



Attitude of parents towards oral health and dental treatment of their children during the COVID-19 pandemic

Atitude dos pais em relação à saúde bucal e tratamento odontológico de seus filhos durante a pandemia do COVID-19

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ABSTRACT

Objective: Increased rate of dental caries among children necessitate regular pediatric dental treatments; however, the COVID-19 pandemic has posed significant challenges for dental visits of children, compromising their oral health. To assess the attitude of parents towards oral health and dental treatment of their children during the COVID-19 pandemic. **Material and Methods:** 232 eligible parents presenting to the Pediatric Dentistry Department of Qazvin Dental School during March and April 2021 seeking dental care for their children were requested to fill out a questionnaire included data regarding demographic information, child's dental history, attitude about the COVID-19 and risk of dental treatments. Data were analyzed using independent t-test, one-way ANOVA, and Pearson's correlation coefficient ($\alpha=0.05$). **Results:** One-third of the parents reported that fear of contraction of COVID-19 was the reason for not seeking dental care during the pandemic. The majority of the parents stated no change in oral hygiene behavior or consumption of sugary foods during the pandemic. Cancellation of previous dental appointments ($P=0.038$) and unwillingness to seek dental care at present ($P=0.015$) were significantly correlated with the susceptibility score. The susceptibility score of the parents was also correlated with their psychological status ($P=0.016$). A significant correlation was noted between the susceptibility score and attitude as well ($r=0.287$, $P<0.001$). **Conclusion:** High level of concern regarding the COVID-19 prevents parents from seeking dental care for their children. It is imperative to take measures to reassure the parents regarding the safety of dental care for their children during the pandemic to ensure continuation of dental care.

KEYWORDS

Attitude, Children, COVID 19, Dental care, Oral health.

RESUMO

Objetivo: O aumento da incidência de cárie dentária entre as crianças exige que tratamentos odontológicos pediátricos regulares sejam realizados; no entanto, a pandemia da COVID-19 trouxe desafios significativos para as consultas odontológicas de crianças, comprometendo a saúde bucal. O objetivo do estudo foi mensurar a atitude dos pais em relação a saúde bucal e o tratamento odontológico de seus filhos durante a pandemia da COVID-19. **Material e Métodos:** 232 pais elegíveis que se apresentaram ao Departamento de Odontopediatria da Faculdade de Odontologia de Qazvin durante março e abril de 2021 em busca de atendimento odontológico para seus filhos foram solicitados a preencher um questionário, incluindo dados sobre informações demográficas,

histórico odontológico da criança, atitude sobre a COVID-19 e risco de tratamentos odontológicos no contexto da COVID-19. Os dados foram analisados usando o teste t independente, ANOVA um fator e coeficiente de correlação de Pearson ($\alpha = 0,05$). **Resultados:** Um terço dos pais relatou que o medo de contrair COVID-19 foi o motivo para não procurar atendimento odontológico durante a pandemia. A maioria dos pais afirmou não haver mudança no comportamento de higiene bucal ou consumo de alimentos açucarados durante a pandemia. Cancelamento de consultas odontológicas anteriores ($P=0,038$) e falta de vontade de procurar atendimento odontológico no momento ($P=0,015$) foram significativamente correlacionados com o escore de suscetibilidade. O escore de suscetibilidade dos pais também foi correlacionado com seu estado psicológico ($P=0,016$). Também foi observada correlação significativa entre o escore de suscetibilidade e a atitude ($r=0,287$, $P<0,001$). **Conclusão:** O alto nível de preocupação em relação a COVID-19 impede que os pais procurem atendimento odontológico para seus filhos. É imperativo tomar medidas para tranquilizar os pais quanto à segurança do atendimento odontológico de seus filhos durante a pandemia para garantir a continuidade do atendimento odontológico.

PALAVRAS-CHAVE

Atitude, Crianças, COVID 19, Cuidados dentários, Saúde oral.

INTRODUCTION

In March 2020, the World Health Organization officially announced the coronavirus disease 2019 (COVID-19) pandemic [1]. The novel coronavirus disease was first discovered in Wuhan, China, and quickly spread worldwide, adversely affecting all aspects of life [2,3]. As the first measure, most countries worldwide announced restrictions and lockdowns, and the healthcare systems did their best to control the disease [3]. As a result, many other aspects of health were neglected early in the pandemic. However, over time, the need to address the challenges against many other healthcare services was revealed. Dental care has a special place in this respect because the risk of disease transmission during dental procedures is believed to be extremely high [4]. The aerosols generated during dental procedures, small salivary or respiratory droplets that remain suspended in the air, and close distance between the patient and dental clinician all add to the high risk of COVID-19 transmission during dental procedures [3,4].

Children are more susceptible to dental caries mainly due to their suboptimal oral hygiene and high consumption of sugary foods and drinks [5]. Also, it is assumed that spending the entire day at home, due to the pandemic conditions, results in development of unhealthy nutritional habits with increased risk of dental caries, and aggressive indoor activities with high risk of dental trauma [4,5]. In addition, tooth eruption and high prevalence of malocclusion in children further necessitate regular dental visits in this group of patients; however, the COVID-19

pandemic has posed significant challenges for dental visits of children, compromising their oral health [5]. Samuel et al. [6] observed high level of fear and anxiety of the parents regarding the COVID-19 and found that higher level of pain and higher frequency of dental caries in 2-6-year-old children were significantly correlated with their lower quality of life.

At present, some country protocols still do not allow the provision of routine dental procedures, and only authorize emergency and urgent treatment procedures [7]. This fact, along with the recommendations of officials and dental organizations, has further added to the confusion of parents regarding dental appointments of their children and risk of COVID-19 contraction in the process of treatment. As a result, many parents do not seek or postpone dental treatments of their children [2,7,8]. Üstün et al. [9] reported a significant reduction in the frequency of dental appointments of children during the COVID-19 pandemic. Moreover, Peloso et al. [7] pointed to the profound impact of the COVID-19 pandemic on dental appointments and level of anxiety of patients. They found a significant correlation between the attitude of patients towards the pandemic and their interest in attending dental appointments. According to their results, 28.6% of the interviewees felt anxious early in the pandemic, which was due to their concerns regarding the risk of disease contraction in dental setting and transmitting it to their family members. According to a study by Moffat et al. [10] perceptions of susceptibility, a higher valuation of dentistry, and agreement

that COVID-19 is a serious infection were all correlated with having greater caution in attending dental visits.

Considering the limited information regarding the status of pediatric dental patients during the COVID-19 pandemic, this study aimed to assess the attitude of the parents of an Iranian sample towards the oral health of their children and the receipt of pediatric dental services during the COVID-19 pandemic and the associated factors in this respect.

MATERIALS AND METHODS

Study design and samples

This cross-sectional study was approved by the ethical committee of Qazvin University of Medical Sciences with an ethical number of IR.QUMS.REC.1400.015. It was conducted on the parents presenting to the Pediatric Dentistry Department of School of Dentistry, Qazvin University of Medical Sciences in March and April 2021 for dental treatment of their children. Based on the similar study [10], considering the maximum standard deviation of the total score of attitude and belief equal to 5.2 and the type one error equal to 0.05 ($Z = 1.96$) the maximum estimation error of 0.7, the minimum required sample size was estimated to be 212 people. In the present study, a number of 232 samples were entered. The parents were selected by convenience sampling. At the time of study, approximately 10 months had passed since the reopening of dental school clinic and provision of dental care services to patients. Also, traffic restrictions were no longer in effect although distance education was still in place. According to the Iranian Ministry of Health, the Qazvin city, where the study was conducted, still had the orange flag regarding the COVID-19 status indicating 10 to 24 confirmed new cases of COVID-19 per 100,000 population, and a generally ascending trend of disease.

The inclusion criteria were parents presenting to the Pediatric Dentistry Department of School of Dentistry, Qazvin University of Medical Sciences whose child (age range of 2-12 years) required dental treatment, and were also willing to participate in the study.

Illiteracy (not being able to read and write) was the only exclusion criterion. Participants

received information regarding the study and an informed consent obtained.

Designing the questionnaire and collecting the information

A questionnaire was designed according to studies by Moffat et al. [10] and Peloso et al. [7] with the following five domains according to the opinion of the experts:

- (A) Demographic and general information: This section asked for the age and gender of the parent filling out the questionnaire and the child, level of education of the parents, place of residence, level of income and its alterations during the COVID-19 pandemic, number of children, and history of COVID-19 infection and related deaths in the family or close relatives;
- (B) Child's dental history: Chief complaint of the child, history of dental treatments before the pandemic and the level of cooperation of the child during previous procedures, postponing or canceling previous dental appointments during the pandemic, changed oral hygiene practice or increased use of sugary foods and drinks during the pandemic, receipt of fluoride varnish therapy during the pandemic, and history of online consultation regarding dental problems of the child during the pandemic;
- (C) General attitude of the parents regarding the COVID-19: Performance of the parents in the community during the COVID-19 pandemic, psychological status and level of anxiety of the parents regarding the COVID-19, practice with regard to current dental appointments, paying attention to the use of personal protective equipment such as facemask, and adherence to the precautionary measures such as social distancing;
- (D) Perceived susceptibility regarding dental visits during the COVID-19 pandemic, which was assessed by 5-point Likert-scale questions (#24 to #32); score 1 indicated highly agree, and score 5 indicated highly disagree;
- (E) Attitudes and beliefs regarding the risk of contraction of COVID-19 in a dental setting (5-point Likert scale questions #33 to #42 and descriptive information).

To assess the content validity and face validity of the questionnaire, it was administered among 10 experts who were the faculty members of the School of Dentistry of Qazvin University of Medical Sciences. To determine the face validity, the grammar and wording of the questions, and position of the items in their rightful place were evaluated, and the necessary modifications were made according to the feedbacks of the raters. In assessment of content validity, simplicity, clarity, and relevance of the items were evaluated, and necessary modifications were made. The Cronbach's alpha coefficient was calculated for assessment of the reliability of the questionnaire, which was found to be 0.75. After obtaining written informed consent from the participants, the questionnaire was administered among the participating parents to collect the required information.

Statistical analysis

Data were analyzed using SPSS version 25 (Armonk, NY: IBM corp). The mean and standard deviation values were reported for the quantitative variables; while, the number and percentage were reported for

the qualitative variables. Independent t-test or one-way analysis of variance (ANOVA) was applied to analyze the correlation of qualitative variables with the susceptibility and attitude scores while the Pearson's correlation coefficient was used to analyze the correlation of quantitative variables with the susceptibility and attitude scores. $P < 0.05$ was considered statistically significant.

RESULTS

Demographic information

The mean age of the participating parents was 36.00 ± 6.66 years and the mean age of their children was 7.67 ± 2.15 years. Mainly mothers participated in this study (69%) and the level of education of the majority of the participants was high-school diploma (42.1%). They were mostly residing in urban areas (54.1%). Moreover, 22% of the participants reported a positive history of COVID-19 infection and 7% reported the death of a first-degree relative or close friend due to COVID-19. Table I presents the demographic information of participants in detail.

Table I - Demographic information of participants

Variable	Number	Percentage	
Gender	Male	72	31.0
	Female	160	69.0
Level of education	Below high-school diploma	74	34.3
	High-school diploma	91	42.1
	Bachelor's degree	40	18.5
	Master's degree or higher	11	5.1
Place of residence	Urban areas	125	54.1
	Rural areas	106	45.9
Family income	Both parents working	21	9.1
	Only father working	192	83.1
	Only mother working	6	2.6
	Both unemployed	12	5.2
Alterations in family income during the pandemic	Increased or no change	83	36.4
	Decreased	145	63.6
House ownership	Owned	139	60.4
	Rented	91	39.6
Number of children	1	54	23.3
	2	131	56.5
	3 or more	47	20.2
Order of child in the family	First	102	44.5
	Second	102	44.5
	Third or higher	25	11
The parent the child lives with	Both parents	223	96.1
	Father	4	1.7
	Mother	5	2.2
Gender of child	Female	117	50.4
	Male	115	49.6
Positive history of COVID-19 in the parents or first-degree relatives	Yes	50	21.6
	No	181	78.4
Death due to COVID-19 in first-degree relatives or close friends	Yes	16	6.9
	No	215	93.1

Dental history of children

Table II presents the information regarding the dental history of children. Nocturnal toothache and toothache when eating were the most common reasons for seeking dental care. Also, 34% of the parents reported not seeking dental care during the COVID-19 pandemic, mainly due to fear of being infected by COVID-19. According to the parents, the frequency of tooth brushing by their children did not change during the pandemic. Furthermore, 70% reported no change in the frequency of consumption of sugary foods and drinks by their children during the pandemic.

Overall attitude of the parents regarding the COVID-19

Table III presents the information about the overall attitude of the parents towards the

COVID-19 pandemic. Approximately 47% of the parents followed the traffic restrictions during the pandemic, and 64% were anxious or petrified. Nonetheless, 83% stated that they would attend their current dental appointments.

Susceptibility and attitude

Table IV presents the mean total score and the individual item responses (scores 1-3 as agree, scores 4-5 as disagree) for susceptibility and attitude of the parents towards dental appointments during the COVID-19 pandemic. The mean total score was 26.18 ± 4.96 for susceptibility and 26.92 ± 3.46 for attitude. Regarding individual items, the most disagreement susceptibility response belonged to the question "I believe that risk of being infected by COVID-19 in a dental setting is higher than that in a hospital

Table II - Children's dental treatment aspects and oral health habit

Variable	Response	Number	Percentage
Reason for seeking dental care	Nocturnal toothache	49	22.3
	Toothache when eating	73	33.2
	Dental infection and swelling	29	13.2
	Dental trauma	14	6.4
	Assessment of tooth eruption	16	7.3
	Orthodontic treatment	20	9.1
	Others	19	8.6
History of dental treatment before the pandemic	Yes	93	41.7
	No	130	58.3
Level of cooperation of the child in previous dental procedures	Good	113	84.3
	Moderate	17	12.7
	Poor	4	3.0
Not attending dental appointments during the pandemic	Yes	74	33.8
	No	145	66.2
Reason for not attending dental appointments during the pandemic	Fear of being infected by COVID-19	36	36.7
	Financial problems	29	29.6
	Non-emergency conditions	15	15.3
	Others	18	18.4
Change in frequency of toothbrushing during the pandemic	Increased	58	26.5
	No change	151	68.9
	Decreased	10	4.6
Consumption of sugary foods and drinks during the pandemic	Improved	33	14.9
	Worsened	33	14.9
	No change	155	70.1
Use of fluoride varnish during the pandemic	Yes	49	23.0
	No	164	77.0
History of remote consultation regarding dental problems of children (over the phone, or online)	Yes	20	9.0
	No	202	91.0

Table III - Overall attitude of the parents regarding the COVID-19 pandemic

Variable		Number	Percentage
Practice of the parents during the pandemic	Leaving the house only for work	101	47.2
	Occasionally going out for shopping, leisure, or meeting up with friends and family	93	43.5
	No change	20	9.3
Psychological status of the parents regarding the COVID-19	Calm and indifferent	82	36.3
	Anxious	111	49.1
	Scared/petrified	33	14.6
Attending dental appointments during the pandemic	Yes	189	83.3
	No/only in emergency situations	38	16.7

Table IV - Parental perceived susceptibility, attitude and beliefs during the COVID-19 pandemic for dental appointment of children

Perceived susceptibility to contract COVID-19 from attending a dental appointment	Response	Number	Percentage
In my opinion, dental clinicians are at higher risk of being infected by COVID-19 than others.	Agree	196	81.7
	Disagree	29	12.9
In my opinion, dental clinicians are at higher risk of transmitting COVID-19 to others.	Agree	185	81.9
	Disagree	41	18.1
I am concerned about being infected by COVID-19 from dental staff.	Agree	162	71.7
	Disagree	64	28.3
I am concerned about being infected by COVID-19 from other patients in the waiting room.	Agree	203	89.4
	Disagree	24	10.6
In my opinion, the risk of being infected by COVID-19 in a dental setting is higher than that in a supermarket.	Agree	171	75.3
	Disagree	56	24.7
In my opinion, the risk of being infected by COVID-19 in a dental setting is higher than that in movies.	Agree	123	54.7
	Disagree	102	45.3
In my opinion, the risk of being infected by COVID-19 in a dental setting is higher than that aboard a plane.	Agree	140	62.2
	Disagree	85	37.8
In my opinion, the risk of being infected by COVID-19 in a dental setting is higher than that in a concert/stadium.	Agree	119	52.9
	Disagree	106	47.1
In my opinion, the risk of being infected by COVID-19 in a dental setting is higher than that in a hospital admitting COVID-19 patients	Agree	81	37.3
	Disagree	136	62.7
Perceived susceptibility variable total score	Mean (SD)	26.2	5.0
Attitudes and beliefs regarding the risk of contracting COVID-19 from attending a dental appointment	Response	Number	Percentage
I believe that the risk of contracting COVID-19 is higher than the risk of not performing regular dental check-ups for my child.	Agree	160	75.1
	Disagree	53	24.9
I believe that the risk of contracting COVID-19 is higher than the risk of not restoring a cavity.	Agree	142	67.6
	Disagree	68	32.4
I believe that the risk of contracting COVID-19 is higher than the risk of not treating an aching tooth or dental infection.	Agree	124	58.5
	Disagree	88	41.5
Social distancing is important to prevent COVID-19.	Agree	11	5.1
	Disagree	204	94.5
I am well aware of the Ministry of Health guidelines for dental clinicians regarding the provision of dental care during the pandemic.	Agree	81	37.9
	Disagree	133	62.1
I trust my dental clinician that he/she strictly adheres to the Ministry of Health guidelines regarding the provision of dental care during the pandemic.	Agree	25	11.6
	Disagree	1901	88.4
I am concerned that use of personal protective equipment in dental setting leads to a shortage in such equipment for the hospitals admitting COVID-19 patients.	Agree	136	64.5
	Disagree	75	35.5
I believe that risk of contracting COVID-19 is higher than the risk of not performing emergency dental treatments.	Agree	169	80.1
	Disagree	42	19.9
Attitude and belief variable total score	Mean (SD)	26.9	3.5

Table V - Comparison of the attitude of the parents regarding susceptibility to COVID-19 based on some variables

		Mean	Std. Deviation	P-value*
Not attending dental appointments during the pandemic	Yes	25.11	4.59	0.034
	No	26.70	5.15	
Do you attend your dental appointments during the pandemic, if you have any?	Yes	26.57	4.81	0.012
	No/only in emergency situations	24.25	5.92	
Psychological status with regard to COVID-19	Calm and indifferent	27.28	5.42	0.016
	Anxious	25.85	4.38	
	Scared/petrified	24.40	4.98	

*Independent t-test or one-way ANOVA.

admitting COVID-19 patients”. Among the attitude items, the most disagreement response belonged to the statement “social distancing is important for prevention of COVID-19”.

Correlation of the attitude of the parents with different variables

As shown in Table V, independent t-test revealed significantly lower mean susceptibility score regarding dental services in parents with no history of dental appointment during the COVID-19 pandemic (25.11 ± 4.60 versus 26.70 ± 5.15 ; $P=0.034$). Also, the susceptibility score of the parents who gave a positive answer to the question “do you attend your current dental appointments, if you have any?” was significantly higher than the score of parents who reported seeking dental care only in emergency situations ($P=0.012$). Moreover, the score of the parents who declared to be calm and indifferent was significantly higher than the score of anxious or scared/petrified parents ($P=0.016$). A positive significant correlation was noted between the susceptibility score and attitude as well ($r=0.287$, $P<0.001$).

Although parents with academic education had a higher attitude score than those with high-school diploma or lower educational level, this difference was not statistically significant ($P=0.100$). The susceptibility and attitude scores of the parents regarding COVID-19 had no significant association with other variables ($P>0.05$).

DISCUSSION

Considering the scarcity of information regarding the effect of COVID-19 pandemic on pediatric dental appointments, this study aimed

to assess the attitude of the parents regarding oral health of their children and receipt of pediatric dental services during the COVID-19 pandemic and the associated factors in this respect. The reason to address this topic was the significant role of the parents as one corner of the pediatric dentistry triangle [11]. Although the parents reported no change in oral hygiene practice of their children during the pandemic, the receipt of preventive and therapeutic dental services had greatly decreased due to the existing concerns regarding contracting COVID-19. In the present study, 69% of the questionnaires were filled out by mothers, which reflects the fact that mothers mainly address the treatment needs of their children. This finding was similar to gender distribution of the parents who participated in a similar study [12]. According to the present results, 70% of the current dental visits were due to the consequences of untreated previous carious lesions. Nonetheless, approximately one-third of the parents declared that they did not attend their previous dental appointments due to fear of contracting COVID-19. In a study by Hajek et al. [8], approximately 43% of the patients had postponed their dental appointments, which was significantly correlated with younger age, and higher affect regarding COVID-19. In the present study, the economic impacts of COVID-19 had resulted in a reduction in the income of 60% of the participating families. However, only half of them stated not attending dental appointments due to financial issues. This finding may be attributed to low cost of dental procedures in a university setting compared with private dental offices, and the significance of other factors involved in seeking dental care during the pandemic. Nonetheless, 83% of the participants declared attending their current dental appointments, if having any. This finding

may be due to the reassurance of patients by dental clinicians, and observation of careful adherence of the staff to the protocols. Sun et al. [2] reported that 81% of the parents agreed to take their children for a dental visit after they were reassured about the safety and adherence to the guidelines over the phone. However, in the study by Peloso et al. [7] only 38% were persuaded to attend a dental appointment [7]. Controversy in the results on this topic may be due to different target populations, and the fact that the study by Peloso et al. [7] was conducted early in the pandemic. The percentage of parents who reported adhering to traffic restrictions regarding transportation at night during the pandemic was 47% in the present study while this rate was 78% in the study by Peloso et al. [7]. The majority of the participants reported being anxious or scared/petrified due to COVID-19 pandemic, which was in line with the findings of Peloso et al. [7].

According to the present results, parents who had cancelled their previous dental appointments had an overall higher level of concern regarding contracting COVID-19 in dental setting ($P=0.038$). Similarly, Samuel et al. [6] found that parents who had higher level of fear and anxiety regarding the COVID-19 pandemic often postponed the necessary dental treatment of their children, which was associated with a reduction in their oral health related quality of life. In line with their findings, more anxious parents in the present study preferred to seek dental treatment only in emergency situations ($P=0.015$). Parents who were calm or indifferent about the pandemic had a more positive attitude regarding dental care at this time ($P=0.016$), which was in agreement with previous findings reported in the literature [6,7,10].

Although the parents in the present study believed that the risk of COVID-19 transmission through dental procedures is high, they highly trusted their clinicians in adherence to the guidelines regarding the provision of dental care during the COVID-19 pandemic. On the other hand, the parents were most concerned about disease transmission from other patients in the waiting room. The maximum score in the domain of attitudes and beliefs belonged to the significance of social distancing in prevention of COVID-19. Thus, it may be concluded that standardization of waiting rooms according to the Center for Disease Control protocols and adherence to social distancing are among the

most important factors to reassure the patients and prevent appointment cancellation by them.

Estimation and comparison of the risks of COVID-19 with dental procedures required for children according to the opinion of the parents revealed that as the required procedure became more acute (from dental check-up to restorative procedures, and then management of acute conditions such as dental infections), the significance of treatment increased to the parents but they still believed that the risk of COVID-19 contraction was more serious than the risk of not receiving the required dental procedure. This finding was in agreement with the results of previous studies [2,13], and is alarming since it points to the increased risk of dental emergencies [3,9].

In the present study, only 9% of the parents reported benefitting from remote dental consultations. Sen Tunc et al. [12] reported self-medication by 70% of the parents to alleviate dental pain in their children during the COVID-19 pandemic. In a retrospective study on online pediatric dental consultations in Wuhan, China, 40% of the consultations were about emergency conditions; 98% of which were related to toothache, swelling, or dental trauma [5]. This finding highlights the need for reinforcement of tele-dentistry infrastructures and provision of remote therapeutic services for primary assessment and triage of patients.

Approximately 70% of the parents in the present study reported no change in oral hygiene behavior of their children (tooth brushing) and consumption of sugary foods and drinks during the COVID-19 pandemic. Similarly, 58% of the parents in a study by Baptista et al. [14] reported no change in tooth brushing frequency by children. However, controversy exists on this topic since a cohort study on adolescents reported a significant reduction in daily frequency of tooth brushing during the COVID-19 pandemic [15]. It should be noted that this finding only reflects the perception of the parents regarding oral hygiene behavior and practice of their children and does not necessarily indicate correct implementation of preventive measures. Also, the present finding may be attributed to the time of conduction of this study since this study was carried out approximately one year after the emergence of COVID-19 pandemic when online participation in school programs organized the

daily routine of children and their hygienic behavior to a great extent. The present results regarding no change in consumption of sugary foods and drinks were in agreement with the findings of the abovementioned cohort study on adolescents [15], which is probably related to increased frequency of home cooking and having a healthier diet during the lockdowns.

Approximately 77% of children in the present study reported no use of professional fluoride therapy during the COVID-19 pandemic, which reflects only a small percentage of all children requiring fluoride therapy. In a study by Schwendicke et al. [16] the greatest reduction in dental appointments was related to preventive procedures, which had decreased by 80% compared with the pre-pandemic time. The percentage values reported in the present study supported those of Schwendicke et al. [16] which is alarming and points to the high possibility of an increase in the prevalence of dental caries in near future.

One limitation of this study was that it was conducted at only one center (university clinic of Qazvin city). Although the conditions in Qazvin city are similar to most other parts of Iran, multi-center studies in different cities are required to increase the generalizability of the results.

CONCLUSIONS

Within the limitations of this study, it can be concluded that most parents are highly concerned about the contraction of COVID-19 in dental setting, and consequently, they often postpone emergency and non-emergency dental appointments of their children, which leads to increased unmet dental needs during pandemic. Most of the chief complaints included toothache and the percentage of preventive dental treatments was low, which may lead to higher burden of children dental caries in near future.

In order to prevent a catastrophe in future oral health of children, the Center for Disease Control protocols regarding social distancing in dental clinics should be precisely followed, and the parents should be informed and reassured in this respect to decrease the cancellation rate of appointments. Also, the infrastructure required for tele-dentistry should be created to form an

efficient dentist-patient communication and perform the triage of patients remotely.

Authors' Contributions

Conceptualization; R.J, M.T. , AH.P. ; Methodology; R.J., N.A. , SH.S., M.R., Software; M.R., Validation; R.J., M.T., M.R., Formal Analysis; M.R., Investigation; R.J., M.T., M.R., Resources; R.J, N.A., SH.S., Data Curation: M.R.; Writing – Original Draft Preparation; Writing – Review & Editing: R.J., M.T., AH.P., R.P.,; Visualization: M.T., Supervision: R.J., R.P.

Conflict of Interest

There is no conflict of interests.

Funding

This study was supported by Dental Caries Prevention Research Center, Qazvin University of Medical Sciences, Qazvin, Iran.

Regulatory Statement

This study was approved by the ethical committee of Qazvin University of Medical Sciences with an ethical number of IR.QUMS.REC.1400.015.

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Date submitted: 2022 Feb 02
Accept submission: 2022 May 10