

# Changes in Behavior Management and Treatment Modalities in Pediatric Dentistry during COVID-19 Pandemic

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## ABSTRACT

**Objective:** This study aims to assess the knowledge and confidence of dentists related to behavior management with extra personal protective equipment (PPE), non-aerosol-generating dental procedures in the course of the coronavirus disease-2019 (COVID-19) pandemic.

**Materials and methods:** A cross-sectional online survey was conducted among a sample of dentists who worked in Jordan and India in June 2020 during the COVID-19 pandemic.

**Results:** This study included a total of 177 dentists in Jordan and India that were practicing during the early months of the pandemic. Most dentists were seeing <6 patients per day. The most common emergency treatments during the pandemic by Jordanian dentists were abscesses (51.8%) and cellulitis (44.6%) vs (44.6%) abscesses and (35.5%) pulpitis in India. There was a high adoption of all elements of the PPE protocol. Most participants never or rarely used N<sub>2</sub>O sedation to manage their patients in Jordan and India (80.4 and 71.1%), respectively. Participants in Jordan and India that considered treatment non-aerosol-generating procedures (non-AGP) were (82.1 vs 97.5%,  $p = 0.000$ ), respectively.

**Conclusion:** Most of the surveyed dentists believe the extra PPE acts as a barrier to patient communication and child behavior management and would consider modifying the PPE to be more child-friendly. Most dentists consider non-AGP procedures and silver diamine fluoride (SDF) to be practical ways to practice safer dentistry, yet more training and information is needed for dentists treating children to provide a more confident safe environment for both dentists and their patients.

**Keywords:** Attitude, Behavior management, Children, Pediatric dentistry.

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## INTRODUCTION

Coronavirus disease-2019 (COVID-19) refers to the coronavirus causing severe acute respiratory syndrome (SARS) among other symptoms.<sup>1,2</sup> Contact with airborne droplets or contaminated surfaces has been postulated as the mode of transmission of this viral infection.<sup>3</sup> Severe symptoms include respiratory distress and ultimate death. Mainly affecting people with comorbidities regardless of age group. A nasopharyngeal swab followed by a seroprevalence test is the main practice to assess and diagnose if a patient is COVID-19 positive.<sup>2</sup>

So far, the data have shown children to be less commonly affected with the coronavirus than adults and if so with milder symptoms. Several postulations were examined, one of which is that they are less exposed to hospital-based infections than senior adults and have less contact with animals, compared to adults working with animals and livestock. However, with children being asymptomatic or having milder symptoms of the disease, they are often less tested, hence misjudging the number of children infected with the virus. Concerning SARS-CoV-2, a study pre-published in early March 2020 concluded that children have the same possibility as adults to get infected but present with milder symptoms or are asymptomatic.<sup>4</sup> Children had a better prognosis in general.<sup>5</sup>

Nevertheless, the role children play in transmitting the virus remains unclear. Most children infected by SARS-CoV-2 reported so far have been infected from within their household and they presented with milder symptoms than the adults in the same household.<sup>4</sup>

The degree of shedding of the COVID-19 virus in the upper respiratory tract, even among pre-symptomatic patients has been a critical factor in the transmission and rapid spread of this virus compared to SARS-CoV-1 that mainly replicates in the lower

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respiratory tract.<sup>6</sup> In the case of infection with SARS-CoV-1, the viral loads' peak along with the onset of symptoms, whereas in cases of SARS-CoV-2 (COVID-19) the viral loads peak 5 days after the onset of symptoms, making detection of the virus less effective and more difficult in the latter case.<sup>7,8</sup>

This asymptomatic phase and transmission of SARS-CoV-2 has been the weak link in the chain of controlling the COVID-19 pandemic.<sup>9</sup> This along with the milder presentation of the infection in children imparts a critical situation for healthcare providers, especially those dealing with pediatric patients, mainly in the field of dentistry.

Medical procedures such as bronchoscopy and intubation might increase the risk of transmitting the virus due to aerosol and droplet generation. Well-regulated hygiene practices and cross-infection control are important to minimize nosocomial outbreaks. Efficiently screening and triaging patients for any respiratory signs and symptoms, any high-grade fever, and inquiring about contact history in addition to rigorous infection control and disinfection practices can help minimize transmission of the virus.<sup>4</sup>

The oropharyngeal area is naturally moist with saliva secreted from salivary glands into the oral cavity. Not only does it contain water and minerals but it also contains secretions along with bacteria and viruses shed from various anatomical structures in the area, whether from the oral cavity or upper respiratory tract. Thus, oral fluids harbor a range of pathogenic bacteria and viruses that could be transmitted via aerosolized particles or droplets produced during dental procedures. Therefore, it should be presumed that all dental patients may be infectious, and there is a potential to spread the virus by dental aerosols; thus, universal precautions to limit aerosols must always be in place regardless of circumstances.<sup>10</sup>

The use of dental rotary instruments, air-water syringes or ultrasonic scalers, and air polishing creates an aerosolized cloud that is a mixture of water from pipelines, saliva, and blood. It is not uncommon for this cloud to be visible. Controlling this aerosol cloud as much as possible is paramount to maintain cross-infection control. Even in instances when this cloud of aerosols is not visible, it should be known that contaminated aerosols are produced during these dental procedures. The possible routes for spreading the COVID-19 virus in a dental setting could be through direct contact with body fluids of an infected patient, contact with droplet contaminated surfaces or instruments that have been contaminated by the patient, and/or contact with infectious airborne particles.<sup>10</sup>

Aerosols (particles <50 µm in diameter) with their ability to stay airborne and their potential to enter respiratory passages have been proposed as the major source of infection in dental practices.<sup>11,12</sup> Therefore, minimizing dental aerosols is instrumental in minimizing the transmission of infection. In the USA, and to date of writing this paper, the healthcare care professionals who have been tested positive for COVID-19 had been working in hospital settings and nursing homes, but none were reported in dental office settings, and no data are yet available assessing the risk of COVID-19 transmission in dental settings.<sup>13,14</sup>

Surgical masks are the main staple of dental personal protective equipment (PPE). They protect mucous membranes of the mouth and nose from droplets, unfortunately, they do not provide complete protection against the inhalation of airborne infectious agents.<sup>13,14</sup> With the advent of COVID-19, concerns that dental aerosols are a potential for the spread of infection, and the need to mitigate this aerosol cloud has been a matter of discussion among dental professionals since the start of this pandemic.

As the pandemic continues to evolve, with the possibility of a resurgence of the disease, healthcare providers are responding to unprecedented conditions in their communities. The CDC recognizes that dental settings need to provide non-emergency dental care. It is a fine balance for dental health personnel, providing necessary treatment while minimizing the risk of viral transmission.<sup>15</sup> Many changes have already been in effect in the way we deliver dental services. Social distancing in waiting rooms, temperature checks for patients and the accompanying adults, and the wearing of masks indoors by all personnel for the foreseeable future.

Since airborne droplets are the main source of transmission for the SARS-CoV-2 virus, during the epidemic period, additional protective measures with PPE are recommended for the pediatric dentist and other dental and healthcare professionals. Proper PPE such as, but not limited to, surgical masks, face shields, protective goggles, surgical gloves, head cover caps, and protective gowns. There are three levels of protection for the pediatric dentist. Standard primary protection for staff in a clinical setting: wearing a disposable work cap; disposable surgical mask; work clothes with white coat; protective goggles or face shields and disposable latex or nitrile gloves. Secondary or advanced protection: same as primary with addition of disposable or external surgical insulation clothing and disposable latex gloves. Tertiary or heightened protection when in contact with a patient suspected or confirmed with COVID-19 infection. Though the recommendation is to defer treatment for such patients, if treatment cannot be delayed, special well-protective gowns are necessary. If not available, a lab coat with an external disposable protective suit should be worn. In addition to the PPE worn in standard primary protection.<sup>16</sup>

Pediatric dentists treat patients ranging from infants and toddlers, pre-teens, teenagers, in addition to individuals with special healthcare needs that may be difficult to manage. Pediatric dentists are trained to manage the behavior of their population of patients using basic behavior guidance techniques (e.g., tell-show-do, distraction, voice control, parental presence/absence, nitrous oxide/oxygen inhalation) and advanced behavior management techniques (e.g., protective stabilization, sedation, general anesthesia) as adjuncts to provide dental care.<sup>17</sup>

Behavior guidance is the process by which practitioners help patients identify appropriate and inappropriate behavior. This process involves the interaction of the dental team along with the patient and parent. It aims to establish communication, lessen fear and anxiety, deliver quality dental care, build a trusting rapport between the patient and the dental team, to deliver the safest and highest quality dental treatment while motivating the child's constructive attitude toward oral healthcare. It is an essential part of pediatric dental practice<sup>18</sup> and is as important as surgical skills.

Communication between the dental team, mainly the pediatric dentist and patient can come about in several ways. Spoken words, along with the tone of voice, facial expression, and body language are the main ways of communication. The presence and consistency of all four elements are crucial. Lack of consistency will lead to miscommunication due to a poor fit between the intended message by the pedodontist and how it is understood by the child.<sup>19</sup> Poor communication and behavior management may result in a child that is behaving poorly, hence causing an obstacle to quality dental care.

Employing simple contact gestures, like a tap on the shoulder, a change of practitioner's posture, and facial expression expresses a change in body language and acts as a nonverbal communication method to reinforce behavior management of children in the pediatric dental office. The goal of non-verbal communication is to gain or prolong the patient's attention and compliance and augment the success of other communicative behavior management techniques.<sup>18</sup> With the new PPE guidelines, this will be a challenge for a new communication barrier has been created now.

Since aerosols generated by dental procedures are a source of virus transmission, limiting aerosol-generating procedures by adopting minimally or non-invasive biologic atraumatic treatment modalities would reasonably provide a safer option. Evidence-

based dentistry supports the use of biological approaches for caries management in pediatric patients which might be a safer option under these COVID-19 circumstances.<sup>20</sup> Minimal invasive dentistry (MID) ranges from no caries removal to selective caries removal. The main advantages of MID are tooth structure preservation and minimizing pulp exposure risk. The use of slow speed or manual excavation in MID has the potential to reduce patient discomfort either through the process itself or by minimizing the need for local anesthetic. This decrease in the child's discomfort, less crying, and better behavior decreases the spread of natural aerosols. These procedures tend to be quicker, make it easier for the child, reduce the number of patients in waiting rooms, and allow the dentist to accommodate more patients on the same day when needed.<sup>20,21</sup>

Atraumatic/alternative restorative treatment (ART) has been practiced in non-traditional dental care settings as a means of restoring and preventing caries. Its goal is the placement of a provisional restoration until further definitive dental care is possible. Interim therapeutic restoration (ITR) utilizes similar techniques but has different therapeutic goals. Interim therapeutic restoration may be used to restore, arrest, or prevent the progression of carious lesions when traditional cavity preparation and/or placement of traditional dental restorations are not feasible and need to be postponed. Stepwise excavation of caries in patients with multiple open carious lesions whether using slow speed rotary or hand excavation, restored with glass ionomer or resin-modified glass ionomer can act as a means for caries control before the definitive treatment appointment.<sup>22</sup>

Silver diamine fluoride (SDF) has recently been at the forefront of caries management as a caries lesion arresting tool. Since caries excavation before SDF application is not necessary, it lends itself as a great minimally invasive, effortless, and painless technique for both patient and practitioner. Silver diamine fluoride arrests caries by the antibacterial effect of silver and by remineralization of enamel and dentin.<sup>23</sup>

The Hall technique is a method of restoring primary molars with preformed metal crowns without operatively preparing the teeth. The prefabricated stainless-steel crown (SSC) is cemented over a caries-affected primary molar without local anesthetic, caries removal, or tooth preparation. This technique is minimally invasive since space is created between molars by the placement of orthodontic separators and not using a dental handpiece, thus minimizing aerosol generation. No local anesthetic is required, which helps with behavior management, and it adheres to the concept of caries management through a biologic approach.<sup>10,24</sup>

The uncertainty in the presentation of COVID-19 infection in children, and whether they can be asymptomatic carriers due to unpredictability of signs and symptoms along with the changes in PPE create a challenging environment for dentists in general and pediatric dentists mainly.<sup>21</sup>

Along with reports of a second wave of the virus, the need to provide dental care for COVID-19 positive patients is imminent. This may be a concern for dental health providers, parents, and pediatric patients as well. Understanding the challenges and the treatment alternatives to minimize aerosol generation in the dental office is valuable to continue providing quality dental care in a safe stress-free environment.

Given that information and the fact that the literature concerning the impact of COVID-19 in pediatric dentistry is quite limited the study aims to evaluate the knowledge of dentists related

to behavior management with extra PPE, non-aerosol-generating dental treatments, and their attitude toward pediatric patients during the coronavirus disease COVID-19 outbreak.

## MATERIALS AND METHODS

### Design and Study Population

A cross-sectional survey was conducted among a sample of dentists who work in Jordan and India in June 2020. Only pediatric and general practitioners who treat children and who were practicing during the study period were included in this study. An online questionnaire using *SurveyMonkey* forms was used to collect the data. The sample of dentists was selected through Facebook groups of dentists including the Jordanian Society of Pediatric Dentistry group and Jordanian dentists' forum in Jordan and Southeast Asian Group in India. The questionnaire was anonymous to maintain the privacy and confidentiality of all information collected in the study. Ethical approval was obtained from the Institutional Review Board at Jordan University of Science and Technology.

### Study Instrument

Questions of the survey were developed after reviewing pertinent literature and the international guidelines of the CDC,<sup>16</sup> ADA,<sup>25</sup> AAPD,<sup>26</sup> Royal College of Surgeons,<sup>27</sup> and Jordan Dental Association.<sup>28</sup> The questionnaire was designed in English and comprised a series of questions about sociodemographic characteristics. The survey was a structured multiple-choice questionnaire and allowed a text response, it was divided into sections: dentists' demographic and profession-related characteristics, number of patients and nature of emergency cases treated during the COVID-19 pandemic, PPE protocol, extra precautions and their effect on behavior management, and infection control measures for preventing COVID-19, and pediatric dentistry procedures pre- and post-COVID-19. Also

### Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (IBM SPSS). Data were described using percentages. The differences between proportions were analyzed using Chi-square test. A *p* value of <0.05 was considered statistically significant.

## RESULTS

### Participants' Characteristics

This study included a total of 177 (133 females and 44 males) dentists. Their age ranged from 18 to 64 years. Almost 44.1% of participants aged  $\geq 35$  years. A total of 136 (76.8%) had completed a master or residency program in pediatric dentistry and 31 (17.5%) were general dental practitioners. The participants' characteristics according to nationality are shown in Table 1.

### Dental Emergencies Treated during COVID-19

Table 2 shows the common emergencies treated during the COVID-19 pandemic. Most dentists were seeing <6 patients per day. The most common emergency cases treated during the COVID-19 pandemic by Jordanian dentists were abscess (51.8%) and cellulitis (44.6%). In India, the most common emergency was an abscess (44.6%), followed by pulpitis (35.5%).

Table 3 shows the PPE use and extra precautions taken by dentists. A small percentage of dentists reported receiving any

**Table 1:** The demographic and professional characteristics of the dentists ( $n = 177$ )

Variable	Nationality				Total	
	Jordan		India			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender						
Female	49	87.5	84	69.4	133	75.1
Male	7	12.5	37	30.6	44	24.9
Age (years)						
<35	17	30.4	82	67.8	99	55.9
≥35	39	69.6	39	32.2	78	44.1
Years of practice						
<5	6	10.7	57	47.1	63	35.6
5–10	22	18.2	7	12.5	29	16.4
>10	41	73.2	28	23.1	69	39
Specialty						
Pediatric dentists	28	50.0	108	89.3	136	76.8
General dentists	19	33.9	12	9.9	31	17.5

**Table 2:** Common emergencies treated during COVID-19 pandemic

Variable	Nationality				<i>p</i> value
	Jordan		India		
	<i>n</i>	%	<i>n</i>	%	
The average number of pediatric patients treated per day during COVID-19					
<5	25	44.6	51	42.1	0.010
5–10	15	26.8	55	45.5	
>10	16	28.6	15	12.4	
Common emergencies treated during COVID-19					
Trauma	24	42.9	40	33.1	0.207
Pulpitis	24	42.9	43	35.5	0.350
Abscess	29	51.8	54	44.6	0.375
Cellulitis	25	44.6	14	11.6	<0.001
Broken restoration	8	14.3	13	10.7	0.498
Pain of unknown origin	4	7.1	19	15.7	0.115
Other	11	19.6	15	12.4	0.205

training on COVID-19 (21.4% in Jordan and 29.8% in India,  $p = 0.247$ ). There was a high adoption of all elements of the PPE protocol, except for the level 3 mask (38% in Jordan and 33.9% in India). With regards to extra precautions taken at the workplace, almost all dentists in India and Jordan took at least one extra precaution. Taking the temperature of the patient was more commonly practiced by Indian dentists compared to Jordanian dentists (82.6 vs 67.9%,  $p = 0.027$ ). The least precaution taken was the use of HEPA filters (41.3% in India vs 8.9% in Jordan,  $p < 0.001$ ). Indian dentists were more likely to report that they would be modifying their PPE to be more child-friendly than in Jordan (82.6 vs 51.8%;  $p < 0.001$ ).

When asked about clinical pediatric dentistry procedures and familiarity with non-aerosol-producing procedures, most participants did never or rarely used  $N_2O$  sedation to manage their patients in India and Jordan (71.1 and 80.4%, respectively). Most dentists were unlikely planning to use it often in India and Jordan (61.2 and 73.2%, respectively), mostly attributed to fear of aerosol infection in India and Jordan (47.9 and 41.1%, respectively). Most participants in India and Jordan considered treatment procedures

with less aerosol production, respectively (97.5 vs 82.1%,  $p = 0.000$ ). More participants in Jordan were practicing such treatment modalities before the COVID-19 pandemic than in India (71.4 vs 66.9%) but more participants in India took classes to familiarize themselves with these procedures (61.2 vs 50%). The procedure they were most familiar with in India was atraumatic restorative treatment (ART) (52.1%) followed by SDF (28.9%). For Jordan, it was the Hall Stainless Steel Crown technique (26.8%) and ART (25.0%). More participants in India reported that they would benefit from online classes to know more about the treatment modalities than in Jordan (94.2 vs 85.7%) (Table 4).

## DISCUSSION

Pediatric dentists play an important role in providing care and managing dental emergencies while adhering to universal infection control practices. Dental caries is the single most common chronic childhood disease,<sup>29</sup> and untreated caries can cause pain and infections, it is more difficult to stabilize without surgical

**Table 3:** Personal protective equipment (PPE) use and extra precautions are taken by dentists

Variable	Nationality				p value
	Jordan		India		
	n	%	n	%	
Personal protective equipment (PPE) protocol					
N95 mask	45	80.4	106	87.6	0.205
Level 3 mask	19	33.9	46	38.0	0.600
Face shield	53	94.6	114	94.2	0.909
Goggles/loupes	30	53.6	91	75.2	0.004
Head cover	40	71.4	99	81.8	0.117
Surgical gown	51	91.1	106	87.6	0.498
Gloves	54	96.4	110	90.9	0.190
Extra precautions at the workplace					
No patients in the waiting room	44	78.6	80	66.1	0.092
No magazines and books on the tables	37	66.1	85	70.2	0.577
No toy box	34	60.7	85	70.2	0.209
No play area	38	67.9	75	62.0	0.449
HEPA filters	5	8.9	50	41.3	0.000
Taking patient temperature	38	67.9	100	82.6	0.027
Screening over the phone	30	53.6	85	70.2	0.031

**Table 4:** Pediatric dentistry procedures pre- and post-COVID-19

Variable	Nationality				p value
	Jordan		India		
	n	%	n	%	
Using N <sub>2</sub> O sedation to manage patients					
Never or rarely	45	80.4	86	71.1	0.383
Sometimes	7	12.5	25	20.7	
Usually	4	7.1	10	8.3	
Using hydrogen peroxide rinse before any examination or treatment	36	64.3	93	76.9	0.144
Considering treatment procedures with less aerosol production (such as silver diamine fluoride, atraumatic restorative treatment, interim restorative therapy, resin infiltration, Hall stainless steel crown technique)	46	82.1	118	97.5	0.000
Practicing non-AGP before COVID-19 pandemic	40	71.4	81	66.9	0.847
Took any classes to familiarize yourself with these procedures	28	50.0	74	61.2	0.272

intervention and the delay in treatment will only cause worsening of symptoms,<sup>30,31</sup> therefore, it will not stop during a pandemic.

In the absence of or limited preventive or palliative dental care, dental pain and infections may become more frequent. Dental emergencies attributed to abscesses and periodontal infections account for >1.5% of emergency department visits annually. Existing restorations may fail, and if not treated promptly, will require more costly treatment when practices reopen.<sup>32</sup>

Even though children infected with the COVID-19 virus are presented with milder clinical symptoms than adults, these young patients can act as asymptomatic carriers of the virus and pose a transmission risk in the dental office. Dental personnel must stay informed and updated with the most recent changes in local and international guidelines related to this disease as they continue to be modified as we learn more about this virus, its mode of transmission, and its clinical manifestations to optimize safety for dental care providers and patients. Dentists treating children during

this pandemic must follow universal infection control procedures meticulously. Promoting preventive dental behaviors should be encouraged and MID procedures should be utilized to minimize aerosol generation.<sup>33</sup>

Several dental and medical organizations continue to provide guidelines to adopt strict measures emphasizing the importance of minimizing cross-infection, proper use of PPE. These guidelines also proposed prioritizing cases to be treated selection while maintaining the safety of dental personnel, patients, and their guardians. Multiple online classes and webinars were also available to practitioners during lockdown/stay-at-home orders in many countries to educate healthcare providers on how to deal with this novel virus.

Such measures include screening patients before admission to dental offices, limiting treatment to emergency procedures only, utilizing non-aerosol-generating procedures (non-AGP) as much as possible, and performing environmental disinfection. However,

researchers have reported that due to the asymptomatic nature of this infection in some patients, COVID-19 virus transmission could be difficult to control in the dental setting. This has led to limited dental work provided for pediatric patients during the beginning of the pandemic. Among healthcare personnel, dentists and members of the dental team seem to be a higher risk group for infection. Ensuring the safety of the dental team is not only important to their personal health but also to protect the patients that need the dental service while eliminating any risk of transmission of the virus.<sup>34</sup>

The extra PPE recommended by most dental associations covers most of the face-concealing most facial expressions which are imperative in communication and behavior management. Of most of the surveyed dentists in this study, 83.5–78.6% believe that the extra PPE would influence behavior management. The percentage of respondents that stated that they would modify their PPE to make it more acceptable to children was 82.6–51.8%. The suggested modifications were placing smiley stickers or that with the provider's face over gowns, using colorful gowns or painting on them, altering character costumes to act as PPE. Other suggestions by respondents were to schedule a mask-free video call with the patient before the actual office visit, where the dentist and staff can introduce themselves, and to have the assistant display and explain the PPE with tell-show-do before the dentist being present in the operatory.

Many patients and parents have received COVID-19-related information through local healthcare providers' propaganda. In a survey of parents and dental treatment during the pandemic, slightly over 50% of the parents stated that they would take their child to the dentist during the outbreak if he/she had a severe toothache. In this same study, the parent's confidence level was increased when the preventive measures being taken at the dental clinics were thoroughly explained to them.<sup>35</sup>

When dentists use all the necessary precautions and infection control protocols to avoid viral infection, this will reassure parents increasing their confidence level which will reduce parental stress and have a positive behavioral influence on the patients by creating a relaxed anxiety-free environment. This will allow better behavior management, better dental work, and better access to care.

As for the use of nitrous oxide, 71–80% of respondents were not using it during their emergency cases and 61–73% were planning on not using it post-COVID-19 due to fear of infected aerosols. This will be another barrier to the behavior management of the anxious pediatric patient, and a barrier to treatment. Patients that would have been managed with nitrous oxide inhalation sedation will now need more advanced behavior guidance techniques such as oral/IV sedation and general anesthesia. Unfortunately, with the COVID-19 pandemic, there has been an overwhelming of hospitals that challenged access to pediatric dentistry, which will further delay the treatment to be provided to our dental patients. Providing information and access to guidance for infection control and proper sterilization of nitrous oxide and oxygen system components can provide practitioners with the confidence to use inhalation sedation to manage the behavior of their patients.

To minimize infection, most dentists surveyed stated that they are taking extra measures at their workplace to minimize infection with the COVID-19 virus. These extra measures were taking the patient's and caretaker's temperature before admitting to the office, not having people wait in the waiting room instead of having them

wait in cars, and texting or calling when ready for their appointment. Screening patients over the phone while scheduling their dental appointment. Eliminating toys, magazines, closing the play area, and no prize box, instead, the assistant is handing out prizes at the end of the appointment.

Between 42% and 45% of dentists surveyed were seeing <6 patients a day and they were only treating emergency cases. The low number of patients could be attributed to fear of infection, and thus minimizing the number of patients taken care of to those who are in pain, to alleviate pain. Nearly half of the emergencies treated were related to abscesses and cellulitis, followed by pulpitis. Broken restorations and lost appliances were not significantly considered emergencies. These patients would have to have their treatment delayed increasing the risk of further pain and infection.

This might create a backlog of patients in need of restorative treatment and this delay will lead to the progression of dental decay, causing worsening of symptoms, behavior, and treatment needs.

The responding dentists are following the guidelines and recommendations issued by the Jordanian Dental Association, AAPD checklist for reopening, and CDC guidelines for dental practices during CPVID-19 pandemic.<sup>16,26,28</sup>

There was a high adoption of all PPE elements by most dentists, but a low percentage of dentists receiving COVID training. They either depended on information gathered from guidelines or reading updates or developed some PPE on their own.

When asked about the non-AGP, 82–97% considered such treatment procedures while treating their pediatric patients during this pandemic. There were significantly more dentists in India than Jordan that were providing such non-AGP during the pandemic, although more dentists in Jordan 61% than in India 67% were already practicing non-AGP before the COVID-19 pandemic. These percentages show a good level of knowledge and acceptance of such procedures, and that the fear of spreading the infection necessitates the practice of non-AGP treatments, such as ART, SDF, and extractions.

Most respondents, 76.8% are with advanced training in pediatric dentistry/pediatric dentistry specialists. Yet, there is still a significant percentage of them not practicing non-AGP. This could be because most emergencies were cellulitis and abscess and hence the treatment was extraction, or it might be a lack of confidence in such treatment techniques.

Regarding patient management when the participants were asked about their confidence in managing and treating cooperative pediatric patients, the average confidence level was 8 out of 10, and 6 out of 10 for uncooperative patients. The practitioners' confidence level in treating pediatric patients dropped to around 5 out of 10 for treating pediatric patients after the COVID-19 pandemic. This would indicate that fewer children might be able to have their dental needs met. In addition to the participants' strong belief that children are asymptomatic carriers. This might act as a barrier to provide dental care for those in need.

At the beginning of the pandemic, the recommendations were to defer elective treatment and only deal with emergencies but now, after months have passed and the virus is still spreading and circulating, continuous deferral of elective procedures is not practical. Initial and moderate carious lesions will be advanced in months leading to more complicated pathologies as irreversible pulpitis, necrosis, abscesses, and cellulitis making behavior management ever more challenging.

## CONCLUSION

We concluded that most of the surveyed dentists believe that the extra PPE acts as a barrier to patient communication and child behavior management and they would consider modification of the PPE to be more child friendly. The majority of surveyed dentists also believed that the implementation of non-AGP and SDF applications are practical ways to practice safer dentistry, yet more training and information is needed for dentists treating children to provide a more confident safe environment for both dentists and their patients.

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