e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
Sefrina, et al | Amerta Nutrition Vol. 6 Issue 1SP (December 2022). 19-24



RESEARCH STUDY OPEN ACCESS

# The Interaction of Three Types of Undernutrition and Health Insurance Subscriptions at the Children in the Karawang Coastal Area, Indonesia

## *Interaksi Tiga Jenis Kekurangan Gizi dan Langganan Asuransi Kesehatan pada Anak di Pesisir Karawang, Indonesia*

**Linda Riski Sefrina[1]*, Ratih Kurniasari[1], Milliyantri Elvandari[1], Annisa Ratri Utami[2], Asep Malinda Aiboga[2], Neng Ulya[3]**

[1]Nutrition Department, Faculty of Health Science, Universitas Singaperbangsa Karawang, Karawang, Indonesia
[2]Pertamina Hulu Energi Offshore North West Java (ONWJ), Indonesia
[3]Departement of Islamic Education, Universitas Singaperbangsa Karawang, Kawarang, Indonesia

***ARTICLE INFO***

***Received:*** *15-10-2022*
***Accepted:*** *29-11-2022*
***Published online:*** *23-12-2022*

***Correspondent:***
*Linda Riski Sefrina*
*linda.riski@fkes.unsika.ac.id*

***DOI:***
*10.20473/amnt.v6i1SP.2022.19-24*

***Available online at:***
*https://e-journal.unair.ac.id/AMNT*

***Keywords:***
*Health insurance, Undernutrition, Underweight, Stunting, Wasting*

**ABSTRACT**

**Background:** Three types of undernutrition including stunting, underweight, and wasting, are a global public health problem. In terms of policies, guidance, programming, and financing, they are mostly separated while all of them are caused by poor diet.
**Objectives:** This study aimed to identify the association of underweight and wasting status with stunting of the children and health insurance subscriptions in the Coastal Area.
**Methods:** This was a cross-sectional study involving children aged 6 to 59 months. Demographic backgrounds were obtained from parents through a questionnaire. Height and weight were measured. Z-scores for height-for-age, weight-for-age, and weight-for-age were determined and classified using WHO AnthroPlus software. The binary logistic regression test was used to identify the association of variables.
**Results:** A total of 108 children participated in the study. The prevalence of stunting, being underweight, and wasting was 21.3%, 21.3%, and 13.9% respectively. It was found that most demographic characteristics (age, gender) and health insurance were similar in each of the undernutrition types, except for age level in stunting children. The risk of stunting in underweight children is significant differences, but not for wasting children in the coastal area. This study also shows that there is a significant correlation between the incidence of stunting with wasting and being underweight in children in the coastal area of Karawang.
**Conclusions:** Overall, underweight children tend to have a stunting risk. The policy and community-based program need to not focus on one category of undernutrition only, but also on other types of undernutrition simultaneously, with the aim that nutritional problems in children can be handled holistically.

***ABSTRAK***

***Latar Belakang:*** *Terdapat tiga jenis kekurangan gizi yaitu* stunting, underweight, *dan* wasting *di dunia. Ketiga jenis ini merupakan masalah kesehatan masyarakat global yang berdampak pada pengembangan sumber daya manusia. Dari sisi kebijakan, pembinaan, program, dan pembiayaan sering dilakukan terpisah-pisah, padahal semuanya disebabkan oleh pola makan tidak sehat yang dilakukan dalam waktu yang lama.*
***Tujuan:*** *Penelitian ini bertujuan untuk mengidentifikasi hubungan* underweight *dan* wasting *dengan* stunting *pada anak serta penggunaan asuransi kesehatan di wilayah pesisir pantai.*
***Metode:*** *Penelitian ini merupakan penelitian potong lintang yang melibatkan anak usia 6 sampai 59 bulan. Latar belakang demografi diperoleh dari orang tua melalui kuesioner. Tinggi dan berat badan diukur. Z-skor untuk tinggi badan menurut umur, berat badan menurut umur, dan berat badan menurut umur ditentukan dan diklasifikasikan menggunakan perangkat lunak WHO AnthroPlus. Uji regresi logistik biner digunakan untuk mengidentifikasi hubungan variabel.*
***Hasil:*** *Sebanyak 108 anak berpartisipasi dalam penelitian ini. Prevalensi* stunting, underweight, *dan* wasting *masing-masing adalah 21,3%, 21,3%, dan 13,9%. Penelitian ini menemukan bahwa sebagian besar karakteristik demografi (usia, jenis kelamin) tidak berbeda pada masing-masing jenis gizi kurang, kecuali untuk tingkat usia pada anak* stunting. *Penelitian ini juga menunjukkan bahwa terdapat korelasi yang signifikan antara kejadian* stunting *dengan* wasting *dan* underweight *pada anak di wilayah pesisir pantai Karawang.*

***Kesimpulan:*** *Secara keseluruhan, anak kurus cenderung memiliki risiko stunting. Kebijakan dan program berbasis masyarakat sebaiknya tidak hanya terfokus pada satu kategori gizi buruk saja, tetapi juga pada jenis gizi kurang lainnya secara bersamaan, dengan tujuan agar masalah gizi pada anak dapat ditangani secara holistik.*

***Kata kunci:*** *Asuransi kesehatan,* Undernutrition, Underweight, Stunting, Wasting

## INTRODUCTION

The problem of undernutrition in children under the age of 5 both worldwide and in Indonesia is still a public health problem. Based on WHO (2021), shows that as many as 149 million children suffer from stunting and 45 million children suffer from wasting. In 2021, the prevalence of stunting in children under five in Indonesia is 24.5%, underweight is 17.0% and wasting is 7.1%. The Indonesian Nutrition Status Survey (2021) shows the prevalence of stunting under-fives in West Java Province is 24.5% and in Karawang Regency is 20.6% [1]. These prevalence are included as public health problems that needed to immediate attention and treatment. This is related to the long-term impact of malnutrition on human resources, including economic losses [2].

The Indonesian government has a target of reducing the stunting prevalence rate to less than 14% by 2024. The handling of stunting in Indonesia is carried out in an integrated manner through various parties. In 2013, the Indonesian government's commitment to accelerate nutrition improvement was stated through Presidential Decree Number 42 of 2013 concerning the National Movement to Accelerate Nutrition Improvement [3]. Then in 2018, the government made the National Strategy for the Acceleration of Stunting Prevention for 2018-2024 which contain 5 pillars and priorities for the acceleration of stunting prevention. The five pillars consist of commitment and vision of national and regional leadership, national campaign and behavior change communication, encouraging program convergence at the central and regional levels, food and nutrition security, monitoring and evaluation [4].

The previous studies showed the uses of health insurance in stunting children. The health insurance subscriptions led to better health for children in China [5]. A study in Egypt also presented that children without health insurance coverage were more likely to be stunted than children who have health insurance [6]. This result was the opposite of the study in Aceh that showed that health insurance did not correlate with stunting incidence [7]. This problem showed that research that analyzes the correlation between health insurance in malnutrition, especially in the coastal area, is still limited and still needed to be conducted.

Some studies have noted that programs to address stunting, underweight, and wasting are often carried out separately [8–10]. The three categories of malnutrition are often found in the same population and have interrelated risk factors. This could be due to the limited investigation into the link between stunting and underweight and wasting [11]. Previous studies have assessed the barriers to handle malnutrition can occur because there is a gap in information about the condition of malnutrition in more than one category. This problem happens might be caused by the possibility that children are stunting, underweight, and wasting at the same time [12].

The problem of stunting, being underweight, and wasting are manifestation of malnutrition caused by inadequate nutrition and disease both chronically and acutely. Myat et al. (2018) revealed the heightened risk of mortality associated with wasting-stunting children[13]. This problem shows that children with malnutrition in more than one category need attention so that the care of children with malnutrition can prevent a worse impact on health. Assessment of the interrelationships of these three categories is important to set priorities for future intervention goals to be able to address nutrition problems comprehensively. Therefore, the purpose of this study was to identify a comparison of the risk of stunting in the incidence of wasting and underweight in children aged 0-59 months and to assess the sociodemographic characteristics and health insurance subscription in families with undernutrition children.

## METHODS

The present study was conducted in November-December 2021 using a cross-sectional research design. The research location was in Pedes District, Karawang. This location is one of the districts with a high prevalence of stunting in Karawang. The population in this study were all children aged 6-59 toddlers in Sungaibuntu. The site was chosen because of the high prevalence rate of stunting in Karawang. Based on the results of the sample calculation using the Lemeshow formula, the sample needed in this study were 108 research subjects. We used purposive sampling with the inclusion criteria for the selection of research subjects: children aged 6-59 months, live in the research location, had a handbook of health of both mother and child (Buku Kesehatan Ibu dan Anak), for the last 3 months regularly visited the integrated health care in the village (Posyandu) and did not have chronic diseases such as tuberculosis. The exclusion criteria for subjects were suffering from congenital defects such as hydrocephalus and certain syndromes.

The assessment of the nutritional status of research subjects using the calculated Z-score indicator. The measurement was handled by trained research assistants. Research assistants conducted the measurements three times, checked by a second observer, and the mean of measurement was used for analysis. Z-scores for weight-for-height (WHZ), height-for-age (HAZ), and weight-for-age (WAZ) were calculated using the WHO growth standards. The Z-scores for weight and height were computed based on the child's age and gender using WHO AnthroPlus. The following standard case definitions were applied to each record: Stunting: HAZ < -2.0, Underweight: WAZ < -2.0, and Wasting: WHZ < -2.0.

The prevalence of stunting, wasting, and being underweight were calculated based on the different age groups (≤2 y.o and >2 y.o), and gender (boys and girls) compared with Z-scores. We analyzed both univariate

and bivariate tests using SPSS ver 16.0. This study uses the Chi-square statistical test with a significance of *p*-value <0.05 and 95% confidence interval, then continued with binary logistic regression for significant result variables. Ethical approval was obtained from Research Ethics Committee for Esa Unggul University, Jakarta, Indonesia. The date of approval was on October 29th, 2021 with number 0364-21.364/DPKE-KEP/FINAL-EA/UEU/X/2021.

## RESULTS AND DISCUSSION

A total of 108 children were enrolled as the subjects. The age mean of the subjects was 31 ± 16 months. Stunting and being underweight were more common than stunting in this study. Overall, the high number of children were observed with stunting (HAZ <-2) 21.3%, underweight (WAZ < -2) 21.3%, and wasting (WHZ <-2) 13.9%, respectively (Table 1).

**Table 1**. The prevalence of undernutrition children in the Karawang Coastal Area

| Nutritional Status | *n* | *%* |
|---|---|---|
| Stunting | | |
| Yes | 23 | 21.3 |
| No | 85 | 78.7 |
| Underweight | | |
| Yes | 23 | 21.3 |
| No | 85 | 78.7 |
| Wasting | | |
| Yes | 15 | 13.9 |
| No | 93 | 86.1 |

Table 2 reports their demographic and health insurance subscription according to their nutritional status. The risk factors associated with nutritional status concerning demographic among these communities were analyzed by Chi-square test. The results reveal that the risk of underweight or wasting had no difference with age and gender (p>0.05) which means that all ages and gender had similar risks either for underweight or wasting. Similarly, the girls and boys had no different risk of stunting. Although there was no difference in risk, in this study women had a greater prevalence of undernutrition than men. Otherwise, the stunting was significantly different based on age groups (p<0.05; CI 95%: 0.316 (0.099-1.010)). This result indicates that children more than 2 years old had a higher risk of stunting. In the case of the health insurance subscription, most children were not covered by health insurance and its usage tends to be alike among the three types of undernutrition (p> 0.05).

**Table 2**. Demographic and health insurance based on nutritional status

| Variable | Total of subjects [n(%)] | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | Stunting | | Underweight | | Wasting | | |
| | Yes | No | Yes | No | Yes | No | |
| Age groups | | | | | | | |
| ≤2 y | 4 (10.5) | 34(89.5) | 5 (13.2) | 33(86.8) | 7 (18.4) | 31(81.6) | 38 (100.0) |
| >2 y | 19(27.1) | 51(72.9) | 18(25.7) | 52(74.3) | 8 (11.4) | 62(88.6) | 70 (100.0) |
| p-value | 0,044* | | 0.128 | | 0.316 | | |
| [95% CI] | [0.316 (0.099-1.010)] | | [0.438 (0.148-1.292)] | | [1.750 (0.581-5.269)] | | |
| Gender | | | | | | | |
| Boys | 10(20.0) | 40(80.0) | 11(22.0) | 39(78.0) | 8(16.0) | 42(84.0) | 50 (100.0) |
| Girls | 13(22.4) | 45(77.6) | 12(20.7) | 46(79.3) | 7(12.1) | 51(87.9) | 58 (100.0) |
| p-value | 0.760 | | 0.868 | | 0.556 | | |
| [95% CI] | [0.865 (0.342-2.189)] | | [1.081(0.430-2.720)] | | [1.388(0.465-4.142)] | | |
| Health Insurance | | | | | | | |
| Yes | 7 (26.9) | 19(73.1) | 6(23.1) | 20(76.9) | 2 (7.7) | 24(92.3) | 26 (100.0) |
| No | 16(19.5) | 66(80.5) | 17(20.7) | 65(79.3) | 13(15.9) | 69(84.1) | 82 (100.0) |
| p-value | 0.421 | | 0.799 | | 0.294 | | |
| (95% CI) | [1.520 (0.546-4.233)] | | [1.147(0.399-3.303)] | | [0.442 (0.093-2.104)] | | |

*significant at *p*-value< 0.05 based on the Chi-square test

This present study also identified the comparison between stunting based on other types of undernutrition, which are underweight and wasting. Table 3 shows the risk of stunting in underweight children was significantly different, but not for wasting children. This result indicated that underweight children have a higher risk to develop stunting.

**Table 3**. The difference between underweight and wasting risk in stunting children

| Nutritional Status | Stunting [n(%)] | | Total [n(%)] | p-value[1] | CI 95% |
|---|---|---|---|---|---|
| | Yes | No | | | |
| Age groups | | | | | |
| ≤2 y | 4 (10.5) | 34(89.5) | 38 (100.0) | 0.048 | 0.660 (0.437-0.996) |
| >2 y | 19(27.1) | 51(72.9) | 70 (100.0) | | |
| Underweight | | | | | |
| Yes | 12 (52.2) | 11 (47.8) | 23 (100.0) | <0.001 | 23.079 (5.322-100.078) |
| No | 11 (12.9) | 74 (87.1) | 85 (100.0) | | |
| Wasting | | | | | |
| Yes | 1 (6.7) | 14 (93.3) | 15 (100.0) | 0.005 | 0.030 (0.003-0.351) |
| No | 22 (23.7) | 71 (76.3) | 93 (100.0) | | |

[1] Constant= 4.332, Nagelkerke $R^2$=0.396, Percentage correct 86.1%

The present study revealed that the number of stunting, underweight and wasting is a public health problem in the coastal area [14]. Blankenship et al. (2020) also showed that children in coastal areas have a higher risk to be stunting 39% and wasting 65% [15]. Besides macronutrients and micronutrient deficiencies as the main factor of undernutrition, environmental factors including poor water and sanitation are known as the second largest global risk factor of stunting in children [16]. The community in the coastal area had experienced more suffering from climate change, like in Sungaibuntu. The disruption caused by climate change such as rising air and sea surface temperatures increases storm intensity and impacts water availability [17]. Then they will affect the food availability and security on the coast. In Sungaibuntu, based on the initial observations of researchers in Sungaibuntu, this location there are having tidal floods frequently, especially when the rainy season. Schnitter et al. (2019) stated that flooding and rising sea level have impacts on to decline in fisheries and agricultural crops [18]. Therefore, it is recommended that the intervention for undernutrition with geographical targeting hopefully ameliorate nutritional conditions.

The children >2 years in the present study tend to have a higher risk to have stunting than ≤2 years. This result is in line with a previous study that explained that the correlation between stunting and age was not linear. The lowest probability to had stunting is at 0-6 months. The risks of stunting rise to peak at 24-42 months and then declined to start at 4 years old [19]. The risk of stunting, underweight, and wasting in the boys was similar to the girls. This result was not acquired with a study by Dranesia et al. (2019), which showed that boys tended to experience stunting more frequently than girls [20].

According to Chen et al. (2019), health insurance has the direct potential to reduce the risk of economic factors for medical treatments and ensure financial accessibility[5]. The present study shows that the insurance participation rate was still low (26.0%) and was not significantly different for all of the undernutrition categories. It might be influenced by the low coverage of health insurance for both children with and without undernutrition. Even though this study presented that the risk of stunting, wasting, and underweight is similar within the children based on coverage of health insurance, the undernutrition children tend to the children without health insurance. The result of this study was not in line with previous studies. A study in Ghana showed that health insurance was associated with the underweight incidence in children [21]. A recent study in Uganda revealed the household's participation in health insurance potential to decrease 4.3% the probability of stunting in children under 2 years old[22]. These differences indicate the acceptance of medical insurance in various communities. Some factors that determine enrollment in health insurance are knowledge and understanding of insurance, healthcare quality, and reliance on the insurance. The community who did not enrolment have some barriers factors including cultural beliefs, affordability, lack of adequate legal policy, firm rules, and unacceptable benefits package [23].

Our study found significant differences between stunting and underweight children ($p<0.05$). The percentage of children who stunting and underweight in this study was 11.1%. This percentage was higher than the recent study conducted in Malawi (8.8%) [19]. The risk of stunting between children who wasting and non-wasting was similar ($p>0.05$; CI 95%= 0.231 [0.029-1.853]). That result was a distinction from the previous study that showed the proportion of wasting children increased significantly with the degree of stunting in children aged 0-59 months [24]. Socio-economic status, cultural values, social security, and poor accessibility to education and health services for mother and child might be the causes of regional differences in stunting and wasting of children [25]. Hence, the intervention for children should consider the interaction between the types of undernutrition.

To our knowledge, this is the first empirical study that identified the comparison of the risk of stunting in the incidence of wasting and underweight and the health subscription in undernutrition in Indonesia. The present study has some imperfections. First, this study was only conducted in one village, so it is still needed to conduct research in other districts in the Karawang coastal area. Second, we did not obtain information related to the nutrient intake, particularly macronutrients, of the subjects which was might be directly correlated with undernutrition.

The community in the coastal area had more experience with difficulties to access food availability and health services. Health insurance is community-based financing that could be implemented in the household of the coastal area. This study provides knowledge of the role of the community-based financing approach to ameliorate nutritional status in children 0-59 months. These findings also contribute implications on how the

government is able to ameliorate relevant health insurance policies and promote children's health. The Indonesian government ought to promote active health management especially for children 0-59 months, enlarge the earmarking of medical services (resources, facilities, and system), and access for the household in the coastal area.

## CONCLUSIONS

The stunting in the children was influenced by the other types of undernutrition especially underweight. The study also revealed the community in the coastal area had low access the health insurance. Further study ought to identify the factors of low coverage of health insurance in the coastal area. According to the findings in this study, policy makers need to focus on the preventive approaches to stunting, underweight, and wasting simultaneously.

## ACKNOWLEDGEMENT

All subjects who participated in the study are gratefully acknowledged. Special thanks are due to Pertamina Hulu Energi ONWJ (Offshore North West Java) Indonesia for the full funding for this study.

## CONFLICT OF INTEREST AND FUNDING DISCLOSURE

This research was funded by Pertamina Hulu Energi ONWJ (Offshore North West Java) Indonesia

## REFERENCES

1. Health Ministry of Indonesia. *Ministry of Health Performance Report 2020. Health Ministry of Indonesia* (2021).
2. Health Ministry of Indonesia. Basic Health Research of Indonesia 2018. *Health Ministry of Indonesia* 198 (2018).
3. Health Ministry of Indonesia. The stunting prevention is important. *Data Inf. Center, Heal. Minist. Indones.* 1–27 (2018).
4. Karyadi, E. Stunting: a multisector challenges and unfinished nutrition agenda. *Universa Med.* **38**, 69–72 (2019).
5. Chen, L. & Chu, L. Does health insurance coverage lead to better child health? Evidence from China. *China Popul. Dev. Stud.* **3**, 1–23 (2019).
6. Issa, A. Determinants of Childhood Stunting in Egypt: Further Analysis of Demographic and Health Survey 2014 Using Generalized Logistic Regression Approach. (2019).
7. Suriati & Farisni, T. N. the Relationship Between Nutritional Health Services for Pregnant Women and the Incidence of Stunting in Lhok Bot, Aceh Jaya. *Clin. Med. Insights* **03**, 1–8 (2022).
8. Menon, P. & Stoltzfus, R. J. Building convergence in science, programs, and policy actions on child undernutrition: Symposium rationale and overview. *Adv. Nutr.* **3**, 224–226 (2012).
9. Martorell, R. & Young, M. F. Patterns of stunting and wasting: Potential explanatory factors. *Adv. Nutr.* **3**, 227–233 (2012).
10. Hawkes, C., Haddad, L. & Udomkesmalee, E. The global nutrition report 2015: What we need to do to advance progress in addressing malnutrition in all its forms. *Public Health Nutr.* **18**, 3067–3069 (2015).
11. Yoshida, S. Approaches, tools and methods used for setting priorities in health research in the 21st century. *J. Glob. Health* **6**, (2016).
12. Rudan, I. *et al.* Setting health research priorities using the CHNRI method: VII. A review of the first 50 applications of the CHNRI method. *J. Glob. Health* **7**, (2017).
13. Myatt, M. *et al.* Children who are both wasted and stunted are also underweight and have a high risk of death: A descriptive epidemiology of multiple anthropometric deficits using data from 51 countries. *Arch. Public Heal.* **76**, 1–11 (2018).
14. Bose, K. *et al.* Stunting, underweight and wasting among Integrated Child Development Services (ICDS) scheme children aged 3-5 years of Chapra, Nadia District, West Bengal, India. *Matern. Child Nutr.* **3**, 216–221 (2007).
15. Blankenship, J. L., Cashin, J., Nguyen, T. T. & Ip, H. Childhood stunting and wasting in Myanmar: Key drivers and implications for policies and programmes. *Matern. Child Nutr.* **16**, 1–8 (2020).
16. Danaei, G. *et al.* Risk Factors for Childhood Stunting in 137 Developing Countries: A Comparative Risk Assessment Analysis at Global, Regional, and Country Levels. *PLoS Med.* **13**, 1–18 (2016).
17. Lincoln Lenderking, H., Robinson, S. ann & Carlson, G. Climate change and food security in Caribbean small island developing states: challenges and strategies. *Int. J. Sustain. Dev. World Ecol.* **28**, 238–245 (2021).
18. Schnitter, R. *et al.* An assessment of climate change and health vulnerability and adaptation in dominica. *Int. J. Environ. Res. Public Health* **16**, (2019).
19. Chikhungu, L. C. Trends and patterns of stunted only and stunted- underweight children in Malawi : A confirmation for child nutrition practitioners to continue focusing on stunting. **34**, 111–117 (2022).
20. Dranesia, A., Wanda, D. & Hayati, H. Pressure to eat is the most determinant factor of stunting in children under 5 years of age in Kerinci region, Indonesia. *Enferm. Clin.* **29**, 81–86 (2019).
21. Acquah, E., Darteh, E. K. M., Amu, H. & Adjei, D. K. A. Predictors of underweight in children under-five years in Ghana. *Ghana Med. J.* **53**, 71–78 (2019).
22. Nshakira-Rukundo, E., Mussa, E. C., Gerber, N. & von Braun, J. Impact of voluntary community-based health insurance on child stunting: Evidence from rural Uganda. *Soc. Sci. Med.* **245**, 112738 (2020).
23. Dror, D. M. *et al.* What factors affect voluntary uptake of community-based health insurance schemes in low- and middle-income countries? A systematic review and meta-analysis. *PLoS One* **11**, 1–31 (2016).
24. Garenne, M., Myatt, M., Khara, T., Dolan, C. & Briend, A. Concurrent wasting and stunting

among under-five children in Niakhar, Senegal. *Matern. Child Nutr.* **15**, e12736 (2019).
25. Chowdhury, T. R. *et al.* Factors associated with stunting and wasting in children under 2 years in Bangladesh. *Heliyon* **6**, e04849 (2020).