

The Influence of Diet and Intake of Macro and Micro Zinc Nutrients on the Incident of Stunting in Toddlers Ages 12-36 Months in Usitasae Village

João Cerrilo Colo¹, Margaretha Solang², Sylva Flora Ninta³

^{1,2,3}Department of Public Health, Postgraduate, Gorontalo State University, Gorontalo City

ABSTRACT: Short Toddlers (Stunting) is a nutritional status based on the Body Length according to Age (PB/U) index or Body Height according to Age (TB/U) where in the anthropometric standard for assessing children's nutritional status, the results of these measurements are at the threshold (Z- Score) -3 SD to <-2 SD (short /stunted) and <-3 SD (very short/ severely stunted). The formulation of the problem is how *Stunting* occurs in toddlers aged 12-36 months and whether there is an influence of the type of food, amount of food, food schedule, carbohydrates, protein, fat, and zinc on the incidence of *stunting* in toddlers aged 12-36 months. This research aims to analyze the influence of diet and intake of macro and micronutrient zinc on the incidence of *stunting* in toddlers aged 12-36 months. This type of observational research uses a *cross-sectional* design. This research was carried out in Usitasae Village. The sample in this study consisted of 54 toddlers using *cluster random sampling* techniques with bivariate analysis using the *chi-square* test and multivariate analysis using the multinomial logistic regression test. The results of data analysis on the prevalence of stunting in toddlers aged 12-36 months were 64.8%. The relationship between nutritional intake and the incidence of stunting in toddlers is the type of food (P value = $0.005 \leq \alpha = 0.05$), the amount of food (P value = $0.018 \leq \alpha = 0.05$), the food schedule (P value = $0.022 \leq \alpha = 0.05$), carbohydrates (P value = $0.010 \leq \alpha = 0.05$), protein (P value = $0.000 \leq \alpha = 0.05$), fat (P value = $0.008 \leq \alpha = 0.05$), zinc (P value = $0.006 \leq \alpha = 0.05$). There is a relationship between the type of food, amount of food, food schedule, carbohydrates, protein, fat, and zinc on the incidence of stunting in toddlers aged 12-36 months. There is a need for further study regarding the intake of macro and micronutrients zinc in toddlers aged 12-36 months.

KEYWORDS: Stunting incidence, diet, nutrients, macro and micro zinc.

INTRODUCTION

Stunting or chronic malnutrition problems are caused by insufficient nutritional intake for a long time due to food not meeting nutritional needs. Stunting can occur when the fetus is still in the womb and only appears when the child is two years old (Rahmadhita, 2020). Stunting (short) measures chronic body length or height malnutrition according to age (PB/U or TB/U). Stunting in the first 1000 days of life (HPK) is irreversible and closely related to functional failure, which has an impact on high morbidity and mortality rates in children (Wanimbo et al., 2020).

The results of World Health Organization (WHO) data for 2020 stated that globally, 22% or 149.2 million children under 5 years old experienced Stunting (UNICEF / WHO / World Bank Group, 2021). The 2019 UNICEF report states that the prevalence of children aged 0-59 months experiencing undernutrition or malnutrition in South Asia is 52%, Central Asia 5%, and Asia Pacific/East Asia 15% (UNICEF, 2019). A study on the prevalence of undernutrition in Southeast Asia found that in Cambodia it was 3.27%, Laos 2.22%, Myanmar 1.56%, Thailand 1.10%, Timor-Leste 5.30% and Vietnam 1.05%. % (Mutunga et al., 2020).

Failure to thrive in toddlers is at risk of causing children to experience difficulties in achieving optimal physical and cognitive development (Wulandari & Muniroh, 2020). Stunting impacts life, including increasing the risk of morbidity and mortality caused by infection (Rahmandiani et al., 2019). Low height during childhood is a long-term indicator of malnutrition in children due to insufficient quality and quantity of food, which is accompanied by infectious diseases experienced by children (Wulandari & Muniroh, 2020). Nutrient intake is one of the direct causes that can influence the nutritional status of toddlers. Nutrient intake can also be obtained from several nutrients, including macronutrients such as carbohydrate energy, protein, and fat. Macronutrients are nutrients needed in large quantities by the body and play a major role in providing energy. Macronutrient intake can influence the nutritional status of toddlers (Diniyyah et al., 2017).

The prevalence of stunting in Timor-Leste is 47.1% Ministerio da Saude (MDS) 2021, which is far above the "very high" threshold according to WHO, namely $\geq 30\%$. Therefore, Stunting continues to be a major problem in this country. Stunting is higher among boys (52.0%) than girls (46.6%) and much higher in rural areas (52.5%) than in urban areas (39.8%).

Stunting in children in Timor-Leste is largely related to maternal and child sociodemographic factors as well as the quality and

The Influence of Diet and Intake of Macro and Micro Zinc Nutrients on the Incident of Stunting in Toddlers Ages 12-36 Months in Usitasae Village

availability of health services. There are gaps in values, wealth, and region in Timor-Leste, showing that certain groups are at high risk of experiencing Stunting. Therefore, it is critical to identify the quality of services provided by health facilities, the involvement of health workers and volunteers in improving maternal and child health outcomes, and mothers' intentions to use health services in Timor-Leste. Promoting maternal behaviors such as breastfeeding practices in PNC may be particularly effective in addressing child stunting in Timor-Leste. In addition, ensuring nutritious food intake and increasing accessibility to pregnant women is urgently needed in Timor-Leste. With the existing data, the author is interested in researching "The Influence of Diet and Intake of Macro Nutrients and Zinc on the Incident of Stunting in Toddlers aged 12-36 months in Usitasae Village".

METHODS

Location this research was conducted in Usitasae Village, *Sub-Região Oe-silo, Região Administrativa Especial Oe-curse, Ambeno* (RAEOA) in 2024. This research will be conducted for three months according to the research schedule. The type of research used is quantitative research with a cross-sectional approach, namely research where the independent variable and dependent variable are taken simultaneously. The population in this study was the total number of stunted and non-stunted toddlers in Usitasae village, totaling 68 toddlers aged 12-36 months. From the results of the sampling formula using the *Cluster Random Sampling* technique, the sample used in this research was 54 Stunted toddlers. The data collected in this research consists of primary data and secondary data.

RESULTS AND DISCUSSION

A. Multivariate Analysis

1. Description of Gonorrhoea Sexually Transmitted Infection

Multivariate analysis aims to determine the influence between many independent variables and a dependent variable. The multivariate analysis used in this research is multinomial logistic regression analysis; this means there are more than 2 categories in the variables studied. Variables included in the multinomial logistic regression analysis have a significant value ($p \leq 0.05$) in the previous bivariate analysis. According to the results of the bivariate analysis, it is known that the variables carried out in the multivariate analysis are the adequacy level of types of food, the adequacy level of the amount of food, the adequacy level of the food schedule, the adequacy level of carbohydrates, the adequacy level of protein, the adequacy level of fat, the adequacy level of zinc.

Table 1. Multivariate Analysis, Intake of Types of Food, Amount of Food, Food Schedule, Carbohydrates, Protein, Fat, Zinc with the Incident of Stunting in Toddlers aged 12-36 months

<i>Stunting events</i>		B	Sig.	Exp(B)
<i>Stunting</i>	Type of Food	,070	.005*	,779
	Amount of Food	,053	.018*	,739
	Meal Schedule	,035	.022*	,523
	Carbohydrate	,130	.010*	2,189
	Proteins	,826	,000*	11,526
	Fat	,072	.008*	1,055
	Zinc	-.053	.006*	-.514

Source: Primary data 2024

a. Category reference: Not *Stunting*

b. Numbers marked with an asterisk (*) have a Significant value

The results of the multivariate analysis table in Table 1. show that the next variable that has the most influence on the incidence of stunting in toddlers aged 12-36 months with the stunting category has a very significant value ($p\text{-value} = 0.005 \leq \alpha = 0.05$), which can be interpreted as a type of intake. Food has a significant influence on the incidence of Stunting; from the food intake coefficient value of 0.070, which is positive, this value can be interpreted as meaning that the more stunted toddlers with less food intake, the greater the probability that toddlers will experience stunting, from the results of the Goods Ratio or Exp value. (B) The variable intake of types of food in the less category has a value of 0.779, which indicates that the intake of food in the less category is estimated to have a 0.779 times higher chance of experiencing stunting than toddlers who are not stunted.

The amount of food intake with the incidence of stunting in toddlers aged 12-36 months in the stunting category has a significant value ($P\text{ value} = 0.018 \leq \alpha = 0.05$); it can be interpreted that the intake of the amount of food has a significant influence on the incidence of Stunting, from the coefficient value of the adequacy level The amount of food, namely 0.053, has a positive value, so this value can be interpreted as meaning that the more stunted toddlers with less food intake, the higher the probability of toddlers experiencing Stunting from the results of the Goods Ratio or Exp(B) variable, the intake of food in the less category has a value of

The Influence of Diet and Intake of Macro and Micro Zinc Nutrients on the Incident of Stunting in Toddlers Ages 12-36 Months in Usitasae Village

0.739. This indicates that food intake in the low category is estimated to have a 0.739 times higher chance of experiencing Stunting compared to toddlers who are not stunted.

Carbohydrate intake and the incidence of stunting in toddlers aged 12-36 months in the stunting category have a significant value (P value = $0.010 \leq \alpha = 0.05$); it can be interpreted that carbohydrate intake has a significant influence on the incidence of Stunting, from the coefficient value of carbohydrate intake, namely 0.130 has a positive value, then this value can be interpreted as meaning that the more stunted toddlers with less carbohydrate intake, the higher the probability of toddlers experiencing Stunting from the results of the good ratio or Exp(B) variable for the low carbohydrate intake category which has a value of 2,189, this indicates that carbohydrate intake Those in the underweight category are estimated to have a 2,189 times higher chance of experiencing Stunting compared to toddlers who are not stunted.

Protein intake and the incidence of stunting in toddlers aged 12-36 months in the stunting category have a significant value (P value = $0.000 \leq \alpha = 0.05$); it can be interpreted that protein intake has a significant influence on the incidence of Stunting, from the protein intake coefficient value of 0.826 has a positive value, then this value can be interpreted as meaning that the more stunted toddlers with less protein intake, the higher the probability of toddlers experiencing Stunting from the results of the good ratio or Exp(B) protein intake variable in the deficient category has a value of 11,526, this indicates that protein intake Those in the underweight category are estimated to have a 11,526 times higher chance of experiencing Stunting compared to toddlers who are not stunted.

Fat intake and the incidence of stunting in toddlers aged 12-36 months in the stunting category have a significant value (P value = $0.008 \leq \alpha = 0.05$); it can be interpreted that fat intake has a significant influence on the incidence of Stunting, from the coefficient value of fat intake, namely 0.072 has a positive value. This value can be interpreted that the more stunted toddlers with less fat intake, the higher the probability of toddlers experiencing Stunting from the results of the good ratio or Exp(B) fat intake variable in the low category has a value of 1.055; this indicates that fat intake Those in the underweight category are estimated to have a 1,055 times higher chance of experiencing Stunting compared to toddlers who are not stunted.

Zinc intake and the incidence of stunting in toddlers aged 12-36 months in the stunting category have a significant value (P value = $0.006 \leq \alpha = 0.05$); it can be interpreted that zinc intake has a significant influence on the incidence of Stunting, from the coefficient value of food intake, namely -0.053 has a positive value, so this value can be interpreted as meaning that the more stunted toddlers with less zinc intake, the higher the probability of toddlers experiencing Stunting from the results of the Goods Ratio or Exp(B) variable, the zinc intake variable in the deficient category has a value of -0.514, this indicates that zinc intake in the deficient category is estimated to have a -0.514 times higher chance of experiencing Stunting compared to toddlers who are not stunted.

B. Discussion of Research Results

1. Stunting Incidence Rate in Toddlers Aged 12-36 in Usitasae Village

In Table 4.1, the incidence of stunting in toddlers aged 12-36 months is 35 (64.8%) in the stunted toddler category and 19 (35.2%) in the non-stunted toddler category. In this study, the average height and weight per age of toddlers was found to be a very short z-score < -3 SD, compared to toddlers who were not stunted, according to the 2005 WHO standards. Research that has been carried out shows that the majority of toddlers experience stunting; this can be influenced by insufficient food availability and mothers' knowledge about food processing along with insufficient family income, from the results of interviews conducted with local officials, health workers, and civilians at the research location.

2. The Influence of Types of Food Intake on the Incidence of Stunting in Toddlers Aged 12-36 Months.

Che square analysis shows that food intake influences the incidence of stunting in toddlers, which has a significant value (P value = $0.005 \leq \alpha = 0.05$). It can be concluded that food intake influences the incidence of stunting in toddlers aged 12-36 months in Usitasae village in 2024. These contain nutrients that are beneficial for the body, namely carbohydrates, proteins, fats, vitamins, and minerals (Oetoro 2012). Carbohydrates, fats, and proteins are macronutrients as energy sources, while vitamins and minerals are micronutrients that regulate the body's smooth metabolism (Suhardjo & Kusharto 2010).

3. The Influence of Amount of Food Intake on the Incidence of Stunting in Toddlers Aged 12-36 Months.

Chi-square analysis showed an influence of food intake on the incidence of Stunting, which obtained a significant value (P value = $0.018 \leq \alpha = 0.05$). It can be concluded that food intake influences the incidence of stunting in toddlers aged 12-36 months in Usitasae village in 2024. Insufficient food intake causes the body's calorie needs and adequacy not to be met. This results in a lack of energy and other nutritional elements the body needs. A diet that is not good in quantity, type, and function over a long period causes the body's need for nutritional elements (including carbohydrates, protein, and fat) to be unfulfilled.

4. The Effect of Eating Schedule Intake on the Incidence of Stunting in Toddlers Aged 12-36 Months.

Chi square analysis shows an influence of meal schedule intake on the incidence of stunting in toddlers. The value obtained is significant (P value = $0.022 \leq \alpha = 0.05$), and it can be concluded that meal schedule intake influences the incidence of stunting in toddlers aged 12-36 months in Usitasae village. Generally, the eating schedule for toddlers aged 12-36 months is like that of adults, requiring three healthy and nutritious main meals daily, plus two to three snacks. However, this is not a standard benchmark and

The Influence of Diet and Intake of Macro and Micro Zinc Nutrients on the Incident of Stunting in Toddlers Ages 12-36 Months in Usitasae Village

can be adjusted to suit certain conditions. A meal schedule can determine the frequency of meals in a day with an optimal eating routine, namely 3 main meals spaced 3 hours apart. This schedule can be modified according to needs as long as it stays within 3 hours (Tjokoprawiro, 2003).

5. The Effect of Carbohydrate Intake on the Incident of Stunting in Toddlers Aged 12-36 Months.

Chi square analysis is known. Carbohydrate intake influences stunting in toddlers. A significant value was obtained ($P \text{ value} = 0.010 \leq \alpha = 0.05$), so it can be concluded that carbohydrate intake influences the incidence of stunting in toddlers aged 12-36 months in Usitasae village in 2024. This research aligns with Iranian research (2018), which shows a relationship between carbohydrate intake and growth index. This research shows that tall children have fewer problems with low carbohydrate intake. The level of adequate carbohydrates does not affect overall energy intake because it is based on the recommendation that 60% of energy needs come from carbohydrate sources.

6. The Effect of Protein Intake on the Incidence of Stunting in Toddlers Aged 12-36 Months in Usitasae Village.

Che square analysis is known. Protein intake influences the incidence of stunting in toddlers. A significant value was obtained ($P \text{ value} = 0.000 \leq \alpha = 0.05$), and it can be concluded that protein intake influences the incidence of stunting in toddlers aged 12-36 months in Usitasae village in 2024. This research is in line with research by Nur (2020), that there is a significant relationship between protein nutrients and the nutritional status of children with a ratio of 50% of the nutritional status of children with problems, proving that there is a significant relationship between protein intake and the nutritional status of toddlers. Protein is a nutrient often related to the growth of children under five, where a lack of protein intake in children under five tends to experience slower growth compared to children with sufficient protein intake.

7. The Influence of Fat Intake on the Incidence of Stunting in Toddlers Aged 12-36 Months in Usitasae Village.

Che square analysis is known. Fat intake influences stunting in toddlers. A significant value was obtained ($P \text{ value} = 0.008 \leq \alpha = 0.05$), and it can be concluded that fat intake influences the incidence of stunting in toddlers aged 12-36 months in Usitasae village in 2024. Research This is in line with research by Nur (2020) that shows that there is a significant relationship between fat intake and children's nutritional status based on the TB/U index and the nutritional status of children under five years old in the district. Cendana, Enrekang District.

8. The Effect of Zinc Intake on the Incidence of Stunting in Toddlers Aged 12-36 Months in Usitasae Village.

Che square analysis is known. Zinc intake influences the incidence of stunting in toddlers. A significant value was obtained ($P \text{ value} = 0.006 \leq \alpha = 0.05$), so it can be concluded that there is an influence of zinc intake on the incidence of stunting in toddlers aged 12-36 months in Usitasae village in 2024. Research This is in line with research by Anggun (2019), which found that the zinc intake of children under five was deficient, namely 47.4% of the total number of children under five. There is a significant relationship between zinc intake and the incidence of malnutrition in children aged 6-24 months in Leyangan village, Semarang district.

CONCLUSIONS

1. The incidence of stunting in toddlers aged 12-36 months in Usitasae Village from 54 respondents under toddlers aged 12-36 months in the stunting category was 35 with a percentage of (64.8%), the non-stunted category was 19 with a percentage of (35.2%).
2. The pattern of providing types of food has a significant effect ($P \text{ value} = 0.005 \leq \alpha = 0.05$) on the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
3. The pattern of providing the amount of food significantly affects ($P \text{ value} = 0.018 \leq \alpha = 0.05$) the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
4. The pattern of feeding schedules has a significant effect ($P \text{ value} = 0.022 \leq \alpha = 0.05$) on the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
5. Carbohydrate nutritional intake significantly affects ($P \text{ value} = 0.010 \leq \alpha = 0.05$) the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
6. Protein nutritional intake significantly affects ($P \text{ value} = 0.000 \leq \alpha = 0.05$) the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
7. Fat nutritional intake significantly affects ($P \text{ value} = 0.008 \leq \alpha = 0.05$) the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
8. Zinc nutritional intake significantly affects ($P \text{ value} = 0.006 \leq \alpha = 0.05$) the incidence of stunting in toddlers aged 12-36 months in Usitasae Village.
9. There is a variable that has the most influence on the incidence of stunting in toddlers aged 12-36 months in Dessa Usitasae, namely protein intake in the low category, which is estimated to have an 11.526 times higher chance of experiencing Stunting

The Influence of Diet and Intake of Macro and Micro Zinc Nutrients on the Incident of Stunting in Toddlers Ages 12-36 Months in Usitasae Village

compared to toddlers who are not stunted.

REFERENCES

- 1) Afifah, L. 2019. Hubungan Pendapatan, Tingkat Asupan Energi dan Karbohidrat dengan Status Gizi Balita Usia 2-5 Tahun di Daerah Kantong Kemiskinan. *Amerta Nutrition*, 3(3), 183.
- 2) AKG. 2019. Peraturan Menteri Kesehatan Republik Indonesia Nomor 28 Tahun 2019 Tentang Angka Kecukupan Gizi Yang Dianjurkan Untuk Masyarakat Indonesia. *AKG*, 8(5), 55.
- 3) Akuntabilitas, L. 2019. Laporan Akuntabilitas Kinerja Instansi Pemerintahan (LAKIP) Dana Dekonsentrasi (03-DK) Tahun 2019.
- 4) Ayuningtyas, A., Simbolon, D., & Rizal, A. 2018. Asupan Zat Gizi Makro dan Mikro terhadap Kejadian Stunting pada Balita. *Jurnal Kesehatan*, 9(3), 445.
- 5) Baculu, E. P. H. 2017. Hubungan Pengetahuan Ibu Dan Asupan Karbohidrat Dengan Status Gizi Pada Anak Balita Di Desa Kalangkangan Kecamatan Galang Kabupaten Toli Toli. *Promotif*, 7(1), 14–17.
- 6) Choliq, I., Nasrullah, D., & Mundakir, M. 2020. Pencegahan Stunting di Medokan Semampir Surabaya Melalui Modifikasi Makanan Pada Anak. *Humanism : Jurnal Pengabdian Masyarakat*, 1(1), 31–40.
- 7) Dewi et.al. 2017. Hubungan Tingkat Kecukupan Zat Besi Dan Seng Dengan Kejadian Stunting Pada Balita 6-23 Bulan. *Amerta Nutrition*, 1(4), 361.
- 8) Diniyyah, S. R., & Nindya, T. S. 2017. Asupan Energi, Protein dan Lemak dengan Kejadian Gizi Kurang pada Balita Usia 24-59 Bulan di Desa Suci, Gresik. *Amerta Nutrition*, 1(4), 341.
- 9) Gusti Putu Ngurah Adi Santika, S.Pd., M. F., & Fakultas. 2016. Pengukuran Tingkat Kadar Lemak Tubuh Melalui Jogging Selama 30 Menit Mahasiswa Putra Semester IV FPOK IKIP PGRI Bali Tahun 2016. *Science of Surveying and Mapping*, 41, 89–98.
- 10) Hariyati et al. 2016. Hubungan Antara Riwayat Infeksi dan Tingkat Konsumsi dengan Kejadian Stunting pada Anak Usia 25-59 Bulan di Wilayah Kerja Puskesmas Kalisat Kabupaten Jember (The Correlation Between History of Infection and Consumption Level with Genesis Stunting Among C.
- 11) Hidayati, M. N., Perdani, R. R. W., & Karima, N. 2019. Peran Zink terhadap Pertumbuhan Anak. *Majority*, 8, 168–171.
- 12) Kemenkes RI. 2018. Buletin Stunting. Kementerian Kesehatan RI, 301(5), 1163–1178
- 13) Kemenkes RI. 2016. Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2016 Tentang Standar Antropometri Anak. 2(1), 5–7.
- 14) Kundarwati et al. 2022. Hubungan Asupan Protein, Vitamin A, Zink, dan Fe dengan Kejadian Stunting Usia 1-3 Tahun. 11(1), 9–15.
- 15) Langi et.al. 2019. Asupan Zat Gizi Dan Pendapatan Keluarga Terhadap Kejadian Stunting Pada Anak Usia 3-5 Tahun. *Gizido*, 11(2), 51–54.
- 16) Londa, V. Y. 2018. Pengaruh Sistem Merit Terhadap Semangat Kerja Aparatur Sipil Negara Di Kantor Sekretariat Daerah Kota Manado. *Jurnal Administrasi Publik*, 4(53), 1–13.
- 17) Maharani et al. 2017. Pengaruh Suplementasi Seng Dan Zat Besi Terhadap Tingkat Kecukupan Energi Balita Usia 3–5 Tahun Di Kota Semarang. *Nature*, 6, 293–300.
- 18) Marahayu et.al. 2020. Hubungan Tingkat Kecukupan Zinc Dan Protein Dengan Kejadian Stunting Pada Anak Di Kabupaten Demak Mustika Marahayu Hubungan Tingkat Kecukupan Zinc Dan Protein Dengan Kejadian Stunting Pada Anak Di Kabupaten Demak. *Publikasi.Dinus.Ac.Id*, 548–555.
- 19) Ministerio Da Saude (MDS), *Peskiza Ai-Han NoNutrisaun Timor Leste (PANTL)*, 2020.
- 20) Muhammad, F., Nurhajjah, S., & Revilla, G. 2018. Pengaruh Pemberian Suplemen Zink Terhadap Status Gizi Anak Sekolah Dasar. *Jurnal Kesehatan Andalas*, 7(2), 285.
- 21) Nomura K, Bhandari AKC, Matsumoto-Takahashi ELA, Takahashi O. 2023. Risk Factors Associated with Stunting among Children Under Five in Timor-Leste. *Annals of Global Health*. 2023; 89(1): 63, 1–14. DOI:
- 22) Nugraheni, A. N. S., Nugraheni, S. A., & Lisnawati, N. 2020. Hubungan Asupan Zat Gizi Makro dan Mineral dengan Kejadian Balita Stunting di Indonesia: Kajian Pustaka. *Media Kesehatan Masyarakat Indonesia*, 19 (5), 322–330.
- 23) Nursalam. 2015. *Metodologi Penelitian Ilmu Keperawatan: Pendekatan Praktis*.
- 24) Putra, Y. D., Fahrurazi, H., & Mahmudah. 2020. Hubungan Pola Asuh Ibu Dengan Kejadian Stunting Pada Balita Usia 12-59 Bulan Di Desa Juking Pajang Wilayah Kerja Puskesmas Puruk Cahu Kabupaten Murung Raya Provinsi Kalimantan Tengah Tahun 2020. Hubungan Pola Asuh Ibu Dengan Kejadian Stunting Anak Usia 24-59 Bulan Di Posyandu Asoka II Wilayah Pesisir Kelurahan Barombang Kecamatan Tamalate Kota Makasar, 53.
- 25) Rahmadhita, K. 2020. Permasalahan Stunting dan Pencegahannya. *Jurnal Ilmiah Kesehatan Sandi Husada*, 11(1), 225–229.

The Influence of Diet and Intake of Macro and Micro Zinc Nutrients on the Incident of Stunting in Toddlers Ages 12-36 Months in Usitasae Village

- 26) Rahmandiani, R. D., Astuti, S., Susanti, A. I., Handayani, D. S., & Didah. 2019. Hubungan Pengetahuan Ibu Balita Tentang Stunting Dengan Karakteristik Ibu dan Sumber Informasi di Desa Hegarmanah Kecamatan Jatinangor Kabupaten Sumedang Rizkia. *Jsk*, 5(2), 74–80.
- 27) Rahmawati et.al. 2020. Faktor-Faktor yang Berhubungan dengan Stunting Sangat Pendek dan Pendek pada Anak Usia 24-59 Bulan di Kecamatan Sawah Besar Related Factors of Very Short and Short Stunting In Children Aged 24-59 Months in Kecamatan Sawah Besar. *Jurnal Ilmiah Kesehatan Masyarakat*, 12(2), 68–78.
- 28) Ramadhan et.al. 2020. Hubungan Tinggi Badan Ibu, Sosial, Ekonomi Dan Asupan Sumber Zinc Dengan Kejadian Stunting Pada Anak Usia 3-5 Tahun Di Puskesmas Kopelma. *Jurnal Averrous*, 6(1), 55–65.
- 29) Ririn, K., & Trias, M. 2020. Stunted Toddlers Had Lower Hair Zinc Level Compared to Their Normal Peers: Result from a Case Control Study in Nganjuk. *J NutrSci Vitaminol*, 9-12.
- 30) Sanitation, E., Sari, Y. W., Wirjatmadi, B., & Setyaningtyas, S. W. 2020. Hubungan Tingkat Kecukupan Zat Gizi Makro, Personal Hygiene Ibu, Sanitasi Lingkungan Dan Diare Dengan Kejadian Stunting Balita Usia 24- 59 Bulan. 11, 94–104.
- 31) Sari, H. P., Permatasari, L., Ayu, W., & Putri, K. 2021. Perbedaan Keragaman Pangan, Pola Asuh Makan , dan Asupan Zat Gizi Makro pada Balita dari Ibu Bekerja dan Ibu Tidak Bekerja Differences of Food Diversity , Child Feeding Patterns, and Macro Nutrition Intake in Children from Business Women and Housewife. 60,2–3.
- 32) Septiawahyuni, suminar. 2019. Kecukupan Asupan Zinc Berhubungan dengan Perkembangan Motorik pada Balita Stunting dan Non-Stunting Adequacy of Zinc Intake is Related to Motoric Development among Stunted and Non-Stunted Toddler. 1–6.
- 33) SSGI, 2021. Hasil Studi Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi, dan Kabupaten/Kota Tahun 2021. In Buku Saku (pp. 1–168).
- 34) Supariasa et.al. 2019. Faktor-Faktor Yang Mempengaruhi Kejadian Stunting pada Balita di Kabupaten Malang. *Karta Rahardja, Jurnal Pembangunan Dan Inovasi*, 1(2), 55–64. Tim Nasional Percepatan Penanggulangan Kemiskinan. (n.d.). 100 Kabupaten/Kota Prioritas untuk Intervensi Anak Kerdil (Stunting). 1.
- 35) Toliu et.al. 2018. Hubungan Antara Tinggi Badan Orang Tua Dengan Kejadian Stunting Pada Anak Usia 24-59 Bulan Di Kecamatan Pasan Kabupaten Minahasa Tenggara Stunting adalah kondisi bayi yang gagal tumbuh pada usia 0-11 bulan dan anak balita berusia 12-59 bulan . Terjadinya. *Jurnal KESMAS*, 7(5), 5–9.
- 36) UNICEF. 1998. the State of the World ' S the State of the World ' S Children. In Oxford University press.
- 37) UNICEF/WHO/ World Bank Grub. 2021. Title levels and trends in child malnutrition.
- 38) Wanimbo, E., & Wartiningih, M. 2020. Hubungan Karakteristik Ibu Dengan Kejadian Stunting Baduta (7-24 Bulan) Di Karubaga. *Jurnal Manajemen Kesehatan Yayasan RS.Dr. Soetomo*, 6(1), 83.
- 39) Wulandari, R. C., & Muniroh, L. 2020. Hubungan Tingkat Kecukupan Gizi, Tingkat Pengetahuan Ibu, dan Tinggi Badan Orang tua dengan Stunting di Wilayah Kerja Puskesmas Tambak Wedi Surabaya. *Amerta Nutrition*, 4(2), 95.
- 40) Yosephin, B. 2018. Tuntunan Praktis Menghitung Kebutuhan Gizi (K. Marcella (ed.)). Andi Offset.