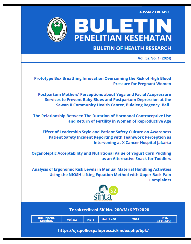

Buletin Penelitian Kesehatan
e-ISSN: 2338-3453 | p-ISSN: 0125-9695
Volume 53 Issue 1, 2025, Page 38-48
DOI: 10.33860/bpk.v53i1.4096
Website: https://ojs.polkespalupress.id/index.php/bpk
Publisher: Poltekkes Kemenkes Palu

A Good Example of Stunting Reduction at Districts/Cities in Indonesia: Secondary Data Study

Nina Fentiana[1]*, Trini Sudiarti[2], Daniel Ginting[3], Suharto[1]
[1]Nursing Academy of Kesdam I/BB, North Sumatera, Indonesia
[2]Faculty of Public Health, Universitas Indonesia, West Java, Indonesia
[3]Postgraduate Public Health, Universitas Sari Mutiara Indonesia, North Sumatera, Indonesia
*Corresponding Author: E-mail: fentiana.nina@gmail.com

open access

ARTICLE INFO

Article History:
Received: 2025-01-17
Accepted: 2025-04-11
Published: 2025-06-30

Keywords:
Food Access; Pathway; Toddlers; Pregnancy Checkup; Stunting

ABSTRACT

Background: The 2025-2029 NMDP targets a reduction in stunting of 14.4% in 2029 from a baseline of 18.8% in 2025. This means that stunting must be reduced by 4.4% over 4 years, or approximately 1.1% per year. Indonesia has only managed to reduce stunting by 0.1% per year. This research aims to identify best practices, provide policy insights, or analyze success factors.
Methods: The study processed aggregate data at the district/city level from Basic Health Research 2018, Susenas 2018 and Gross Regional Domestic Product (PDRB) data from BPS 2018 with a cross-sectional design. Stunting was measured in children aged 0-23 months using standardized value (Z-score) using WHO Anthro 2018. Other data variables are presented in percentages. Correlation tests and path analysis were used to see the direct and indirect relationships of various risk factors to stunting.
Results: There is a significant relationship between access to food and the prevalence of stunting at the district/city level (p-value <0.05; r-value = 0.19). Pregnancy check-ups (path coefficient = -0.29) and access to food (path coefficient = -0.31) have a significant direct contribution to the prevalence of stunting at the district/city level.
Conclusion: Research findings state that pregnancy checks according to regulations and access to food are risk factors for stunting that have a major impact on reducing stunting in districts/cities. In low and medium categories of stunting, the government needs to pay attention to the disparity in the percentage of nutritional services for these two factors, along with other factors that are already running.

INTRODUCTION

Indonesia has not succeeded in reducing stunting in toddlers in the 4-year period of the NMDP (National Medium-Term Development Plan) (PPN/Bappenas, 2024). A very wide disparity in stunting prevalence between districts/cities was found in Indonesia (Ayuningtyas et al., 2022; UNICEF, 2020). This is due to the implementation of stunting prevention efforts that have not been organized across sectors and have not focused on the First 1000 Days of Life (Aryastami, 2017). The 2020-2024 NMDP targets a reduction in toddler stunting rates to 14% by 2024. (Presiden Republik Indonesia, 2020), However, stunting in Indonesia based on the 2023 National Health Survey is still 21.5% (Kemenkes RI, 2023). This figure does not meet the 2020-2024 NMDP target. Around 1 in 5 toddlers in Indonesia experience stunting and only 15 provinces out of 38 provinces in Indonesia have a stunting prevalence below the national figure (Kemenkes BKPK, 2023).

Basic Health Research Data from 2013 and 2018, the 2016 National Health Indicator Survey, and the 2023 Indonesian Health Survey data show a wide variation in the distribution of stunting between provinces (Riskesdas 2013, 2013; Kemenkes BKPK, 2023; Kementerian Kesehatan Republik Indonesia, 2016; Kementrian Kesehatan RI, 2018). Basic Health Research 2018 recorded that East Nusa Tenggara Province and West Sulawesi were the two provinces in Indonesia with stunting prevalence >40%. However, the 2023 Indonesian Health Survey reported that there were no more provinces in Indonesia with stunting prevalence >40%. The highest stunting prevalence was found in Central Papua Province at 39.4% (Kemenkes BKPK, 2023; Kementrian Kesehatan RI, 2018).

The high prevalence of stunting not only has an impact on physical growth failure but also simultaneously raises the risk of children growing and developing with less than optimal intelligence levels and children being more susceptible to disease (Achadi et al., 2020). The short-term impact of stunting is associated with increased morbidity and mortality due to infections, especially pneumonia and diarrhea. Akombi et.al's 2017 study in Nigeria reported that stunted children under the age of 5 had diarrhea in the two weeks prior to the survey (Akombi et al., 2017).

Various efforts and programs to reduce stunting to target factors that contribute to stunting and are interrelated in the prenatal, birth and postnatal periods have been widely reported in a number of studies. Peru, Ethiopia, Senegal, Nepal and the Kyrgyz Republic are trying to reduce stunting through a multisectoral and comprehensive approach (Akseer et al., 2020; Brar et al., 2020; Huicho et al., 2020; Tasic et al., 2020). Ethiopia reported key factors for reducing stunting were increasing total edible crop yield (32%), increasing the number of health workers (28%), decreasing open defecation (13%), parental education (10%), maternal nutrition (5%), economic improvement (4%), and decreasing the incidence of diarrhea (4%) (Tasic et al., 2020).

The 2025-2029 NMDP again targets a reduction in stunting to 14.4% in 2029 from a baseline of 18.8% in 2025 (Kementerian PPN/Bappenas, 2025). This means that stunting must be reduced by 4.4% in 4 years or around 1.1% per year. The 2023 Indonesian Health Survey reported that Indonesia only managed to reduce stunting by 0.1% per year (Kemenkes RI, 2023). Therefore, studies are needed in regions in Indonesia with low and medium stunting prevalence to serve as good examples for reducing stunting in line with government targets.

METHODS

The study processed aggregate data at the district/city level from Basic Health Research 2018, Susenas 2018 and Gross Regional Domestic Product (GRDP) data from BPS 2018 with a cross-sectional design. Stunting data was measured in children aged 0-23 months using the threshold value of stunting prevalence for public interest according to WHO 2019. WHO classifies the threshold value of stunting prevalence for public health interests into five categories. Stunting prevalence <2.5% is categorized as very low, prevalence 2.5% - <10% is categorized as low, 10% - <20% is categorized as medium, 20% - <30% is categorized as high, and stunting prevalence ≥30% is categorized as very high (Global Nutrition Report, 2018). The strength test on the sample uses the correlative analytical hypothesis test formula using α=5% and β=80%, then the minimum sample size for the study for a test strength of 80% is 67 districts/cities (Thabane, 2004). The research will analyze 108 districts/cities with low and medium stunting prevalence categories. The study collected data from 514 districts/cities. Aggregate data at the district/city level were obtained by analyzing data from 32,095 samples of children aged 0-23 months in all districts/cities whose height was measured and the children lived with their mothers in one household and the mothers were interviewed. Districts/cities with a prevalence of stunting in children aged 0-23 months <20% n= 108

Stunting is calculated using standardized values (Z-score) using WHO Anthro 2018 (Kementerian Kesehatan, 2020; WHO, 2009). Other data variables are presented in percentages (Badan Penelitian dan Pengembangan Kesehatan RI, 2018; Kementrian Kesehatan RI, 2018). In order to find out the results obtained are meaningful, a significance level of 0.05 is used in the correlation test. Path analysis is used to see the direct and indirect relationship of a variable that is hypothesized as a cause to a variable that acts as an effect. Path analysis in this study uses a path

diagram using a theoretical model of the research conceptual framework. The purpose of path analysis is to determine the direct and indirect relationship of various stunting risk factors with stunting prevalence at the district/city level.

The research has obtained ethical permission from the Research Ethics Commission and Public Health Service, Faculty of Public Health, University of Indonesia Number: Ket-09 / UN2.F10.D11 / PPM.00.02 / 2022 dated January 27, 2022. The 2018 Basic Health Research data has also obtained ethical permission from the Health Research Ethics Commission, Health Research and Development Agency (KEPK-BPPK) with No: LB.02.01 / 2 / KE.024 / 2018, Ref: Approval No: LB.02.01 / 2 / KE.267 / 2017 dated July 27, 2017.

RESULTS

Editing of Basic Health Research 2018 data found data from 2 districts/cities where no cases of stunting in children aged 0-23 months were found, namely Semarang City, Central Java Province and Yalimo Regency in Papua Province, so these 2 districts/cities were excluded from the analysis. The districts/cities excluded from the analysis have data with unique characteristics that are very different from other observations, so they are excluded from the analysis because they cause problems in statistical analysis. Overall, the research panel analyzed data from 106 districts/cities. Secondary data was then recoded for each research variable. The data set ready for analysis is presented in the form of a percentage at the district/city level for each variable and rupiah for the GRDP per capita variable at the district/city level.

Descriptive Statistics

The results of the analysis obtained an average stunting of 15.71% (95% CI: 15.05 - 16.37), with a standard deviation of 3.41%. The lowest stunting prevalence of 5.55% was in Memberamo Raya Regency, Papua Province and the highest stunting prevalence of 19.80% was in Batu City, East Java Province. From the interval estimation results, it can be concluded that 95% believe that the average prevalence of stunting is between 15.05% and 16.37%.

Table 1. Relationship between Stunting Risk Factors and Stunting Prevalence at Regency/City Level in Indonesia

Characteristics	Mean	SD	Nilai r	P value
Wash Hands With Soap (%) (X1)	80.56	16.72	0.15	0.112
Children receiving vitamin A (2 times in 1 year) (%) (X2)	30.59	9.70	0.08	0.359
Complete Basic Immunization (%) (X3)	54.45	23.61	0.09	0.341
GRDP Per Capita (thousand rupiah) (X4)	65.226	59.389	0.005	0.963
Early Initiation of Breastfeeding (EIB) (%) (X5)	55.87	16.85	0.04	0.671
Access to Food (%) (X6)	11.18	7.96	-0.19	0.043*
Mother's Education (≥Senior High School) (%) (X7)	17.49	8.83	0.12	0.201
Pregnant women consume at least 90 iron tablets during pregnancy (%) (X8)	30.36	16.82	-0.08	0.411
Mothers who check their pregnancy 4 times with health workers (1-1-2) (%) (X9)	65.81	19.54	0.02	0.823
Access to Health Care Facilities (%) (X10)	66.04	15,58	-0.05	0.589
Mothers who use modern contraception after giving birth to their last child/KB (%) (X11)	62.66	15.95	0.18	0.054
Access to Basic Sanitation (%) (X12)	34.56	17.90	0.004	0.966
Access to Clean Drinking Water (%) (X13)	94.22	8.95	0.14	0.145
Exclusive Breastfeeding (%) (X14)	48.68	13.84	-0.17	0.072
Low Birth Weight (<2500 gr) (%) (X15)	12.43	5.36	-0.12	0.222

**P-value <0.05*

In Indonesia, there are no districts/cities with very low stunting prevalence (stunting prevalence <2.5%). As many as 100 districts/cities still face the problem of moderate or medium stunting (stunting prevalence 10% - <20%). DKI Jakarta and D.I Yogyakarta provinces are the provinces with the most districts/cities with low and medium stunting categories, namely 5 out of 6 districts/cities (83.3%) in DKI Jakarta Province and 4 out of 5 districts/cities (80.0%).

Bengkulu and West Sulawesi provinces are provinces that do not have districts/cities with low and medium stunting categories.

The results of statistical tests show that there is a significant relationship between access to food and the prevalence of stunting at the district/city level (p-value <0.05).

Table 2. Direct, Indirect and Total Relationship of Stunting Risk Factors with Stunting Prevalence at Regency/City Level in Indonesia in the Best Model, 2018 (n=106)

Variables			Direct Relationship	Indirect Relationship (Exclusive Breastfeeding)	Indirect Relationship (LBW)	Total Relationship	Contribution (%)
Stunting (Y)	←	LBW (X15)	-0.21	-	-	-0.21	4.41
Stunting (Y)	←	Pregnant Women's Blood Supplement Tablets (X8)	-	-	0.05	0.05	0.25
Stunting (Y)	←	Pregnancy Checkup (X9)	-0.29	-	-	-0.29	8.41
Stunting (Y)	←	Modern contraception (X11)	0.25	-	-0.04	0.21	6.25
Stunting (Y)	←	Access to Food (X6)	-0.31	-	-	-0.31	9.0
Stunting (Y)	←	Access to Clean Drinking Water (X13)	0.24	-	-0.04	0.24	5,76
Stunting (Y)	←	Access to Basic Sanitation (X12)	-	-	0.04	0.04	0.16

Based on the best path analysis, information was obtained on the simultaneous relationship between the variables LBW, pregnant women consuming at least 90 iron tablets during pregnancy, mothers using modern contraception after giving birth to their last child/KB, access to food, pregnancy check-ups, access to clean drinking water, and access to basic sanitation with the prevalence of stunting of R2 = 0.1662. The amount of contribution of the variables LBW, pregnant women consuming at least 90 iron tablets during pregnancy, mothers using modern contraception after giving birth to their last child/KB, access to food, pregnancy check-ups, access to clean drinking water, and access to basic sanitation to the prevalence of stunting in the district/city was 0.1662 x 100% = 16.62%. The rest (residual) which is 1 - 0.1662 = 0.8338 x 100% = 83.38% is influenced by other factors.

Indonesia has six districts/cities with a low prevalence of stunting, namely Memberanmo Raya District/City (Papua Province), Klungkung (Bali Province), Pariaman City (West Sumatra Province), Bitung City (North Sulawesi Province), Bangli (Bali Province), and Deiyai (Papua Province). Therefore, these six districts/cities can be used as learning places for other districts/cities in efforts to prevent and reduce the prevalence of stunting. A total of 19 districts/cities out of 106 districts/cities in the low and medium categories require priority attention because they have a prevalence of stunting on the threshold towards the high stunting problem category (20% - <30%). The Sulawesi region, spread across North Sulawesi, South Sulawesi, Central Sulawesi, and Southeast Sulawesi, has the most districts/cities with a stunting prevalence of almost 20% (high stunting category) so that serious efforts are needed in handling stunting by paying attention to various modifiable risk factors.

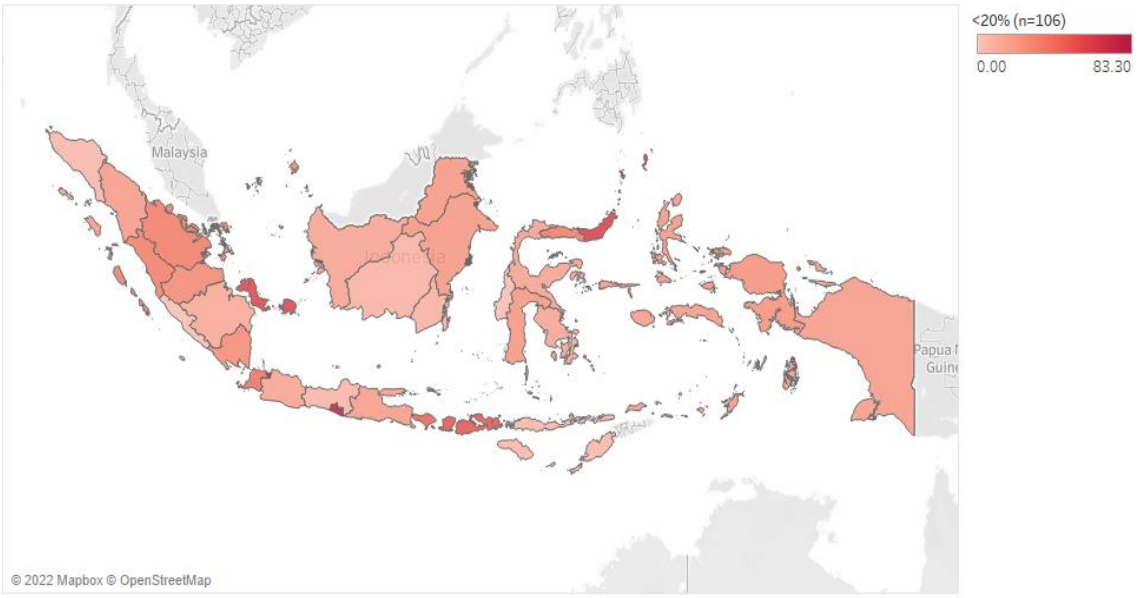

Figure 1. Distribution of Districts/Cities with Low and Medium Stunting Prevalence, 2018
Note : the percentage of districts/cities with low and medium stunting prevalence is small
percentage of districts/cities with low and medium prevalence of stunting

DISCUSSION

Pregnancy check-ups and food access contribute significantly directly to the prevalence of stunting at the district/city level. The direct relationship between pregnancy check-ups and stunting at the district/city level (path coefficient = -0.29) has a negative path coefficient, meaning that the higher the percentage of pregnancy check-ups, the higher the decrease in the prevalence of stunting at the district/city level in the district/city by 8.41%. One pregnancy check-up visit is associated with a 3.82% decrease in the likelihood of giving birth to LBW and a 4.11% decrease in the likelihood of stunting (Kuhnt & Vollmer, 2017). PMK Number 97 of 2014 states that pregnant women must undergo at least 4 pregnancy check-ups, including 1 in the first trimester, 1 in the second trimester and 2 in the third trimester (Kementerian Kesehatan, 2014). This aims to ensure that pregnant women can undergo their pregnancies healthily and give birth to quality babies. In addition to the quantity, quality pregnancy checks according to standards must also be met to ensure the health of the mother and baby.

Basic Health Research 2018 reported that visits for pregnancy check-ups in Indonesia increased compared to 2013. In 2018, the first visit (k1) was 96.1% compared to 2013 which was only 95.2%. Visits for the fourth pregnancy check-up (k4) in 2018 were 74.1% and in 2013 it was 70.0%. Although nationally there has been an increase in the percentage of pregnancy check-ups, the distribution at the provincial level shows a large disparity. The Eastern Region of Indonesia (Maluku and Papua Regions) has the lowest percentage of pregnancy check-ups. The westernmost region of Indonesia (Sumatra Region) has a distribution of pregnancy check-ups one level above it. Meanwhile, the best distribution of k1-k4 pregnancy check-ups is centered in the Central Region of Indonesia (Java-Bali Region) (Laksono et al., 2020). The results of the study also found that the percentage of pregnancy checks according to standards (1-1-2) also varied at the district/city level. In districts/cities with a prevalence of stunting <20%, 45 districts/cities had a percentage of pregnancy checks according to standards (1-1-2) of 0.0%.

Pregnancy check-ups are closely related to stunting both in terms of quantity and quality (Camelia, 2020). Pregnancy checks that are not up to standard will not be able to detect problems during pregnancy. If pregnant women only come for pregnancy checks at the beginning of pregnancy and at the end of pregnancy, it will not support early detection of pregnancy problems, thus causing delays in action to support fetal growth (Nur'Ain et al., 2020).

Access to food contributes significantly directly to the prevalence of stunting at the district/city level. This means that an increase in the percentage of access to food (path coefficient = -0.31) will be related to a decrease in the prevalence of stunting at the district/city level by 9.0%. Access to food in this study is the ability of households (households) of children aged 0-23 months to meet the food needs of all household members both physically, socially and economically so that household members can live healthily. The ability of households to meet food needs illustrates food security in households (S. Suharyanto, 2017).

Various studies have reported the relationship between household food access (security) and stunting (Bulkis et al., 2021; Femidio & Muniroh, 2020; Masrin et al., 2014; Mengistu et al., 2021; Ningrum, 2019). Children living in food-secure households are more likely to receive a minimum acceptable diet than others. The results of a case-control study in Sedayu District, Bantul Regency, Yogyakarta reported that children aged 6-23 months in food-insecure households have a 2.7 times greater risk of stunting compared to children in food-secure households (Masrin et al., 2014). If households have the ability to access available food both physically, socially and economically, then households with children aged 0-23 months will be able to meet the nutritional needs of children (Hanani & Susilo, 2020). Food availability and food access vary across Indonesia. This is because food production capabilities vary between regions in Indonesia and between seasons, requiring careful management of food distribution so that food is available all the time throughout Indonesia (Suharyanto, 2011).

Many factors affect the amount and quality of food that can be accessed by family members. Food prices are reported to have a significant negative relationship with consumption levels. This means that if food prices increase, people will tend to reduce their consumption of certain foods (Ilman & Wibisono, 2019). So children with low food access families tend not to have their intake needs met which has an impact on malnutrition problems. Children aged 0-23 months with families with poor food security have a 10.9 times higher risk of stunting after being corrected by the child's age, birth weight, breast milk consumption, pacifier use, food diversity, mother's age, mother's education, mother's nutritional knowledge, food hygiene practices, father's education and father's occupation (Utami & KP, 2015).

The percentage of post-pregnancy family planning was also found to contribute significantly indirectly to the prevalence of stunting at the district/city level through the path of decreasing the percentage of LBW. This means that increasing the percentage of access to basic sanitation and decreasing the percentage of LBW (path coefficient = -0.04) will be related in line with decreasing the prevalence of stunting at the district/city level. Family planning contributed 1.96% to decreasing the prevalence of stunting at the district/city level. Narrow birth spacing and high birth order are high-risk fertility behavior factors associated with increasing the prevalence of stunting (Tamirat et al., 2021). Several studies have reported an association between birth spacing and the risk of stunting. The risk of stunting in children in India is higher if the birth spacing is less than 3 years. Children in South Asia have also been reported to have a lower risk of stunting if they are born with an interval of >24 months between marriage and first birth (Mauluddin & Novianti, 2020; Rana et al., 2019; Tiwari et al., 2020). The percentage of family planning at the district/city level in the research district/city was only 63.24%, so a family planning approach to regulate birth spacing to reach a percentage of ≥90% needs to be attempted to boost the acceleration of stunting reduction at the district/city level.

There is a lot of evidence that shows that birth or pregnancy spacing is related to child stunting. Pregnancy spacing of less than ≤ 2 years is reported to have a risk of stunting in children of 0.5 times compared to pregnancy spacing > 2 years (Jayanti R, 2021). A study in Ghana also reported that birth spacing increases the chances of child survival. Birth spacing of less than 24 months poses a risk to child survival rates and child health (Lartey et al., 2016). Studies in African countries also report that young maternal age at first birth (<18 years), narrow birth intervals, and high birth order are the main factors causing stunting (Tamirat et al., 2021).

Basic Health Research 2013 recorded that women aged 15-49 years with married status who used modern contraception (implants, MOW, MOP, IUD, condoms, injections, pills) were 59.3% (Riskesdas 2013, 2013). Basic Health Research 2018 recorded an increase in modern family planning coverage among women aged 10-54 years in 2018 by 78.56% or an increase of

19.26% (Kementrian Kesehatan RI, 2018). Although it turns out that there is an increase nationally, the distribution of family planning coverage still varies by province and district/city. Basic Health Research 2018 reported that West Java Province had the highest family planning coverage and North Kalimantan Province had the lowest percentage of family planning. The results of the study also found large variations in family planning distribution at the district/city level. This means that there are still districts/cities where mothers of children aged 0-23 months do not use contraception after the birth of their last child.

Access to clean drinking water was also found to contribute significantly indirectly to the prevalence of stunting at the district/city level through the path of decreasing the percentage of LBW. This means that increasing the percentage of access to basic sanitation and decreasing the percentage of LBW (path coefficient = -0.04) will be related in line with the decrease in the prevalence of stunting at the district/city level. Family planning contributed 1.96% to the decrease in the prevalence of stunting at the district/city level. Analysis of IFLS 2014 data reported that toddlers living in households with unsafe drinking water sources were at 1.21 times higher risk of experiencing stunting compared to children living in households with access to better drinking water sources (Irianti et al., 2019). The availability of unimproved drinking water, the distance of the water source is too close to the toilet, improper water treatment before consumption can cause nutritional disorders in children. This happens because the water contains pathogenic microorganisms and other chemicals, causing children to experience diarrhea (Aguayo & Menon, 2016). Therefore, efforts are needed from various parties to fulfill the need for clean drinking water in terms of quantity, quality, storage and water processing, especially in the first thousand days of life to prevent and reduce the incidence of stunting.

Drinking water that is not suitable in terms of quantity and quality can cause various diseases and increase the incidence of waterborne diseases. One of the waterborne diseases that is used as an indicator in monitoring the quality of drinking water in Indonesia is diarrhea (Kemenkes, 2021). Basic Health Research 2013 and 2018 reported an increase in the prevalence of diarrhea in Indonesia based on symptoms and diagnosis by health workers, namely 7% (2013) to 8% (2018) (Riskesdas 2013, 2013; Kementrian Kesehatan RI, 2018). These data show that the quality of drinking water spread across all districts/cities in Indonesia does not all meet the drinking water standards according to the Indonesian Minister of Health Regulation No. 32 of 2017.

The model studied or tested is built based on a certain theoretical framework that is able to explain the causal relationship between research variables. The path model has also met 6 assumption tests in path analysis, namely normality, linearity, multicollinearity, independence, existence and homoscedasticity. The model obtained is a model that is appropriate or fit and significant. The path model obtained is acceptable and has a good fit between theory and data. A significant p-value indicates that the covariance value of the model prediction results is the same as the data sample covariance matrix, meaning that there is no difference in the theoretical model with empirical data.

This study has several limitations, including secondary data has a response rate that does not reach 100%, thus causing non-response bias. The Riskesdas 2018 response rate for household samples was 95.58%. The response rate for the Riskesdas 2018 household member sample was 93.20%. Survey data were taken cross-sectionally so that the results of the analysis were not strong enough to provide evidence of a causal relationship between the dependent and independent variables. Several secondary data variables were obtained based on the mother's memory, thus possibly causing bias.

CONCLUSION

The results of the study found that stunting is caused by many factors as evidenced by the direct and indirect relationship between various stunting risk factors and stunting prevalence. Based on the stunting risk prevention pathway model at the district/city level, it can be concluded that districts/cities can play an important role in efforts to prevent stunting risk through the implications of stunting risk prevention policies at the district/city level by targeting stunting risk

factors that have a major impact on reducing stunting especially access to food. Learning from districts/cities that have low and medium category stunting problems, the government needs to pay attention to the disparity in the percentage of nutritional services in access to food and pregnancy checks in accordance with the provisions without abandoning other nutritional services that have been implemented.

Author's Contribution Statement: Authors explicitly outline and describe their individual contributions to the research and the development of the manuscript. This statement is intended to provide transparency and clarity regarding each author's role in the project. It helps readers and reviewers understand the specific contributions of each author to the research process

Conflicts of Interest: The authors explicitly state that they have no financial or personal relationships with entities that might unduly affect their objectivity.

Source of Funding Statements: This study was funded by the Directorate of Research and Community Service 2022 with Publikasi Terindeks Internasional (PUTI) Pascasarjana, No. KKB-267/UN2.RST/HKP.05.00/2022.

REFERENCES

Achadi, E. L., Achadi, A., & Aninditha, T. (2020). *Pencegahan Stunting Pentingnya Peran 1000 Hari Pertama Kehidupan*. PT.Rajagrafindo Jakarta. http://www.rajagrafindo.co.id/produk/pencegahan-stunting-pentingnya-peran-1000-hari-pertama-kehidupan-endang-l-achadi/

Aguayo, V. M., & Menon, P. (2016). Stop stunting: Improving child feeding, women's nutrition and household sanitation in South Asia. *Maternal and Child Nutrition*, *12*, 3–11. https://doi.org/10.1111/mcn.12283

Akombi, B. J., Agho, K. E., Hall, J. J., Merom, D., Astell-burt, T., & Renzaho, A. M. N. (2017). Stunting and severe stunting among children under-5 years in Nigeria : A multilevel analysis. *BMC Pediatrics*, 1–17. https://doi.org/10.1186/s12887-016-0770-z

Akseer, N., Vaivada, T., Rothschild, O., Ho, K., & Bhutta, Z. A. (2020). Understanding multifactorial drivers of child stunting reduction in Exemplar countries: a mixed-methods approach. *The American Journal of Clinical Nutrition*, *112*(2), 792S-805S. https://doi.org/10.1093/ajcn/nqaa152

Aryastami, N. K. (2017). Kajian Kebijakan dan Penanggulangan Masalah Gizi Stunting di Indonesia. *Buletin Penelitian Kesehatan*, *45*(4), 233–240. https://doi.org/10.22435/bpk.v45i4.7465.233-240

Ayuningtyas, D., Hapsari, D., Rachmalina, R., Amir, V., Rachmawati, R., & Kusuma, D. (2022). Geographic and Socioeconomic Disparity in Child Undernutrition across 514 Districts in Indonesia. *Nutrients*, *14*(4), 1–17. https://doi.org/10.3390/nu14040843

Riskesdas 2013, Badan Penelitian dan Pengembangan Kesehatan 1275 (2013). https://doi.org/10.1126/science.127.3309.1275

Badan Penelitian dan Pengembangan Kesehatan RI. (2018). Pedoman Pengisian Kuesioner Riskesdas 2018. In *Kementerian Kesehatan RI*. Kementerian Kesehatan RI, Badan Penelitian dan Pengembangan Kesehatan. https://repository.badankebijakan.kemkes.go.id/id/eprint/4606/1/Pedoman_Kues_Rkd_2018_1.pdf

Brar, S., Akseer, N., Sall, M., Conway, K., Diouf, I., Everett, K., Islam, M., Sène, P. I. S., Tasic, H., Wigle, J., & Bhutta, Z. (2020). Drivers of stunting reduction in Senegal: a country case study. *The American Journal of Clinical Nutrition*, *112*(2), 860S-874S. https://doi.org/10.1093/ajcn/nqaa151

Bulkis, S., Summase, I., Nadja, R. A., Rahmadanih, & Nirwan. (2021). Relationship between rice farmers household food security and stunting incidence in Enrekang Regency. *IOP Conference Series: Earth and Environmental Science*, *807*(3), 1–8. https://doi.org/10.1088/1755-1315/807/3/032078

Camelia, V. (2020). Hubungan Antara Kualitas & Kuantitas Riwayat Kunjungan Antenatal Care (ANC) Dengan Stunting Pada Balita Usia 24-59 Bulan Di Kecamatan Pujon Kabupaten Malang. *Journal of Issues in Midwifery*, *4*(3), 100–111. https://doi.org/10.21776/ub.joim.2020.004.03.1

Femidio, M., & Muniroh, L. (2020). Perbedaan Pola Asuh dan Tingkat Kecukupan Zat Gizi pada Balita Stunting dan Non-Stunting di Wilayah Pesisir Kabupaten Probolinggo. *Amerta Nutrition*, *4*(1), 49. https://doi.org/10.20473/amnt.v4i1.2020.49-57

Global Nutrition Report. (2018). 2018 Global Nutrition Report: Shining a light to spur action on nutrition. In *Development Initiatives*. Development Initiatives. https://doi.org/10.1063/1.4759115

Hanani, Z., & Susilo, R. (2020). *Hubungan Praktik Pemberian Makan dan Konsumsi Pangan Keluarga Dengan Kejadian Stunting Balita di Wilayah Kerja Puskesmas Kalibagor*. *13*(2), 117–118. https://journals.ums.ac.id/jk/article/view/11552

Huicho, L., Vidal-Cardenas, E., Akseer, N., Brar, S., Conway, K., Islam, M., Juarez, E., Rappaport, A., Tasic, H., Vaivada, T., Weigle, J., & Bhutta, Z. A. (2020). Drivers of stunting reduction in Peru: a country case study. *The American Journal of Clinical Nutrition*, *112*(2), 860S-874S. https://doi.org/10.1093/ajcn/nqaa151

Ilman, assyifa S., & Wibisono, I. D. (2019). Analisis Harga Pangan dan Prevalensi Stunting di Indonesia. *Center for Indonesian Policy Studies*, 1–17. https://repository.cips-indonesia.org/media/publications/276146-mengurangi-stunting-melalui-reformasi-pe-6eb15148.pdf

Irianti, S., Prasetyoputra, P., Dharmayanti, I., Azhar, K., & Hidayangsih, P. S. (2019). The role of drinking water source, sanitation, and solid waste management in reducing childhood stunting in Indonesia. *IOP Conference Series: Earth and Environmental Science*, *344*(1), 1–10. https://doi.org/10.1088/1755-1315/344/1/012009

Jayanti R, E. R. (2021). Faktor Jarak Kehamilan yang Berhubungan dengan Kejadian Stunting di Puskesmas Harapan Baru Samarinda Seberang. *Borneo Student Research*, *2*(3), 1705–1710.

Kemenkes. (2021). Peta Jalan Pengawasan Kualitas Air Minum Nasional (2020-2030). In *Peta Jalan Pengawasan Kualitas Air Minum Nasional (2020-2030)* (Vol. 44, Issue 1, pp. i–Vi). https://doi.org/10.47655/dialog.v44i1.470

Kemenkes BKPK. (2023). Survei Kesehatan Indonesia (SKI) Dalam Angka. In *SKI*. Kemenkes BKPK. https://www.badankebijakan.kemkes.go.id/ski-2023-dalam-angka/

Kemenkes RI. (2023). Factsheets: Stunting di Indonesia dan Determinannya. *Ski*, 1–2. https://www.badankebijakan.kemkes.go.id/fact-sheet-survei-kesehatan-indonesia-ski-2023/

Kementerian Kesehatan. (2014). Peraturan Menteri Kesehatan republik Indonesia Nomor 97 Tahun 2014 Tentang Pelayanan Kesehatan Masa Sebelum Hamil, Masa Hamil, Persalinan, Dan Masa Sesudah Melahirkan, Penyelenggaraan Pelayanan Kontrasepsi, Serta Pelayanan Kesehatan Seksual. *Kemenkes RI*, *5*(1–2), 171–185. https://doi.org/10.1300/J064v05n01_12

Kementerian Kesehatan. (2020). *PMK No 2 Tahun 2020 Tentang Standar Antropometri Anak* (Vol. 28, Issue 2, pp. 1–43). Kementerian Kesehatan RI. https://peraturan.bpk.go.id/Details/152505/permenkes-no-2-tahun-2020

Kementerian Kesehatan Republik Indonesia. (2016). *Laporan Survei Indikator Kesehatan Nasional (Sirkesnas) 2016 Laporan Survei Indikator Kesehatan Nasional (Sirkesnas) 2016* (Issue November 2016, pp. 33–47). Badan Penelitian Dan Pengembangan Kesehatan. https://bblabkesling.go.id/a-sirkesnas-2016

Kementerian PPN/Bappenas. (2025). Ringkasan Rancangan Awal RPJMN 2025-2029. In *Ringkasan Rancangan Awal RPJMN 2025-2029*. Kementerian PPN/Bappenas. https://www.setneg.go.id/baca/index/rpjmn_2025_2029_fondasi_awal_wujudkan_visi_indonesia_emas_2045

Kementrian Kesehatan RI. (2018). Laporan Nasional Riskesdas 2018. In *Badan Penelitian dan Pengembangan Kesehatan* (p. 198). Badan Penelitian Dan Pengembangan Kesehatan. http://labdata.litbang.kemkes.go.id/images/download/laporan/RKD/2018/Laporan_Nasional_RKD2018_FINAL.pdf

Kuhnt, J., & Vollmer, S. (2017). Antenatal care services and its implications for vital and health outcomes of children: Evidence from 193 surveys in 69 low-income and middle-income countries. *BMJ Open*, *7*(11), 1–8. https://doi.org/10.1136/bmjopen-2017-017122

Laksono, A. D., Rukmini, R., & Wulandari, R. D. (2020). Regional disparities in antenatal care utilization in Indonesia. *PLoS ONE*, *15*(2), 1–13. https://doi.org/10.1371/journal.pone.0224006

Lartey, S. T., Khanam, R., & Takahashi, S. (2016). The impact of household wealth on child survival in Ghana. *Journal of Health, Population, and Nutrition*, *35*(1), 38. https://doi.org/10.1186/s41043-016-0074-9

Masrin, Paratmanitya, Y., & Aprilia, V. (2014). Household food security correlated with stunting in children 6-23 months. *Jurnal Gizi Dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, *2*(3), 103–115. https://ejournal.almaata.ac.id/index.php/IJND/article/view/296/268

Mauluddin, A., & Novianti. (2020). The Role of the Population , Family Planning and Family Development Program (KKBPK) in Reducing Stunting Prevalence Peran Program Kependudukan , Keluarga Berencana , dan Pembangunan Keluarga (KKBPK) dalam Menurunkan Prevalensi Stunting. *CIC Lembaga Riset Dan Konsultan Sosial*, 20–28. https://journal.cicofficial.com/index.php/jbo/article/view/50

Mengistu, D. D., Degaga, D. T., & Tsehay, A. S. (2021). Analyzing the contribution of crop diversification in improving household food security among wheat dominated rural households in Sinana District, Bale Zone, Ethiopia. *Agriculture and Food Security*, *10*(1), 1–16. https://doi.org/10.1186/s40066-020-00280-8

Ningrum, V. (2019). Akses pangan dan kejadian balita stunting: kasus pedesaan pertanian di klaten. *Pangan*, *28*(1), 73–82. https://www.jurnalpangan.com/index.php/pangan/article/view/424

Nur'Ain, M. S., Hayati, R., & Kasman. (2020). Hubungan Riwayat Kunjungan Antenatal Care , BBL Dan Asi Esklusif Dengan Kejadian Stunting Di Wilayah Kerja UPT Puskesmas Mandastana Tahun 2020. *Jurnal Kesehatan Masyarakat Universitas Islam Kalimantan*, *1*, 1–8. https://eprints.uniska-bjm.ac.id/2315/

PPN/Bappenas, K. (2024). *Rencana Kerja Pemerintah Tahun 2025*. Kementerian Perencanaan Pembangunan Nasional/ Badan Perencanaan Pembangunan Nasional Tahun 2024. https://peraturan.bpk.go.id/Details/306775/permen-ppnkepala-bappenas-no-2-tahun-2024

Presiden Republik Indonesia. (2020). *Rencana Pembangunan Jangka Menengah Nasional 2020-2024*. 2015–2019. https://setkab.go.id/presiden-teken-perpres-no-18-2020-tentang-rencana-pembangunan-jangka-menengah-nasional-tahun-2020-2024/

Rana, M. J., Gautam, A., Goli, S., Uttamacharya, Reja, T., Nanda, P., Datta, N., & Verma, R. (2019). Planning of births and maternal, child health, and nutritional outcomes: recent evidence from India. *Public Health*, *169*, 14–25. https://doi.org/10.1016/j.puhe.2018.11.019

Suharyanto, H. (2011). Ketahanan Pangan. *Sosial Humaniora*, *4*(2), 186–194. http://iptek.its.ac.id/index.php/jsh/article/view/633/355

Suharyanto, S. (2017). Karakteristik Tingkat Ketahanan Pangan Rumah Tangga Petani Berbasis Agroekosistem Lahan Sawah Irigasi Di Provinsi Bali. *SEPA: Jurnal Sosial Ekonomi Pertanian Dan Agribisnis*, *11*(2), 191. https://doi.org/10.20961/sepa.v11i2.14176

Tamirat, K. S., Tesema, G. A., & Tessema, Z. T. (2021). Determinants of maternal high-risk fertility behaviors and its correlation with child stunting and anemia in the East Africa region: A pooled analysis of nine East African countries. *PLoS ONE*, *16*(6 June 2021), 1–16. https://doi.org/10.1371/journal.pone.0253736

Tasic, H., Akseer, N., Gebreyesus, S. H., Ataullahjan, A., Brar, S., Confreda, E., Conway, K., Endris, B. S., Islam, M., Keats, E., Mohammedsanni, A., Wigle, J., & Bhutta, Z. A. (2020). Drivers of stunting reduction in Ethiopia: a country case study. *The American Journal of Clinical Nutrition*, *112*(2), 860S-874S. https://doi.org/10.1093/ajcn/nqaa151

Thabane, L. (2004). *Sample Size Determination in Clinical Trials HRM-733 CLass Notes*. Departement of Clinical Epidemiology&Biostatistics, Faculty of Health Sciences, McMaster University. https://tbrieder.org/publications/books_english/lemeshow_samplesize.pdf

Tiwari, I., Acharya, K., Paudel, Y. R., Sapkota, B. P., & Kafle, R. B. (2020). Planning of Births and Childhood Undernutrition in Nepal: Evidence from a 2016 National Survey. *BMC Public Health*, 1–14. https://doi.org/10.21203/rs.3.rs-40329/v1

UNICEF. (2020). Situasi Anak di Indonesia - Tren, peluang, dan Tantangan dalam Memenuhi Hak-Hak Anak. *Unicef Indonesia*, 8–38. https://www.unicef.org/indonesia/id/laporan/situasi-anak-di-indonesia-2020

Utami, N. H., & KP, D. S. (2015). Ketahanan Pangan Rumah Tangga Berhubungan Dengan Status Gizi Anak Usia Di Bawah Dua Tahun (Baduta) Di Kelurahan Kebon Kalapa, Kecamatan Bogor Tengah, Jawa Barat. *Gizi Indonesia*, *38*(2), 105. https://doi.org/10.36457/gizindo.v38i2.184

WHO. (2009). WHO Child Growth Standards. *Developmental Medicine & Child Neurology*, *51*(12), 1002–1002. https://doi.org/10.1111/j.1469-8749.2009.03503.x