



Factors Related to Stunting among Children Age 6-59 Months In Babakan Madang Sub-District, West Java, Indonesia

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Abstract

Stunting is a category of malnutrition that can cause death for children. In 2018, 30.8% of children under five in Indonesia experienced stunting. This study aimed to determine the factors that are related to stunting in Babakan Madang sub district, West Java, Indonesia. A cross sectional study was carried out among 612 children aged 6–59 months on May–August 2019. Z-scores were calculated using WHO Anthro. The characteristics of the under-fives (sex, age, history of infectious diseases), maternal characteristics (education level, mother's occupation, income per month, age during pregnancy, parity), and infant feeding practices (colostrum feeding, early initiation of breastfeeding, exclusive breastfeeding, pre-lacteal feeding, timely complementary feeding) were analysed. The results of univariate and bivariate analysis using Chi-square showed that for age over 24 months, nonexclusive breastfeeding and untimely complementary feeding were related to stunting. It is recommended that local governments conduct counselling and make positive approaches to the community emphasizing the importance of exclusive breastfeeding and timely complementary feeding.



Article History

Received: 8 November 2020
Accepted: 02 April 2020

Keywords

Aged 6–59 Months;
Children;
Complementary Feeding;
Infant Feeding Practice;
Pre-Lacteal Feeding;
Stunting.

Introduction

Malnutrition is a leading cause of health problems in developing countries, a source of 3.5 million deaths globally, and the cause of 35% of morbidity in children under five.¹ One of the categories of malnutrition that often occurs in under-fives is stunting. In 2010, about 171 million children under five experienced stunting.² Stunting can increase

the risk of infectious diseases, which have an impact on the greater economic burden on the community. Therefore, the nutritional status of individuals is very important, especially in children under the age of five. Poor nutritional status will affect an individual's, physical and mental growth, begins at the first life and extending into adolescence and adulthood.³

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Doi: <http://dx.doi.org/10.12944/CRNFSJ.8.2.10>

The results of the 2018 National Basic Health Research (NBHR) show that 30.8% of Indonesian children under five experience stunting, while the stunting prevalence of West Java Province is 32%.⁴ According to WHO 2010, because its prevalence remains above 20% and even more than 30%, stunting of West Java province is included in the high prevalence category.⁵

The high prevalence of stunting can be influenced by characteristics of children (sex, age, history of infectious diseases), maternal characteristics (education level, mother's occupation, income per month, age during pregnancy, parity) and infant feeding practices (colostrum feeding, early initiation of breastfeeding, exclusive breastfeeding, pre-lacteal feeding, timely complementary feeding).^{6,7,8}

Children aged 6-59 months are more likely to experience stunting because from the age of 6 months after exclusive breastfeeding sometimes breastfeeding is not continued until 2 years. In addition, complementary feeding is sometimes inappropriate, while their nutritional needs increase.⁹ The report of the 2018 NBHR did not clearly state the causes for the high rate of stunting among the children. The objectives of this study were to determine factors related to stunting in children under five in Babakan Madang, West Java; and to evaluate the correlation between the infant feeding practices and stunting.

Materials and Methods

A cross-sectional quantitative study was performed during May–August 2019. The study population consisted of all children aged 6–59 months living in Babakan Madang sub district, West Java, Indonesia. The sampling method used was cluster random sampling. Data were taken from six villages and each village has 2 posyandu (local health post). Next, fifty-one children were randomly selected from each posyandu according to the study criteria. Selection was done at the time the posyandu was conducted. The total sample size obtained was 612 children aged 6–59 months. The inclusion criteria of this study were children living in the study site for at least one year and the youngest child in a family. If a family had more than one child aged under five, the elder child was not chosen to avoid recall bias in the mother when answering questions about infant feeding.

This was due to the tendency of the same parenting pattern from mother to child.¹⁰ The exclusion criteria were children with physical or genetic disorders, children with mental disorders, and twins.

Data was collected through anthropometric measurements (length or height) and questionnaires. Data were collected by trained enumerators by interviewing the mothers using standard questionnaire.^{11,12} Stunting was the dependent variable that categorized as stunted ($HAZ < -2$ SD) and normal ($HAZ \geq -2$ SD) according to the WHO Child Growth Standards 2006.¹³

The independent variables were characteristics of children aged 6–59 months (sex, age, history of infectious diseases), maternal characteristics (education level, mother's occupation, income per month, age during pregnancy, parity) and infant feeding practices (colostrum feeding, early initiation of breastfeeding, exclusive breastfeeding, pre-lacteal feeding, timely complementary feeding). The children were divided into two categories according to their age: 6–23 months and 24–59 months. Children were considered to have a history of infectious diseases if they had experienced ailments such as coughing, diarrhoea or respiratory infections during the last 3 months.

The level of mother's education was categorized as low (junior high school graduate) and high (senior high school graduate and above). With regard to occupation, mothers were categorized as housewife or others. Income per month was categorized as low (under local minimum wage) or high (greater or equal to local minimum wage). Mothers who became pregnant either at the age of less than 20 years or at the age of 36 years or older were categorized as at risk, mothers who became pregnant at the age of 20–35 were categorized as not at risk. With regard to parity, mothers were categorized as at risk if they had been pregnant four times or more and not at risk if they had been pregnant less than four times.¹⁴

The colostrum feeding indicates that the mother breastfed the baby shortly after giving birth. If the new-born was placed on the mother's chest and the new-born skin was in contact with the mother's skin for at least 40 minutes to 1 hour, namely is the early initiation of breastfeeding category. Exclusive

breastfeeding indicates that the baby was breastfed from birth until the age of 6 months. The definition of the pre-lacteal feeding is a given food or drink before breastfeeding initiation. Timely complementary feeding (at 6 months) was categorized as given and not given. Length was measured using digital

0D231-B Onemed® with 0.1cm accuracy. Height was measured using GEA stature meter with 0.1cm accuracy. The software used for data analysis was the SPSS® (version 19.0) using descriptive statistics, chi-square analysis and bivariate comparisons.

Table 1: Frequency Distribution Based on Characteristics of Children and Mothers

Variables	Categorized	n	%
Nutritional status (n=612)	Stunted	248	40.5
	Normal	364	59.5
Characteristics of children			
Sex (n=612)	Male	300	49
	Female	312	51
Age (months) (n=612)	6–23	289	47.2
	≥24–59	323	52.8
History of infectious diseases (n=607)	Yes	418	68.9
	No	189	31.1
Characteristics of mothers			
Education level (n=612)	Low	481	78.6
	High	131	21.4
Mother's occupation (n=612)	Housewives	516	84.3
	Others	96	15.7
Income per month (IDR 3.760.000) (n=612)	Low	396	64.7
	High	216	35.3
Aged during pregnancy (n=612)	At risk	135	22.1
	Not at risk	477	77.9
Parity (n=612)	At risk	567	92.6
	Not at risk	45	7.4

Results

The result presented in the tables below show that not all the 612 mothers responded to all the questions in the questionnaires. The data in Table 1 indicates that the prevalence of stunting in children aged 6-59 months was 40.5% (248/612). There was no difference in the number (percentage) of male and female children that participated in this study. Of all the children that consented to participate 52.8% (323/612) were over 24 months; 68.9% (418/607) had history of infectious diseases. For the mothers, 78.6% (481/612) had low level of education, most of

them 84.3% (516/612) were housewives, and 64.7% (396/612) were in the low income category. Most (77.9%) of the 612 mothers were categorized as not at risk with regard to age during pregnancy, but 92.6% were categorized as at risk in terms of parity.

The results in Table 2 show that 84.6% (515/609) of mothers did not give colostrum, 66.5% (407/612) did not perform early initiation of breastfeeding, 71.5% (432/604) did not provide exclusive breastfeeding, 40.9% (249/609) gave pre-lacteal food, and 71.8% (438/612) provided untimely complementary feeding.

Table 2: Frequency Distribution in Infant Feeding Practices

Variables	Categorized	N	%
Colostrum feeding (n=609)	No	515	84.6
	Yes	94	15.4
Early initiation of breastfeeding (n=612)	No	407	66.5
	Yes	205	33.5
Exclusive breastfeeding (n=604)	No	432	71.5
	Yes	172	28.5
Pre-lacteal feeding (n=609)	Yes	249	40.9
	No	360	59.1
Timely complementary feeding (n=612)	Not given	438	71.8
	Given	172	28.2

Table 3: Factors Related to Stunting

Variable	Stunting				OR (95% CI)	P value
	Yes		No			
	n	%	N	%		
Sex						
Male	128	42.7	172	57.3	1.19	0.32
Female	120	38.5	192	61.5	(0.86-1.64)	
Age (month)						
23-Jun	97	33.6	192	66.4	0.57	0.00*
≥24-59	151	46.7	172	53.3	(0.41-0.79)	
History of infectious diseases						
Yes	176	42.1	242	57.9	1.23	0.27
No	70	37	119	63	(0.86-1.76)	
Education level of mothers						
Low	197	41	284	59	1.08	0.75
High	51	38.9	80	61.1	(0.73-1.61)	
Mother's occupation						
Housewives	212	41.14	304	58.9	1.16	0.58
Others	36	37.5	60	62.5	(0.74-1.82)	
Income per month						
Low	162	40.9	234	59.1	1.04	0.85
High	86	39.8	130	60.2	(0.74-1.46)	
Age during pregnancy						
At risk	48	35.6	87	64.4	0.76	0.21
Not at risk	200	41.9	277	58.1	(0.51-1.13)	
Parity						
At risk	232	40.9	335	59.1	1.25	0.58
Not at risk	16	35.6	29	64.4	(0.66-2.36)	
Colostrum feeding						
No	205	39.8	310	60.2	0.85	0.56
Yes	41	43.6	53	56.4	(0.54-1.33)	

Early initiation of breastfeeding						
No	168	41.3	239	58.7	1.09	0.65
Yes	80	39	125	61	(0.77-1.54)	
Exclusive breastfeeding						
No	187	43.3	245	56.7	1.5	0.03*
Yes	58	33.7	114	66.3	(1.03-2.17)	
Pre-lacteal feeding						
Yes	103	41.4	146	58.6	1.08	0.69
No	142	39.4	218	60.6	(0.77-1.50)	
Timely complementary feeding						
Not given	189	43.2	249	56.8	1.49	0.04*
Given	58	33.7	114	66.3	(1.03-2.15)	

The result in Table 3 indicates that 42.7% (128/300) the male children were stunted, compared to 38.5% (120/312) of the female children. This difference was not statistically significant ($p=0.32$). Of the 248 stunted children, 39.1% (97/248) were in the 6 to 23 months age group and 60.9% (151/248) were in the 24 to 59 months age group. This difference was statistically significant ($p=0.00$). Stunting was prevalent among 42.1% (176/418) of children with history of infectious diseases. The proportion of stunting among children with low educated mothers was 41.0% (197/481); 41.14% (212/516) among mothers who do not work and 40.9% (162/396) among mothers with monthly family income less than IDR 3.760.000. Stunting occurred in 41.9% (200/477) of children whose mothers were categorized as not at risk in terms of age during pregnancy, and 40.9% (232/567) of children whose mothers were found to be at risk in terms of parity. A total of 39.8% (205/515) of children under five who were not given colostrum were stunted, as were 41.3% (168/407) of children who did not receive early initiation of breastfeeding. Of the children who were given pre-lacteal food, 41.4% (103/249) were stunted. The results in Table 3 also show that three factors were significantly related with stunting. The factors were age over 24 months (OR: 0.57, 95% CI: 0.41-0.79), non-exclusive breastfeeding (OR: 1.50, 95% CI: 1.03-2.17), and children that did not have timely complementary feeding (OR: 1.49, 95% CI: 1.03-2.15).

Discussion

Bivariate analysis shows that more male children were stunted compared to the female children in our present study, although the difference was not statistically significant.

Stunting in under-fives was more common in children aged over 24 months. A study by Bloss *et al.*,¹⁵ conducted in Kenya showed similar results; : children aged over two years were more likely to experience growth disorders than children aged under two years. This situation occurs because children generally start to be weaned at the age of two years and begin to be exposed to unhealthy environmental conditions outside the home and may not be receiving adequate nutrition.

Prevalence of stunting was higher in children with a history of infectious diseases. Prior studies by Augsburg and Lesmes¹⁶ and Asfaw *et al.*,¹⁷ showed similar results stating that toddlers were found to be suffering from chronic malnutrition as a result of inadequate nutrient intake and recurrent infections in the digestive tract.

Statistically, there was no significant relationship between mother's education and stunting. However, stunting was more common among children whose mothers had low level of education. The same results were found in India, where the incidence of stunting was more common in children of low-educated mothers. Mothers with higher levels of education are likely to be more effective in managing household resources and have an awareness of the advantages of limiting the number of children they have.¹⁸

No significant relationship was found between mother's occupation and stunting, but the prevalence of stunting was higher in children whose mothers were housewives. This finding is in line with a study conducted by Das and Gulshan,¹⁹ which stated that there is no significant relationship between mother's occupation and stunting.

The results of this study is similar to the results in the National Basic Health Research 2010 that showed no difference in the proportion of stunting in populations with the highest and lowest quintile income levels. However, studies conducted by Vitolo *et al.*,²⁰ and Fentahun *et al.*,²¹ concluded that the low economic condition of a family will affect its purchasing power to meet the nutritional needs of the children.

Although the proportion of stunting was higher among children of mothers who have a risk (more than four time pregnancies), but there was no relationship between this factor. The results of a study by Senbanjo *et al.*,²² showed that the risk of stunting increases with the increasing number of children in the family. This can cause stress during pregnancy because, in addition to having to take care of their children, mothers need attention to their nutritional status during pregnancy.

According to WHO's, early initiation of breastfeeding, within one hour of birth, protects the newborn from acquiring infection and reduces newborn mortality. Early initiation of breastfeeding had no significant relationship with stunting, but the likelihood of stunting occurring was greater among under-fives who had not experienced early initiation of breastfeeding. This result is similar to the result by Kismul *et al.*,²³ and Birara,²⁴ which stated that children with no early initiation of breastfeeding would be likely to experience stunting.

Breast milk is the best nutrition for babies to receive from birth until the age of 6 months. Breast milk contains nutrients that are very suitable for their needs. A significant relationship was found between exclusive breastfeeding and stunting ($p=0.039$), in which children who were not given exclusive breastfeeding had a 1.5 times greater risk of stunting. This finding is in accordance with a study conducted in Southern Ethiopia, which concluded that children who were not given exclusive breastfeeding were likely to experience stunting.^{25,26,27}

The proportion of stunting was higher among children who were given pre-lacteal food. Pre-lacteal feeding is not recommended because it can cause digestive disorders and interfere with the process of breastfeeding. This study showed that the

percentage of stunted under-fives who were given pre-lacteal food was higher than those who were not, though no significant relationship was found. This is similar to a prior study which found that pre-lacteal feeding was not significantly related to the incidence of stunting in children.^{28,29}

The age of 6 months is a time of transition for babies when complementary feeding should begin. This is because, at this age, breastfeeding only is no longer sufficient to meet the energy and nutritional needs of children. There was a significant relationship between complementary feeding and stunting ($p=0.04$), in which children who were not given timely complementary feeding had a 1.4 times greater risk of stunting. This result is in accordance with studies conducted by Tessema *et al.*,³⁰ and Abeway *et al.*,³¹ in Ethiopia, which show that children who are given untimely complementary feeding are two times greater risk of experiencing stunting.

This study found that risk factor for stunting was children aged 24 months and above, non-exclusive breastfeeding, and untimely complementary feeding. Future study can be carried out in the qualitative aspects about ethnic and cultural factors including restrictions which cannot be do in the community associated with infant feeding practices. This can be an input for local government and related sectors to make programs that can increase the coverage of infant feeding practices, especially exclusive breastfeeding and timely complementary feeding.

Conclusion

The prevalence of stunting in children aged 6–59 months in Babakan Madang is 40.5%. Variables significantly related to stunting were children aged over 24 months, nonexclusive breastfeeding, and untimely complementary feeding. To prevent stunting among children aged 6-59 months, this study recommends that local governments need to improve information and conduct periodic counselling and also positive approaches to the community about the importance of exclusive breastfeeding and timely complementary feeding to reduce stunting.

Acknowledgements

The author would like to thank Dr.Ir. Trini Sudiarti M.Si and Prof. Dr.Dra. Ratu Ayu Dewi Sartika Apt,

MSc for their help and guidance during the research and also to the funding sources.

Funding

This research was funded by the Ministry of Research, Technology and Higher Education through the University of Indonesia Directorate of Research and Community Service in 2019, with title Final Project Publication Research Grant (PITTA B), No: NKB-0602/UN2.R3.1/HKP.05.00/2019.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

The ethical assessment procedure was approved by the University of Indonesia Faculty of Public Health Ethics Research and Handling Committee (Ethics committee approval number 257/UN2.F10/PPM.00.02/2019).

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