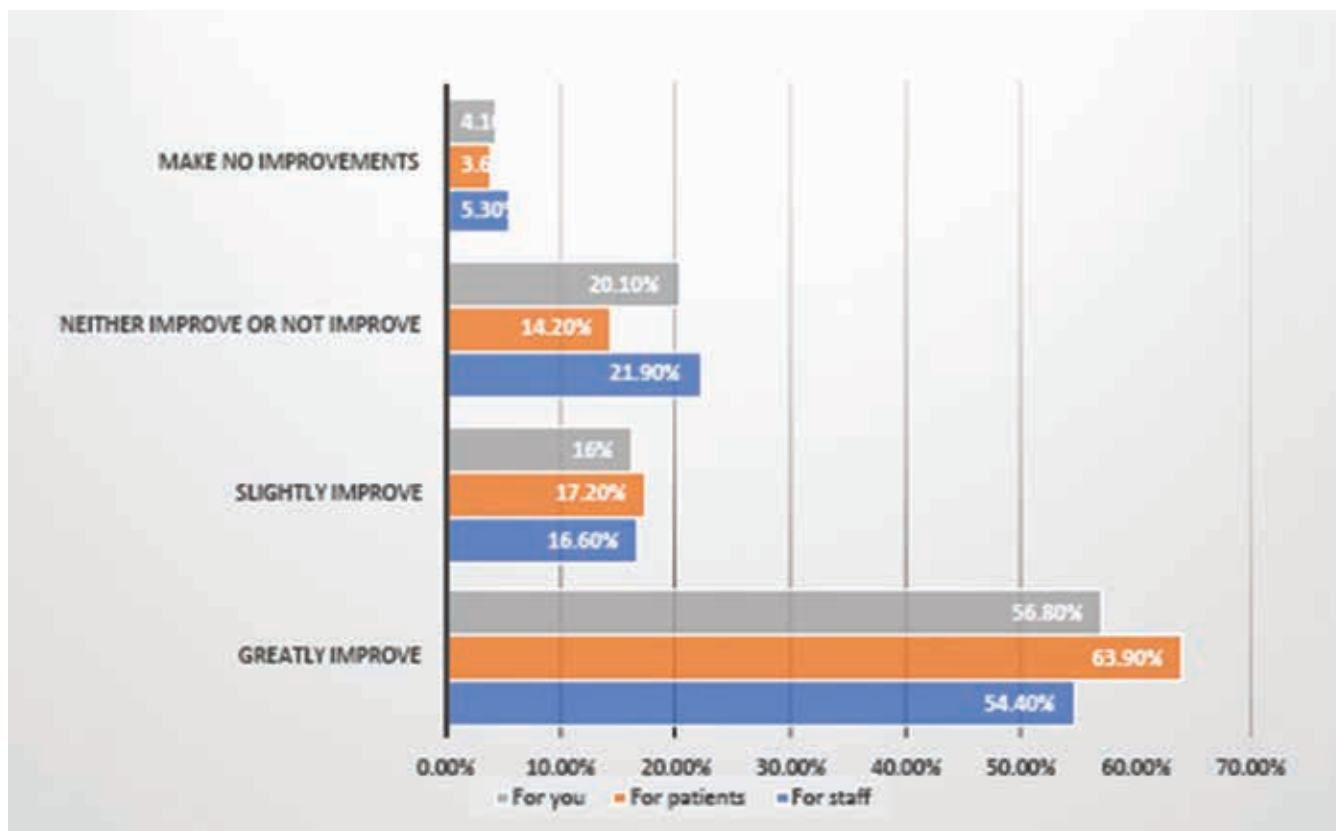
Additionally, 19% reported personnel loss. There was a significant impact on staff due to lost income, loss of childcare, and contracting the COVID-19 virus. (Figure 2). 42% planned on providing regular care followed by telehealth, others provided screening and testing as a part of the care plan (Figure 3). The availability of vaccines played a major role in helping to decrease the spread of the virus. Approximately 64% of the respondents felt that the vaccines greatly improved their ability to return to their dental practices. 3.6%



**FIGURE 2.** *Effects of the pandemic on mental health of the dental practitioner.*

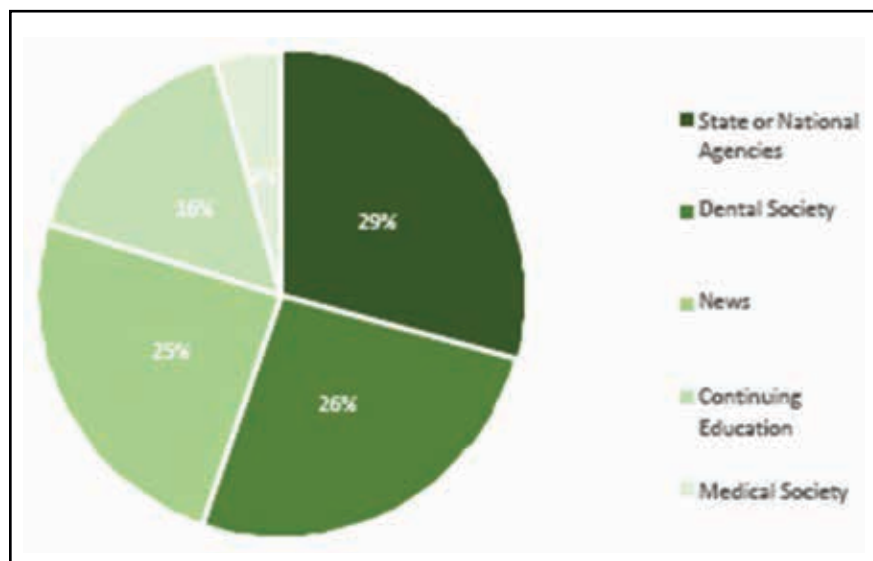


**FIGURE 3.** *Opinions on roles of the dental practitioner during the pandemic.*

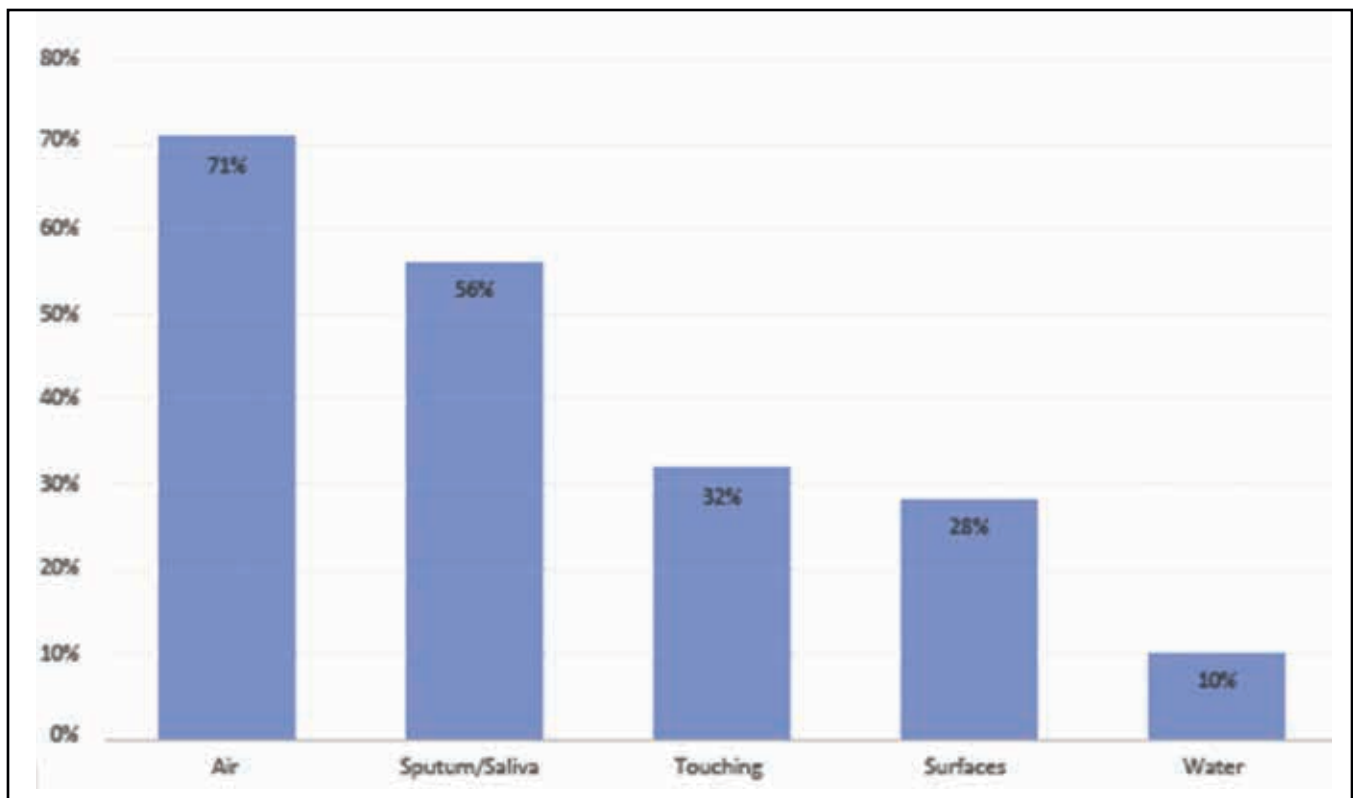


**FIGURE 4.** *Impact of the vaccine on dental practice and the dental team.*

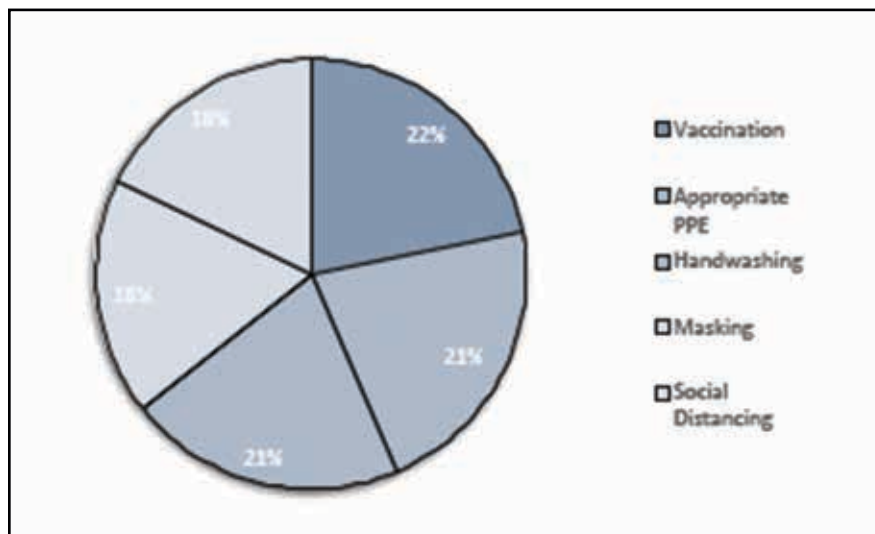
believed that vaccines did not help in returning to practice. (Figure 4). The most important challenge for dentists was to keep updated and learn more about COVID-19 and its transmission. Information about the virus and pandemic was obtained from state and national agencies, dental/medical societies, news outlets, and continuing education courses (Figure 5). When asked about their knowledge on the transmission of the virus, 71% of the respondents mentioned air as the primary route of transmission while others identified sputum, touching surfaces, and water (Figure 6). The most effective methods thought to decrease spread of the virus were vaccinations, appropriate PPE, handwashing, wearing masks, and social distancing (Figure 7). The respondents (92%) closed their clinics for the first 3 months in response to the pandemic while other clinics



**FIGURE 5.** *Sources of information for knowledge about the COVID-19 virus.*

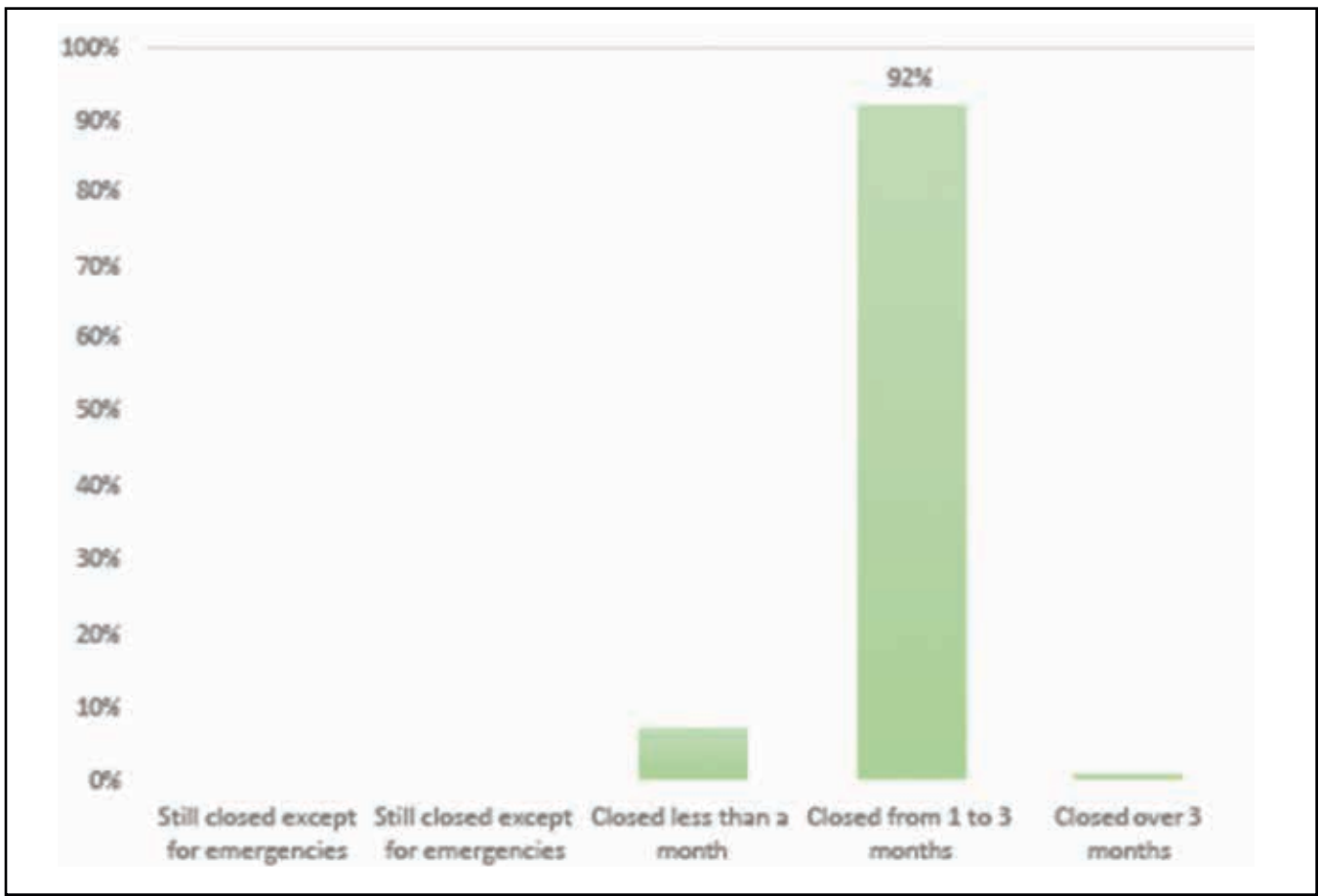


**FIGURE 6.** Respondents' knowledge of the virus and how it is transmitted.

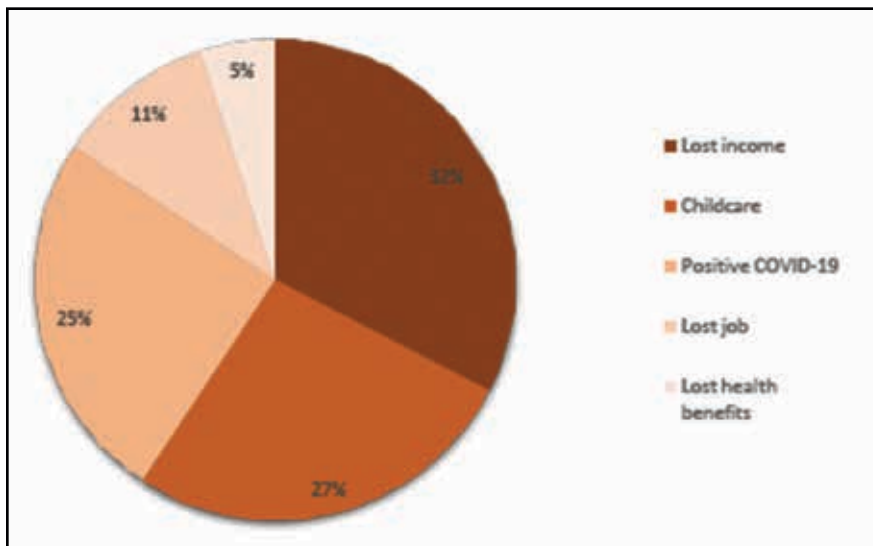


**FIGURE 7.** Respondents' knowledge on prevention and transmission of COVID-19.

provided care only for emergencies (Figure 8). This had an impact on the number of patients treated daily. Considering an average number of patients treated by dentists in a clinic daily, 77.5% of the respondents treated around 30 patients whereas 17% of them did not treat any patients (Figure 10). The pandemic affected employees through loss of income (32%), childcare (27%), employees who contracted COVID-19 (25%), job loss (11%), and loss of health insurance benefits (5%) (Figure 9). During the early part of the pandemic there was a shortage of supplies and a decrease in patient flow affecting both productivity and financial stability.



**FIGURE 8.** Dental practice closure during the pandemic.

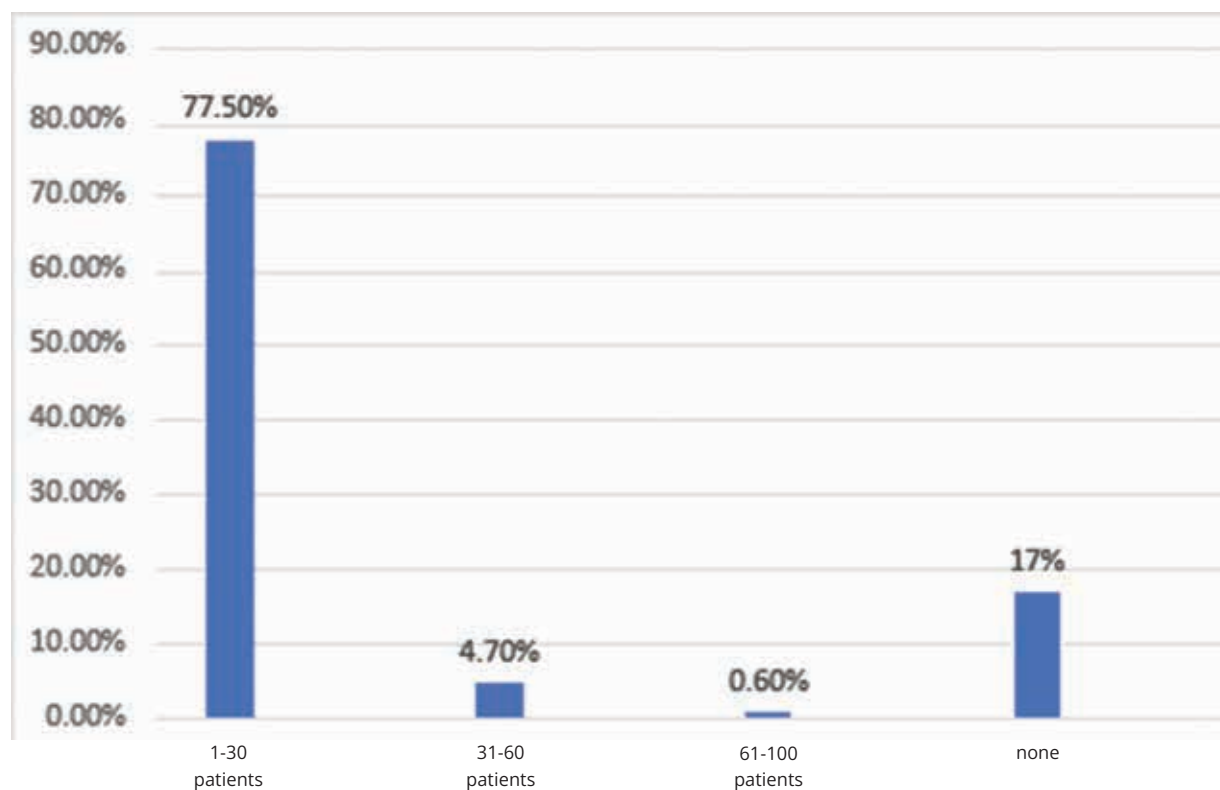


**FIGURE 9.** Impact of the pandemic on employees.

## DISCUSSION

In our study population of dentists, 76.1% were solo practitioners and 28% were general dentists—77% were practiced in urban areas, and the average years in practice was 30. Many of the practitioners believed that the pandemic was handled appropriately by our state government but disagreed that the mandate to close dental offices was necessary (28%). Ninety-two percent of respondents closed their practices during the first months of the pandemic. Closure of dental practices was directly related to the belief that dental providers were not essential workers. Interim guidance from the World Health Organization during the pandemic recommended routine dental care be postponed until COVID numbers decreased in communities





**FIGURE 10.** *Effect of the pandemic on practice volume.*

with significant infection rates.<sup>16</sup> The American Dental Association (ADA) disagreed with the recommendation and responded that oral health care was important to overall health regardless of disease outbreak/pandemic. Our data reflects and supports the information issued by the ADA and showed that 95% of participants of our survey thought dentists should be classified as essential health care workers and 45% continued to provide some degree of dental care to patients.<sup>17</sup>

As knowledge about the novel coronavirus grew and as vaccines were developed, dental providers returned to their practices and patient care. With new information emerging each day as the pandemic raged on, confidence in how to best combat the virus emerged. Equally important was knowledge about the virus and how

to decrease transmission and thus decrease morbidity and mortality. We learned that masking, distancing, and other methods of infection control in offices were key to containing the virus. Responses in this study pointed to the previously mentioned measures as required to help reduce infection along with handwashing (21%), appropriate PPE (21%), and vaccination (22%).

According to a study by Schaffer DeRoo and colleagues, healthcare professionals' support of vaccination as well as shared personal experiences with the COVID-19 vaccination encouraged uptake.<sup>18</sup> The majority of dentists in this study believed that vaccines greatly improved the ability to practice safely for themselves, their patients, and their staff. Recommendations from national and state agencies and professional dental

societies were also pivotal to informing practitioners and were the sources where most dentists gained knowledge about COVID-19.

Despite the knowledge gained and precautions taken, the impact of the pandemic on dental providers and their practices was very apparent. A commentary by Robin Gelburd in a US News report indicated that there was a decline in utilization of dental services during the pandemic, and after the bans were lifted in March 2020, the decline continued until June 2020, when there was a slight decrease compared to the same timepoints in 2019.<sup>19</sup> In a study by Software Pundit focusing on the economic impact of the pandemic on dental practices, there was a 6% decline in revenue corresponding to a decrease in practice revenue of about \$8.3 billion compared to 2019.<sup>20</sup>

The economic effects experienced by dentists were not the only adverse experiences during the COVID crisis. There were also problems associated with mental health and well-being. A recent study of Texas dentists by Bsoul et. al. indicated that the effect of the pandemic on dentists was significant and there was a need for interventions that would support safety and mental health.<sup>21</sup> This study showed that 95% of dentists experienced worry and anxiety while the remainder experienced anger, sadness, personal loss, and depression. A systematic review published in 2021 on the psychological impact of COVID-19 found similar results reporting that fear, anxiety, and stress were the most common mental challenges.<sup>22</sup>

The pandemic significantly and adversely impacted the world and as we continue down the road to recovery after multiple surges, there is still much to learn. Our health care systems in the state were, at times, overwhelmed and the loss of life was devastating for many. Now that infection rates have dwindled, it is important to gain a better understanding of the effects COVID-19 on dental professionals including how their opinions, knowledge gained, and challenges experienced will shape their professional and personal lives into the future.

Additional studies that evaluate the long-term effects of COVID-19 on dentists and the practice of dentistry should be considered.

## CONCLUSION

The effects experienced by dentists practicing in the state mirrored many of the challenges experienced by much of the country. Gradually, by keeping updated with the emerging information,

dentists were able to return to patient care. The pandemic caused economic and mental health challenges for dentists. However, with increasing knowledge and understanding of the COVID-19 virus, development of vaccines, and better infection control protocols, dentists have returned to practice more confidently.

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