

Mother's Eating Behavior During Pregnancy and Family Income with Malnutrition: Stunting Prevention in Madura, Indonesia (Mother's Eating and family Income with Stunting Prevention)

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Abstract

Stunting is a serious nutrition problem in children aged 24-60 months which is increasing every year in Madura Island. One of the causes of stunting is the local Madura culture that prohibits certain foods to be consumed by pregnant women even though it contains high protein. This study explained the relationship between mother's eating behavior during pregnancy and family income with stunting prevention strategy for children aged 24 – 60 months in Madura, Indonesia.

A descriptive cross-sectional study was conducted on 141 mothers in Madura Island. This study used purposive sampling technique. Structured interview-administered questionnaire was used to collect socio-demographic information, mothers' eating behavior during pregnancy and stunting prevention strategy. Data were analyzed using Chi-square with a level of significance of 0.05.

Mother's eating behavior during pregnancy ($p = 0.000$) and family income ($p=0.001$) had a relationship with stunting prevention behavior. Mothers having a good eating behavior during pregnancy and family income more than 150 USD had positive stunting prevention strategies.

Mothers' eating behavior during pregnancy and family income play an important role in stunting prevention strategy. It is recommended to continue health education by health workers in collaboration with community leaders regarding stunting prevention strategies.

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Introduction

Stunting is a physical developmental abnormality that is measured based on height according to age and caused by chronic nutrient deficiencies so the child becomes shorter than his/her age^{1,2}. Indonesia is ranked 5th in the world for the number of children with stunting, where more than one-third of children under five years have height below average³. Many factors affect the incidence of stunting in toddlers, including family income, lack of exclusive breastfeeding, prohibitions on food, mother's habit in providing food and inadequate nutrient intake so that the children lack of nutrients needed by the body^{4,5}. Stunting has an impact on delayed growth and development of children which causes decreasing of learning

achievement, increasing mortality and morbidity so that the productivity and competitiveness of the nation decreases⁶.

The incidence of stunting in Asia was 55% at 2017, Indonesia ranked 4th with prevalence of children suffering from stunting 36% (88 million)⁷. Stunting data according to Indonesia Basic Health Research are 30.8% at 2018, which is still far from the WHO target of below 20%. Bangkalan, a regency in Madura, has a very high stunting prevalence compared to other districts on Madura Island, which is 43%⁸.

According to Pender's theory (2015), previous behavior in the past had an impact on behavior that could improve health status⁹. Community who strongly adhere to cultural customs can influence their health status. Madura Island is inhabited by Madurese and it is one of the ethnic tribes with a large population in Indonesia. Madurese are very cultural, they prioritize religion and culture of the ancestors so sometimes they ignore the health behavior taught by health workers. Madurese people believe in their ancestors' beliefs so they tend to under-

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utilize existing health services provided in the communities, such as health education¹⁰. This causes pregnant women not to get maximum services from the public health center, such as not getting iron tablets, folic acid, and iodine. Thus, it can increase the risk of stunting in the baby. The Madurese have a prohibition of pregnant women consuming foods that are considered taboo, such as squid, shrimp, and poultry, even though the foods are useful for the growth and development of the fetus. They believe that the baby will resemble the type of animal that has been eaten by their mother when the baby is born¹¹. The behavior that is considered taboo causes nutrient deficiency. Pregnant women in the Madura tribe who do not get maximum health services from the health centers or do not consume high-protein foods that are considered taboo are at risk of having stunted children later on.

Madura's regional income is the lowest compared to all regions in East Java, which shows that welfare in the Madura island region is still poor¹². It can affect the nutritional status of each family member. The families who have income problems often do not care about the nutritional content of the food consumed because they prefer to use the income to fulfill family needs¹³. These conditions result in family members not getting adequate nutrition, especially pregnant women who should get good nutrition so that the fetus can develop properly and avoid the risk of stunting. The strategies are needed to prevent the occurrence of stunting in children. One strategy that can be done is maintaining the pregnant women's health so they can give birth to healthy babies. The aim of this study was to explain the relationship between mothers' eating behavior during pregnancy and family income with stunting prevention strategy on Madura island.

Materials and methods

This study was conducted in one of the Public Health Centers in Madura covering 11 villages. Design used cross-sectional study. The population were mothers who had children aged 24 - 60 months. Purposive sampling technique having inclusion criteria such as mothers who can read and write and have children with no pathological conditions was used in this study. The exclusion criteria were participants who did

not provide all the data needed for the study. The number of participants were 141 mothers.

Data were collected using a structured interviewer-administered questionnaire that had been tested for validity and reliability using the Cronbach's alpha test. Demographic data used questionnaire containing of questions about the characteristics of the respondent including age, educational level, family income, occupation, marital status, number of children, child's height, sex and age of the child. Child weight was measured by local digital scale. Children height was measured by portable height/length measuring boards and stadiometers. Questionnaire of mother's eating behavior during pregnancy contained the actions taken by the mother during pregnancy related to nutrient intake during pregnancy. This questionnaire consisted of 13 items that were measured using a Likert scale. The stunting prevention behavior was measured by the Guttman scale. The questionnaire was divided into favorable and unfavorable questions with a value of 1 for "no" answers, value 2 for "yes" answer, and vice versa for unfavorable questions.

Functionality and reliability of the questionnaires were checked with 15 respondents who were not part of this study. All the questionnaires were tested with Cronbach's alpha. The value of Cronbach's alpha test for mother's behavior during pregnancy questionnaires was 0.921 and stunting prevention questionnaire was 0.823. It means that all of the questionnaires were reliable for this study.

Data were analyzed with descriptive and bivariate analysis. Descriptive analysis aimed to describe the data characteristics of respondents and bivariate analysis determined the associations between independent and dependent variables. The process of analyzing data in this study used the chi-square statistical test with p -value < 0.05 .

Ethics approval for this study was obtained at Airlangga University. Permission to conduct research was obtained from the Regency administration and village health centers in the study area. This research is in the Department of Health, especially maternal and child health. Participants were guaranteed confidentiality of the information and also the full right to choose to participate or not in this research without consequences for their decisions. Written

agreement was signed from each participant.

Results

Based on the results of socio-demographic characteristics shown in Table 1, The data showed that the majority of mothers' educational level was elementary school (56%). Most of the mothers in this study have age between 26-35 years old (66%). The majority of mothers (52.5%) in this study had family income less than 150 USD based on the minimum wage on Madura Island in 2019.

Variable	Category	Frequency	%
Mother's Educational Status	Elementary school	79	56
	Junior high school	28	19.9
	Senior high school	20	14.2
	College	14	9.9
	Total	141	100
Mother's age	17 – 25 years old	22	15.6
	26 – 35 years old	98	66.0
	36 – 45 years old	26	18.4
	Total	141	100
Number of children	1 – 2 children	93	61.6
	> 2 children	48	31.8
	Total	141	100
Family Income (Based on Madura minimum wage)	< 150 USD	74	52.5
	> 150 USD	67	47.5
	Total	141	100
Age of the child	24 – 36 month	58	41.1
	37 – 48 month	34	24.1
	49 – 60 month	49	34.8
	Total	141	100
Gender (Child)		68	48.2
		73	51.8
	Total	141	100
Children's Height (in cm)*		40	28.3
	Normal	101	72.7
			100

Table 1. Socio-Demographic Characteristics (n=141).

*Children's height was measured based on mean of children's height in the same age, t<mean=short, t>mean=normal.

This study showed that the majority of mothers (62.4%) had sufficient positive behavior during pregnancy. The intended behavior of mothers makes efforts to fulfill nutritional needs during pregnancy by consuming milk, iron, folic acid (16,6%), green vegetables (18,8%), additional biscuits for pregnant women (16,8%), fish, nuts (15,1%), and using iodized salt to process food (17,9%) (Table 2).

The result showed that 35.4% mothers had positive behaviors in stunting prevention. The stunting prevention strategies done by the mothers were providing healthy diet for children (31,8%), providing good parenting (36%), and providing good sanitation and safe environment (32,2%) as shown in Table 2.

Variable	Indicator	%
Mother's eating behavior	Consumes supplementary biscuits for pregnancy	16.8
	Consumes iron and folic acid supplements	16.6
	Using iodine salt to cook	17.9
	Consumes high protein foods	15.1
	Consumes fruits and vegetables	18.8
	Using clean and safe water	14.8
	Total	100
Stunting prevention strategies	Provide healthy diet for children	31.8
	Provide good parenting	36
	Provide good sanitation and safe environment	32.2
	Total	100

Table 2. The indicators of mother's eating behavior during pregnancy and stunting prevention strategies (n=141).

This study found that there was a significant association between mother's eating behavior during pregnancy with stunting

prevention behavior for children aged 24-60 months in the island of Madura with p-value = 0.000. This study also showed that there was a significant association between family income and the prevention of stunting for children aged 24 - 60 months in Madura Island (p = 0.001). Mothers who had a family income less than 150 USD had negative stunting preventions strategies (23.4%), whereas mothers who had family income more than 150 USD had lower negative stunting preventions (9,20%) (Table 3).

Variable	Stunting Prevention Strategy		Total p-value
	Negative	Positive	
Education level			
Elementary school	28 (19.8)	51 (36.1)	79 (55.9)
Junior high school	10 (7.1)	18 (12.8)	28 (19.9)
Senior high school	6 (4.3)	14 (10)	20 (14.3)
College	3 (2.1)	11 (7.8)	14 (9.9)
Economy level			
< 150 USD	34 (24.1)	40 (28.4)	74 (52.5)
> 150 USD	13 (9.2)	54 (38.3)	67 (47.5)
Children height			
Low	10 (7.1)	30 (21.3)	40 (28.4)
Normal	37 (26.2)	64 (45.4)	101 (71.6)
Mother's eating behavior			
Poor	3 (2.12%)	1 (0.80%)	4 (2.83%)
Sufficient	38 (26.94%)	50 (35.46%)	88 (62.4%)
Good	5 (3.54%)	44 (31.20%)	49 (34.7%)
Family income			
< 150 USD	33 (23.4%)	41 (29.08%)	74 (52.5%)
> 150 USD	13 (9.20%)	54 (38.29%)	67 (47.5%)

Table 3. Relationship between mother's eating behavior and family income with stunting prevention strategy (n=141).

Discussion

This study described how mother's behavior during pregnancy and family income are related to maternal behavior to prevent stunting in children aged 24-60 months. Nutritional composition per box / 100 grams / five pieces of biscuits for pregnant women are 520 kcal energy, 56 grams of carbohydrates, 16 grams of protein, 26 grams of fat, 11 kinds of vitamins, and seven kinds of minerals¹⁴. But sometimes mothers behaved according to their cultural beliefs. for example. avoiding the taboo foods during

pregnancy.

The education level is often associated with the level of maternal knowledge related to the fulfillment of nutrition in children, but the main factors influencing the incidence of stunting are biological and psychological⁹. The biological factors as the determinant of stunting are maternal height carried through the chromosome genes as a physical determinant of the child, malnutrition, and infectious diseases^{15,16}. Psychological aspects related to stunting are inadequate parenting. including feeding practices, psychosocial stimulation, hygiene practices, environmental sanitation, and health service utilization^{15,17}.

The phenomenon in the Madura tribe is that pregnant women are prohibited to eat foods considered taboo, like fish and poultry¹¹. The lack of micronutrient and macronutrient during pregnancy can cause malnutrition in children under five years old¹⁸. In line with prior study, protein intake by pregnant women lowered the risk of stunting in their children¹⁹. The protein need is 54% higher during pregnancy⁴. Protein deficiency causes disruption of fetal metabolic processes and food transportation from mother to fetus, which results in fetal growth disorder leading to low birth weight infant²⁰.

Folic acid and iron are needed by pregnant women for fetal development. Iron deficiency during pregnancy tends to cause low birth weight¹⁸, premature abnormalities, and fetal growth retardation²¹. The babies with those conditions have an increased risk of becoming stunted in future if they do not get proper care. Inadequate nutritional intake during pregnancy is a factor that can affect low birth weight among babies (LBW)²². The babies born with low body weight may have the process of growth and development affected and are at risk of stunting²³. Consuming folic acid and iron during pregnancy reduces the incidence of babies born stunted by 22.6%²⁴.

Mothers who become pregnant at a young age are at risk of having a stunted child. Lower odds of stunted were observed among children whose mothers were above 35 years old²⁵. This may be because young mothers require adequate nutrition for them to grow into adulthood and as a young mother; food shared in small proportion between the infant and the mother may not be adequate. In addition, younger mothers may tend to have poor

knowledge and caring practices of good nutrition for young children.

Mothers' behavior in preventing children from stunting is important to reduce the prevalence, especially in Indonesia. Mother's behavior is influenced by socio-cultural values that exist, especially in the Madurese. The community has more trust in ancestors, so that can influence every health behavior that is carried out. The socio-cultural value of a mother becomes the dominant risk factor for stunting; events such as stopping breastfeeding before 24 months is a risk factor for stunting²⁶. There is a Madurese ethnic culture that puts children at risk of being stunted, such as lack of maternal coverage on exclusive breastfeeding and giving additional foods to babies under six months, such as rice porridge, banana, crushed dates, coconut water, and sugar water¹¹. One of predisposing factor that influences behavior is value. Values are a cultural perspective between generations regarding matters of consequence that reflect the values of others²⁷. Culture, traditions or habits in society regarding the wrong diet can result in nutritional problems and affect the growth and development of children²⁸.

According to prior research, families whose income every month was below the minimum wage were most at risk of having children with stunting²⁹. The socioeconomic status of the family, especially the mother who is in charge of caring for children, is the main factor that can affect the nutrition status of the child²⁰. Families with low income tend not to be able to fulfil all the needs of each family member in various aspects, including in the aspect of meeting nutritional needs and adequate health services. This has a great impact on children because they do not get good nutrition to support growth and do not get healthcare service when attacked by disease. Poor economic conditions will also have an impact on the sanitation and cleanliness of the home. Most Madurese people have uninhabitable houses (narrow land, dirt floors, and poor water sources), which could increase the risk of infectious disease and lead to stunting incidence in children³⁰. The statement is in line with prior study which stated that there is a correlation between stunting and low economic status, that children with families who have low economic status are 2.36 times more at risk of stunting and children with families low-income have a 1.46 times higher risk of stunting³¹.

Therefore, for improving child health and nutrition status in poor households, an establishment of properly functioning economic and financial structures which support children from underprivileged households is needed to improve food security and access to basic health care services.

Good mother's behavior during pregnancy will lead to positive stunting prevention as well. Mothers who have good knowledge and attitude about feeding behavior tend to choose the right and proper feeding for themselves and their babies³². Attitude is a predisposing factor that can influence a person to take a behavioral action. A person's attitude is always judged as positive or negative, the more positive the more influential a person does positive behavior in the next opportunity²⁷.

Conclusion

This study found that most of the mothers had good eating behavior during pregnancy even though the families had an income below the regional minimum wage. But otherwise, the majority of respondents had good stunting prevention strategies. It can be concluded that mother's eating behavior during pregnancy and family income has a relationship with stunting prevention strategy. Based on these findings, the recommendation is providing continuous health education by health workers in collaboration with community leaders based on cultural approach. The government should continue the program of supplementary feeding for pregnant women and toddlers, especially for family who have low income.

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Declaration of Interest

The authors report no conflicts of interest pertaining to any of the products or companies discussed in this article.

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