

## RESEARCH STUDY

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# Development of Under-five Wasting Children and Related Factors in Padang City

## Perkembangan dan Faktor yang Berhubungan dengan Balita Wasting di Kota Padang

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### ABSTRACT

**Background:** At the age of under five years, there is rapid physical, cognitive, social, and emotional development, which influences their future abilities. The prevalence of wasting in Indonesia is 7.7%, but it has not received serious attention, so it needs to be explored further.

**Objectives:** This Study aimed to examine the development of under-five wasting children and any associated factors in the Anak Air's Health Center Working Area, Padang City.

**Methods:** It was observational analytical research with a cross-sectional design. The research sample was under-five wasting children aged 12 – 60 months, totaling 118 people taken as respondents. Data on the internal factors of respondents was collected using a validated questionnaire. The development of respondents was examined by using the pre-developmental screening questionnaire. Data was analyzed using chi-square and ordinal logistic regression.

**Result:** This study found that most respondents were under 3 years old, male, had normal birth weight, and had no history of suffering from infectious diseases. A total of 13 (11.1%) of respondents had deviation development, 59 (50%) were doubtful, and only 46 (38.9%) had normal development. Bivariate results showed a significant relationship between age (p-value=0.024), gender (p-value=0.034), and infectious diseases (p-value=0.001) with respondents' development. There is no significant relationship between birth weight and the respondents' development (p-value=0.906). Age is the most related factor to the respondents' development.

**Conclusion:** The conclusion is most respondents have questionable and distorted development, and age is the most related factor. More attention is needed for under-five wasting children so that their development is normal.

### INTRODUCTION

Toddlers are a crucial period in a child's life. Rapid physical, mental, social, cognitive, and psychological growth occurred during this period. Various factors can disrupt toddler growth and development, including malnutrition. Malnutrition due to lack of nutritional intake causes failure to grow. One is a lack of body weight based on the child's age, known as wasting.

Wasting is one of the nutritional problems in toddlers that has not been resolved. The wasting reach 45 million or around 6.8% in 2022 globally<sup>1</sup>. The prevalence of wasting in Indonesia is around 7.7%, based on the results of the Indonesian Nutritional Status Survey (SSGI) in 2022. The prevalence of wasting in Padang City has increased from 7.7% in 2021 to 8.1% in 2022<sup>2</sup>. This

shows that the figure is rising from the National Medium Term Development Plan target of 7.5%. The highest prevalence of wasting in Padang City is in the working area of the Air Children's Health Center<sup>2,3</sup>.

Wasting causes delays in children's growth and development. Toddlers with wasting nutritional status have a 3.5 more significant risk of experiencing growth and development failure compared to normal children<sup>4</sup>. Toddler development has at least four domains, namely language development, gross motor skills, fine motor skills, and social development. This development can be screened using an instrument called the pre-screening development questionnaire<sup>4</sup>. Repeated and unresolved wasting in toddlers causes stunting<sup>5,6</sup>.

The growth and development of toddlers are influenced by several factors, namely age, gender, history of birth weight, and history of infection<sup>7</sup>. Toddlers are an age group that are vulnerable to health and nutritional problems. Toddlers are transitioning from being passive consumers to being semi-active consumers. During the toddler period, dietary needs increase, while toddlers cannot yet ask for or find food. Working mothers often entrust the care of toddlers to other people so that the risk of malnutrition is greater<sup>8</sup>. Other risk factors such as gender, birth history, and the incidence of infectious diseases in toddlers also influence the toddler's development. Girls usually develop faster than boys. Toddlers with a history of low birth weight and contagious diseases have a greater risk of experiencing developmental disorders<sup>9-11</sup>.

Anak Air Health Center is located in Koto Tengah District, which has the highest wasting prevalence in Padang City. A preliminary study conducted at the Anak Air Health Center found that data on toddlers with malnutrition (wasting) increased from 2021 to 2022. The target indicator for toddlers with malnutrition (wasting) at the Anak Air Health Center has also not reached the target according to the National Medium-Term Development Plan (RPJMN) in 2021, and the achievement of Early Detection of Growth and Development is still low at around 68.4%. The development assessment of 5 toddlers with malnutrition using the pre-screening development questionnaire found that 4 toddlers had questionable development and 1 toddler had appropriate development<sup>12</sup>. The presence of developmental disorders in toddlers is an indicator that there will be developmental disorders at a later age and will even cause adverse impacts in adulthood. This study aimed to examine the development of toddlers affected by wasting and any associated factors in the Anak Air's Health Center Working Area, Padang.

## METHODS

This study used a cross-sectional design. Data is taken simultaneously to see the relationship between the two variables. 118 mothers who had under-five wasting child aged 12-60 months in the Anak Air Health Center working area were taken as respondents. Data collection was conducted from October to November 2023. Mothers of toddlers willing to participate in the research, who signed informed consent forms, had a maternal and child health book/card for health, and did not entrust their children to other people were included in the research. Mothers who could not be found during two visits had changed addresses or her child had normal nutritional status based on weight examination were excluded from the study. This research was approved by the Faculty of Medicine ethics committee, Universitas Andalas, number 493/UN.16.2/KEP-FK/2023 on September 25, 2023.

The wasting population data was obtained from

the Anak Air Health Center documentation. Then, all of under-five wasting children based on the data were re-evaluated. Weight measurements were carried out using calibrated scales. Then the nutritional status of respondents was assessed by weight based on age. Respondents who were in wasting conditions were included as respondents. Data on toddler characteristics in age, gender, birth history, and infections were obtained from interviews and observations. The toddler's mother was asked about the child's age and weight at birth and the data was confirmed with records from the maternal and child health book/card. The toddler's health history in the form of infection was obtained from interviews with the toddler's mother.

Toddler development was assessed using the pre-developmental screening questionnaire. The pre-developmental screening questionnaire is a questionnaire that has been recognized for screening the development of toddlers and has been widely used in Indonesia<sup>13</sup>. The questionnaire consists of ten questions answered with "yes" or "no". A "yes" answer is given a value of one and a "no" answer is given a value of zero. All scores are added together to get the final score. The examination results are assessed using 3 criteria: development according to a value of 9-10, doubtful development of a value of 7-8, and deviation of development of a value <6. Data collection was carried out by researchers assisted by one trained enumerator. Data were analyzed statistically using the chi-square and multivariate tests using logistic regression.

## RESULTS AND DISCUSSIONS

This research involved 118 mothers who had wasting child aged 12-60 months. Under-five wasting children characteristics can be seen in the table 1. Table 1 shows that most of the research subjects were under three years old, male, had average birth weight, and had no history of infectious diseases. The analysis showed that most respondents, namely those aged 1-3 years, were as many as 76.3%, compared to those aged 4-5 years, as much as 23.7%. This is in line with several other studies which say wasting occurs more often in younger children. Age 1-3 is crucial for children's growth and development<sup>14-16</sup>. Children under the age of three are particularly vulnerable to malnutrition, including conditions like wasting. This vulnerability arises from several factors, such as the developing digestive system, which may not fully function yet; the high energy demands associated with rapid growth; and young children remain passive recipients of care, relying on those around them. An immature digestive tract may struggle to absorb sufficient nutrients, including proteins, to meet the child's needs. Furthermore, if parents or caregivers lack nutrition knowledge, the food provided to children may fail to satisfy their dietary requirements, leading to malnutrition<sup>17</sup>.

**Table 1.** Characteristics of under-five-wasting children

Variable	Frequency (n)	%
Age		
1-3 years	90	76.3
4-5 years	28	23.7

Variable	Frequency (n)	%
Gender		
Boy	66	55.9
Girl	52	44.1
Birth weight		
Low birth weight	14	11.9
Normal	104	88.1
History of infectious disease		
Present	20	16.9
Absent	98	83.1
Total	118	100

The research showed that respondents at toddler age experienced doubtful development by around 50%. This is because it is possible that at this age, children's eating patterns change, making it difficult for them to adapt to changes in nutrition. It was also found that most toddlers at this age still lack socialization and independence, which causes their development to be delayed.

The analysis results showed that the number of boys respondents was greater than the number of girls respondents. The results also revealed that about 60.6% of boys are more likely to experience doubt, and 9.1% have development deviation. Various studies suggest a connection between gender and developmental delays in under-five children. It is observed that boys are more active in outdoor play, expending energy without a

corresponding intake, potentially contributing to these findings<sup>18-20</sup>.

Examination of respondents' development can be seen in table 2. Table 2 shows that more of the respondents' development was doubtful development, around 50%, compared to normal development, around 39%, and deviant development, around 11%. This shows that the majority of wasting toddlers are developmentally inappropriate, around 61%. Other research says that dominant under-five-wasting children experience doubtful development<sup>21,22</sup>. Insufficient nutritional status will hinder the rate of development experienced by individuals. As a result, the proportions of body structure become inappropriate for their age, which ultimately will have implications for the development of other aspects.

**Table 2.** Distribution of wasting toddlers' development

Classification	Frequency (n)	%
Deviation	13	11.1
Doubtful	59	50
Normal	46	38.9
Total	118	100

The research showed a relationship between children's age and the development of under-five-wasting children (table 3). Several studies also say a relationship exists between children's age and development. Other research says that younger children at 36 months have a 0.8 times higher risk of experiencing developmental delays than older children at 60 months<sup>18</sup>. Other researchers also revealed that 35.7% of children under the age of 3 years were suspected of experiencing developmental delays, and among children aged 6–12 months, 17%–20% of them experienced delays in communication, problem-solving, personal-social, and gross motor skills, and almost 30% experience delays in fine motor development<sup>23</sup>. Child hemoglobin

concentrations, care and stimulation factors, and caregiver factors were all either directly or indirectly linked to suspected developmental delay in the structural equation model. These results point to areas that future intervention programs should concentrate on, such as enhancing nutrition and feeding practices, increasing public awareness of developmental delays, and enhancing parenting abilities to enable parents to spend more time with their kids. The other factors, such as the developing digestive system, which may not fully function yet, the high energy demands, and others that cause children at younger ages to have a greater risk of suffering from wasting<sup>17,23</sup>.

**Table 3.** The Relationship between internal factors and the development of wasting toddlers

Variable	Development of Wasting Toddlers						Total		p-value
	Deviation		Doubtful		Normal		n	%	
	n	%	n	%	n	%			
Age									
1-3 years	6	6.7	48	53.3	36	40	90	100	
4-5 years	7	25	11	39.3	10	35.7	28	100	0.024*
Total	13	11	59	50	46	39	118	100	
Gender									
Boy	6	9.1	40	60.6	20	30.3	66	100	
Girl	7	13.5	19	36.5	26	50	52	100	0.034*
Total	13	11	59	50	46	39	118	100	

Variable	Development of Wasting Toddlers						Total		p-value
	Deviation		Doubtful		Normal		n	%	
	n	%	n	%	n	%			
Birth weight									
Low birth weight	2	14.3	7	50	5	35.7	14	100	0.906
Normal	11	10.6	52	50	41	39.4	104	100	
Total	13	11	59	50	46	39	118	100	
History of infectious disease									
Present	6	30	12	60	2	10	20	100	0.001*
Absent	7	7.1	47	48	44	44.9	98	100	
Total	13	11	59	50	46	39	118	100	

\*Chi-square test, significant if p-value<0.05

There was no significant relationship between birth weight and toddler development in this study (table 3). This may be due to most toddlers having a normal birth weight, accounting for approximately 88.1% of the total, while around 11.9% had an abnormal birth weight. The study, conducted in the Boyolali area, included 203 respondents, 87.2% having a normal birth weight<sup>24</sup>. Children who were born with low birth weight (LBW) are at a higher risk of developmental delays compared to those born with normal weight. Research also suggests that LBW children are more likely to experience motor development issues during their toddler years<sup>25</sup>. The conditions during prenatal periods can significantly impact childhood and adulthood. LBW children are linked to various disorders such as oral, memory, executive function, cognitive, and metabolic disorders, including obesity, type 2 diabetes mellitus, and hyperlipidemia<sup>10,11</sup>. Additionally, children with LBW may encounter central nervous system problems, leading to developmental delays in the future<sup>26</sup>.

The analysis revealed that a more significant percentage (83.1%) of wasting toddlers did not have a history of infectious diseases compared to those (16.9%) who did. This suggests a correlation between a lack of contagious disease history and developing wasting in toddlers. Other studies have also found a high percentage (77.8%) of toddlers without a history of infectious diseases. Consistent with this research, there appears to be a connection between a history of contagious diseases and toddler development. When infected, the body expends excess energy to fight the disease instead of focusing on growth and development, disrupting children's overall well-being. Frequent infections, like ear or respiratory infections, can result in long-term health issues. Toddlers who experience frequent illness may miss out on opportunities to develop motor skills due to fatigue or being unwell. This can lead to a lack of engagement in activities that support cognitive growth, such as play, exploration, and interaction with their environment. Since brain development is rapid during this stage, illness can diminish the necessary stimulation for optimal cognitive development. Moreover, the discomfort caused by infections can make toddlers more irritable, anxious, or withdrawn, which may impede the development of healthy emotional responses<sup>27,28,29</sup>.

This study has several limitations. This study used a cross-sectional design by taking dependent and independent variables simultaneously. So, no causal relationship between the two variables could be assessed. In addition, the research variables are still

limited to discussing internal factors related to wasting children. This study was also conducted in a limited area in Padang City, so the study's result may be different from other areas.

### CONCLUSIONS

This research concludes that most under-five-wasting children have doubtful and distorted development. Age, gender, and incidence of infection in under-five-wasting children are related to the occurrence of developmental disorders in toddlers. Developmental screening and immediate intervention are needed for all wasting children so that they do not fall into worse developmental disorders.

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### CONFLICT OF INTEREST AND FUNDING DISCLOSURE

All authors have no conflict of interest in this article and no funding from others.

### AUTHOR CONTRIBUTIONS

DD: conceptualization, methodology, supervision, validation, writing—original draft, and editing; FTS: conceptualization, methodology, investigation, writing—review and editing; BIU: methodology; formal analysis, writing—review.

### REFERENCES

- 1 UNICEF, W. a. W. B. G. Levels and Trends in Child Malnutrition. New York. (2023). URL: <https://www.who.int/publications/i/item/9789240073791>.
- 2 Kementerian Kesehatan RI (2022a). Buku Saku Hasil Studi Status Gizi Indonesia (SSGI) Tahun 2022. (2022). URL: <https://repository.badankebijakan.kemkes.go.id/id/eprint/4855/3/Buku%20Saku%20SSGI%202022%20rev%20270123%20OK.pdf>.
- 3 Kementerian Kesehatan RI. Pedoman Indikator Program Kesehatan Masyarakat Dalam RPJMN Dan Renstra Kementerian Kesehatan Tahun 2020 - 2024. Jakarta (2020).
- 4 Husin, M., Wikananda, G. & Suryawan, I. W. B. The association between wasting nutritional status and delayed of child development in children age 12-60 months in Wangaya General Hospital, Denpasar, Bali. *Intisari Sains Medis* **10**

- (2019). DOI: <https://doi.org/10.15562/ism.v10i2.384>.
- 5 Richard, S. A. *et al.* Wasting is associated with stunting in early childhood. *The Journal of nutrition* **142**, 1291-1296 (2012). DOI: <https://doi.org/10.3945/jn.111.154922>.
- 6 Schoenbuchner, S. M. *et al.* The relationship between wasting and stunting: a retrospective cohort analysis of longitudinal data in Gambian children from 1976 to 2016. *The American journal of clinical nutrition* **110**, 498-507 (2019). DOI: <https://doi.org/10.1093/ajcn/nqy326>.
- 7 Diana, F. M. Pemantauan perkembangan anak balita. *Jurnal Kesehatan Masyarakat Andalas* **4**, 116-129 (2010). DOI: <https://doi.org/10.24893/jkma.v4i2.79>.
- 8 Arisman 2008, Gizi dalam Daur Kehidupan, Jakarta: Penerbit Buku Kedokteran. EGC.
- 9 Andini, V., Maryanto, S. & Mulyasari, I. The correlation between birth length, birth weight and exclusive breastfeeding with the incidence of stunting in children age group 7-24 months in wonorejo village, pringapus district, semarang regency. *Jurnal Gizi Dan Kesehatan* **12**, 49-58 (2020). DOI: <https://doi.org/10.35473/jgk.v12i27.60>.
- 10 Hatch, B., Healey, D. M. & Halperin, J. M. Associations between birth weight and attention-deficit/hyperactivity disorder symptom severity: indirect effects via primary neuropsychological functions. *Journal of Child Psychology and Psychiatry* **55**, 384-392 (2014). DOI: <https://doi.org/10.1111/jcpp.12168>.
- 11 Andreanetta, P. T., Santosa, Q., Indriani, V., Arifah, K. & Fatchurohmah, W. Hubungan Berat Badan Lahir Dengan Status Gizi Dan Perkembangan Anak Usia 6-60 Bulan. *Jurnal Medika Udayana* **11**, 7-11 (2022). DOI: <https://doi.org/10.24843.MU.2022.V11.I9.P07>.
- 12 Febri, T. S. *Faktor-Faktor yang Berhubungan dengan Perkembangan Balita Wasting i Wilayah Kerja Puskesmas Anak Air Kota Padang Tahun 2023*, Universitas Andalas, (2024).
- 13 Dhamayanti, M. Kuesioner praskrining perkembangan (KPSP) anak. *Sari Pediatri* **8**, 9-15 (2016). DOI: <https://doi.org/10.14238/sp8.1.2006.9-15>.
- 14 Erika, E., Sari, Y. & Hajrah, W. O. Kejadian Wasting pada Balita Usia 6-59 Bulan: Wasting Incidence among Toddlers aged 6-59 Months. *Jurnal Bidan Cerdas* **2**, 154-162 (2020). DOI: <https://doi.org/10.33860/jbc.v2i3.110>.
- 15 Soedarsono, A. M. & Sumarmi, S. Faktor yang Mempengaruhi Kejadian Wasting pada Balita Di Wilayah Kerja Puskesmas Simomulyo Surabaya Factors that Influence the Incident of Wasting Among Children Under Five Years Old In Simomulyo Public Health Center Surabaya. (2021). DOI: <https://doi.org/10.20473/mgk.v10i2.2021.237-245>.
- 16 Afrah, R., Desmawati, D. & Sriyanti, R. Tackling Toddler Malnutrition: Exploring Maternal Influences on Wasting. DOI: <https://doi.org/10.52403/ijrr.20240105>.
- 17 Black, R. E. *et al.* Maternal and child undernutrition and overweight in low-income and middle-income countries. *The lancet* **382**, 427-451 (2013). DOI: [10.1016/S0140-6736\(13\)60937-X](https://doi.org/10.1016/S0140-6736(13)60937-X).
- 18 Shatla, M. M. & Goweda, R. A. Prevalence and factors associated with developmental delays among preschool children in Saudi Arabia. *Journal of High Institute of Public Health* **50**, 10-17 (2020). DOI: [10.21608/jhiph.2020.79318](https://doi.org/10.21608/jhiph.2020.79318).
- 19 Gupta, S., Shrivastava, P., Samsuzzaman, M., Banerjee, N. & Das, D. K. Developmental delay among children under two years of age in slums of Burdwan Municipality: A cross-sectional study. *Journal of Family Medicine and Primary Care* **10**, 1945-1949 (2021). DOI: [10.4103/jfmpc.jfmpc\\_1926\\_20](https://doi.org/10.4103/jfmpc.jfmpc_1926_20).
- 20 Hanna, H. Faktor-Faktor yang Berpengaruh Terhadap Gangguan Tumbuh Kembang Pada Anak di Klinik Tumbuh Kembang Rsia Bunda Aliyah. *Jurnal Mahasiswa BK An-Nur: Berbeda, Bermakna, Mulia* **8**, 252-263 (2022). DOI: [http://dx.doi.org/10.31602/jmbkan.v8i3.9023](https://doi.org/10.31602/jmbkan.v8i3.9023).
- 21 Pratama, A. A., Ardian, J., Lastyana, W. & Rahmiati, B. F. Hubungan Status Gizi dengan Perkembangan Anak Usia 1-5 Tahun. *Nutriology: Jurnal Pangan, Gizi, Kesehatan* **4**, 33-38 (2023). DOI: <https://doi.org/10.30812/nutriology.v4i2.3239>.
- 22 Arifuddin, D., Nulanda, M., Jafar, M. A. & Abdullah, R. P. I. Hubungan Status Gizi Dan Riwayat BBLR Terhadap Perkembangan Anak Dengan Studi KPSP Dipuskesmas Maradekaya. *Fakumi Medical Journal: Jurnal Mahasiswa Kedokteran* **3**, 308-318 (2023). DOI: <https://doi.org/10.33096/fmj.v3i4.198>.
- 23 Zhang, J. *et al.* Factors influencing developmental delay among young children in poor rural China: a latent variable approach. *BMJ open* **8**, e021628 (2018). DOI: [10.1136/bmjopen-2018-021628](https://doi.org/10.1136/bmjopen-2018-021628).
- 24 Amir, N. A. R., Budihastuti, U. R. & Murti, B. Factors Associated with Development in Children Under Five. *Journal of Maternal and Child Health* **4**, 40-48 (2019). DOI: <https://doi.org/10.26911/thejmch.2019.04.01.06>.
- 25 Nazi, S. & Aliabadi, F. Comparison of motor development of low birth weight (LBW) infants with and without using mechanical ventilation and normal birth weight infants. *Medical journal of the Islamic Republic of Iran* **29**, 301 (2015). URL: <https://pubmed.ncbi.nlm.nih.gov/articles/PMC4764289/pdf/MJIIRI-29-301.pdf>.
- 26 Nengsih, U. & Noviyanti, D. S. D. Hubungan riwayat kelahiran berat bayi lahir rendah dengan pertumbuhan anak usia balita. *Jurnal Bidan* **2**, 234046 (2015). URL: <https://media.neliti.com/media/publications/234046-hubungan-riwayat-kelahiran-berat-bayi-la-3abc33e7.pdf>.



- 27 Hayuningtyas, R. D., Laila, S. F. N. & Nurwijayanti, N. Analysis of Factors Affecting the Development of Children of Toddler Ages Assessed from History of Infection Diseases, Nutritional Status and Psychosocial Stimulation in Ponorogo Regency. *Journal for Quality in Public Health* **3**, 341-347 (2020). DOI: <https://doi.org/10.30994/jqph.v3i2.82>.
- 28 Desyanti, C. & Nindya, T. S. Hubungan riwayat penyakit diare dan praktik higiene dengan kejadian stunting pada balita usia 24-59 bulan di wilayah kerja Puskesmas Simolawang, Surabaya. *Amerta Nutrition* **1**, 243-251 (2017). DOI: <https://doi.org/10.20473/amnt.v1i3.2017.243-251>.
- 29 Rahmi, A. T., Azrimaidaliza, A. & Desmawati, D. Hubungan Kesulitan Makan Dengan Status Gizi Pada Anak 3-5 Tahun Di Kelurahan Jati Kota Padang. *Jurnal Endurance: Kajian Ilmiah Problema Kesehatan* **5**, 430-437 (2020). DOI: <http://doi.org/10.22216/jen.v5i3.4855>.