SOUTH EAST ASIA NURSING RESEARCH
Available on : https://jurnal.unimus.ac.id/index.php/SEANR

Original Research

Risk Factors of Stunting in Toddlers 24-59 Months in Rembang Regency, Indonesia

Galuh Ramaningrum[1], Hema Dewi Anggraheny[2], Aisyah Lahdji[2]

[1] Department of Pediatric, Faculty of Medicine, Universitas Muhammadiyah Semarang, Indonesia
[2] Department of Public Health, Faculty of Medicine, Universitas Muhammadiyah Semarang, Indonesia

Article Info

Article History:
Submitted: Dec 26th 2021
Accepted: March 1st 2022
Published: March 29th 2022

Keywords:
Factors; Stunting; Toddlers

Abstract

Rembang Regency is an area in Central Java with a fairly high stunting rate, in 2017 it reached 32.36%. The Sedan Health Center is located in Rembang Regency with a stunting prevalence in 2019 of 7.16%. This is still a serious problem in the region. Risk factors for stunting include child and maternal risk factors. Child risk factors include food intake, birth weight, gender, history of chronic disease, history of breastfeeding, complementary foods, socio-economic, environmental sanitation, and immunization status. The purpose of this study was to determine what factors influence stunting in the working area of the Sedan Health Center. This research used observational analytic research with a case-control design and has been matched based on age. The research was carried out from January-February 2021. The number of samples was 45 cases (stunted toddlers) and 45 controls (non-stunted toddlers). Data were collected by measuring the height of children under five and interviewing with a questionnaire. Data analysis used the chi-square test and logistic regression test. Variables of energy intake (p=0.000), protein, history of exclusive breastfeeding (p=0.000), history of complementary feeding (p=0.000), number of family members (p=0.001), and family sanitation (p=0.000) had significant outcome was associated with the incidence of stunting. The most influential factor is the history of complementary foods. Stunting cases occur in children with low energy and protein intake. A varied food intake especially with a high-calorie and high-protein composition can prevent children from stunting.

INTRODUCTION

Stunting is a condition of failure to thrive due to chronic malnutrition, so that it looks short for its age. This nutritional deficiency occurs in the First 1000 Days of Life. Stunting can be diagnosed at the age of 2 years. According to the 2018 Global Nutrition Report (GNR), every country in the world experiences nutritional problems, including stunting 22.2% (150.8 million), wasting 7.5% (50.5 million), and overweight 5.6% (38 million). 3 million). Indonesia is one of the countries with stunting, overweight, and wasting nutritional problems, and is the 5th country with the highest number of stunting under-fives.[1]

Based on Riskesdas data, the prevalence of stunting in Indonesia in 2007 was 39.8%, in 2013 there was 37.2% and in 2018 it was

Corresponding author:
Hema Dewi Anggraheny
hemadewi@unimus.ac.id
South East Asia Nursing Research, Vol 4 No 1, March 2022
ISSN:2685-032X
DOI: https://doi.org/10.26714/seanr.4.1.2022.7-13

30.8%.[2] According to the 2019 Susenas Integrated Toddler Nutrition Status Study, stunting cases in 2019 became 27, 67%.3 Central Java Province in 2019 stunting cases were quite high at 27.68%.[2] One of them that is of concern is Rembang Regency. The percentage of stunting cases in Rembang Regency in 2015-2017 was 38.5%, 25.99%, and 32.36%. Meanwhile, the prevalence of stunting at the Sedan Health Center in 2019 was 7.16% (274 toddlers), which is still below the expected target.

The impact of stunting on toddlers can reduce intelligence, susceptible to infectious diseases. Toddlers who experience stunting in early life will experience permanent damage, causing motor, cognitive, and intellectual development disorders that have an impact on education. In addition, stunting can also have an impact on income and work productivity so that economic growth will deteriorate.[3]

Stunting is influenced by maternal and child factors. Maternal factors include a history of infection in the mother, teenage pregnancy, hypertension in the mother, the level of education and knowledge of the mother. Child factors include gender, age, birth weight, food intake, especially protein and energy, and history of infectious diseases, history of breastfeeding and complementary feeding, immunization, parents' socioeconomic, number of family members, and environmental sanitation.[4–8]

This study aims to analyze the relationship between risk factors including factors in children, namely gender, age, birth weight, food intake, especially protein and energy, and history of infectious diseases, history of breastfeeding and complementary feeding, immunization, socioeconomic status of people. old age, number of family members, and environmental sanitation. As well as factors in the mother include maternal education. By knowing which factors influence it, it can be a reference to prevent stunting by improving existing risk factors.

METHODS

This research is an analytic observational study with a case control design and has been matched based on age. The study was conducted in the working area of the Sedan Public Health Center, Rembang Regency in January-Februari 2021. Primary data were obtained from filling out a questionnaire on the variables of energy and protein intake using the Semiquantitative Food Frequency Questionnaire (SQ-FFQ) and measuring the height of toddlers. Secondary data was obtained from the Puskesmas to find out stunting data. The sample collection method used consecutive sampling technique by meeting the inclusion criteria in the case group, namely children aged 24-59 months with an index of height/age <-2 SD, a control group of children aged 24-59 months with an index of height/age >-2 SD and willing be a respondent. Exclusion criteria were toddlers aged 24-59 months who suffered from congenital diseases such as congenital heart disease, bone dysplasia, and familial short stature. Toddlers aged 24-59 months who have chromosomal disorders such as Down Syndrome, Turner Syndrome. Toddlers aged 24-59 months suffering from endocrine disorders such as hypothyroidism, Cushing's syndrome.

The sample size used was 90 subjects, 45 were stunted and 45 were not stunted. Analysis using Chi-Square and logistic regression. This research has received ethical approval from the Health Research Ethics Committee, Faculty of Medicine, University of Muhammadiyah Semarang with number 020/EC/FK/2021.

RESULTS

Most of the respondents in the case and control groups were female (53.3% in both groups), normal birth weight (86.7% in cases and 97.8% in controls), middle maternal education (53.3% in cases and 55.6% in controls), had no previous history of chronic disease (93.3% in cases and 100% in controls), mothers did not work

(82.2% in cases, and 91.1% in controls), and with complete immunization status (91.1% in cases and 100% in controls).

There were contradictory results between the case and control groups. Most of the case group received low energy (75.6%) and protein (53.3%) intake, history of not exclusive breastfeeding (64.4%), history of complementary feeding for less than 6 months (60%), total family members more than 4 (64.4%), and unhealthy environmental sanitation (80%). While in the control group, most of them received adequate energy (91.1%) and protein (95.6%) intake, history of exclusive breastfeeding (86.7%), history of complementary feeding 6 months (91.1%), number of family members 4 (73.3%), and healthy environmental sanitation (60%).

Table 1
Stunting Risk Factors Analysis

Child Risk Factors		Stunting				Total		OR (95% CI) Lower-Upper	p
		Yes = 45		No = 45		n	%		
		n	%	n	%				
Energy intake	Less	34	75,6%	4	8,9%	38	42,2 %	31,682 (9,248-108,539)	0,000*
	Enough	11	24,4%	41	91,1%	52	57,8 %		
Protein intake	Less	24	53,3%	2	4,4%	26	28,9%	24,571 (5,300-113,926)	0,000*
	Enough	21	46,7%	43	95,6	64	71,1%		
Gender	Male	21	46,7%	21	46,7%	42	46,7%	1,000 (0,437-2,289)	1,000
	Female	24	53,3%	24	53,3%	48	53,3%		
Birth weight	Low birth	6	13,3%	1	2,2%	7	7,8%	6,769 (0,780-58,723)	0,110
	Normal	39	86,7%	44	97,8%	83	92,2%		
History of Chronic Infection	Yes	3	6,7%	0	0,0%	3	3,3%	-	0,242
	No	42	93,3%	45	100%	87	96,7%		
History of exclusive breastfeeding	No	29	64,4%	6	13,3%	35	38,9%	11,781 (4,106-33,808)	0,000*
	Yes	16	35,6%	39	86,7%	55	61,1%		
History of complementary food	< 6 Bulan	27	60%	4	8,9%	31	34,4%	15,375 (4,690-50,404)	0,000*
	≥ 6 Bulan	18	40%	41	91,1%	59	65,6%		
Number of family member	Big	29	64,4%	12	26,7%	41	45,6%	4,984 (2,028-12,253)	0,001*
	Small	16	35,6%	33	73,3%	49	54,4%		
Mother's education	Basic	10	22,2%	10	22,2%	20	22,2%	-	0,967
	Medium	24	53,3%	25	55,6%	49	54,4%		
	High	11	24,4%	10	22,2%	21	23,3%		
Mom's job	Work	8	17,8%	4	8,9%	12	13,3%	2,216 (0,616-7,970)	0,352
	Doesn't work	37	82,2%	41	91,1%	78	86,7%		
Environmental sanitation	Not Healthy	36	80%	18	40%	54	60%	6,000 (2,337-15,406)	0,000*
	Healthy	9	20%	27	60%	36	40%		
Imunization statue	Not complete	4	8,9%	0	0%	4	4,4%	2,098 (1,681-2,617)	0,117
	Complete	41	91,1%	45	100%	86	95,6%		

*p<0,05

From Table 1, there are 45 toddlers who experience stunting, 34 (75.6%) toddlers have a nutritional adequacy rate of less energy. From the statistical test with the *Chi Square* test, the value of p = 0.000 (p < 0.05 or significant) and the value of Odd Ratio (OR) 31.682 (95% CI:9.248-108.539), it can be concluded that lack of energy intake has a risk factor. 31,682 times the incidence of stunting. In the risk factor for protein intake, the majority of stunting under-fives received a protein adequacy rate of 24 (53.3%) under five. From the Chi Square statistical test, the value of p = 0.000 (p <0.05 or significant) and the value of Odd Ratio (OR) 24,571 (95% CI:5,300-113.926),

it can be concluded that protein intake has a 24 times chance of being stunted. In the risk factor for the gender of children under five who experience stunting, the majority of them are female, there are 24 (50%) children under five. From the Chi Square test, the value of p = 1,000 (p > 0.05 or not significant) and the value of Odd Ratio (OR) 1,000 (95% CI: 0.437-2.289), it can be concluded that gender is not a risk factor for stunting.

The majority of stunting toddlers did not receive exclusive breastfeeding as many as 29 (64.4%). From the Chi-Square test, p value = 0.000 (p <0.05 or significant) and the Odd Ratio (OR) value of 11.781 (95% CI: 4,106-33.808). In conclusion, a history of exclusive breastfeeding has an 11-fold chance of being stunted. The majority of under-fives who experienced stunting with the age of giving complementary food <6 months were 27 (60%). Chi-Square test obtained p value = 0.000 (p < 0.05 or significant) and the value of Odd Ratio (OR) 15.375 (95% CI: 4,690-50,404), it can be concluded that the history of the age of complementary feeding has a risk factor of 15 times the incidence of stunting.

The majority of stunting toddlers with family members 4 (large) as many as 29 (64.4%). Chi-Square test obtained p value = 0.001 (p < 0.05 or significant) and the value of Odd Ratio (OR) 4.984 (95% CI: 2.028-12.253), it can be concluded that the number of family members has a risk factor 4 times against stunting incident. The majority of unhealthy environment sanitation is 36 (80%) who are stunted. The results of statistical tests using the Chi-Square test obtained a p value = 0.000 (p <0.05 or significant), and an Odd Ratio (OR) value of 6.000 (95% CI: 2.337-15.406), it can be concluded that environmental sanitation has a risk factor of 6 times the incidence of stunting.

The most important risk factor is history time to start complementary food, where toddlers with complementary food < 6 months have a risk factor of 15.375 times experiencing stunting than toddlers with complementary food ≥ 6 months.

DISCUSSION

In this study, it was found that nutritional intake of energy was lacking because the majority of toddlers consumed food that did not vary, the amount did not match their intake needs, and preferred to consume light food. The energy needed by toddlers is 2 times greater than adults because they are in the process of growth and development.[9]

The majority of respondents in the case group had a low nutritional adequacy rate. This happens because the majority of toddlers consume little protein, especially animal protein which is very high in content. Toddlers prefer protein from vegetable sources, apart from the lack of knowledge about nutrition, also because of the socioeconomic status at the research site, so they are limited in consuming animal protein. This is similar to several other studies which state that there is a relationship between adequate protein intake and stunting.[9,10]

History of early time receiving complementary feeding is a variable associated with stunting in this study. Most of the case groups received complementary feeding at the age of less than 6 months. Toddlers who received complementary food less than 6 months, the majority of parents lacked knowledge about the dangers of inappropriate complementary food. Besides that, mostly in the area, toddlers who were less than 6 months had already been given food. The provision of age-appropriate complementary food will prevent toddlers from stunting, because toddlers receive exclusive breastfeeding and at 6 months digestion is ready to digest so that the nutrients are fulfilled. This study is similar to other studies which state that there is a relationship between the early age of complementary feeding and the incidence of stunting.[10]

The number of family members associated with the incidence of stunting in this study. The number of family members affects the supply and distribution of food in the family. Family size determines intake intake for each family member. The large number of family members must be in line with high socio-economic conditions so that each family member is met with nutrients.[4]

Environmental sanitation is also a factor associated with the incidence of stunting in this study. In the results of the study, for house components such as the state of the walls, floors, ventilation, smoke holes in less condition because the majority of houses are in a simple state. Sanitation facilities such as waste water, latrines, waste water disposal and trash bins are not good because for disposal of waste directly flowed into rivers and for daily trash dumped in open dumps and some are dumped directly into rivers. This happens because they are in a densely populated house and are in an environment with low socioeconomic status. To support human health, good environmental sanitation is needed.[11]

Unhealthy sanitation conditions will cause problems such as decreased quality of life, water pollution, and the emergence of infectious diseases. Poor sanitation can lead to stunting associated with the possibility of the emergence of infectious diseases. Several other studies have also stated that environmental sanitation is associated with stunting.[11]

CONCLUSIONS

The energy and protein intake, history of exclusive breastfeeding, history of complementary food, number of family member, and environmental sanitation were the risk factors of stunting. The most influencing factor is history of complementary food. Stunting cases occur in children with low energy and protein intake. A varied food intake especially with a high-calorie and high-protein composition, can prevent children from stunting.

ACKNOWLEDGMENT

The author would like to thank Faculty of Medicine Universitas Muhammadiyah Semarang which has supported this research.

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