

## The Prevalence of Caries and Gingivitis in Elementary School Children in Grade IV, V and VI in East Sinjai District

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### Abstract

The purpose of this study is to describe the prevalence of caries and gingivitis among to elementary school children in grades IV, V, and VI in East Sinjai.

This research was an observational analytic with cross-sectional study using a formula for sampling then got 100 samples and clinical examination of each sample using DMF-T index for caries and gingival index for gingivitis. Data were processed by SPSS program version 21.

Based on the data analysis, the result showed that prevalence of caries for elementary children in East Sinjai is low with average 1.5 according to WHO interpretation. The prevalence of gingivitis is low with average 0.5 for gingival index, these results were effect of areas factor and occupation.

The incidence of caries and gingivitis in elementary children in Est Sinjai were low and caused by areas and parents education.

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### Introduction

Oral health is important for general health and quality of life. One type of oral health is dental health. Dental health becomes important, especially for the development of children.<sup>1</sup> To assess the status of dental health, the presence and absence of dental disease can be monitored, including the degree of dental caries. Caries often occurs in children but parents pay less attention because of the assumption that the child's teeth will be replaced with permanent teeth. It is evident that untreated oral hygiene will be a source of infection for diseases affecting other organs.

Dental caries is one of the most common dental and oral diseases in the community, especially in children. Based on Household Health Survey (SKRT, 2004), caries prevalence in Indonesia reached 90.05%. According to WHO, the state of dental caries in Indonesia tends to increase from year to year. Another disease that

often accompanies caries is a periodontal disease. Periodontal disease is mostly caused by pathogenic microorganisms on oral biofilms or dental plaques that accumulate around teeth with poor oral hygiene. The development of increased gram-negative and anaerobic bacteria in subgingival plaque is a sign of periodontal disease. Gingivitis is one of the periodontal diseases that often affects children and adolescents, with a percentage of 82.1%.<sup>2</sup>

The province of South Sulawesi has a high incidence of dental and mouth problems. On 25 November 2015, the province of South Sulawesi was termed the first healthy rrovince in Indonesia. This predicate becomes a reference for South Sulawesi that this is not the end of the hard work of development in the health sector but a whip to keep trying to improve the health status of the community. One of the efforts is to improve the level of oral and dental health starting with children. This can also be seen from the ratio of the number of dentists and patients to be treated is as much as 8 per 1000 population.<sup>3</sup>

Information and promotion of dental and oral health issues should be introduced early to children so that they can know how important it is to maintain their oral and dental hygiene. It is also important to ensure child are free from dental diseases, such as caries and gingivitis. Based on the fact that dental caries and gingivitis is a disease that is often found in children, there

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is still a minimal number of dentists improving the degree of dental and oral health in Sinjai district. Especially in East Sinjai district, the promotion of dental health education still very low and researchers intend on examining the prevalence of caries and gingivitis in elementary school children in grades IV, V and VI in East Sinjai district.

### Materials and methods

The type of this research is observational analytic using cross-sectional study design. The research was conducted in several elementary schools in East Sinjai sub-district, namely SDN 156 Kaloling, SDN 127 Takkalalla, SDN 27 Kabupaten Sinjai, SDN 84 Kabupaten Sinjai, SDN 25 Borong Uttie Kabupaten Sinjai, SDN 210 Lengkesse, SDN 28 Pakkita, SDN NO. 33 Patalassang, SDN 29 Maroanging, and SDN 92 Panaikang. This research was conducted on 28-29 May 2017.

The population of the study conducted in the ten primary schools was 690 people. The determination of the sample size in an important study may be representative of the population or sample. Determination of sample size if the known population is as follows.

$$n = \frac{NZ(1 - \frac{\alpha}{2})^{2P(1-P)}}{Nd^2 + Z_{(1-\frac{\alpha}{2})}^2 P(1-P)}$$

n: Sample

N: Population

Z<sub>(1- $\alpha$ /2)</sub>: standard normal distribution value, the magnitude depends on the level of trust (TK), if TK 90% = 1.64, TK 95%=1.96, TK 99%=2.57

P: proportion of events, if unknown is recommended 0.5

d: major deviations; 0.1

so to know the minimum sample required for this research are:

$$n = \frac{690(2.57)^2 0.5(1 - 0.5)}{690(0.1)^2 + (2.57)^2 0.5(1 - 0.5)}$$

$$n = \frac{852.3495}{8.55}$$

$$n = 99.69$$

so that the minimum sample size required in this study is as many as 100 people.

Sampling technique is purposive sampling that is sampling according to required sample requirement. The sample of the research used are elementary school students in grades IV, V, and VI which are present when the examination is done in school with the determination of sample size as above. The independent variables from this research are children of grade IV, V and VI of elementary school and dependent variable that is dental caries and gingivitis. The tools and materials used in this study, namely oral diagnostic equipment, dental probe, personal protective equipment (gloves and mask), alcohol, betadine, stationery, and inspection form sheets. The type of data used is the primary data. Data processing using SPSS version 21 for windows 8.0. Presentation of data in tabular form.

### Results

Distribution of caries based on the school. From (Table 1), it can be seen that in schools located in non-coastal areas, such as SDN 27 Sinjai, has a very low caries percentage with the least amount and SDN 25 Boronguttie has a low caries percentage with the highest overall amount. As for coastal areas, schools with very low percentages of caries are SDN 92 Panaikang and at least SDN 84 Sinjai.

Table 2 shows gingival health index based on the origin of the school. It can be seen that in non-coastal areas, students with mild inflammation are at least SDN 210 Lengkesse and the highest number is SDN 28 Pakkita. In coastal areas almost all students in schools located in this region have only mild inflammation.

Table 3 shows the index of caries and gingivitis based of the origin of the school with the average def-t is 1.5 (low) and gingival index 0.5 (mild inflammation).

| Location          | Schools              | def-t Index |    |     |    |        |    |      |    |
|-------------------|----------------------|-------------|----|-----|----|--------|----|------|----|
|                   |                      | Very low    |    | Low |    | Middle |    | High |    |
|                   |                      | n           | %  | n   | %  | n      | %  | n    | %  |
| Non-coastal areas | SDN 210 Lengkesa     | 5           | 50 | 3   | 30 | 2      | 20 | 0    | 0  |
|                   | SDN 25 Boronguttie   | 8           | 80 | 2   | 20 | 0      | 0  | 0    | 0  |
|                   | SDN 27 Sinjai        | 3           | 30 | 0   | 0  | 7      | 70 | 0    | 0  |
|                   | SDN 28 Pakkita       | 5           | 50 | 1   | 10 | 4      | 40 | 0    | 0  |
|                   | SDN156 Kaloling      | 5           | 50 | 1   | 10 | 2      | 20 | 2    | 20 |
| coastal areas     | SDN 133 Pattalassang | 7           | 70 | 1   | 10 | 2      | 20 | 0    | 0  |
|                   | SDN 127 Takkalala    | 8           | 80 | 2   | 20 | 0      | 0  | 0    | 0  |
|                   | SDN 92 Panaikang     | 9           | 90 | 0   | 0  | 1      | 10 | 0    | 0  |
|                   | SDN 29 Maroanging    | 6           | 60 | 1   | 10 | 1      | 10 | 2    | 20 |
|                   | SDN 84 Sinjai        | 4           | 40 | 2   | 20 | 4      | 40 | 0    | 0  |
| Total             |                      | 60          | 60 | 13  | 13 | 23     | 23 | 4    | 4  |

**Table 1.** Caries index based on the school.

| Location          | Schools              | Gingival index |   |                     |     |                   |    |                     |   |
|-------------------|----------------------|----------------|---|---------------------|-----|-------------------|----|---------------------|---|
|                   |                      | Healthy        |   | Slight inflammation |     | Mild inflammation |    | Severe inflammation |   |
|                   |                      | n              | % | N                   | %   | N                 | %  | n                   | % |
| Non-coastal areas | SDN 210 Lengkesa     | 0              | 0 | 5                   | 50  | 5                 | 50 | 0                   | 0 |
|                   | SDN 25 Boronguttie   | 0              | 0 | 8                   | 80  | 2                 | 20 | 0                   | 0 |
|                   | SDN 27 Sinjai        | 0              | 0 | 6                   | 60  | 4                 | 40 | 0                   | 0 |
|                   | SDN 28 Pakkita       | 0              | 0 | 10                  | 100 | 0                 | 0  | 0                   | 0 |
|                   | SDN156 Kaloling      | 0              | 0 | 9                   | 90  | 1                 | 10 | 0                   | 0 |
| coastal areas     | SDN 133 Pattalassang | 0              | 0 | 8                   | 80  | 2                 | 20 | 0                   | 0 |
|                   | SDN127 Takkalala     | 0              | 0 | 10                  | 100 | 0                 | 0  | 0                   | 0 |
|                   | SDN 92 Panaikang     | 0              | 0 | 10                  | 100 | 0                 | 0  | 0                   | 0 |
|                   | SDN 29 Maroanging    | 0              | 0 | 10                  | 100 | 0                 | 0  | 0                   | 0 |
|                   | SDN 84 Sinjai        | 0              | 0 | 9                   | 90  | 1                 | 10 | 0                   | 0 |
| Total             |                      | 0              | 0 | 8                   | 80  | 2                 | 20 | 0                   | 0 |

**Table 2.** Gingival health index based on the school.

| Location          | Schools              | Index def-t |               | Gingival Index |                        |
|-------------------|----------------------|-------------|---------------|----------------|------------------------|
|                   |                      | Mean        | Karies status | Mean           | Gingival health status |
| Non-coastal areas | SDN 210 Lengkesa     | 1.6         | Low           | 0.8            | Slight inflammation    |
|                   | SDN 25 Boronguttie   | 1           | very low      | 0.7            | Slight inflammation    |
|                   | SDN 27 Sinjai        | 2.3         | Low           | 0.8            | Slight inflammation    |
|                   | SDN 28 Pakkita       | 1.8         | Low           | 0.1            | Slight inflammation    |
|                   | SDN156 Kaloling      | 2           | Low           | 0.4            | Slight inflammation    |
| Coastal areas     | SDN 133 Pattalassang | 1.1         | very low      | 0.5            | Slight inflammation    |
|                   | SDN127 Takkalala     | 1           | very low      | 0.2            | Slight inflammation    |
|                   | SDN 92 Panaikang     | 0.8         | very low      | 0.8            | Slight inflammation    |
|                   | SDN 29 Maroanging    | 1.8         | Low           | 0.1            | Slight inflammation    |
|                   | SDN 84 Sinjai        | 2           | Low           | 0.8            | Slight inflammation    |
| Average           |                      | 1.5         | Slight        | 0.5            | Slight inflammation    |

**Table 3.** Caries and gingivitis index based on school origin.

## Discussion

The results of the study were analyzed using chi-square showing p-value <0.05 means there is a significant relationship between the location environment with dental and oral health problems can be seen that the prevalence of caries and gingivitis in children that occurred in East Sinjai district is still relatively low. There is a difference in the number of DMF-T indexes on the subject between the coastal and non-coastal areas of Jepara Regency, where the subject living on the coastal DMF-T index was lower at 1.88 compared in subjects residing in non-coastal areas of 4.14. The study also observed that health status of periodontal tissue studied coastal areas includes mild gingivitis with 92%, and moderate gingivitis 8%, whereas in non-coastal areas includes mild gingivitis 42%, moderate gingivitis with 52%, and severe gingivitis 6%. 32 In addition, this is consistent with the assertion that coastal areas with those working as fishermen often consume fish, so that the oral cavity is good. While in the community in non-coastal areas that do not work as a fisherman causes lower fish consumption so that the condition of the oral cavity is worse. A significant difference in the DMF-T index between coastal and non-coastal areas can be attributed to food consumption patterns. The more often a person consumes the fish, the caries index will be lower.<sup>4</sup>

As is well known that coastal locations, the fluoride content is also high at 1.2-1.4 mg/L. The benefits of water containing fluoride includes reducing the occurrence of dental caries 40% to 65%. Meanwhile, mineral fluoride basically aims to restore minerals in teeth lost due to acids derived from bacterial and sugar plaque. Without the addition of minerals, the teeth become easily damaged. In addition, the fluoride will also remove plaque containing bacteria in the teeth. As is known, bacteria will produce acid substances that damage the teeth. In some conditions, such as people suffering from dry mouth, gum disease, often suffering from cavities, and using braces, the use of fluoride in toothpaste or mouthwash is highly recommended. Therefore, this is one of the things that affect why caries index and gingivitis in children in elementary schools located on the coast have fewer risks. In addition, seawater has a microorganism that produces antibiotics,

antimicrobials and antibacterials that can inhibit the growth of disruptive bacteria and provide dental enamel protection and help improve dental and oral health because some of its ingredients are proven to be useful for preventing caries and other dental problems.<sup>5</sup>

This study indicated that the subject group domiciled in the coastal areas had a lower DMF-T index. The results of this study in Takalar district of South Sulawesi which states that the average DMF-T value in Komara area (mountain) is higher than in Topejawa area (coastal). This may be due to the fact that people in the Komara area get little food with people in Topejawa close to seafood such as sea fish, tea, and some vegetables.<sup>6</sup>

From the results of the study also found that one of the factors that may affect caries status and gingival health is the parental occupation. However, the result of chi-square test with  $p > 0.05$  result means there is no significant correlation between the type of occupation with the dental and oral health status of the child in this case caries and gingivitis. This study is in line with some kindergartens in Padang area that the result of statistical test shows there is no significant relationship between fathers occupation and child caries status. This may be due to caries caused by multiple factors such as behaviour in maintaining dental health. If the family has good behaviour in maintaining oral health then the child will have good behaviour as well.<sup>7</sup>

As mentioned above, the effect on the caries incidence rate in children is the environment and the level of parental knowledge about the importance of maintaining good dental and oral health early on. Researchers also assume that education and parental knowledge influence the number of caries incidence occurring in primary school children in some schools in East Sinjai district. This is what causes some schools in coastal and non-coastal locations to have high and low caries incidence rates. Recent research from Europe shows that children from low-income families and those with low levels of late education have a higher risk of dental caries than children from high socioeconomic families. Parents' attitudes, especially mothers, have an important role in dental practice in their children. Mothers with low levels of education, older age (over 30 years), live in rural areas, and families with small

incomes may increase the incidence of dental caries in children. Mothers with a high level of education have children with better dental health compared with mothers with low levels of education.<sup>8</sup>

That children whose mothers deliver oral health education early in the home show free caries than uneducated. However, there is no influence of parental education on child dental caries. The level of education presents the level of a person's ability to obtain and understand health information. The higher the level of education a person assumed the better the level of understanding of health information obtained. The problem here is where the respondent's parents obtained information about dental hygiene. Researcher monitoring during the research process found that some of the respondents' parents stated that they rarely obtained information on how to maintain oral hygiene.<sup>9</sup>

Another opinion that parent occupation can affect the severity of caries and gingivitis and have an indirect effect on tooth decay. In terms of education, parents can only describe the level of knowledge that they understand themselves. A low level of parental education results in a low level of education for children about the importance of maintaining healthy teeth and mouth.<sup>10</sup>

Factors that cause a high index of dental caries and child gingivitis is the lack of health services obtained by the child due to low socioeconomic level of the elderly. Someone who is at a low socioeconomic level or is in poverty is not capable of getting health care because of the high cost of health care. This study is supported by several studies which suggest that there is a relationship between socioeconomic factors with caries. The greater percentage of dental caries is present in children with low parental education levels compared with high parental education levels. The socioeconomic level is a predisposing factor for dental caries and gingivitis. People with high caries categories are often associated with socioeconomic factors, such as low-income, low levels of education, employment and lack of access to adequate health care. The socioeconomic level of education can affect one's knowledge. Higher education will make a person have better knowledge and insight so as to influence the healthy behaviour of the person. Dental caries index is higher in children with low

socioeconomic level due to lack of food intake received by children. The socioeconomic level can affect food intake so that children with low socioeconomic rates of caries prevalence are higher than children with high socioeconomic parent level. Children in infancy need nutritious food intake. Parents with low socioeconomic levels will pay less attention to the intake of foods consumed by children so that it can affect the child's growth and affect the health of the body, including oral and dental health. If the intake of food received by the child is lacking calcium, the teeth can become vulnerable to caries. Dental caries index is higher in children with low socioeconomic level.<sup>11</sup>

### Conclusions

The number of caries occurrence is most prevalent in grade 4 students while gingivitis is most prevalent in grade VI students. There was a significant association between coastal and non-coastal sites to caries and gingivitis incidence rates in primary school-aged children in East Sinjai district. There was no significant association between parental occupation and the incidence of caries and gingivitis in primary school-aged children in East Sinjai district. There is a significant relationship between knowledge and parental education with the incidence of caries and gingivitis in primary school-aged children in East Sinjai district.

### Declaration of Interest

The author reports no conflict of interest and the article is not funded or supported by any research grant.

### References

1. Nurwidayati. Faktor yang berhubungan dengan karies gigi pada anak usia 4–6 tahun. *Jurnal Berkala Epidemiologi* 2014; 2: 197. (Indonesia)
2. Khamis A. Re-visiting the decay, missing, filled teeth (dmft) index with a mathematical modelling concept. *Open Journal of Epidemiology* 2016; 6: 17.
3. Ghutaimel H, Riba H, Kahtani S, Duhaimi S. Common periodontal diseases of children and adolescents. *International Journal of Dentistry* 2014; 26: 1-7.
4. Fitriyanti A, Susilowati A, Darjono U. Perbedaan pola konsumsi ikan dan status kesehatan gigi dan mulut pada anak usia sekolah dasar (7-12 th) di Daerah pesisir dan non pesisir kabupaten jepara tahun 2012. *Jurnal Odontologi Dental* 2014; 1: 6-8. (Indonesia)
5. Ratnasari, Gultom E, Andriyani D. Tingkat keparahan karies dan status gizi pada anak sekolah usia 7-8 tahun. *Jurnal Keperawatan* 2014; 1: 33-34. (Indonesia).
6. Wiratmo H. Pengaruh air minum terhadap terjadinya karies pada usia 12-15 tahun di daerah pantai dan pegunungan di kabupaten takalar 2008. *Media Kesehatan Gigi* 2010; 1: 21-23. (Indonesia)
7. Susi, Bachtiar H, Azmi U. Hubungan status sosial ekonomi orangtua dengan karies anak umur 4 dan 5 tahun. *Majalah Kedokteran Andalas* 2012; 36: 102-104. (Indonesia)
8. Khotimah K, Suhadi N, Purnomo. Faktor-faktor berhubungan dengan kejadian karies pada anak usia 6-12 tahun di SD negeri karangayu 03 semarang. *Jurnal Kesehatan Masyarakat* 2012:7-9. (Indonesia)
9. Ngantung R, Pangemanan D, Gunawan P. Pengaruh tingkat sosial ekonomi orangtua terhadap karies anak di TK Hang Tuah bitung. *Jurnal e-Gigi (eG)* 2015; 3: 545-546. (Indonesia)
10. Fatmasari M, Widodo, Adhani Rosihan. Hubungan antara tingkat sosial ekonomi orang tua dengan indeks karies gigi pelajar SMPN di Kecamatan Banjarmasin Selatan. *Dentino Jurnal Kedokteran Gigi* 2017; 1: 65-66. (Indonesia)
11. Hamudeng AM, Ryanda FR. Anxiety level differentiation in 6-12 years old children before and after loss dental care using topical anasthesy at Dental Hospital Hasanuddin University. *J Dentomaxillofac Sci* 2016; 1: 166-170.