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# Relationship between Dental Caries and Nutritional Status in Toddlers at Kaliwates Jember

Ristya Widi Endah Yani*

*Dentistry Faculty, University of Jember, Indonesia*
*Email: ristya_widi@yahoo.com*

**Abstract**

SEARO data (2013), approximately 70-95% of school age children in South East Asia suffer from dental caries. WHO (2000) recommended that 50% of children aged 5-6 years should be free of caries, in 2010 caries free program reached 90%. In fact, up to now dental caries in children is still in a high category, including in Indonesia. It indicates that dental caries is a serious problem and must be treated immediately as it will affect nutritional status. The study was aimed at analyzing the relationship between dental caries and nutritional status of toddlers. Observational study was conducted in toddlers aged 3-5 years in several pre-schools in the Kaliwates Jember from July to October 2013. The study took 49 samples by using purposive sampling. Dental caries (using def-t and pufa index) and nutritional status (using Growth Chart) were employed as variables of this study. The data were presented by using form of distribution frequency table and Pearson correlation test. The average of def-t index was 4.69 (high category), the average of pufa index was4.49 (high category), the average of nutritional status of children was 3.61(good criteria). *Pearson correlation test* between dental caries (def-t and pufa index) with nutritional status showed p=0.000 (p<0,05) with the direction is inverse and the strength is moderate. Pain and infection due to dental caries can leads to food intake disorder, sleep habits disorder, and metabolic processes disorder then it causes low nutritional status of toddlers. Dental caries is related to the nutritional status of toddlers. The higher dental caries, the lower nutritional status.

***Keywords***: dental caries; def-t index; pufa index; nutritional status.

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* Corresponding author. Tel (0331-333536), Fax (0331-331991)
E-mail address: ristya_widi@yahoo.com.

## 1. Introduction

SEARO data, approximately 70-95% of school age children in South East Asia suffer from dental caries. WHO (2000) recommended that 50% of children aged 5-6 years should be free of caries, in 2010 caries free program reached 90%[1]. In fact, up to now dental caries in children is still in a high category, including in Indonesia.

Toddlers suffering from rampan caries have the lower nutritional status [2-4]. The pain of dental caries reduces chewing activity due to discomfort, so not all types of food can be consumed, change in diet likely to be liquid or semi-liquid, so reduces calorie intake and weight [5,6]. Caries is associated with poor child growth and low body weight [7-9]. It is consistent with the studies in toddlers in Turkey with rampan caries, the result shows that approximately 8.7% of toddlers with caries, have less than 80% of the ideal body weight as compared with the toddlers without caries. Toddlers suffering rampan caries have significantly lower weight and height than the comparison the toddlers without caries [10].

Change in body weight is a very sensitive indicator for monitoring the growth of toddlers. The toddlers who have weight gain lower than it should be, experience growth trouble and will be at risk of malnutrition. Growth Chart (KMS) can monitor growth of children based on anthropometric index of weight for age [11]. This study was aimed at analyzing the relationship between dental caries and nutritional status of toodlers.

## 2. Materials and Methods

The observational analytic study with cross sectional approach in toddlers (3-5 years old) from several schools in the Kaliwates District Jember from July up to October2013. The study used 49 samples using purposive sampling. Tools and materials used in this study are mouth mirror, *probes*, *sonde*, *excavator*, *pinset*, growth chart, alcohol, masks, gloves, tampons, *cotton pellet*, and glass. The independent variables was dental caries (def-t and pufa index) and the dependent variable was nutritional status (growth chart). Def-t index is measured by summing the component d (caries), e (missing teeth), f (filled teeth). Pufa index is measured by summing the component p (pulpitis), u (ulceratif), f (fistula) and a (abcess). Nutritional status of children is obtained by determining the point correlating between body weight and age ofthe toddler. There are eight regions in the area of growth chart, that the formation from down to top are; 1$^{st}$white, 1$^{st}$yellow, 1$^{st}$light green, 1$^{st}$dark green, 2$^{nd}$ light green, 2$^{nd}$dark green, 2$^{nd}$yellowand 2$^{nd}$white. White and yellow area on growth chart showed growth disturbance, where 1$^{st}$white area means severe malnutrition, 1$^{st}$yellow indicates under weight, both2$^{nd}$ yellow and 2$^{nd}$ white are as show over weight. While the green area indicates a normal nutritional status. Nutritional status data obtained will be coded, are 1=1$^{st}$ white area; 2=1$^{st}$ yellow area;3=1$^{st}$light green area; 4=1$^{st}$dark green area; 5=2$^{nd}$ light green area; 6=2$^{nd}$dark green area; 7=2$^{nd}$yellow area; 8=2$^{nd}$white area.The results were obtained from the primary data presented in frequency distribution tables and statistical analysis by Pearson correlation testto analyze the relationship between dental caries and nutritional status of toddlers.

## 3. Results

The study was conducted on 49 samples aged 3-5 years toddlers in several pre-schools in the Kaliwates District Jember using purposive sampling to observe the relationship between dental caries and nutritional status.

Description of the mean, deviation standard, and variance of def-t, pufa and nutritional status are shown in table below:

**Table 1:** Mean, Deviation standard and Variance of def-t, pufa and Nutritional status

| | n | Minimum | Maximum | Mean | Deviation Std | Variance |
|---|---|---|---|---|---|---|
| def-t | 49 | 0 | 10 | 4.69 | 2.58 | 6.63 |
| pufa | 49 | 0 | 9 | 4.49 | 2.35 | 5.51 |
| Nutritional Status | 49 | 1 | 6 | 3.61 | 1.22 | 1.49 |

Table1shows the number of 49 samples. The minimum value of def-tis 0, maximum is 10; the minimum value of pufa is 0, maximum is 9; the minimum value of nutritional status is 1, maximum is 6.The average of def-t is 4.69 (high category), deviation standard of def-t is 2.58 and the variance is 6.63. Pufa average is 4.49, deviation standard of pufa is 2.35 and the variance is 5.51. The average of nutritional status of toddler is 3.61(between area of the 1st light green and 1st dark green), and is quite good. Deviation standard of nutritional status is 1.22 and the variance is 1.49. To observe relationship between def-t and pufa index to nutritional status can be noticed in table 2 below:

**Table2:** Correlation of Spearman def-t – Nutritional and pufa - Nutritional status.

| | Correlation coefficient | Sig. (2-tailed) |
|---|---|---|
| def-t–Nutritional status | -0.522 | 0.000 |
| pufa - Nutritional status | -0.579 | 0.000 |

Table 2 shows relationship between def-t and pufa index and nutritional status ($p < 0.05$) with the direction is inverse and the strength is moderate (0.5-0.75), so the higher def-t and pufa index, the lower the nutritional status.

**4. Discussion**

The average of toddlers def-t and pufa index in several schools in the Kaliwates District Jember is in a high category. Dental caries is a multi-factorial disease. There are many influential factors i.e*streptococcus mutans*in the oral cavity, family caries experience, tooth brushing behavior, habits (eating sweet, snacking, drinking milk out of bottle at night), age, health beliefs, level of income, maternal education, fluoride content in drinking water [12-14], whereas the average of toddlers nutritional status is in a good category. Main factor of nutritional status in children are disease and food intake. There are other factors that also affect nutritional status such as socio-economic, demographic, family members, education level, ethnicity, religion, income level, employment, natural resources, water supply, sanitation, access to health care [15-18].

The results of the data analysis (Table 2) shows that there is a relationship between the def-t and pufa index with nutritional status (inverse relationship). The higher caries, the lower nutritional status of toddlers. Toddlers who

suffer from rampant caries have lower nutritional status. This is relevant with the study in Turkey about infant with rampan caries. The result shows that approximately 8.7% of toddlers with caries, have less than 80% of the ideal body weight as compared with the toddler without caries. Toddlers suffering rampan caries have significantly less weight and lower height than the comparison group without caries [10].

The physical impact of caries in toddlers includes pain, prematurely tooth loss, chewing disorder, inability in speaking and tasting food. The psychological impact such as sleep disorder, school absence with reduced concentration in learning which results in lowering IQ. Pain and infection due to dental caries can leads to food intake disorder, sleep habits disorder, and metabolic processes disorder. Pain will reduced is comfort, not all kinds of food can be consumed, a change in diet is likely into liquid or semi-liquid reducing the intake of calories. Sleep disorder can decrease gluccosteroid and growth hormone production. In addition there is a decrease in hemoglobin from erythrocyte production in the bone marrow [19-25].

Infections caused by oral disease leads to metabolic and clinicalc hanges in an individual, including hypermetabolism, negative nitrogen balance, the increase of gluconeogenesis and fat oxidation is modulated by cytokines hormones and other inflammatory mediators compounded by the decrease of food intake. This infection condition requires an increased need for nutrients and proteins which aims at replacing nutrient slot during infection to maintain body's metabolic balance. The loss of body protein catabolism resulted from an infection is necessarily to be replaced immediately by increased protein intake [26].

## 5. Conclusion

There is a relationship between dental caries in toddlers and nutritional status with an inverse relationship. The higher dental caries, the lower the nutritional status of toddlers.

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