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DIFFERENCE OF DIETARY PATTERNS IN STUNTING AND NON STUNTING CHILDREN 2-5 YEARS OLD IN THE LANGKAT DISTRICT

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ABSTRACT

Background: Stunting in children under five years of age is still less recognized because the difference between stunted children and normal children at that age is not really seen. Many factors influence the occurrence of stunting in children under five, one of which is the child's diet. This study aims to analyze the differences in diet among stunted and non-stunting children aged 2-5 years in Langkat district.

Materials and Methods: This research is a survey research using a cross-sectional design. The sample in this study amounted to 60 children, consisting of 30 stunted children and 30 non-stunting children. Dietary pattern data consisting of food intake was obtained using the 24-hour food recall Form. Data analysis used the Mann-Whitney test.

Result: The results showed that there were differences in dietary patterns in stunted and non-stunting children based on the amount of nutrient intake for energy (p = 0.000), carbohydrates (p = 0.000), protein (p = 0.000), vitamin A (p = 0.014), iron (p. = 0.001), zinc (p = 0.000), magnesium (p = 0.000) and calcium (p = 0.000), except for vitamin C (p = 0.092).

Conclusion: Officers are expected to further improve maternal knowledge through disseminating information about the importance of balanced nutrition for toddlers so that child feeding varies, and the socialization of exclusive breastfeeding and efforts to reduce stunting through village funds.

Keywords: Stunting, Not Stunting, Dietary Pattern, Toddler, 2-5 years old.

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1.0 Introduction

Indonesia now needs special attention to overcome the problem of stunting because of the large number of children who experience this incident. Stunting is the growth of a child's body that does not match height and age due to lack of nutrition for a long time. Stunting occurs starting from the womb until the first two years of age. Malnutrition continues until infancy can lead to growth and development disruption, resulting in the loss of a quality generation (Mita, 2019).

Children aged three years and over have a tendency to consume risky foods. Data from Riskesdas (2018) showed that the 3-4 year old group consumes more or the same as one time per day of sweet food at 59.6 percent, sweet drinks by 68.57 percent, salty foods by 31.1 percent, fatty / fried foods by 35 percent, consumption of seasonings is 76 percent, and the frequency of eating 1-6 times per week consuming grilled food is 33.5 percent, processed meat / chicken / fish foods with preservatives by 32.5 percent, instant noodles / food instant consumption of 58.7 percent and less or equal to three times per month consuming soft drinks by 92.7 percent and energy drinks by 97.3 percent. The data showed that children like food and drinks that are sweet, seasoned,

The low energy and protein consumption of children under five in Indonesia is evidenced by the 2014 Survei Diet Total (SDT) which shows that 55.7 percent of toddlers lack energy intake and below the Recommended Energy Allowences (REA) and 17.1 percent of children under five get energy intake that exceeds the Recommended Dietary Allowences (RDA), is more or equal to 130 percent of the REA. Research results by Hermina et al. (2011) stated that children under five (24-59 months) are more stunted with a lack of energy by 31.5 percent than normal children under five (24.9%). This condition illustrates that the energy intake of stunting children under five is significantly different from normal children under five ($p = 0.000$), and stunting children tend to have more energy deficits.

Meeting protein intake during toddlerhood can help the child's growth and development process because protein has a major function as a building substance. Hanum's research (2014) shows that 78.8 percent of stunting is found in toddlers who experience protein deficiency. Research by Solihin et al (2013) shows a close relationship between protein intake and stunting, seen from each addition of one percent of the protein adequacy level of children under five, will increase the Z-score height for age of toddler's by 0.024 units.

Micro nutrition is considered to be able to prevent stunting, especially vitamins A, Fe, Zn, and Iodine (Souganidis, 2012). Along with the development of the times, other nutrients were found that have an important role in the linear growth of children, namely Ca and P (Stuijvenberg, 2015). Sari's (2016) study showed that the risk of stunting was higher in the group with low calcium intake, namely 3.625 times than those whose intake was fulfilled, and low phosphorus 2.29 times greater in the stunting group. Dewi's research (2016) shows that zinc consumption is lower in the group of stunting toddlers aged 48-59 months, fulfilling around 93.64 percent of the RDA. Zinc deficient children have a 9.94 times higher risk of experiencing stunting. Research Damayanti (2017) states that iron deficiency has a 3.2 times risk of causing stunted children.

Based on the explanation from officers at the Langkat District Health Office, Langkat is one of the 100 districts / cities selected for stunting reduction. The villages that are the locus of the

stunting prevention program are Sematar, Coconut Plantation, Secanggang, Pematang Serai, Sei Meran, Perlis, Paluh Manis, Securai Selatan, Securai Utara, and Padang Tualang. The results of the EPPGBM data entry from the Langkat District Health Office showed that the number of stunting children in Langkat district in 2018 was 207 people. The majority of stunting children were in Sematar village at 32.7 percent. In addition, the results of a preliminary survey conducted on 10 children aged 2-5 years in Kebun Kelapa village showed that none of the children were exclusively breastfed and had been given food since they were less than 4 months old because the children cried a lot and would immediately be fed.

Measurement of food consumption was also carried out on children and the results showed 80.0 percent lacked calories, 50.0 percent had protein deficiency and 80.0 percent lacked calcium. Mothers who were asked about children's eating habits found that mothers rarely gave breakfast to children on the grounds that the children did not like breakfast, children usually ate breakfast after 9 am following their family meal hours, and liked to eat snacks. At this age mothers also do not give milk to children and all mothers agree that an obese child is a healthy child.

The explanation above makes the reason for the author to examine the comparison of diets in stunting and non-stunting children aged 2-5 years in Langkat District.

2.0 Materials and Methods

This study used a quantitative approach with a survey research type with a cross sectional study design that aims to explain the differences in dietary patterns in stunted and non-stunted children aged 2-5 years in Langkat District. This research was conducted in several districts in Langkat District. Langkat District consists of 23 sub-districts and the researchers focused their research in three sub-districts, namely Salapian, Stabat sub-district and Besitang sub-district.

The sampling technique used in this study was the Area Probability Sample with a total sample of 60 people, namely 30 stunting and 30 non-stunting. The dietary patterns of measuring the nutritional intake obtained using a 24-hour food recall form. The level of energy, carbohydrate and protein consumption was categorized as over intake (> 110% RDA), good intake (80-110% RDA), and less intake (<80% RDA). Vitamins and minerals were categorized as good (> 77% RDA) and less (≤ 77% RDA). Stunting was measured using microtoise to an accuracy of 0.1 cm. The stunting category was categorized into three, namely Very Short (H/A <-3 SD); Short (H/ A-3SD to <-2 SD) and Normal (H/A -2 SD to 2 SD).

The analysis carried out in this study was divided into 2 analyzes, namely univariate analysis to see the proportions of the research data variables and bivariate analysis using the Independent Sample T-Test.

3.0 Result

3.1 Univariate Analysis

Univariate analysis is used to see the distribution of each variable in the study. The distribution variables that will be seen are the characteristics of the child, dietary patterns, and the child's height.

3.1.1 Characteristics of Children

The distribution of child characteristics is presented in table 9, it is known that the majority of stunted children in this study were aged 24-47 months, namely 76.7 percent, male gender, namely 60.0 percent with birth order between 1-2, namely 70.0 percent and exclusive breastfeeding of 93.3 percent. Meanwhile, the majority of children who were not stunted were aged 48-60 months, namely 56.7 percent with a birth order between 1-2, namely 63.4 percent and 76.7 percent were not exclusively breastfed. The results can be seen in Table 1 as follows:

Table 1 Frequency Distribution of Child Characteristics

Characteristics of Children	Stunting		Not Stunting	
	n (30)	percent	n (30)	percent
Child's Age				
24-47 months	23	76.7	13	43.3
48-60 months	7	23.3	17	56.7
Gender				
Male	18	60.0	15	50.0
Women	12	40.0	15	50.0
Child Birth Order				
1-2	21	70.0	19	63.4
3-4	8	26.7	10	33.3
greater than or equal to 5	1	3,3	1	3,3
History of breast milk				
Exclusive	2	6,7	7	23.3
Not Exclusive	28	93.3	23	76.7

3.1.2 Child's height

The distribution of the child's height is presented in table 10, it is known that the average Z-Score of stunted children is -2.86 SD with a minimum height of 76 cm and a maximum of 99.7 cm, while non-stunting children have an average Z-Score of -0 , 52 SD with a minimum height of 81 cm and a maximum of 111 cm. The results can be seen in Table 2 as follows:

Table 2 The Comparison Distribution of Stunting and Non-Stunting Height of Children

Child's Height	*Stunting*	Not Stunting
Mean ± SD (cm)	85.33 ± 6.43	98.97 ± 8.10
Average Z-Score (SD)	-2.86	-0.52
Minimum (cm)	76	81
Maximum (cm)	99.7	111

3.1.3 Dietary habit

The results showed that stunted children had less energy sufficiency with a total of 100 percent, while 70.0 percent of children who were not stunted were in the good energy adequacy category. The results showed that in general, stunted children had insufficient carbohydrate adequacy, which was 86.7 percent, while 46.7 percent of non-stunting children were in the good carbohydrate adequacy category. The majority of stunted children had a good protein adequacy level, namely 43.3 percent, while 83.3 percent of children were not stunted with more protein adequacy.

The results showed that the consumption of vitamin A in stunted children had less vitamin intake, namely 83.3 percent, while for non-stunting children it was 50.0 percent. The majority of stunted children had less vitamin C intake, namely 90.0 percent, while non-stunting children were 86.7 percent. The majority of stunted children had a deficiency of iron intake of 100 percent, while in non-stunting children it was 83.3 percent. The zinc intake showed that most of them had a deficiency of 63.3 percent in stunted children, while 70.0 percent of non-stunting children were in the good category.

The results showed that stunted children had insufficient magnesium adequacy by the amount of 40.0 percent, while 90.0 percent of non-stunting children were in the good category. The results showed that the majority of children had insufficient calcium with the amount of 100 percent in stunting children and 6.7 percent having good calcium sufficiency in non-stunting children.

Table 3. Distribution of stunted and non-stunted children under five based on nutrient intake

Nutritional intake	Stunting		Not Stunting	
	n (30)	Percent	n (30)	percent
Energy				
Less (<80% RDA)	30	100.0	6	20.0
Good (80-110% RDA)	0	0.0	21	70.0
More (> 110% RDA)	0	0.0	3	10.0
Carbohydrate				
Less (<80% RDA)	26	86.7	16	53.3
Good (80-110% RDA)	4	13.3	14	46.7
Protein				
Less (<80% RDA)	5	16.7	3	10.0
Good (80-110% RDA)	13	43.3	2	6,7
More (> 110% RDA)	12	40.0	25	83.3
Vitamin A				

Less (≤ 77% RDA)	25	83.3	15	50.0
Good (> 77% RDA)	5	16.7	15	50.0
Vitamin C				
Less (≤ 77% RDA)	27	90.0	26	86.7
Good (> 77% RDA)	3	10.0	4	13.3
Iron				
Less (≤ 77% RDA)	30	100.0	25	83.3
Good (> 77% RDA)	0	0.0	5	16.7
Zinc				
Less (≤ 77% RDA)	19	63.3	9	30.0
Good (> 77% RDA)	11	36.7	21	70.0
Magnesium				
Less (≤ 77% RDA)	12	40.0	3	10.0
Good (> 77% RDA)	18	60.0	27	90.0
Calcium				
Less (≤ 77% RDA)	30	100.0	28	93.3
Good (> 77% RDA)	0	0.0	2	6,7

3.2 Bivariate Analysis

The results of statistical tests using the Mann Whitney test showed that there were significant differences between the intake of energy, protein, carbohydrates, vitamin A, calcium, magnesium, iron and zinc with the incidence of stunting. The nutritional substance that was not different between stunting and non-stunting children was vitamin C with a p value = 0.092.

Table 4. Results of Comparative Analysis of Nutritional Intake of Stunting and Non-Stunting Children

Variable	Stunting	Not Stunting	*p*
	Mean ± SD	Mean ± SD	
Energy intake (kcal)	826.28 ± 102.70	1194.20 ± 183.06	0,000
RDA Percentage (%)	60.69 ± 7.56	86.69 ± 13.54	
Carbohydrate intake (grams)	126.73 ± 36.63	166.09 ± 16.17	0,000
RDA Percentage (%)	58.66 ± 17.03	76.22 ± 7,11	
Protein Intake (gram)	23.00 ± 7.18	40.04 ± 15.74	0,000
RDA Percentage (%)	109.44 ± 36.22	179.88 ± 79.58	
Vitamin A intake (mcg)	213.02 ± 105.37	350.18 ± 299.95	0.014
RDA Percentage (%)	51.79 ± 25.63	81, 30 ± 66.37	
Vitamin C intake (mg)	13.88 ± 25.05	16.18 ± 14.28	0.092
RDA Percentage (%)	33.99 ± 62.51	37.85 ± 33.52	
Iron intake (mg)	2.63 ± 0.98	4.06 ± 2.36	0.001
RDA Percentage (%)	34.35 ± 12.42	48.35 ± 29.32	
Zinc intake (mg)	2.60 ± 0.87	3.89 ± 1.42	0,000
RDA Percentage (%)	77.79 ± 29.88	101.57 ± 48.07	

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Magnesium Intake (mg)	63.15 ± 22.00	114.61 ± 35.26	0,000
RDA Percentage (%)	88.64 ± 26.85	145.94 ± 57.11	
Calcium intake (mg)	127.68 ± 53.80	233.52 ± 162.68	0,000
RDA Percentage (%)	17.92 ± 8.18	28.16 ± 18.99	

4.0 Comparison of Diet in Stunting and Non-Stunting Children

The results of statistical tests with the Mann Whitney test obtained p = 0.000 or p <α (0.05), meaning that there is a difference in energy consumption in stunted and non-stunting children aged 2-5 years. The results of research conducted by Setiawan (2018), showed that there was a relationship between the level of energy intake and the incidence of stunting and the less energy consumption, the 7.5 times greater risk of experiencing stunting (OR = 7.5; 95% CI 2.2 - 25.6). The results of this study are also in line with Daud (2018), that there is a relationship between energy intake and stunting with a value of p = 0.022 in the working area of the Teladan Health Center Medan City.

The results of statistical tests show that there are differences in carbohydrate consumption in stunting and non-stunting children aged 2-5 years. Based on these results, it can be seen that the average total carbohydrate intake collected through the food recall method is significantly lower in stunting children than non-stunting children, even though these two groups have a low RDA percentage. The results of Bahar and Dachlan's (2019) study showed that there was a relationship between carbohydrate intake and stunting with p = 0.005 and there was a difference in carbohydrate consumption in stunting and non-stunting children, where stunted children were generally in the low category as much as 60.8 percent and non-stunting was generally in the category sufficient, namely 66.7 percent. This research is also in line with Ayuningtyas' research (2018), which shows that 54.4 percent of toddlers stunting carbohydrate intake in the low category and there is a significant relationship between carbohydrate intake and stunting for children aged 24-59 month in the working are Sumber Urip Health Center, Rejang District with p value 0.003.

The bivariate test results also showed that there was a significant difference between protein intake in stunting and non-stunting children with a value of p = 0.000. Based on the habit of consuming protein, it is known that the food sources of animal protein that are most often consumed by children are eggs, fish and anchovies. Research by Nachvak (2020), found that egg intake is inversely related to the incidence of stunting in children. The results of a clinical trial conducted by Baum (2017), showed that children who consumed 10 eggs per week for 6 months had more linear growth compared to children who ate less than 1 egg per week.

The results of this study indicate that there are differences in the consumption of vitamin A in stunting and non-stunting children aged 2-5 years. This study is in line with Fatimah (2018), which shows that 88.9 percent of stunted children have a deficit in vitamin A adequacy levels and there is a significant difference in the level of vitamin A adequacy between stunting and non-stunting children. The results of Laraeni's (2018) study also showed that inadequate vitamin A consumption was found in more stunted children, namely 54.8 percent, while non-stunted children consumed adequate vitamin A, namely 61.3 percent.

The statistical test results obtained p = 0.092 or p> α (0.05), meaning that there is no difference in the consumption of vitamin C in stunting and non-stunting children. Lack of adequate consumption of vitamin C is caused by stunted and non-stunting children who rarely eat fruit. The results of Hapzah's research (2018), in Kalukku District, Mamuju Regency, show that stunting and non-stunting children consume vitamin C in the low category, namely 96.9 percent. The results of another study by Histiana (2018) showed that there was no relationship between vitamin C adequacy on nutritional status (height / age) with a p value = 0.592.

There is a difference in iron consumption in stunting and non-stunting children. This research is supported by Fatimah and Wirjatmadi (2018), showing that 68.2 percent of children under five with stunting have a deficit (≤ 70% RDA) and there is a significant difference in the level of iron adequacy between stunting and non-stunting children. The results of this study are also in line with Yuniarti (2019), that iron intake is a risk factor for stunting. Children in the stunting group had less iron intake than the non-stunting group. Children with less iron intake were 3.08 times more likely to become stunted.

The statistical test results obtained p = 0.001 or p <α (0.05), meaning that there is a difference in zinc consumption in stunted and non-stunting children. The results of Ayuningtyas' research (2018) show that there is a significant relationship between zinc intake and the incidence of stunting indicated by a p value = 0.011. The results of the research by Fatimah and Wirjatmadi (2018), show that 91.7 percent of children under five with zinc sufficiency level are a deficit (≤ 70% RDA).

Based on the statistical test using the Mann Whitney test, it was found that the value of p = 0.000 or p <α (0.05), which means that there is a difference in magnesium consumption in stunting and non-stunting children. The results of Masrul's (2019) study showed that the difference in children's magnesium intake was clearly visible where the average stunted child consumed magnesium intake of 138.03 ± 82.06 while the non-stunting child was 147.45 ± 95.31. The results of another study by Chairunnisa (2018) showed that the average intake of magnesium in stunted children was lower than in non-stunting children, but the results of the T Independent test showed that there was no difference in intake between stunted and non-stunting children with a value of p = 0.36.

The results of statistical tests show that there are differences in calcium consumption in stunting and non-stunting children. Research by Nachvak (2020) states that there is a significant relationship between milk consumption and stunting. In line with these findings in a prospective cohort study, Bao et al (2018), reported that consumption of dairy products is inversely associated with stunting. Children who consume milk in higher amounts have better height growth (Wiley, 2009).

5.0 Conclusion and recommendation

The results of the study regarding the comparison of dietary patterns in stunting and non-stunting children in Langkat District can be concluded that there are differences in diet based on the amount of macro (energy, carbohydrate and protein) and micro (vitamin A, iron, zinc, magnesium and calcium intake) but there is no difference in the intake of vitamin C. When

compared with the recommended nutritional adequacy rate, the macro nutritional adequacy of non-stunting children is generally in the good category (80-110% RDA) and protein is in the higher category while stunted children are generally in the less category (<80% RDA) except for protein which is in good category, but the micronutrient adequacy of stunting and non-stunting children is generally still low (≤ 77% RDA), especially in the nutritional intake of vitamin A, vitamin C, iron, and calcium.

To health center officers to provide education about nutritious and balanced food in the hope that mothers will pay attention to and get children to eat various types of food. It is recommended that the village head collaborates with puskesmas officers to strengthen posyandu activities and use village funds to reduce stunting rates such as strengthening food availability and community independence programs.

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Declaration

The authors declare that no conflicts of interest exist.

References

Ayuningtyas, Demsa Simbolon, Ahmad Rizal. (2018). Macro and micro nutrient intake on the incidence of stunting in children under five. Journal of Health, 9 (3), 444-447. Accessed fromhttps://ejurnal.poltekkes-tjk.ac.id/index.php/JK/article/view/960

Bahar, B., & Dachlan, DM (2019). The relationship between macro nutrient intake and micronutrients with stunting in children aged 24-59 months in the Work Area 1 Puskesmas Kabere, Cendana District, Enrekang Regency. Journal of Indonesian Community Nutrition: The Journal Of Indonesian Community Nutrition, 8 (2), 90-97. Accessed from http://journal.unhas.ac.id/index.php/mgmi/article/view/90-97

Bao, N., Le, K., Sandjaja, S., Poh, BK, Rojroongwasinkul, N., Huu, CN, ... & Bragt, M. (2018). The consumption of dairy and its association with nutritional status in the South East Asian Nutrition Surveys (SEANUTS). Nutrients, 10 (6), 759.doi: 10.3390 / nu10060759

Baum, JI, Miller, JD, & Gaines, BL (2017). The effect of egg supplementation on growth parameters in children participating in a school feeding program in rural Uganda: a pilot study. Food & nutrition research, 61 (1), 1330097.doi: 10.1080 / 16546628.2017.1330097

Chairunnisa, E., Kusumastuti, AC, & Panunggal, B. (2018). Intake of vitamin d, calcium and phosphorus in stunting and non-stunting children aged 12-24 months in Semarang City. Journal of Nutrition College, 7 (1), 39-44. Accessed fromhttps://ejournal3.undip.ac.id/index.php/jnc/article/view/20780

Daud, NF, & Sinarsih, S. (2018). Stunting prevalence of children under five in Medan-Indonesia due to deficiency of energy intake: analysis of influencing factors. Journal of Kesmas (Public Health) Khatulistiwa, 5 (1), 8-13.

Damayanti, RA, Muniroh, L., & Farapti, F. (2017). Differences in nutritional adequacy levels and history of exclusive breastfeeding for stunting and non-stunting toddlers. Media Nutrition Indonesia, 11 (1), 61-69. Accessed from https://e-journal.unair.ac.id/MGI/article/view/4393

Fatimah, NSH, & Wirjatmadi, B. (2018). Adequacy levels of vitamin a, zinc and iron and frequency of infections among stunting and non-stunting children under five]. Media Nutrition Indonesia, 13 (2), 168-175. Accessed from https://e-journal.unair.ac.id/MGI/article/view/7062

Hanum, F., Khomsan, A., & Heryatno Y. (2014). Relationship between nutritional intake and height of mothers with nutritional status of children under five. Journal of Nutrition and Food, 9 (1), 1-6. Accessed fromhttp://journal.ipb.ac.id/index.php/jgizipangan/article/view/8256/6458

Hanum, NH (2019). The relationship between maternal height and history of breastfeeding with the incidence of stunting in toddlers aged 24-59 months. Amerta Nutrition, 3 (2), 78-84. Accessed fromhttps://e-journal.unair.ac.id/AMNT/article/view/11453

Hapzah, H., & Supriandi, S. (2018). Calcium and vitamin C intake with the height of the students of SD Negeri Inpres Beru-Beru, Kalukku District, Mamuju Regency. Manarang Health Journal, 2 (2), 95-98. Accessed fromhttp://jurnal.poltekkesmamuju.ac.id/index.php/m/article/view/22

Laraeni, Y., Suhaema, S., Irianto, I., & Faridha, SNA (2018). The consumption pattern of stunting and non-stunting children aged 12-23 months in Bintaro Village, Ampenan District, Mataram City. Scientific Development Media. 12 (10), 475-488. Accessed fromhttp://ejurnal.binawakya.or.id/index.php/MBI/article/view/81

Masrul, M. (2019). Study of stunting and normal children based on dietary care and nutritional intake in the Stunting Management Program, Pasaman Regency, West Pasaman. Andalas Health Journal, 8 (2S), 74-81. Accessed from http://jurnal.fk.unand.ac.id/index.php/jka/article/view/991

Mita, AA, & Rina, O. (2019). Parental education, maternal nutritional knowledge regarding child development and gakin status with the incidence of stunting in toddlers aged 24-59 months in the Work Area of Puskesmas Karangmojo II Gunungkidul (Doctoral Dissertation, Poltekkes Kemenkes Yogyakarta). Accessed fromhttp://eprints.poltekkesjogja.ac.id/1134/

Nachvak, SM, Moradi, S., Sadeghi, O., Esmailzadeh, A., & Mostafai, R. (2020). Food Groups Intake in Relation to Stunting Among Exceptional Children.

Research Square. doi: 10.21203 / rs.3.rs-29797 / v1

Sari, EM, Mohammad, J., Neti, N., & May, NS (2016). Protein, calcium and phosphorus intake in stunted and non-stunting children aged 24-59 months. Indonesian Journal of Clinical Nutrition, 12 (4), 152-159. Accessed from https://jurnal.ugm.ac.id/jgki/article/view/23111

Setiawan, E., Machmud, R., & Masrul, M. (2018). Factors related to the incidence of stunting in children aged 24-59 months in the Work Area of Andalas Public Health Center, Padang Timur District, Padang City Years. Andalas Health Journal, 7 (2), 275-284. Accessed fromhttp://jurnal.fk.unand.ac.id/index.php/jka/article/view/813

Solihin, RDM, Anwar, F., & Sukandar, D. (2013). The relationship between nutritional status, cognitive development, and motor development in preschool children. Nutrition and Food Research, 36 (1), 62-72. Accessed fromhttp://ejournal.litbang.kemkes.go.id/index.php/pgm/article/view/3396

Souganidis, E. (2012). The relevance of micronutrients to the prevention of stunting. Sight and life, 26 (2), 10-18. Accessed fromhttps://nutritionandfoodfacts.com/2013/04/16/the-relevance-of-micronutri-ents-to-the-prevention-of-stunting/

Stuijvenberg, ME, Nel, J., Schoeman, SE, Lombard, CJ, du Plessis, LM, & Dhansay, MA (2015). Low intake of calcium and vitamin D, but not zinc, iron or vitamin A, is associated with stunting in 2-5 year old children. Pubmed Nutrition, 31 (6), 841-846. Accessed from https://pubmed.ncbi.nlm.nih.gov/25933491/

Wiley, USA (2009). Consumption of milk, but not other dairy products, is associated with height among US preschool children in NHANES 1999–2002. Annals of Human Biology, 36 (2), 125-138. Accessed fromhttps://pubmed.ncbi.nlm.nih.gov/19241191/

Yuniarti, TS, Margawati, A., & Nuryanto, N. (2019). Risk factors for stunting of children aged 1-2 years in the Rob area, Pekalongan City. Journal of Nutrition Research, 7 (2), 83-90. Accessed from http://ejournal.poltekkes-smg.ac.id/ojs/index.php/jrg/article/view/5179