

Dental Caries Severity Based on The Nutritional Status of Preschool Children in Jatinangor

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Abstract

Background: The prevalence of dental caries in Indonesia is still high. The pain caused by dental caries could interfere with children's ability to eat and even their growth. This study aimed to discover the proportion of dental caries severity related to nutritional status in children aged 3–5 years.

Methods: This descriptive study was carried out in 3 Pre-school Education Centers (Pendidikan Anak Usia Dini, PAUD) in the sub-district of Jatinangor in September 2014. Sixty four children were selected through cluster random sampling as samples. The degree of caries was measured by def-t index. Nutritional status was determined by anthropometric measurements, i.e. body weight (BW)/body height (BH) or body mass index (BMI)/Age index.

Results: There were 59 (92%) children suffered from dental caries out of which 48 (75%) children was severe, 6 (9%) children was moderate, and 10 (16%) children was mild. Furthermore, 18 (28%) children were mildly undernourished and 46 (72%) were well-nourished. Out of all the children with severe dental caries, 16 (34%) children had mild undernourishment while out of all the children with moderate-mild dental caries, 2 (12%) children had mild undernourishment.

Conclusions: Children aged 3-5 years in the sub-district of Jatinangor have a relatively severe dental caries even though their nutritional status are generally good. Mildly undernourished children largely come from the group with severe dental caries. [AMJ.2016;3(2):314–8]

Keywords: Dental caries, nutritional status, preschool children

Introduction

Optimal growth is very important to children in order to achieve their maximum potential when they become adults. Children growth acceleration during preschool age is lower than during infancy.¹ It is because preschool children are already actively playing and tend to be picky with their food.¹ As such, parents or caretakers need to pay special attention so that children's food intake in preschool age does not decrease.¹

Dental caries is one of dental infectious diseases which can affect children's food intake. Pain caused by untreated dental caries can disturb the mastication process in children, leading to decreased food intake or even growth disruption.² A study by Alkarimi et al.³ in Saudi Arabia and another one by Benzian et al.⁴ in the Philippines stated that

there is a significant correlation between the high degree of severity of dental caries with low body mass index (BMI) in children.^{3,4}

In Indonesia, the prevalence of dental caries is still fairly high. Basic Health Research (*Riset kesehatan dasar*, Riskesdas) 2013 reported that Decay Missing Filled-Teeth (DMF-T) index among Indonesians reached 4.6. This number means that an average Indonesian has 5 teeth with dental caries.⁵

Based on the description above, this study aimed to discover the proportion of dental caries severity related to nutritional status in children aged 3-5 years.

Methods

This study was a descriptive study conducted in September 2014 in 3 Pre-school Education Centers (Pendidikan Anak Usia Dini or PAUD)

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in the sub-district of Jatinangor, which were PAUD AL-Azhar, PAUD Hayatushifa, and PAUD Sayang Bunda. All procedures in this study had been approved by the Health Research Ethics Committee Faculty of Medicine Universitas

Padjadjaran.

The sample was made up of 64 subjects who were selected by cluster random sampling. The inclusion criteria were 3-5 years old children with consenting parents or caretakers.

Table 1 Basic Characteristics

Variables	n (64)	%
Gender		
Males	23	36
Females	41	64
Age (years)		
3-4	7	11
4-5	35	55
5-< 6	22	34
Father's Education		
Elementary School	6	9
Middle School	15	24
High School	34	53
Higher Education	5	8
Unknown	4	6
Mother's education		
Elementary School	2	4
Middle School	15	23
High School	36	56
Higher Education	5	8
Unknown	6	9
Father's Occupation		
Civil Servants	7	11
Employee (Private)	18	29
Self-employed	27	42
Others	6	9
Unknown	6	9
Mother's Occupation		
Civil Servants	1	2
Employee (Private)	13	20
Self-employed	3	5
Housewives	39	61
Unknown	8	12

Table 2 Severity of Dental Caries

Variables	n (64)	%
Severity of dental caries		
Low(def-t 0,0-2,6)	10	16
Moderate (def-t 2,7-4,4)	6	9
High (def-t \geq 4,5)	48	75

The children who were absent during data collection were excluded.

The clinical examination to examine the severity of dental caries was done by a trained dental nurse in a location with sufficient lighting. Def-t index comprises of: (1) decayed (d), which is the number of teeth with untreated dental caries, (2) extracted (e), which is the number of teeth that were extracted specifically due to dental caries, (3) filling (f), which is the number of teeth with fillings. The three components (d,e, and f) from each subject was summed up and presented as def-t index.

Body weight (BW) and body height (BH) measurement were done using digital weight scale (precision 0.1 kg) and microtoise (precision 0.1 cm) respectively. During the measurement, respondents were asked to wear only light or minimal clothing and not allowed to wear footwear, jackets, caps/hats, or bags.

The severity of dental caries was measured using def-t index and then categorized into three groups according to the World Health Organization (WHO): low (0,0–1,1), moderate (2,7-4,4), and high (\geq 4,5). Nutritional status was determined by using the z-score of BW/BH or BMI/age index. Index of BW/BH was used in under-five children, while BMI/age index was used for respondents who were 5 years old or older but not yet 6 years old.

The values for z-score was calculated by using application WHO antro version 3.2.2 and then interpreted according to WHO 2006. The BW/BH or BMI/age index z-score was used for the interpretation. Mild undernutrition is when $-2 < z\text{-score} < -1$ and good nutrition is

when $-1 \leq z\text{-scores} < +2$. All data was processed using computerized methods.

Results

There were 64 subjects involved in this study. Basic characteristics of the subjects that were recorded were gender, age, parents' education, and parents' occupation. Most respondents were females and the largest proportion came from the 4-5 years old age group. The mean age of all the respondents was 57.59 (6.91) months old or roughly about 4 years and 10 months old (Table 1).

Table 1 showed that the largest proportion of parents had middle school education. The largest proportion of fathers was self-employed while the largest proportion of mothers was housewives. The respondents generally came from lower middle economy class.

Out of all respondents, 52 (92%) children were confirmed to have dental caries, 48 (75%) children was severe, 6 (9%) children was moderate, and 10 (16%) children was mild (Table 2).. The overall mean def-t index (SD) was 7.61 (4.34), all of which was due to dental caries component (d).

Out of 18 (28%) children were mildly undernourished and 46 (72%) were well-nourished (Table 3).

Out of all the children with severe dental caries, 16 (34%) children had mild undernourishment while out of all the children with moderate-mild dental caries, 2 (12%) children had mild undernourishment (Table 4).

Table 3 Nutritional Status

Variables	n (64)	%
Nutritional status (BW/BH, BMI/age)		
$-2 < SD < -1$ (Mild undernutrition)	18	28
$-1 \leq SD < +2$ (Good nutrition)	46	72

Table 4 Respondent’s Severity of Dental Caries and Nutritional Status

Severity of dental caries	Mild Undernutrition	Good Nutrition	Total
High	16 (34%)	32 (66%)	48
Moderate-Low	2 (12%)	14 (88%)	16
Total	18	46	64

Discussion

In this study 92% of respondents suffered from dental caries with mean def-t index of 7.61. This result reflected that an average preschool child in Jatinangor had 8 teeth with dental caries. This result was higher than other countries. A study in Bangalore, India⁶ discovers that the prevalence of dental caries among preschool children there is 27.5% with mean def-t index of 0.854. The prevalence of dental caries among preschool children in Riyadh, Saudi Arabia⁷ was 74.8% with def-t index of 6.1 while in Kiambaa, Kenya⁸, it is 59.5% with def-t index of 2.46.^{7,8} This could happen because in Jatinangor, parent’s awareness and knowledge of the importance of dental health maintenance since early age was still lacking, as indicated by the high number of dental caries cases even though the majority of respondent’s mother was housewives (61%).

Table 4 showed that respondents with mild undernutrition mostly came from group of children with severe dental caries. This was a reflection of the correlation between severe dental caries with mild undernutrition. This conformed to an analytic study by Alkarimi et al.³ in Saudi Arabi and another by Benzian et al.⁴ in the Philippines. Those studies report a significant correlation between the high severity of dental caries and low BMI in children.

Those two studies had a different finding from a study by Hong et al.⁹ Hong et al.⁹ reported that there is a significant correlation between high severity of dental caries with high BMI (overweight) in children. The different findings were in agreement with a systematic review by Hooley et al.¹⁰ on the correlation between BMI and dental caries among children aged 0-18 years. The study reports that dental caries has correlation with both high and low BMI.

Several factors that cause the difference in the above studies are the different scales used to measure the severity of dental caries, presence of other controlled variables,

age of respondents, BMI range, and the socioeconomic status of the respondent.

The conclusions of this study are that children aged 3-5 years old in the sub-district of Jatinangor have a fairly high prevalence of dental caries, while the nutritional status among children are generally good and that children with mild undernutrition mostly come from the group with high severity of dental caries.

The limitation of this study was on the use of study design (descriptive cross-section), which prevented the analysis of the correlation between the severity of dental caries and nutritional status. As such, the author recommends a further study to analyze the correlation between the two variables, while also taking into consideration the dental caries severity scale, BMI range, and other variables that can potentially affect dental caries and nutritional status such as socioeconomic status, nutritional intake, and respondent’s oral health.

In general, the author also recommends the local health authority and public health center (Pusat Kesehatan Masyarakat, Puskesmas) to improve parent’s awareness and knowledge on the importance of early dental health maintenance. This is for reducing the high severity of dental caries in Jatinangor Subdistrict.

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