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**IMPACT OF THE COVID-19 PANDEMIC ON THE DENTAL EMERGENCY
DEPARTMENT SERVICE PATTERN: EXPERIENCE OF A UNIVERSITY-BASED
DENTAL HOSPITAL IN INDONESIA**

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ABSTRACT

Background: The COVID-19 pandemic and the policies taken by the Indonesian government have had a major impact on health sectors and resulted in changes in health services patterns provided by the Emergency Department (ED) in dental hospitals. Identifying changes in dental hospital visits is pivotal to formulate policies that must be prepared immediately and adapted to the dynamics for the use of dental and oral health service during pandemic. **Objective:** This study compares services at the ED of the Universitas Airlangga Dental Hospital during the pre-pandemic and the beginning of the COVID-19 pandemic. **Method:** This is a retrospective study, based on data extracted from the medical records of all patients who came to the ED during March-July 2019 and the COVID-19 period (March-July 2020). Patients were classified according to the case diagnosis, and the data of the two periods were statistically compared using the independent t-test or the Mann-Whitney U test, as applicable. **Results:** There was an increase in the number of patient visits in March-July 2020 (503 patients) compared to March-July 2019 (113 patients). The highest number of visits was in April 2020 (143 patients). Infection and miscellaneous cases were the most common in both periods with drastic increase in 2020. There were significant differences in the total number of visits, infections, and miscellaneous cases. **Conclusion:** The COVID-19 pandemic in Indonesia has caused a change in the general picture of dental and oral health services by an increase in patient number and case distribution.

Keywords: COVID-19, Dental hospital, Emergency department, Health service, Pandemic

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INTRODUCTION

A new virus known as the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was first detected in Wuhan, Hubei Province, China. This then spread rapidly throughout the world, and on 30 January 2020, a public health emergency of international concern was declared. On 11 March 2020, 2019-nCoV disease was confirmed as a global pandemic, also known as the COVID-19 pandemic.^{1,2}

The first case of COVID-19 in Indonesia was announced in March 2020. There was a rapid spread of the virus thereafter. The Indonesian government responded in several ways, one of them being social restriction on a large scale. This started in the city of Jakarta, followed by the cities of Bogor, Depok, Bekasi, Tangerang, Surabaya, and other areas.^{3,4} This policy was implemented not only for the national education system but also in the public health sector. Educational activities were carried out online. In the public health sector, Appeal number YR.03.03 / III / III8 / 2020 of the Ministry of Health stated that hospitals could only provide emergency services during this period of restriction. This influenced the management of hospital services and the types of patient care provided. This policy was made to reduce the risk of cross infection especially considering the high potential of airborne contamination by aerosol in procedures such as dental procedures. The end of the first wave of the COVID-19 pandemic was announced by the Indonesian Ministry of Health (policy number HK.01.07/MENKES/413/2020) in July 2020.^{5,6}

Dentists are among the highest occupational risk categories for the transmission and contraction of COVID-19. Routine dental treatments produce significant amounts of aerosols composed of saliva, blood, and

tissue fluids, and are considered to be high risk for the spread of the virus. Such treatments include the use of turbine handpieces, air–water syringes, and ultrasonic dental scalers⁷, which can transmit the virus directly to the dentist or dental assistant.

The COVID-19 pandemic has brought changes in all aspects of life for Indonesian citizens. In the healthcare sector, both concerns about the COVID-19 pandemic and the local restrictions resulted in a reduction in the visits made by people to healthcare facilities. These policies by the Indonesian Ministry of Health may have retarded the spread of infection but as Abdelrahman *et al.* (2021) reported most dental practices which had closed with the first wave of the pandemic incurred serious financial losses. This included the Universitas Airlangga Dental Hospital, which had to modify the dental services and procedures offered during the pandemic.⁸

The Indonesian Dentists Association (PDGI), the American Dental Association (ADA), along with other dental associations worldwide, urged dentists to postpone elective dental procedures and to provide only emergency dental treatments.^{9,10} ADA defined dental emergencies as “potentially life-threatening conditions that require immediate treatment to stop ongoing tissue bleeding and/or alleviate severe pain and/or infection including trauma, cellulitis, and uncontrolled bleeding”.¹¹ During the COVID-19 pandemic, dental treatments have been divided into various classes: emergency cases, urgent cases (with or without aerosol generation), non-urgent cases, and elective cases. Emergency cases in dental care include unstable maxillofacial fractures, diffuse soft tissue infections that can compromise the airway, and uncontrolled post-operative bleeding. Urgent cases include severe dental pain, dental trauma with avulsion or luxation, acute pericoronitis and periodontal disease, and stable fractures.^{12,13}

To assess the trends in visits to the dental emergency department during this period, it is necessary to study patient characteristics and the type of care provided by the health facility during the pandemic, as well as the changes that occurred in comparison with the previous one-year period. This will assist the formulation of policies that must be prepared immediately and adapted to the dynamics for the use of dental and oral health service during pandemic.

METHODS

This is a retrospective study using total sampling of all medical records reporting visits at the emergency department (ED) of the Universitas Airlangga Dental Hospital during March–July 2019 and the COVID-19 period (March–July 2020). The study was certified to be ethically cleared by Health Research Ethical Clearance, Faculty of Dental Medicine, Universitas Airlangga (number: 3/UN3.9.3/Etik/PT/2022). The data were extracted from the medical records by one investigator (RNN) and confirmed by the author (EPD), including patient identities, age and gender, examinations, treatment, and other diagnostic procedures. The number of visits in each month was calculated and categorized according to age and gender. The purpose of the visit was also recorded and categorized as a) patient: person seeking dental treatment; b) patient’s guardian/companion: person accompanying the patient; and c) visitor: person not related to the patient and visiting the facility for purposes other than dental treatment. The medical records used in the study have been authorized by the doctor in charge. Additionally, during March–July 2020, COVID-19 screening was performed on all visiting patients. Medical records with missing data were excluded from this study.

The diagnosis of the patient was then categorized. The case diagnosis categories are shown in table 1. (modified from Kim *et al.*) The data obtained were analyzed and statistically compared with data from March–July 2019 using the independent t-test or the Mann-Whitney U test, as applicable.

RESULTS

There were 503 emergency department (ED) visits during March–July 2020 at the Universitas Airlangga Dental Hospital. The details are shown in table 2. The total number of patients was significantly higher than in 2019 ($p=0.001$).

The number of patients visiting each month varied during the observed period and is shown in Figure 1. In March–July 2019, the highest number of patients were seen in May (24%), while in March–July 2020, the patients’ visits peaked in April (28%).

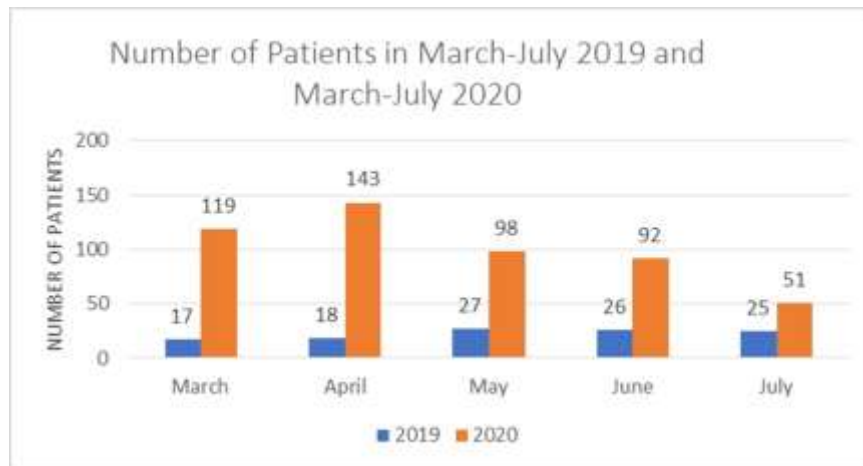


Figure 1. Number of patients in March-July 2019 and March-July 2020

The data's normality and homogeneity were evaluated using the Kolmogorov-Smirnov normality test and Levene's test for homogeneity of variances (Table 1). Only the data on the total number of visits, caries cases, and infections had normal and homogeneous distributions. Further statistical analysis showed significant differences in the total number of visits, infections, and miscellaneous cases.

Table 1. Statistical analysis result of hospital visits changes during COVID-19 pandemic

Variable	Year	Mean $\pm$ SD	Normality (p)	Homogeneity (p)	p
Number of visit ^a	2019	22.6 $\pm$ 4.7	0.127	0,061	0.001*
	2020	100.6 $\pm$ 34.2	0.928		
Caries ^a	2019	4.2 $\pm$ 1.8	0.377	0.229	0.090
	2020	8.6 $\pm$ 4.7	0.483		
Infection ^a	2019	8.4 $\pm$ 3.2	0.794	0.147	0.026*
	2020	24 $\pm$ 12.3	0.113		
Bleeding ^b	2019	1.4 $\pm$ 0.5	0.814	0.621	0.913
	2020	1.4 $\pm$ 0.4	0.046		
Trauma ^b	2019	4.2 $\pm$ 0.37	0.314	0.456	0.288
	2020	3.4 $\pm$ 0.6	0.000		
TMD ^b	2019	1 $\pm$ 0.63	0.042	0.108	0.723
	2020	0.6 $\pm$ 0.4	0.046		
Medic ^b	2019	0.2 $\pm$ 0.2	0.00	0.001	0.155
	2020	1.8 $\pm$ 0.91	0.057		
Miscellaneous	2019	1.6 $\pm$ 0.87	0.018	0.069	0.015*
	2020	15.8 $\pm$ 6.9	0.169		

^a uji independent t-test * significant (p<0,05)
^b uji Mann-Whitney U

The number of cases in each diagnostic category for the periods March–July 2019 and March–July 2020 is shown in Figure 2. In both periods, a majority of the cases seen were infections. Figure 3 shows the number of cases in each diagnostic category as per the number of visits to the emergency department.

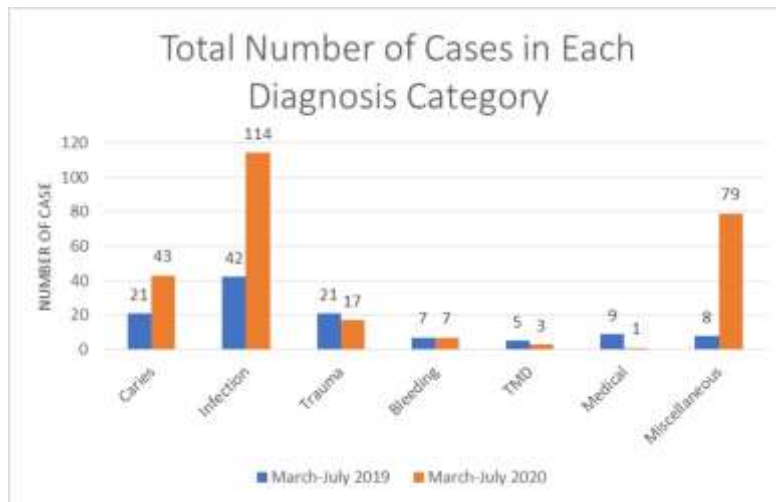
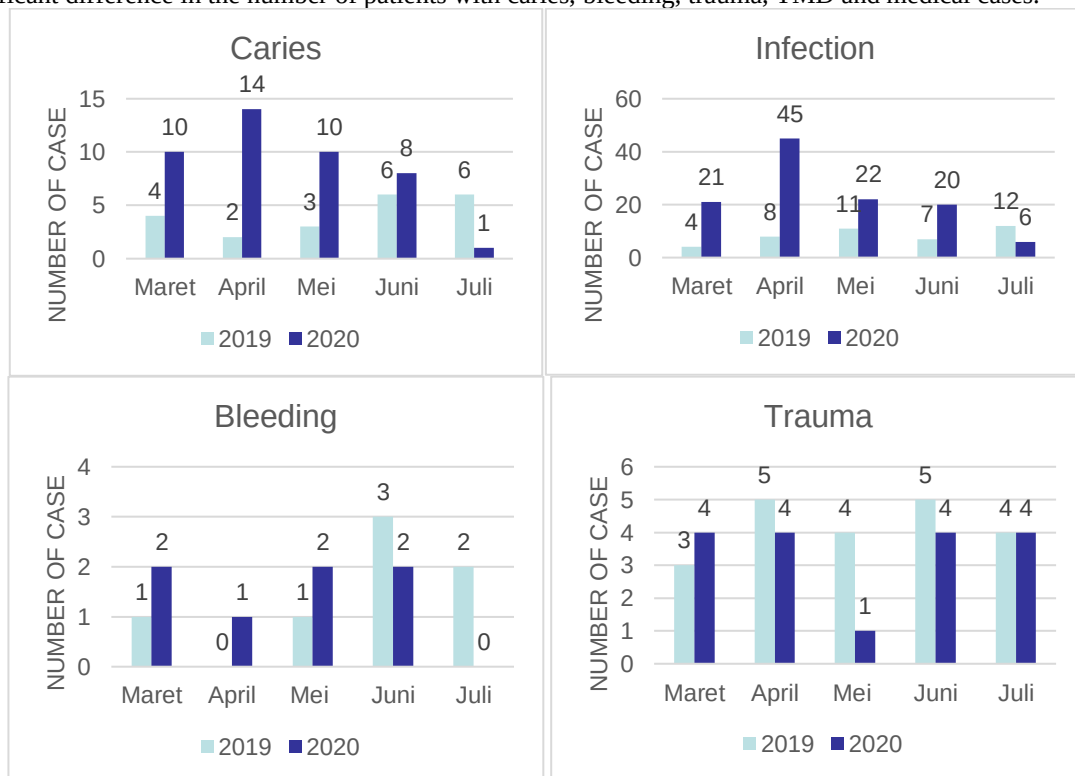


Figure 2. Total Number of cases in each diagnostic category in March-July 2019 and March-July 2020.

The highest number of visits was in April 2020 (143 patients). Infection cases were the most common in both periods, with 2.7 times cases increase in 2020 compared to 2019. The miscellaneous case category also has drastic increase of case number in 2020 (79 cases or 9.8 times) as compared to the previous period. There was no significant difference in the number of patients with caries, bleeding, trauma, TMD and medical cases.



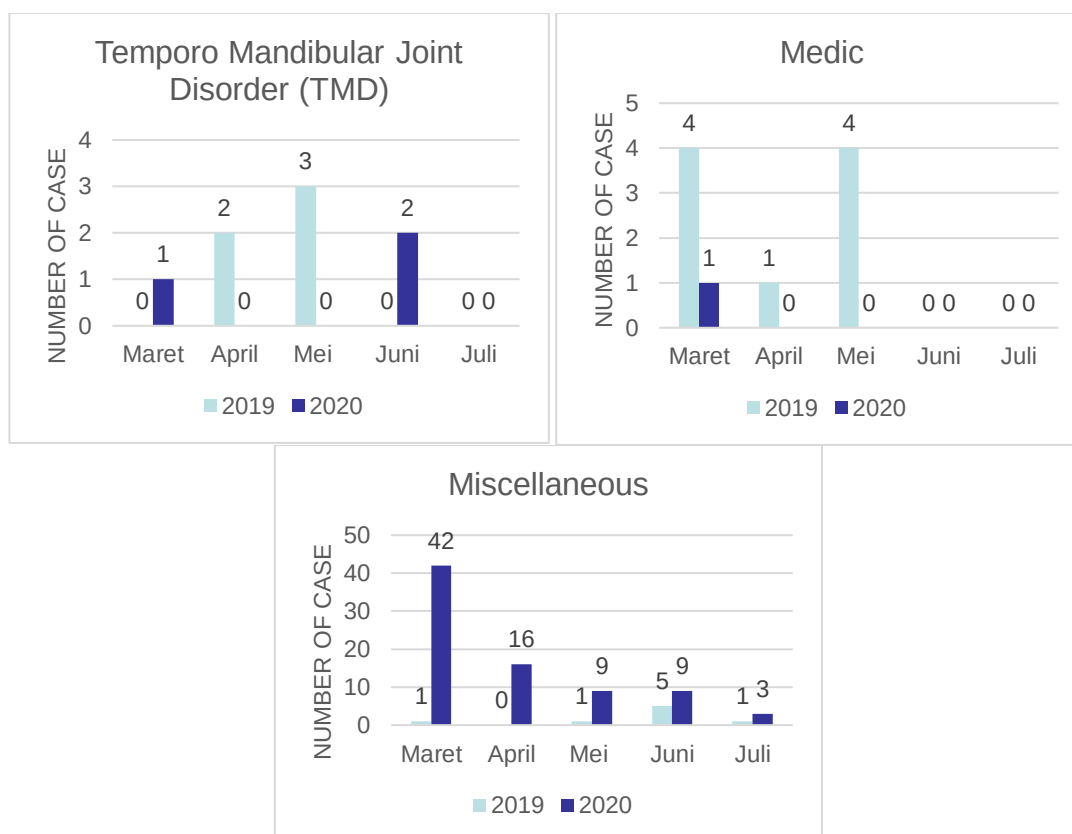


Figure 3. Number of cases in March-July 2019 and March-July 2020

DISCUSSION

The COVID-19 pandemic has caused changes in the healthcare, education, and economic sectors. To prevent the spread of COVID-19, hospitals in Indonesia could only handle emergency cases during the period of restriction, while elective cases could only be managed if the patient was confirmed negative for COVID-19. Due to the new regulations, many private dental practices were either closed, or avoided performing dental treatment as dentists were vulnerable to exposure to the virus. Dental aerosols, by-products of some dental procedures such as scaling and high-speed air turbine burs, facilitate the spread of the infection from patients to dentists.^{15,16}

On March 16th, 2020, in response to the escalating concerns regarding COVID-19, the American Dental Association (ADA) recommended that dental practices postpone all non-emergency treatments and focus solely on emergency dental services.^{9,11} This decision, prompted by the increasing spread of the virus, has led to a significant reduction in access to dental care.¹⁶ The closure of some dental and oral health facilities caused a significant increase in the number of visits to the ED of the Universitas Airlangga Dental Hospital during March-July 2020. There was an increase by 390 people (345%) compared to the period March-July 2019. The highest number of visits occurred in April 2020 and then decreased.

The number of caries and infection cases in this study were increased significantly at the Universitas Airlangga Dental Hospital during the pandemic which is in accordance to global trends during the COVID-19 pandemic. There was a notable increase in dental infections and carious complications in Indonesia, particularly attributed to delays in routine care. Untreated caries often progresses through the pulpo-periapical region and extend into the facial and neck fascial spaces, ultimately leading to serious infections. A retrospective review at the Universitas Airlangga Dental Hospital, based on emergency department data from August 2017 to February 2020, found that nearly half of dental emergency visits were due to infections and approximately 22% were directly related to untreated caries.¹⁷ During the pandemic, dental clinics nationwide were largely restricted to emergencies only, per Indonesian Dentists Association directives, causing postponement of routine dental visits. This led to worsening of mild carious lesions into acute infection requiring urgent care.^{18,19} Additionally, a regional cross-sectional study in Jember (East Java) conducted in March 2021 observed that over 75% of adults who avoided dental visits during COVID-19 exhibited moderate to severe caries, further highlighting the impact of deferred treatment on oral health status in Indonesia.²⁰ The level of people's awareness to seek dental treatment on a regular basis is still low²¹. Hence, mild cases are left untreated until the severity increases, and an emergency situation arises. The call for closure of dental practice by the Indonesian Dentists Association caused emergency

cases to seek care at dental service providers that were still open during the pandemic, including the Universitas Airlangga Dental Hospital.

The study result of increase infection during pandemic, specifically caries, are very different from similar studies conducted in Germany during the first four weeks of the pandemic (March-April 2020) after the implementation of the restriction policy by the German government. Research conducted by Lentge *et al.* (2021) stated that the number of patient visits during that period decreased drastically compared to the previous period and was dominated by traumatic events caused under the influence of alcohol. It also stated that there was a trend to classify ordinary cases as emergency cases before the COVID-19 pandemic in Germany. When the pandemic occurred, there was a fear of COVID-19 transmission in dental practice, causing patients to postpone their dental visit. This caused the number of cases to drop drastically. The number of traumatic events due to social activities or sports was also reduced due to restrictions on social activities. As a result, traumatic events occurring under the influence of alcohol in the domestic or private setting dominated the category.²²

Elective cases grouped under miscellaneous cases were the second largest number of cases to be managed in the ED at the beginning of the pandemic. This was caused by all elective cases being shifted to the ED. These would normally have been handled in the respective department of the hospital. Besides, post-operative care was also administered in the ED. As a result, there was an accumulation of patients from each department unit in the ED.²³

During the COVID-19 pandemic, the number of bleeding cases remained unchanged compared to the same period in 2019. The main cause of bleeding was local factors, such as poor oral hygiene and the presence of a calculus. The decrease in the number of trauma cases at the beginning of the pandemic could be due to the local restrictions as it decreased the mobility of citizens and the number of traffic accidents. Based on data from the East Java Communication and Information Office, the number of traffic accidents in East Java decreased by about 14% during the COVID-19 pandemic compared to the same period in 2019.²⁴ Similarly, in April 2020, the number of injuries due to traffic accidents in Cali, Colombia, also decreased by 76% and the death rate by 55% due to strict restrictions during the COVID-19 pandemic.² A decrease in the number of motor vehicle accidents by 60.5% also occurred in the United Arab Emirates.²⁵ Trauma cases in the Universitas Airlangga Dental Hospital were dominated by dento-alveolar and vulnus fractures both in 2019 and in 2020.

There was a decrease in the number of temporo-mandibular displacement (TMD) cases although it was not significant. This might be because some TMD cases can be managed conservatively or electively.²⁶ Hence, patients can defer treatment, except in cases of displacement without reduction, which can cause lockjaw.

As an emergency health service provider, the Universitas Airlangga Dental Hospital also provides medical services besides dental care. The slight decrease in the number of medical cases during early COVID-19 pandemic was because in 2019, most of the patients referred to the ED were students at the Faculty of Dentistry of the hospital or patients who were being treated in the outpatient departments and happened to have a medical emergency. Medical cases in March-July 2019 were predominantly due to dyspepsia, while the most common diagnoses during the whole year were syncope, dyspepsia, lower leg and knee injuries, ankle injuries, and open wounds of the head. It is in accordance with Al Sebaei (2024) study reporting that the most common medical emergency diagnosis in general was syncope followed by hypoglycemia.²⁷ Vasovagal syncope, typically triggered by anxiety, represents the most frequent cause of loss of consciousness in dental clinics. In contrast, hypoglycemia may occur in undiagnosed or unaware diabetic patients as a result of insulin or oral anti-diabetic medication use.²⁸

In contrast, during 2020, the highest number of cases were gastro-esophageal reflux disease (GERD), hypoglycemia, syncope, open sores on the upper arm, and hypertensive urgency.²⁹ The incidence of gastroesophageal reflux disease (GERD) increased annually prior to the COVID-19 pandemic. At the onset of the pandemic in 2020, the number of GERD cases presenting to healthcare facilities declined compared to the pre-pandemic period. This reduction may be attributed to concerns regarding SARS-CoV-2 infection and the perception that GERD symptoms did not warrant urgent medical attention, which likely contributed to decreased hospital visits.³⁰

The limitation of this study is that this research investigates the characteristics of patients who presented to the ED during the early part of the COVID-19 pandemic compared with those who presented during the same period of the previous year. It is still unclear whether this change is due to the pandemic or just patient fluctuations, as the comparative data were from only one previous year. However, from our data we can see the significant increase in ED visit and change in cases number during the short period during early COVID 19 pandemics. Future study needs to see patients' trends and change during the full course of COVID 19 pandemic up to now based on the change in pandemic situation and government's policies and further research may also evaluate the risk of exposure to COVID-19 infection among dentists still needs to be done by comparing the number of positive patients with the number of infected medical personnel to determine the effectiveness of the preventive measures taken, such as personal protective equipment, equipment sterilization and room disinfection, during emergency services provision.

CONCLUSION

The COVID-19 pandemic in Indonesia has caused a change in the general picture of dental and oral health services by an increase in patient number and case distribution.

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