



Factors Affecting Nutritional Status in Children Aged 6–24 months in Lamongan Regency, Indonesia

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Abstract

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BACKGROUND: Family food security and parenting are factors affecting changes in nutritional status related to family care and food availability.

AIM: This study aims to analyze the factors affecting nutritional status in children aged 6–24 months in Lamongan Regency, Indonesia.

METHODS: The study used cross-sectional data with 191 children aged 6–24 months and their parents, selected by simple random sampling. The data were collected through observations and interviews and used to assess the physical endurance and nutritional status based on the questionnaires, food frequency, observations, weight scales, and World Health Organization/National Center for Health Statistics reference standards.

RESULTS: The results of the double linear regression test $p = 0.000$ indicated that the parenting coefficient had more influence on the nutritional status of children aged 6–24 months than the family food security coefficient on the nutritional status of children in Lamongan Regency, with $Y = 1.565 + 0.062 X_1 + 0.446 X_2$, Y being nutritional status, 1.565 as the coefficient value, X_1 (0.062) being family food security, and X_2 (0.446), parenting.

CONCLUSION: Better parenting improved the nutritional status of children aged 6–24 months compared to maintaining food security. Thus, parenting improvement programs could be prioritized through the Community Health Center.

Introduction

Poor nutrition is still a public health problem in Indonesia according to nutritional monitoring data (PSG 2016) from the Institution of the Directorate General of Community Nutrition Directorate General of Public Health Ministry of Health of the Republic of Indonesia. As many as, 3.4% of children under 5 years old have poor nutrition (especially aged 6–24 months). About 13.9% of children in the province of East Java under the age of 5 years (especially aged 6–24 months) also experience malnutrition. Since this age is when brain development will reach 80%, malnutrition risks slowing down growth and development [1]. The problem of malnutrition is also experienced by children in Lamongan Regency, a district of East Java.

Poor nutrition can be caused by several factors, such as children's food (diet), infectious diseases, family food security, childcare patterns, health services, and environmental health. Two factors, namely, food security and parenting, are currently the main concerns of the Lamongan Regency government. Children's nutritional status is influenced by various

factors related to food security such as physical dimensions (availability), the economy (purchasing power), nutrition (fulfillment of needs), individual cultural and religious values, food security (health), and time (continuous availability).

Parenting factors can also affect nutritional status, since they may determine children's feeding patterns and families' eating habits. These two factors have been studied extensively. Fatimah *et al.* (2012) stated that there is a strong relationship between these factors and the nutritional status of children in rural areas [2]. Rusyantia *et al.* (2017) stated that food security could improve people's nutritional status [3]. Handayani (2017) stated that parenting affects children's nutritional status [4]. Aramico *et al.* (2016) stated that parenting affects the nutritional status of school-age children in one of the districts in Aceh [5].

These studies and others, however, have not researched how these factors influence malnutrition, especially in children aged <5 years. This study analyzes the factors influencing the nutritional status of children aged 6–24 months who live in Lamongan Regency, Indonesia.

Methods

This study consisted of cross-sectional research involving 191 children aged 6–24 months and their parents. The sampling technique used was simple random sampling to select the respondents. The data were collected from participants who met the following criteria: (1) Children aged 6–24 months from families living in Lamongan Regency, (2) children who were free of other diseases (chronic disease) besides malnutrition, and (3) parents who were willing to be studied.

The data were collected through a questionnaire about parenting and food security. The food security questionnaire consisted of three questions about the availability of rice for >120 days, frequency of eating more than 3 times a day, and protein consumption. The food security questionnaire used several food security indicators such as food availability, namely, the availability of rice for ≥ 120 days, having money to buy rice for ≥ 120 days, sustainability measured by the frequency of food consumption, and food security measured by access to food containing animal and vegetable protein, which was ranked first. The third category entails stable food supply and good consumption of protein (able to afford both animal and vegetable protein). The questionnaire calculated food security based on food security indicators as in the reference [6] and nutritional status using weight measurements based on the age.

The parenting questionnaire used indicators such as frequency, type of food, and feeding methods, and categorized parents into (1) less parenting, (2) sufficient parenting, and (3) good parenting [7].

The nutritional status data were measured using the anthropometry index of body weight/age and categorized according to the National Center for Health Statistics classification. The categories are (1) weight – very low (poor nutrition) if < -3 standard deviations (SD); (2) weight – low (lack of nutrition) if ≥ -3 SD and < -2 SD; (3) weight – normal (good nutrition) if ≥ -2 SD and $< +2$ SD; and (4) weight – more (more nutrition) if $> +2$ SD [8].

All of the data were loaded into the Statistical Package for the Social Sciences version 19 and analyzed using statistical methods. Multiple linear regressions were used to analyze the factors influencing nutritional status of children aged 6–24 months. The level of significance was set at $p < 0.05$.

Results

Table 1 shows that most age of mothers were 25–29 years (47.6%), most of them were farmers

(40.8%), the most common number of family members was more than four (53.9%), most children were female (77.5%), and the average age of children was 15.28 months.

Table 1: Distribution of respondents by age, occupation of parents, number of family members, sex of children, and age of children in Lamongan Regency 2018

Characteristics of respondents	Frequency	Percentage
Age of mother		
20–24 years	25	13.1
25–29 years	91	47.6
30–34 years	47	24.6
35–39 years	11	5.8
40–44 years	10	5.2
45–49 years	5	2.6
50–54 years	-	-
55–59 years	1	0.5
60–64 years	1	0.5
Parents' job		
Farm workers	51	6.7
Farmer	78	40.8
Private/self-employed	53	27.7
Government employees	5	2.6
Not working/housewife	4	2.1
Number of family members		
≤ 4	88	46.1
> 4	103	53.9
Child sex		
Male	43	22.5
Female	148	77.5
	Mean	SD
Age of child (months)	16.28	4.50

Table 2 shows that almost half of the respondents had food-resistant households (48.2%). In terms of parenting, most were classified as good parenting (52.2%). In terms of nutritional status, most children had normal body weight (78.0%).

Table 2: Status of family food security, parenting, and nutritional status of children aged 6–24 months in Lamongan Regency, 2018

Variable	Frequency	Percentage
Food security		
Households are not food-resistant	43	22.5
Households lack food security	56	29.3
Food-resistant households	92	48.2
Parenting		
Less	31	16.2
Medium	60	31.4
Fine	100	52.4
Nutritional status		
Body weight is very low	6	3.1
Low weight	35	18.3
Normal weight	149	78.0
Above normal	1	0.5

Table 3 shows that the effects of food security and parenting on improving nutritional status. The results of the double linear regression test ($p = 0.000$) indicate that the coefficient of parenting had more influence on the nutritional status of children aged 6–24 months than the family food security coefficient because the parenting coefficient was higher than the family food security coefficient, $Y = 1.565 + 0.062 X_1 + 0.446 X_2$, with Y being nutritional status, 1.565 being the coefficient value, and X1 (0.062) being family food security and X2 (0.446), parenting. As per Table 4, the R value of 0.746 shows that family food security variables and parenting have a very strong relationship with nutritional status variables, since the value of R measures the correlation of coefficients. If the value is closer to -1 or 1 , the relationship is getting stronger. If the value is closer to 0, the relationship is getting weaker. The R^2 value (coefficient of determination)

Table 3: Effect of family food resilience and fostering patterns on nutritional status of children aged 6–24 months in Lamongan Regency

Variable	Nutritional status								
	Body weight is very low		Low weight		Normal weight		More weight		
	n	%	n	%	n	%	n	%	
Family food security									
Households are not food-resistant	5	2.60	32	16.80	6	3.10	0	0.00	
Households lack food security	0	0.00	3	1.60	53	27.70	0	0.00	
Food-resistant	1	0.50	0	0.00	90	47.10	1	0.50	
Parenting									
Less	5	2.60	26	13.60	0	0.00	0	0.00	
Medium	1	0.50	9	4.70	50	26.20	0	0.00	
Good	0	0.00	0	0.00	99	51.80	1	0.50	

Double linear regression test results $p=0.000$.

of 0.556 (55.6%) is close to 1 (100%), which means that the model is good because the variables (family food security and parenting) can explain the nutritional status variables. The null hypothesis is rejected, since $p = 0.000$. This implies that the variables of family food security and parenting affected the nutritional status variable.

Table 4: Factors influencing nutritional status in children aged 6–24 months in Lamongan Regency (n=191)

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Standard error			
(Constant)	1.565	0.082		19.158	0.000
Family food security	0.062	0.067	0.098	0.927	0.035
Parenting	0.446	0.072	0.657	6.192	0.000

$R=0.746$; Adjusted $R^2=0.556$.

Discussion

The coefficients show that parenting had more influence on the nutritional status of children aged 6–24 months in Lamongan Regency than family food security because parenting's coefficient was higher than that of family food security.

The previous studies show malnutrition status (nutrition status) of children in Indonesia mostly caused by nutritional intake factor and protein insufficiency [9]; moreover, family income and education also become factor of children malnutrition which is mostly related to the factor of malnutrition in Indonesia (OR = 2,713) [10]. This previous study clarified that education factor is vividly related to parenting factor and food security factor is highly related to family income factor, thus it can broaden the previous studies that malnutrition status in Indonesia is not merely caused by nutritional intake factor and protein insufficiency but caused by family income and lack of education factor, also it is also affected by parenting and family food security factor in family.

This study implies that parenting is more influential on nutritional status than family food security. Better nutritional status cannot be achieved if parental/caregiver care for the child is lacking, even if the family is food-resistant [11], [12], [13], [14]. Parenting here entails providing children with love and attention that can improve the psychological quality and independence of

toddlers, contributing to their growth and development. Meanwhile, families that are not food-resistant may experience problems in providing adequate food for children [15], [16], [17], [18].

The results show that a small percentage of respondents was food-resistant with very low body weight due to congenital heart abnormalities. Their malnutrition was not caused by a lack of food but by congenital heart disease, which causes lack of appetite and weakens children's immune systems. Payne (1983) stated that health status (nutritional status) is influenced by factors such as environment, behavior, health services, and heredity, as per the theory of healthy sickness [19]. Green *et al.* (1980) stated that behavior (diet) is influenced by three main factors, namely, the predisposing factor, enabling factor (family food security), and reinforcing factor. Thus, family food security and parenting indirectly affect nutritional status [15], [20].

Families with food security are able to provide enough food for their children without experiencing food shortages. Families who are not food-resistant may experience problems in providing adequate food for their children. Parenting entails making sure that a family gets enough high-quality food and nutrition, especially the children, who are not able to fend for themselves. Observing proper feeding patterns also helps to improve the nutritional status of children [21], [22].

In terms of food availability and sustainability, the children received sufficient food/energy from consuming a staple food (rice) for ≥ 120 days and eating 3 times a day. For animal protein, almost half of the respondents consumed chicken eggs daily, and for vegetable protein, almost all respondents consumed tofu and tempeh daily. Vegetable sources such as tofu and tempeh can be consumed by all the households in villages in the district because their prices are relatively cheap and they are easily available. Chicken eggs are consumed as a source of animal protein because they are affordable. Families', especially the children's, need for protein are being met by consuming chicken eggs, tofu, and tempeh [23].

This is in accordance with the physiological and psychological needs of both children and parents. The act of feeding children meets the following needs: (a) Physiological, namely, nutritional needs for metabolic processes, activities, and children's development; (b)

psychological, namely, to satisfy children by providing other pleasures; and (c) educational, namely, educating babies and children on how to consume food, to foster good eating habits and behavior so that they will choose proper foods in line with their parents' beliefs or religion [16].

Based on this study result, it has a significant role in affecting malnutrition in Lamongan in which it is not only merely parenting factor but also caused by environment and social factor in Lamongan society. This is related to the lack of knowledge and education, also the society and family culture result the eldest member in the family (grandparents) still hold a significant role in making decision of food feeding or parenting. Thus, parenting factor becomes more essential than food security factor in affecting malnutrition.

Conclusion

The purpose of this study was to determine the factors influencing the nutritional status of children aged 6–24 months in Lamongan Regency, Indonesia. The factors tested were food security and parenting. The results show that parenting was more influential in improving the nutritional status of children aged 6–24 months in Lamongan Regency, with a higher coefficient than family food security.

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