Indonesian Journal of Global Health Research
Volume 8 Number 3, June 2026
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

HEIGHT-AGE ON THE RISK OF DELAYS IN TODDLER DEVELOPMENT

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ABSTRACT
Short stature of toddlers is a height discrepancy according to age in toddlers which can cause interference with the development of fine movements, gross movements, speech and language as well as social independence. Short stature in toddlers can result in long-term deficits in physical and mental development so that they are unable to learn optimally at school compared to children of normal height. Short stature can be a normal or abnormal variant. Children with normal variations of short stature do not require treatment, while abnormal short stature in children needs to be recognized early. The aim of this study was to explore the impact of height discrepancy according to age on the risk of developmental delays in toddlers at the Children's Polyclinic at Panti Nirmala Hospital in Malang. This research design uses a cross-sectional method with a sampling technique carried out in this way, namely purposive sampling of 60 respondents, data collection is carried out by measuring the child's height and measuring development using the Denver test. Based on test Chi Square it can be seen that the value p = 0.000, this value is smaller than p <0.05, so the conclusion from this study is that there is a significant influence between the two variables where this result indicates short stature can increase the risk of delays in achieving the developmental stages of toddlers through validation of the DDST measuring instrument. This research can be input for nurses to do more aware, more agile and more improved knowledge regarding the development of management models for weight-age, height-age and nutritional status of children towards the achievement of toddler development stages.

Keywords: denver test; development; height-age; toddler

How to cite (in APA style)
Anjarwati, N., & Nurwidyaningtyas, W. (2026). Height-Age on the Risk of Delays in Toddler Development. *Indonesian Journal of Global Health Research*, *8*(3), 1297–1304. https://doi.org/10.37287/ijghr.v8i3.896.

INTRODUCTION

Abnormal short stature in children is a height discrepancy for age caused by chronic malnutrition, which can lead to various short- and long-term problems. Short stature in children can lead to developmental disorders, including fine motor skills, gross motor skills, speech and language, and social independence. Toddlers with short stature will experience difficulties in achieving optimal physical and cognitive development in the future (Nailis A, 2017). Child development encompasses all changes that occur in a child, including physical, motor, personal-social, language and speech skills, as well as social and independence development (Sumiyati, 2018). Many factors play a crucial role in supporting physical growth and development, one of which is nutrition. Malnutrition at this age impacts children's growth and development. Malnutrition issues that are often associated with development are malnutrition and stunting, more commonly known as short stature (Yeni Iswari, 2021). Short stature is defined as height <P3 or -2SD of the applicable curve according to age and gender according to the WHO and CDC standard growth curves (IDAI 2017).

The 2018 Global Nutritional Report reported that there are approximately 150.8 million (22.2%) stunted toddlers, which is one of the factors inhibiting human development in the world. The World Health Organization (WHO) has identified five sub-regions of stunting prevalence, including Indonesia in the Southeast Asia region (36.4%) (United Nations, 2018) (UNICEF, Levels and Trends in child malnutrition - UNICEF WHO The World Bank Join Child Malnutrition Estimates, 2019). According to the WHO (World Health Organization), more than 200 million children under 5 years of age, including toddlers, worldwide do not fulfill their developmental potential, and most

of them live in Asia and Africa. The incidence of developmental delays in the United States ranges from 12-16%, Thailand 24%, and Argentina 22% (Yunita, 2020). National data from the Indonesian Ministry of Health indicates that in 2014, 13% to 18% of toddlers experienced growth and developmental disorders (Ministry of Health, 2014). At Panti Nirmala Hospital, specifically in the Pediatric Clinic, approximately 1 in 5 children were still found to be stunted. Data from January to November 2022 showed that approximately 47 children were stunted.

Toddlers with stunting also have an IQ 5-10% lower than those of normal children (Adillah, 2019). Toddlers with stunted stature tend to experience slow physical growth and stunting, a result of inadequate nutritional intake. Nutrition plays a crucial role in growth, especially in toddlers, where adequate nutrition can impact subsequent growth and development. Disrupted physical growth in toddlers can also impact the development of nerve cells, which can impact motor function, intelligence, and social responsiveness. This can negatively impact the function of the five senses, which stimulate the brain (Ruminingsih, 2022). Several previous studies have shown that toddlers with short stature tend to have lower cognitive abilities, delayed motor and language development, and are more susceptible to infectious diseases. However, previous researchers generally only examined individual aspects of child development, and the results varied. Based on this background, this study aims to further examine the impact of short stature, especially on the risk of developmental delays in toddlers in the Panti Nirmala Hospital area, Malang.

METHOD

The type of research used in this study is a correlation design with a cross-sectional approach that aims to determine the relationship between variables where the independent and dependent variables are identified at one time. The population of this study was all toddler patients at the Children's Polyclinic of Panti Nirmala Hospital in March - August 2023 totaling 100 respondents. The estimated subjects/samples in this study were all short-statured toddlers who came to the Children's Polyclinic of Panti Nirmala Hospital Malang in the period February - June 2023. If the number of short-statured toddlers from January - November 2022 was found to be 47 patients, the maximum estimated number of subjects/samples of the study was 42 subjects/samples. The sampling technique was carried out by non-random sampling using a purposive sampling method. Researchers used a sample of 60 respondents who met the inclusion criteria (fully conscious toddler patients, mothers who were willing for their children to be respondents, present at the location when the study took place, parents who could communicate well and clearly). The time of data collection and research was carried out from March to August 2023. The research was conducted at the Children's Polyclinic of Panti Nirmala Hospital Malang using interview techniques, then measuring body length/height using a microtoise and length board followed by examining HEIGHT-AGE discrepancies using the DDST format. The data analysis technique in this study used the Chi square test. The Chi Square test is classified as a type of non-parametric statistics used to test two variables, both of which are nominal categories (Swarjana, 2015), said to have a significant relationship if with a 95% confidence level, the p-value is less than 0.05.

RESULT

A total of 60 respondents agreed to participate in this study, in table.
1 shows the age distribution of the newborn respondent group as many as 9 respondents (15%), the infant respondent group as many as 28 respondents (46.6%) and the toddler respondent group as many as 23 respondents (38.4%). Respondents who had acute illnesses were 51 respondents (85%), respondents who had chronic illnesses were 9 respondents (15%). In the distribution of HEIGHT-AGE there were 30 toddlers with normal stature (50.0%). Meanwhile, toddlers with very short stature were 14 children (23.3%) and short stature were 16 people (26.7%). In table 2 shows the distribution of HEIGHT-AGE against the developmental stage through validation of the DDST measuring tool as many as 60 respondents, the majority of children as many as 51 respondents (85%) had normal development. While as many as 9 respondents (15%) were

suspected of experiencing a risk of developmental delay. Table 3 shows the height/age interpretation for 14 very short stature children, with 8 (88.9%) suspected and 6 (11.8%) normal development. There were 16 short stature children, with 1 (11.1%) suspected, and 15 (29.4%) short-stature toddlers with normal development. There were 30 normal-stature toddlers with normal development, with 0 (0.0%) suspected and 30 (58.8%) normal.

Table 4 shows that in the treatment group, for respondents with very short stature, 6 (11.5%) had normal development and 8 (88.9%) had suspected developmental delays. For respondents with short stature, 15 (29.4%) had normal development and 1 (100%) had suspected developmental delays. Meanwhile, for toddlers with normal stature, 30 (100%) had normal development. The results of the statistical test using Chi square obtained a p value = 0.000, meaning the p value <0.05, these results indicate that short stature can increase the risk of delays in achieving toddler developmental stages.

Table 1.
Characteristics of Respondents (n= 60)

No	General Data	f	%
Age	Newborn	9	15
	Infant	28	46,6
	Toodler	23	38,4
Penyakit Penyerta	Acute	51	85
	Chronic	9	15
Height-age	Very Short Stature	14	23,3
	Short Stature	16	26,7
	Normal	30	50,0

Table 2.
Respondent Characteristics Based on Height/Age Against Development Stage (n= 60)

Interpertasi DDST	f	%
Suspect	9	15
Normal	51	85

Tabel 3.
Respondent Characteristics from DDST Results According to Height-Age (n= 60)

Height-Age	Interpertasi			
	Suspect		Normal	
	f	%	f	%
Very Short Stature	8	88.9	6	11.8
Short Stature	1	11,1	15	29.4
Normal	0	0.0	30	58.8

Tabel 4.
Chi-square Test Analysis Exploring the Impact of HEIGHT Mismatch According to Age on the Risk of Delayed Developmental Stages in Toddlers

Height-Age	Interpertasi						*Chi Square Test*
	Normal		Suspect		Total		
	f	%	f	%	f	%	
Very Short Stature	6	11.8	8	88.9	14	23.3	
Short Stature	15	29.4	1	11.1	16	26.7	*P* = 0.000
Normal	30	58.8	0	0.0	30	50.0	

DISCUSSION

Based on table 3, After Z-score measurements were carried out on 60 respondents based on the HEIGHT-AGE distribution, there were 30 toddlers with normal stature (50.0%). Meanwhile, for toddlers with short stature, there were 14 children with very short stature (23.3%) and 16 children with short stature (26.7%). Based on the age distribution of the newborn respondent group, there were 9 respondents (15%), the infant respondent group had 28 respondents (46.6%) and the toddler respondent group had 23 respondents (38.4%). Short stature is a problem of chronic malnutrition caused by a lack of nutritional intake over a long period of time, resulting in growth disorders in

children, namely the child's height is lower or shorter (dwarfism) than the standard for their age. Short toddlers are toddlers with nutritional status based on length or height according to age when compared to WHO standard standards, the z-score value is less than -2 standard deviations and is categorized as short if the z-score value is less than -3 standard deviations, categorized as very wasteful (Kurniati, Pakalia, 2020). Abnormal short stature in children needs to be recognized early. The causes of short stature are divided into normal and abnormal or pathological variants. Pathological causes include endocrine (hormonal disorders, chromosomal abnormalities, etc.) and non-endocrine (malnutrition, chronic illness, psychosocial factors, etc.). Short stature in children under 5 years of age requires special attention at all levels of health care because stunted growth in early life has both short- and long-term implications, such as an increased risk of morbidity and mortality due to impaired mental development, decreased school performance, decreased income in adulthood, physical and functional deficits, and an increased prevalence of infectious and metabolic diseases (Purnamasari, 2023).

Based on table 4, after conducting the z-score and DDST II examination, the results of the interpretation of Height/Age for very short stature were 14 people with very short stature, with 8 people (88.9%) suspected and 6 people with normal stature (11.8%). Based on the interpretation results above, it shows that the majority of respondents with very short stature were suspected of experiencing a risk of delay in achieving developmental stages which was also caused by other factors, namely chronic diseases and chronic malnutrition as explained in Table 5.2. For short stature, there were 16 people with a suspect of 1 person (11.1%) who had a chronic disease and malnutrition status and 15 respondents with normal stature (29.4%) who did not have chronic diseases and normal nutritional status. There were 30 toddlers with normal stature (58.8%) with 0 people (0.0%) suspected.

According to Supariasa (2016), development is the increase in abilities (skills) in more complex body structures and functions in a regular and predictable pattern as a result of the maturation process of body cells, tissues, organs, and organ systems, each developing in such a way that each can fulfill its function. This also includes the child's emotional, intellectual, and behavioral development as a result of interactions with their environment. Severe short stature in children will result in long-term deficits in physical and mental development, making them unable to learn optimally in school compared to children of normal height. The underlying factors that cause short stature can interfere with growth and intellectual development.

Research by Hairunis (2018) entitled "The Relationship between Nutritional Status and Growth and Development Stimulation with Toddler Development" concluded that toddlers with normal stature have a 3.3 times greater chance of achieving appropriate development compared to toddlers with short and very short stature. Toddlers require adequate nutritional stimulation to support their development. Toddlers with short stature are at risk of delayed growth and development. Therefore, adequate stimulation and nutrition are needed to prevent growth failure. Developmental delays can be prevented through physical exercise and early stimulation, which will enhance a child's development. Stimulation of growth and development is a factor that influences toddler development. The interaction between the environment and stimulation can influence the development of each child. The period before five is a crucial period in child development because the fundamental growth and development that occurs during infancy will influence and determine the child's subsequent development.

The Chi-Square test shows a p-value of 0.000, which is less than $p<0.05$, indicating a significant relationship between the two variables. These results indicate that short stature can increase the risk of delayed developmental milestones in toddlers. Therefore, the hypothesis is accepted. This likely occurs because many factors can influence short stature. Direct factors include dietary intake, infectious diseases, low birth weight, and genetics. Indirect factors include nutritional knowledge,

parental education, socioeconomic status, parenting styles, food distribution, and family size (Supariasa, 2017).

Panti Nirmala Hospital, particularly in the Pediatric Clinic, still finds that 1 in 5 children meet the criteria for short stature. Data from March to August 2023 revealed approximately 30 children with stunting. At each monthly visit, the children were found to be short to very short. Some parents were unaware of their child's condition, claiming they still ate at home and were active while playing, without realizing the importance of paying attention to age-appropriate nutrition and calorie intake. After conducting z-score and DDST examinations, 30 respondents were found to be short to very short, and 9 respondents were suspected of being at risk of developmental delays due to chronic illnesses and chronic nutritional problems. Wulansari's (2021) study, "The Effect of Stunting on the Development of Toddlers Aged 2-5 Years in Madiredo Village, Pujon District, Malang Regency," concluded that stunted toddlers with growth disorders are caused by chronic malnutrition and/or chronic or recurrent infectious diseases, as indicated by a height-for-age (H/A) z-score <-2 standard deviations according to the WHO. This can lead to impaired fine motor, gross motor, language, and personal-social development.

Purnamasari's (2023) research, entitled "Recognizing Abnormal Short Stature in Children," concluded that short stature can be a normal or abnormal variant. Children with normal variations of short stature do not require treatment, while abnormal short stature in children needs to be recognized early. The causes of short stature are divided into normal and abnormal or pathological variants. For example, a family history of short stature and normal growth rate, short stature accompanied by delayed puberty, hormonal or chromosomal abnormalities or syndromes, short stature accompanied by normal weight or obesity leading to hormonal disorders can indicate a normal variant. Pathological causes include endocrine (hormonal disorders, chromosomal abnormalities, etc.) and non-endocrine (malnutrition, chronic illness, psychosocial, etc.). Early recognition of abnormal short stature through clinical and supporting examinations allows for appropriate management and is expected to improve the child's quality of life and reduce the socioeconomic burden on the family, society, and the nation. Age-specific HEIGHT or short stature significantly impacts the risk of developmental delays in toddlers with abnormally short stature, which can impact cognitive, psychosocial, and quality-of-life impairments later in life. It is recommended that the community consistently monitor children's growth and development closely, as both are closely related to improving human resource quality. Further early detection and parental involvement are needed to optimally stimulate the development of toddlers with short stature to minimize the incidence of greater deviations (Purnamasari, 2023).

CONCLUSION

During the visit of the Children's Polyclinic of Panti Nirmala Hospital, as many as 60 respondents, 50% of children who came to the Children's Polyclinic of Panti TNirmala Hospital showed a normal stature category, 26.7% short stature and 23.3% very short stature. The results of the DDST II validation showed that toddlers who came to the Children's Polyclinic of Panti Nirmala Hospital had normal category development and 15% had a suspect category. The discrepancy between Height/Age in toddlers at the Children's Polyclinic of Panti Nirmala Hospital will increase the risk of delay (p: 0.000) through the validation of the DDST measuring tool. This can be seen from the number of children with very short stature and short stature who have a risk of delay compared to children who have normal Height/Age

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