Ecological Relationship between Poverty and Nutritional Status of Toddler in Indonesia in 2018

Wasis Budiarto[1], Ratna Dwi Wulandari[1], Nikmatur Rohmah[2], Agung Dwi Laksono[3]

[1]Lecturer, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia. Universitas Airlangga Campus C Mulyorejo, Surabaya, Indonesia 60115, [2]Lecturer, Faculty of Health Science, Muhammadiyah University of Jember, East Java, Indonesia. Gumuk Kerang, Karangrejo, Sumbersari, Jember, East Java, Indonesia 68124, [3]Researcher, National Institute of Health Research and Development, the Indonesia Ministry of Health, Jakarta, Indonesia. Percetakan Negara 29, Jakarta, Indonesia 10560

Abstract

Data in the world states that 462 million are underweight, 47 million children under the age of 5 are wasting, 14.3 million are very thin, and 144 million are stunting. Previous study reports about 45% of child deaths <5 years are related to malnutrition—the study aim to analyzing the relationship between poverty and nutritional status of the toddler in Indonesia ecologically. The study used secondary data from the official report of the Indonesia Ministry of Health. The study takes all provinces as samples. Moreover, the study used the percentage of poor people as an independent variable. On the other hand, the researchers analyzed three other variables as dependent variables: the proportion of underweight toddlers, the proportion of stunting toddlers, and the proportion of wasting toddlers. The study examined the data using a scatter plot to determine the relationship. The results show that the greater the percentage of an underweight toddler in a country, the higher the proportion of underweight toddler in that region. Meanwhile, the more significant the proportion of the deprived population in an area, the more considerable proportion of stunting in that area. Moreover, the higher the poor people in the province, the higher the proportion of wasting in that province. The study concluded that poverty has a relationship with nutrition status of the toddler in Indonesia.

Keywords*: poverty, underweight, stunting, wasting, ecological analysis, public health.*

Introduction

Malnutrition can include wasting, stunting, and underweight. Data in the world states that 462 million are underweight, 47 million children under the age of 5 are wasting, 14.3 million are very thin, and 144 million are stunting. About 45% of child deaths <5 years are related to malnutrition[1]. Therefore, reducing child stunting is the first goal in the global nutrition target by 2025[2]. Despite social and economic developments, the worldwide burden of malnutrition remains too high. There is an important relationship between nutritional status, human resources, and financial status. Poor nutrition causes a decrease in individuals' physiological, mental capacities, hinders productivity levels, and is vulnerable to poverty. There is a two-way relationship between malnutrition and poverty. Malnutrition results in conditions of poverty by reducing the economic potential of the population[3]. Discussion on nutritional status is crucial because it is an indicator of the growth of children under five.

We can measure toddler growth through body weight, height, and body mass index. Impaired growth of children under five is a sign of an obstacle to nutritional status. Malnutrition can cause various losses, including

Corresponding Author:
Ratna Dwi Wulandari
Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia. Universitas Airlangga Campus C Mulyorejo, Surabaya, Indonesia 60115
Email: ratna-d-w@fkm.unair.ac.id

developmental delays in children aged 3-6 years, quality of life of children, physical function, emotional function, social function, communication, fine motor skills, and problem-solving. The overall prevalence of developmental delay was 35.4%[4–7].

The prevalence of child stunting in Indonesia has remained high over the last decade. At the national level, child stunting is around 37%[2]. Another study states that the prevalence of stunting, wasting, and very thin is 9.1; 3,8; and 3.8%[6]. The prevalence of stunting was 39.4%, while the percentage of households consuming foods high in protein and calcium was 41%[8]. This phenomenon shows that nutritional status is still a significant problem in achieving the global nutrition target in 2025. Several factors supporting stunting and wasting rates in Indonesia require a deeper study.

Previous studies have suggested that the percentage of poor people is positively related to the prevalence of stunting[9]. Households that occupy a livable house and have completed basic education negatively correlate with the prevalence of stunting in Indonesia. The situation means that this variable is a protective factor for a province to have short children under five. Meanwhile, non-exclusive breastfeeding for the first 6 months, low socioeconomic status of the family, premature birth, short birth length, short mothers, low maternal education are the determining factors for child stunting in Indonesia[2]. Education and income reduce the likelihood of being underweight by 10-30%[10]. It is estimated that 90 percent of children, especially girls and young women, experience some form of poverty[11]. Physical, economic, demographic, social, and environmental factors are the main contributors to food insecurity[12].

In contrast to other studies, it is stated that there is no correlation between short-term changes between measures of income and overall height[13]. Similarly, a study was found that found positive deviations of feeding with the nutritional status of children under five in low-income families [14]. Overall, the factors that represent the ecology of internal and external nutrition need to be considered to reduce stunting rates[12]—the study aim to analyzing the relationship between poverty and the nutritional status of the toddler in Indonesia ecologically.

Materials and Methods

Study Design

The author used an ecological interpretation method in the research. Environmental research relies on collective comparisons rather than human comparisons. The data examined in the ecological analysis is aggregate data at a given community or level; in this case, it is at the provincial level. Aggregate measures, environmental measurements, and global measures should also be used as factors in an ecological survey. In epidemiology, ecological research aims to make biological inferences about individual risk effects or ecological inferences about group effects[15,16].

Data Source

Secondary data from the 2018 Indonesia Basic Health Survey and the 2018 Indonesia Health Profile report were included in this analysis. Both papers are official documents of the Republic of Indonesia's Ministry of Health. The province is the study's unit of research. The thesis looked at every part of Indonesia (34 provinces).

Data Analysis

The dependent variable in this study is the nutrition status of the toddler. The nutritional status of a toddler consists of underweight, stunting, and wasting. Underweight is a classification of toddler nutritional status based on body weight index for age (Z-score < -2.0). Meanwhile, stunting is a classification of the nutritional status of children under five based on indicators of length/height per age (Z-score < -2.0). Moreover, wasting is a classification of the nutritional status of toddlers based on indicators of body weight per length/height (Z-score < -2.0)[17].

In this analysis, poverty was used as an independent variable. The percentage of a province's impoverished

population was used to define poverty (September 2018). The data was evaluated bivariate using a scatter plot in the analysis. The linear fit line was used in the analysis to assess the association between toddler poverty and nutrition status. The author carried out the research with the assistance of the IBM SPSS 21.

Findings

Table 1 is a descriptive statistic of the poverty and nutrition status of the toddler by the province in Indonesia. The results presented informs that the lowest percentage of the poor population is 3.55%, while the highest proportion of maternity care in health facilities is 27.43%. In Indonesia, the proportion of poor people varies widely between provinces.

Table 1. Descriptive statistics of the percentage of the poor people and nutrition status of the toddler by the province in Indonesia, 2018

Variable	N	Range	Min	Max	Mean	Std. Deviation
Percentage of the poor population	34	23.88	3.55	27.43	10.6076	5.70346
Proportion of underweight	34	16.50	13.00	29.50	19.2088	4.53581
Proportion of stunting	34	25.10	17.60	42.70	30.2618	5.30260
Proportion of wasting	34	40.30	31.90	72.20	49.4706	9.20351

Source: The 2018 Indonesia Basic Health Survey and the 2018 Indonesia Health Profile

Figure 1 depicts a scatter plot of the number of impoverished citizens and the proportion of underweight toddlers by Indonesian province. The graph displays the two variables' penchant for a positive relationship. The more significant the poor people proportion in a region, the higher the underweight toddler percentage.

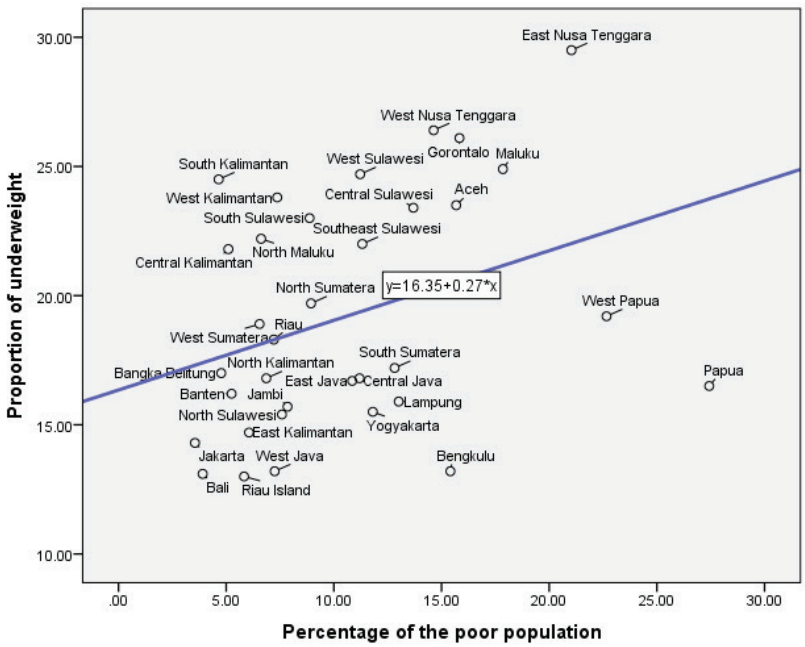

Figure 1. Scatter plot of the percentage of the poor people and the proportion of underweight by the province in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

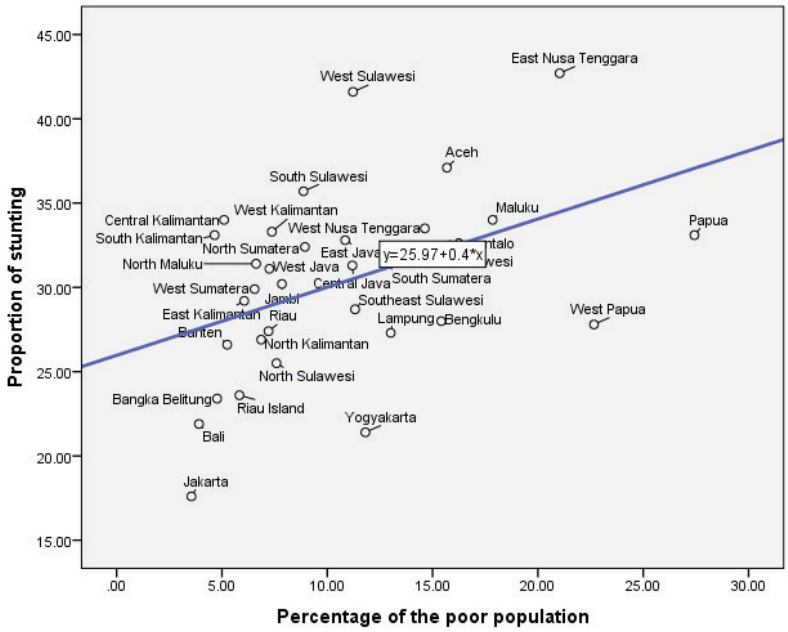

Figure 2. Scatter plot of the percentage of the poor people and the proportion of stunting by the province in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

Figure 2 depicts a scatter plot of the number of disadvantaged people and the proportion of stunting in Indonesia by region. Figure 2 illustrates the two variables' propensity for a favorable interaction; as a result of the condition, the more significant the deprived population proportion of the region, the greater the stunting toddlers proportion in that region.

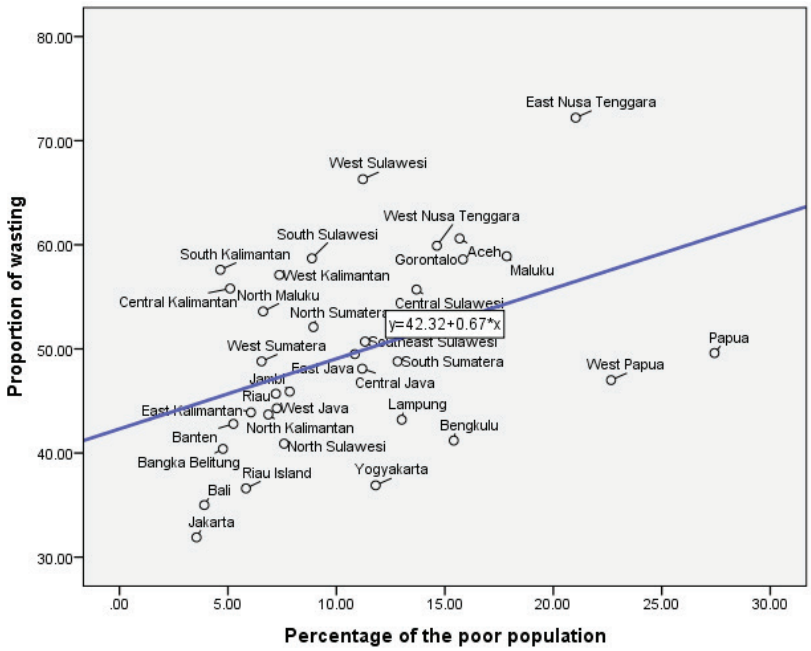

Figure 3. Scatter plot of the percentage of the poor people and the proportion of wasting by the province in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

Figure 3 shows the scatter plot of the percentage of poor people and the wasting of toddlers in Indonesia's province. The scatter plot shows the tendency for a positive relationship between the two variables. The situation means that the higher the poor population in the province, the higher the wasting toddlers proportion in that province.

Discussion

Several previous studies have informed that socioeconomic status is related to the nutritional status of children under five, both underweight, stunting, and wasting. Previous studies have found that poverty is closely related to the nutritional status of children under five[18]. Poverty is known to be closely associated with the ability of families to provide food needs in the family. Families with poor conditions for a long time will significantly affect the nutritional status of children under five to become worse[19,20]. In general, better socioeconomics is a strong determinant of better health output[20–22].

Meanwhile, poverty in the family is also known to be related to the low level of education of family members, especially their parents' education[23]. The intense maternal education situation makes them less aware of the nutritional status of children, both because of limited knowledge and because of financial limitations[24–26].

On the other hand, poverty is also closely related to poor sanitation, especially in urban slum settlements. This situation worsens the low nutritional status of children under five due to the risk of infection and disease caused by poor sanitation. The low-income family lives, including diarrhea and worms[27,28].

Intervention by the government in this poor group of people is needed. This intervention ensures that there is no deterioration in the nutritional status of children under five due to food availability in inadequate families. In Indonesia, the government has issued several policies to strengthen food security for low-income families. Among them is distributing rice to the poor and providing direct cash assistance, including subsidizing contribution assistance for National Health Insurance[29].

Study Limitation

Since the data used is statistical data at the regional level, this study, undertaken using the ecological analysis method, has drawbacks in its use as a policy basis. More research at the personal level is needed to collect more reliable knowledge before deciding on an intervention strategy[30].

Conclusion

The study concluded that poverty has a relationship with the nutritional status of the toddler in Indonesia. The higher the poor population in the province, the higher the proportion of underweight, stunting, and wasting in that province.

Conflict of Interests: Nil

Source of Funding: Self-funding

Ethical Clearance: The study was conducted by utilizing secondary data from published reports. For this reason, the study not required an ethical clearance in the implementation of this research.

Acknowledgments: The authors are grateful to the Ministry of Health of the Republic of Indonesia for providing a report as material for analysis in this study.

References

1. WHO. Malnutrition. Word Health Organization. 2020. p. 1.
2. Beal T, Tumilowicz A, Sutrisna A, Izwardy D, Neufeld LM. A review of child stunting determinants in Indonesia. Matern Child Nutr. 2018;14(4):1–10.
3. Siddiqui F, Salam RA, Lassi ZS, Das JK. The Intertwined Relationship Between Malnutrition and Poverty. Front Public Heal. 2020;8(August):1–5.
4. Saputo H, Fazrin I, Yalestyarini EA. The Correlation Between Stimulation , Nutritional Status and Child Development. J Ners. 2020;15(2):96–100.
5. Yuliasti Eka Purnamaningrum I. The Effect of

Malnutrition on The Quality of Life of Children Aged 2-4 in Indonesia. Int J Sci Res Educ. 2017;5(05):6425–30.

6. Jimoh AO, Anyiam JO, Yakubu AM. Relationship between child development and nutritional status of under-five nigerian children. South African J Clin Nutr. 2018;31(3):50–4.
7. Workie SB, Mekonen T, Mekonen TC, Fekadu W. Child development and nutritional status in 12-59 months of age in resource limited setting of Ethiopia. J Heal Popul Nutr. 2020;39(1):1–9.
8. Mahmudiono T, Sumarmi S, Rosenkranz RR. Household dietary diversity and child stunting in East Java, Indonesia. Asia Pac J Clin Nutr. 2017;26(2):317–25.
9. Laksono AD, Kusrini I. Ecological Analysis of Stunted Toddler in Indonesia. Indian J Forensic Med Toxicol. 2020;14(3):1685–91.
10. Hanandita W, Tampubolon G. The double burden of malnutrition in Indonesia: Social determinants and geographical variations. SSM - Popul Heal. 2015;1:16–25.
11. UNICEF. The State of Children in Indonesia. State Child Indones. 2020;May:1–78.
12. Raiten DJ, Bremer AA. Exploring the Nutritional Ecology of Stunting : New Approaches to an Old Problem. Nutrients. 2020;12(2):371.
13. Kirk A, Kilic T, Carletto C. Composition of Household Income and Child Nutrition Outcomes Evidence from Uganda. World Dev. 2018;109:452–69.
14. Merita M, Sari MT, Hesty H. The Positive Deviance of Feeding Practices and Carring With Nutritional Status of Toddler Among Poor Families. J Kesehat Masy. 2017;13(1):106–12.
15. Utami SM, Handayani F, Hidayah M, Wulandari RD, Laksono AD. Ecological Analysis of Preeclampsia/Eclampsia Case in Sidoarjo Regency, Indonesia, 2015-2019. Indian J Forensic Med Toxicol. 2020;14(4):3474–9.
16. Yesica D, Megatsari H, Laksono AD, Ibad M. Ecological Analysis of Maternity Care in Indonesia in 2018. Indian J Forensic Med Toxicol. 2021;15(2):2261–7.
17. National Institute of Health Research and Development of The Indonesia Ministry of Health. The 2018 Indonesia Basic Health Survey (Riskesdas): National Report [Internet]. Jakarta; 2019. Available from: http://labmandat. litbang. depkes. go.id/images/download/ laporan/ RKD/2018/ Laporan%7B%5C_%7DNasional%7B%5C_%7DRKD2018%7B%5C_%7 DFINAL.pdf
18. Rogawski McQuade ET, Clark S, Bayo E, Scharf RJ, DeBoer MD, Patil CL, et al. Seasonal Food Insecurity in Haydom, Tanzania, Is Associated with Low Birthweight and Acute Malnutrition: Results from the MAL-ED Study. Am J Trop Med Hyg. 2019 Mar;100(3):681–7.
19. Wulandari RD, Laksono AD. Determinants of knowledge of pregnancy danger signs in Indonesia. PLoS One. 2020;15(5):Article number e0232550.
20. Wulandari RD, Qomarrudin MB, Supriyanto S, Laksono AD. Socioeconomic Disparities in Hospital Utilization among Elderly People in Indonesia. Indian J Public Heal Res Dev. 2019;10(11):1800–4.
21. Laksono AD, Paramita A, Wulandari RD. Socioeconomic Disparities of Facility-Based Childbirth in Indonesia. Int Med J. 2020;25(1):291–8.
22. Wulandari RD, Putri NK, Laksono AD. Socioeconomic Disparities in Antenatal Care Utilisation in Urban Indonesia. Int J Innov Creat Chang. 2020;14(2):498–514.
23. Ipa M, Widawati M, Laksono AD, Kusrini I, Dhewantara PW. Variation of preventive practices and its association with malaria infection in eastern Indonesia: Findings from community-based survey. PLoS One. 2020;15(5):e0232909.
24. Laksono AD, Wulandari RD, Kusrini I, Ibad M. The effects of mother's education on achieving exclusive breastfeeding in Indonesia. BMC Public Health. 2021;21(1):14.
25. Pillai VK, Maleku A. Women's education and child stunting reduction in India. J Sociol Soc Welf. 2019;4(3):111–30.
26. Kusrini I, Ipa M, Laksono AD. "Is It true that the child is king?": Qualitative Study of Factors Related to Nutritional Status of Children in West Lombok, Indonesia. Indian J Public Heal Res Dev. 2019;10(12):1729–33.
27. Cumming O, Cairncross S. Can water, sanitation and hygiene help eliminate stunting? Current evidence and policy implications. Matern Child Nutr. 2016;12:91–105.

28. Badriyah L, Syafiq A. The Association Between Sanitation, Hygiene, and Stunting in Children Under Two-Years (An Analysis of Indonesia's Basic Health Research, 2013). Makara J Heal Res. 2017;21(2).
29. Wulandari RD, Laksono AD, Matahari R. The Effects of Health Insurance on Maternity Care in Health Services in Indonesia. Int J Innov Creat Chang. 2020;14(2):478–97.
30. Megatsari H, Laksono AD. Hypertension in Indonesia in 2018 : An Ecological Analysis. 2020;(December).