



CORRELATION BETWEEN STUNTING AND TODDLER DEVELOPMENT

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ABSTRACT

Stunting is still a serious public health problem in Indonesia that has an impact not only on linear growth but also on child development. Stunting will affect physical performance and mental and cognitive functions will be disrupted. The children are left behind in many areas of child development including; social personality, fine motor, language, and gross motor. This study purposes to determine the relationship between stunting and children's development. This study used a quantitative method using a cross sectional approach. The study respondents were 190 toddlers obtained by consensive sampling techniques that fit the inclusion and exclusion criteria. The data collection instrument used anthropometric measurements and the Denver II questionnaire (DDST) is highly sensitive. Analysis of bivariate data using Kendall's Tau test. The results of the study were mostly male stunting toddlers (62.3%), the average age was 31.42 months. The results showed 53 stunting toddlers (100.0%) with normal development of 2 toddlers (3.8%), and suspected or suspected 50 toddlers (96.2%). The results of Kendall's Tau test reveal that there is a relationship between stunting and toddler development with p value =0.000 (p <0.05). Conclusion of stunting has relationship to the development of toddlers in Kemudo Village.

Keywords: development; stunting; toddlers

INTRODUCTION

Toddlers are children aged 0-59 months whose development is very rapid in achieving optimal function (Kemenkes RI, 2018). Toddlers are a vulnerable group to the intake of food and nutrients needed by the body. Less than optimal nutrition can lead to malnutrition and excess nutrition. Nutritional problems that often occur in toddlers include lack of vitamin A, iron nutritional anemia, protein energy deficiency, *stunting*, disorders due to iodine deficiency, and excess nutrition (Kemenkes RI, 2018). *Stunting* is a chronic nutritional disorder caused by a lack of nutritional intake over a long period of time (UNICEF, 2021). *Stunting* is still a center of attention that has not been addressed because of its negative influence on the health and development of children and adults (Kemenkes RI, 2020). The results of the 2020 WHO (World Health Organization) data show that globally there are 149.2 million or 22% of children under five are *stunted*. Meanwhile, in 2020 there are 53% in Asia and 41% in African countries (UNICEF, 2021). WHO explained that Asia is ranked first with *stunting* in the world.

Prevalence *stunting* in Indonesia according to the SSGI (Indonesian Nutrition Status Survey) in 2021, it is decreasing every year. In 2019 it was 27.7%, while the prevalence of *stunting* in 2021 reached 24.4%, but because it did not reach the WHO target of 20%, the prevalence of *stunting* is still relatively high (SSGI, 2021). In 2022, the prevalence of *stunting* under five in Central Java is 20.8%. This province ranks 20th nationally. The prevalence of *stunting* under five according to SSGI 2021 in Central Java is 20.9%, while in Klaten Regency according to the SSGI (2021) it has increased. The prevalence of *stunting* in 2021 will reach 15.5% while in 2022 the prevalence of *stunting* will reach 18.2% (SSGI, 2022).

Stunting caused by a number of factors, including a history of low birth weight (LBW), breastfeeding, immunization status, parenting style regarding nutrition, culture and economy. The effects of *stunting* are divided into two, namely long-term and short-term impacts (UNICEF, 2021). Toddler age is very important in its development. At this age, children develop very rapidly, especially during the first 1,000 days of life. In this period, the brain will develop rapidly and form neural connections that are important for the child's cognitive and emotional functioning in the future. In addition, children experience the development of fine motor skills, gross motor skills, language and social (Latifah et al., 2022).

Toddler development is affected by a number of factors, both external and internal factors. Internal factors consist of genetics, race or ethnicity, age, family, chromosomal abnormalities and sex. While external factors include labor, prenatal and postpartum factors (RI Ministry of Education and Culture, 2020). The effects of *stunting* on toddler development are delays in motor and cognitive development, (WHO, 2019). Research from Zakiyya et al., (2021) regarding "Analysis of *Stunting* Incidents on the Development of Children Aged 6-24 Months" explains that childhood is at risk of *stunting*, due to various factors that cause *stunting*. Children with *stunting* from the start are more behind in cognitive and fine motor aspects. This agrees with study from Utami et al., (2021), revealed that *stunting* is a risk of problems from the low brain development that the motor development is hampered and mental growth is delayed.

On research Syahrudin et al., (2022) with the title "Relationship of *Stunting* Incidents with the Development of Children Aged 6-23 Months". The sample for this study was 72 respondents aged 6-23 months who were determined by proportional random sampling. The instrument used KPSP (developmental pre-screening questionnaire). Based on the analysis, it shows that *stunting* is related to developmental barriers for children aged 6-23 months in the working area of the Taraweang Health Center, Pangkep Regency. The difference in the research used by this researcher lies in the dependent variable of toddler development. This study uses a quantitative method with an approach *cross sectional*. The population studied was all toddlers in Kemudo Village with a total of 53 *stunted* toddlers and 137 not *stunted*. The sample size was 190 respondents. The sampling technique used *consecutive sampling* technique. The research location is in Kemudo Village. The instruments used were anthropometric measurements and Denver II. The measuring instruments that will be used are the *portable stadiometer SECA 213*, the *body length board* and the child development questionnaire (DDST).

Preliminary study results at the Prambanan Health Center, prevalence *stunting* in Toddlers in February there were 86 cases. The village with a high prevalence of *stunting* in toddlers is Kemudo Village with a total of 25 cases. Referring to the results of an interview with the Kemudo Village midwife on March 27, 2023, *stunting* toddlers experienced poor growth, even though they attended the posyandu every month but there was no increase in height. Meanwhile, the development of toddlers is quite good, starting from talking, walking and receiving responses. There are also toddlers whose development is lacking so that they require special attention from the Puskesmas. Based on the above background, *stunting* can result in impaired growth and development of toddlers. Thus, researchers are interested in conducting this research with the aim of analyzing "The Relationship between *Stunting* and Toddler Development in Kemudo Village". The research site was chosen because of the high prevalence of *stunting* in all villages located the Prambanan Healths Center Work Area and having a sufficient number of respondents to serve as a research location.

METHOD

This type of study is a quantitative research with the approach of *cross sectional*. This study was carried out on June 8, 9, 10, 24 2023 at the Toddler Posyandu in Kemudo Village. The population in study were all toddlers (1-5 years) in Kemudo Village, namely 359 toddlers. The sample in this study was 190 children under five who were obtained using the *consecutive sampling* technique.

The types of data in this study are primary data and secondary data. Primary data were achieved from parental reports and actions taken by toddlers using the DDST questionnaire and anthropometric measurements on toddlers. The secondary data is supporting data achieved from the Prambanan Health Center. This research has gone through the ethical clearance process at the Muhammadiyah University of Surakarta with No. 4938/B.1/KEPK-FKUMS/VII/2023.

Instrument for measuring *stunting* namely by using two tools, namely the *portable stadiometer SECA 213* and the *body length board or infantometer* with the normal *Z-score* category -2 SD to +3SD and the *stunting* category *Z-score* -3 SD to <-2 SD. The measurement of toddler development uses the Denver Development Screening Test II (DDST-II) sheet with a *suspect* category if two or more *cautions* are obtained and 1 or more *delays* and the normal category if there is no *delay*, at most one *caution*. The Denver II is widely used because it is quick to administer and highly sensitive (Christavao et al, 2023). Data analysis includes univariate and bivariate analysis. Univariate analysis was performed to describe the characteristics of the respondents and bivariate analysis to establish the relationship between the independent and dependent variables.

RESULT

The result of this study shows significant differences in the factors influencing children's developmental levels, as shown in Tabel 1 and Tabel 2.

Table 1.
 Average Age and Height of Toddlers n = (190)

Variable	Min	Max	Means	SD
<i>Stunting</i>				
Age (Month)	14	56	31,41	10,38
Height	68	96	81,18	6,70
Not <i>Stunting</i>				
Age (Month)	12	58	32,25	12,839
Height	70	116	88,12	9,222

Table 1 shows the average age of five *stunting* is 31.41 months with an average height of 81.18 cm, while the average age of toddlers who are not *stunted* is 32 months with an average height of 88.12 cm.

Table 2 indicates that the majority of toddlers of the male sex experience it *stunting* as many as 33 toddlers (62.3%). The most parity of the second child is 24 toddlers (45.3%). The majority of babies with normal *stunting* had a birth history of 43 toddlers (81.1%), where the mother had a high school education level (73.6%). Most of the mothers did not work (73.6%) and at most had two children (26.4%). Most of the *stunting* toddlers experienced developmental disorders in gross motor skills as much as 44 cautions (83.0%). Most of the *stunting* toddlers experienced suspected or suspected developmental disorders as many as 51 toddlers (96.2%). Toddler *stunting* have an average age of 31.41 months with the youngest being 14 months and the oldest being 56 months. Toddlers are children aged 0-59 months whose development is very rapid in achieving optimal function (Kemenkes RI, 2018). This is in line with research Aprilia, (2022) Under five years of age, the risk of *stunting* is higher than children over five years of age. Less than optimal nutrition can lead to malnutrition and excess nutrition. Nutritional problems often occur in toddlers including lack of vitamin A (KVA), AGB (iron nutritional anemia), protein energy deficiency (KEP), *stunting*, IDD (disorders due to iodine deficiency), and excess nutrition (Kemenkes RI, 2018).

That toddler *stunting* has an average height of 81.18 cm. In the results of this study, toddlers' height was included in the *stunting* category, this can be seen in the standard anthropometric assessment of toddlers' nutritional status with body length for age (PB/U) or height for age (TB/U) on the Z-score (Regulations in the Ministry of Health No.2, 2020). Factors that affect toddlers' height include genetic or hereditary factors and infectious factors. Genetic factors are one of the internal factors that affect the height of toddlers because, where if parents are short it is possible to reduce short

traits in children (Indah et al., 20219). This agrees with the research of Sagita & Kemal N. Siregar, (2022) explained that parents' height is a risk factor for *stunting* in toddlers.

Table 2.
Frequency Distribution of Respondents n= (190)

Characteristics	Stunting		Not Stunting		Total	
	f	%	f	%	f	%
Gender						
Man	33	62,3	62	45,3	95	50
Woman	20	37,7	75	54,7	95	50
Parity						
The first child	22	41,5	62	45,3	84	44,2
Second child	24	45,3	60	43,8	84	44,2
The third child	6	11,3	15	10,9	21	11,1
Fourth Child	1	1,9	0	0	1	0,5
Childbirth History						
Normal	43	81,1	105	76,6	148	77,9
SC	10	18,9	32	23,4	42	22,1
Mother's Education						
Elementary School	3	5,7	2	1,5	5	2,6
Junior High School	10	18,9	11	8	21	11,1
Senior High School	39	73,6	103	75,2	142	74,7
College	1	1,9	21	15,3	22	11,6
Mother's job						
Work	14	26,4	52	38	66	34,7
Doesn't work	39	73,6	85	62	124	65,3
Number of children						
One	14	26,4	56	40,9	70	36,8
Two	14	26,4	62	45,3	76	40
Three	12	22,6	19	13,9	31	16,3
Four	13	24,5	0	0	13	6,8
Developmental Aspects						
a. Personal Social						
Caution	36	67,9	5	3,6	41	21,6
Normal	17	32,1	132	96,4	149	78,4
b. Fine Motor						
Caution	16	30,2	0	0	16	8,4
Normal	37	69,8	137	100	174	91,6
c. Language						
Caution	21	39,6	1	0,7	22	11,6
Normal	32	60,4	136	99,3	168	88,4
d. Rough motoric						
Caution	44	83	3	2,2	47	24,7
Normal	9	17	134	97,8	143	75,3
Toddler Development						
Suspect	51	96,2	0	0	51	26,8
Normal	2	3,8	137	100	139	73,2

Toddlers who are male mostly experience *stunting* as many as 33 toddlers (62.3%) while women 20 toddlers (37.3%). The results of this study agree with Yuningsih & Perbawati, (2022) described that the incidence of *stunting* was found to be higher in male toddlers (38.1%) compared to females (36.2%). Research results from Rahayu & Casnuri, (2019), also described that the incidence of *stunting* tends to be found in boys due to the provision of different food and nutritional variations, where men have a great opportunity to experience *stunting* (Rahayu & Casnuri, 2019). The cohort study in Ethiopia found that boys are twice as likely to be *stunted* as girls. Previous studies stated that boys are more easily malnourished than girls (Yuningsih et al., 2022). That toddler *stunting* the most parity of the second child is 24 toddlers (45.3%). This study results are consistent with the analysis research S. Rahayu et al., (2019), which explains that mothers with parity primipara and

multipara (having less than 4 children) have a lower risk of *stunting* compared to mothers with grandemultipara parity (having more than 4 children). This is in line with research Sarman & Darmin (2021) explained that mothers with many parities would tend to have *stunted* children due to poor economic conditions resulting in insufficient nutritional intake.

Toddlers with a history of normal delivery 43 toddlers (81.1%) are more affected *stunting* than toddlers with a history of cesarean delivery 10 toddlers (18.9%). The study results are consistent with study of Aisy & Kurniasari (2022) which explains that there is no relationship between history of childbirth and the incidence of *stunting* in toddlers. This research is consistent with study of Wali et al., (2020) with the result that children born normally but not facilitated by health will be more likely to experience *stunting* than children born normally but not facilitated by health. Mothers with high school education level mostly had *stunted* toddlers, 39 toddlers (73.6%). These findings are consistent with research Husnaniyah et al., (2020) who explained that there is a relationship between the education of the mother's and the incidence of *stunting* in the working area of work Kandanghaur Indramayu Health Center. These results concur with research Ariyanto et al., (2021) which states that mothers with low education are at risk of having stunted children 2.22 times greater than mothers with higher education.

Mothers who do not work and are housewives have infants who are at risk of *stunting* as many as 39 mothers (73.6%). These findings are consistent with research of Amelia (2020) explained that there is a relationship between the working mother's and the incidence of *stunting*, where mothers who do not work are 5 times more likely to have young children who experience *stunting* compared to working mothers. Mothers with one and two children experienced *stunting* in 14 toddlers (26.4%). These findings are consistent with research by Wahyudi et al., (2022) which explains the prevalence of *stunting* under five from first to third birth order, but significantly higher in the fourth child. Mothers with one and two children experienced an incident *stunting* 14 Toddlers (26.4%). The finding of this research agree with the research of Wahyudi et al., (2022) which explains the prevalence of *stunting* under five from first to third birth order, but significantly higher in the fourth child. This agrees with study Safitri et al., (2021) explained that there was a significant relationship between the number of children and the perception of *stunting*, while the number of children between the ages of 3-5 is at risk of *stunting* 4.87 times. The number of children in a family influences family food security. Inadequate food intake due to the large number of family members is one of the determinants of nutritional status (Safitri et al., 2021).

Table 3.

Analysis of *Kendall's Tau Stunting* Test with Toddler Development Aspects

Developmental Aspects	R	P
Personal Social	0.701**	0.000
Fine Motor	0.488**	
Language	0.545**	
Rough motoric	0.840**	

Table 3 shows the results of statistical tests using the *Kendall's Tau* test for significant values of 0.000 was obtained, less than 0.05, which means that *stunting* is related to four aspects of development. Where the value of the correlation coefficient of the data for *stunting* with aspects of social personal development is obtained by value ($r = 0.701^{**}$), meaning that the level of closeness of the relationship between variables has a strong relationship. In the aspect of fine motor development, a correlation coefficient value of ($r = 0.488^{**}$) is obtained, meaning that the level of closeness of the relationship between variables has a moderate relationship. In language development, the correlation coefficient value is ($r = 0.545^{**}$), meaning that the level of close relationship between variables has a moderate relationship. In gross motor skills, the correlation coefficient value is ($r = 0.840^{**}$), the level of closeness between variables has a very strong relationship.

Table 4 shows that most of the Toddlers *stunting* experiencing development suspect or suspected (96.2%). In contrast, those in the non-*stunting* category experienced normal development (100.0%). If seen from the results of statistical analysis with the *Kendall's Tau* Test, gained a p-value of 0.000

<0.05 means there is a relationship between the incidence of *stunting* and the development of toddlers.

Table 4.

<i>Stunting</i> Events		Toddler Development						R	P
		<i>Suspect</i>		Normal		Total			
		f	%	f	%	f	%		
<i>Stunting</i>		51	96.2	2	3,8	53	100	0.974**	0.000
Not <i>Stunting</i>		0	0	137	100	137	100		
Amount		51	100	139	100	190	100		

DISCUSSION

Stunting is a condition in which a toddler is below (inappropriate) height or length for their age. *Stunting* is one of the goals of the Sustainable Development Goals (SDGs), which includes the second Sustainable Development Goal, which is to end hunger and all forms of malnutrition by 2030 and realize food security. The goal is to reduce *stunting* rates by 40% by 2025 (Buletin, 2018). According to the World Health Department (WHO) Bluetin Pudat 2019, long and short term. Toddler *stunting* experiencing developmental disorders suspect as many as 51 toddlers (96.2%). These findings are consistent with research Wulandari et al., (2021) *stunting* has a significant relationship and is 9.3 times at risk of experiencing developmental delays compared to children who are not stunted. This agrees with research Syahrudin et al., (2022) which explains that *stunting* toddlers tend to have dubious development caused by malnutrition due to lack of nutrients. Development is the process of maturing the body's functions, seen in the capacity of intelligence and behavior (Fikawati et al., 2017). Aspects of development consist of personal social, fine motor, language and gross motor (Soetjningsih & Ranuh, 2015). Factors that affect developmental delays include low birth weight, inadequate nutritional intake, and infectious diseases (Wulandari et al., 2021).

The findings of this study agree with the study of Syahrani & Partners, (2019) which explains that *stunting* toddlers are 4 times more at risk of experiencing abnormal child development compared to toddlers who are not *stunted*. *Stunting* is a risk factor for increased mortality, low motor development and cognitive abilities and imbalances in bodily functions. The incidence of *stunting* is closely related to developmental disorders. Developmental delays are conditions in which a child is unable to achieve developmental tasks at the expected time. Developmental disorders can occur in motor, language and social. Barriers to children's motor function are related to the maturation of the triceps surae so that they affect the mechanical ability of the muscles (Syahrudin et al., 2022). Developmental delay disorder is characterized by slow maturation of neurons, motor movements, lack of intelligence, and slow social responses (Yadika et al., 2019). Various stimulations in early life have an influence on brain growth and mutations (Zakiyya et al., 2021).

Theory of UNICEF (2020) explained that during the *stunting* period, damage occurred to brain cells which could affect the central area of motor movement coordination, namely around the cerebellum. Children who experience chronic malnutrition are predicted to experience various obstacles in the future and have physical and intellectual abilities, as well as low productivity. Ngure, (2018) explained that *stunting* in toddlers can directly affect brain development and affect physical development, motor development, and physical activity. This motor development is influenced by the brain. The brain regulates every movement of the child. The more mature the brain's nerves, the more mature the child's motor skills will be (Soetjningsih & Ranuh, 2015). Relationship between *stunting* with the development of toddlers in Kemudo Village, a correlation coefficient value of ($r = 0.974^{**}$) is obtained which indicates a positive correlation direction with a very strong relationship. This means that the more toddlers are not stunted, the better the development of toddlers. This is confirmed by research Syahrudin et al., (10) which explained that of the 26 respondents under five

stunting, as many as 16 respondents (16.5%) experienced developmental disorders *suspect*. This is caused by malnutrition. Malnutrition occurs when nutritional intake in children is not optimal so that it will have an impact on physical growth and brain malnutrition. Efforts to prevent stunting in toddlers include holding PMT (supplementary feeding) activities for toddlers, monitoring toddler growth, organizing early stimulation of child development and providing optimal health services (RI Regulations in the Ministry of Health No. 39, 2016).

CONCLUSION

Referring to the results of the research above regarding "Relationships *Stunting* Regarding the development of toddlers in Kemudo Village, the following conclusions can be drawn: in this study, the characteristics of the respondents were the age of the respondents who were *stunted* 31.41, while the toddlers who were not *stunted* had an average age of 32.25 months. The mean height for *stunted* toddlers is 81.18 cm, while for non-stunted toddlers the average height is 88.12 cm. The number of respondents in this study were male and female were the same, 95 under five (50.0%) each. Parity mostly first and second children (44.2%), history of mostly normal births as many as 148 (77.9%), mother's education at most high school level 142 (74.7%), most mothers do not work 124 (65.3%), the number of children is at most two 76 (40.0%). Most of the toddlers experienced the development of suspected or suspected male sex with second child parity, history of normal delivery, high school mother's education (SMA) and mothers who did not work. children with male gender with a mother's level of education at the high school level (SMA) have a percentage of suspected or suspected developmental disorders. Toddlers who are *stunted* are more male than female. The most parity of the second child is the size, the history of delivery is mostly normal. Mother's education level is mostly high school. Most mothers do not work and have at most two children. Most of the stunting toddlers experienced suspect or suspected development (94.3%). There is a relationship between *stunting* and toddler growth and development in Kemudo Village where the value of $p = 0.000 < 0.05$

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