

The Spread of Dental Caries at Dental Hospital Padjadjaran University Before and During Pandemic COVID-19

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Abstract

Pandemic COVID-19 increases public anxiety and fear of infection, causing limited access and delays to the dentist. This was affecting the spread of dental and oral health diseases, particularly caries. This study aimed to describes the spread of dental caries at Dental Hospital Padjadjaran University before and during pandemic COVID-19.

A descriptive cross-sectional study using 74 patient samples obtained by purposive sampling. The DMF-T index was evaluated using secondary data from medical records, and lifestyle and caries indicators questionnaires provide primary data.

Before pandemic COVID-19, the DMF-T index was 3.64, increasing to 6.08 during pandemic. Based on the questionnaire, 63,5% of respondents went to the dentist during pandemic COVID-19, the majority went to the dentist when there was pain (56,7%), and respondents had difficulty accessing treatment to the dentist (72,9%). During pandemic, there was an increase in respondents reporting caries (94,6%) and sweets consumption (59,5%).

The spread of dental caries of patients before was medium criteria and became high criteria during pandemic COVID-19. The difficulty of accessing treatment to the dentists, the assumption to go to the dentist when there was pain, and increased consumption sweet consumption, could contribute the spread of caries during pandemic COVID-19.

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Introduction

All countries in the world are currently experiencing an outbreak of *coronavirus disease* or known as COVID-19 and being affected by it.¹ In December 2019, the first case of severe acute respiratory syndrome caused by the COVID-19 virus was reported from Wuhan, China.² The first case of the COVID-19 virus in Indonesia was confirmed positive on 2 March 2020.³ The status of COVID-19 was indicated by WHO as a pandemic on 11 March 2020.⁴ The spread of COVID-19 virus transmission from droplets and contact person-to-person is very fast. Every country acts quickly to reduce the spread of the COVID-19 virus.³ Indonesian government made

policies that changed people's lifestyles to keeping a distance, maintaining personal hygiene, and using personal protective equipment. This causes everyone to reduce activities outside the home.^{5,6}

The research of people's behavior during pandemic COVID-19 said that public anxiety and fear of being infected with the COVID-19 virus caused people to avoid dental treatment.^{7,8} According to the results of research from Peking University, Beijing, China, it was reported that only 38% of patients visited dental clinics during pandemic COVID-19 and there is a significant decline in dental practice providers.^{1,9} Unhealthy lifestyle practices due to diet, social and economic conditions during pandemic COVID-19 also have an impact on dental and oral health status.¹⁰ Based on the results of a survey in Italy, 2020, reported that the isolation during pandemic COVID-19 increase in consumption of unhealthy food, overeating, and more snacking between meals.⁴ Survey from the Ministry of Health Republic of Indonesia in 2021 shows that citizens

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have experienced a decline in maintaining oral hygiene during pandemic COVID-19.¹¹

Limited accessibility and delays to visiting the dentist, as well as a decrease in dental and oral health status can affect the spread of dental and oral health diseases, especially caries. The spread of caries is supported by data from Indonesia Basic Health Research Survey (RISKESDAS) 2018, that the largest proportion of dental problems in Indonesia is tooth decay/cavities/toothache (45.3%) and caries prevalence reached 8.8%.¹² The high prevalence of caries in Indonesia can be assessed from the severity of tooth decay through the DMF-T index. Based on the Indonesian Ministry of Health's Information Data Center, Indonesia's DMF-T index in 2018 was 7,1.¹³ National Dental Health Month activities held at Dental Hospital Padjadjaran University (RSGM Unpad) showed that the most dental and oral health problems found in the community were cavities or caries.¹⁴ The prevalence of dental caries reached 98.7%, while the prevalence rate for free dental caries was only 1.3%.¹⁵

Due to the highest number of dental caries problems with the COVID-19 pandemic situation can impact dental and oral health. Poor oral and dental health contribute to an imbalance of overall health, because it may be related to other diseases, such systemic diseases. This study is required to evaluate the spread of dental caries in patients at Dental Hospital Padjadjaran University before and during pandemic COVID-19.

Materials and methods

The study is a descriptive cross-sectional method. Primary data were collected in the form of questionnaires and secondary data in the form of odontograms on medical records from the Medical Record Installation of Dental Hospital Padjadjaran University (RSGM Unpad). The population in the study were patients with a history of caries before pandemic COVID-19 in 2019 and during pandemic COVID-19 in 2020-2021. The population of this research is 91 people. The study sample size was determined using a cross-sectional formula with 5% of an error limit and obtained 74 samples from the purposive sampling technique based on inclusion and exclusion criteria. The instruments used in this study were stationery, laptops, *Microsoft*

office, *Microsoft excel*, *SPSS*, and *Google Form*.

Odontogram data is needed to calculate DMF-T in each individual to see the spread of caries by comparing the DMF-T Index before and during pandemic COVID-19. Category D is decay for the number of caries teeth that can be filled. Category M is missing for the number of permanent teeth that have been/indicated to be extracted due to caries. Category F is filling for the number of permanent teeth that have been filled.¹⁶ Calculation of individual DMF-T index = total number of D + M + F in individuals, and population DMF-T index = a total number of individual DMF-T index of the total sample divided by the total number of samples.

A questionnaire of lifestyle and caries indicators was used to assess people's lifestyle and caries from before and during pandemic COVID-19. The assessment used the Guttman scale to analyze respondents' answers. The Guttman scale is a scale that only provides two answer choices. It is Yes and No, so the answers are obvious (firm) and consistent. The resulting data is nominal; the value of answers Yes is 1 and No is 0.¹⁷ This questionnaire has been tested for validity and reliability tests on 30 samples of patients with a history of caries before and during pandemic COVID-19.

The results of the DMF-T index value data and the collected questionnaires were analyzed descriptively and presented in tabular form. This research was conducted by obtaining a permit issued by Research Ethics Commission of the Padjadjaran University with the number: 144/UN6.KEP/EC/2022.

Result

The results of the study on the spread of dental caries in patients at the Dental Hospital Padjadjaran University before and during pandemic COVID-19 based on the DMF-T index with a sample of 74 patients. (Table 1.)

Time	Decay Tooth (D-T)	Missing Tooth (M-T)	Filled Tooth (F-T)	Total DMF-T
Before pandemic COVID-19	250	4	15	269
During pandemic COVID-19	254	17	179	450

Table 1. Components of D-T, M-T, F-T at Dental Hospital Padjadjaran University patients before and during pandemic COVID-19.

The comparison of DMF-T index values in patients before and during pandemic COVID-19

was derived from calculating the number of components D-T, M-T, F-T divided by the number of samples researched. The criteria generated from the DMF-T index value before pandemic COVID-19 was moderate and became high criteria during pandemic COVID-19. (Table 2.)

Time	n	DMF-T Index Value	Criteria
Before pandemic COVID-19	74	3.64	Moderate
During pandemic COVID-19	74	6.08	High

Table 2. DMF-T index values at Dental Hospital Padjadjaran University patients before and during pandemic COVID-19.

The results of the questionnaire respondents on indicators of lifestyle and caries shown in (Table 3.)

Indicator	Percentage (%)
Experienced toothache	
Ever	94.5
Never	5.5
Knowing cavities after feeling pain	
Yes	74.3
No	25.7
Treatment to the dentist during pandemic COVID-19	
Ever	63.5
Never	36.5
Difficulty in accessing treatment to the dentist during pandemic COVID-19	
Yes	72.9
No	27.1
Reasons for difficulty in accessing treatment to the dentist during pandemic COVID-19	
Practice closed	30.7
Dental practice additional costs for health protocols	24.0
Fear of contracting the COVID-19 virus	45.3
Frequent consumption of sweet foods	
Yes	74.3
No	25.7
Increased consumption of sweet foods	
Yes	59.5
No	40.5

Table 3. Indicators of lifestyle and dental caries .

Comparison of lifestyle and dental caries indicators before and during pandemic COVID-19 based on respondents' result were shown in (Table 4.)

Discussion

The DMF-T index is an epidemiological study of health status, that is used to evaluate and monitor oral health interventions in the community.¹⁸ The DMF-T index describes the severity of tooth decay or the calculation of caries status especially applied to permanent teeth.¹⁶

The severity of tooth decay can be used as an indicator in determining the spread of caries in a population. The DMF-T index calculation was obtained by counting the number of decay, missing, and filled teeth due to caries.¹⁸ Dental caries is one of the main oral diseases and the most common dental health problem in the community, which can affect the health and quality of life's patients.¹⁹ Dental caries can occur from a synergy between physical, biological, environmental, and behavioral factors which related to the lifestyle of each individual, so referred to as a multifactorial disease.^{20,21} The beginning of caries is characterized by a demineralization process that occurs on the tooth surface by acids from microorganisms, is progressive, and cannot heal itself.²²

Indicator	Before pandemic COVID-19	During pandemic COVID-19
	Percentage (%)	Percentage (%)
Cavities		
Ever	90.5	94.6
Never	9.5	5.4
Behavior if have cavities		
Go to the dentist	67.6	45.8
Self-medication	18.9	40.3
Left untreated	13.5	13.9
Frequency of visits to the dentist		
Once a year	25.7	12.2
More than once a year	17.6	13.5
Only when there is pain	56.7	37.8
Never	-	36.5
Frequency of tooth brushing		
Once a day	17.6	12.2
Twice a day	64.8	74.3
More than twice a day	17.6	13.5

Table 4. Indicators of lifestyle and dental caries during pandemic COVID-19.

The results of the research based on the components of D-T, M-T, F-T before pandemic COVID-19 in 2019 showed that the total number of D-T, M-T, F-T components from the 74 samples was 269 teeth with most of the patients having cavities (D-T) as many as 250 teeth, the second highest frequency was the have fillings on their teeth (F-T) as many as 15 teeth, and the lowest frequency had missing teeth due to caries (M-T) as many as 4 teeth. The results of calculating the total number of components of D-T, M-T, F-T before pandemic COVID-19 resulted in 3,64 of the DMF-T index value. According to WHO, the DMF-T index value is divided into five criteria, very low (0.0-1.1), low (1.2-2.6), moderate (2.7-4.4), high (4.5 – 6.5), and very high (≥ 6.6).²³ The criteria for the DMF-T index

value in patients at Dental Hospital Padjadjaran University before pandemic COVID-19 was moderate criteria. During pandemic COVID-19, showed that there were 254 decayed teeth (D-T) which are the most common in patients. There was an increase in the number of teeth that has fillings (F-T) from before pandemic COVID-19 as many as 179 filled teeth, and teeth missing due to caries (M-T) as many as 17 teeth so the total number of D-T, M-T, F-T components is 450 teeth and DMF-T index value was 6.08 and category was high.

This research compared the DMF-T index value of patients before pandemic COVID-19 in 2019 and during pandemic COVID-19 in 2020-2021, the result of data shows that there was the spread of caries in patients during pandemic COVID-19. This can be seen from the increase in the DMF-T index value before pandemic COVID-19 was from moderate to high criteria during pandemic COVID-19. The increase in the value of the DMF-T index during pandemic COVID-19 is suitable with the review article of *Shamsoddin et al. 2021*, explained that the increase in cavities during pandemic COVID-19 was caused by changes in people's lifestyles, such as not visiting the dentist, and the paradigm in the community was still oriented towards disease treatment and had not at the prevention stage.⁷ Based on the DMF-T index value before and during pandemic COVID-19, there was no significant increase. This is suitable with the explanation according to the Bandung Health Profile that before pandemic COVID-19, dental caries was recorded as a disease that was always included in the 10-20 biggest diseases, however, restrictions on mobility during pandemic COVID-19 caused a decrease in patient visits which resulted in fewer caries cases. The number of teeth recorded does not mean that dental caries decreased.²⁴

The results of respondents' answers to a questionnaire of lifestyle and caries indicators were divided into two, before and during pandemic COVID-19. The questionnaire was divided into two to compare the patient's lifestyle before and during pandemic COVID-19, so that an assessment can be made for indicators of lifestyle and caries. Based on the results of the answers in tables 3 and 4, several indicators have changed significantly during pandemic COVID-19. The pandemic requires the public to practice social distancing, this affects the number

of patients at the Dental Hospital Padjadjaran University. Based on this research from data on patient visits, there was a significant decrease in the number of patients. In 2019, the total number of old and new patient visits at Dental Hospital Padjadjaran University was 50.070. Then in 2020-2021, it decreased by 50% from patients in 2019 due to the pandemic COVID-19. Research by *Samuel et al. 2021*, explained that the decrease in the number of people who had dental treatment could affect the decline in medical treatment of dental and oral health problems so that there would be an increase in dental and oral health problems, such as dental caries.²⁵ The results showed that only 63.5% respondents went to the dentist during pandemic COVID-19.

From the results of the research, it can be seen that before pandemic, there were 90.5% of respondents who experienced cavities and during pandemic COVID-19, there was an increase in respondents who experienced cavities becoming 94.5% respondents. The similar research was conducted by *Endahyani et al. 2021*, in Sumbersari District, Jember, which showed that 72.25% of respondents had moderate to severe caries levels during pandemic COVID-19.²⁶ The high percentage of cavities is supported by the *Pasiga 2020*, which explains the lack of knowledge about dental and oral health (30%) and not visiting the dentist unless the symptoms are severe enough, so that it is associated with the culture of the citizen in Indonesia who think to go to the dentist if they have a pain.²⁷ This is suitable with the results of the questionnaire before and during pandemic COVID-19, the majority of respondents answered about the frequency of visits to the dentist. It is only when there was pain with a percentage before the pandemic is 56.7% of respondents and 37.8% of respondents during pandemic COVID-19.²¹

The COVID-19 pandemic caused people having difficulty accessing dental care, research by *Ibrahim et al. 2021*, explained the fear of being infected with the COVID-19 virus because the risk of being infected with COVID-19 was higher in dental clinics, so it related to not taking care during pandemic COVID-19.²⁸ This is related to the results of the research that the reason for the difficulty in accessing treatment to the dentist was the fear of contracting the COVID-19 virus (45.3%). Research by *Brondani*

et al. 2021, explained that dental care clinics and services have a high risk of exposure to the COVID-19 virus. The high transmission capability of the COVID-19 virus which can be transmitted through aerosol production during dental treatment. This makes dentists and patients very susceptible to exposure. Based on the risk, several dental practices are increasing costs for health protocols as a precaution against COVID-19 virus transmission for dentists and patients.²⁹ The research results showed that 24.0% of respondents made the additional cost for health protocols the reason for the difficulty in accessing treatment to the dentist.

The results of the research before and during pandemic COVID-19, there was an increase in behavior towards follow-up behavior if you experienced cavities, this was self-medicating behavior (40.3%) and left untreated (13.9%). This result was supported by *Pasiga, 2020* research, showed respondents' behaviors were self-medication (42.7%), left untreated (31.3%), online consultation with a dentist (13.7%), and coming to the dentist (6,1%).²⁷ A decrease in the behavior of going to the dentist if you have cavities (45.8%) and an increase in other options such as self-medicating and letting it heal by itself, such as the research of *Endahyani et al. 2021*, that showed respondents in Summersari District, Jember that there are 22.77% of respondents who go to the dentist and 77.23% of other respondents choose other options during pandemic COVID-19.²⁶

The research of *Brondani et al. 2021*, showed improvement reduction of the frequency of sugar consumption during pandemic COVID-19. This is related to the habit of families would have more time to cook at home so that there is an increase in improvement food habits.²⁹ It is not related to the result of the questionnaire, that the answers of respondents who experienced an increase in consumption of sweet foods (59.5%) were higher than respondents who did not experience an increase in consumption of sweet foods (40.5%). However, the result of questionnaire related with surveys in Italy 2020 from the research of *Ferrante et al. 2020*, resulted in data on the proportion of respondents who reported an increase in consumption of sweet foods was three times higher than respondents who reduced the intake of sweet foods.⁴

The habit of consuming sweet foods must

be balanced with maintaining *oral hygiene* every day, which is one of the external environmental factors that can affect the activity of biofilm that can cause caries.³⁰ However, it does not completely eliminate the biofilm. One way to maintain oral hygiene is to brush your teeth regularly because it can help damage the biofilm's structure and decrease the potential pathogen.³¹ The frequency of tooth brushing twice a day during pandemic COVID-19 has increased compared to before pandemic COVID-19 (64.8%) become 74.3% of respondents, according to research by *Balafif et al. 2021*, about the *Oral Health Assessment During the COVID-19 pandemic* that 87.9% of Bandung people brush their teeth twice a day.³² This research showed that many respondents brush their teeth twice a day, but the research did not include questions about how and when to brush their teeth, so the respondents did not know how and when to brush their teeth. This showed that further research is needed to determine how and when to brush teeth correctly.

Based on this research, it is necessary to increase the knowledge of Dental Hospital Padjadjaran University patients regarding the spread of caries during pandemic COVID-19 including the etiology, prevention, and treatment of caries. The lifestyle changes during the COVID-19 pandemic situation, such as oral hygiene, improper tooth brushing, and limited dental care can have an impact on decreasing the level of dental and oral health maintenance so that the high potential for dental and oral diseases.³² According to *Shamsoddin et al.*, oral health was a good indicator of overall health. The COVID-19 pandemic is not over yet so that maintaining a healthy lifestyle to maintain dental and oral health independently is very important.⁷

Conclusion

The spread of dental caries of patients Unpad before pandemic COVID-19 was moderate criteria and became high criteria during pandemic COVID-19. The difficulty of accessing treatment to the dentists, the assumption to go to the dentist when there was a pain, and increased consumption of sweets food, could trigger the spread of caries during the pandemic COVID-19.

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Declaration of Interest

The authors report no conflict of interest.

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