

IMPACT OF COVID-19 ON UTILIZATION OF DENTAL SERVICES BY PATIENTS VISITING TERTIARY CARE DENTAL CENTRE LAHORE

Qayyum Akhtar, Khalid Mahmood, Umer Qayyum, Nadeem Ahmed Rana, Hafiza Qurat-UI-Ain Sajjad, Amjad Naeem

CMH Lahore Medical and Dental College, Lahore/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To assess the impact of COVID-19 pandemic on utilization of Dental services by patients visiting a tertiary care dental centre in Lahore, Pakistan.

Study Design: Cross-sectional comparative study.

Place and Duration of Study: 28 Military Dental Centre, Combined Military Hospital Lahore Medical and Dental College, from Feb to Apr 2020.

Methodology: The records of patients reported from 17 February to 16 April 2020 were retrieved from unit's data bank and analysed. The patients' demographic data and presenting complaints in pre-COVID group vs COVID group were compared using SPSS version 22.

Results: A total of 3173 patients, 1802 male and 1371 females reported for routine and emergency dental services. The age ranged between 5 to 79 years (31.97 ± 13.032). Eighty four percent (248 vs 2925) less patient visited during COVID compared to pre-COVID period significantly less female visited 1337 (45.7%) vs 34 (13.7%) during COVID period ($p < 0.001$).

A significant difference was observed between two COVID period groups patients visited for various complaints requiring treatment ($p < 0.001$). Acute pulpal/periodontal conditions 1051 (35.93%) were the leading cause of visit in pre-COVID period. While during COVID period Orofacial cellulitis/infections 123 (49.60%) were the leading cause followed by acute pulpal/periodontal conditions 107 (43.15%), non-urgent complaints 17 (6.85%) and facial trauma 1 (0.40%). Non-urgent complaints reduced from 1022 (34.94%) to 17 (6.85%).

Conclusion: COVID-19 has strong impact on utilization of dental services, limiting them to the acute conditions mainly.

Keywords: COVID-19, Epidemic, Emergency dental services, Facial trauma, Records.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

A series of pneumonia cases outbreak was reported with unknown etiology in Wuhan, Hubei, China in December 2019¹. Scientists took one month to isolate the agent responsible, belonging to coronavirus family and WHO named it, novel coronavirus (nCoV-19) because of the crown like spikes on the virus surface when viewed under an electron microscope¹. The current reference name for the Coronavirus induced illness is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)². Other members of the family are the common cold virus, middle east respiratory syndrome coronavirus (MERS-CoV)

and SARS-CoV-1^{3,4}. Like the other viruses of the family, the SARS-CoV-2 has an animal reservoir probably bat⁵. The start of the global pandemic has been reported to have started from a live animal and seafood market.

The disease caused by the virus as COVID-19 has spread from Wuhan (China) to several other countries with a variable number of cases and different rates of transmission⁶. The outbreak was declared as public health emergency of international concern on 30 January 2020 and pandemic on 11 March 2020 by WHO². There has been 2314621 confirmed cases and 157847 confirmed deaths globally, as on 20 April 2020⁷. In Pakistan, a total of 9216 confirmed cases (6958 Active and 192 casualties) have been reported in different regions, as on 21 April 2020. Majority of cases have been identified from Punjab followed by

Correspondence: Dr Khalid Mahmood, Classified Oral & Maxillofacial Surgeon, CMH Lahore Medical and Dental College, Lahore Pakistan

Received: 06 May 2020; revised received: 15 May 2020; accepted: 02 Jul 2020

Sindh, Khyber Pakhtunkhwa, Gilgit Baltistan, Baluchistan, Federal capital Islamabad, Azad Jammu and Kashmir, respectively⁸.

The transmission routes, treatments, and outcomes of COVID-19 are receiving much research attention⁹. The initial exposure of subject virus in Pakistan has been reported through import from various countries especially visitors travelling from border city of Taftan, Iran followed by local transmission². Social distancing has been enforced through strict lockdown by the Government of Pakistan, similar to rest of the nations as a single and most important primary measure to decrease the rate of infection transmission and to “flatten the curve” i.e. decreasing of numbers of infected persons over a period of time in graphical representation. The public has been persuaded to stay at home and coming out only essentially while maintaining a social distance at all times. The medical including dental services have been restricted to emergencies (trauma and uncontrollable bleeding/pain) only². Therefore, the objective of this study was to assess the impact of COVID-19 on utilization of dental services at a tertiary care unit in Lahore, Pakistan.

METHODOLOGY

This cross sectional comparative study was conducted at 28 Military dental centre (MDC), CMH Lahore Medical and Dental College during the COVID-19 after getting the approval from institutional review committee (105/ERC-4/20 dated 1 April 2020). Dental records of patients who fulfilled inclusion criteria of either gender, completed diagnosis with relevant medical history forms duly filled, reported between 17 February to 16 April 2020 were retrieved from unit's central data bank by non-probability consecutive sampling technique and used for study purpose while incomplete patients' dental records without proper diagnosis and awaited diagnosis were excluded from present study. WHO calculator was used to calculate sample size of 3173 while keeping confidence level of 95%, estimated true proportion 38%⁹ and 5% of absolute precision.

The demographic data and presenting complaints of all the patients reported to this tertiary care dental centre to avail routine as well as emergency dental services between pre-COVID period (17 February to 16 March 2020) and COVID period (17 March to 16 April 2020) were used. Though SARS-CoV-2 was reported in Pakistan on 26th February⁸ but we continued routine working till¹⁷ March when full scale protective measures were enforced by Govt of Pakistan and dental care was limited to emergency care only. OPDs were limited to attend emergency conditions only. Patients were grouped into pre-COVID period and COVID period and data was analysed using statistical package for social sciences, SPSS-22 (IBM Corp., Armonk, NY, USA). The continuous variable i.e. age was presented as Mean \pm SD while categorical data i.e. patients dental conditions/complaints and gender as n(%). Chi-square test was used for analysis while keeping the significance of *p*-value at <0.05.

RESULTS

A total 3173 patients, 1802 male and 1371 females reported to 28 MDC clinics to avail routine as well as emergency dental services from 17 February 2020 to 16 April 2020. Their demographic characteristics were listed in table-I. The age of patients was between 5 years to 79 years with mean age 31.97 ± 13.032 . Eighty four percent (n=248 vs 2925) less patient visited dental Centre clinics during COVID period compared to Pre-COVID period. More male patient visited during pre-COVID and COVID period compared to female and there was a significant decline in female visitors 1337 vs 34 (45.7% vs 13.7%) availing dental care facilities during COVID period (*p*<0.001).

Acute pulpal and periodontal conditions 1051 (35.93%) were main reasons for availing dental services in pre-COVID period group compared to COVID period group in which Orofacial cellulitis/infections 123 (49.60%) were main reasons to visit dental clinics followed by acute pulpal/periodontal conditions 107 (43.15%), non-urgent miscellaneous (restorative, prosthodontic and orthodontic) complaints 17 (6.85%) and

facial trauma 1 (0.40%) table-II. Proportion of non-urgent miscellaneous complaints/conditions reduced from 1022 (34.94%) to 17 (6.85%). A statistically Significance correlation was observed between two COVID period groups and types of patients' dental complaints/conditions and gender ($p < 0.000$).

like triple syringe and high speed rotary hand pieces etc. mixed with saliva of an infected patient¹³. These are small enough to stay in the air for 3 hours before settling down on any surface or entering the respiratory tract^{14,15}. Proper attention is therefore being directed to droplet precautions^{2,12,16}. In addition to the aerosol generation

Table-I: Demographic characteristics of patients who availed dental services before and during the COVID-19 epidemic.

	Total (n)	Gender [n (%)]		Age (n (%) & Mean + SD)			Average (yrs)
		Male	Female	<18 years	18-50 years	>50 years	
Pre-COVID Group	2925	1588 (54.3%)	1337 (45.7%)	200 (6.84%)	2333 (79.76%)	392 (13.4%)	31.82 ± 13.054
COVID Group	248	214 (86.3%)	34 (13.7%)	23 (9.28%)	206 (83.06%)	19 (7.66%)	33.68 ± 12.666

Table-II: Complaints/Conditions of patients who availed dental services before and during the COVID-19 epidemic (n=3173).

Complaints/Conditions	PR-E COVID Group	COVID Group	p-value
Acute Pulpal/periodontal conditions	1051 (35.93%)	107 (43.15%)	0.001
Orofacial cellulitis/infections	840 (28.71%)	123 (49.60%)	
Facial trauma	12 (0.41%)	1 (0.40%)	
Non urgent miscellaneous complaints	1022 (34.94%)	17 (6.85%)	

DISCUSSION

The SARS-CoV-2 has put pressure on the Healthcare system like no other disease in the recent past due to lack of established guidelines, our understanding of the disease as well as its implications are continuously evolving. Chinese health authorities curtailed the dental institutions from providing elective dental procedures to the public⁹, similarly Pakistani authorities also issued standing operating procedures (SOPs) with the objective of cutting down the rout of transmission. The nCoV-19 is believed to be transmitted primarily through three routes; Direct transmission (through cough, sneeze or droplet inhalation), Contact transmission (through oro-nasal-ocular route) and Aerosol transmission¹⁰. Asymptomatic carriers of this virus are equally capable of transmitting as symptomatic patients. Some of the specialties that are extremely susceptible to transmission are Otolaryngologists, Ophthalmologists, Anesthesiologists and Dentists^{11,12}. Dentists are particularly exposed to the virus because of the aerosol (droplets with <50um diameter) generated by pressurized air driven instruments

during dental surgery procedures, different surfaces are also infected and can remain infected with the virus for up to several hours. The virus remains viable in aerosols for up to 3 hours. SARS-CoV-2 can remain virulent on copper for up to 4 hours, up to 24 hours on cardboard sheets and 2 to 3 days on plastic or stainless steel^{2,17}.

Ali *et al* in recent literature survey prohibited the elective procedures in dental surgery and only emergency cases are recommended to be dealt, that too, with appropriate precautions². A detailed patient history is the first step in management of any patient. A brief history about recent travel, fever, cough or difficulty in breathing should be taken. Basic protective equipment includes; complete body covering gowns, face shields, surgical mask/respirator and gloves. In proven cases powered air purifying respirators (PAPRs) should also be considered whenever economically feasible. Hand washing with soaps and alcohol based hand scrubs for at least 20 seconds is highly recommended. Extra oral radiography is recommended, since radiographs can stimulate aerosol production by cough or gag

reflex, similarly local anesthesia should be used while taking impressions¹⁸. Before start of the procedure chlorhexidine gluconate should be used to reduce the microbial count¹⁹. As a general principle, the use of drills and burs should be limited to extreme emergency only along with volume suction.

This study was carried out during extraordinary circumstances depicting salient and meaningful findings. The number of patients decreased significantly from Pre to COVID period ($p < 0.05$) due to the social distancing and lockdown enforced by the Government authorities. At the same time people were educated to stay at home unless absolutely necessary. More male patients visited dental Centre during pre-COVID and COVID period compared to female (45.7% Vs 13.7%) because of their jobs. Probably because the male members of family usually go out for other works can conveniently report to dental centre. On the contrary female culturally prefer staying at home. This factor may have led to the sharp decline in the female reporting during study period. The results of our study are in convergence with similar study carried out in china, in a public tertiary stomatological hospital between 1 February and 10 February 2020. Guo *et al*⁹ also reported 38% decline in overall incoming patient seeking dental emergency services and fewer female patients reported during COVID period then pre-COVID period. He attributed, basing on his findings and previous study²⁰, that the females were more apprehensive about undergoing dental procedures then males particularly during COVID. This apprehension may also be applicable on our female population basing on our data.

The patients >50 years of age also decreased to great extent during pre-COVID period as compared to COVID (13.4% to 7.66%). The population was influenced from the news and media information that the people over fifty years or suffering from other ailment which compromise the immunity were more prone to get infected from the corona virus with low survival rate as compared to young adults. The elderly seemed to be

more cautious in our study. (83.06% vs 7.66%). The rise in the age group <18 years, 6.84% to 9.28% during pre to COVID period respectively was expectedly because of closure of schools and parents wanted to avail this opportunity to get the work of their children done as soon as possible. This trend may be discouraged in our awareness campaigns on social media/ news.

OCI was the leading complaint during COVID period followed by APP (49.60% and 43.15% respectively). While FT and other miscellaneous complaints (including restorative, prosthetic and orthodontics) constituted the meagre number (0.40% and 6.85% respectively). This means it was orofacial pain due to infections primarily which persuaded them to report. These findings in our study match the previous literature²¹. Most recent study carried out in china by Guo *et al*⁹ support the results of our study in which the dental pulpal or periapical lesions were leading causes of emergency visits followed by cellulitis/abscess. The proportion of dental and oral infection raised from 51% of pre-COVID 19 to 71.9% during COVID-19. Our findings are in the same line that the infections increased from 64.64% to 92.75%. The emergency conditions caused by bacterial infections might be avoided if oral hygiene is taken care of optimally. The oral hygiene measures including regular brushing, use of antiseptic mouthwash, flossing, prostheses hygiene, minimal use of sticky and sugary contents etc. while staying at home during lockdown may be promoted in our media campaigns/news.

Facial trauma was reduced from n=12 (pre-COVID) to n=3 (COVID). The implementation of certain restrictions by the Government authorities like social distancing, lockdown and prohibition of pillion riding on motorbikes might have influenced peoples' coming out on road which probably led to decrease in trauma patients.

It was observed in the present study that patient reported with urgent/ emergency dental complaint were 93.15% (APP+OCI+FT) and there were 6.85% walked in patients with non-urgent/

emergency complaints. Within the limitation of this study it doesn't evaluate the Urgency/emergency level of the patients' reporting. The data used in this study depicts initial few weeks of COVID-19 pandemic in our country. The public would be influenced from media campaigns/news and get more educated/careful as the disease takes its course. More elaborative and in-depth studies may be conducted, once the pandemic is over.

Presently the public and authorities at all tiers are focusing on fighting the signs, symptoms and consequences of COVID-19. The present study may be helpful in understanding the current pattern of peoples' utilizing the dental services. It may be helpful in predicting the future dental needs and formulate the plans and modify our dental practices e.g. to cater for the backlog of 84% who preferred to stay at home during COVID-19 and expected to visit as soon as the pandemic is over. These piled up patients would be primarily elderly i.e. >50 years of age and females.

ACKNOWLEDGEMENT

We are extremely indebted to Institute of Dentistry, CMH Lahore Medical and Dental College for extending best possible assistance during the conduct of this study.

CONCLUSION

COVID-19 has strong impact on utilization of dental services, limiting them to the acute conditions (trauma, uncontrollable pain and bleeding) mainly.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. New images of Novel Corona virus SARS-CoV-2 now available | NIH: National Institute of Allergy and Infectious Diseases. <https://www.niaid.nih.gov/news-events/novel-coronavirus-SARSCov2-images>. Accessed March 18, 2020.
2. Ali S, Zeb U, Muhammad A. Transmission Routes and Infection Control of Novel Coronavirus-2019 in Dental Clinics - A Review. *J Islamabad Med Dent Coll* 2020; 9(1): 65-72.
3. CDC. 2019 novel Coronavirus (2019-nCoV) frequently asked questions and answers. Centers for disease control and prevention. <https://www.cdc.gov/coronavirus/2019-ncov/faq.html>. Published February 11, 2020. Accessed March 18, 2020.
4. CDC. HAN Archive-00426 | Health Alert Network (HAN). <https://emergency.cdc.gov/han/han00426.asp>. Published Feb 11, 2020. Accessed March 19, 2020.
5. CDC. 2019 Novel Coronavirus (2019-nCoV) situation summary. Centers for Disease Control and Prevention. <https://www.cdc.gov/coronavirus/2019-ncov/summary.html>. Published Feb 11, 2020. Accessed March 18, 2020.
6. Perrella A, Carannante N, Berretta M, Rinaldi M, Maturo N, Rinaldi L. Editorial-Novel Coronavirus 2019 (Sars-CoV2): a global emergency that needs new approaches?. *Eur Rev Med Pharmacol Sci* 2020; 24(4): 2162-4.
7. Down loaded from Official web site of WHO. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
8. Government of Pakistan official portal. COVID 19, Health Advisory Platform. Down loaded from <http://www.covid.gov.pk/stats/pakistan> on 4 April 2020.
9. Guo H, Zhou Y, Liu X and Tan J. The impact of the COVID-19 epidemic on the utilization of emergency dental services. *J Dent Sci*. Available at <https://doi.org/10.1016/j.jds.2020.02.002>.
10. Harrel SK, Molinari J. Aerosols and splatter in dentistry: a brief review of the literature and infection control implications. *J Am Dent Assoc* 2004; 135(4): 429-37.
11. Lu CW, Liu XF, Jia ZF. 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet* 2020; 395(10224): e39.
12. Backer JA, Klinkenberg D, Wallinga J. Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20-28 January 2020. *Euro Surveill* 2020; 25(5): 2000062.
13. Harte JA. Standard and transmission-based precautions: an update for dentistry. *J Am Dent Assoc* 2010; 141(5): 572-81.
14. Doremalen N, Bushmaker T, Morris DH, Holbrook M, Gamble A, Williamson B, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *N Engl J Med* 2020; 382(1): 1564-67.
15. Corstjens PL, Abrams WR, Malamud D. Saliva and viral infections. *Periodontol* 2000. 2016; 70(1): 93-110.
16. Centers for Disease Control and Prevention. Interim infection prevention and control recommendations for patients with confirmed coronavirus disease 2019 (COVID-19) or persons under investigation for COVID-19 in healthcare settings. <https://www.cdc.gov/c>.
17. van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. Detection of 2019 novel coronavirus (2019-nCoV) by real-time RT-PCR. Compared with SARS-CoV-1. *N Engl J of Med*. 2020 .
18. Whaites E. Essentials of dental radiography and radiography. 2nd ed. Edinburgh: Churchill-Livingstone; 1996. pp. 107-113.
19. Fine DH, Furgang D, Korik I, Olshan A, Barnett ML. Reduction of viable bacteria in dental aerosols by preprocedural rinsing with an antiseptic mouthrinse. *Am J Dent* 1993; 6(5): 219-21.
20. Ashok N, Rodrigues JC, Azouni K, Darwish S, Abuderman A, Alkaabba A, et al. Knowledge and apprehension of dental patients about MERS-A questionnaire survey. *J Clin Diagn Res* 2016; 10(5): 58-62.
21. Tramini P, Al Qadi Nassar B, Valcarcel J, Gibert P. Factors associated with the use of emergency dental care facilities in a French public hospital. *Spec Care Dent* 2010; 30(2): 66-71.