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Middle East Research Journal of Dentistry
ISSN: 2789-8687 (Print) & ISSN: 2958-2075 (Online)
Frequency: Bi-Monthly
DOI: https://doi.org/10.36348/merjd.2025.v05i02.002

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Dental Visits and Dental Treatment Patterns among Preschool Children during the COVID-19 Pandemic: A Retrospective Study

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Abstract: ***Objectives*:** To investigate the patterns of dental visits and treatment patterns among preschool children during the COVID-19 pandemic at a dental centre in Kuwait. ***Method*:** This study was designed as a retrospective observational study involving children aged 3 to 6 years, who visited a dental centre serving 17 cities in Zahra, Kuwait, from 2020 to 2022. Patients' demographic data, reasons for dental visits, medical history, dental caries experiences, frequency of dental visits, and treatment items were extracted from patient file records using a pre-determined data extraction sheet by two calibrated investigators. ***Result*:** A total of 369 dental visits were reviewed among 296 Kuwaiti preschool children. The average age of those children was 4.32 (±1.05), with 53.0% (n=157) below age five. The primary reasons for dental visits were pain relief and dental check-ups. The most frequently employed preventive measures were topical fluoride application and oral hygiene instruction. In 2020 and 2021, the most prevalent active treatment was tooth extraction. The proportion of children who underwent tooth extraction was higher in children with toothache than those without toothache (58.2% vs 25.3%, p<0.001). Medication tended to be prescribed for children aged 3 to 4 years, when compared to those over 4 years old (9.6% vs 2.9%, p=0.019). Conversely, children over the age of four were more likely to have multiple dental visits compared to their younger counterparts (28.1% vs 15.9%, p=0.016). ***Conclusion***: Dental treatment patterns were associated with children's age, caries experience and history of toothache. Children suffering from toothache were more inclined to undergo tooth extraction during COVID-19 pandemic.

Keywords: COVID-19, Dental Visit, Retrospective, Preschool Children, Paediatric.

Research Paper

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How to cite this paper:
Rawan Aldeijani *et al* (2025). Dental Visits and Dental Treatment Patterns among Preschool Children during the COVID-19 Pandemic: A Retrospective Study. *Middle East Res J. Dent*, 5(2): 14-22.

Article History:
| Submit: 29.01.2025 |
| Accepted: 28.02.2025 |
| Published: 08.03.2025 |

1. INTRODUCTION

COVID-19, caused by airborne pathogens such as SARS-CoV-2, is a highly infectious disease that rapidly spread, leading to a global pandemic. In January 2020, the World Health Organization (WHO) declared the outbreak of COVID-19 as a "public health emergency of international concern", and the outbreak exhibited substantial implications on social and economic structures, as well as health care services (Estrich *et al*., 2020; WHO, 2020). Dental care providers are at an increased risk of exposure to COVID-19, as most dental treatment procedures produce significant amounts of droplets or aerosols, which consist of saliva, blood, and tissue fluids (Goriuc *et al*., 2022). These procedures are considered high-risk for the spread of the virus due to the potential for airborne transmission. An online survey involving 2,195 dentists in US revealed that most dental offices implemented enhanced infection prevention measures, including patient screening, social distancing, disinfection, and utilisation of personal protective equipment (PPE), in order to control the SARS-CoV-2 transmission in dental clinic settings (Estrich *et al*., 2020). The enhanced infection control protocols can also increase the cost and complexity of dental care. Many dental services were temporarily ceased or postponed during the outbreak of the pandemic, causing a delay in routine and preventive dental care for dental patients, which may have led to the deterioration of existing dental diseases (Dill *et al*., 2023; Hajek *et al*., 2021). A nationally representative web-based survey conducted in Germany revealed that more than one in five patients had postponed their dental visits,

and this trend was age-dependent, with younger patients being more likely to delay their dental visits during the COVID-19 pandemic *(Hajek et al*., 2021).

Kuwait, a Middle Eastern country, shares its southern border with Saudi Arabia and its northern border with Iraq. The country has a diverse population, comprising individuals from a range of Arab nations, including Egypt, Syria, and Lebanon, as well as those from Southeast Asian countries (Hamadah *et al*., 2020). The first case of COVID-19 in Kuwait was reported in February 2020 (*KUNA : Kuwait Confirms 3 Coronavirus Cases Coming from Iran's Mashhad Health, 2020*). Since then, the virus has spread rapidly across the country, affecting individuals of various ages and backgrounds. In response to the pandemic, the Kuwaiti government implemented a series of measures to curb the spread of the virus. During the first shutdown period in Kuwait, which lasted from April 2020 to June 2020, almost all types of dental procedures were impacted (AlHayyan *et al*., 2022). Several studies have been conducted to investigate the dental caries experiences and dental treatment among Kuwaiti residents. A questionnaire-based study recruited individuals from six districts in Kuwait, and revealed that only 32.2% of the participants had dental visit experiences within 6 months, and toothache and dental emergencies were identified as common reasons for dental visits (Al-Shammari *et al*., 2007). In another study conducted at a dental clinic in Kuwait, it was reported that 52% of paediatric patients had untreated cavities, 33% had extensive cavities, and 8% experienced tooth loss (Ali, 2016). However, there are limited studies investigating dental visits, oral health status, or treatment patterns among preschool children in Kuwait, especially during the COVID-19 pandemic.

Conducting retrospective studies on dental visit patterns during the COVID-19 pandemic is essential for understanding the implications and consequences of the disruptions experienced in dental care services, as Kuwait has a diverse population with varying dental care needs. The aim of this retrospective study is to investigate dental visits and dental treatment patterns among preschool children during the COVID-19 pandemic in Kuwait. By analysing dental service patterns and trends during the pandemic, dental professionals and policymakers could understand the challenges faced and identify areas requiring improvement or support.

2. MATERIALS AND METHODS

2.1. Ethical Approval

This study was reviewed and approved by the Standing Committee of Medial & Health Research Coordination, Ministry of Health, State of Kuwait (Ref.: 1086) as well as the Institutional Review Board of the University of Hong Kong / Hospital Authority Hong Kong West Cluster (Ref.: UW 24-499). Written informed consent was signed by parents or legal guardians of the children during their initial dental appointment.

2.2. Study Design and Participants

This study was designed as a retrospective observational study. The participant pool consisted of children registered at the Paediatric Dentistry Unit at Jaber Al-Ahmad Specialized Dental Centre in Kuwait spanning from the year of 2020 to 2022, during the COVID-19 pandemic. The inclusion criteria were: i) Children aged between 3 to 6 years old; ii) Children born and raised in Kuwait; iii) Children living in cities that are served by Jaber Specialised Dental Centre (Al-Qusour, Al-Adan, Al-Qurain, Mubarak Al-Kabeer, Sabah Al-Salem, Hitteen, Salam, Zahra, Shuhada, Al-Siddiq, Messila, Al-Masayel, Al-Fnaitees, Subhan Industrial, Abu Ftaira, West Abu Ftaira Herafiya , Wista Area(Related to Al-Qurain Markets & Subhan Military Area); iii) Children with comprehensive charting, radiographic examination and clinical records; and vi) Consent forms signed by parents or legal guardians. The exclusion criteria were as follows i) Children younger than 3 or older than 6 years; ii) Children whose clinical records presented with missing items; and iii) Children with intellectual or developmental disabilities.

2.3. Data Collection

To ensure consistency and comprehensiveness, a pre-determined clinical note extraction sheet was employed to extract data from patient file records, including the reasons for dental visits (chief complaint), age, gender, medical history, dental caries status, frequency of dental visits, and treatment procedures performed. The dental treatment items were categorised into the following domains: i) Preventive treatment, encompassing dental prophylaxis, topical fluoride application, dietary analysis, oral hygiene instruction, and fissure sealant application; ii) Restorative treatment, including composite restoration, glass ionomer cement (GIC)/ resin-modified glass ionomer cement (RMGIC) restoration, conventional stainless steel crown (SCC), and Hall crown; iii) Pulp treatment, such as pulpotomy or pulpectomy; iv) Tooth extraction; v) Space maintainer, including band and loop, lower lingual holding arch, Nance button, trans-palatal appliance, and partial dentures; and vi) prescription of medication. The above information was extracted and cross-checked by two investigators.

2.4. Data Analysis

Statistical analysis was performed using the IBM SPSS Statistics 28.0 (IBM Corp, Armonk, New York). Categorical variables were presented as frequencies and percentages, whereas continuous data were presented by mean and standard deviations (SD). Fisher's Exact tests and Chi-square tests were employed to analyse the associations between the categorical

independent variables and patients' dental conditions or dental treatment experiences. All the tests were two-sided, and the statistical significance was set at 0.05.

3 RESULTS

3.1. Characteristics of Children Who Visited Dentists during COVID-19

During the period of the COVID-19 pandemic, a total of 296 preschool children visited Jaber Al-Ahmed Specialised Dental Hospital. The average age of those children was 4.32 (±1.05), with 53.0% (n=157) were under the age of five. Nearly half (51%) were girls. Additionally, 7.1% (n=21) of these children were presented with systemic diseases, and the majority (91.9%) of children exhibited dental caries. Over three-quarters (78.4%) of the paediatric patients attended just one dental appointment during the COVID-19 pandemic (Table 1).

Table 1: Characteristics of children who visited dentists during COVID-19 (n=296).

	% (n)	Mean (SD)
Sex		
Male	49.0 (145)	
Female	51.0 (151)	
Age (year)		4.32 (1.05)
3 to 4	53.0 (157)	
5 to 6	47.0 (139)	
Systemic diseases		
Yes	7.1 (21)	
No	92.9 (275)	
Dental caries		
Yes	91.9 (272)	
No	8.1 (24)	
Multiple dental visits		
Yes	21.6 (64)	
No	78.4 (232)	

3.2 Dental Visit Patterns among the Recruited Patients

During the COVID-19 pandemic, 369 dental visits were reviewed among child patients who met the inclusion criteria. The number of dental visits across the years 2020, 2021, and 2022 were 51 (13.8%), 124 (33.6%), and 194 (52.6%), respectively, demonstrating an increasing trend over the years. The top two reasons for dental visits during the study period were dental check-ups (40.4%) and toothache (32.0%). Only 0.3% (n=1) of the paediatric patients sought dental treatment for aesthetic issues, while 6.5% (n=24) patients came for soft tissue lesions, and 7.0% (n=26) for tooth decay (Figure 1).

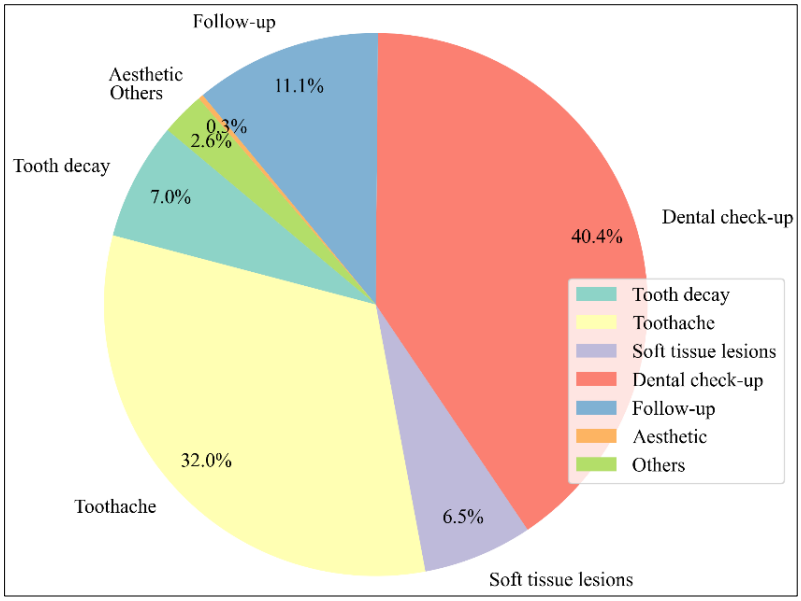

Figure 1: Reasons for paediatric dental visits during COVID-19 pandemic

Moreover, 21.6% (n=64) of the recruited patients visited dentists multiple times during the COVID-19 pandemic. The proportion of children who had multiple dental visits was higher among children aged 5 to 6 years than those aged 3 to 4 years old (28.1% vs 15.9%, p = 0.016). However, there were no significant differences in gender, medical history, and dental caries status (p > 0.05). No significant differences were detected in gender, age, and medical history among children who visited dentists for regular dental check-ups (p > 0.05). Likewise, there were no statistical differences in sex, age, and medical history among children who visited dentists due to toothache. Reasonably, caries-free children were more likely to visit a dentist for routine check-ups when compared to children affected by dental caries (87.5% vs 44.5%, p <0.001). In contrast, children with dental caries were more likely to visit dentists for toothache-related issues when compared to children without caries (40.1% vs 4.2%, p <0.001, Table 2).

Table 2: Dental visit patterns among paediatric patients during COVID-19 pandemic

Factors	Multiple dental visits (n=64)		Dental check-ups (n=142)		Toothache (n=110)	
	% (n)	*p*	% (n)	*p*	% (n)	*p*
Gender		NS		NS		NS
Male	20.0 (29)		49.7 (72)		33.8 (49)	
Female	23.2 (35)		46.4 (70)		40.4 (61)	
Age (years)		0.016		NS		NS
3-4 years	15.9 (25)		50.3 (79)		33.1 (52)	
5-6 years	28.1 (39)		45.3 (63)		41.7 (58)	
Systematic disease		NS		NS		NS
Yes	38.1 (8)		48.4 (133)		36.7 (101)	
No	20.4 (56)		42.9 (9)		42.9 (9)	
Dental caries		NS		<0.001		<0.001
Yes	22.4 (61)		44.5 (121)		40.1 (109)	
No	12.5 (3)		87.5 (21)		4.2 (1)	

3.3. Dental Treatment Patterns among the Paediatric Patients

The treatment items provided to the preschool children who visited Jaber Al-Ahmed Specialised Dental Centre during the COVID-19 pandemic were summarised in Table 3. Restorative materials like composite, GIC, and SCC were chosen by the dental practitioners. An increasing trend was observed in the application of Hall crowns, with 7.8% in the year of 2020, 21.0% in 2021, and 22.2% in 2022. A similar increase was observed in the prescription of medications from 2020 to 2022, with 2.0% in 2020, 4.8 % in 2021, and 6.2% in 2022. In contrast, the proportion of children receiving GIC restorations displayed a decreasing tendency from 2020 to 2022. Likewise, the percentage of children undergoing tooth extractions also declined, from 37.3% in 2020 to 33.9% in 2021, and further dropped to 32.5% by the end of 2022. Additionally, after tooth extraction, none of those children had received space maintainer during the COVID-19 pandemic.

Table 3: Dental treatment among paediatric patients during the COVID-19 pandemic

Items	2020 (n=51)	2021 (n=124)	2022 (n=194)
Preventive Treatment			
Prophylaxis	2.0 (1)	1.6 (2)	3.1 (6)
Topical fluoride	51.0 (26)	62.9 (78)	41.2 (80)
Diet analysis	17.6 (9)	16.1 (20)	20.1 (39)
Oral hygiene instruction	43.1 (22)	33.9 (42)	43.3 (84)
Fissure sealant	17.6 (9)	9.7 (12)	12.9 (25)
Restorative treatment			
Composite restoration	31.4 (16)	19.4 (24)	22.2 (43)
GIC restoration	7.8 (4)	5.6 (7)	4.1 (8)
Conventional SSC	33.3 (17)	27.4 (34)	34.0 (66)
Hall crown	7.8 (4)	21.0 (26)	22.2 (43)
Pulp treatment	37.3 (19)	21.0 (26)	25.3 (49)
Surgical treatment	37.3 (19)	33.9 (42)	32.5 (63)
Space maintainer	-	-	-
Medication	2.0 (1)	4.8 (6)	6.2 (12)

Data presented in the format of % (n).

At the beginning of COVID-19 pandemic, the top five dental treatment items were topical fluoride application, oral hygiene instruction, tooth extractions, pulp treatment, and conventional SSC. In the year of 2022, the top five dental treatment items shifted to oral hygiene instruction, topical fluoride application, conventional SSC, surgical extraction, and pulp treatment. Preventive treatments, particularly topical fluoride application and oral hygiene instruction, remained popular among pediatric patients during the entire pandemic period. However, dental prophylaxis, a basic preventive dental procedure for plaque removal, was found to be the least popular preventive measure during the whole COVID-19 pandemic period (Figure 2).

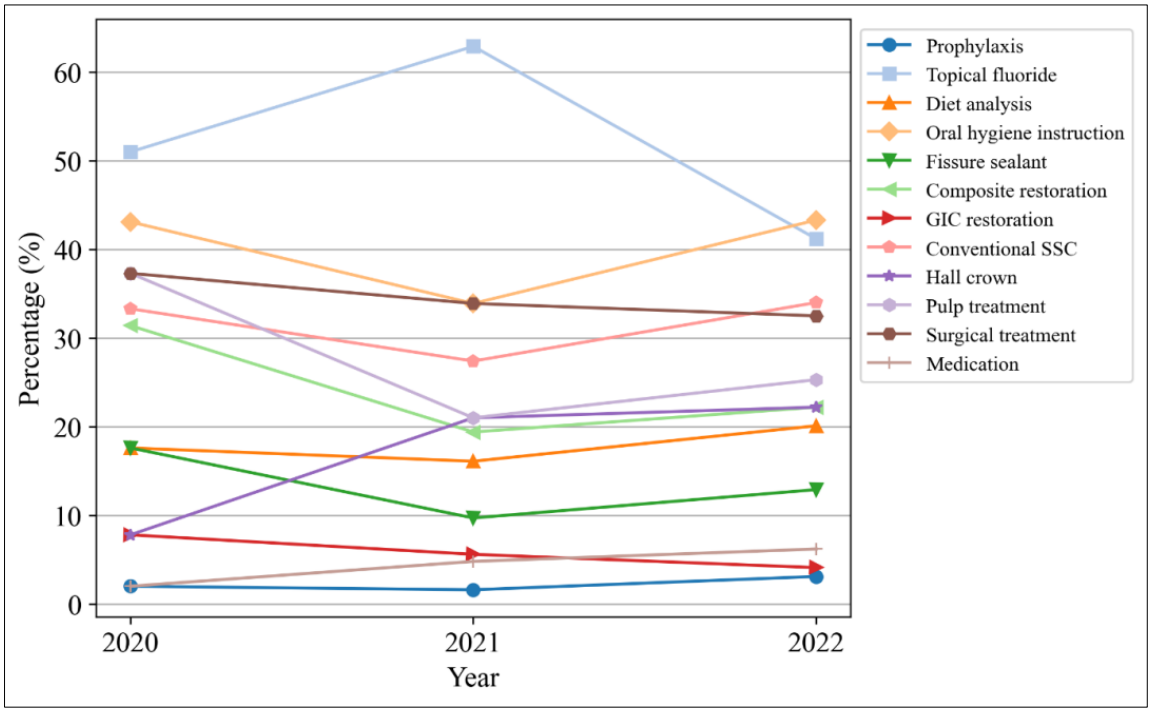

Figure 2: Dental treatment patterns among paediatric patients during the COVID-19 pandemic

3.4. Factors associated with Paediatric Dental Treatment Patterns during COVID-19

There were no significant differences in dental treatment patterns between boys and girls nor between children with and without systemic diseases ($p > 0.05$, Table 4). However, children's dental caries status was found to be associated with the types of treatment they received. Children without dental caries tended to receive preventive treatment when compared to children with dental caries (100% vs 71.7%, $p = 0.002$). Conversely, children with dental caries tended to receive restorative and pulp treatment (63.2% vs 4.2%, $p < 0.001$), as well as tooth extraction (40.4% vs 4.2%, $p < 0.001$), when compared to those children without dental caries. Furthermore, the proportion of children who received preventive treatment was higher among children without toothache than those who complained of toothache (82.8% vs 59.1%, $p < 0.002$). In contrast, the proportion of children who received surgical treatment was higher among children with toothache when compared to those without toothache (58.2% vs 25.3%, $p < 0.001$). Additionally, the proportion of children prescribed medication was higher in children aged 3 to 4 years when compared to children aged 5 to 6 years (9.6% vs 2.9%, $p = 0.019$).

Table 4: Factors associated with dental treatment items among the paediatric dental patients during the Covid-19 pandemic

Factors	Preventive treatment (n=219)		Restorative & pulp treatment (n=173)		Surgical treatment (n=111)		Prescription of medication (n=19)	
	% (n)	*p*	% (n)	*p*	% (n)	*p*	% (n)	*p*
Sex		NS		NS		NS		NS
Male	73.1 (106)		57.9 (84)		33.8 (49)		6.2 (9)	
Female	74.8 (113)		58.9 (89)		41.1 (62)		6.6 (10)	
Age		NS		NS		NS		0.019
3-4	74.5 (117)		56.7 (89)		34.4 (54)		9.6 (15)	
5-6	73.4 (102)		60.4 (84)		41.0 (57)		2.9 (4)	

Systematic disease		NS		NS		NS		NS
No	73.8 (203)		57.5 (158)		37.5 (103)		6.9 (19)	
Yes	76.2 (16)		71.4 (15)		38.1 (8)		0.0 (0)	
Caries status		0.002		<0.001		<0.001		NS
No	100 (24)		4.2 (1)		4.2 (1)		0.0 (0)	
Yes	71.7 (195)		63.2 (172)		40.4 (110)		7.0 (19)	
Toothache		<0.001		NS		<0.001		NS
No	82.8 (154)		55.4 (103)		25.3 (47)		5.9 (11)	
Yes	59.1 (65)		63.6 (70)		58.2 (64)		7.3 (8)	

4. DISCUSSION

The global COVID-19 pandemic exhibited a significant impact on dental care. Retrospective studies on dental visit patterns during the pandemic are crucial for understanding the disruptions in dental care and informing future strategies depending on the nature of the emergency situation like wars, natural disasters or new pandemic. In this retrospective study, a total of 369 dental visits were reviewed among 296 Kuwaiti preschool children during the pandemic. Over the three-year pandemic period, we observed an upward trend in the number of dental visits among paediatric patients, with the lowest number of visits recorded in 2020. This pattern aligns with another study involving multiple hospitals and clinics in Canada, which also reported a sharp decrease in dental visits among paediatric patients in 2020 (Moharrami *et al*., 2022). The patients' demographic characteristics, dental visit frequencies, reasons for dental visits, and dental treatment items were investigated in the present study. To the best of our knowledge, this is the first observational study to investigate dental attendance and dental treatment patterns among Kuwaiti preschool children during the COVID-19 pandemic.

Regarding the reasons for dental visits during the COVID-19 pandemic, our study indicated that toothache was identified as one of the major concerns, while aesthetic issues were only reported by 0.3% of the recruited child patients. This demonstrated a trend of patients seeking dental care primarily for symptomatic relief rather than for aesthetic purposes. Additionally, another study highlighted that patients requiring urgent dental treatments were more likely to seek dental services during the pandemic (Moharrami *et al*., 2022). Several dental care protocols emphasise the importance of prioritising emergency and urgent dental treatments for conditions such as swelling, pain, bleeding, dental trauma, and infections during COVID-19 (Shamsoddin *et al*., 2021). In fact, the priority during the pandemic was pain relief, especially during curfew from March to June 2020, as emergency protocol was applied in all the specialised Dental Centres in Kuwait. In an online survey conducted in Japan, 3,895 individuals reported that they were suffering from toothache during the pandemic, and almost half (n=1,906) of them refrained from visiting a dentist even though they wished to seek treatment *(Koyama et al.*, 2022). This suggested that toothache was a primary concern for dental attendance, and the dental treatment needs of patients suffering from toothache were not adequately met during the COVID-19 pandemic.

The barriers to dental visits during the pandemic are not limited to the concerns of SARS-CoV-2 infection, but also related to the decreased income (Koyama *et al.*, 2022; Zhou *et al.*, 2021). A cross-sectional study involving 27,575 participants demonstrated that decreased income was associated with postponed or cancelled dental visits during the pandemic, and the economic impact of the pandemic could potentially exacerbate oral health inequalities (Koyama *et al*., 2022). A study conducted during a non-pandemic period further highlighted that children from lower-income families were more likely to encounter dental care barriers (Zhou *et al*., 2021). Additionally, our findings indicated that younger children were less likely to have multiple dental visits during the COVID-19 pandemic when compared to their elder counterparts. This age-dependent pattern of dental visits was also reflected in another study, which revealed that younger patients were more likely to delay dental visits during the pandemic (Hajek *et al*., 2021). A pre-pandemic cross-sectional study also found that among preschool children, those aged 4 to 6 years were more likely to visit a dentist than children aged 3 or below (Zhou *et al*., 2021).

Regarding the dental treatment items during the COVID-19 pandemic, preventive measures were widely used, particularly the topical fluoride application and oral hygiene instruction. From 2020 to 2022, these two strategies served as the top two preventive measures among the recruited child patients. However, dental prophylaxis, a basic preventive dental procedure, was the least popular preventive measure used during the pandemic. According to the American Academy of Pediatric Dentistry (AAPD, 2024), dental prophylaxis is typically performed by dental personnel to professionally remove plaque, stain, and calculus from patients' tooth surfaces, which helps facilitate patient oral health education and clinical examination. However, the removal of dental plaque or stains using a rubber cup or ultrasonic scalers can generate droplets or aerosols, potentially increasing the risk of SARS-CoV-2 transmission. Similarly, the application of fissure

sealants, which requires rinsing and drying the tooth surface, could also generate droplets or aerosols. Therefore, compared to other preventive measures (such as fluoride application, oral hygiene instruction, and dietary analysis), dental prophylaxis and fissure sealants were less commonly selected by dental practitioners during the COVID-19 pandemic.

The top three active dental treatment items during the COVID-19 pandemic were tooth extraction, pulp therapy, and SSC restoration, which were widely used among children with dental caries. Additionally, children affected by dental caries were more likely to suffer from toothache during COVID-19 pandemic. A cross-sectional study conducted in India found that children with dental caries and higher levels of self-perceived toothache were more likely to have poorer Oral Health-Related Quality of Life (OHRQOL) during the COVID-19 pandemic (Samuel *et al.*, 2021). These findings indicated that dental caries remained a major dental issue among young children. In the post-pandemic period, oral health promotion activities are highly recommended to control the progress of dental caries in preschool children and enhance their quality of life.

A retrospective study conducted in Poland revealed an increase in the number of surgical procedures during the COVID-19 pandemic when compared to the pre-pandemic period (Nijakowski *et al.*, 2021). Children who were experiencing toothache were more likely to have their teeth extracted during the pandemic. Premature loss of primary teeth may lead to complications such as drifting of the adjacent teeth, midline shift, and space loss, which in turn can result in ectopic eruption, early eruption, delayed eruption, or even impaction of the permanent tooth in both mixed and permanent dentitions (Gandhi & Gurunathan, 2022; Laing *et al*., 2009). A space maintainer is recommended to mitigate the consequences of space loss, thereby reducing the demand for complex orthodontic interventions in the future (Gandhi & Gurunathan, 2022; Laing *et al.*, 2009; Simon *et al*., 2012). In our pre-determined data extraction sheet, we considered both fixed and removable appliances, such as band and loop, lower lingual holding arch, Nance button, trans-palatal appliance, and partial dentures. However, none of the paediatric patients who had undergone tooth extraction during the pandemic received a space maintainer afterwards.

A questionnaire-based cross-sectional study conducted in Saudi Arabia found that while 72.8% of parents reported that their children had missing teeth due to dental caries or tooth injuries, 76% of parents had never heard of space maintainers, and 71.6% reported that their dentists did not advise them to use any space maintainer (AlMotawah *et al*., 2022). These findings indicated a lack of awareness regarding space maintenance among parents. Additionally, space maintainers have potential drawbacks. They can retain dental plaque, increasing the risk of dental caries and gingival inflammation, and may also impinge on soft tissues, disrupt the eruption of adjacent teeth, or fracture and become dislodged (Gandhi & Gurunathan, 2022). Maintaining these appliances often requires periodic check-ups, repairs, or even the replacement of several different types of space maintainers until the completion of treatment (Ahmad *et al*., 2018). The ongoing COVID-19 pandemic might exacerbate parental reluctance to frequent dental visits. To address this challenge, Yangdol and colleagues used three-dimensional (3D) printing technology to fabricate a space maintainer for a child patient with autism, indicating that digital dentistry could be a child-friendly and time-saving approach during challenging periods like a pandemic (Yangdol *et al*., 2023).

Our study was the first retrospective study revealing the patterns of dental visits and dental treatment items among preschool children in Kuwait. There were several limitations in the present study. The primary limitation was that the dental records were extracted from a single dental centre in Kuwait, rather than multiple centres, resulting in a smaller sample size. Nevertheless, the Paediatric Dentistry Unit at Jaber Al-Ahmad Specialised Dental Centre in Kuwait, which serves as the data resource for this study, provides free dental care for preschool children who are living in Al-Qusour, Al-Adan, Al-Qurain, Mubarak Al-Kabeer, Sabah Al-Salem, Hitteen, Salam, Zahra, Shuhada, Al-Siddiq, Messila, Al-Masayel, Al-Fnaitees, Subhan Industrial, Abu Ftaira, West Abu Ftaira Herafiya , Wista Area (Related to Al-Qurain Markets & Subhan Military Area). Given that all preschool children living in these cities have access to dental services at this centre, it allowed us to gather a representative sample, providing insights into the dental treatment patterns among Kuwaiti preschool children during the COVID-19 period. Another limitation of our study was its limited timeframe, focusing on the pandemic period without making comparisons to the pre-pandemic or potential post-pandemic periods. To fully understand the impact of COVID-19 on paediatric dental care, more well-designed studies with larger sample sizes and longer time spans are required.

5. CONCLUSION

The COVID-19 pandemic has had an impact on paediatric dental visits and dental treatment patterns among preschool children in Kuwait. Over the span of the three-year pandemic, an increasing trend was observed in the number of paediatric dental visits. The primary reasons for dental visits were pain relief and dental check-ups. Children aged 5 to 6 years were more likely to have multiple dental visits during the pandemic than younger children, whereas children aged 3 to 4 years

tended to receive less invasive treatments, such as prescribed medications. Preventive measures were widely implemented among paediatric patients. The most popular preventive measures were topical fluoride application and oral hygiene instruction, whereas dental prophylaxis was not frequently used during the pandemic. Regarding active treatment items, tooth extraction, pulp therapy, and SSC restoration were the top three dental procedures that were more likely to be provided to children with dental caries. Children suffering from toothache were more inclined to undergo tooth extraction without the placement of subsequent space maintainers. More well-designed retrospective and cohort studies with larger sample sizes and longer time spans are warranted to provide a more comprehensive overview of the impact of COVID-19 on dental care among child patients.

Author Contributions:

Conceptualization, Rawan Aldeijani and Hai Ming Wong; Methodology, Cynthia Kar Yung Yiu and Ni Zhou; Investigation, Rawan Aldeijani, Waleed Aldeeweli and Mohammad Almehateb; Resources, Waleed Aldeeweli and Mohammad Almehateb; Writing – original draft, Rawan Aldeijani; Writing – review & editing, Waleed Aldeeweli, Mohammad Almehateb, Cynthia Kar Yung Yiu, Hai Ming Wong and Ni Zhou.

Funding: This research received no external funding.

Institutional Review Board Statement:

This study was reviewed and approved by the Standing Committee of Medial & Health Research Coordination, Ministry of Health, State of Kuwait (Ref.: 1086) as well as the Institutional Review Board of the University of Hong Kong / Hospital Authority Hong Kong West Cluster (Ref.: UW 24-499).

Informed Consent Statement:

Written informed consent was signed by parents or legal guardians of the children during their initial dental appointment.

Data Availability Statement:

The original contributions presented in this study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

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