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CLEAN AND HEALTHY LIVING BEHAVIOR AND THE INCIDENCE OF DENTAL CARIES IN SCHOOL-AGED CHILDREN

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Abstract

Dental and oral health *has become a problem that needs to be solved immediately*. In Indonesia, the prevalence of dental caries tends to be high (above 70%) in all age groups. There is an improvement in the prevalence of dental caries in school-aged children. This happened because the children did not exhibit healthy hygiene. To determine the relationship between clean and healthy *living behavior and the incidence of dental caries in school-aged children*. Correlational analytical research type. Cross-sectional approach method. The research variable studied was dental caries. The population of all students at Pecangaan Elementary School Jepara is 80 students. By using the Slovin formula, the final result is 45 students. The research sample was selected based on the inclusion criteria: 1) Having dental caries. 2) Children aged 6-12 years at Pecangaan Elementary School. 3) Willing to be a respondent. Exclusion criteria: 1) Children who were not present during the research. 2) Children who do not agree to informed consent. A stratified random sampling was used to determine the sample for each class. The measuring tool used is a "clean and healthy living behavior" questionnaire. Data analysis used univariate and bivariate with the chi-square test. The implementation was in November 2024. Results: There is a statistically significant relationship between clean and healthy living behavior and the incidence of dental caries in school-age children, with a P value of 0.005 (p <0.05). There is a statistically significant relationship between clean and healthy living behavior and the incidence of dental caries in school-aged children. The participation of teachers, parents, and health centers is very needed to overcome health problems in elementary schools, especially related to dental and oral health.

I. INTRODUCTION

Dental and oral health problems require immediate treatment because they affect the body's condition. Dental and oral health problems can cause toothache if not treated properly, children will be too lazy to do activities, children will not go to school, and loss of appetite, which will impact child growth and developmental disorders. (Nopi Nur Khasanah, 2019). Based on data from the Global Burden Of Disease Study in 2019, it is estimated that tooth decay is the most common condition, and oral disease affects almost 3.5 billion people worldwide, An estimated 2 billion people suffer from permanent tooth caries, and 514 million children suffer from primary tooth caries. (WHO, 2024).

Dental caries is a condition in which the hard layer outside the teeth is eroded by bacteria that produce acid. This can damage deeper tooth tissue if not treated immediately. Dental caries among children often haunt most parents in Indonesia. Food and bad oral habits contribute to dental caries among school-aged children. This dental disease is very common and is a major public health problem worldwide

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because of the pain and suffering experienced by the subject, the high cost of treatment, and its impact on quality of life. Dental caries can affect both primary and permanent teeth in school-aged children. It is one of the important things in human life because the ideal growth and development can be achieved with a healthy body.(Pontoluli et al., 2021). Oral health is important for general health and well-being and greatly affects the quality of life, including speech, eating, and self-esteem. Dental health problems will affect a person's performance.

According to the World Health Organization (WHO), in 2022, the number of childhood caries worldwide reached 514 million. Based on (WHO, 2022), the highest prevalence of childhood caries is in the western Pacific, western Mediterranean, and Southeast Asia regions, with percentages of 46.20%, 45.10%, and 42.77% (World Health Organization, 2022). Data from the Ministry of Health in 2018 showed that the prevalence of caries in Indonesia reached 88.8%, with a prevalence of root caries at 56.6%. The prevalence of dental caries tends to be high (above 70%) in all age groups. Children aged 5-9 years have a prevalence rate of 92.6%. (Riset Kesehatan Dasar (Riskesdas), 2018). The results of national health research on oral dental problems increased from 25.9% in 2013 to 57.6% in 2018. Based on the 2018 risk, the percentage of Central Java Province's population with oral and dental health problems is 25.9%. The proportion in the 10-14-year-old age group, which is the age of school children, is 25.2%, while in the habit of brushing teeth, 2.3% brushed their teeth properly in 2013 and decreased to 2% in 2018. (Balitbangkes Kemenkes RI, 2018).

According to the 2022 Jepara City health profile, based on the results of dental examinations for elementary school students in Jepara City, the results (School Dental Efforts) of 19,790 elementary school students who were examined, 15,211 elementary school students needed dental health care, and 15,211 students or 76.86% received treatment.(Dinas Kesehatan Kabupaten Jepara, 2022).

The mouth is ideal for bacterial growth because of the temperature, humidity, and sufficient food available there. These bacteria affect dental and oral health. Dental and oral hygiene is determined by food debris, plaque, calculus alba material, and stains on the surface of the teeth. Dental and oral health are an inseparable part of overall body health. The level of individual dental and oral hygiene practices directly impacts overall dental and oral health (Melinawati, 2019). Based on the results of a survey that was taken on July 17, 2024, which was conducted at Pecangaan Elementary School, Pecangaan District, Jepara Regency, there were 20 respondents from the results, 10 respondents, four respondents experienced dental caries, four students experienced gingivitis, and two respondents did not experience gingivitis and dental caries. Because of that, the researcher researched the relationship between clean and healthy living behavior and the incidence of dental caries in elementary schools so that children can maintain personal hygiene, including teeth.

According to Nour Sriyanah (2023), Elementary school children are children aged 6-12 years, which means the transition period from preschool to Elementary School (SD). This period is also known as the transition period from early childhood to late childhood until pre-puberty. Commonly, after reaching age 6, children's physical and spiritual development is better, and their health is improving. This means that children will be more resistant to various situations that can disrupt their health.

Dental caries, also known as cavities, is damage to the surface of teeth that occurs due to bacterial activity that damages the demineralization of hard tissue (enamel, dentin, cementum) and damage to organic tooth material due to acid production by hydrolysis of accumulated food residue from the tooth surface. (Hongini & Aditiawarman, 2021). The aim of this study is to determine the relationship between clean and healthy living behavior and the incidence of dental

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caries in children at Pecangaan Elementary School, Pecangaan Village, Pecangaan District, Jepara Regency 2024.

II. RESEARCH METHODS

This type of research is correlation, which involves data collection actions to determine whether there is a relationship and level of relationship between two or more variables. In this study, 2 variables have been determined: the independent variable, namely clean and healthy living behavior, and the dependent variable, namely dental caries in elementary school children.

The study was conducted at Pecangaan Elementary School in November 2024. The population in this study were students at Pecangaan Elementary School, which was 80 students, which was then formulated into 45 sampling students. To determine the sample for each class, Stratified Random Sampling was used with the Simple random sampling technique (simple random sampling), namely through a random number approach or drawing. in order to reduce bias or the tendency to favor one member.

The criteria for respondents are :

1. Inclusion Criteria
   a. Have dental caries.
   b. Children aged 6-12 years at Pecangaan Elementary School.
   c. Willing to be respondents
2. Exclusion Criteria
   a. Children who are not present at the time of the research.
   b. Children who do not agree to the informed consent.

The instruments used to collect data are questionnaires and observations. For the questionnaire titled "Clean and healthy living behavior," in the form of questions with yes or no answers with questions, nine questions are positive, and six are negative. The reliability value is 0.869, and the Validity Test was carried out with 16 Respondents at SDN 3 Pecangaan because the school is adjacent to the research location and has almost the same respondent characteristics, with the results of the count range between 0.543 - 0.747 and the significance value between 0.001 - 0.030 so that it is declared valid.

The data collection technique of this research uses questionnaires and observation instruments. The data analysis method uses a computer with the following steps: editing (checking), coding (giving codes), scoring (giving values to instrument items), tabulating (entering research data), and processing (data processing). Univariate data analysis includes age, gender, dental caries, and CHLB with the calculation of mean and frequency of presentation during bivariate analysis with the chi-square test.

This research has been declared to have passed the ethical test from the Health Research Ethics Committee of the Universitas Muhammadiyah Kudus with the number 134/Z-7/KEPK/UMKU/I/2025 on January 21, 2025.

III. RESULTS AND DISCUSSION

A. Respondent Characteristics

Table 1. Frequency Distribution of Student Characteristics Based on Gender and Age (n=45)

	Characteristics	f	%	Mean	SD
Age		-	-	9.266	1.851
Gender	Male	16	35.6	-	-
	Female	29	64.4	-	-
Total		**45**	**100**	**-**	**-**

Table 1 describes that the gender of the respondents was mostly girls, as many as 29 people (64.4%), and the average age of the respondents was 9 years, with a standard deviation of 1.851.

B. Clean and healthy living behavior in students

Table 2 Clean and healthy living behavior in students (n=45)

CHLB	f	%
Good	6	13.3
Moderate	31	68.9
Low	8	17.8
Total	**45**	**100**

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Table 2 describes that most respondents' Clean and Healthy Living Behavior is fairly good, totaling 31 people (68.9%).

C. The incidence of dental caries in students

Table 3 Incidence of dental caries in students (n=45)

Dental Caries	f	%
Dental Caries	30	66.7
No Dental Caries	15	33.3
Total	**45**	**100**

Table 3 shows that the majority of respondents had dental caries, with a total of 30 people (66.7%).

D. Relationship between Clean and Healthy Living Behavior (CHLB) and the Incidence of Dental Caries at Pecangaan Elementary School, Pecangaan District, Jepara Regency in 2024

Table 4 Cross Tabulation of the Relationship between Clean and Healthy Living Behavior (CHLB) and the Incidence of Dental Caries at Pecangaan Elementary School, Pecangaan District, Jepara Regency in 2024 (n=45)

CHLB	Caries				Total		P value
	No Dental Caries		Dental Caries				
	f	%	f	%	f	%	
Good	5	11.1	1	2.2	6	13.3	0.005
Moderate	10	22.2	21	46.7	31	68.9	
Low	0	0	8	17.8	8	17.8	
Total	**15**	**100**	**30**	**100**	**45**	**100**	

Table 4 describes that out of 45 respondents who have Good CHLB and no dental caries, there are 5 (11.1%), while those with dental caries are 1 (2.2%). Fairly Good CHLBs are 31 (68.9%), consisting of 21 (46.7%) dental caries, while those without dental caries are 10 (22.2%). Low CHLB are eight people or 17.8% of all respondents, where those with dental caries are more than those without dental caries, namely 8 (17.8%) with 0 (0%).

After crosstabulation (cross table), a Chi-square analysis will be continued because in this study, according to the title, namely in the Operational Definition of Variables, there are nominal and ordinal scales. The test results obtained a p-value of 0.005 <α = 0.05, which states Ho is rejected, meaning there is a significant relationship between CHLB and the incidence of dental caries at Pecangaan Elementary School, Pecangaan District, Jepara Regency in 2024.

Discussion

Student Characteristics

Based on the research results, it is known that the average age of students is 9 years. This is the same as the research results from Puput Risti Kusumaningrum (2023) where the highest respondent was 9 years old. The average age of respondents studied by Dewi Fortuna (2021) also had an average age of 9 years, whereas according to Dewi (2023), most respondents are 7 years old, which consists of 65 respondents (59.1%). At that age, children are more often affected by tooth decay due to a lack of dental and oral hygiene knowledge. This affects children aged between 7-9 years caused by tooth decay. This is in accordance with WHO's opinion on the average age of elementary school children, namely between 7-15 years, while in Indonesia, the age range is 7-12 years.

The results of the study show that the majority of students are girls. This is in line with the results of research conducted by Ningsih (2022), with the majority of respondents being girls, which consists of 81 people (54.7%).

Meanwhile, research conducted by Ni Nyoman Dewi (2019) also resulted in the fact that the gender of respondents who were mostly elementary school-aged children was girl, namely 137 students (54.8%). This also aligns with research by Samsita et al. (2023), in which the gender most prevalent at SDN 2, Rantetayo, was a girl, with a total of 24 students (60%). The results of a study published in the Proceedings of the National Academy of Sciences (2015) show that

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women's survival skills are better after birth. So, in this world, there are more female genders than males. This is in accordance with data from students at Pecangaan Elementary School for the 2023/2024 academic year, where many students are girls.

Clean and Healthy Living Behavior (CHLB)

The study results show that students had clean and healthy living behavior in the Moderate (Fairly Good) category because many respondents had CHLB criteria of 56-75%, and most respondents, ts were too lazy to brush their teeth and avoided hot and cold foods.

Clean and Healthy Living Behavior (CHLB) ac, According to Skinner, as quoted by Notoadmodjo (2018) then, clean and healthy living behavior is a response of a person (organism) to stimuli or objects related to illness and disease, health service systems, food and drink and the environment. According to Melvianus Selan (2024), individual health behavior tends to be influenced by the attitude of the person's beliefs about the desired health condition and lack of biological knowledge.

In this study, many respondents whose CHLB was fairly good were affected by the lack of individual cleanliness regarding CHLB. So, it is crucial for the school community, especially teachers and students, to raise awareness of CHLB in the school environment. According to Notoadmodjo (2018), CHLBs are related to the response to stimuli or objects that correlate with illness and disease, health service systems, food and drink, and the environment. Research conducted by Yusfar & Yuni (2018) shows that most CHLB results are fairly good, namely 67 respondents (54.5%). As with Ana Lestari's research in 2021, the result of her study found that clean and healthy living behavior in the fairly good category was the highest majority, with 26 respondents (74.3%). This is affected by the need for children's support system in brushing their teeth, including support from their parents and the teachers at school, and many students like to eat sweet and unhealthy foods.

School-aged children generally like sweet foods. This habit is formed because mothers' knowledge about a good diet for children is still relatively low, so they have introduced sweet foods to their children since they were toddlers. Children become accustomed to consuming these sweet foods, which will continue until they are adults. The high level of consumption of sweet foods among elementary school students is because the tongues of elementary school children tend to like sweet foods, and sweet foods are usually packaged in attractive and colorful packaging that attracts children's interest. In addition, sweet foods such as candy, cotton candy, bread, ice cream, and biscuits are generally affordable and easy for children to find at school, so many children consume these foods. Food consumption patterns in school children also tend to follow their friends. (Maharani, 2023).

According to the Ministry of Health, the benefits of CHLB in schools are to create clean and healthy schools so that students, teachers, and the school community are protected from various threats of disease, increase enthusiasm for the teaching and learning process, which has an impact on student learning achievement, the image of the school as an educational institution is increasing so that it can attract parents' interest and can improve the image and performance of the government in the field of education, and become an example of a healthy school for other regions. (Platform, 2020).

Dental Caries

The results of the study show that the majority of students had dental caries. Based on the research results of Putri (2021), the presentation of dental caries experienced by school-aged children 23 children (41.8%) with media caries, while 17 children (30.9%) experienced superficial dental caries and 15 children (27.3%) experienced deep dental caries. Moreover, according to research by Yusfar & Yuni (2018), it was

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found that there were 70 respondents (56.92%) whose teeth showed brownish/blackish spots with a result of 13.6 and in the very high category.

According to Dewi (2023), diseases that attack teeth generally begin with plaque on the teeth. The plaque arises from food residue that settles on the tooth layer and then interacts with abundant bacteria in the mouth, such as streptococcus Mutan. Plaque is a scourge for the mouth and is invisible to the eye. Plaque will combine with saliva containing calcium, forming hard mineral salt deposits.

Plaque growth is accelerated by the increasing number of bacteria in the mouth and the accumulation of bacteria and food debris. If not cleaned, plaque will form a mineral called tartar, increasing tooth decay risk. Caries is a chronic, progressive hard tissue disease of the teeth caused by the action of microorganisms. It is characterized by demineralization of hard tissue. It is also followed by damage to organic substances that can destroy tooth enamel and dentin so that holes appear in the teeth. (Haryana, 2023).

The problem found in this study is that respondents are accustomed to rarely brushing their teeth after eating or bathing and also eating or drinking sweet things. The results of the Basic Health Research (Riskesdas) in 2023 were that 56.9% of the Indonesian population had dental and oral problems. According to Kartika, quoted by Simbolon (2020), who conducted research based on the age group, the young age group suffers more from tooth decay than those aged 45 years and over; aged 10-24 years, tooth decay is 66.8-69.5%, those aged 45 years and over 53.3% and those aged 65 years and over 43.8%. This condition shows that tooth decay occurs frequently in productive ages.

The Relationship Between Clean and Healthy Living Behavior and the Incidence of Dental Caries in School-Age Children

The results of the study show that there is a relationship between Clean and Healthy Living Behavior and the incidence of dental caries. In this study, many respondents whose CHLB were fairly good were due to the lack of individual hygiene regarding CHLB. So, improving the awareness and knowledge of CHLB in schools is necessary. For this reason, it is very crucial for the school community, especially teachers and students, to raise awareness of CHLB in the school environment, according to the theory put forward by Notoadmodjo (2018) that CHLB responds to stimuli or objects related to illness and disease, health service systems, food and drinks and the environment.

The results of the respondents' answers showed that there were still respondents who said that their CHLB was not good in their environment; this was possible due to the lack of awareness and knowledge of the importance of behaving cleanly and healthily in life. However, the researcher coordinated with local teachers to maintain the respondents' clean and healthy way of life.

Previous research that supports this was conducted by Yusfar & Yuni (2018), who examined the relationship between clean and healthy living behavior and the incidence of dental caries (cavitation) in school-aged children. The results of the study were obtained in the distribution of the Unhealthy Behavior Category in the high category, namely with a total of 67 respondents (54.5%) and healthy behavior in the low category, namely 56 respondents (45.5%). This means many children still know the importance of daily daily implementing clean and healthy living behaviors. From the results of the Frequency Distribution of Dimensions and Percentage of Dental Caries, it can be concluded that after the researcher analyzed, there were 70 respondents (56.92%) whose teeth looked brownish or blackish with a result of 13.6 and in the very high category.

A study conducted by Septi Viantri (2018) also showed that there are many factors that can contribute to tooth decay. One is how much children care about brushing their teeth correctly. They usually

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don't brush their teeth properly but know-how. Research by Samsinta Kala'tiku (2023) also provides evidence of a relationship between knowledge and compliance with brushing teeth and the emergence of tooth caries.

Brushing your teeth greatly affects oral hygiene. Children who do not want to brush their teeth will easily get tooth decay because tooth decay begins when food remains on the surface of the teeth for a long time. The presence of food remains on the surface of the teeth causes bacteria. The bacteria in the oral cavity multiply and eat away at the food remains that stick to the surface of the teeth, then produce acid. Exposure to acidic substances accompanied by acidic foods and drinks will cause tooth minerals to be lost and plaque on the surface of the teeth so that tooth decay occurs. (Elianora, 2023).

During the study, some respondents still copied their friends' answers even though the researcher had warned that the questionnaire answers would not affect academic grades at school. To minimize this, the researcher advised respondents not to copy because this was not a grade in learning, and the researcher also arranged the distance between the respondents' seats when filling out the questionnaire.

In data collection, researchers experienced obstacles such as the difficulty of children showing their dental conditions because the children were embarrassed and some were afraid of the equipment used for examinations such as flashlights and dental mirrors. In this case, researchers provided knowledge that this did not cause pain and showed videos about dental examinations through a projector.

IV. CONCLUSION

There is a statistically significant relationship between clean and healthy living behavior and the incidence of dental caries in school-age children, with a P value of 0.005 ($p < 0.05$). The results of the study of clean and healthy living behavior with the incidence of dental caries in school-aged children are expected to be implemented for students and can improve dental maintenance with the aim of increasing student knowledge about clean and healthy living behavior and avoiding dental caries and increasing teacher's awareness to promote clean and healthy living behavior in students and Need to hold a healthy tooth month in collaboration with the health team in the local environment. The results of this study can also be used as lecture material. The study results become part of the material or study material for learning, especially in the Health promotion courses, community aggregate nursing, and community nursing. The study results are the basis for developing interventions that can improve students' CHLB and reduce the incidence of dental caries in students. Further researchers should continue this study by observing the variables in clean and healthy living behavior in school and household settings.

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