ORIGINAL ARTICLE

The differences in development between stunting and normal children at the age of 3–72 months

Eka Putri Primasari, M.Kes[1], Putri Nelly Syofiah, M.Keb[2], Gina Muthia, M.Keb[2], Dian Febrida Sari, M.Keb[1], Irma Isra Hayati[2]

[1]Diploma III of Midwifery Program, STIKes MERCUBAKTIJAYA Padang, West Sumatra, Indonesia, [2]Bachelor of Midwifery Program, STIKes MERCUBAKTIJAYA Padang, West Sumatra, Indonesia

ABSTRACT

Introduction: Globally, there were around 22% of children under the age of 5 suffer from stunting. The Asian region contributes around 21.8% of the world's stunting cases. This study aims to looked at the differences in development between stunted and normal children at the age of 3–72 months.

Materials and methods: This type of research used an analytic observational approach with a cross-sectional design. The research variables were the child development and stunting. The sample were 130 respondents. Data were analysed with chi-square test.

Results: The results showed that stunted children were 5.525 times more at risk of getting "deviated/doubtful" development screening results than normal children (OR= 5.525; 95% CI= 2.488–12.268; p-value <0.001).

Conclusion: It can be concluded that there were developmental differences between stunted children and normal children.

KEYWORDS:
Child development, stunting, normal

INTRODUCTION

Globally, there are 149.2 million children or almost a quarter of the number of children under the age of 5 suffering from stunting. Asia contributed to as many as 79 million stunting cases of the world's stunting cases.[1] Likewise, what is happening in Indonesia, especially in the West Sumatra province, is known that in 2021, the highest cases of stunting occurred in Pasaman Regency with the prevalence of short toddlers is 30.2%.[2,3] In Primasari et al, out of 12 sub-districts in Pasaman Regency, the Pegang Baru Public Health Center in Panti District has a fairly high stunting percentage of 16.8%.[4]

In accordance with the Guidelines for Implementation of Stimulation, Detection and Early Intervention on Child Growth and Development at the Basic Health Service Level, Child Development Monitoring can be assessed with Kuisioner Pra Skrining Perkembangan (KPSP) instrument. The KPSP instrument recommended by the Ministry of Health of the Republic of Indonesia.[5] Stunting is a condition where a child's growth is stunted, which is caused by chronic malnutrition which can make a child shorter than his age. Chronic malnutrition causes failure to thrive in children. Failure to thrive in children can cause cognitive, language and motor developmental disorders in children that are not in accordance with the child's developmental age.[6] To optimize children's development, every child needs to be given stimulation to stimulate cognitive, language and motor skills. Stimulation to children can be given by mothers, fathers and other family members. Children's brain tissue, especially at the age of five, which gets stimulation can develop 80% at the age of 3 years. If a child never gets stimulation, his brain tissue may shrink or not develop optimally.[7] Based on the results of Primasari et al, it was found that there were differences in the development of fine motoric and gross motoric skills between stunted toddlers and normal toddler.[4] According to the Kuisioner Pra Skrining Perkembangan (KPSP) instrument, children's development is assessed based on four aspects, namely, fine motoric, gross motoric, social independence and speech language.[5] So, in this study, the researchers wanted to see the differences in the development of stunted children and normal children related to these four aspects.

MATERIALS AND METHODS

This study used an analytic observational approach with a cross-sectional design. This research has the scope of looking at the differences in development between stunted and normal children at the age of 3–72 months. This research was conducted in The Working Area of The Pegang Baru Public Health Center, Pasaman Regency. The sample size in this study was calculated using the following Daniel's formula.[8] The number obtained from the results of the minimum sample calculation was 130 respondents. The time of the research was carried out from April to September 2020. The sampling technique was carried out by accidental sampling. That was carried out on children who came to Posyandu during the data collection process on August, 10–13th 2020. The research variables were the child development and stunting.

The operational definition of stunting in children in this study was seen from resulting in low height-for-age at <–2SD. Height-for-age is one of the indices for measuring nutritional status (Body Length per Age) which is a way of determining the incidence of stunting with the results of examinations

This article was accepted: 03 July 2023
Corresponding Author: Eka Putri Primasari
Email: ekaputri28@gmail.com

with categories namely very short (< -3 SD), short (-3 SD to -2 SD) and and normal (-2 SD to 2 SD) and high (> 2 SD). The operational definition of child development in terms of 4 aspects (fine motoric, gross motoric, social independence and speech language), that's measured by KPSP instrument. The KPSP measurement results consist of deviations if the number of yes answers < 6. Doubtful if the number of yes answers = 7-8 and normal if the yes answer = 9-10.[5] Inclusion criteria in this study were willing to become respondents, aged 3-72 months according to the age category measured on the KPSP questionnaire, healthy children, children and parents cooperative during the examination. Exclusion criteria in this study were children who did not come to posyandu at the time of data collection. There was no drop out in this study. The statistical test used was chi-square test with a 95% confidence level (α=0.05). Data were analysed using SPSS 17.

RESULTS

From the 130 respondents in this study, 46 people were identified as stunted and 84 people were normal. The characteristics of the respondents can be seen in Table I and Table II. Based on table I can be known that the average age of children, who be respondent is 33.33 +/- 19.24 months. The smallest age of respondent is 3 months and the highest is 72 months.

From Table II, it is known that more than half respondent have male gender, both in groups children identified as stunting (54.3%) and normal children (51.2%). More than half (63.8%) of the children who became respondent was 1st and 2nd child on number of siblings. Viewed from history of birth weight there were 3.1% (4 people) of children who experienced in Low Birth Weight (LBW) <2500 grams, 3 of them found in children with stunting category and 1 of them in normal children. In the group of children with stunting, there were 37% had very short height and 63% with height short in accordance her/his age.

From Table III, it is known that the results of KPSP screening, on stunting children were found almost half (41.3%) have "doubtful" fine motoric screening results and "doubtful" developmental screening results were also found in a small part (6%) of normal children. In the gross motor development screening results for the group of children with stunting, 4.3% found the results "deviation" and 34.8% "doubtful". Whereas in the group of normal children there were no "deviation" screening results, however, there was a small proportion (14.3%) whose screening results were "doubtful". In the aspect of social development and independence, 2.2% of stunted children were found with "deviation" screening results and 8.7% "doubtful". In normal children's screening results there were no "deviations" screening results, it's just that in normal children there were 9.5% with "doubtful" screening results. Viewed from the screening results for language and speech development, 21.7% of the results were "doubtful" in the stunting group and 9.5% of the results were "doubtful" in normal children.

In terms of the results of the KPSP assessment as a whole, it was found that a small portion (8.7%) had "deviation" results and almost half (47.8%) had "doubtful" results in the stunting group. Whereas normal children are not found with the results of the screening "deviations", but there was found a small proportion (19%), with "doubtful" screening results. From Table IV, it can be seen that the statistical test results show that stunted children are more at risk of 5.525 times getting the results of the "deviation/doubtful" development screening compared to normal children (OR= 5.525; 95% CI= 2.488–12.268; *p*-value <0.001).

DISCUSSION

Stunting is a condition of failure to thrive in children under five resulting from chronic malnutrition so that children are short for their age. This period of malnutrition occurs since the baby is in the womb and in the early days after the baby is born. However, stunting conditions only appear after the baby is 2 years old.[6] Stunting reflects chronic malnutrition and can have long-term impacts, including growth retardation, decreased cognitive, motor, language development and mental abilities, susceptibility to disease, low-economic productivity, and low reproductive quality.[9]

The results of the bivariate test were obtained (*p*-value <0.001), meaning that there was a statistically significant difference in the development of stunted and normal children. The test results also show that stunted children are 5.525 times more at risk of getting "deviation/doubtful" developmental screening results than normal children (OR= 5.525; 95% CI= 2.488–12.268). This is supported by the results of research by several experts including the results of research by Probosiwi et al. (2017) who found stunting to have a relationship with child development, marked OR = 3.9 (1.7–8.9), meaning that among the development of suspect children. It is likely that children with stunting are 3.9 times more at risk than children with normal development.[10] The results of the study Migang (2021) also found stunted toddlers were at risk of 22 times experiencing developmental delays compared to normal toddlers (p-value <0.001; OR = 22,176; 95%CI= 2,661–184,798).[11]

Stunting can cause children to lose their curiosity about the environment, make them lazy to do interact with the environment, so that there is a possibility of failure in achieving motor development when compared to normal children.[12] Stunting will also result in low cognitive and intellectual development, behavioral problems and poor school performance, physical abilities and low productivity, which can last into adulthood.[7,13] The results of the study of Wahidamunir stated the opposite, namely that there was no significant relationship between the incidence of stunting and the level of development of children aged 48–59 months (p value 0.37).[14] This is because the child's growth and development are related to the environment in which the child is born and lives. Development is also influenced by environmental stimuli including parenting, education level and family socio-economic.[1] There are several limitations that need to be considered in this study namely, the cross-sectional design of this study poses limitations to the causal relationship between the variables studied. Also, the data in this study were only processed a bivariately, since the differences in development seen were from the KPSP screening results combining four aspects (fine motoric, gross

Table I: Description of Respondent's Age (in month)

Respondents	N (N= 130)	Min	Max	Means	Standard Deviation
Stunted Children	46	9	60	35.43	14.98
Normal Children	84	3	72	32.18	21.22
Whole Respondents	130	3	72	33.33	19.24

Table II: Frequency distribution of respondent characteristics

Characteristics respondents	Stunted (N= 46)		Normal (N= 84)		Whole respondents (N= 130)	
	f	%	f	%	f	%
Sex						
Man	25	54.3	43	51.2	68	52.3
Woman	21	45.7	41	48.8	62	47.7
What order are you in family						
1st child and 2nd child	28	60.9	55	65.5	83	63.8
> 3rd child	18	39.1	29	34.5	47	36.2
History of birth weight						
LBW (< 2500 grams)	3	6.5	1	1.2	4	3.1
Normal weight (> 2500 g)	43	93.5	83	98.8	126	96.9
Height-for-age category						
Very short	17	37.0	0	0	17	13.1
Short	29	63.0	0	0	29	22.3
Normal	0	0	84	100.0	84	64.6

Table III: Frequency distribution of the results of the KPSP assessment

Characteristics respondents	Stunted (N= 46)		Normal (N= 84)		Whole respondents (N= 130)	
	f	%	f	%	f	%
KPSP results of fine motoric						
Deviation	0	0	0	0	0	0
Doubtful	19	41.3	5	6.0	24	18.5
Normal (according to age)	27	58.7	79	94.0	106	81.5
KPSP results of Gross Motoric						
Deviation	2	4.3	0	0	2	1.5
Doubtful	16	34.8	12	14,3	28	21.5
Normal (according to age)	28	60.9	72	85.7	100	76.9
KPSP results of social and independence						
Deviation	1	2.2	0	0	1	0.8
Doubtful	4	8.7	8	9.5	12	9.2
Normal (according to age)	41	89.1	76	90.5	117	90.0
KPSP results of speech and language						
Deviation	0	0	0	0	0	0
Doubtful	10	21.7	8	9.5	18	13.8
Normal (according to age)	36	78.3	76	90.5	112	86.2
KPSP Results						
Deviation	4	8.7	0	0	4	3.1
Doubtful	22	47.8	16	19.0	38	29.2
Normal (according to age)	20	43.5	68	81.0	88	67.7

LBW: Low Birth Weight, KPSP Results: Results of child development assessment of four aspects (fine motoric, gross motoric, social independence and speech language.

Table IV: Developmental differences in stunting and normal children aged 3–72 months

Child Development (KPSP Result)	Stunted (N= 46)		Normal (N= 84)		Total (N= 130)		*p*-value	OR (95%CI)
	f	%	f	%	f	%		
Deviation/Doubtful	26	61.9	16	38.1	42	100	<0.001	5.525 (2.488–12.268)
Normal (according to age)	20	22.7	68	77.3	88	100		
Total	46	35.4	84	64.6	130	100		

motoric, social independence and speech language). It has not been examined further from each aspect separately and also this research has not explored further about the causes of stunting, it is suggested that future researchers can study it further.

CONCLUSION

It can be concluded that there are developmental differences between stunted children and normal children. In the stunting children group, it was found that a small proportion had "deviation" KPSP measurement results and almost half had "doubtful" KPSP results. Whereas normal children group were not found with the results of the screening "deviations", but there was found a small proportion with "doubtful" screening results. Stunted children are predicted to experience obstacles in the future and have low physical, intellectual and productivity abilities. However, child development is not only influenced by stunting conditions but is also influenced by other factors such as the environment where the child was born, where the child lives and environmental stimuli, including parenting style, level of education and family socio-economic status. This research has not explored further about the causes of stunting, It is hoped that future researchers can study it further.

ACKNOWLEDGMENT

Special thanks to all of the respondents involved, posyandu cadres, Pegang Baru Public Health Center, Pasaman Regency and LPPM STIKes MERCUBAKTIJAYA Padang.

FUNDING

There is no funding provided for this research.

CONFLICT OF INTEREST

Conflicts of interest have not been disclosed by any authors.

REFERENCES

1. Ernawati F, Muljati S, Safitri A. Correlation between birth length and 12 month old child development. Penelit. J Nutr Food Res 2014; 37 (2): 109-18.
2. Ministry of Health Republic of Indonesia. Indonesian Health Profile 2021 [cited Dec 2022]. accessed from: https://www.kemkes.go.id/downloads/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-2021.pdf.
3. Kusnandar VB. This is the West Sumatra region with the largest prevalence of stunting toddlers in 2021 [cited Dec 2022]. Available from: https://databoks.katadata.co.id/datapublish/2022/07/20/ini-wilayah-sumatra-barat-dengan-prevalensi-balita-stunting-terbesar-pada-2021.
4. Primasari, EP, Syofiah PN, Muthia G. Differences in motor development for stunting and normal toddlers in the work area of the Pegang Baru Health Center. PREPOTIF J Kesehat Masy 2020; 5 (1): 1-6.
5. Ministry of Health Republic of Indonesia. Guidelines for Stimulating Early Detection and Intervention on Child Growth and Development at the Basic Health Service Level 2019 [cited April 2020]. Retreived from:https://www.bidannusantara.com/admin/dist/file/Pedoman-SDISTK-di-Puskesmas-2019.pdf.
6. National Team for the Acceleration of Poverty Reduction Republic of Indonesia. Summary of 100 Priority Districts/Cities for Stunting Intervention 2017. [cited Dec 2022]. Available from: https://www.tnp2k.go.id/images/uploads/downloads/Buku%20Ringkasan%20Stunting.pdf.
7. Soetjiningsih and Ranuh, G. 2013. Child Development. EGC.
8. Swarjana, I Ketut. 2022. POPULATION-SAMPLE, Sampling Techniques & Bias in research. 1st Edition. ANDI Publisher.
9. UNICEF. Situation of Children in Indonesia - Trends, opportunities and Challenges in Fulfilling Children's Rights. Unicef Indonesia. May, 2020. [cited April 2020]. Accessed from: https://www.unicef.org/indonesia/sites/unicef.org.indonesia/files/2020-07/Situasi-Anak-di-Indonesia-2020.pdf.
10. Probosiwi H, Huriyati E, Ismail D, et al. Stunting and development among 12-60 month aged children in Kalasan. Ber Kedokt Masy 2017; 33 (11): 559-64.
11. Migang YW. Stunting nutritional status on the developmental level of toddlers. PREPOTIF J Kesehat Masy 2021; 5 (1): 319-27.
12. Pantaleon MG, HadiH, Gamayanti IL, at al. Stunting is related to children's motor development in Sedayu District, Bantul, Yogyakarta. Indon J Nutr Diet 2015; 3(1): 10-21.
13. Alam MA. Impact of early-onset persistent stunting on cognitive development at 5 years of age: results from a multi-country cohort study. PLoS One 2020; 15 (2): 1-16.
14. Wahidamunir W. The relation between stunting incidents and developmental levels of children aged 48-59 months in Pertiwi Majene Kindergarten. J HEST 2022; 2 (1): 26-37.