

The Correlation Between Stunting And Learning Achievement In 9-12 Years Old Children At Idi Rayeuk, East Aceh Regency, Indonesia

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Abstract: - Stunting is a chronic malnutrition problem caused by poor nutritional intake in a long period of time. Prevalence of stunting in 5-12 years old children in Indonesia reached 30.7%. Stunting prevalence in Aceh is 34.3% (12.9% very short and 21.4% short). Stunting caused delayed maturation of brain function. The purpose of the study is to determine the relationship between stunting and learning achievement of children aged 9-12 years in *Public School* (SDN) 2 Idi Rayeuk East Aceh. The study design was Cross-sectional with non-probability sampling. The height was measured using Microtoise. The learning achievement was measured using the value of Math, Science and *Indonesian Language* in the final semester. Out of 201 subjects, there were 41 children suffering from stunting. Children who experience stunting tend to be more likely to obtain "adequate" learning achievement. Children not suffering from stunting are more likely to obtain "good" and "excellent" grades. Spearman analysis generated p-value (.0000) in all three subjects. Based on the research result, it is concluded that there is a significant relationship between stunting with children learning achievement..

Keywords: - Stunting, learning achievement, final report card score.

Introduction:

School period is a children growth period which is very fast and active. Good and balanced diet will provide good nutritional quality to children. (1) Providing food with inadequate nutrition would disrupt children growth and development. One such occurrence is stunting. (2)

Stunting is an occurrence when children are riddled with chronic malnutrition. Based on the length or height according to their age compared to the standard WHO-MGRS (Multicentre Growth Reference Study) in 2007, the children are categorized short with the z-score score less than -2SD and is categorized as very short if the z- score less than -3SD. WHO states that stunting is a public health problem with a high prevalence category when the prevalence of stunting is 30-39% and the prevalence is very high when it is above or equal to 40%.(3) Based on RISKESDAS data, Indonesia suffers from stunting prevalence in children aged 5-12 years. The prevalence is 30.7% (12.3% very short and 18.4% short). The stunting prevalence in Aceh is 34.3% where 12.9% is very short and 21.4% short. (4)

Stunting is closely related to the children low cognitive abilities. Inability to obtain nutritional need for a long period of time would cause inoptimal brain and tissue development. This may delay the maturation of brain function. Due to delayed maturation of brain function in a long period of time, it would cause low cognitive abilities. It is associated with malnutrition and can affect the children's learning achievement. (5) There are many factors that affect learning achievement but some studies show that stunting is closely related to children's learning achievement,(6)

Primary school age is the second golden age for children growth both physically and mentally. It is influential for the future. Should a person experiences stunting at that time then the brain development will also be disrupted. Stunting experienced by children in school-age will affect children ability to follow the lessons in school. It may affect the learning achievement. Nerve cells inside a brain are associated with a person's response such as seeing, hearing and thinking during the learning process. (7)

A study on students found that children with an age range of 9-12 years old suffering from stunting had a 9.2 times greater risk of having an IQ below average than non-stunting children. They possess the risk of underachievement at 1.4% compared to those not suffering from stunting. (8)

Yustika conducted research on elementary students in the Samalantan area exhibited that there was a significant relationship between stunting and learning achievement. Children suffering from stunting have impaired students 'thinking and learning abilities'. Students' attendance and learning achievements will decrease compared to non-stunting children. (9) Stunting children possess an IQ of 11 points which is lower compared to non-stunting children. (10)

Based on several research results and existing theories, the researchers are interested to conduct research that aims to determine the relationship between stunting and learning achievement. In this study, researchers conducted an assessment on 9-12 years old children in basic school in Idi Rayeuk East Aceh, Indonesia

Research Method:

This study used analytic observational methodology cross-sectional design, non-probability sampling with total sampling type The process of collecting data was conducted in August 2017. The population in this study were 4th – 6th-grade students aged 9-12 years old basic school Idi Rayeuk East Aceh, Indonesia. The inclusion criteria were children aged 9-12 years who are in the 4th-6th grade. The parents also required to agree on having their children's height measured. Exclusion criteria are children with physical disabilities that affect height. The number of samples in this study was 201 students whose height were measured, and determined by values contained in the student's report book for the latest semester result. The data obtained were statistically analyzed using SPSS version 18 computer program.

Result:

This study was conducted on 4-6th-grade students. The number of respondents was 201 students. The frequency distribution of study variables is presented in table 1. Based on table 1, out of a total of 201 respondents, male respondents more than female respondents. There were 106 male respondents (52.7%). The respondents in 4th grade more than other grades. Total 4th grader respondents were 69 (34.3%). Based on the results of the measurements, there were 41 students suffering from stunting (20.4%).

Based on table 2, out of 201 respondents, there were 41 respondents who experienced stunting. Majority of the respondents stunting are male sex (22 male respondents)/(53.7%).

Based on the learning achievement table (table 3), math subjects in good category is the most dominant learning achievement obtained by respondents. Out of 111 respondents, 33 respondents in 4th grade (29.7%), 39 respondents in 5th grade (35.1%), and 39 respondents in 6th grade (35.1%).

Science subjects exhibited 113 respondents had good category learning achievement. There were 35 respondents in 4th grade (31.0%), 39 respondents in 5th grade (34.5%), and 39 respondents in 6th

grade (34.5%). Indonesian language subjects exhibited 123 respondents with good category learning achievement. There were 34 respondents in 4th grade (27.6%), 48 respondents in 5th grade (39.0%), and 41 respondents in 6th grade (33,3%). Based on the table above, 201 respondents from 4th-6th grade have good learning achievement on average.

Based on cross-tabulation data in the table 4, it shows that respondents experiencing stunting obtained adequate achievement compared to non-stunting respondents in every subject. math subject good category was obtained by 99 non-stunting respondents (49.3%), on the other hand stunting children obtaining adequate category, was 28 respondents (13.9%). Science subject exhibited 95 non-stunting respondents obtaining good category learning achievement (47.3%), whereas 22 stunting respondents generally obtained adequate category learning achievement (10.9%). About 106 non-stunting respondents generally obtained good category learning achievement in Indonesian Language subject (52.7%), while 21 stunting respondents generally obtained adequate learning achievement (10.4%).

Based on the result of spearman statistic test on math learning achievement, the probability value (p) <0.05 (p = 0.0000) with rank correlation is 0.473 means that there is a significant relationship between stunting and mathematics learning achievement with adequate correlation. Science subject learning achievement exhibited that the results of Spearman statistical test obtained the probability value (p) <0.05 (p = 0.0000) with rank correlation worth 0.357. It indicates a significant relationship between stunting with Science learning achievement at adequate correlation. Indonesian Language subject exhibited that based on the results of Spearman statistical tests obtained the value of probability (p) <0.05 (p = 0.0000) with rank correlation 0.350. It indicates that there is a significant relationship between stunting with Indonesian Language learning achievement at adequate correlation.

Table 1 - Distribution of research subjects general characteristics

General Characteristic	Frequency (n=201)	Percentage (%)
Sex		
Men	106	52.7
Women	95	47.3
Grade		
4 th grade	69	34.3
5 th grade	66	32.8
6 th grade	66	32.8
Stunting		
Yes	41	20.4
No	160	79.6

Table 2 - Distribution of stunting characteristics

Respondent Characteristics	Stunting	
	Frequency	Percentage (%)
Sex		
Men	22	53.7
Women	19	46.3
Grade		
4 th grade	13	31.7
5 th grade	12	29.3
6 th grade	16	39.0

Table 3 - Distribution of characteristics of learning achievement towards grade

Learning Achievement	Grade						Total	
	Grade 4		Grade 5		Grade 6			
	n	%	n	%	N	%	n	%
Matematika								
Very good	15	36.6	18	43.9	8	19.5	41	100.0
Good	33	29.7	39	35.1	39	35.1	111	100.0
Adequate	21	42.9	9	18.4	19	38.8	49	100.0
Science								
Very good	14	35.9	18	46.2	7	17.9	39	100.0
Good	35	31.0	39	34.5	39	34.5	113	100.0
Adequate	20	40.8	9	18.4	20	40.8	49	100.0
Indonesian Language								
Very good								
Good	18	47.4	12	31.6	8	21.1	38	100.0
Adequate	34	27.6	48	39.0	41	33.3	123	100.0
	17	42.5	6	15.0	17	42.5	40	100.0

Table 4 - Stunting relationship with learning achievement

Learning Achievement	Stunting				Total		R	P-Value
	Non-Stunting		Stunting					
	n=160	%	n=41	%	n=201	%		
Mathematics								
Very Good	40	19.9	1	0.5	41	20.4	0.473	0.0000
Good	99	49.3	12	6.0	111	55.2		
Adequate	21	10.4	28	13.9	49	24.4		
Science								
Very Good	38	18.9	1	0.5	39	19.4	0.357	0.0000
Good	95	47.3	18	9.0	113	56.2		
Adequate	27	13.4	22	10.9	49	24.4		
Indonesian Language								
Very Good							0.350	0.0000
Good	35	17.4	3	1.5	38	18.9		
Adequate	106	52.7	17	8.5	123	61.2		
	19	9.5	21	10.4	40	19.9		

Discussion:

Research result conducted in basic school Idi Rayeuk East Aceh exhibited 41 stunting children out of 201 respondents (20.4%). Although the prevalence of stunting in Idi Rayeuk East Aceh does not exceed the prevalence of Aceh Province and national prevalence of children aged 5-12 years in 2013,(4,11) nevertheless the existing stunting prevalence is an issue at it is above the tolerance set by WHO (20%). (12)

Based on this study, out of the 41 respondents who experienced stunting, the prevalence of stunting among male respondents was more than that of female respondents (53.7%). This could occur due to growth rate differences between men and women. Women grow rapidly at around 8-13 years old, while men occur at around 10-15 years old. Women growth generally occurs more compared to men. (13)

Based on stunting children learning achievement of each subject, it exhibited that only (0.5%) students obtained very good grades for math and science and (1.5%) obtained a very good grade for the Indonesian Language. Adequate category learning achievement was obtained as follows: (11.9%) for math, (9.5%) for natural science subjects, and (9.0%) Indonesian Language subjects. This occurs due to stunting children experience more difficulties in the learning process and generate lower learning achievement

compared to non-stunting children. Learning difficulties experienced by stunting children are closely related to bad learning achievement and low IQ scores. (14) Children who experience Stunting are also a manifestation of a growth disorder. One of the parts of the body that is most at risk is the brain. The brain is an organ which houses nerve cells closely related to child responses such as seeing, hearing, and thinking during the learning process. Stunting would disrupt the learning process thus affecting learning achievement. (7)

Out of 41 respondents who experienced stunting generally possess adequate learning achievement compared to non-stunting respondents. These generally possess excellent learning achievement. Stunting children possess lower cognitive, affective and psychomotor abilities. It would generate a lower learning achievement score, and IQ score compared to a non-stunting child. This is consistent with research conducted in Brazil and Morocco where primary school-aged stunting children having lower cognitive abilities, learning achievement scores, and IQ scores compared to their non-stunting peers.(15,16) Research in the Philippines exhibits that the z-score score of height by age is positively correlated with IQ scores. The lower the z-score height/age indicates a lower IQ score. (17)

Research conducted by Ridha Rahmawati (2009) exhibited stunting respondents generally possess above average grade IQ score at best. On the other hand, their non-stunting peers could generate a very superior grade IQ score. Statistical test results exhibited a significant relationship between stunting and IQ. IQ scores in stunting children were lower than non-stunting children ($p < 0.05$). (18)

The results of the data analysis performed in this study used the Spearman Correlation Test. The probability value obtained was 0,0000 ($p < 0.05$). Each subject indicates that there is a significant correlation with positive correlation and sufficient correlation between stunting and learning achievement of 9-12-year-old students at basic school in Idi Rayeuk East Aceh. This result is in line with research conducted by Prisca, et al (2017) in central Jakarta where stunting has a significant relationship with the achievement of primary school children in Central Jakarta. (19)

Stunting is not the only factor that can affect a child's learning achievement. Child learning achievement can also be influenced by factors that can not be controlled. These factors are factors from within the child itself such as interest in learning, talent, and motivation to learn. In addition, environmental factors surrounding communities can also affect the learning achievement of children.(20,21) Nevertheless, these factors are not assessed in this study.

Monitoring the growth of children is very important to ensure intervention could be done as early as possible. Stunting may cause cognitive impairment, therefore overall health promotion activities are the first steps that can be disseminated to the community. It is conducted to increase public awareness of the importance of assessing children growth and development.

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