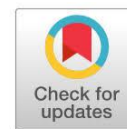


Nutritional status and toddler development: a relationship study



Nursyahid Siregar¹, Ratnawati Ratnawati², Rif'atul Amini³

¹Midwifery Department, Poltekkes Kemenkes Kalimantan Timur, Samarinda, Indonesia, siregarnursyahid@yahoo.co.id

²Nutrition Department, Poltekkes Kemenkes Kalimantan Timur, Samarinda, Indonesia, ratna845@gmail.com

³Nutrition Department, Poltekkes Kemenkes Kalimantan Timur, Samarinda, Indonesia, ratna845@gmail.com

ARTICLE INFO

Article history:

Received: July, 15th 2020

Revised : Feb, 4th 2021

Accepted: Feb, 6th 2021

Keyword:

Stunting
Non-stunting
Appropriate
Doubt
Deviation

ABSTRACT

SDGs have an international target of 2025 for decreased stunting and wasting in infants. Stunting indicates that there is a manifestation of the problem of nutrient deficiency and infection experienced since or before the child's birth period in a long period that can affect the development of the brain, the maturity of muscle function becomes slow causing the motor ability to be obstructed. The purpose of this research is to analyze the relationship status of stunting and non-stunted nutrition with the development of toddlers in Mangkupalas community health center. This research is a descriptive-analytical study with a cross-sectional approach. Large samples were 82 toddlers taken with accidental sampling technique from July to October 2019 at Mangkupalas Public health center (PHC). Analyzed by testing hypotheses of research using Chi-square test with CI 95%. The results showed that there is 41 sample (50%) stunting, and 41 samples (50%) not stunting. Development status was 43 (52.4%) appropriate, 32 (39.0%) doubt, and 7 (8.5%) deviation. Chi-Square test result p-value= 0.000. There are relationships between stunting and non-stunting nutrition status to the development of toddlers.

This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Nursyahid Siregar

Midwifery Department, Poltekkes Kemenkes Kalimantan Timur, Indonesia

W. Monginsidi Street No. 38, Sidodadi, Samarinda Ulu, Samarinda. Telp. (0541) 738153

Email: siregarnursyahid@yahoo.co.id

INTRODUCTION

SDGs (Sustainable Development Goals) is a sustainable development program that has 17 goals with 169 measurable targets until 2030. In the 2nd goal, there is a target of 2030 which is to end all forms of malnutrition, including achieving the 2025 international target for the reduction of stunting and wasting in toddlers(1). Stunting shows manifestations of malnutrition problems and infections experienced since or before the birth of a child over a long period. The process of maturation and the formation of connections of the neurological system occurs progressively after the process of birth to the mass of early childhood. Malnutrition in the prenatal to early childhood mass can lead to neurological disorders and brain development disorders that affect motor, cognitive, language, socio-emotional abilities, and mental retardation (2). Decreased motor function of stunting children without congenital abnormalities related to the low mechanical ability of the tricep muscle so that the slow maturity of muscle function causes the motor ability to stunt children to be inhibited (3).

Globally, in 2010 the prevalence of short children was 26.7% (171 million) of children with 167 million occurrences occurring in developing countries (4). According to the World



Health Organization (WHO) in 2010, the prevalence of stunting is said to reach a high number when it reaches 30% - 39% and is said to be very high if the prevalence has reached $\geq 40\%$. Currently, Indonesia is positioned to be among the top 5 countries that have stunting after the countries of India, China, Nigeria, and Pakistan with the number of children under the age of 5 who experience stunting (5). The prevalence of stunting children in Indonesia is in a high category because based on data from Riskesdas in 2018, nationally the prevalence of stunting is 30.8%. According to WHO prevalence should be less than 20% therefore stunting should still get special attention (6). The prevalence of stunting toddlers in east Kalimantan based on data from the East Kalimantan Health Office in 2017 is relatively high, namely 30.6% of the total toddlers. Of the 10 regencies/cities in Kaltim, the highest stunting cases are currently in Bontang City which is 32.4% in 2017, and Samarinda City at least recorded 28.8 percent. The number of stunting incidents in Samarinda city for the short toddler category in 2017 amounted to 462 toddlers and for the category of very short toddlers amounted to 190 toddlers, the highest number was located in the working area of Mangkupalas Health Center which is 145 toddlers with short toddler category and 32 toddlers with very short toddler category (7). Children stunting with the age of 0-59 this month can still be dealt with with the gift of exclusive breast milk and balanced nutrition while preventing not to stunting, pregnant women should not be malnourished, even children must be filled with nutrients. The impact of this stunting should also be noted so that it can be done in a preventive effort (7).

Research conducted on children aged 24-59 months in Semarang in 2016 showed that there are differences in development in stunting and non-stunting children, including the development of rough motor, fine motor, language, and social personal (2). Research (13) shows cognitive, fine, and coarse motor abilities are influenced by nutritional status. Where the nutritional status of the child is positively related to social factors such as maternal education level, employment status, and family income. Other studies say that there are subtle motor developmental differences between children of less short weight and less short weight children (18). The novelty of this study is that researchers will examine parenting patterns.

From the background above researchers are interested to research to know the relationship status of stunting and non-stunting nutrition to the development of toddlers in the work area Puskesmas Mangkupalas year 2019.

METHOD

This research is quantitative research with analytical methods. The design of this research is descriptive-analytic of the analytical with a Cross-sectional approach (8). This study was held from July to October 2019 in the working area of the health center of Mangkupalas. The population in this study is toddlers with age 2-5 years old in the working area of the clinic Mangkupalas. The sample in this study is 82 toddlers by the criteria of inclusion (toddlers aged 2-5 years, toddlers who can stand, never suffer from infectious diseases Chrosforos, cooperative respondents) and exclusion criteria (when the study took place of the respondent in sick, respondents who were not allowed by the elderly) with accidental sampling techniques. The study was approved by the Poltekkes Ministry of the Kaltim (EC LB. 02.01/7/2068/2019) Ethics Commission.

The tools and materials used are microtoise, Z-Score table, playground tools such as site (APE), and KPSP sheet. To determine the nutritional status of toddlers is conducted height measurement by using microtoise, then Mauri in table Z-Score stunting or non-stunting criteria. The assessment was conducted by using KPSP sheets and APE. Data collection is done 1 time by researchers.

Data analysis used to measure the relationship of stunting and non-stunting nutritional status to toddler development is to use Chi-Square test calculation (X^2) and program using *statistic software*.

RESULTS

Univariate analysis

Table 1 Frequency distribution of respondent characteristics

Respondent Characteristics	Frequency	Percentage
Age		
2 years old	13	15,9
3 years old	24	29,3
4 years old	36	43,9
5 years old	9	11
Gender		
Male	34	41,5
Female	48	58,5
Breast Feeding		
Exclusive breastfeeding	42	51,2
Non-exclusive breastfeeding	40	48,8
Foster pattern		
Parents	73	89
Childcare	9	11
Length of birth body		
Normal (47-52 cm)	61	74,4
Abnormal	21	25
Birth weight		
Normal	78	95,1
Abnormal	4	4,9
Nutritional Status		
<i>Not Stunting</i>	41	50
<i>Stunting</i>	41	50
Development Status		
Appropriate	43	52,4
Doubt	32	39
Deviation	7	8,5

Bivariate Analyze

Table 2. Relationship with nutritional status stunting with the development of toddlers aged 2-5 years

Nutritional Status	Development Status			P Value
	Appropriate	Doubt	Deviation	
<i>Not Stunting</i>	35 (85,4%)	6 (14,6%)	0	0,00
<i>Stunting</i>	8 (19,5%)	26 (63,4%)	7 (11,1%)	
Total	43 (100%)	32 (100%)	7 (100%)	

There are relationship status of stunting and non-stunting nutrition with the development of toddlers aged 2-5 years in the working area of the health center of Mangkupalas with p value =0,00< α 0,05.

DISCUSSION

Based on table 2 the statistical test results get p-value = 0.00, there is a relationship between the status of stunting and non-stunting nutrients to the child's development. The number of infants who have questionable development and the majority diverges in infants with stunting nutritional status of 63.4% and 11.1%. While in infants non-stunting the majority of the development corresponds 85.4%.

It is following the opinion of Soetjningsih explaining that nutritional status is one of the determinants of child development factors. In infants, the growing aspect is one aspect that is seriously considered because it describes the process of forming a person, a physical or psychosocial toddler. The child development sphere consists of crude motor, fine motor, language and speech, and social/self-reliance (9,10).

In the child's life phase there is a phase of growth and development. Child growth is strongly influenced by the adequacy of nutrients. Children's nutritional needs are not met causing the child to be subjected to nutritional disorders. As a result, children become susceptible to illness, passive, easy to weary, lethargic, sleepy, unable to receive lessons well which causes their achievements to be reduced. In addition, nutritional deficiencies in infants are one of the health problems that can affect death. The nutritional status factor is important to be considered to help children's development, especially in childhood (10,11).

It is not as if the development of stunting children is a result of the process of muscle maturity so that the muscle's mechanical abilities are reduced. Long-term deficiency of nutrients, especially energy, fats, and proteins will inhibit the process of forming and maturation of muscle tissues. Children with high body height and strong muscles will be faster to master the motor movements compared with children who have a height less than children in their age (12).

This research is in line with research conducted in children aged 24-59 months in Semarang in 2016, that there are differences in children stunting and non-stunting, covering the development of crude motor, fine motor, language, and social person. This indicates that the deficiency of nutrients/undernutrition affects the growth, development, and physical activity of the child, which will affect the development of the brain through the behavior of caregivers and children's interactions with the Environment (2;21). Research of Subasinghe (13) also demonstrates the ability of cognitive, fine motor, and coarse influenced by nutritional status. Where the nutritional status of children relates positively to social factors such as maternal education, job status, and family income. Other studies say that there are subtle motor developmental differences between children of less short weight and less short weight children (14). Factors that affect stunting are the number of family members, social economy (19), and influenced by maternal nutrition during pregnancy (20). Unlike the results of Ningrum's research (22) that there is no relationship between nutritional status and the development of toddlers. And Susanty's research (23) There is no relationship between stunting degrees, iron intake, zinc intake, maternal education, maternal work, and per capita income of households with smooth and coarse motor development

Stunting children experience slow and short skeletal growth. This condition is due to not fulfilling food needs and increased pain over a long period. The prevalence of many stunting and thin children occurs in the 2nd and 3rd Year of Life (15). To achieve good growth is required adequate nutrients. Foods that are less good in quality or quantity will cause less nutrition. Less nutritional conditions can cause growth and development disorders, especially developments that can result in changes in the structure and functioning of the brain. The human brain underwent tremendous structural and functional changes between the 24th to the 2nd week of the 42 after conception. This development continues after birth until the age of 2 or 3 years, the fastest period of the first 6 months of life. Thus the growth of brain cells lasted until the age of 3 years (16).

In the Village Pocketbook on Stunting treatment in 2017, the impact that Stunting can cause is the short-term impact of progression, intelligence, physical growth disorder, and metabolic disorders in the body. And the long-term impact is decreased cognitive ability and achievement of learning, decreased immune so that children are susceptible to disease, risk of the onset of diabetes, obesity, heart disease, and blood vessels, cancer, stroke, and disability in old age (17).

Research shows that newborn babies have approximately one hundred billion brain cells. The maturation process and the formation of neurological system connections occur progressively after the birth process until the early childhood mass. Deficiency of nutrients

during prenatal to early childhood mass can lead to neurological disorders and brain developmental disorders affecting motor, cognitive, language, socio-emotional, and mental retardation (2). Decreased motor function of stunting children without congenital abnormalities related to the low mechanical capability of the tricep muscles so that the slow maturity of muscle function causes stunted child motor ability (3).

CONCLUSION

Most non-stunting toddlers have appropriate development and toddlers most have a delirious development. There is a relationship between stunting and non-stunting nutritional status to the development of toddlers.

Growth and development in this golden age are very important to note, it is expected that the public can pay attention to the development of toddlers by providing stimulation to toddlers and paying attention to the intake of toddlers to prevent stunting. The community should be more concerned with the nutritional status of toddlers, especially the nutritional status of stunting

ACKNOWLEDGEMENTS

The author expressed his gratitude to all the related parties who have supported the implementation of this research through a lecturer grant program.

Funders of this research are obtained from DIPA.

REFERENCES

1. Bappenas. Riset Kesehatan Dasar 2013. 2013;
2. HANANI R. Perbedaan Perkembangan Motorik Kasar, Motorik Halus, Bahasa Dan Personal Sosial Pada Anak Stunting. 2016;
3. Das Gracias Paiva M, Souza TOL, Canon F, Perot C, Xavier LCC, Ferraz KM, et al. Stunting delays maturation of triceps surae mechanical properties and motor performance in prepubertal children. *Eur J Appl Physiol.* 2012;112(12):4053–61.
4. Mitra. Permasalahan Anak Pendek dan Intervensi Untuk Mencegah Stunting. Pekanbaru. 2015;
5. Trihono. Pendek (stunting) di Indonesia, masalah dan solusinya. Jakarta: Lembaga Penerbit Balitbangkes; 2015.
6. Riskesdas. Laporan Nasional Riset Kesehatan Dasar (Riskesdas Tahun 2017). Jakarta; 2018.
7. Dinas Kesehatan Kaltim. Profil Kesehatan Tahun 2017. Samarinda; 2017.
8. Notoatmodjo S. Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta; 2012.
9. Riskesdas. Laporan Nasional Riset Kesehatan Dasar (Riskesdas Tahun 2013). Jakarta; 2013.
10. Soetjningsih. Tumbuh Kembang Anak Edisi 2. Jakarta: EGC; 2015.
11. Suherman. Perkembangan Anak. Jakarta: EGC; 2010.
12. Solihin RDM, Anwar F SD. Kaitan Antara Status Gizi, Perkembangan Kognitif dan Perkembangan Motorik Anak Usia Pra Sekolah. *J Penelit Gizi dan makanan*. 2013;36(1).
13. Subasinghe W. The Effect of Nutritional Status on Cognitive and Motor Development of Pre-School Children. *Trop Agric Res.* 2018;18.
14. Wani Y, Nutrition HH-IJ of H, 2018 undefined. Perbandingan Perkembangan Motorik Anak Usia 1-3 Tahun dengan Berat Badan Kurang Pendek dan Tidak Pendek. *IjhnUbAcId [Internet]*. 2018;33–40. Available from: <http://www.ijhn.ub.ac.id/index.php/ijhn/article/view/231>
15. Alina H. Status Stunted dan Hubungannya Dengan Perkembangan Anak Balita di Wilayah Pesisir Pantai Utara Kota Cirebon. *J Gizi Klin Indones.* 2010;6(3).
16. Gladys;Gunawan. Hubungan Status Gizi dan Perkembangan Anak Usia 1-2 Tahun. *Sari PEDIATR.* 2011;3.

17. Kementrian Desa. Buku Saku Desa dalam Penanganan Stunting. Jakarta; 2017.
18. Pantaleopn, dkk. Stunting berhubungan dengan perkembangan motorik anak di Kecamatan Sedayu, Bantul, Yogyakarta. *Jurnal Gizi dan Dietetik Indonesia*: 2018.
19. Fikadu, T., Assegid, S. & Dube, L. (2014). Factor Associated With Stunting Among Children Age 24 To 59 Months in Meskan District, Gurage Zone, South Ethiopia: A case-control study. *BMC Public Health*. Diakses dari <http://www.biomedcentral.com/1471-2458/14/800>.
20. Fitrah, Ernawati. (2013). Pengaruh Asupan Protein Ibu Hamil dan Panjang Badan Bayi Lahir Terhadap Kejadian Stunting Pada Anak Usia 12 Bulan di Kabupaten Bogor. *Jurnal Penelitian Gizi dan makanan*.
21. Hanani, R.2016. Perbedaan Perkembangan Motorik Kasar, Motorik halus, Bahasa dan Personal Sosial Pada Anak Stunting Dan Non Stunting. Semarang: UNDIP.
22. Ningrum dan Utami. Hubungan Antara Status Gizi Stunting Dan Perkembangan Balita Usia 12-59 Bulan. Seminar Nasional dan Presentasi Hasil-Hasil Penelitian Pengabdian Masyarakat
23. Susanty M, Margawati A. 2012. Hubungan derajat stunting, asupan zat gizi dan sosial ekonomi rumah tangga dengan perkembangan motorik anak usia 24-36 bulan di wilayah kerja Puskesmas Bugangan Semarang. *J Nutr Coll*.