

Original Article

Impact of Covid-19 on Pediatric Dental Practice During First, Second And Third Wave Among A Group Of Pediatric Dentists: A Cross- Sectional Study

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Abstract

Aim: To assess impact of COVID-19 on pediatric dental practice during first, second and third wave among a group of pediatric dentists.

Methodology: This study is based on a closed- ended questionnaire that directed to pediatric dentists who work in Egypt. The survey included questions that evaluate Pediatric Dentists' financial status and their attitude regarding pediatric dental care during first, second and third wave of pandemic COVID-19.

Results: Overall, 345 pediatric dentists contributed to this study. More than two thirds of participants (n=274, 79.4%) changed their working time and dental practice. Regarding income; more than three quarters of participants (n=284, 82.3%) suffered decreased income, two thirds (n=230, 66.7%) have encountered financial problems. However; nearly one quarter of participants (n=93, 27%) had another source of income for daily expenditure.

Conclusions: COVID-19 has a major impact on the practice of paediatric dentistry. Egyptian pediatric dentists preferred to lower their work hours and limit dental procedures to emergency treatments until the end of the pandemic. So, approximately three quarters of participants faced a decrease in income and also encounter financial problems.

Keywords: COVID-19, Pandemic, Pediatric, Dentistry, Dental practice

I. INTRODUCTION:

On the 11th of March, 2020, COVID-19 (SARS- CoV- 2) was declared as a pandemic by the World Health Organization (WHO). SARS- CoV- 2 is an unpredictable virus that is rapidly transmitting from one country to another. Worldwide, nearly 637.4 million individuals have been infected and over 6.6 million have died including the pediatric population [1]. Due to the unique nature of dentistry, most dental procedures generate significant amounts of droplets and aerosols, potentially raising the risk of spreading infection. Recent studies have demonstrated the role of the oral mucosa in

COVID-19 infection, in addition to expressing the Angiotensin- converting enzyme II (ACE2) receptor in salivary glands in the asymptomatic process in infected saliva, making it one of the main sources of viruses [2]. This has a tremendous impact on medical and dental procedures that are Aerosol Generating Procedures (AGP) [3][4]. These factors directly contribute to the higher level of COVID-19 related fear and anxiety among dentists compared to the general public. This directly contributed to financial status of dentists in Egypt.[5][6]. Therefore, this study aimed to assess impact of COVID-19 on pediatric dental practice during first,

second and third wave among a group of pediatric dentists.

II. MATERIALS AND METHODS

Study Design:

This study is a cross-sectional study based on an online structured closed-ended questionnaire distributed among pediatric dentists to assess the impact of COVID-19 on pediatric dental practice during first, second and third wave.

Egyptian pediatric dentists with at least Master's degree where work place is located in Egypt were included. Both sexes were enrolled.

However, Participants who refuse to participate were excluded in addition to Fresh Graduated interns who weren't specialized yet.

- **Sample size calculation:**

The sample size was revised and approved by the Medical Biostatistics Unit (MBU), Faculty of Dentistry, Cairo University, Egypt, in 2021. The required sample size was estimated using a study by (Ahmadi et al., 2020) [7]. By adopting a confidence interval of (95%), a margin of error of (5%) with finite population correction; the sample size (n) was found to be a total of (345). Sample size calculation was performed using Epi info for windows version 7.2.

- **Methods:**

- **Consent:**

The study was reviewed and approved by the Ethical Committee, Faculty of Dentistry, Cairo University in 2021 concerning the scientific content and the compliance with the applicable research and human subjects regulations. Before filling out the questionnaire, the approval of participants who responded to the online google form of the questionnaire, a separate consent section containing a YES/NO question was added at the beginning of the questionnaire form. Also, The privacy of the participants was governed and protected.

- **Questionnaire Design:**

An online structured survey composed of 34 questions obtained from previous validated questionnaires [7][8] with some adjustments divided into the following sections:

- Section (A) General data about enrolled participants: This section is composed of six questions about gender, age, years of practice, graduation place, experience grade and work place.
- Section (B) consisted of 9 closed questions (yes/no questions) about Pediatric Dentists' experience during the alert phase of first, second and third wave of pandemic.
- Section (C) is composed of 9 questions based on the 5- point Likert scale scoring to evaluate Pediatric Dentists' perception regarding the COVID-19 pandemic.
- Section (D) is composed of 10 Multiple-choice questions about Pediatric Dentists' attitude regarding pediatric dental care during first, second and third wave of pandemic COVID-19.

This survey was conducted through an online questionnaire using Google Forms to collect the data. The questionnaires was anonymous to maintain the privacy and confidentiality of all information collected in the study. A note had been added in the description of the online questionnaire that asking participants not filling this questionnaire twice to avoid duplication of the data. We added an option that we wouldn't accept response from the participant if he didn't complete whole questions not to get incomplete data.

- **Bias:**

Selection bias was avoided by including all pediatric dentists fulfilling the inclusion criteria. Information bias was overcome by explaining the aim to the participants pediatric dentists without guiding them to specific answers. Finally, all collected data had been accurately recorded and reported to avoid detection and reporting bias.

- **Data sources management:**

Data obtained through an online questionnaire for assessing pediatric dental practice during first, second and third wave of pandemic COVID-19 among Egyptian pediatric dentists. Data collected was saved and tabulated on a computer for backup then stored online on Google drive and finally statistically analyzed.

- **Statistical analysis:**

Qualitative data were presented as frequencies and percentages. Chi-square test and Fisher's Exact test were used for comparisons regarding qualitative data. Quantitative data were presented as median, range, mean and standard deviation (SD) values. Likert scale scores are non-parametric data; so Mann-Whitney U test was used to compare between scores of two groups. Kruskal-Wallis test was used to compare scores of more than two groups. Dunn's test was used for pair-wise comparisons when Kruskal-Wallis test is significant. The significance level was set at $P \leq 0.05$. Statistical analysis was performed with IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.

III. RESULTS

Respondents to the questionnaire were 345 pediatric dentists; 60 males (17.4%) and 285 females (82.6%). Nearly half the participants aged less than 30 years old. The majority of participants had less than five years and from five to 10 years practice years. Almost three quarters of participants graduated from governmental universities. The highest obtained educational grade was Master Degree followed by PhD while participants with higher grade were less than 10% of the participants. Almost half of the participants were academic staff and one quarter of them had private clinics.

A. Experience during waves of the pandemic

About two thirds of the participants had symptoms of COVID-19 but slightly more than one third had tested positive for COVID-19. The majority of participants had implemented

the latest dental procedures' guidelines during the pandemic and had increased PPE consumption while performing dental procedures. Rising in the price of PPE was reported by the majority of participants while more than half of the participants had problems with providing PPE. Regarding income; more than three quarters of participants suffered decreased income, two thirds have encountered financial problems. However; nearly one quarter of participants had another source of income for daily expenditure.

B. Perceptions regarding COVID-19 pandemic

About one third of the participants strongly agreed/agreed that they had problems with paying basic fees. Approximately three quarters of participants strongly agreed/agreed that there was a decrease in income due to continuation of the pandemic. As regards dental treatment guidelines; almost three quarters of participants strongly agreed/agreed that it was useful and expected that the guidelines will be changed in the future. Similarly; approximately three quarters of participants strongly agreed/agreed that PPE are effective to prevent virus transmission. Approximately half of participants disagreed/strongly disagreed that Phone call is effective to resolve patients' dental problems. More than three quarters of participants strongly agreed/agreed to examine the patient for COVID-19 symptoms before starting treatment. As regards the perception that re-opening dental clinics resulted in spreading of COVID-19 virus; almost one third of participants strongly agreed/agreed with that perception; one third were neutral while one third disagreed/strongly disagreed with that perception. Approximately three quarters of participants strongly agreed/agreed that Dental pediatric profession would continue by persisting COVID-19.

C. Pediatric dentists' attitudes regarding pediatric dental care during waves of COVID-19 pandemic

About two thirds of participants reported increased calls from patients during wavers of COVID-19 pandemic. More than two thirds of participants changed their working time and dental practice. About one quarter of participants didn't change their treatment plans while more than half of the participants have performed emergency treatment only. Cancellation of all treatments until the end of the alert phase or end of the pandemic was reported by about 15% of the participants. More than half of participants had performed different types of non-emergency treatment including initial examination, restorative treatment of asymptomatic carious lesions as well as extraction of asymptomatic teeth. The

most prevalent cause of performing non-emergency procedures was patients' request. The most prevalent change in dental practice standards was not performing unnecessary treatment followed by reducing treatments sessions then focusing on preventive care. Prior to COVID-19 pandemic; about one fifth of participants used oral rinse for the patients before treatment. The most commonly used type of mouth wash was Chlorhexidine followed by Hydrogen peroxide then other types. More than one third of participants didn't use the rubber dam – when indicated – prior to COVID-19 pandemic; the majority of them think that rubber dam will be useful to use it in all the indicated treatments.

Table 1: Frequencies (n) and percentages (%) for general data of the study participants (n = 345)

General data	n	%
Gender		
Male	60	17.4
Female	285	82.6
Age category		
Less than 30 years old	177	51.3
More than 30 years old	168	48.7
Practice years		
Less than 5 years	124	35.9
5 – 10 years	122	35.4
More than 10 years	99	28.7
Dental education		
Governmental university	252	73
Private university	93	27
Highest educational grade		
Master Degree	259	75.1
PhD	62	18
Higher	24	7
Workplace		
Academic staff	175	50.7
Military hospitals	17	4.9
Ministry of Health	64	18.6
Private clinic	89	25.8

Table 2 . Frequencies (n) and percentages (%) for responses of pediatric dentists regarding their experience during waves of the pandemic (n = 345)

Experience during waves of COVID-19	N	%
1. Had symptoms of COVID-19.	214	62
2. Had positive test for COVID-19.	123	35.7
3. Implemented latest dental procedures' guidelines during the pandemic.	271	87.6
4. Increased PPE consumption while performing dental procedures.	326	94.5
5. Rising in the price of PPE.	289	83.8
6. Had problems with providing PPE.	205	59.4
7. Decrease income.	284	82.3
8. Encounter financial problems.	230	66.7
9. Had another source of income for daily expenditure.	93	27

Table 3 . Percentages (%) of answers to perceptions regarding COVID-19 pandemic (n = 345)

Perceptions about COVID-19	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	%	%	%	%	%
1. Had problems with paying basic fees.	4.9	31.3	42	18	3.8
2. A decrease in income due to continuation of the pandemic.	20.6	52.5	18	6.4	2.6
3. Latest guidelines of dental settings during COVID-19 are useful.	17.4	53.9	26.4	2.3	0
4. The guidelines toward dental practice during COVID-19 will change in the future.	17.1	56.8	19.4	5.8	0.9
5. PPE is effective to prevent virus transmission.	22.6	49	20.6	7	0.9
6. Phone call is effective to resolve patients' dental problems.	0.9	16.2	26.1	47	9.9
7. Examine the patient for COVID-19 symptoms before starting treatment.	39.7	42.6	6.4	6.7	4.6
8. Re-opening dental clinics resulted in spreading the virus.	8.1	22.9	33.6	32.5	2.9
9. Dental pediatric profession would continue by persisting COVID-19.	8.1	65.8	23.8	2.3	0

Table 4. Percentages (%) of answers to attitudes regarding pediatric dental care during COVID-19 pandemic (n = 345)

Attitudes regarding pediatric dental care during waves of COVID-19	n	%
1. Increased number of phone calls from patients.	212	61.4

2. A change in working time and dental practice.	274	79.4
3. A change in treatment plans during the pandemic:		
a. Nothing has changed	97	28.1
b. Cancelled all treatments until the end of the pandemic	9	2.6
c. Cancelled all treatments until the end of the alert phase of the pandemic	42	12.2
d. Performed emergency treatment	197	57.1
4. Type of non-emergency treatments done during the pandemic:		
a. None	141	40.9
b. Restorative treatment of asymptomatic carious lesions	83	24.1
c. Extraction of asymptomatic teeth	33	9.6
d. Initial examination	88	25.5
5. The cause of performing non-emergency procedures:		
a. Patients' request	143/204	70.1
b. Financial problems	61/204	29.9
6. Changes in dental practice standards:		
a. Focus on preventive care	90	26.1
b. Not performing unnecessary treatment	148	42.9
c. Reducing treatment sessions	107	31
7. Prior to COVID-19 pandemic, did you use oral rinses for the patients before treatment:		
a. Yes	74	21.4
b. No	176	51
c. Not always	95	27.5
8. Which type of oral rinse have you used:		
a. Chlorhexidine mouth wash	48/74	64.9
b. Hydrogen peroxide diluted with water	14/74	18.9
c. Others	12/74	16.2
9. Prior to COVID-19 pandemic, did you use the rubber dam when indicated:		
a. Yes	93	43.2
b. No	134	38.8
c. Not always	118	34.2
10. If you haven't used the rubber dam, do you think that in the future it can be useful to use it in all the indicated treatments:		
a. Yes	81/134	60.4
b. No	16/134	11.9
c. Not always	37/134	27.6

IV. DISCUSSION:

Respondents to the questionnaire were 345 pediatric dentists; 60 males (17.4%) and 285 females (82.6%). Females were predominant in this sample, which might be explained because the number of female pediatric dentists in Egypt is higher than the number of male pediatric dentists. About two thirds of the participants had symptoms of COVID-19 but slightly more than one third had tested positive for COVID-19. This indicates that dental practice should be done even with more infection control measures, and proves that pediatric dental practitioners is a high risk profession for infection. In contrast to adult treatment, where a return to normality in everyday treatment can be expected due to the possibility of vaccination, this wouldn't happen in pediatric dental practice due to the lack of vaccination possibilities.

It was impressive that we found the majority of participants in our study had implemented the latest dental procedures' guidelines during the pandemic and had increased PPE consumption while performing dental procedures. Also, we found almost three quarters of participants strongly agreed/agreed that dental treatment guidelines were useful and expected that the guidelines will be reformed in the future. Similarly; approximately three quarters of participants strongly agreed/agreed that PPE are effective to prevent virus transmission. These results were consistent with the finding of (Ahmadi et al., 2020) [7]. The guidelines may differ in different regions of the world according to their facilities and supplies. Though, we believe that a comprehensive worldwide instructions and recommendations must be provided for dental settings especially for pediatric dentists to minimize the risk of infection effectively.

Since the main route of transmission of COVID-19 is through airborne droplets, during the epidemic period, additional protective measures with personal protective equipment (PPE) are recommended for the pediatric dentist and other

healthcare professionals, in particular when performing aerosol generating procedures (AGP). PPE usually include: surgical mask, face shield, protective goggles, gloves, medical cap, and protective suits [9]. The majority of participants (94.5 %) had increased PPE consumption while performing dental procedures. Also, Rising in the price of PPE was reported by the majority of participants (83.8%) while more than half of the participants (59.4%) had problems with providing PPE. This could be due to the rapid enhance of demand for PPE resulted in the shortage of these supplies all over the world.

Our study showed pediatric dentists with Master's Degree were the highest prevalence of increased PPE consumption followed by dentists with PhD while those who had higher degrees showed the lowest prevalence of increased PPE consumption. That could be Masters holders were more respondents to the questionnaire by percentage of 75% , and they were working more hours to cover their financial problems. Also, pediatric dentists with Master's Degree showed the highest prevalence of having problems with providing PPE as they were highest prevalence of increased PPE consumption and also they were highest prevalence of feeling the rise in price of PPE. That may be an alarm for all countries to that quality & availability of PPE is a matter of national security for facing such as pandemics.

Our study showed that pandemic covid-19 had a tremendous effect on daily basis of pediatric dentistry in Egypt; we found that pediatric dentists aged less than 30 years old showed higher prevalence of focusing on preventive care than dentists aged more than 30 years old who showed higher prevalence of not performing unnecessary treatment as well as reducing treatment sessions. Also, Pediatric dentists who have practiced less than 5 years showed the highest prevalence of performing emergency treatment while Pediatric dentists who have practiced more than 10 years showed the highest prevalence of cancelling all treatments till the end of the pandemic. That's why they were less

infected with Covid-19 than young pediatric dentists as it was showed in our results.

Our results showed significant difference in pediatric dentists aged less than 30 years old showed statistically significantly higher prevalence of decrease income and encountering financial problems than those aged more than 30 years old which makes sense as young dentists are still in the start of their career so they don't have any financial basic. Unlike, Dentists who had more than 10 years' experience showed the lowest prevalence of encountering financial problems as they already have their own stable career and financial status. For the same reason we found pediatric dentists with Master's degree showed the highest prevalence of encountering financial problems followed by dentists with PhD while those who had higher degrees showed the lowest prevalence of encountering financial problems.

Also, pediatric dentists working at private clinics showed the highest prevalence of having decreased income followed by dentist working at military hospitals then Ministry of Health while academic staff showed the lowest prevalence of having decreased income. That's due to financial support and fixed salaries in universities and ministry of health sector unlike private work which is more dependent upon number of cases and flow of patients.

Limitations of the study:

Although Online surveys facilitate recording responses accurately and targeting the required participants faster and at a lower cost, they make it difficult to achieve sample representativeness due to lack of data base for pediatric dentists in Egypt, and the quality of data may be poor due to lack of communication with the responders or limited understanding of the questions.

V. CONCLUSIONS

In the light of our study, COVID-19 has and will continue to have a major impact on the practice of pediatric dentistry. The most prevalent change in dental practice standards was not performing

unnecessary treatment followed by reducing treatments sessions. According to the results of the present study, Egyptian pediatric dentists preferred to lower their work hours and limit dental procedures to emergency treatments until the end of the pandemic. Approximately three quarters of participants faced a decrease in income and also encounter financial problems.

Additionally, Telemedicine and triage could be useful tools to assess patient's conditions before the dental visit. In the future, it can be helpful in critical situations for the management of dental emergencies not only in a pandemic but also in other cases

VI. Recommendations

Avoidance of elective AGPs is recommended wherever possible and management of emergencies should take priority. Additionally, All countries should give priority to quality & availability of PPE as it is a matter of national security for facing such as pandemics. Furthermore, Improvement in the communication methods between the pediatric dentists in Egypt through making a data basis with their contacts/e-mails and regular conferences is of prime importance. Financial back-up plans and management guidelines during pandemics or any crisis are of a great importance. Finally, Further studies should be performed in different areas in world to generalize the study findings.

Acknowledgment

The author is thankful to all the participants involved in the study for their cooperation and support.

Financial support and sponsorship

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability statement

The data set used in the current study is available on request

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