

# INCIDENCE OF STUNTING AND ITS RELATIONSHIP WITH FOOD INTAKE, INFECTIOUS DISEASES, AND ECONOMIC STATUS IN KENDARI, SOUTHEAST SULAWESI, INDONESIA

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# INCIDENCE OF STUNTING AND ITS RELATIONSHIP WITH FOOD INTAKE, INFECTIOUS DISEASES, AND ECONOMIC STATUS IN KENDARI, SOUTHEAST SULAWESI, INDONESIA

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## ABSTRACT

**Background:** Stunting is characterized by inhibition of growth in children that lead to failure in getting normal heights and healthy child's age. It is a public health problem in the working area of Public Health Center of Mata, Kelurahan Mangga Dua in Kendari in 2016.

**Objective:** This study aims to examine the relationship between food intake, infectious diseases, economic status and the incidence of stunting in Kendari, Southeast Sulawesi, Indonesia

**Methods:** This was a descriptive cross sectional study with retrospective approach. This research was conducted in Public Health Center of Mata. There were 41 respondents were selected as the samples. Data were collected by questionnaires, observation, and documentation. Data were analyzed using ChiSquare test.

**Results:** The results showed that there were significant associations between food intake ( $p= 0.001$ ), infectious diseases ( $p= 0.000$ ), economic status ( $p= 0.000$ ), and the incidence of stunting in infants.

**Conclusion:** It can be concluded that there is a relationship between food intake, infectious diseases and economic status with the incidence of stunting in children aged 2-4 years in the working area of Public Health Center of Mata, Kendari. Therefore, good food intake is needed for the growth and development of the child. Moreover, changing the behavior of parents by doing the healthy and clean behavior in the household to prevent infectious diseases in children infectious diseases is also very important. Economic status however also plays key role in the incidence of stunting in children

**Key words:** food intake, infectious diseases, economic status, stunting

## INTRODUCTION

Stunting can be identified by assessing a child's length or height. There is international agreement that children are stunted if their length/height is below  $-2$  SDs from the WHO Child Growth Standards median for the same age and sex.<sup>1</sup> Stunting is characterized by inhibition of growth in children that lead to failure in getting normal heights and healthy child's age. It is chronic malnutrition or growth failure in the past and used as a long-term indicator of malnutrition among children.<sup>2</sup>

Some of the factors associated with the incidence of stunting include lacking of energy and protein, often experiencing chronic disease, feeding practices that do not conform, and poverty factor. The prevalence

of stunting is increased for children age 2 years. In addition, UNICEF reports some facts related to stunting such as: children who experienced early stunting before 6 months old will experience more severe stunting by the age 2 years. Severe stunting in children would be the long-term deficit in the physical and mental development, and effect to the learning in school. These children might absent from school frequently than children with good nutritional status. However, some consequences are faced for the children's success in the future. Stunting will greatly affect the health and development of children. The basic factor that causes stunting may interfere with growth and intellectual development. The causes of stunting are low birth weight, inadequate

breastfeeding, weaning food is not appropriate, recurrent diarrhea, and respiratory infections. Based on the research, most children with stunting consume foods under the provisions on nutrient levels, from poor families with many family members, residing in the region of suburban and rural communities. The influence of nutrition in early childhood who is experiencing stunting may interfere with growth and lack of cognitive development. Child stunting age 5 years tend to persist throughout life. The growth failure in early childhood may persist in adolescence, which then grow into adult stunting and directly affect the health and productivity. Thus, improving chances of having children with low birth weight. Stunting is particularly dangerous for women because it is more likely to hinder the process of growth and a greater risk of dying in childbirth.<sup>2</sup>

In 2010, Ministry of Health Republic of Indonesia showed the prevalence of short toddlers was decreased by only 1.2% from 36.8% in 2007 to 35.6% in 2010. While in 2013 there was an increase of 1.6% to 37.2%.<sup>3</sup> Research showed the prevalence of children under five with the short body continued to increase on age group 0-23 months. It is from 28.7% in the age group ≤ 5 months to 32.1% in the age group 6-11 months, and down to 41.5% in the age group 12-23 months. It can be said that the prevalence of stunting in Indonesia is still high.<sup>4</sup>

Direct factors that cause the incidence of stunting are the consumption of foods that do not meet the criteria as needed, in term of amount and composition of nutrients, clean and safe (eg. for infants who are not breastfed exclusively) as the first factor. The second factor is the direct cause of infectious disease is associated with a high incidence of infectious diseases, especially diarrhea and acute respiratory disease. These factors

are closely related to the quality of basic health services, especially immunization, environmental quality and healthy behavior. Environmental quality, especially the availability of clean water, sanitation and health behavior such as washing hands with soap, defecation in the toilet, not smoking, air circulation in the household and others. Other factors are food availability in the family, especially food for babies 0-6 months (exclusive breastfeeding) and 6-23 months (complementary foods), and balanced nutrition, particularly for pregnant women. These factors related to the quality of parenting, environmental sanitation, household food access, and health care are affected by the level of education, income, and access to information, especially about nutrition and health.<sup>5</sup>

Stunting in under-five children should be a particular concern because it can inhibit the physical and mental development of children. It is associated with an increased risk of morbidity and mortality and impaired motor skills and mental growth. Under-five children suffering from stunting are at risk of a decline in intellectual ability, productivity, and increase the risk of degenerative diseases in the future. This is because the stunting child also tends to be more susceptible to infectious diseases, so the risk of decreased quality of learning in schools and at risk more often present.

Stunting also increases the risk of obesity due to the short body ideal weight is also low. Weight gain a few kilograms can make body mass index is rising beyond the normal limits. The state of overweight and obesity for a long time will increase the risk of degenerative events. Stunting in children can also lead to impaired cognitive development and inhibition of

mental and motor development.<sup>6</sup> Several studies have found a link with between height growth and developmental changes within the first 3 years. Studies in animals have shown that the cerebellum of the brain that coordinates motor movement is the most vulnerable to damage early in infancy, so that early malnutrition in the lives of children will inhibit lower motor development.<sup>7</sup>

Based on the profile of Southeast Sulawesi Provincial Health Office, the number of stunting status is 163,412 (74.2%). The causes of stunting diseases are diarrhea and acute respiratory tract infections. It was found that patients with diarrhea in infants/toddlers were 7,223 (12.23%) cases, and those with acute respiratory tract infections were 4,115 (17.5%) cases.<sup>8</sup> In 2014, the cases of stunting in Kendari district were 886 (33.1%) cases of respiratory infections, 1,124 (18.16%) cases of diarrhea, and malnutrition 41 (0.17%) cases. In addition, it was also found 1,913 (18.21%) of the diarrheal diseases and 1,271 (4.73%) cases of acute respiratory infections.<sup>9</sup>

## METHODS

This was a descriptive correlational study with retrospective approach to identify the disease or the effects of specific health status in the present, and the risk factors identified from the past.<sup>10</sup> This research was conducted in the Public Health Centre of Mata, Kelurahan Mangga Dua in May 2016. The population in this study was all toddlers in working area of Public Health Centre of Mata, Kelurahan Mangga Dua. The sample was 30% (41 respondents) of the population of all underfive children who were suffering from

stunting. Data were collected by questionnaires. Secondary data were also used in this study such as the records of the height for age of respondents. Data were analyzed by chi-square test with the significance level (<.05).

## RESULTS

### Characteristics of Research Subjects

Table 1 shows the characteristics of respondents by age of mother, education, occupation and the characteristics of the children, that the children's age and gender. It is indicated that the majority of mothers' age was 21-30 years (29 people or 70.73%). Most of them (20 people) had high school background (48.78%), become housewife (27 people or 65.85%). While the majority of children's age is between 21-30 months consisting of 21 people (51.22%), and of 22 children were male (53.66%).

**Table 1. Distribution of Respondent's Characteristics (Maternal Age, Maternal Education, Job Status, Children Age, and Gender)**

<b>Characteristics of Respondents</b>	<b>f</b>	<b>%</b>
Maternal age (years):		
21-30	29	70.73
31-40	12	29.27
Education Level of Mother:		
No school	1	2.43
SD	3	7.32
SMP	14	34.15
High School	20	48.78
College	3	7.32
Status of work:		
Work	14	34.15
Does not work	27	65.85
The children's age (months):		
21-30	21	51.22
31-40	18	43.9
41-50	2	4.88
Gender:		
Male	22	53.66
Female	19	46.34

**Relationship between Food Intake, infection diseases, economic status with Stunting Incidence In Toddlers Aged 2-4 Years in the Working Area of Puskesmas Mata, Kelurahan Mangga Dua 2016**

Based on table 2, the food intake aspect indicated that those who had good nutritional status that did not experience stunting/ normal were 12 people (29.3%), and those with stunting were 7 people (17.1%). While those who had malnutrition status that did not experience stunting/ normal were 3 people (7.3%), and those with stunting were 19 people (46.3%).

In infectious disease aspect, the respondents who were suffering from infectious diseases that did not experience stunting/ normal were 3 (7.3%), and those with stunting were 22 people (53.7%). While respondents who were not suffering from infectious diseases that did not experience stunting/ normal were 12 people (29.3%), and those with stunting were 4 people (9.8%).

In addition, in economic status aspect, the respondents who had middle to high economic status that did not experience stunting/ normal were 11 people (26.8%), and those with stunting were 3 (7.3%). While respondents who had a lower economic status that did not experience

stunting/ normal were 23 people (56.3%), and those with stunting were 4 people (9.8%).

will be experienced by infants in a condition where the parents are not able to provide the needs of food intake such as macronutrients

**Table 2. Relationship between Food Intake, infection diseases, economic status with Stunting Incidence In Toddlers Aged 2-4 Years in the Working Area of Puskesmas Mata, Kelurahan Mangga Dua 2016**

Food Intake	Normal		Stunting	
	f	%	f	%
Good nutritional status	12	29.3	7	17.1
Malnutrition status	3	7.3	19	46.3
Infectious Diseases	Normal		Stunting	
	f	%	f	%
Suffering Infectious Diseases	3	7.3	22	53.7
Not Suffering from Infectious Diseases	12	29.3	4	9.8
Economic Status	Normal		Stunting	
	f	%	f	%
Middle to high economic status	11	26.8	3	7.3
Lower economic status	23	56.3	4	9.8%

## DISCUSSIONS

Based on the results of statistical tests with  $p\text{-value} = 0.001$ , showed the statistically significant association between dietary intake and the incidence of stunting. It shows that a person who has good nutrition status will likely not experience the incidence of stunting. Otherwise, someone who has malnutrition status was likely to experience the incidence of stunting.

According to the findings of the study, researchers assume that the deficient or poor provision of food intake will be able to affect the incidence of stunting. Among the cause of stunting is parenting in providing food intake, the limited provision of food intakes such as macronutrients and micronutrients. Conversely, if the provision of food intake is good for young children, it can prevent or reduce the risk of incidence of stunting in under-five children. Stunting

and micronutrients.

Food intake contributes to a person attempts to increase the intake of foods such as macronutrients (carbohydrates, proteins and fats) and micronutrients (vitamins, minerals, and zinc). Thus, it is assumed that if someone knows the importance of food intake, he or she will likely not experience stunting.

The results of this study support the theory of Almatsier in 2009 that height growth could be hampered if a child is deficient of food intake such as proteins. If the body lacks nutrients, especially carbohydrates and fats, protein reserves will be overhauled to cover the deficit and used as an energy source.<sup>11</sup> In Sumatra, it is noted that the intake of food such as macronutrients and micronutrients showed a significant relationship to the incidence of stunting.<sup>12</sup> However, It contrasts with the research of Anisa which showed that there

was a significant relationship between dietary intake of macronutrients and micronutrients and the incidence of stunting.<sup>13</sup>

On the other hand, the results of the statistic test also indicated that there was a significant association between infectious disease and incidence of stunting (p-value=0.00). It tells that a person suffering from an infectious disease tends to experience stunting; otherwise someone who does not suffer from infectious diseases tends to not experience the incidence of stunting.

Based on these results, researchers assume that someone who has an infectious disease can affect a person's status of food intake and experience the incidence of stunting. Otherwise, someone who did not have an infectious disease cannot affect the status of a person's food intake and prevent the incidence of stunting or no experience. Therefore, respondents who have children who are not suffering from infectious diseases tend to pay more attention to the health status and food intake compared to the respondents who have children suffering from infectious diseases, health status and less attention to their food intake. Therefore, the handling of infectious diseases suffered as early as possible will help to improve nutrition status with the balanced fulfillment of food intake in accordance with the needs of toddlers. Many toddlers who experienced stunted due to an infectious disease caused by parenting who were lacking in terms of cleanliness of child and clean and healthy life behavior in the family. If the parents' parenting of the child's cleanliness or healthy life behavior in the family is adequate, it can prevent infectious diseases and also prevent/ reduce the risk of incidence of stunting in children under five due to lack of parental knowledge of the importance of clean and healthy life behavior in a family environment.

Household behave clean and healthy living is household that meet 10 indicators of clean and healthy life behavior in the household, among other things: births assisted by skilled health personnel, giving the baby breast milk exclusively, weighing babies and toddlers, using clean water, washing hands with clean water and soap, using latrines healthy, eradicating mosquito larvae in the house once a week, eating fruits and vegetables daily, doing physical activity every day, and having no smoke at home.<sup>14</sup>

The implementation of the 10 program of clean and healthy life behavior in the family will reduce the risk of a toddler suffering from infectious diseases such as diarrhea, acute respiratory tract infections, intestinal worms and so on.

The results of this study were supported by the theory that was advanced by Suraoka *et al* that the relationship of infectious diseases with food intake is a reciprocal relationship and causality.<sup>15</sup> Infectious diseases may worsen the state of nutrition and state of nutrition is lacking, thus can facilitate a person susceptible to infectious diseases. In addition, Masithah *et al* in their research also states that under-five children who are suffering from diarrhea had a positive relationship with the index of nutritional status that is the height for age.<sup>16</sup> Other studies in Libya also stated that the incidence of diarrhea is the factors causing stunting in children under 5 years old.<sup>17</sup> Infectious diseases showed a significant correlation to the index of nutritional status, height for age in infants.<sup>18</sup> It means that in order to reduce the incidence of stunting, the housewives need to prevent infectious diseases and attention to food intake and health status of children.

However, some studies might contrast with the result of this study that showed no correlation between the incidence of infectious diseases and stunting in children

under five in Nghean, Vietnam and Rome.<sup>19</sup> Additionally, there was no significant correlation between the incidence of diarrheal disease and stunting in Indonesia.<sup>20</sup> It is also explained that malnutrition children who have low resistance to disease will reduce their capacity to fight disease and others. It is called as infection-malnutrition.<sup>21</sup>

Literature indicated that there was no association between infection and the incidence of stunting.<sup>13</sup> This may occur due to infectious disease might only happen in the last one-month period, which was necessarily represent an infectious disease that has been experienced by a toddler during his life.

Another result<sup>5</sup> based on the statistical tests in this study showed that there was a significant relationship between economic status and the<sup>12</sup> incidence of stunting with pvalue (0.00). This finding is consistent with the research of Astari<sup>7</sup> *al*, indicated that the economic status also has a significant effect on the incidence of stunting.<sup>22</sup> In this regard, researchers assume that families with middle to high economic status have no experience of stunting, while families who have medium economic status might suffer stunting. Therefore, families who have middle and upper economic status tend to pay more attention to the health status and can meet the needs of their children. Otherwise, families who have medium economic status are less likely to meet their needs. This causes a lot of respondents who experienced stunting. The need to repair the economic status of the family in order to support the needs of families, both primary and secondary needs is important. The improvement of the economic status will reduce the risk of incidence of stunting. However, these results are consistent with the theory of Suhardjo who said that, when the economic status is low, food needs will

not be met, otherwise if the income is good, the food needs will be met.<sup>23</sup> It is also supported by the research in Maluku province that found the low economic status in North Maluku was associated with the incidence of stunting in children aged 0-59 months.<sup>24</sup>

## CONCLUSIONS

Based on the findings of this study, it can be concluded that there is a relationship of food intake, infectious diseases and economic status with the incidence of stunting in children aged 2-4 years in the working area of Public Health Center of Mata, Kendari. Food intake, both macronutrients and micronutrients are needed for the growth and development of the child. Moreover, infectious diseases can be prevented by changing the behavior of parents by doing the healthy and clean behavior in the household to prevent infectious diseases in children. Economic status is also very supportive of primary and secondary needs for the family.

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