Micronutrients Intake and Exclusive Breastfeeding as a Risk Factor for Stunting among Children Aged 13-36 Months Old in Simpang Kiri, Subulussalam

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Abstract

Stunting is a state of the nutritional status of a person based on the z-score height of age which lies in z-score <-2 SD. Stunting is a state of undernutrition that continues over time and happens in the long term. Prevalence of stunting in Subulussalam among children under 5 years old was is 64,91% which 48% occured in Simpang Kiri sub-district. This study was aimed to analyze whether micronutrient intake and exclusive breastfeeding were risk factors for stunting. The design was case-control unmatched, the subjects were children between 12-36 months with 53 stunted and 55 normal. The variables were the frequency of intake mineral source (Ca, Fe, and Zn), the frequency of intake vitamin A source, and exclusive breastfeeding. Data were analyzed using chi-square test and odds ratio.The results showed that frequency of intake Ca source (OR=4,11, 95%CI:1,83-9,25), frequency of intake Fe source (OR=4,31, 95%CI:1,70-10,9), frequency of intake Zn source (OR=7,46, 95%CI: 1,58-35,2), frequency of intake vitamin A source (OR=2,51, 95%CI: 1,15-5,49) and exclusive breastfeeding (OR=5,38, 95%CI:2,28-12,7) were the risk factor against stunting. Intake of micronutrients (calcium, Fe, zinc, and Vitamin A) and exclusive were a risk factors for stunting.

Keywords: Intake, micronutrient, exclusive breastfeeding stunting, Case-Control

e-ISSN: 2656-1123 (media online)
url: http://prociding.sari-mutiara.ac.id/index.php/samicoh
article submit: Augustus 2018
article revise: September 2018
article publish: November 2018

Introduction

Nutritional status is a picture of excess or lack of nutritional intake. One form of malnutrition is shortness or stunting. Stunting is the state of a person's nutritional status based on the z-score height of age which is located in the z-score <-2 SD. Stunting is a condition of past malnutrition and occurs continuously so that the child cannot reach the optimal growth. Stunting can cause a decrease in the immune system and increase the risk of infectious diseases, especially if it occurs during infant and childhood. Another negative impact is the tendency to get high blood pressure, diabetes, heart disease and obesity in adulthood (1).

Previous research has been done to determine the causes of stunting. One of the most related factors was lack of nutrition (2,3). Stunting is also closely related to exclusive breastfeeding where infants who do not get exclusive breastfeeding tend to be short (4).

The prevalence of stunting is still high in Indonesia. The prevalence of stunting in Aceh was higher than national prevalence. One of the cities in Aceh with a high prevalence of stunting in children under 5 years of age, is Subulussalam. The prevalence of stunting in children under the age of 5 years is 64.91 where the largest proportion of incidents occur in Simpang Kiri District as much as 48%.

Methods

The research design was unmatched case-control. The research was conducted on January – August 2015. The sample in this study were children aged 12-36 months. The number of samples was 106 children consisting of 53 stunting and 53 normal children. Sampling technique using simple random sampling.

The data collected consists of primary data and secondary data. Primary data includes body length data obtained using infantometer to measure the length of the body of children aged 12-24 months and microtoise to measure the height of a child aged 25-36 months. Data of the frequency intake of calcium, ferrum, zinc, and vitamin A were obtained through the food frequency questionnaires (FFQ). Exclusive breastfeeding data obtained through questionnaires.

Results

Table 1. Bivariate Analysis of Risk Factors for Stunting

Variable	Case n = 53	Control n = 53	Total n = 106	OR (95%CI)
The frequency of calcium				
Low intake	35	17	52	4,11
High intake	18	36	54	(1,83-9,25)
The frequency of ferrum				

Low intake	45	30	75	4,31
High intake	8	23	31	(1,70 – 10,90)
Frekuensi Makan Sumber Zink				
Low intake	12	2	14	7,46
High intake	41	51	92	(1,58 – 35,25)
Frekuensi Makan Sumber Vit. A				
Low intake	33	21	54	2,51
High intake	20	32	52	(1,15 – 5,49)
Pemberian ASI eksklusif				
Tidak	31	11	42	5,38
Ya	22	42	64	(2,28 -12,71)

The intake of calcium among stunting group less than 3 times a week as much as 66% while in the normal group consume calcium more than 3 times a week. Statistical test results obtained p = 0.000 < 0.05 indicating that there was a association between the frequency calcium intake with the incidence of stunting. The odds was 4.11, meaning that children which had low intake of calcium were 4.11 times (95% CI: 1.83-9.25) more likely to be stunted compared to those with high intake of calcium.

Statistical test results obtained p = 0.001 <0.05 indicating that there was an association between the frequency of Fe with the incidence of stunting. Children which had low intake of ferrum were 4.31 times (95% CI: 1.70-10.90) more likely to be stunted compared to those with high intake of ferrum.

Stunting group consume zinc less than 3 times a week as much as 22.6% while in the normal group consume zinc more than 3 times a week. Statistical test results obtained p = 0.004 < 0.05 indicating that there was an association between the frequency of zinc intake with the incidence of stunting. Intake of zinc was significantly associated with stunting, as the odds were higher in children who had low intake of zinc (OR = 7.46, 95% CI: 1.58-3.25) compared to those with high intake of zinc.

Stunting children consume vitamin A less than 3 times a week as much as 62.3% while in normal children consume vitamin A more than 3 times a week as much as 60.4%. Statistical test results obtained p = 0.02 < 0.05 indicates that there was an association between the frequency vitamin A consumption with stunting. Consumption of vitamin A was significantly associated with stunting, as the odds were higher in children who had low consumption of vitamin A (OR = 2.51, 95% CI: 1.15-5.49) compared to those with high consumption of vitamin A.

Inappropriate exclusive breastfeeding was higher among the cases than in controls (OR = 5.38, 95% CI: 2.28-12.71). The odds of getting stunting was 5.38 times higher among the children who did not get exclusive breastfeeding than those who get exclusive breastfeeding.

Discussion

Calcium deficiency leads to reduction in bone mass by increasing bone resorption to preserve the level ionised calcium in the extracellular fluid. Dietary calcium deficiency may also be a major cause of rickets in children developing countries (5). Calcium in bone is easily mobilized into body fluids and blood, if needed to be passed on to tissue cells that need it more, especially *trabecule* from bone structure is a place of calcium accumulation which is very easy to release calcium to be used in other needs (6).

The results showed that low intake of calcium was associated with stunting among children. The odds was 4.11, meaning that children which had low intake of calcium were 4.11 times more likely to be stunted compared to those with high intake of calcium. The results of this study are in line with previous studies in Egypt. The mean low serum level of calcium was more apparent among the stunted children with significant difference (7).

Calcium deficiency for a long time affects bone density so that optimal bone formation and growth is not achieved. The average calcium addition a day should range from 150-200 mg; and the peak is 400 mg / day in a period of rapid growth (8).

Consumption of zinc was associated with stunting. The odds was 7.46, meaning that children which had low intake of zinc were 7.46 times more likely to be stunted compared to those with high intake of zinc. The results of this study are in line with other studies which said children with low intake of zinc were 2.67 times to be stunting (9). Zink plays a role in bone growth and height. Children who had low intake of zinc are at risk of developing growth barriers. Zinc requirement for children aged 1 to 3 years is 3 mg of zinc per day and in children aged 4 to 8 years is 5 mg of zinc per day (10).

Consumption of vitamin A is related to the incidence of stunting. This study is consistent with other studies which suggest that there was a relationship between vitamin A and the incidence of stunting in children (11). Children who were not given vitamin A supplementation experienced stunting 1.5 times compared to children who were given vitamin A supplementation. Vitamin A supplementation affected children's linear growth (12). Children who were given vitamin A supplementation turned out to be able to increase

the child's height by 0.16 cm in 4 months compared to children who were not given vitamin A supplementation.

Proper giving of breastmilk to children will provide many positive effects for the health and development of the child. Breastmilk is an ideal food for babies, especially in the first six months, because it meets health requirements. Breastmilk contains all the nutrients a baby needs to build body cells and as the main energy source for babies.

Exclusive breastfeeding is associated with stunting. This is in line with other studies, there was an association between colostrum with stunting among infants (13). Another study said that children who did not get exclusive breastfeeding would have 3.22 times suffered from malnutrition (14) while according to the risk of the child being stunting was 6.9 times if the child did not get exclusive breastfeeding (15).

The low level of exclusive breastfeeding is one of the triggers of stunting in children under five due to past events and will have an impact on the child's future. Conversely good breastfeeding by the mother will help maintain the nutritional balance of children so that the achievement of normal child growth (16).

Conclusion

The frequency of micronutrient intake (calcium, Fe and zinc) and exclusive breastfeeding were a risk factor for stunting in children aged 12-36 months in Simpang Kiri, Subulussalam.

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