



Adequacy Levels of Micronutrient as Risk Factors of Stunting in Toddlers in Pardasuka Village

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ABSTRACT

Nutrition problems that are indicated by body size which is shorter than the toddlers' age are called stunting. Where the results of the pre-survey on 10 stunting toddlers in Pardasuka Village obtained an average level of vitamin A, zinc, and iron adequacy that is less than the RDA. The purpose of this study was to determine differences in adequacy levels of micronutrients (vitamin A, zinc, and iron) in toddlers aged 24-59 months with stunting and non-stunted conditions in Pardasuka village. Method : the design used in this study was a case-control approach. The sample in this study amounted to 56 toddlers. Bivariate analysis in this study used the Chi-Square Test. Result : The results showed that there were differences between the case group and control group in vitamin A adequacy level with OR = 3.029 and p-value < 0.05, zinc adequacy level with OR = 2,400 and p-value < 0.05, and adequacy level iron value OR = 3.100 and p-value <0.05. Conclusion : there are differences in consumption patterns, levels of adequacy of macronutrients and micronutrients in stunted and non-stunted toddlers in Pekon Pardasuka

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INTRODUCTION

Constraints in nutrition which are indicated by body size shorter than their age are called stunting. Golden age is a time when a child's physical growth or brain develops optimally. Optimal growth and development must be accompanied by optimal nutrition. Consumption of food in children in the golden period is crucial for toddlers so parents need to work hard to ensure children get balanced nutrition. The state of stunting can be measured by length or height if the measurement results prove a z-score of -3 SD to -2 SD (Standard Deviation) in the short category and -3 SD in the very short category (Ministry of Health, 2018).

The incidence of stunting is more common in toddlers aged 2-5 years compared to toddlers aged under 2 years. This is because at the age of 2-5 years the growth velocity has

entered a slowing phase compared to toddlers aged under 2 years (Kemenkes, 2013).

Based on information from the World Health Organization's 2018 stunting prevalence data, Indonesia was the third country with the third highest stunting prevalence in 2005-2017 with 36.4% (Ministry of Health, 2018). According to the monitoring results of the Monitoring of the Nutritional Status (PSG) of children under five in Lampung Province, the percentage of stunting children under five in 2013-2018 decreased. In 2013 the problem of stunting under five in Lampung Province was 42.6% and in 2018 it was 27.28% (DINKES Lampung Province, 2019).

According to Riskesdas data in 2018, the stunting rate in Pringsewu Regency was 20.19%. Based on data entry results in the online application for recording and reporting public nutrition (E-PPGBM) the stunting prevalence in 2020 was 9.7% (2,451 stunting toddlers). The highest cases of stunting were

found in Pardasuka District with 295 children under five. (Pringsewu District Health Office, 2021).

The results of the pre-survey and interviews with 10 mothers with stunted toddlers in Pardasuka Induk village showed that one of the causes of stunting in the area was caused by improper feeding. The pattern of feeding in toddlers is not appropriate and the amount of food intake given is not in accordance with the needs of toddlers. The pre-survey results showed 10 stunting toddlers aged 24-59 months, 9 out of 10 stunting toddlers had an adequate level of vitamin A less than the RDA, 8 out of 10 stunted toddlers had zinc or zinc adequacy levels less than the RDA, and 10 stunted toddlers had sufficient levels of zinc. iron is less than the RDA.

METHOD

Participant characteristics and research design

This type of research is a quantitative research using the method of observation and case control approach. The research was conducted in November 2021 in Pardasuka Village, Pringsewu Regency, precisely in 5 posyandu namely (Seroja 1, Seroja 2, Seroja 4, Mandiri, and Mawar).

Sampling procedures

The sampling method used in this research is random sampling.

Table 1
Risk factors for stunting in toddlers aged 24-59 months

No.	Variable	Sufficiency Level	Nutritional status		OR	p-value
			Case	Control		
1.	Vitamin A	adequate	24 (85,7%)	9 (32,1%)	3,029	0,000
		inadequate	4 (14,3%)	19 (67,9%)		
2.	Zinc	adequate	22 (78,6%)	10 (35,7%)	2,400	0,003
		inadequate	6 (21,4%)	18 (64,3%)		
3.	Iron	adequate	23 (82,19%)	8 (28,6%)	3,100	0,000
		inadequate	5 (17,9%)	20 (71,4%)		

The Relationship between the Adequacy of Micronutrients and Stunting

Based on the results of the study in Table 4.7, it can be seen that there is a significant difference in the level of vitamin A adequacy with the case group and the control group for toddlers aged 24-59 months with a p-value of 0.000 which means that there is a significant relationship between the level of vitamin A adequacy as a risk factor for stunting. and the value of OR = 3.029, which means that the level of vitamin A adequacy that is not sufficient is 3.029 times more at risk of suffering from stunting than the level of adequate vitamin A adequacy. Vitamin A deficiency increases a child's risk of infectious diseases. Vitamin A deficiency will cause children to experience growth failure. Vitamin A is needed for the development of bones and epithelial cells that make up the enamel in teeth. In Vitamin A deficiency, bone growth is stunted and bone shape is not normal, so toddlers who experience vitamin A have the potential to experience stunting (Andriani & Wirjatmaji, 2012).

This research is in line with the research conducted by Sulistiyaningsih and Yanti in 2016 whose research results are that toddlers who lack vitamin A intake will be 17.5 times

Sample size, power, and precision

The study population in this study were 384 toddlers. The number of samples in the study were 56 children under five with a case group of 28 toddlers and a control group of 28 toddlers.

Measures and covariates

Data were collected by interviewing parents of toddlers and taking anthropometric measurements of toddlers. Interviews were conducted using a personal data questionnaire and SQ-FFQ (Semi Quantitative Food Frequency) and anthropometric measurements were carried out by measuring the toddler's height using a microtoise and an infantometer.

Data analysis

The statistical test used in the bivariate analysis was the Chi Square test. This research was carried out after obtaining the Ethical Clearance from the Tanjungkarang Health Polytechnic with the number 266/KEPK-TJK/XII/2021.

RESULTS AND DISCUSSION

Differences in consumption patterns, energy, protein, vitamin A, zinc, and iron in the case and control groups are presented in table 1.

more at risk of suffering from stunting when compared to toddlers who have sufficient intake of vitamin A. This is in line with Fatimah and Bambang's research in 2017 which showed that there was a significant difference between the stunting and non-stunted groups in the variable level of vitamin A adequacy (p=0.002).

There is a significant difference in the level of zinc adequacy with the case group and the control group for toddlers aged 24-59 months with a p-value of 0.003 indicating a significant relationship between the level of zinc adequacy as a risk factor for stunting and the OR value = 2,400 which means that the level of zinc adequacy is not sufficient. moderately at risk is 2.4 times more at risk of suffering from stunting compared to a sufficient level of zinc. Zinc is closely related to bone metabolism, so zinc plays a role in growth and development. Zinc also plays a role in facilitating the effects of vitamin D on bone metabolism through stimulation of DNA synthesis and bone cells. Zinc is very important during times of growth and development. If a child has zinc deficiency, it will cause a decrease in immunity to infection, and impaired growth or stunting (King, et al, 2015).

This study is in line with research conducted by Dewi and Nindya in 2017 which stated that there was a significant

relationship between zinc consumption and the incidence of stunting. This is in line with Mardini's research in 2014, it was found that zinc deficiency in toddlers will be at risk of stunting by 16.1 times compared to non-deficient toddlers.

There is a significant difference in the level of iron adequacy with the case group and the control group for toddlers aged 24-59 months with a p-value of 0.000 which means that there is a significant relationship between the level of iron adequacy as a risk factor for stunting and the OR value = 3.100 which means the level of iron deficiency is high. The adequacy of iron that is not sufficient is at risk of 3.1 times more risk of suffering from stunting than the level of adequate iron adequacy. Iron deficiency will cause iron nutritional anemia, besides iron deficiency also has an impact on lowering the body's immune ability, so that infectious diseases can easily enter the body. Iron anemia and prolonged infectious diseases will have an impact on the linear growth of children which will result in stunting (Damayanti, 2016). This study is in line with research by Bahmat, et al, 2010 which stated that there was a significant relationship between iron intake and stunting. This is in line with the research conducted by Sulistianingsih and Yanti in 2016 which showed that a low iron intake was 4.54 times more likely to suffer from stunting compared to toddlers who had sufficient iron intake.

CONCLUSIONS AND SUGGESTIONS

There is a difference between the level of adequacy of micronutrients (vitamin A, zinc, and iron) for stunted and non-stunted toddlers where the level of micronutrient adequacy (vitamin A, zinc, and iron) that is less or not sufficient is more at risk of stunting than with adequate levels of micronutrients (vitamin A, zinc, and iron).

Suggestion, for future researchers it is better to use the Cohort design because this design has the power to prove case inference compared to other observational studies. And it is necessary to carry out good communication and a conducive place to conduct interviews to dig up information from research respondents so that information is more accurate.

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REFERENCES

- Kementerian Kesehatan. 2018. Situasi Balita Pendek (Stunting) Indonesia. Jakarta : Kementerian Kesehatan RI.
- Kementerian Kesehatan RI. 2013. Pedoman Gizi Seimbang. Jakarta: Kementerian Kesehatan RI.
- Dinas Kesehatan Provinsi Lampung. 2019. Profil Kesehatan Provinsi Lampung Tahun 2019. Lampung : Dinas Kesehatan Provinsi Lampung.
- Dinas Kesehatan Kabupaten Pringsewu. 2021. Workshop Pengukuran Antropometri bagi Kader Posyandu di Kabupaten

Pringsewu tahun 2021. Diakses dari: [https://dinkes.pringsewukab.go.id/detailpost/workshop-pengukuran-antropometri-bagi-kader-posyandu-kabupaten-pringsewu-tahun-2021.\(02 Oktober 2021\)](https://dinkes.pringsewukab.go.id/detailpost/workshop-pengukuran-antropometri-bagi-kader-posyandu-kabupaten-pringsewu-tahun-2021.(02%20Oktober%202021)).

- Murarkar, S., Gothankar, J., Doke, P., Pore, P., Lalwani, S., Quraishi, S., Malshe, N. 2020. Prevalence and determinants of undernutrition among under-five children residing in urban slums and rural areas, Maharashtra, India: a community-based cross-sectional study. *BMC Public Health*, 2.
- Widyaningsih, N. N., Kusnandar, & Anantanyu, S. 2018. Keragaman Pangan, Pola Asuh Makan, dan Kejadian Stunting Pada Balita Usia 24-59 Bulan. *Jurnal Gizi Vol.7*.
- Savita, Riza, Amelia, Fitra. 2020. Hubungan Pekerjaan Ibu, Jenis Kelamin, dan Pemberian Asi Eksklusif Terhadap Kejadian Stunting Pada Balita 6-59 Bulan di Bangka Selatan. *Jurnal Kesehatan Vol.8 No.1*. Poltekkes Pangkalpinang.
- Hermawan, D., Prihantika, I., & Meiliyana. 2020. Profil Data Gender dan Anak Kabupaten Lampung Tengah R. Sulistiawati. Dinas Pemberdayaan Perempuan dan Perlindungan Anak Kabupaten Lampung Tengah.
- Nining Yuliani Rohmatun. 2014. Hubungan Tingkat Pendidikan Ibu dan Pemberian Asi Eksklusif dengan Kejadian Stunting Pada Balita di Desa Sidowarno Kecamatan Wonosari Kabupaten Klaten. Naskah Publikasi. Program Studi Gizi Fakultas Ilmu Kesehatan Universitas Muhammadiyah Surakarta.
- Dewi, S. R. 2019. Faktor Risiko Ibu Hamil Terhadap Kejadian Stunting di Desa Sukaraja Kecamatan Gedong Tataan Kabupaten Pesawaran Tahun 2019.
- Suparyanto. 2014. Konsep Dasar Pendapatan Keluarga. Diakses tanggal 30 Desember 2021 <http://dr-suparyanto.blogspot.com/2014/03/konsep-dasar-pendapatan-keluarga.html>
- Sari, R., & Sulistianingsih, A. 2017. Faktor Faktor yang Berpengaruh terhadap Kejadian Stunting pada Balita di Kabupaten Pesawaran Lampung. *Jurnal Nasional Akper Dharma Wacana*, Vol.02. No.02.
- Asri, S. M. P., Rahfiludin, M. Z., & Martini. 2018. Hubungan Karakteristik Keluarga Kurang Mampu dengan Kejadian Stunting pada Balita di Kota Semarang. *Jurnal Management Kesehatan Indonesia Vol.6*.
- Kementerian Kesehatan RI. 2016. Pusat Data dan Informasi 2015. Jakarta: Kementerian Kesehatan RI.
- Andriani, M & Wirjatmaji, B. 2012. Pengantar Gizi Masyarakat. Jakarta: Kencana Prenada Media Group.
- Fatimah, N. S.H & R. Bambang Wirjatmadi 2017. Hubungan Tingkat Kecukupan Vitamin A, Seng dan Zat Besi serta Frekuensi Infeksi Pada Balita Stunting dan Non stunting. Program Studi S1 Kesehatan Masyarakat, Universitas Airlangga, Surabaya Departemen Gizi Kesehatan, Fakultas Kesehatan Masyarakat, Universitas Airlangga, Surabaya.
- King, J.K., Brown, K.H., Gibson, R.S., Krebs, N.F. 2015. Biomarkers of nutrition for development (BOND) – zinc review. *The journal of nutrition* 858s-879s.
- Dewi, Kartika Enggar., Nindya, Susila Triska. 2017. Hubungan Tingkat Kecukupan Zat Besi dan Seng Dengan Kejadian Stunting Pada Balita 6-23 Bulan. *Jurnal. Amerta Nutrition Vol 1 No 4*.
- Mardini KW. 2014. Kadar Seng Serum Rendah sebagai Faktor Resiko Perawakan Pendek pada Anak. Tesis. Biomedik Univesitas Udayana.

- Bahmat, D. O., Bahar, H., & Jus' at, I. 2010. Hubungan Asupan Seng, Vitamin A, Zat Besi dan Kejadian Pada Balita (24-59 Bulan) dan Kejadian Stunting di Kepulauan Nusa Tenggara (Riskesdas 2010). Jakarta Univ. Esa Unggul.
- Damayanti, A. P., Muniroh, Lailatul., Farapti. 2016. Perbedaan Pola Konsumsi dan Penyakit Infeksi pada Balita Stunting dan non Stunting. *Adi Husada Nursing Journal* Vol 2 No 2. Fakultas Kesehatan Masyarakat. UNAIR.