



## The Relationship Between Nutrient Intake (Protein, Zinc, Iron), Parenting, and Sanitary Hygiene on The Incidence of Stunting

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### ABSTRACT

**Introduction:** Stunting is a condition where the length or height of a toddler is below his age group. This condition is measured by length or height according to age  $< -2$  SD, which WHO has determined. This study aimed to determine the relationship between intake of nutrients (protein, zinc, and iron), parenting styles, and sanitation hygiene on the incidence of stunting. The method used is a cross-sectional study design. **Methods:** The research sample was 73 mothers under five. The sampling technique used is simple random sampling. The analysis used is the Pearson correlation test and multiple linear regression analysis. **Results:** The results of this study indicate that there is a relationship between protein intake and stunting ( $p$ -value = 0.159), zinc intake and stunting ( $p$ -value = 0.192), and iron intake and stunting ( $p$ -value = 0.365). Parenting style with stunting ( $p$ -value = 0.025) and the relationship between sanitation hygiene and stunting ( $p$ -value = 0.022). **Conclusion:** The most dominant variable in the incidence of stunting is sanitary hygiene (coefficient  $\beta$  = 0.218,  $p$ -value = 0.002).

**Keywords:** Protein intake, zinc, iron, parenting style, sanitation hygiene, stunting

### INTRODUCTION

Indonesia faces nutritional problems that severely impact the quality of Human Resources (HR). One of these dietary problems is the high incidence of stunting (short stature). Stunting is a condition where the length or height of a toddler is below his age group. This condition is measured by length or height according to the age of  $< -2$  SD that WHO has determined (Health Ministry of Indonesia, 2018b).

Based on Basic Health Research data (2018) from 2007 to 2018, the prevalence of stunting experienced significant fluctuations. In 2007-2013, prevalence rates of stunting increased by 0.4% from 36.8% to 37.2%. From 2013 to 2018, the numbers stunting decreased by 6.4% from 37.2% to 30.8% (Health Ministry of Indonesia, 2018a). Based on Indonesian Nutritional Status Study (SSGI, 2021b), Stunting Prevalence in Indonesia in 2021 has decreased by 24.4%. Despite the decline, the prevalence rate still exceeds the WHO achievement target, with a limit of 20%, so stunting is still said to be a public health problem that urgently needs special treatment.

According to Sari *et al.* (2021) Stunted toddlers will experience growth and development failure conditions in the short and long term. Short-term impact stunting can cause non-optimal growth and development that hinders cognitive and motor development and metabolic disorders. In

contrast, the long-term impact of stunting can cause a permanent decline in intellectual capacity and neurological dysfunction in children that will affect productivity in adulthood.

There are two causes of stunting: direct and indirect. According to the Indonesian Ministry of Health (2018b) Direct influences cause stunting, namely insufficient food intake and infectious diseases in toddlers. Inadequate food intake causes inadequate nutrition in infants and toddlers. The baby can cause this by not getting Early Initiation of Breastfeeding at birth, is not given exclusive breastfeeding until the age of 6 months, and the presence infectious diseases of the baby that can cause stunting (diarrhea, asthma, acute respiratory infections (ARI), and congenital abnormalities). Based on Kusumawati's research, *et.al* (2015) Mentioned that a relationship between food intake and the level of nutritional adequacy of toddlers affects the incidence of stunting. Toddlers with insufficient macronutrients and micronutrients, namely protein, Fe, Zn, Ca, Vitamin D, A, and C, can cause stunting.

Indirect causes of stunting in toddlers, among others, are related to parenting, food security, health services, and inadequate environmental health, including water and sanitation (Health Ministry of Indonesia, 2018). Parenting type is divided into parenting, feeding, and primary health care parenting. Feeding parenting is closely related to the chosen feeding method, while essential health care parenting is closely related to the mother's interest in the child's health. (Permata Sari *et al.*, 2022). Based on research Aramico, *et.al.*, (2016), mentioning a correlation between parenting and the incidence of stunting. Poor feeding parenting has a three times higher risk of becoming stunted.

In addition to parenting factors, according to Kullu *Et. Al.* (2018), saying that factor hygiene and Inadequate sanitation can indirectly impact the incidence of stunting in toddlers. Personal and environmental hygiene affects the risk of infectious diseases, which decreases toddlers' nutritional status. Factor hygiene, such as the lack of sanitation, includes inadequate access to clean water, unhealthy latrine facilities, and behavioral hygiene. The onset of infectious diseases such as diarrhea worms will affect the linear growth of children and can increase mortality (Kwami *et al.*, 2019). Based on Dwi Bella's research (2019), it is stated that there was a significant relationship between practices of hygiene and the occurrence of stunting. Children with hygiene and Inadequate self-sanitation had a 3.42 times higher risk of stunting compared to children with practiced hygiene and good sanitation. Stunting can continue to increase when the abovementioned risk factors are ignored. The need for innovation accelerates decline stunting by paying attention to the causative factors present at each locus of stunting in Indonesia. Accelerated innovation stunting is being promoted in various districts in Indonesia, including Kendal Regency. Based on Kendal Regent Regulation Number 42 of 2021 concerning the acceleration of decline stunting integrated, Kendal Regency has 60 Priority Villages for Accelerating Decline stunting integrity, one of which is Getas Village. One of the villages with a rank of 1 point *stunting* in Singorojo sub-district and 11<sup>th</sup> in Kendal district. (Kendal Regency Government, 2021). Based on preliminary survey observations, it was found that the parenting, diet, and sanitation in the village still needed improvement (only about 75% of residents had healthy

latrines). The background review became the basis for researchers to examine the relationship between Intake of nutrients (protein, zinc & iron), parenting, and hygiene sanitation of events stunting in Getas Village, Singorojo District, Kendal Regency.

## **METHOD**

This research was conducted in Getas Village, Singorojo District, Kendal Regency. The population in this study amounted to 423 mothers who had toddlers. This study was a research study with a cross-sectional design. The sampling technique used was *simple random sampling* with inclusion criteria: (1) willing to participate in research by filling in informed consent, (2) mothers of toddlers who have toddlers aged 24-59 months. Exclusion criteria: The toddler's mother withdrew during the study. The calculation in determining the number of samples uses the Lameshow formula. The results of the sample calculation taken were 73 maternal respondents who had toddlers aged 24-59 months in Getas Village, Singorojo District, Kendal Regency.

The research instruments used in this study were semi-quantitative FFQ, parenting, and healthy home observation questionnaires of the director general of disease and environmental control. Data analysis techniques are processed using the SPSS Program for Windows 16.0. Bivariate analysis in knowing the relationship between variables in this study used the Pearson Correlation Test, and multivariate analysis in understanding the most influential variables in this study used multiple linear regression tests.

## **RESULTS AND DISCUSSION**

### **1. Characteristics of Mothers and Toddlers**

The characteristics of respondents consisted of maternal age, mother's last education, mother's occupation, toddler age, toddler gender, and toddler Height-for-Age nutritional status. Data on the distribution of respondent characteristics can be seen in Table 1.

Most maternal age is in the early adult category (26-35 years), amounting to 42 people with a percentage of 58%. Most maternal education has the last education at the junior high school level of 26, with a percentage of 36%. In Mother's occupation, most people work as housewives, totaling 44 people, with a percentage of 60%. In family income, the majority earn < regional minimum wages (< IDR 2,340,000), totaling 39 people with a percentage of 53%. In the toddler gender, most men amounted to 46 people, with a percentage of 63%. At the age of toddlers, the majority in this study were between 37 and 59 months old, averaging 55 people, with a 75% percentage. In the number of family members, the majority in one family consists of  $\leq 4$  people, totaling 46 people with a percentage of 63%. In the number of children, the majority in this study had children  $\leq 2$  people, totaling 61 people with a percentage of 84%.

**Table 1. Characteristics of Research Subject**

	<b>Freq (n)</b>	<b>Percent (%)</b>
<b>Mother's Age</b>		
Late Adolescents (17-25 years)	11	15
Early Adults (26-35 years)	42	58
Late Adults (36-45 years)	18	25
Early Elderly (46-55 years)	2	3
Total	73	100
<b>Mother's Education Level</b>		
Elementary	20	27
Junior High	26	36
Senior High	22	30
Diploma/Bachelor	5	7
Total	73	100
<b>Mother's Occupation</b>		
Housewives	44	60
Farmers	3	4
Laborers	18	25
Civil Servant	2	3
Traders	6	8
Total	73	100
<b>Family's Income</b>		
< regional min wages (< Rp 2.340.000)	39	53
> regional min wages (> Rp 2.340.000)	34	47
Total	73	100
<b>Toddler's Gender</b>		
Male	46	63
Female	27	37
Total	73	100
<b>Toddler's Age</b>		
(24-36 months)	18	25
(37 -59 months)	55	75
Total	73	100
<b>Total Family</b>		
≤ 4 people	46	63
> 4 people	27	37%
Total	73	100

<b>Total Kids</b>		
≤ 2 kids	61	84
> 2 kids	12	16
Total	73	100

## 2. Characteristics of Respondents based on Research Variables

**Table 2. Respondent Characteristics**

<b>Age of Toddler</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>	<b>Mean</b>	<b>Min.</b>	<b>Maks.</b>
<b>Nutritional status Height-for-age (z-score)</b>					
Normal (>-2 SD)	48	66			
Stunted (< -2 SD)	25	34	-1,4	4,15	2,5
Total	73	100			
<b>Protein Intake (AKG (1-3 years): 20 gr, AKG (4-6 years): 25 gr)</b>					
Normal (≥77% AKG)	64	88			
Deficiency (<77% AKG)	9	12	32,5	3,6	57,7
Total	73	100			
<b>Zinc Intake (AKG (1-3 years): 3 mg, AKG (4-6 years): 5 mg)</b>					
Normal (≥77% AKG)	47	64			
Deficiency (<77% AKG)	26	36	3,7	1,3	6,7
Total	73	100			
<b>Iron Intake (AKG (1-3 years): 7 mg, AKG (4-6 years) : 10 mg)</b>					
Normal (≥77% AKG)	54	74			
Deficiency (<77% AKG)	19	26	7,6	1,2	11,9
Total	73	100			
<b>Parenting</b>					
Good (> 80 %)	59	81			
Average (60-80%)	0	0	85,6	62	98
Bad (<60%)	14	19			
Total	73	100			
<b>Hygiene Sanitasi</b>					
Qualified (score 1068-1269)	22	30			
Unqualified (score <1068)	51	70	961,6	493	1230
Total	73	100			

Toddler (66%) with a mean z-score of -1.4 SD. The majority of protein intake ≥ 77% RDA (adequate) of 64 toddlers (88%) with a mean value (average) of protein intake of 32.5 g. In zinc intake, the majority of ≥ 77% RDA (adequate) amounted to 47 toddlers (64%) with a mean value (average) of 3.7 mg. In iron intake, the majority of ≥ 77% RDA (adequate) amounted to 54 toddlers (74%) with a mean value (average) of 5.6 mg.

In parenting, the majority of suitable parenting styles (score >80%) amounted to 59 people (81%) with a mean score (average) of 85.6. In sanitary hygiene, most respondents had unqualified sanitary hygiene (score <1068), and 48 people (66%) had a mean score (average) score of 961.6.

**3. The relationship of intake (protein, zinc & iron) to the incidence of *stunting***

Based on a statistical analysis of *Pearson correlation at the 5% significance level in Table 3*, it was found that protein intake had a *p-value* of 0.152 (*p-value* > 0.05) with *r* = -1.52, indicating that there was no significant relationship between protein intake and the incidence of *stunting*. Thus, zinc intake has a *p-value* of 0.192 (*p-value* > 0.05) with *r* = -0.154, which shows no significant relationship between zinc intake and the incidence of *stunting*. In addition, iron intake has a *p-value* of 0.365 (*p-value* > 0.05) with *r* = -0.108, indicating no significant relationship between iron intake and the incidence of *stunting*.

**Table 3. Analisis Bivariat hubungan asupan zat gizi (protein, seng dan besi) terhadap kejadian *stunting***

<b>Nutrient</b>	<b><i>p-value</i></b>	<b><i>r</i></b>	<b><i>n</i></b>
Protein Intake	0,152	-1,52	
Zinc Intake	0,192	-0,192	73
Iron Intake	0,365	-0,108	

*\*Pearson correlation test*

The results of this study are in line with research conducted by Novia (2015) entitled "The Relationship Between Protein and Zinc Intake with Incidence *Stunting* in Toddlers Aged 2-5 years in the working area of the South Cimahi Health Center in Cimahi City in 2015", it was found that there was no relationship between intake protein with nutritional status height-for-age with value *p-value* = 0.660. This research is also in line with Sundari E's research (2016) Entitled "The Relationship of Protein, Zinc, Iron, and History of Infectious Disease Intake with *Z-score* height-for-age in Toddlers." The study stated no significant relationship between zinc intake (*p-value* = 0.2, *r* = 0.01) and iron (*p-value* iron = 0.198, *r* = 0.214) with index *z-score* height-for-age.

Based on the interview results, the average intake of adequate protein nutrition partly comes from consuming formula milk with a frequency of 8-12 x / day. However, the frequency of consumption of foods containing animal and other vegetable proteins still needs to be improved. The average toddler with less protein intake is caused by rarely consuming animal and vegetable side dishes; toddlers only consume eggs, tofu, and tempeh 3x a week and consume protein sources from fresh meat and fish only 2-3x a month (rarely).

In this case, protein consumption is mainly focused on formula milk, which is considered reasonably practical given the frequent frequency and makes children complete and not fussy if left at work. Formula milk for toddlers is not enough to meet their needs, even though it is given in large amounts, because the best source of nutrients is the primary food source. In addition, the dose of formula milk for toddlers must be considered because, at that age, formula milk is no longer the primary food source; it should be the percentage of family food consumption that is the primary

source. According to Lestari Puji *et al.* (2014), in research, it was said that giving formula milk to children without paying attention to the dose, even though it is felt that the frequency is frequent, will affect the level of nutritional adequacy of children mothers only guess. If the dose given to children exceeds the recommendations, it will cause children to experience excess nutrition, and vice versa.

In addition, in this study, there were toddlers with sufficient zinc intake but *stunting*; this may be due to some respondents tending to have the habit of consuming carbohydrate food sources derived from cereals (rice, wheat bread, corn) and beans (soy milk, tofu, tempeh) consumed can be more than 4-5x / day, where the food sources mentioned have antinutrient compounds, namely acids phytate which has a role affects the absorption of zinc if consumed in excess. Therefore, even though there has been a lot of zinc intake from other foodstuffs, if phytic acid in the body is high due to excessive consumption not according to the portion it should be, then it becomes one of the inhibiting factors of zinc absorption in the body.

Based on the results of iron intake interviews, some children have adequate iron intake, but some children's height-for-age index is stunted. This may be caused by consuming high doses of calcium in milk. Namely, the average daily milk consumption can be more than 8-12x / @ three measuring spoons (30 gr). High calcium milk in formula milk consumed has the property of inhibiting iron absorption in the body.

Based on existing theories, according to Ayumi (2014), the best source of zinc comes from animal protein, namely liver, meat, shellfish, and eggs. Vegetable protein sources also contain Zn, such as cereals, tubers, and legumes, but in this case, the availability of biologics is low. If consumption is too excessive, high phytate derived from high-fiber foods (wheat, whole grains, nuts) can inhibit zinc absorption. According to Adriani (2014), factors inhibiting zinc absorption include fiber and phytate in the body. In addition, albumin levels in plasma are a significant determinant of zinc absorption. When blood albumin decreases, zinc absorption decreases. Zinc deficiency can inhibit the metabolism of thyroid hormones, androgens, and growth hormone (GH). Zinc is vital in protein synthesis and IGF-I, which can be inhibited by zinc deficiency. A decrease in IGF-I concentration will affect the potential mechanism for growth retardation and, if prolonged, can lead to stunting children (Dinaresti A, 2020).

The limitation of this study is that it did not analyze the factors inhibiting the absorption of protein, zinc, and other iron that indirectly affect the quality of nutritional intake. The inhibitory factors analyzed are known only from high doses of calcium and phytic acid in food. However, infectious diseases, alkaline medicines, and food security have yet to be discovered whether they also contribute to the absorption of toddler nutrients in Getas Village.

#### **4. The Relationship of Parenting to the Incidence of *Stunting***

Based on a statistical analysis of Pearson correlation with a significance level of 5% in Table 4, it was obtained that p-value = 0.025 and r = 0.263. This shows that the p-value < 0.05 indicates a significant (meaningful) relationship between parenting and *stunting* and has a strong relationship of

26.3% or a weak correlation. This means that only 26.3% of parenting factors affect the incidence of *stunting*. In addition, a positive value on the *r* value means that the two variables are positively correlated. If the mother's parenting score is higher (good parenting), the *z-score* height-for-age will increase (normal nutritional status/not *stunting*) and vice versa.

**Table 4. Analisis bivariat hubungan pola asuh terhadap kejadian *stunting***

	<i>Stunting</i>
<b>Parenting</b>	<i>p-value</i> = 0,025
	<i>r</i> = 0,263
	<i>n</i> = 73

\*Pearson Correlation test

This is in line with research. Putri (2020), in his study entitled "Aspects of Parenting, Diet, and Family Income on Genesis Stunting, "It was found that there was a significant relationship between parenting style and incidence of stunting with a *p-value* < 0.001. In addition, research by Dwi Bella et al. It was also found that there was a significant relationship between parenting styles (parenting habits *p-value* 0,001; feeding habits *p-value* 0,000; hygiene habits *p-value* 0.021 and the habit of getting health services *p-value* 0.000) to events stunting.

Based on the results of interviews in the realm of toddler parenting in Getas Village, toddlers with good parenting tend to be supported by the first aspect, namely the treatment of mothers in meeting physical needs, including nutritional intake, proper place, and clothing as well as early health care with complete primary immunization. 55% of mothers under five always try to eat their children 3x a day according to balanced nutrition. In addition, they provide proper clothing for children when playing outside by considering personal hygiene and monitoring children's development by bringing them to the healthcare community every month.

The second aspect concerns ASIH (affection), the provision of affection in the sense of sufficient attention through physical and psychological contact since childhood. This is related to most respondents being mothers of toddlers who do not work, namely as Housewives (60%) who live daily at home so that children are under supervision. Mothers of toddlers tend to supervise children when they eat, play, and do daily activities. Similarly, 25% of mothers with jobs as factory workers, even though busy, still pay attention to their children by preparing breakfast before going to work. However, supervision cannot be as maximum in daily life as housewives.

The third aspect regarding ASAH (mental stimulation needs), in this case, mothers tend to train their children's independent behavior from an early age so that a smart, independent, and quality productive personality will be formed, including 80% of mothers accustomed children to brush their teeth every day, train children to eat alone without being fed, teach children to be good with their friends and limit the use of gadgets, and give praise to children when children finish their food.



Several parenting treatments in this study, in terms of parenting styles, are categorized as good, namely, parenting styles characterized by parents who always provide support and control every child's development without being too restrictive (Santrock, 2011). The provision of support and supervision for children in the process of growth and development can be viewed from 3 aspects, namely aspects of ASUH (Physical Needs of intake), ASIH (Needs of Affection), ASAH (Needs of Mental Stimulation) (Soetjningsih, 2012).

According to Noorhasanah and Tauhidah (2021), Parenting behavior in good feeding is, in this case, teaching the right way to eat, providing foods of high nutritional value, the ability to control many small portions of food consumed, preparing hygienic food, and correct diet so that children can well receive Intake Nutrition. In addition, primary health care behaviors, in this case, include paying attention to children's nutritional state, carrying out child weighing and immunization, maintaining children's hygiene, maintaining home conditions and environmental sanitation, seeking treatment when children are sick, and stimulating for children.

However, in addition, the majority have good parenting. There are also 19% of respondents with less parenting. 16% have a height-for-age index category stunting. Based on the results of interviews, it was found that some mothers work in factories, so toddler supervision is entrusted every day to grandmothers who tend to provide toddlers with freedom and lack of supervision. Treatment The ones given by grandma and mother must be different. The average toddler with a mother working in a factory in feeding is not good, such as irregular eating (only 2x a day) and lack of napping habits. Most importantly, it is formula milk, even though the nutrients from formula milk are not enough to replace existing foodstuffs. In addition, because mothers work when weighing in the healthcare community, some come with their grandmothers, so monitoring the growth and development of toddlers is not optimal. According to Noorhasanah and Tauhidah (2021), If the parenting style of feeding and monitoring the growth and development of the toddler is not implemented correctly, the child will quickly get sick and potentially get repeated disease infections. Repeated infections will inhibit children's growth, the impact of which is that children can experience stunting.

The limitation of this study is the distribution of parenting results, which show that most parenting styles are suitable. This is because, based on the analysis that has been done, mothers of toddlers who fill out this questionnaire, on average, have good results. This is because the mother's level of knowledge is good, but unfortunately, this study does not take knowledge variables to analyze it.

##### **5. The Relationship of Sanitary Hygiene to the Incidence of Stunting**

Based on a statistical analysis of Pearson correlation with a significance level of 5% in Table 13, it was obtained that  $p\text{-value} = 0.022$  and  $r = 0.267$ . This shows that the  $p\text{-value} < 0.05$  indicates a significant (meaningful) relationship between sanitary hygiene and stunting incidence and has a strong relationship of 26.7% or is classified as weak. This means that sanitation *hygiene* factors

only affect the incidence of *stunting*. In addition, a positive value on the r value means that the two variables are positively correlated, where if the higher the value of the sanitary *hygiene* score, the z-score height-for-age value increases (normal nutritional status/not *stunting*) and vice versa.

**Table 5. Analisis bivariat hubungan *hygiene* sanitasi terhadap kejadian *stunting***

	<b><i>Stunting</i></b>
<b><i>Hygiene</i> sanitation</b>	<i>p-value</i> = 0,022
	r = 0,267
	n= 73

This is in line with the research. Mia *et.al*, (2021) A significant relationship exists between hygiene and environmental sanitation, especially regarding stunting events. According to research Purnama and Zairinayati (2019) Entitled "Relationships Hygiene Environmental Sanitation with Events Stunting, "It was found that there was a significant relationship between hygiene Environmental sanitation and the occurrence of stunting with a p-value of 0,001 (*p-value* <0.05).

Based on observations, hygiene, and Inadequate sanitation (not qualified) at the research site partly contributed to 3 assessment components. The first component is that 52% of houses do not have ceilings. In the second component, namely the sanitation facilities component, the ownership of healthy latrines is still tiny. Namely, 36% of latrines do not have septic tanks and are directly channeled into the river. In addition, 45% do not have final waste disposal facilities. The third component is the component of occupant behavior, habits, and hygiene. Poor ones, such as throwing garbage in rivers due to the absence of landfills, are supporting indicators that cause data acquisition hygiene. Sanitation at the study site was largely unqualified. According to Met *et al.* (2019), unhealthy use of latrine facilities and behavior hygiene is not good. It contributes to the onset of infectious diseases such as diarrhea and intestinal worms that will affect the linear growth of children and can increase mortality.

According to Afriani and Patmawati (2021)Factor hygiene Sanitation dramatically influences children's growth and development because children under five are susceptible to various infections and diseases. Continuous exposure to human and animal feces can lead to chronic bacterial infections. The infection is caused by poor hygiene and sanitation practices, making nutrition difficult for the body to absorb. Hygiene and Environmental sanitation, to a low degree, trigger digestive tract disorders, which divert growth energy to the body's resistance to infection. When the body's energy is less while the body is focused on fighting infectious diseases, which happens for a long time; it will potentially result in growth disorders that impact children becoming short (*stunting*).

## **6. Multivariate Analysis of the Most Influential Varaibel on Stunting**

The results of a multivariate test using multiple linear regression tests showed that the variables related to the incidence of *stunting* in Getas Village, Singorojo District, Kendal Regency

were parenting ( $p=0.212$ ) and sanitary.  $\beta$  hygiene ( $= 0.218$ ). The most vital relationship between the incidence of *Stunting* is seen from the beta value of the regression coefficient ( $\beta$ ), which has a value of 0.218 (the highest compared to the parenting variable) in this study. B The sanitary hygiene variable has a dominant influence on stunting incidence.

**Table 6. Analisis Multivariat Uji Regresi Linier Berganda**

Variable	Koefisien (B)	Standarize coefficient ( $\beta$ )	R <sup>2</sup>	p-value
Parenting	0,037	0,212	0,114	0,014
Hygiene Sanitation	0,002	0,218		
Constanta	-6,187			

**CONCLUSIONS**

The average results of nutritional intake from 73 respondents included a protein intake of 32.5 mg (adequate protein intake), zinc intake of 3.7 mg (adequate zinc intake), and iron intake of 7.6 mg (adequate intake). In the parenting picture, 59 toddlers (81%) have good parenting, with an average score of 85.6. In the description of sanitary hygiene, there were 48 respondents (66%) who had unqualified sanitary hygiene with an average score of 961.6 (<1608). In the description of *stunting*, as many as 25 toddlers (34%), toddlers with non-stunting categories, as many as 48 toddlers (66%), and an average z-score of -1.4 (standard).

The results of the *Pearson correlation test analysis* between the independent variables of protein, zinc, and iron nutrient intake on variables tied to stunting events showed no significant relationship between the three, each with  $p$ -value protein = 0.152 ( $p$ -value > 0.05),  $p$ -value zinc = 0.192 ( $p$ -value > 0.05),  $p$ -value iron = 0.365 ( $p$ -value > 0.05).

The results of the *Pearson correlation test analysis* between parenting independent variables and stunting-bound variables showed a significant relationship between the two with  $p$ -value = 0.025 ( $p$ -value < 0.05) and positive correlation strength with  $r = 0.263$  (weak correlation).

The results of the *Pearson correlation test analysis* between the sanitary hygiene-free variable and the variable tied to *stunting* events showed a significant relationship between the two with  $p$ -value = 0.022 ( $p$ -value > 0.05) and positive correlation strength with  $r = 0.267$  (weak correlation).

The variable that most influence the incidence of *stunting* is *sanitary hygiene*  $p$ -value 0.002 ( $p$ -value <0.05) with a beta value of regression coefficient of 0.218 (the highest compared to other variables). $\beta$

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