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The Impact of Protein Intake on Stunting in Toddlers: A Lapai Health Center Study

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ABSTRACT

Introduction: Stunting is a short stature caused by chronic malnutrition based on weight-for-age, height-for-age, and chronological age that greatly impacts child growth and development. According to SSGI 2021, Southeast Sulawesi is ranked fifth in Indonesia with the highest stunting rate at 30.2% and North Kolaka Regency has a stunting rate of 29.1%. The causes of stunting are quite diverse, one of which is the lack of protein food consumption. The purpose of this study was to determine the relationship between protein intake and the incidence of stunting in toddlers.
Methods: This study was an observational analytic study. This study was participated by 18 children who were registered at the Lapai Health Centre. Using the cross-sectional method and chi-square test, 18 children will be analyzed to determine the relationship of protein intake to stunting.
Results: The results showed that the percentage of toddlers with less protein intake was 72.2% and only 27.8% were in the sufficient category. Toddlers with the stunting category were 77.8% and toddlers with the normal category were only 22.2%. With data analysis using the chi-square test, the P-value <0.05 (P-value 0.04) was obtained.
Conclusion: This study focuses on the increasing incidence of stunting in toddlers caused by a lack of protein intake. The results of this study emphasize to that parents and local governments to pay more attention to children's protein intake during toddlerhood by providing varied protein intake.

Keywords: Stunting; protein intake; toddler

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Introduction

Indonesia, as a developing nation, primarily focuses on matters related to nutrition. The nutritional problem is the increasing prevalence of stunting toddlers. Stunting is short stature due to chronic malnutrition characterized by weight age, below height age and below chronological age. Several factors cause stunting, one of which is due to inadequate consumption of protein foods. Based on the latest publication of the WHO shows the number of children under five with short stature worldwide is 154.8 million toddlers. Data from WHO on stunting rates published in 2018 revealed that Indonesia became the third highest stunting rate in the Southeast Asia region with a percentage of 36.4% [1].

Indonesia is a nation grappling with a triple burden of malnutrition, characterized by issues of under nutrition, overweight, and deficiencies in micronutrients [2]. According to data from the R&D of the Indonesian Ministry of Health, the Study of the Nutritional Status of Toddlers in Indonesia in 2021 is quite high with a stunting prevalence of 24.4%. Southeast Sulawesi Province occupies the 5th position with the highest stunting rate in Indonesia amounting to 30.2% with North Kolaka district having a stunting rate of around 29.1% [3].

Stunting has adverse effects on growth and development. The short-term effects of stunting, namely impaired brain development and intelligence, disruption of body metabolism, disruption of physical growth, and increased medical costs. The long-term impact of stunting, namely cognitive function and physical development that is less than optimal, weakening of the immune system that can lead to mild diseases and the development of degenerative diseases, such as diabetes, obesity, cancer, cardiovascular disease, and disability in old age .[4]The purpose of this study is to determine the relationship between protein intake and the incidence of stunting in toddlers in the work area of the Lapai Health Center, North Kolaka Regency.

Methods

This study was conducted at Puskesmas Lapai, North Kolaka Regency, South-east Sulawesi in August 2023. Patient data was obtained directly through primary data whereas theprimary data was obtained from the FFQ Food Record form semi-quantitative anthropometric examination. Ethical approval for this study was obtained from the Faculty of Medicine, Muslim Indonesia University and the Health Research Ethics Committee of Muslim Indonesia University with the ethics committee approval number Ref: 377/A.1/KEPK-UMI/VII/2023.

This study used an observational analytic method using a cross-sectional approach, where variables were measured simultaneously. The sample calculation used the Slovin formula. Data collection methods in this study using primary data. Primary data were obtained from parents of toddlers who directly filled

in the semi-quantitative FFQ Food Record form to determine the daily protein intake of toddlers and to determine the incidence of stunting by anthropometric examination using a microtoise, baby scale, digital scales, and infantometer. Measurements were taken directly by the researcher. Data were obtained during visits to the health center and home visits.

Result

In this study, the researcher took the research samples by taking anthropometric measurements on toddlers who visited the Lapai Health Centre. In addition, researchers made visits to the homes of toddlers recorded at the Lapai Health Centre. After taking anthropometric measurements, interviews were conducted with parents regarding the condition and food intake of toddlers and filling out semi-quantitative FFQ Food Record forms to determine the protein intake of toddlers daily, weekly, and monthly. The data was collected and analyzed further.

The data were obtained on the distribution of sex, age, height/length, weight, and distribution of protein intake.

Univariate Results

Table 1. Gender Distribution of Toddlers

Gender	n	%
Woman	4	22.2
Man	14	77.8
Total	18	100.0

Source: Primary Data, 2023

Table 1 illustrates the gender distribution of toddlers with men dominating the percentage of 77.8% with 14 people, while women only 22.2% with 4 people.

Table 2. Description of Age, Weight, Height and Protein Consumption/Day

Characteristic	N	Minimum	Maximum	Average	Standard Deviation
Age (Months)	18	13	37	24.17	7.88
Weight (kg)	18	6.10	13.50	9.46	2.04
Height (cm)	18	63.50	92.70	78.48	7.63
Protein Consumption/Day (g)	18	11.04	15.04	13.41	1.24

Source: Primary Data, 2023

Table 2 shows descriptions of the frequency of age, weight, height, and protein consumption/day of toddlers. The average age of toddlers is 24.17 months with the smallest age of 13 months and the largest age of 37 months. The average weight of toddlersis 9.46 kg with the smallest body weight of 6.1 kg and the largest weight of 13.5 kg. The average height of toddlers is 78.48 cm with the smallest height of 63.50 cm and the largest height of 92.70 cm. The average consumption of protein/day is 13.41 grams.

Table 3. Distribution of Adequacy of Toddler Protein Consumption

Protein Adequacy	n	%
Enough	5	27.8
Less	13	72.2
Total	18	100.0

Source: Primary Data, 2023

Table 3 illustrates the distribution of the adequacy category of protein consumption/day toddlers with the percentage of toddlers in the category of protein intake less by 72.2% and the category of sufficient only 27.8%.

Table 4. Distribution of Stunting Incidence in Toddlers

Stunting Category	n	%
Stunting	14	77.8
No *Stunting*	4	22.2
Total	18	100.0

Source: Primary Data, 2023

Table 4 illustrates the spread of stunting in toddlers. Stunting toddlers have a percentage of 77.8% with 14 people and normal toddlers only 22.2% with 4 people.

Bivariate Analysis

Table 5. Analysis of the Relationship between Protein Consumption Adequacy and the Incidence of Stunting in Toddlers

			Stunting Category		Total	P-value
			Stunting	Normal		
Protein Adequacy Category	Less	n	12	1	13	0.04
		%	92.3	7.7	100.0	
	Enough	n	2	3	5	
		%	40.0	60.0	100.0	
Total		n	14	4	18	

%	77.8	22.2	100.0

Source: Primary Data, 2023

Table 5 shows the results of the chi-square test with a p-value obtained of 0.04 (<0.05) which indicates that there is a significant relationship between protein intake and the incidence of stunting in toddlers.

Discussion

The results describe the prevalence of male toddlers dominating when compared to the number of female toddlers. This is in line with the 2021 Health Statistics Profile data which explains that the percentage of children aged 0-4 years who have health complaints according to sex is dominated by men with 18.34% and for women with 15.68% [5]. In addition, the results of research from Anggi Tria Abimayu and Nurul Dina Rahmawati in 2023 show that the percentage of male toddlers is very dominating with 52.1% more than female toddlers with 47.9% [6]. A different investigation by Dian Kholika Hamal et al in 2021 proposed that male infants face a 1.15 times higher risk of stunting compared to their female counterparts [7].

The age of the respondents selected was 6-60 months because according to the results of the SSGI 2022 stated that stunting has increased specifically in the age range starting from 6 months [8]. In addition, the fulfillment of child nutrition, especially in toddlers (0-5 years) must be a big concern because the growth rate at this age is quite rapid (Golden Age) [9]. The results of research on protein consumption / day showed a decrease in protein consumption with an average intake per day of 13.41 grams. This information is derived from the Minister of Health Regulation of the Republic of Indonesia Number 28 of 2019, elucidating the recommended protein intake for infants/children aged 6-72 months to be within the range of 15-25 grams [10].

The results of research on protein adequacy explain that protein consumption intake tends to be less. This is in line with the 2014 individual food consumption survey data which describes a decrease in animal protein consumption in toddlers, which is <5% for children aged 6 months and over [11]. In addition, Susenas 2022 data reveals an average daily protein food intake per capita of 62.21 grams (higher than 57 grams), but animal protein intake, such as meat 4.79 grams, eggs and milk 3.37 grams, and fish/shrimp/squid/shellfish 9.58 [12].

The findings indicated a significantly elevated percentage of toddlers classified as stunted, reaching 77.8%. This substantial prevalence of stunting among children under five aligns with the data reported by the SSGI 2022, which records a stunting rate of 21.6% in Indonesia. This prevalence is fairly high because

the achievement of the stunting rate in 2024 is 14% and the achievement of the WHO is less than 20%. Southeast Sulawesi in the SSGI 2022 ranks 9th with the highest stunting rate in Indonesia with 27.7% [8].

The chi-square test results delineate a distinct correlation between the sufficiency of protein intake and stunting in toddlers, evidenced by a p-value of 0.04 (less than 0.05). Several studies identify stunted children as having low serum amino acid levels compared to normal children given that amino acids, particularly essential types of proteins such as lysine, leucine, and tryptophan, are necessary for cognitive growth and development [13].

The research conducted by Annisa Rizky Maulidiana et al regarding Low Intake of Essential Amino Acids in Toddlers in Malang City suggests that the intake of nine EAA in toddlers who are stunted tends to decrease when compared to children who are not stunted. EAA intake should be obtained from food, especially a combination of different types of protein source foods [14]. Other studies have suggested that children lack EAA intake from animal protein foods, especially isoleucine ((OR (95%Cl) 2.58 (1.09 – 6.09, p = 0.00)) [15].

According to a study conducted by Satriani et al in 2019, it was elucidated that there exists a distinct correlation between protein consumption and stunting. The intake of protein-rich foods among stunted toddlers is comparatively lower in comparison to their normal counterparts [16]. Furthermore, based on the study conducted by Iseu Siti Aisyah and Andi Eka Yunianto in 2021, it reveals a distinct connection between the consumption of protein-rich foods and the prevalence of stunting. Insufficient consumption of protein foods has a 5,160 times risk of stunting [17]

Conclusion

Based on the results of the research analysis, there were 13 toddlers with less protein intake category and 5 toddlers with sufficient protein intake category with 14 toddlers belonging to stunting category and 4 toddlers with normal category. From the results of the analysis, it can be concluded that there is a significant relationship between protein intake and the incidence of stunting in toddlers aged 6-60 months in the Working Area of the Lapai Health Center, North Kolaka Regency. After the study, further research is needed by paying attention to other stunting risk factors, such as intake of other nutrients, diet, family social and economic factors, history of chronic diseases, and maternal factors. In addition, people are advised to pay more attention to children's protein intake during toddlerhood in the form of varied protein intake and increase the frequency of protein intake because protein intake will support children’s growth and development.

Conflicts of Interest

There is no conflict of interest.

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References

1. Akbar H, Mauliadi Ramli. Faktor Sosial Ekonomi dengan Kejadian Stunting pada Anak Usia 6-59 Bulan di Kota Kotamobagu. Media Publikasi Promosi Kesehatan Indonesia (MPPKI). 2022;5(2):200–4.
2. Rah JH, Melse-Boonstra A, Agustina R, van Zutphen KG, Kraemer K. The Triple Burden of Malnutrition Among Adolescents in Indonesia. Vol. 42, Food and Nutrition Bulletin. SAGE Publications Inc.; 2021. p. S4–8.
3. Kementerian Kesehatan Republik Indonesia. Buku Saku Hasil Studi Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi, dan Kabupaten/Kota 2021. Humas Litbangkes; 2021.
4. Asra Laily L, Indarjo S. Literature Review: Dampak Stunting terhadap Pertumbuhan dan Perkembangan Anak. Higeia Journal of Public Health Research and Development [Internet]. 2023;3. Available from: http://journal.unnes.ac.id/sju/index.php/higeiahttps://doi.org/10.15294/higeia/v7i3/63544
5. Sari RK, Yugiana E, Noviani A. Profil Statistik Kesehatan 2021. Jakarta; 2021.
6. Tria Abimayu A, Rahmawati D. Analisis Faktor Risiko Kejadian Stunted, Underweight, dan Wasted Pada Balita di Wilayah Kerja Puskesmas Rangkapan Jaya, Kota Depok, Jawa Barat Tahun 2022. Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan. 2023;3.
7. Hamal DK, Nursyarofah N, Qualifa A. Jenis Kelamin Dan Panjang Badan Lahir Sebagai Faktor Kejadian Stunting Di Kabupaten Majene Provinsi Sulawesi Barat Tahun 2018 (Analisis Data Riskesdas 2018). ARKESMAS (Arsip Kesehatan Masyarakat). 2021;6(2):1–7.
8. Liza Munira S. Hasil Survei Status Gizi Indonesia (SSGI) 2022. 2023.
9. Robawati AF, Yulianti AB, Listya H, Prodi P, Kedokteran F, Kedokteran I, et al. Pola Pertumbuhan Balita Usia 0-5 di Puskesmas Garawangi Kabupaten Kuningan Tahun 2018-2021. Med Sci [Internet]. 2022;2:1026–31. Available from: https://doi.org/10.29313/bcsms.v2i1.2003
10. Kementerian Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia [Internet]. 2019 [cited 2022 Jul 5]. Available from: http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No__28_Th_2019_ttg_Angka_Kecukupan_Gizi_Yang_Dianjurkan_Untuk_Masyarakat_Indonesia.pdf
11. Sari HP, Natalia I, Sulistyaning AR, Farida F. Hubungan Keragaman Asupan Protein Hewani, Pola Asuh Makan, Dan Higiene Sanitasi Rumah Dengan Kejadian Stunting. Journal of Nutrition College. 2022;11(1):18–25.
12. Kemenkes RI. Hari Gizi Nasional Protein Hewani Cegah Stunting. 2023;1–32.
13. Endrinikapoulos A, Afifah DN, Mexitalia M, Andoyo R, Hatimah I, Nuryanto N. Study of the importance of protein needs for catch-up growth in Indonesian stunted children: a narrative review. Vol. 11, SAGE Open Medicine. SAGE Publications Ltd; 2023.
14. Maulidiana AR, Sutjiati E. Low intake of essential amino acids and other risk factors of stunting among under-five children in Malang City, East Java, Indonesia. J Public Health Res. 2021;10(2):220–6.
15. Nurbaiti L, Irawati D, Wirabuanayuda G, Warnaini C, Faradina Zubaidi F. Profil Konsumsi Asam Amino Essensial Balita Stunting dan Tidak Stunting Di Kabupaten Lombok Utara. Prosiding SAINTEK LPPM Universitas Mataram. 2023;5:92–6.
16. Hary Cahyati W, Yuniastuti A, Santirani. Disparity of Risk Factors Stunting on Toddlers in the Coast and the Mountain Areas of Sinjai, South Sulawesi. Public Health Perspectives Journal [Internet]. 2019;4(3):196–205. Available from: http://journal.unnes.ac.id/sju/index.php/phpj
17. Aisyah I YA. Hubungan Asupan Energi Dan Asupan Protein Dengan Kejadian Stunting Pada Balita (24-59 Bulan) Di Kelurahan Karanganyar Kecamatan Kawalu Kota Tasikmalaya. Jurnal Kesehatan komunitas Indonesia [Internet]. 2021;17(1):240–6. Available from: https://jurnal.unsil.ac.id/index.php/jkki/article/view/3603/1855