

Overview of Oral Health Status among High School Students Post-Covid-19 Pandemic (A Study at Triguna High School, Jakarta)

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ABSTRACT

Introduction: According to a survey by the Indonesian Ministry of Health (Kemenkes) during the COVID-19 pandemic, the public largely overlooked oral health in favor of adhering to health protocols. To prevent the spread of COVID-19, the Indonesian government implemented Large-Scale Social Restrictions (PSBB) and Public Activity Restrictions (PPKM), which required people to stay home and attend school remotely. These measures directly affected oral health. Both the general public and healthcare workers were concerned about contracting the virus, leading them to avoid activities involving close contact with others. Many adolescents currently in high school experienced the pandemic, with most attending school from home. As a result, they paid little attention to their oral health. Practices such as brushing teeth twice a day became less frequent and when dental pain occurred, students often resorted to over-the-counter medications.

Objective: To evaluate the oral health status of high school students after the COVID-19 pandemic.

Methods and Materials: This cross-sectional study used purposive sampling of students at Triguna High School in Jakarta, following specific inclusion criteria. Data was collected through oral health examinations and the completion of a questionnaire based on the WHO Annex form.

Results: Of the 207 students examined, 150 were found to have dental caries, with a DMF-T index of 3.03. Additionally, 94 students had calculus, and 58 exhibited signs of inflammation.

Conclusion: The most significant oral health issue among students at Triguna High School is dental caries. While 120 students need treatment, it is not urgent, and 20 students require immediate care.

KEYWORDS: COVID-19 pandemic, high school students, oral health.

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INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a pandemic in 2020.¹ A survey conducted by the Indonesian Ministry of Health recorded a change in the public's oral health behaviors during the pandemic. It was found that 2 out of 5 adults did not brush their teeth daily, and 7 out of 10 adults rarely visited a dentist. In comparison, handwashing (64%) was done more frequently than tooth brushing (31%), and the use of hand sanitizer (52%) was more common than mouthwash (20%).² To prevent the transmission and spread of COVID-19, the government implemented health protocols consisting of 5M (maintaining distance, washing hands, wearing masks, reducing mobility

outside the home, and avoiding crowds) and 3T (Testing, Tracing, and Treatment), alongside the enforcement of Large-Scale Social Restrictions (PSBB) and Public Activity Restrictions (PPKM).³ Public concern and fear of contracting the COVID-19 virus impacted oral health, as limited access to dental care led to an increase in oral diseases. The pandemic also hindered face-to-face dental health education, making it difficult to assess adolescents' understanding of proper oral care.⁴ According to research by Roichana et al. (2022), adolescents' knowledge of maintaining oral hygiene was categorized as insufficient, indicating the need for more focus on oral health education.

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In line with the findings of Boy H et al. (2019), the majority of adolescents demonstrated a high level of knowledge regarding dental caries, with 55.9% showing awareness. However, this knowledge was not reflected in their behaviors, as 61.9% exhibited insufficient oral care practices for managing dental caries.6 This suggests that adolescents still lack adequate education on proper oral health maintenance, positioning them as a vulnerable group for dental and oral health issues. In light of this, the present study aims to evaluate the oral health status of students at Triguna High School in Jakarta, who, during the COVID-19 pandemic, engaged in remote learning and home-based activities. Additionally, this research seeks to further investigate the oral health conditions of these students, as no prior dental health assessments or evaluations of their oral health behaviors have been conducted.

METHODS

This study is descriptive research with a cross-sectional design, aimed at assessing the oral health status of students at Triguna High School in Jakarta post-COVID-19 pandemic. The study was conducted at Triguna High School among students in grades X–XII. A purposive sampling method was employed, resulting in a sample size of 207 respondents who met the inclusion criteria. The inclusion criteria for the study were active students at Triguna High School who participated in the research, completed the informed consent, and filled out the questionnaire fully. The exclusion criteria included students who were ill, absent, unwilling to participate in the study, or failed to complete the questionnaire. The analysis conducted was univariate, which aimed to examine the frequency distribution of the sample.

MATERIALS AND PROCEDURE

The instruments and materials used in this study included the Annex 1 and Annex 7 forms from the World Health Organization (WHO). Annex 1 was utilized to assess dental caries experience, bleeding status, pocket depth (periodontal status), dental fluorosis, dental erosion, dental trauma, and the need for immediate dental care. Examinations were conducted using standard instruments, such as a mouth mirror, tweezers, and a periodontal probe to detect pocket depth, the presence of bleeding, and gingival attachment. Annex 7 is a questionnaire designed to identify risk factors for oral health issues. Students were asked to complete the questionnaire, which contained questions about their eating habits, tooth-brushing practices, and the condition of their teeth. This allowed for the identification of risk factors that could contribute to oral health problems among the students.

RESULTS

Table 1. Respondent Characteristics Based on Age and Gender

	n	%
Respondent age (n=207)		
14 years	3	1.4
15 years	33	15.9
16 years	79	38.2
17 years	84	40.6
18 years	8	3.9
Gender (n=207)		
Male	111	53.6
Female	96	46.4

Based on Table 1, the majority of students at Triguna High School are 17 years old, with 3 students aged 14, 33 students aged 15, 79 students aged 16, and 8 students aged 18. The student population consists of 111 male students and 96 female students.

Table 2. Frequency Distribution of Dental Caries, Calculus, Inflammation, and Treatment Needs Among Students at Triguna High School Jakarta

	n	%
Dental Caries		
Healthy teeth	57	27.5
Dental caries	150	72.5
Calculus		
Yes	94	45
No	113	55
Inflammation		
Yes	58	28
No	149	72
Dental treatment needs		
Does not require immediate treatment	62	30
Requires treatment, but not immediate	120	58
Requires immediate treatment	25	12

Based on Table 2, it was found that 150 students (72.5%) at Triguna High School in Jakarta had dental caries, with 94 students (45%) showing the presence of calculus in their

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oral cavity, and 58 students exhibiting signs of inflammation. According to the examination of 207 students, the number of Decay (D) teeth = 586, Missing (M) teeth = 17, and Filling (F) teeth = 26. Therefore, the total DMF-T was 629, which results in a DMF-T index of: $DMF-T = 629 / 207 = 3.03$.

Table 3. Frequency Distribution of Eating Habits and Tooth Brushing Practices among Students at Triguna High School Jakarta

	n	%
Frequency of eating biscuits, sweets, and bread		
Rarely/never	13	6.3
A few times a month	28	13.5
Once a week	24	11.6
A few times a week	89	43.0
Every day	25	12.1
A few times a day	28	13.5
Frequency of eating fresh fruit		
Rarely/never	11	5.3
A few times a month	35	16.9
Once a week	16	7.7
A few times a week	101	48.8
Every day	21	10.1
A few times a day	23	11.1

Based on Table 3, it was found that many students consumed biscuits, sweets, and bread several times a week, with 89 students (43%) reporting this habit. Additionally, 25 students ate these items every day, and 28 students consumed them several times a day. Only 23 students reported eating fresh fruit several times a day, while 101 students ate fresh fruit only a few times a week.

Table 4. Frequency Distribution of Dental Care Among Students During the COVID-19 Pandemic

	n	%
Dental visits during the COVID-19 pandemic		
Yes	19	9.2
No	188	90.8
Experienced toothache during the COVID-19 pandemic		
Yes	22	10.6
No	185	89.4

Actions taken when experiencing a toothache during the COVID-19 pandemic

Leave untreated	67	32.4
Take over-the-counter medication	8	3.9
Consult a dentist online	75	36.2
Seek treatment at a dental clinic	57	27.5

DISCUSSION

A study was conducted to evaluate the dental and oral health status of high school students following the COVID-19 pandemic. The research took place at Triguna High School in Jakarta in September 2024, involving oral examinations of 207 students who met the inclusion criteria. Of the participants, 111 were male (53.6%) and 90 were female (46.4%). The largest group of respondents was 17 years old (Table 1).

The examination of 207 students revealed 586 decayed teeth, 17 missing teeth, and 26 filled teeth. Of the 207 students, 150 were found to have dental caries. These results resulted in a DMF-T index value of 3.03, which indicates a moderate level of dental caries experience among the students at Triguna High School. The survey further identified that dental caries is the most prevalent oral health issue among these students. Dental caries is a progressive demineralization process that leads to the breakdown of mineral components and the formation of cavities.⁷

Dental caries refers to the deterioration of the tooth's hard tissues due to bacterial activity in the oral cavity, which damages the enamel layer.¹ The primary factors contributing to dental caries include host-related factors, microorganisms, and environmental influences, such as the consumption of refined carbohydrates like sucrose.¹ There is a clear link between the occurrence of dental caries and the frequency of sweet food and beverage consumption, as well as candy intake among students at Triguna High School. Frequent consumption of sugary foods and drinks increases the likelihood of developing dental caries. Adolescents, particularly those aged 14 to 20, are at higher risk for caries due to hormonal changes during puberty, which can lead to gum swelling and a decline in oral hygiene. Moreover, a lack of awareness or neglect of oral health habits further contributes to higher rates of caries. The pain associated with dental caries can cause physical limitations and psychological discomfort, leading to functional impairments and a reduced quality of life.⁸

Oral health problems can impact chewing, school activities, self-esteem, and social development among adolescents.² A total of 89 students (43.0%) consume biscuits, cakes, sweet pastries, bread, and similar foods several times a week, which may contribute to the development of dental caries. Cariogenic foods, which are

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high in sugars, can lead to cavities. School-aged children frequently consume such foods, making oral hygiene habits a key factor that indirectly influences the occurrence of dental caries.⁹ Cariogenic foods are typically rich in carbohydrates, sticky, and easily broken down in the mouth. Examples of cariogenic foods include chocolate, candy, sweetened milk, biscuits, wafers, ice cream, sweet bread, sodas, syrup, and other sugary foods and drinks. The sucrose in these foods provides an ideal environment for bacterial growth.² After consuming cariogenic foods, the plaque pH drops to as low as 4.5 and remains low until the sugar is cleared from the mouth and the acids produced are neutralized or dissolved by saliva. This prolonged acidic condition can lead to the demineralization of tooth enamel beneath the surface, creating a favorable environment for bacteria. Excessive consumption of cariogenic foods leads to increased acid production by bacteria, making the oral environment more acidic, which can damage tooth enamel. This disruption of the balance between demineralization and remineralization ultimately results in the formation of dental caries.^{9,10} In terms of oral hygiene practices, 150 students (72.5%) brush their teeth twice or more daily, while 128 students (61.8%) use a toothbrush to clean their teeth. All 207 students (100%) use toothpaste while brushing, and 106 students (51.2%) use fluoride toothpaste. Regular tooth brushing helps remove food particles left on teeth after consuming cariogenic foods, thereby reducing the risk of dental caries.¹¹

Although all students use toothpaste and toothbrushes, 94 students still have calculus in their mouths. The frequency of brushing and overall oral hygiene habits significantly impact the condition of teeth and gums, influencing the risk of dental caries and periodontal disease. In addition to how often teeth are brushed, factors such as the timing of brushing, brushing technique, and daily diet also affect oral cleanliness. It is recommended to use fluoride toothpaste for brushing teeth. The American Dental Association (ADA) suggests that brushing with fluoride toothpaste helps protect teeth from acids produced by plaque.¹²

The anxiety and fear surrounding the Covid-19 pandemic in 2020 had an impact on oral health. Limited access to dental care contributed to an increase in oral health problems. The pandemic also made it challenging to provide in-person dental health education, hindering the ability to assess adolescents' knowledge of proper oral hygiene.⁴ Moreover, the anxiety caused by the pandemic led many individuals to postpone routine dental appointments.¹³

The COVID-19 pandemic in 2020 had a significant impact on overall health. According to the Ministry of Health of the Republic of Indonesia (2020), COVID-19 is a large family of viruses that can cause respiratory infections, ranging from mild to severe symptoms. This disease is zoonotic, meaning it is transmitted between animals and

humans.⁴ Oral health during the COVID-19 pandemic experienced a decline. The effects of the pandemic on oral health led to an increase in various conditions, such as toothaches (pain, swelling), dental decay (cavities, fractures), and gum inflammation (bleeding, tenderness).¹⁴ Hospital Healthcare reports several key findings provided by the American Dental Association (ADA). First, the percentage of adults experiencing toothaches and at risk of developing dental problems rose from 25.5% to 32.1%. Second, the number of adults with dental cavities increased from 19.8% to 28.8%. Third, the percentage of adults reporting toothaches within the past 12 months rose by 4%, reaching 20.2%.⁵

One in three individuals suffers from untreated dental damage, and only 48% of adults sought dental care during the COVID-19 pandemic. Due to the pandemic, dental services were limited in order to minimize the transmission of the virus. As a result, many people went without necessary dental care, and numerous patients missed preventive treatments such as teeth cleanings and regular check-ups. Several factors contributed to this issue, including the enforcement of health protocols like social distancing, economic hardships that impacted oral health, increased sugar consumption during the pandemic, and a decline in motivation or willingness to maintain oral hygiene.⁵

Regular dental visits are closely associated with an individual's daily habits in maintaining oral health. The more frequent the dental visits, the better the condition of one's oral health, and vice versa.⁶ The survey found that 185 students (89.4%) did not experience tooth pain during the Covid-19 pandemic, 188 students (90.8%) did not visit the dentist during the pandemic, and 75 students (36.2%) sought online consultations for tooth pain. During the pandemic, dental care was advised to be postponed for elective treatments due to lockdown regulations. However, routine check-ups are essential for preventive dental care and are associated with improved oral health, while visits prompted by pain are linked to a lower Oral Health Quality of Life.⁷ Therefore, regular dental visits are vital. It is recommended to visit the dentist at least once every six months for caries prevention. Regular check-ups allow for early detection and timely intervention, reducing both the disease burden and treatment costs. They also help prevent the worsening of dental conditions.¹⁵

CONCLUSION

The study on the oral health status of Triguna High School students found that, out of 207 respondents, 15 students had dental caries, 94 had calculus, and 58 had gum inflammation. Among these 207 students, 120 required dental treatment but did not seek it immediately, while 25 needed urgent care. The remaining 62 students did not require any treatment. The DMF-T index was 3.03, and the

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prevalence of dental caries was 72%. This suggests that dental caries is the most significant oral health issue among Triguna High School students. The COVID-19 pandemic likely influenced these findings, as during the pandemic, 185 students (89.4%) did not experience tooth pain, 188 students (90.8%) did not visit a dentist, and 75 students (36.2%) sought online dental consultations for tooth pain.

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