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The Differences of Oral Mucosa Disease between Undernutrition and Stunting Toddlers in Jember

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ABSTRACT

Inadequate nutritional intake when the fetus is born until the early baby is born affects the growth and development of toddlers, which has an impact on malnutrition and stunting. This research aims to analyse the differences of oral mucosa at undernutrition and stunting toddlers in Jember. The study was conducted in Jelbuk District, Jember. A cross-sectional study was applied in this research. The research population was undernutrition toddlers in Silo and Jelbuk with purposive sampling technique. The variables in this research were undernutrition, stunting, and soft tissue diseases of the oral cavity (angular cheilitis, glossitis, cheilitis, recurrent aphthous stomatitis). The samples were 40 undernutrition toddlers and 40 stunting toddlers. The inclusion criteria of respondents were the undernutrition and stunting toddlers aged 24-60 months. While the exclusion criteria were physical disability and mental disorder toddlers. The statistic data of this research were analysed using a Mann–Whitney U Test. The male experienced more undernutrition and stunting based on the gender. The highest percentage of glossitis in undernutrition under five was about 47.5%. The highest percentage of angular cheilitis in stunted toddlers was about 42.5%. The Mann–Whitney U test statistical test resulted in a significance of 0.439. In conclusion, there is no difference on oral mucosa disease between undernutrition and stunting toddlers.

Keywords: oral mucosa; undernutrition; stunting

INTRODUCTION

Background

Stunting is one of the nutritional problems experienced by toddlers in the world today. In 2017, about 22.2% or around 150.8 million toddlers in the world were stunted. However, this figure has increased when compared to the stunting rate in 2000, which was 32.6%. The data on the prevalence of stunting toddlers were collected by the World Health Organization(1).

The prevalence of stunting based in 2018 Basic Health Research data showed that toddlers in Indonesia is still very high with 29.9% and still below the 2019 RPJMN target of 28%. The stunting prevalence in East Java province in 2018 is also high above the national average of 32.8% with the prevalence rate in Jember Regency is close to 40% in detail(2). Undernutrition under five in the world is still high at 32.7%, out of 49 million children under five in the world, and 17 million of them are undernutrition(3). The prevalence of undernutrition toddlers based on the data from the 2018 Basic Health Research among toddlers in Indonesia is still very high that is about 17.8%. This figure is still below the 2019 NMTDP (National Medium-Term Development Plan) of 17%. The prevalence of undernutrition toddlers in East Java is 18.44% in Jember regency and approaching 12% in details(2). The prevalence number of undernutrition and stunting toddlers in Jember belongs to a high level. It also increases from year to year.

Chronic nutritional problems are one of the causes of stunting and undernutrition. Toddlers with nutritional problems show an imbalance in nutritional food intake, causing disruption of dental and oral health[4]. In malnourished toddlers, there is a reducing number of T-helper cells and impaired phagocytosis and imperfect immunologic memory so that the body's immune response center, namely T lymphocytes, cannot produce cytokines and mediators as body defense. Manifestations of nutritional deficiency in the oral cavity show clinical symptoms in the oral cavity such as Angular Cheilitis, Cheilitis, Glossitis, and Recurrent aphthous stomatitis[4,5]. The conditions such recurrent aphthous stomatitis, cheilitis, geographic tongue and glossitis characterized by inflammation and defoliation of the tongue, may be caused by nutritional deficiencies such as vitamin B and iron deficiency[6]. Symptoms of Angular cheilitis and Cheilitis include dry, cracked, sore corners of the lips, sores, pain, and even bleeding. Symptoms of glossitis include a smooth, red or pink and shiny tongue, and burning sensation on the tongue. Symptoms of recurrent aphthous stomatitis are characterized by recurrent ulcers confined to the patient's oral mucosa without other signs of disease. It is better known as long-term canker sores with the discovery of various kinds of minor, major and herpetic formations. These lesions appear at a young age. one of the causes of oral mucosal lesions are macro-deficiency and micro-nutrient (protein, zat besi, vitamin B, folic acid, etc). Those substances are essential for maintaining immune system[7,8]. If this condition is allowed, the undernutrition and stunting on toddlers will be severe. They will experience a brain development disorder and intellegence, a physical, cognitive and metabolism disorder. The data from the Jember District Health Office in 2017 shows that the working are of the Public Health Center which has the highest prevalence of undernutrition is Silo District, while the highest prevalence of stunting is in Jelbuk District.

Purpose

This research aims to analyze the differences of oral mucosa at undernutrition and stunting toddlers in Jember.

METHODS

A cross-sectional study was applied in this research. The study population was undernutrition toddlers aged 24-60 months in Silo District and stunting toddlers aged 24-60 months in Jelbuk District, Jember. The participant was chosen by using side technique with purposive sampling. The variables in this research were undernutrition, stunting and oral mucosa diseases (angular cheilitis, glossitis, cheilitis, recurrent aphthous stomatitis). The samples are 40 undernutrition toddlers and 40 stunting toddlers. The inclusion criteria of respondents were the undernutrition and stunting toddlers aged 24-60 months. While the exclusion criteria were physical disability and mental disorder toddlers. The measurement of undernutrition and stunting toddlers with an index of BB/U (<-3SD, -3SD to -2SD) and TB/U (<-3SD, -3SD to -2SD). Examination of oral mucosa disease (angular cheilitis, glossitis, cheilitis, recurrent aphthous stomatitis) was using a mouth mirror. The data from this research were tabulated and Mann–Whitney U test was performed to determine differences of oral mucosa disease at undernutrition and stunting toddlers.

This study was approved by Research Ethics Committee Faculty of Dentistry University of Jember number 120/UN25.8/KEPK/DL/2018

RESULTS

The result of the differences of oral mucosa diseases at undernutrition and stunting toddlers can be seen in the tables. Table 1 showed that the most undernourished and stunted toddlers was in male. There were 22 undernutrition toddlers (55%), while 25 stunting toddlers (62,5%).

Table 1. The number of undernutrition and stunting toddlers

Number	Cases	Gender	n
1	Undernutrition	Male	22
		Female	18
2	Stunting	Male	25

To find out the number of cases of undernutrition and stunting toddlers with oral mucosa diseases can be seen in the Table 2. Table 2 showed that in undernutrition toddlers, the number of case of glossitis ranks first (47,5%), angular cheilitis (25%), cheilitis (15%) and recurrent aphthous stomatitis (12,5%). The number of cases at stunting toddlers is the highest at angular cheilitis (42,5%), glossitis (25%), cheilitis (20%) and recurrent aphthous stomatitis (12,5%). Undernutrition and stunting toddlers had the same cases of oral mucosa disease, although in different numbers.

Table 2. Number of cases of undernutrition and stunting toddlers with oral mucosa disease

Number	Toddlers	Angular cheilitis (respondent)	%	Glositis (respondent)	%	Cheilitis (respondent)	%	Recurrent aphtous stomatitis (respondent)	%	Total	
1	Undernutrition	10	25	19	47.5	6	15	5	12.5	40	100
2	Stunting	17	42.5	10	25	8	20	5	12.5	40	100

The differences of oral mucosa disease between undernutrition and stunting toddlers can be seen in the Table 3. Table 3 showed that the Mann–Whitney U test statistical test resulted in a significance of 0.439 which means there is no difference in oral mucosa between undernutrition and stunting toddlers.

Table 3. The results of Mann–Whitney U test

Variable	Sig	Note
Oral mucosa between undernutrition and stunting toddlers	0.439	No difference

DISCUSSION

Male toddlers were more likely to experience undernutrition and stunting than female (Table 1). Studies conducted in Ethiopia and other developed countries also showed that male toddlers were very vulnerable to malnutrition due to differences in eating frequencies, energy expenditure, and exposure to health problems compared to female [9,10]. Male toddlers tended to be more active, had stronger gross motor nerves than female. They more quickly mastered motor skill such as walking, running, jumping, and others. More activities required more intake, meaning that they required relatively more calories for growth and development [11]. Therefore, male tended to suffer from more diseases than female due to the genetic, hormonal, and anatomical differences [12,13].

Stunting toddlers were also common in male. Several studies had shown similar results that male suffered from stunting more than female. Female had more fat tissue and less muscle tissue than male. Metabolically, muscle is more active than fat, so muscle will require proportionally higher energy than fat, thus, male and female with the same height, weight and age have different body compositions, so energy needs and nutrition will also be different [12,14].

Table 2 showed that the most common oral mucosa disease in undernutrition toddlers was glossitis followed by angular cheilitis, cheilitis and recurrent aphthous stomatitis. Glossitis was a sign of nutritional deficiencies associated with deficiencies of vitamin B12, iron, folic acid, riboflavin and niacin. The absence of filiform or fungiform papillae on the tongue involved more than 50% of the surface are of the dorsum of the tongue to feel soft and smooth [15]. The causes of inflammation of the tongue include nutritional deficiencies such as Vitamin E, riboflavin, niacin, Vitamin B12, and iron [16].

Angular cheilitis with the main etiologic factor in infancy was nutritional deficiency. Indirect factors that affect the wrong food intake caused toddlers to experience deficiencies of several nutrients such as Vitamin B12, folic acid and iron. So that there was a picture of disease, namely angular cheilitis. Nutritional status of toddlers where the main cause of angular cheilitis was nutritional deficiency caused by deficiency of vitamin B complex, iron and folic acid. Predisposing factors of angular cheilitis, especially nutritional deficiency correlated with environmental conditions [17].

Another oral mucosa disease was cheilitis. Cheilitis was also caused by nutritional deficiencies such as avitaminosis B2, B9, B12, scurvy (Vitamin C), iron deficiency, or zinc deficiency which can cause inflammation around the vermilion border. Symptoms that occured include dry, cracked lips, sores, pain, and even lips could bleed. Fungus or thrush could grow and cause open wounds [5].

Recurrent aphthous stomatitis was also found in undernutrition toddlers, although the number was small. The main cause of recurrent aphthous stomatitis was still unknown. Predisposing factors originating from local disorders could be a sign of other systemic diseases in the body which could be caused by various factors such as trauma (mechanical or chemical), infections (bacteria, viruses, fungi or protozoa), immune system disorders, and systemic disorders (immunodeficiency), nutritional deficiency of food. Nutritional deficiencies such as hematinic deficiency, namely iron, folic acid, vitamins B1, B2, B6, B12 were twice as likely to develop recurrent aphthous stomatitis than healthy people. Deficiencies of vitamin B1, B2, and B6 had been found in 28% of patients with RAS. Deficiency of these vitamins caused a decrease in the quality of the mucosa so that bacteria became easily attached to the mucosa and decreased protein synthesis caused inhibition of cell metabolism. Intake of foods that contain less folic acid and vitamin B12 caused recurrent ulcers. Vitamin B12 substitution therapy showed

promising results in the treatment of RAS. Iron deficiency was another predisposing factor associated with recurrent aphthous stomatitis [18,19].

There were more stunting toddlers who experienced angular cheilitis than other soft tissue diseases. This was related to the growth and development of children and the nutrition they consumed. The high frequency of children with below-normal nutritional status who experienced angular cheilitis was caused by the nutritional adequacy rate (RDA) was not met due to low consumption of energy and protein in daily food or called protein energy deficiency (KEP). Demographically PED (Protein Energy Deficiency) in childhood was caused by a unique environment with material, social, and cultural poverty which was characterized by inadequate sanitation, poor personal hygiene, and less income. The high frequency of children experiencing angular cheilitis with underweight and very thin nutritional status was due to the main etiologic factor of angular cheilitis in childhood was nutritional deficiency [20]. The number of cases of angular cheilitis increased in children, especially in children who had nutritional deficiencies, namely riboflavin deficiency, iron deficiency, folic acid, zinc, pyridoxine, biotin and protein deficiency [21].

Stunting toddlers also experienced glossitis in addition to angular cheilitis. The number of cases of glossitis can occur due to deficiency of vitamins B6, B12, folic acid, iron and zinc. So that the presence of nutritional deficiencies such as in children could be a triggering factor for glossitis [22].

Stunting toddlers experienced cheilitis although the incidence was not as high as angular cheilitis and glossitis. Toddlers with stunting experienced nutritional deficiencies which when accompanied by decreased appetite, also decreased fiber and food intake resulting in insufficient intake so that the quality of diet/nutrition was also poor. This was associated with cheilitis in which saliva was responsible for initiating carbohydrate digestion and dissolving food in the mouth. These changes could result in decreased appetite so that nutrient deficiencies can occur, which also affected the health of the soft tissues in the mouth.

In addition to angular cheilitis, glossitis and cheilitis, another oral mucosa disease that occurs in stunting toddlers was recurrent aphthous stomatitis. Recurrent aphthous stomatitis manifested in the oral cavity which can interfere with masticatory function. According to the previous studies, patients with nutritional deficiencies or with a lower RDA had a longer duration of healing for recurrent aphthous stomatitis than patients with recurrent aphthous stomatitis in general [23]. Children's appetite was reducing so that nutritional intake for the body was also reducing due to a lack of vitamin C, vitamin B1, vitamin B2 and iron [24].

Based on the results of the Mann Whitney U-test, it was explained that there was no difference between oral mucosa disease in undernutrition and stunting toddlers. This was because undernutrition and stunting are manifestations of nutritional deficiencies occuring when the baby reached the age of 2 years. Deficiencies of macronutrient and micronutrient that occur in endornourished and stunted toddlers were a lack of protein, vitamin B12, zinc and iron intake. Malnutrition was a condition that occurs due to lack of intake of nutrients that enter the body. Toddlers who suffered from malnutrition were susceptible to oral mucosa disease [25].

Toddlers who experienced malnutrition such as malnutrition, stunting, and wasting tended to experience oral health problems[26]. The same thing was also shown in a study conducted by Bolat et al., who said that malnutrition (stunting, undernutrition, wasting) caused by a lack of various nutrients in children can affect the condition of the oral cavity, result in various kind of manifestations such as cheilitis, angular cheilitis, glossitis, RAS and oral candidiasis can occur in children with these conditions.

Undernourished and stunted toddlers experienced an imbalance in food intake with the nutritional needs of the body. They were deficient in macronutrients and micronutrients. Macronutrients consist of carbohydrates, proteins, and fats. While macronutrients consists of vitamins and minerals. Imbalance of nutritional intake caused disruption of dental and oral health because it was part of body health that cannot be separated from one another disruption of dental and oral health caused manifestations in the oral cavity. Oral manifestations showed clinical symptoms in the oral cavity such as angular cheilitis, recurrent aphthous stomatitis, cheilitis, scorbutic gingivitis, geographic tongue and glossitis [14].

Community-based oral prevention measured can be an option to reduce oral health problems in undernutrition and stunting toddlers. Oral health education should be given to mothers regarding feeding and dietary practices. Both parents and children should made aware of oral hygiene measures and their follow-up should be done consistantly. Motivation was also needed to explain problems related to oral health through non-conventional ways such as short plays, videos and games [26].

CONCLUSION

In conclusion, there is no difference on oral mucosa disease between undernutrition and stunting toddlers in Jember. The data showed the most common oral mucosa disease in undernutrition amd stunting toddlers was glossitis followed by angular cheilitis, cheilitis and recurrent aphthous stomatitis. Most of oral mucosa diseases in undernutrition amd stunting toddlers were caused by nutritional deficiency.

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