Original Research Article

Impact of COVID 19 pandemic on dental clinic visits

Abstract

Before and during the COVID-19 epidemic, the authors tried to measure the frequency of dental visits. They also tried to determine whether socioeconomic status, oral health diagnoses, and dental service providers can predict dental visits. Patients seeking dental care in Al-Yamama hospital, dental department, Riyadh Saudi Arabia served as the study's participants. Data were taken from digital databases between March 12, 2020, and December 30, 2020, as well as during the same time period in 2019. Multiple logistic regression and the analysis of variance test were used to evaluate the data at = 0.05. A total of 32244 dental appointments were made; in 2019 and 2020, there were 21199 and 11045 visits, respectively. Despite the overall decline, the COVID-19 pandemic in 2020 saw an increase in the number of visits for infections, salivary issues, and temporomandibular disorders. Dental visits during the pandemic were linked to both greater socioeconomic level and more intricate oral diagnosis and dental care. Dental appointments fell off under lockdown notably during the COVID-19 outbreak. Most patients who needed urgent treatment for difficult issues went to dental clinics. Socially deprived people mostly experienced reduced access to care.

Introduction

The upper airways are harmed by COVID-19 infection, which is caused by the new virus coronavirus 2 (WHO, 2020) .The principal clinical signs of the infection include fever, cough, exhaustion, and loss of taste and smell (Guan et al., 2020). The WHO has classified the COVID-19 health issue as a pandemic (WHO). 3 9% of those with the virus are health care workers, who are also at high risk of exposure. Similar to medical professionals, dental professionals are more likely to be exposed to the coronavirus due to close contact with saliva, blood, and a range of aerosol-producing dental procedures. (Spagnuolo et al., 2020).

As a result, many nations imposed limitations to stop the spread of COVID-19. Therefore, WHO encouraged dentists to only offer emergency care that was necessary to preserve a patient's dental function, relieve severe pain, or maintain the patient's quality of life. Non-urgent operations including examinations, prophylaxis, preventive care, and aesthetic procedures should be postponed until there has been a significant drop in COVID-19 community transmission, it was urged (Who, 2020).

Dentists took stringent precautions created by their regional health authorities, as advised by WHO, to stop the virus from spreading. Along with teledentistry, dentists adopted innovative

triage, evaluation, and treatment techniques to reduce work dangers. This method allowed for the initial identification of a true emergency and, if feasible, the prompt implementation of pharmacotherapy. Dental professionals screened patients and looked for COVID-19 clinical symptoms if they needed hands-on dental care. In private clinics outfitted with level 1 personal protective equipment, only patients who could be treated with low-aerosol-generating procedures and met the negative COVID-19 screening criteria would be seen. Patients were to be treated in hospital clinics with suitable infrastructure and level 2 personal protective equipment installation if a symptom was present or if aerosol-generating treatments were necessary (Lammers et al., 2020). Given the limitations placed on the provision of dental care and the additional financial and psychological burdens caused by the COVID-19 pandemic, many people were likely to forego routine dental care (Mallineni et al., 2022).

Data on before and during the pandemic of individual's characteristics, dental visit patterns and frequency, dental services, oral diagnoses, and patient characteristics are missing. In order to ascertain if dental visits during the pandemic could be predicted on the basis of demographic parameters, socioeconomic status, service providers, and diagnoses of oral issues, our goal was to measure the frequency of dental patient visits before, during, and after lockdown.

Method

Study design and participants

Participants in this retrospective cohort study were those who visited Alyamama Hospital in Riyadh, Saudi Arabia, to receive dental care. Participants who visited dental clinics between March 12, 2020 (the day after WHO classified COVID-19 as a pandemic3) and December 30, 2020, as well as during the same time period in 2019, had their data extracted. Dental patients during the pandemic and dental patients before to the pandemic were the two main cohorts identified in 2019 by linking all extracted data.

Data sources

Our data, which is present in the hospital, came from the hospital records system. Researchers can request access to the electronic health records after obtaining ethics permission and signing a data disclosure agreement with the provincial health.

The data set includes demographic information, socioeconomic status, residence zone, service providers, diagnosis, and procedural interventions for all hospital services, including ERs, outpatient clinics, and community-based affiliated clinics. There were up to 10 possible diagnoses, illnesses, and issues.

Data analysis

The analyses were carried out utilizing the Statistical Package for the Social Sciences (Version 25.0, IBM). The results of the descriptive analysis were presented as the mean (standard deviation [SD]) for continuous data and as frequency and percentage for discrete data. It was calculated how frequently people went to the dentist both before and after the pandemic.

The normality of the gathered data was examined using the Kolmogorov-Smirnov test. Dental visits number varied across the 2 periods, and this was determined using a one-way analysis of variance and Bonferroni post hoc tests. Additionally, the pandemic state (outcome measure) was dichotomized into prepandemic and pandemic, and the following predictors were utilized in the binary logistic regression analysis to find the factors crucial in predicting dental visits during the pandemic:

Age: There are five categories: 0 to 18, 19 to 40, 41 to 60, 61 to 80, and 81 to 100.

Gender: male or female;

Residential zone: Al-Rayan, Al-Manar, Al-Salam, Al-Rabwa and Al-Naseem

Based on residential postal code, there are five different categories for economic status, ranging from best to worst.

Service provider: a pediatric dentist, dental hygienist, dentist, or oral surgeon

Oral diagnosis: dental caries, fractures, cysts, infections, lesions, orthodontic issues, periodontal issues, salivary issues, or temporomandibular disorders.

Age and sex were included In the first model. Economic status and residential zone were added to the second model. Finally, service providers and oral diagnosis were incorporated into the third model. Akaike information criterion was applied to compare the models and to determine which one was the best fit for data, and the Nagelkerke R^2 was reported for the final model. A 95% CI and P value < .05 were considered to writing consent was taken from the hospital authority to give the permission for data collection, All data was kept confidential only the statiscian have access to the information.

Results

Male and female patients made up 39% and 60.9%, respectively, of the 32244 dental appointments. For female patients, the mean age was 30.45 while for male patients it was 30.12

In total, 32244 dental visits' data were examined; 21199 of those visits took place in 2019 and 11045 in 2020. Based on the admission type, age, sex, residential zone, economic level, provider, and oral diagnostic, Table 1 shows the frequency of dental visits before and during the pandemic. The interesting conclusion was that while all the variables showed a drop in the frequency of dental visits during the pandemic, more patients reported infections and lesions, salivary issues, and temporomandibular disorders during the pandemic.

Table 1. Descriptive analysis of the predictors in the study.

Variable	PRE-PANDEMIC, NOMBER. (%) 2019	PANDEMIC PERIOD (2020), NOMBER (%)	TOTAL
Visits	21199 (95.7)	11045 (34.2)	32244 (100)
Sex			
Female	12924 (65.3)	6849 (34.6)	19773
Male	8275 (66.3)	4196 (33.6)	12471
Residential zone			14249
Al-Rayan	9125 (64)	5124 (36)	6459
Al-Manar	5214 (81)	1245 (19)	4491
Al-Salam	3245 (72)	1246 (28)	2467
Al-Rabwa	1245 (50.5)	1222 (49.5)	4578
Al-Naseem	2370 (51.8)	2208 (48.2)	14249
Service Provider			
Dental hygienist	2312 (98.1)	45 (1.9)	2357
Dentist	10422 (59.3)	7124 (40.6)	17546
Oral surgeon	5011 (66.8)	2487 (33.1)	7498
Pediatric dentist	3454 (71.3)	1389 (28.6)	4843
Oral Diagnosis			
Caries and dental problems	10121 (33.6)	5142 (33.6)	15263

Variable	PRE-PANDEMIC, NOMBER. (%) 2019	PANDEMIC PERIOD (2020), NOMBER (%)	TOTAL
Cleft and fractures	1014 (87.7)	142 (12.2)	1156
Cysts	1912 (63.4)	1100 (36.6)	3012
Examination	1914 (64.7)	1045 (35.3)	2959
Infections and lesions	2814 (62.1)	1716 (37.9)	4530
Orthodontic problems	1945 (63.4)	1124 (36.6)	3069
Periodontal problems	814 (61.2)	515 (38.8)	1329
Salivary problems	415 (77.6)	120 (22.4)	535
Temporomandibular disorders	250 (64)	141 (36)	391
Age Category, Y			
0-18	10124 (71)	4125 (29)	14249
19-40	4758 (69.4)	2100 (30.6)	6858
41-60	3485 (61.9)	2145 (38.1)	5630
61-80	2451 (55.3)	1978 (44.7)	4429
81-100	381 (35.3)	697 (64.7)	1078
Economic Status			
Best	3943 (64.8)	2144 (35.2)	6087
Good	4133 (67.6)	1985 (32.4)	6118
Normal	8873 (71.6)	3515 (78.4)	12388

Variable	PRE-PANDEMIC, NOMBER. (%) 2019	PANDEMIC PERIOD (2020), NOMBER (%)	TOTAL
Bad	4218 (74.3)	1456 (25.7)	5674
Worst	8873 (82)	1945	10818 (18)

In 2019 and 2020, there were 227 and 149 dental appointments, respectively. The average number of dental visits per day was 58.07 (26.3), and the standard deviation was 30.26 (18.5). Significant differences were found in the pairwise analysis for the two eras, together with a P-value (P .001). (Table2).

Table 2: Comparing dental visits number between the pandemic (2020) and pre-pandemic (2018 and 2019) years using Bonferroni post hoc testing.

	YEAR J	YEAR I	DIFFERENCE of the MEAN (J-I)	STANDARD ERROR.	95% CI
Pandemic Period	2019	2020	–7.95	1.72	–12.84 to −3.96
Pandemic Period, without the Lockdown	2019	2020	–1.84	1.93	–6.54 to 2.86
Lockdown period	2019	2020	–24.76	3.01	–31.95 to −12.48

All of the predictors were included in the multiple logistic regression models. In relation to the pre-pandemic and pandemic periods, the results of multiple logistic regression were reported in table 3. During the epidemic, dental visits were not correlated with age or sexual orientation. Patients with the best (95% CI, 1.14 to 1.46; OR, 11.182) and good (95% CI, 1 to 1.52; OR, 1.26) economic position experienced a smaller decline in the frequency of dental visits than patients with the worst economic status. Table 3

Table 3: Multiple logistic regression to identify the parameters crucial to pandemic period prediction

FACTORS	***P***-VALUE	The ODDS RATIO	95% Confidence interval
Age categorized			
0-18	.23	1.41	0.89 to 1.88
19-40	.42	1.24	0.79 to 1.68

FACTORS	***P*-VALUE**	The ODDS RATIO	95% Confidence interval
41-60	.07	1.38	0.90 to 2.14
61-80	.19	1.07	0.87 to 1.26
Sex			
Female	.19	1.18	0.97 to 1.38
Economic Status			
Best	.02	1.182	1.14 to 1.46
Good	.03	1.263	1 to 1.52
Normal	.17	1.089	0.97 to 1.35
Bad	.86	1.023	0.98 to 1.25
Residential zone			
Al-Rayan	.21	0.48	0.45 - 0.51
Al-Manar	.65	0.69	0.67 - 0.73
Al-Salam	.26	0.59	0.54 - 0.65
Al-Rabwa	.15	0.51	0.48 - 0.55
Al-Naseem	.45	0.76	0.72 - 0.80
Service Providers			
Dental hygienist	.01	0.13	0.06 to 0.38
Oral surgeon	.01	3.17	2.82 to 3.47
Pediatric dentist	.01	3.12	2.57 to 3.75
Oral Diagnosis			

FACTORS	***P***-VALUE	The ODDS RATIO	95% Confidence interval
Caries and dental problems	.01	3.14	2.55 to 3.89
Cleft and fractures	.01	2.23	1.53 to 3.27
Cysts	.01	5.18	4.16 to 6.45
Infections and lesions	.01	5.84	4.88 to 7.48
Orthodontic problems	.01	3.66	2.92 to 4.60
Periodontal problems	.01	3.41	2.55 to 4.58
Salivary problems	.01	13.84	9.35 to 19.89
Temporomandibular disorders	.01	9.68	5.76 to 15.56

$R = 0.169$.

Discussion

We are, the first researchers to thoroughly assess dental visits frequency before, and during the COVID-19 pandemic in Saudi Arabia. The number of days and dental visits frequency reduced during the pandemic, according to our findings.

There may have been fewer dental appointments during the pandemic due to a number of variables. First of all, there wasn't much information available about COVID-19 at the start of the pandemic, and many people avoided routine checkups and examinations out of concern for potential exposure in dental settings and the ensuing morbidities. Additionally, on May 19, 2020, the Centers for Disease Control and Prevention released its interim infection prevention and control guidance for dental settings during COVID-19 (ADA. 2021).

Even when dental facilities were up and operating, there were still a few restrictions for patients. For some people and organizations who commute primarily by public transit, access to dental clinics has become difficult. The main motive for travel shifted as outcome of safety concerns, and there was a transition from public to private and communal transport (Abdullah et al., 2020). According to the CDC and Prevention's recommendations, every patient needed to be checked for COVID-19 symptoms; if any were present, non-emergent oral health care needed to be postponed, and pertinent advice should be given (CDC, 2020).

Additionally, it was advised that the use of aerosol-producing techniques, such as the use of high-speed dental handpieces, air and water syringes, and ultrasonic scalers, be minimized whenever possible. If necessary, the 4-handed dentistry approach should be adopted, utilizing both dental rubber dams and high-evacuation suction to minimize the created aerosols (CDC, 2020; Clarkson et al., 2021).

Our findings showed that not only dental visitation frequency decline, but visitation patterns also changed. Oral surgeons and pediatric dentists saw more patients than general dentists, while dental hygienists saw fewer patients, which is consistent with guidelines and regulations encouraging patients to schedule urgent treatments. Additionally, in comparison to oral examinations, oral health issues of all kinds increased throughout the pandemic period.

Despite fewer visits overall, visits number for infections and lesions increased during the pandemic compared to the pre-pandemic period. It appears that proposals like teledentistry have been successful in repairing the damaged dental system and closing the communication gap between patients and oral health professionals (Wakhloo et al., 2020). To quickly and effectively deliver oral health care to patients, additional adjustments are required.

Another significant finding of our study was that, during the pandemic, individuals from socioeconomically advantaged groups frequented dental clinics more frequently than those from less advantaged groups. Because of this, efforts should be made to remove obstacles to oral health care and to educate people about attending dental clinics during the pandemic. Special attention should also be given to disadvantaged groups and rural areas' access to care.

Conclusion

Dental visits fell dramatically during the pandemic, particularly during the lockdown. Dental clinics were the primary destinations for patients with complex issues needing immediate care. Patients with low socioeconomic status showed less access to healthcare. Additional changes are required to improve the oral health status of patients by encouraging in-person visits, even if guidelines and related suggestions were successful in managing dental appointments during the epidemic.

References

Abdullah M, Dias C, Muley D, Shahin M. Exploring the impacts of covid-19 on travel behavior and mode preferences. *TRIP* 2020; *8*, 100255. Doi: 10.1016/j.trip.2020.100255

Centers for Disease Control and Prevention. Guidance for dental settings: interim infection prevention and control guidance for dental settings during the coronavirus disease 2019 (COVID-19) pandemic. Updated December 4, 2020. Available at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html Accessed NOV 10, 2022

Clarkson j, Ramsay C, Richards D, Robertson C, Aceves M. Aerosol generating procedures and their mitigation in international dental guidance documents: a rapid review. Accessed NOV 18, 2022. Available at: https://oralhealth.cochrane.org/news/aerosol-generating-procedures-and-their-mitigation-international-guidance-documents

Wakhloo T, Reddy GS, Chug A, Dhar M. Relevance of teledentistry during the COVID-19 pandemic. *Fam Med Prim 2020*; *9*(8), 4494. Doi: 10.4103/jfmpc.jfmpc_874_20

Guan W, Ni Z, Hu Y, Liang W, Ou C, He J, Liu L, Shan H, Lei C, Hui DSC, Du B, Li L, Zeng G, Yuen KY, Chen R, Tang C, Wang T, Chen P, Xiang J, Zhong N. Clinical characteristics of Coronavirus Disease 2019 in China. *NEJM 2020*; *382*(18), 1708–1720. Doi: 10.1056/nejmoa2002032

Spagnuolo G, De VD, Rengo S, Tatullo M. Covid-19 outbreak: An overview on dentistry. *IJERPH 2020*; *17*(6), 2094. Doi: 10.3390/ijerph17062094

World Health Organization WHO Director-General's opening remarks at the media briefing on COVID-19: 11 March 2020. Accessed Nov 20, 2021

Available at: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020

World Health Organization. Considerations for the provision of essential oral health services in the context of COVID-19: interim guidance. Accessed Nov 19, 2021. Available at: https://www.who.int/publications/i/item/who-2019-nCoV-oral-health-2020.1

Lammers MJ, Lea J, Westerberg BD. Guidance for otolaryngology health care workers performing aerosol generating medical procedures during the COVID-19 pandemic. *J of Otolaryngol - Head & Neck Surg* 2020; 49, 36. doi: 10.1186/s40463-020-00429-2

Mallineni SK, Innes NP, Raggio DP, Araujo MP, Robertson MD, Jayaraman J. Coronavirus disease (Covid-19): Characteristics in children and considerations for dentists providing their care. *Int. J. Paediatr. Dent 2020; 30*(3), 245–250. Doi: 10.1111/ipd.12653

COVID-19 and dentistry timeline *ADA News.* March 2021 Available at: https://pages.ada.org/covid-19-and-dentistry-timeline?utm_source=morninghuddle&utm_medium=email&utm_content=fromtheada, Accessd at: 15th NOV 2022