

THE RELATIONSHIP OF CARIES RISK FACTOR AND CARIES EXPERIENCE INDEX

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ABSTRACT

Dental caries is the most common disease in the oral cavity. Caries in school children is increasing every year. Many factors cause dental caries, including food content, feeding frequency, plaque abundance, fluorine program, salivary secretion, and buffer capacity. This study aimed to determine the risk factors for caries with the number of Decay Missing Filling Teeth in 5th-grade students at SDN.22 / VI in Jambi City.

This research is an observational study with a cross-sectional design. The study population was the 5th-grade students of SDN.22 / VI Jambi City, and the entire population is the object of research. The data were collected by filling out questionnaires and examination sheets to determine caries risk factors for DMF-T numbers. This study analyzed the data statistically using chi-square analysis to see the risk factors for caries with the Decay Missing Filling Teeth number for 5th-grade students of SDN.22 / VI, Jambi City.

The results of this study state that there is no significant relationship between diseases that affect the DMF-T number (P value = 0.543). There is a significant relationship between food content and DMF-T numbers (P value = 0.000). A significant relationship was found between the frequency of eating with the DMF-T number (P value = 0.000), and there is no significant relationship between the fluorine program and the DMF-T rate in 5th-grade students of SDN.22 / VI Jambi City (P value = 0.464.)

Keywords: Decay; Missing; Filling; DMF-T.

BACKGROUND

According to the results of Riskesdas 2018, 41.4% of children aged 10-14 years in Indonesia have dental and oral health problems, 37.7% of the population in Jambi Province have dental and oral health problems, and 96.5% of children aged 10-14 years in Indonesia brushes their teeth every day, and 1.4% brushes their teeth at the right time. Jambi Province shows that 96.4% of the population in Jambi Province brush their teeth every day, and 1.0% brush their teeth at the right time (Ministry of Health, 2018).

Caries is a pathological process in

the form of damage limited to the dental and oral tissues, continuing from the dentine to the pulp (Newbrun, 1978). All age groups can experience dental caries in children. If caries are left unchecked, it will result in toothache and lazy activities due to enduring pain in the teeth and mouth. Besides, tooth decay in children will impact their teeth in the future. Salivary pH affects the caries process (Newbrun, 1978). Caries prevention has not moved from conventional methods, including fluoridation, improving oral hygiene, and a carbohydrate diet (Suwelo, 1992).

Dental caries have a multi-factorial etiology. Several factors influence each

other: teeth and saliva, agents (microorganisms), and substrates. In addition to these three factors, there is a time factor that also influences the occurrence of caries (Newbrun, 1978, Miller, 1980, Konig and Hoogendoorn, 1982 cit. (Suwelo, 1992). Factors Influencing the Occurrence of caries (a) teeth and saliva (b)). Microorganisms (c). substrate (d). Time DMF-T is an official index used to measure the condition of a person's teeth that have experienced damage, loss, and repair caused by caries (Depkes RI, 1995).

Increasing the degree of public health is the goal of health development in general health and dental health in particular. Various target indicators have been determined by WHO where in 2010, it is expected that children aged five years are 90% free of caries, aged 12 years have a tooth decay severity (DMF-T index) of 1 tooth, the population aged 18 years free of caries removed (component). M=0), the population aged 35-44 years has at least 20 functioning teeth by 90%, the population aged 35-44 years without teeth 2%, the population over 65 years old still has at least 75% functioning teeth, and the population without teeth 5% (Depkes RI, 2008).

Many ways can be done to prevent caries by knowing the risk factors, namely, caries experience, influencing disease, food content, frequency of eating, amount of plaque, fluoride program, salivary secretion, *streptococci mutants*, buffer capacity, and clinical assessment (Brathall & Petersson, 2003). 2004). Caries Risk Factors: (1) Experience of caries, (2) Predisposing disease, (3) Content of food, (4) Frequency of eating, (5) Amount of plaque, (6) *Streptococcus mutans*, (7) Fluorine program, (8) Secretion of saliva, (9) Buffer capacity, and (10) Clinical assessment.

Based on interview observations with school principals, there is a health screening once a year at SDN 22/IV Jambi City located on Jl. DR. Swabessy RT. 06

Buluran Get to know the Telanaipura sub-district, Jambi City, under the supervision of the Aurduri Health Center. Based on the background above, the researcher is interested in researching the risk factors for caries on the Decay Missing Filling-Teeth rate in 5th-grade students of SDN.22 / VI Jambi City. The study aimed to determine the risk factors for caries to the rates of caries experience index for 5th-grade students at SDN 22/IV Jambi City.

RESEARCH METHODS

The type of research used is an observational study with a cross-sectional design. The research was conducted by 5th-grade students of SDN.22 / VI Jambi City at SDN 22/IV Jambi City. Data collection was carried out in October 2020. The population was 5th-grade students of SDN.22 / VI Jambi City students at SDN.22/VI Jambi City. The entire population was used as the research object, a sample of 30 people. The data were collected by filling out questionnaires and examination sheets to get an overview of caries risk factors on DMF-T numbers. This study was analyzed statistically using chi-square analysis to look at the risk factors for caries with the Decay Missing Filling Teeth rate for 5th-grade students of SDN.22 / VI Jambi City.

Data analysis with univariate and bivariate analysis aims to obtain: an overview of the variable distribution and frequency of the variables studied (caries experience, influencing disease, food content, frequency of meals, fluorine program, and DMF-T) and also the relationship between the independent variables (caries experience, influencing disease, food content, meal frequency, and fluorine program) and the dependent variable (DMF-T). The statistical test used is chi-square.

RESULTS AND DISCUSSION

The study's results on the 5th-grade

students of SDN.22 / VI Jambi City students of SDN.22/IV Jambi City were detailed based on the variables studied.

1. Univariate analysis

a. Characteristics of research respondents

The total number of male respondents, as many as 19 respondents (63.3%), and female respondents, as many as 11 respondents (36.7%)

b. Descriptive research variables

The distribution of respondents based on independent variables (a disease that affects food content, frequency of eating, and fluorine program) and bound (Decay Missing Filling-Teeth) in the univariate analysis only uses the frequency distribution with the percentages presented in table form as follows:

Table 1 Frequency Distribution of Respondents Based on Diseases Affecting 5th-grade students of SDN.22 / VI Jambi City

Influenial Disease Variables	Count	Percentage (%)
Healthy	27	90
There is a mild disease that affects	3	10
Have a severe and long-term illness	0	0
Total	57	100

Based on Table 1. The results of the examination of diseases affecting 30 respondents, 27 people (90%) are healthy, and three people (10%) have mild diseases.

Table 2 Frequency Distribution of Respondents Based on Food Content in Class V Students of SDN.22/IV Jambi City

Food Content	Count	Percentage (%)
A diet low in sugar	1	3,3
Less sugar, cariogenic diet	2	6,7
Low sugar content in food	3	10
Overeating sugar	24	80
Total	30	100

Based on Table 2, the results of

examining the food content of 30 students showed that one person (3.3) had a low-sugar diet, two people (6.7%) had a low-sugar diet, a non-cariogenic diet, three people (10%)) a diet with moderate food content and as many as 24 people (80%) have a diet that contains too much sugar.

Table 3 Frequency Distribution of Respondents Based on Meal Frequency in 5th-grade Students at SDN.22/IV Jambi City

Eating Frequency	Count	Percentage (%)
Eat or snack a maximum of 3× a day	2	6,7
Eat or snack a maximum of 5× a day	13	43,3
Eat or snack a maximum of 7× a day	9	30
Eat or snack more than 7× a day	6	20
Total	30	100

Based on Table 3, the results of examining the frequency of eating for 30 respondents obtained as many as two people (6.7%) ate a maximum of three times a day, 13 people (43.3%) ate a maximum of five times a day, nine people (30%) ate a maximum of seven times a day, and as many as six people (20%) eat more than seven times a day.

Table 4 Frequency Distribution of Respondents Based on Fluorine Programs for 5th-grade Students at SDN.22/IV Jambi City

Program Fluor	Count	Percentage (%)
Get maximum Fluor	0	0
Sometimes given the additional Fluorprogram	16	53,3
Toothpaste fluoridated without other additives	14	46,7
No fluoride, no fluoridated toothpaste	0	0
Total	30	100

Based on Table 4, the examination

results of 16 people (53.3%) were sometimes given the additional Fluor program, and as many as 14 people (46.7%) used fluoridated toothpaste without other additives.

Table 5 Frequency Distribution of Respondents Based on Decay Missing Filling- Teeth Rates in 5th-grade Students at SDN.22/IV Jambi City

DMF-T	Count	Percentage (%)
Good	3	10
Not Good	27	90
Total	30	100

Based on Table 5, there are three people (10%) Decay Missing Filling -Teeth with Good criteria, and as many as 20 people (90%) Decay Missing Filling-Teeth with poor criteria.

Bivariate Analysis

The bivariate analysis tested the relationship between the independent variable (free) and the dependent variable (bound) with the chi-square test. A variable have a significant relationship if the p-value obtained is <0.05 .

Relationship of disease that affects the DMF-T rate

The results of the analysis of the disease relationship that affected the DMF-T rate were obtained from 27 healthy respondents. Three respondents had a good DMF-T of 11.1%, and 24 respondents had a poor DMF-T of 88.9%; of three respondents, there are minor illnesses that affect having a DMF-T that is not good at 100%. The statistical test results obtained a p-value of 0.543, meaning the p-value >0.05 . Statistically, it was concluded that there appeared to be no significant relationship between the disease that affected the DMF-T rate in students in 5th grade SDN.22/IV Jambi City. The results of this study are inversely proportional to

existing research studies. According to Casamassimo, (2000), cit. (Karmawati, Tauchid, & Harahap, 2012) that common diseases or conditions that affect caries, such as asthma and seizures in which these diseases can cause a decrease in salivary flow due to changes in the physiology of the oral cavity. This difference may be due to the many healthy respondents with poor DMF-T.

Table 6 Distribution of Diseases Affecting Relationships with DMF-T Rates in 5th-grade Students of SDN.22/IV Jambi City

Influential Disease Variables	DMF-T				Count		p- value
	Good		Not Good				
	N	%	N	%	N	%	
Healthy	3	11,1	24	88,9	27	100	0,543
There is a mild disease that affects	0	0	3	100	3	100	
Total	3	10	27	90	30	100	

The relationship between food content and DMF-T numbers

Table 7 The Relationship between Food Content and DMF-T in 5th-grade Elementary Children

Variable Eating Frequency	DMF-T				Count		p-value
	Good		Not Good				
	N	%	N	%	N	%	
Eat or snack a maximum of 3 times a day	2	10	0	0	2	100	0,000
Eat or snack a maximum of 5 times a day	1	7,7	12	92,3	13	100	
Eat or snack a maximum of 7 times a day	0	0	9	100	9	100	
Eat or snack more than 7 times a day	0	0	6	100	6	100	
Total	3	10	27	90	30	100	

The analysis results of the relationship between food content and DMF-T index showed that one respondent with a low-sugar diet had a good DMF-T of

100%, two respondents with a low-sugar diet and a cariogenic diet had a good DMF-T of 100%, three respondents with a diet and moderate sugar content had an unfavorable DMF-T by 100%. Moreover, 24 respondents with a diet containing too much sugar had an unfavorable DMF-T by 100%. Statistical test results obtained a p-value of 0.000 means $p\text{-value} < 0.05$. Statistically, it can be concluded that there is a significant relationship between food content and DMF-T rates for 5th-grade student SDN.22/IV students in Jambi City. According to Putri et al. (2010), high-frequency sucrose consumption increases the possibility of plaque development caused by the more cariogenic *Streptococcus mutans* (SM) organism. Sucrose intake and too frequent exposure to sucrose can trigger caries activity.

Carbohydrates with low molecular weight, such as sugar, will immediately seep into the plaque and be metabolized rapidly by bacteria. Foods and drinks that contain sugar will quickly lower the pH of the plaque to a level that can cause the demineralization of enamel. The plaque will remain acidic for some time. To return to normal pH, which is 7, it takes 30-60 minutes. Frequent and repeated sugar consumption keeps plaque pH below normal and causes enamel demineralization (Kidd & Bechal, 1992).

c. The relationship between eating frequency and DMF-T numbers

Table 8 Distribution of the relationship between eating frequency and DMF-T rate in 5th-grade students at SDN.22/IV Jambi

Variable Food Content	DMF-T				Count		p-value
	Good		Not Good		N	%	
	N	%	N	%			
A diet low in sugar	1	100	0	0	1	100	0,000
Less sugar, cariogenic diet	2	100	0	0	2	100	
Moderate sugar content	0	0	3	100	3	100	

Overeating sugar	0	0	24	100	24	100
Total	3	35,1	27	64,9	30	100

The analysis results of the relationship between eating frequency and DMF-T numbers from two respondents with a maximum eating frequency of three times a day had a good DMF-T of 100%, and 13 respondents who ate or snacked a maximum of five times a day had an unfavorable DMF-T of 92.3%. Nine respondents with a maximum frequency of eating seven times a day had an unfavorable DMF-T of 100%, and six with eating or snacking more than seven times a day had an unfavorable DMF-T of 100%. Statistical test results obtained a p-value of 0.000 means $p\text{-value} < 0.05$. Statistically, it can be concluded that there is a significant relationship between the frequency of eating and the number of DMF-T in 5th-grade students of SDN.22/IV Jambi City. This result follows the research of Besford (1996), cit. (Karmawati et al., 2012) state that 10 minutes after eating sweet foods where the pH has not reached a safe point, sugar appears again, more acid will be produced, the more significant the decrease in pH, the more minerals will dissolve from the teeth (Karmawati et al., 2011). The results agree with the conclusion stated by Marshall et al. (2003) that the average frequency of intake is carbonated drinks and sweets has a significant relationship with the incidence of caries and its severity. Children who consumed sweets more than four times a day were almost 20 times more likely to develop caries.

A direct relationship between DMF-T and eating between meals (snacking) has been widely demonstrated. Therefore, the primary step for individuals to reduce the incidence of caries is to limit food consumption between meals in the form of snacks, sugary foods, bread, and chocolate. According to (Mangoenprasodjo, 2004), consuming fibrous food has many benefits because chewing fibrous food stimulates saliva

production and has a self-cleansing effect on themouth (Mangoenprasodjo, 2004).

Fluorine program relationship with DMF-T numbers

Table 9 Distribution of Fluorine Program Relations with DMF-T Rates in Grade V students at SDN.22/IV Jambi City

Variable Fluorine program	DMF-T				Count		p- value
	Good		Not Good				
	N	%	N	%	N	%	
Sometimes a fluoride program is added	1	6,2	15	93,8	16	100	
Toothpaste fluoridated without other additives	2	14,3	12	85,7	14	100	0,464
Total	3	10	27	90	30	100	

The relationship between the fluoride program and DMF-T numbers was analyzed from 16 respondents who were sometimes given additional fluoride programs, 15 respondents with DMF-T numbers with poor criteria of 93.8%, and 14 respondents who used toothpaste. Fluorine without other additives has a DMF-T number of unfavorable criteria of 85.7%.

The statistical test results obtained a p-value of 0.464, meaning the p-value>0.05. Statistically, it was concluded that there was no significant relationship between the fluorine program and DMF-T rates in respondents from 5th-grade students at SDN.22/IV Jambi City. This result is not in line with research by Sriyono (2005), which said that fluoride could prevent caries effectively because it has several different ways of working (Sriyono, 2005). Fluor can work systemically through food and drink. From the experimental results in America, adding fluorine concentrations to drinking water has reduced the prevalence of dental caries by 20-40%. This difference may be caused by the 16 respondents who were sometimes

given additional fluorine programs, only one who had good DMF-T, and 15 who had poor DMF-T. The result could have been caused by the frequency of meals and the content of the food consumed by the respondents, so the fluorine program had no significant effect.

CONCLUSION AND RECOMMENDATION

There is no significant relationship between the systemic disease and fluorine program that affects the number of DMF-T in 5th-grade SDN.22/IV Jambi City. There is a significant relationship between food content and frequency of eating and DMF-T rates in 5th-grade SDN.22/IV Jambi City.

REFERENCES

- Brathall, D., Petersson, G. H., Stjernswärd, JR., 2004, <http://www.db.od.mah.se/car/cariogram/cariograminfo.html>, hal 1-8, 13-17, 19-32, 19 April 2020.
- Dep Kes, R. (1995). Tata Cara Kerja Pelayanan Asuhan Kesehatan Gigi dan Mulut di Puskesmas Dirjen Pelayanan Medik (Procedures for Oral Health Care Services at the Director General of Medical Services Health Center)
- DepKes, R. (2008). Laporan Hasil Riset Kesehatan Dasar (Riskedas) Indonesia Tahun 2007. Jakarta: Departemen Kesehatan RI (Indonesian Basic Health Research (Riskedas) Report 2007. Jakarta: Indonesian Ministry of Health)
- Karmawati, I. A., Tauchid, S. N., & Harahap, N. N. (2012). Perbedaan Risiko Terjadinya Karies Baru Pada Anak Usia 12 Tahun Murid SD UKGS Dan SD Non UKGS Di Wilayah Kecamatan Cilandak Jakarta Selatan Tahun 2011. (The Difference In The Risk Of Developing New Caries In

- Children Aged 12 Years at UKGS Elementary School And Non-UKGS Elementary School Students In The Cilandak District, South Jakarta) Jurnal Health Quality, 2(4), 223-233.
- Kemenkes, R. (2018). Hasil utama RISKESDAS 2018. Online) [http://www.depkes.go.id/resources/download/info-terkini/materi_rakorpop_2018/Hasil% 20Riskasdas, 202018](http://www.depkes.go.id/resources/download/info-terkini/materi_rakorpop_2018/Hasil%20Riskasdas,202018).
- Kidd, E. A., & Bechal, S. J. (1992). Dasar-Dasar Karies Penyakit dan Penanggulangannya. (Fundamentals of Caries Disease and its Management) Jakarta: EGC, 1-15.
- Mangoenprasodjo, S. A. (2004). Gigi Sehat Mulut Terjaga, Yogyakarta: Thinkfresh.
- Marshall, T. A., Levy, S. M., Broffitt, B., Warren, J. J., Eichenberger-Gilmore, J. M., Burns, T. L., & Stumbo, P. J. (2003). Dental Caries And Beverage Consumption In Young Children. Pediatrics, 112(3), e184-e191.
- Sriyono, N. W. (2005). Pengantar Ilmu Kedokteran Gigi Pencegahan. Medika, Fakultas Kedokteran Gigi UGM, Yogyakarta, h, 52-57.
- Newbrun, E. (1978). Dietary Fluoride Supplementation For The Prevention Of Caries. Pediatrics, 62(5), 733-737.
- Putri, M. H., Herijulianti, E., & Nurjannah, N. (2010). Ilmu Pencegahan Penyakit Jaringan Keras dan Jaringan Pendukung Gigi. Jakarta: EGC, 25
- Sriyono, N. W. (2005). Pengantar Ilmu Kedokteran Gigi Pencegahan. Medika, Fakultas Kedokteran Gigi UGM, Yogyakarta, h, 52-57.
- Suwelo, I. S. (1992). Karies Gigi Pada Anak Dengan Pelbagai Faktor Etiologi: Kajian Pada Anak Usia Prasekolah.