

# EFFECT OF COMPLEMENTARY FEEDING ON STUNTING AND ANAEMIA IN TODDLERS IN SIDOARJO, EAST JAVA

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## ABSTRACT

**Background:** Stunting is a chronic malnutritional problem which has the risk of developing degenerative diseases and delay the intelligence of children in the future. Anaemia in children is also a health problem in developing countries. This study aimed to examine the effect of complementary feeding on stunting and anaemia in toddlers in Sidoarjo, East Java.

**Subjects and Method:** A cross-sectional study was conducted at Integrated Health Post, Community Health Center Porong, Sidoarjo, East Java. A sample of 99 toddlers under three years of age was selected for this study. The dependent variables were stunting and anemia. The height of the toddlers was measured by microtoise. The hemoglobin level was measured by digital hemoglobin test. The independent variable was supplementary feeding. The data were analyzed by chi-square.

**Results:** Supplementary feeding associated with childhood stunting, and it was statistically significant ( $p=0.001$ ). Supplementary feeding associated with anemia, and it was statistically significant ( $p=0.021$ ).

**Conclusion:** Supplementary feeding associates with childhood stunting and anemia, and it is statistically significant.

**Keywords:** supplementary feeding, stunting, anemia

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## BACKGROUND

Stunting is a chronic nutritional problem in toddlers characterized by height that is not appropriate for their age. Children who are stunted will be at risk for disease and are at risk for degenerative diseases when growing up. The effect of stunting does not only affect health but also affects children's intelligence. Apart from stunting, anemia in children is also a health problem in developing countries. Anemia is also a major nutritional problem in Indonesia, especially iron-deficiency anemia, which is often found in children (Kemenkes RI, 2018).

The prevalence of stunting among toddlers in the world today is concerning. In 2017, 150.8 million children under five in the world were stunted, or around 22.2%. In 2017, more than half of stunting children in

the world came from Asia (55%), while more than a third (39%) came from Africa. Of the 83.6 million stunting children under five in Asia, the highest proportion came from South Asia (58.7%), and the lowest ratio was in Central Asia (0.9%). Based on data on the prevalence of stunting under five, the World Health Organization (WHO), Indonesia is the third country with the highest prevalence in the Southeast Asia/ South East Asia Regional (SEAR) region. The average prevalence of stunting under five in Indonesia in 2005-2017 was 36.4% (Ministry of Health, Republic of Indonesia, 2018).

Based on Nutritional Status Monitoring data for the last three years, stunting has the highest prevalence of other nutritional problems such as malnutrition, wasting, and obesity. The prevalence of short children

under five has increased from 2016 to 2017, 27.5% to 29.6%, respectively. This condition is influenced by various factors: providing complementary foods after the child is 6 months old (Kemenkes RI, 2018).

Most types of malnutrition in children under five in Indonesia are stunted and severely stunted. Branca and Ferrari<sup>7</sup> associated linear growth retardation with deficiencies in energy, protein, and micronutrients, including zinc, potassium, sodium, and thiamine (IDAI, 2015).

Short stature due to malnutrition is called stunting. Those caused by genetic or familial factors are called short stature. The data in Indonesia has not yet distinguished between the two causes of this short stature. The high prevalence of stunting among children under five indicates chronic malnutrition. This indicates complex causes, including socio-economic factors that affect the nutritional value of food intake over a long time and the prevalence of morbidity (IDAI, 2015).

Nutrient deficiency or excess in the 0–2-year age period is generally irreversible and will impact both short and long-term quality of life. Stunting will affect long-term brain development, which impacts cognitive abilities and educational achievement (WHO, 2003).

Stunting is one of the Sustainable Development Goals (SDGs) targets included in the second sustainable development goal: eliminating hunger and all forms of malnutrition by 2030 and achieving food security. The target set was to reduce the stunting rate to 40% by 2015. To achieve this, the government has set stunting as one of the priority programs (WHO, 2003).

According to the United Nations Children's Fund (UNICEF) in 1999, 2 factors cause developmental disorders, direct and indirect. Direct factors include food/nutrition intake, and health. Indirect causative factors include

food accessibility, child care patterns, environmental sanitation, and health services. Other contributing factors that influence anemia and stunting are the knowledge and behavior of parents (caregivers) regarding complementary feeding (WHO, 2003).

The provision of the first solids will significantly affect the diet of the next child. Generally, mothers who give complementary foods to the first breast milk at the age of 6 months are giving crushed bananas or cereal, even though it is allowed to provide complementary foods with a full menu of food flavors. The selection of complementary foods plays an essential role in children's growth and eating behavior. So, there is no deficiency of nutrients such as anemia, which can cause stunting (IDAI, 2015). This study aimed to examine the effect of complementary feeding on stunting and anemia in toddlers in Sidoarjo, East Java.

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## **SUBJECTS AND METHOD**

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### **1. Study Design**

A cross-sectional study was conducted at Integrated Health Post, Community Health Center Porong, Sidoarjo, East Java.

### **2. Population and Sample**

A sample of 99 toddlers under three years of age was selected using random cluster sampling technique.

### **3. Study Variables**

The dependent variables were stunting and anemia. The height of the toddlers was measured by microtoise. The hemoglobin level was measured by digital hemoglobin test. The independent variable was supplementary feeding.

### **4. Data Analysis**

Univariate analysis was conducted to show the sample characteristic of the study in frequency and percentage. Bivariate analysis was carried out using chi-square.

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## **RESULTS**

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Study subjects in this study were 99 toddlers

aged 1-3 years. Table 1 showed the sample characteristics based on gender, the first age of complimentary food, type of complimentary food, stunting incidence, anemia incidence. Most of the study subjects (69.7%) were female.

The first age of giving complementary

foods was > 6 months (51.5%). Most of the toddlers had complete menu solids (54.5%). The majority of the toddlers studied were stunted (69.7%), but few experienced anemias (84.8%). Table 1. Sample Characteristics

Characteristics	Categories	Frequency (n)	Percentage (%)
<b>Gender</b>	Male	30	30.3
	Female	69	60.7
<b>Age of given complementary food</b>	<6 months	48	48.5
	6 months	51	51.5
<b>Menu complimentary food</b>	Single menu	45	45.5
	Complete menu	54	54.5
<b>Stunting</b>	Yes	30	30.3
	No	69	69.7
<b>Anemia</b>	Yes	15	15.2
	No	84	84.8

**Table 2. The effect of the first age of given complementary solids and menu of complementary food on the incidence of stunting (chi-square)**

Variables	Incidence of Stunting				OR	p
	YES		NO			
	N	%	N	%		
<b>Complementary Feeding Age</b>						
<6 months	30	30.3	24	24.2	11.30	0.001
≥6 months	39	39.4	6	6.1		
<b>Complementary Feeding Menu</b>						
Single	24	24.2	21	21.2	5.30	0.001
Complete	45	45.5	9	9.1		

**Table 3. The effect of the first age of given complementary solids and menu of complementary food on the incidence of anemia (chi-square)**

Variables	Incidence of Anemia				OR	p
	YES		NO			
	N	%	N	%		
<b>Complementary Feeding Age</b>						
<6 months	36	36.3	18	18.2	10.4	0.021
≥6 months	39	39.4	6	6.1		
<b>Complementary Feeding Menu</b>						
Single menu	33	33.4	12	12.1	0.2	0.607
Complete menu	42	42.4	12	12.1		

Table 3 showed the relationship between age of first complementary feeding and the incidence of anemia. Complementary feeding

started from toddler age <6 months increased the risk of anemia by 10.40 times compared to those aged ≥6 months, and it

was statistically significant ( $p = 0.021$ ). It also showed the relationship between complementary feeding menu and the incidence of anemia. A complete menu of solid food decreased the risk of stunting by 0.20 times compared to toddlers who get a single menu, and it was not statistically significant ( $p = 0.607$ ).

## DISCUSSION

Inappropriate complementary can affect malnutrition in children, which can fail the growth and development of children. Appropriate complementary feeding should be considered in the initial time of complementary feeding, and the type of complementary foods. The initial time of breastfeeding less than 6 months is not recommended because the baby's digestive process is still immature. The form of solid foods that are given also affects the nutrition status of the baby. The frequency and portion, and procedure for serving complementary foods are also a measure of complementary feeding accuracy.

Global recommendations for correct infant and child feeding were early initiation of breastfeeding within one hour of delivery, exclusive breastfeeding for six months, and complementary feeding as needed from six-month-aged babies with continued breastfeeding for two years, or more (WHO, 2003).

Recommended practice for the complementary feeding includes a minimal variation of menu and frequency of complementary feeding. The frequency of complementary foods was the proportion of children who recommend minimum complementary breastfeeding (Hendricks, 2005). Without frequent meals and various complementary materials, babies and children are at risk of experiencing nutritional deficiencies resulting in stunting, increasing morbidity, and mortality. The WHO recommended consumption frequency for the 9–24-month age group is 3–4 times/day (WHO, 2010).

This study showed a significant relationship between complementary feeding and the incidence of stunting. Hanum (2019) study stated that the more appropriate the practice of complementary feeding with breastfeeding for toddlers, the lower the stunting incidence. The study also revealed that the right complementary breastfeeding had 1.57 times chance of not being stunted than toddlers who get the proper complementary breastfeeding.

Prihutama (2018) study stated that there is a relationship between the timing of complementary feeding and the incidence of stunting at Rowosari Community Health Center Semarang. This was also in line with the statement from WHO (2010) that the baby's digestive tract at 6 months of age is ready to receive additional food. Early provision of complementary foods <6 or  $\geq 6$  months can cause babies to become malnourished and experience developmental delays (WHO, 2010). Widyaswari (2011) also stated that babies who are given complementary foods at the age of 6 months have a better nutritional status than those who receive complementary foods for less than 6 months.

However, this study, against the study by Dwitama (2018), stated that there is no relationship between the practice of complementary feeding and stunting in the Jatinangor area. The study also revealed the type and the texture of the solid complementary foods are not related to stunting incidence. Complementary food has many variations. Children can choose foods that can be put into the mouth easily and tastefully. Therefore, it tends to have nothing to do with the incidence of stunting.

This study showed no significant relationship between the effect of complementary feeding on anemia's incidence in children under five in the Porong Puskesmas.

This was against by study Agustin (2018), which stated a significant relationship between providing complementary foods with anemia in the Tasikmadu Health Center area. Studies revealed that toddlers who did not get various complementary foods, cannot cover their iron needs, which cannot be obtained from breast milk. Agustin also stated that anemia in children aged 6 months was lower than in those who were not on time. Anemia can also be affected by the inappropriate quality and quantity of complementary foods.

IDAI also stated that anemia in children under five was mostly due to the provision of complementary foods with insufficient iron levels. The processing of complementary foods, causing the iron content in food to be lost due to improper processing. Besides, iron content that is not found in breast milk from the age of 6 months can also cause anemia. Therefore, toddlers need iron supplementation from an early age (IDAI, 2012).

The process of providing complementary foods is very influential on children's growth and development. Methods, processing, and selection of types of complementary foods are also influenced by the mother's knowledge of complementary foods. In this study, most mothers had high school education, but mothers could still get information about complementary foods from the internet even though they had secondary education. Not many mothers know nutritional needs of their children, especially regarding the selection and processing of complementary foods.

From the various types of solid food: from a single menu, flour porridge, instant porridge, and 4 start menus, in this study, most mothers chose a single menu for their child's first solid food. A single menu is a menu that consists of only one food

ingredient (Pusparini, 2018). Examples of single menus are, mashed banana, potato, pumpkin etc. The first complementary foods that are commonly given to babies in Indonesia are banana and rice flour mixed with breast milk (IDAI, 2015).

Children with eating problems will also contribute to the prevalence of stunting and malnutrition in Indonesia. Various efforts need to be made to reduce food preferences in children. One of them is educating mothers about the importance of complementary foods with adequate nutrition, choosing the right complementary foods, and information on how to provide food and innovations on complementary foods to increase children's appetite. There is a relationship between the age of first complementary foods with the incidence of stunting and anemia. The socialization of complementary foods should be carried out frequently to prevent stunting and anemia so that the government's target to reduce stunting can be achieved.

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