

IMPACT OF ENVIRONMENTAL SANITATION AND INFECTION DISEASE AS A DETERMINING WASTING AGED 0-59 MONTHS IN ACEH BARAT DISTRICT

Khairunnas¹, Teuku Muliadi², Rona Arnisa³, Enda Silvia Putri⁴

¹Department of Nutrition, Faculty of Public Health, Universitas Teuku Umar, Indonesia

²Department of Nutrition, Faculty of Public Health, Universitas Teuku Umar, Indonesia

³Department of Public Health Science, Faculty of Public Health, Universitas Teuku Umar, Indonesia

⁴Department of Nutrition, Faculty of Public Health, Universitas Teuku Umar, Indonesia

E-mail: ¹khairunnas@utu.ac.id, ²teukumuliadi@utu.ac.id, ³ronaarnisa@gmail.com,

⁴endasilviaputri@utu.ac.id

Abstract

Malnutrition is a public health problem in developing countries, with 50% of the 10-11 million children under five each year dying from preventable causes. West Aceh regency is known as the wealthiest district, but the wealth cannot necessarily overcome the problems of its people. This is indicated by discovering cases of malnutrition and malnutrition in the West Aceh Regency. Various efforts have addressed the nutritional issue, but the pain rate is still high. Purpose: This study aims to find out the relationship between environmental sanitation and infectious diseases with the nutritional status of toddlers in Meureubo Subdistrict, West Aceh Regency. Method: The type of research used is analytical survey research with a cross-sectional design. The sample was toddlers aged 0-59 months. The number of study samples of 95 people was taken by proportional random sampling method. Environmental sanitation variables were obtained from interviews with respondents using questionnaires and direct observations. Infectious disease variables were obtained from interviews with respondents. Variables bound to nutritional status are determined based on anthropometric measurements using the Weight/age indicator. The bivariate analysis uses chi-square and multivariate tests using logistic regression. Results: Statistical test results show that toddlers who do not have latrines will result in wasting in toddlers (95%CI:1.19-6.45), who do not have access to clean water (95% CI: 0.82-4.38), have a history of infectious diseases for the last three months (95% CI: 1.5- 8.5). From these results, we can conclude that the most significant influence on wasting is a child with a history of infectious diseases.

Keywords: Cross-sectional, Weight/Age, Sanitation, Infectious Disease, Wasting.

1. INTRODUCTION

Wasting is one of the reflections of the nutritional state of the community (WHO, 2013). Wasting describes acute malnutrition, usually due to insufficient food intake and infectious diseases (Ahmadi et al., 2018). Toddlers suffering from wasting can be seen with indicators of weight/age or weight/height with a value of z-score <-2 elementary schools from the standard of child growth and development according to WHO (World Health Organization, 2010). In 2017, the prevalence of underweight in toddlers globally was 9.9%. Who estimates that more than two-thirds (69%) of children live in Asia (UNICEF/WHO/World Bank, 2018). In Indonesia, Riskesdas in 2018 showed the prevalence of underweight in toddlers at 10.2%, while in the age group under two years higher at 11.7%. Aceh is one of 3,596 provinces with a prevalence of underweight above the national figure, which is 15.46% in the toddler group and 17.97% in the under-two age group (Kementerian Kesehatan RI, 2018).

Wasting increases the risk of death in children and is even considered a better predictor of child mortality than stunting (Saaka &Galaa, 2016). In 2018, the number of toddler deaths was 5.6

IMPACT OF ENVIRONMENTAL SANITATION AND INFECTION DISEASE AS A DETERMINING WASTING AGED 0-59 MONTHS IN ACEH BARAT DISTRICT

Khairunnas, Teuku Muliadi, Rona Arnisa, Enda Silvia Putri

DOI: <https://doi.org/10.54443/morfai.v2i1.198>

million cases, and 45% were due to nutritional factors. Wasting that occurs early in life can inhibit linear growth or increase the risk of death (Richard et al., 2012).

Wasting is a nutritional problem caused by several factors, including environmental sanitation and a history of infectious diseases (Muliadi, 2021). Families who do not have access to clean water are significantly three times more likely to suffer from nutritional status than families with access to clean water (Ahmad & Indah, 2019). The ownership of latrines is related to the incidence of nutritional status. Improper latrines possession tends to suffer from nutritional status 7,398 times higher than toddlers with decent toilets (Nasrul, 2018). Access to sanitation is one factor that affects the incidence of nutritional status. In Indonesia, it is known that 1 in 5 households still defecate in open spaces, and 1 in 3 households do not have access to clean drinking water. Access to sanitation is said to be feasible if it meets health requirements, including equipped with gooseneck, septic tank (septic tank) / Wastewater Treatment System (WTS), used alone or together (Kemenkes RI, 2018). Children under five with a history of diarrhea are at risk 13.33 times, causing wasting, and children under five with a history of ARI are at risk of 7.01 times wasting (Yuniarti et al., 2019). Infectious diseases in toddlers allow weight loss, and if it lasts for a long time and is not balanced with adequate intake as a healing process, it can cause nutritional status (Kemenkes RI, 2018).

Infectious diseases children under five often suffer diarrhea, strep throat, and acute respiratory tract infections (ARI). ARI and diarrhea occur in children under five because the child's body defense system is low. Diarrheal diseases include one of the diseases with sources of transmission through water (water-borne conditions), and diarrheal infections in children under five are generally accompanied by vomiting and snoring (Hidayat & Fuada, 2011). Lack of public access to clean water or drinking water and poor sanitation and hygiene behavior contribute to the deaths of 1.8 million people a year from diarrhea. Efforts to reduce the incidence of infant and toddler diseases can be pursued by creating healthy environmental sanitation, ultimately improving their nutritional status. (Iskandar et al., 2015).

With the high prevalence of wasting and the many negative impacts it causes, it is necessary to make appropriate interventions to overcome wasting. Therefore, this study aims to look at environmental sanitation relationships such as latrines ownership, water hygiene, and history of infectious diseases in children aged 0-59 months to provide scientific-based information as a basis /reference in creating intervention programs to overcome the problem of wasting.

2. IMPLEMENTATION METHOD

This type of research is a quantitative analytical survey method with a cross-sectional design. We researched the Meureubo Subdistrict of West Aceh Regency with a total of 95 toddlers with sampling techniques, namely Stratified Random Sampling. The Ethics Review Committee of the Faculty of Public Health, Teuku Umar University (UTU), Meulaboh, Indonesia, approved research ethics.

The total variables of this study are four variables. 1). clean water variable is clean water used for physically qualified communities, i.e., not cloudy, odorless, and colorless, while those that do not qualify are cloudy, smelly, and colored. We make variable dichotomy that meets and does not meet. 2). Latrines identify the ownership of household latrines. 3). Infectious Diseases look at the history of infectious diseases in the last three months. We divide it into having a history of

infectious diseases and not having them. 4) Nutritional status is using indicators: Malnutrition: if < -3 SD, Undernutrition: if -3 SD sd < -2 SD, Well-Nutrition: if -2 SD sd $+1$ SD.

To determine the risk factors of wasting from variables, we first conducted a complete logistic regression test with all three variables by calculating odds ratio (OR), 95% confidence interval (CI), and p-value. Then, we performed a logistic regression model by controlling the sex variable. All variables with a p-value of 0.10 or less in the full model are considered in our final logistic regression model and removed using backward gradual selection. All final significant variables at a significance level of 0.05 are used for data analysis using SPSS Version 20.

3. RESULTS AND DISCUSSION

Ninety-five toddlers aged 0-5 months were involved in the study. The number of toddlers aged 0-24 months is 30%, while toddlers aged 24-59 months is 70%. The difference in numbers between males and females was 55.8% of males and 44.2% of female toddlers. The nutritional status of malnutrition (< -3 SD) by 4.2%, undernutrition (< -2 SD) by 37.9% and well-nutrition by 57.9%. Households that qualify for clean water are 40%. In comparison, those who do not qualify are 60%, households that available latrines are 56.4%, those without latrines are 48.6%, and toddlers who have a history of infectious diseases over the past 3 months are 40% those without 60% (Table 1).

Table 1 Subjects Profiles

Characteristics		N=95
Aged (%)	0-24 Month	30
	24-59 Month	70
Gender (%)	Male	55,8
	Female	44,2
Nutritional Status (%)	< -3 SD	4,2
	-3SD to < -2 SD	37,9
	-2 SD to $+1$ SD	57,9
History of infectious disease in 3 months prior to the survey (%)	Yes	40
	No	60
Toilet (Sanitation facility) (%)	Available	56,4
	Not Available	48,6
Clean Water (%)	Recommended	40
	Not Recommended	60

Table 2 Association of Nutrition Status and Sanitation and Infectious Disease

Variables	Malnutrition(< -3 SD) n(%)	Undernutrition(-3 SD to < -2 SD) n (%)	Well-nutrition (-2 SD to $+1$ SD) n (%)	P value	Adjust *OR (95% CI)
Gender (%)					
Male	3(5,6)	20 (37,0)	31(57,4)	0,75	-
Female	1 (2,4)	16(39,0)	24(58,5)		
History of infectious disease					
Yes	4(10,5)	19(50,0)	15(39,5)	0,002	3,6(1.5- 8.5)
No	0(0)	17(29,8)	40(70,2)		
Toilet (Sanitation facility) (%)					
Not Available	4(9,8)	19(46,3)	18(43,9)	0,011	2,78(1,19-6,45)
Available	0(0)	17(31,5)	37(68,5)		

IMPACT OF ENVIRONMENTAL SANITATION AND INFECTION DISEASE AS A DETERMINING WASTING AGED 0-59 MONTHS IN ACEH BARAT DISTRICT

Khairunnas, Teuku Muliadi, Rona Arnisa, Enda Silvia Putri

DOI: <https://doi.org/10.54443/morfai.v2i1.198>

Clean Water (%)					
Not-Recommended	4(10,5)	16 (42,1)	18(47,4)	0,023	1,90(0,82-4,38)
Recommended	0 (0)	21(35,1)	36(64,9)		

In Table 2. It can be known that all variables of this study affect the incidence of wasting in West Aceh except gender variables. The most significantly influential on wasting was the risk factor for infectious diseases with OR 3.6 (1.5- 8.5) after being controlled by gender factors. This proves that infectious disease factors are the main predictors of this study as the leading cause of nutritional deficiencies in Meureubo, West Aceh Regency.

3.1 Clean Water and Sanitation

Assessments on household environmental sanitation are based on water quality, latrines quality, and household sewerage. The availability of clean water in this study was assessed based on the water needs of each household, access from water sources, the distance of water sources with homes, and the safety of waterways from the source. The availability of clean water, environmental sanitation, and hygiene behavior alone cannot eliminate wasting and malnutrition rates. However, it can accelerate the decline in wasting rates with a comprehensive strategy (Halkey et al., 2015). If the state of the physical environment and family sanitation is good, then the health condition of the house residents will also be good, and vice versa. Water sources for cooking or drinking generally come from springs and common wells. As long as the cleanliness of wells and springs is well maintained, the chances of this water source spreading infectious diseases are minimal (Yuniarti et a., 2019).

Unhealthy water will cause infectious diseases in children under five and lose weight, thus acutely affecting the nutritional satus (BB / U). Recent data shows that poor drinking water quality causes 300 cases of diarrhea per 1000 population. Other data suggests that low public access to clean water and basic sanitation can increase the incidence of infectious diseases in children under five. In addition, drinking water must also be maintained so that it is not easily polluted by harmful materials so that if drinking water is in doubt of its safety, it should be boiled to boil (Ikeda et al., 2013). Water qualified to drink is tasteless, odorless, does not contain harmful and explicit substances. By addressing the root causes of disease, drinking water and sanitation can reduce the problem of disease globally due to the environment (TNP2K, 2017).

Water sources have a role in the spread of some infectious diseases. The source of drinking water is one of the sanitation facilities associated with the incidence of infectious sources of disease, such as diarrhea, dysentery, and other diseases. Some infectious germs that cause diarrhea are transmitted through oral transmission (Dwan et al., 2018). Germs or bacteria can be shared by putting liquids or objects contaminated by feces into the mouth. As we all know, water is a basic need for human life, but water is also a medium for transmitting various diseases; therefore, the water used must meet health requirements both in quality and quantity.

Beyond nutritional interventions, the most eye-catching environmental health services for child nutrition status research are water, sanitation, and hygiene (WASH). This is reflected in this review, with most of the reports reviewed focusing on the WASH aspect. This evidence suggests that access to proper sanitation will make nutritional status better. The included words mostly use the yes/no variable to assess personal latrines ownership. Two other studies also found that nutritional status will slowly improve in the study area (most villages) (Dwan et al., 2018).

Another study found that reducing the percentage of indiscriminate defecation in villages was more effective in lowering nutritional status than increasing individual latrines possession (Spears, 2013). The study showed that the size of the number of indiscriminate bowel movements per square kilometer could account for 65% of the variation in children's height globally. It was also found that a 10% increase in indiscriminate bowel movements led to a 0.7% increase in the prevalence of wasting (Spears et al., 2013). Lastly, living in a village with the WASH program raises the average height by 0.3–0.4 elementary school (Hammers & Spears, 2013).

Hygiene practices are essential for supporting a child's health, but most of the studies in this review did not examine the interaction of hygiene habits with access to latrines. Two studies reviewed hygiene practices as independent variables. Both found that better hygiene practices (such as proper handwashing and the presence of soap and water near latrines) were associated with decreased stunting rates (Bhandari D & Choudhary, 2006).

3.2 Infectious Disease

Malnutrition can occur from mild to severe levels and occur slowly over a considerable period. Undernourished toddlers have a higher risk of dying than toddlers with good nutritional status (Andarini et al., 2014). Toddlerhood becomes even more critical because it is a crucial time to create quality human resources. Every year approximately 11 million toddlers around the world die from infectious diseases, one of which is acute respiratory tract infection (ISPA) (UNICEF / WHO / World Bank., 2018)

Nutrients obtained from food intake strongly affect immune reactions and resistance to infection. In conditions of lack of protein-energy (KEP), it can cause the body's resistance to decrease and virulence of pathogens stronger, causing a disturbed balance and infection. In contrast, one of the main determinants in maintaining that balance is the nutritional status (Richard et al., 2013).

Toddlers in the working area of Meureubo Health Center, Meureubo District, West Aceh Regency, mostly have infectious diseases with good nutritional status. It is because toddlers who have good dietary quality will have good endurance. Hence, toddlers are not susceptible to disease even in a bad environment. Conversely, toddlers with undernourished and poor nutritional status have weak endurance and are sensitive to disease. Infectious diseases experienced by toddlers based on the results of the research are tuberculosis, diarrhea, and ISPA (Di Giovanni et al., 2016)

In general, mothers of toddlers in the working area of Meureubo Health Center Meureubo Subdistrict do not know so much about infectious diseases that can cause loss weight and are not so familiar with the signs of symptoms if the child has an infectious disease. They assume that if their child is sick a little, the child will heal independently. If the condition suffered by the child does not heal and repeatedly occurs continuously, while the intake of nutritious food is less because the child does not want to eat, it will cause weight loss.

During illness, a small nutritional intake can cause the child to become malnourished or poor. The infectious disease can be caused by air contaminated with wood dust because most of the respondent's house is in the furniture industry area, besides in the countryside there are still traditional houses whose floors are still ground, if the family pays less attention to clean and healthy lifestyles then toddlers will be susceptible to abusers (Di Giovanni et al., 2016 & Richard et al., 2013).

IMPACT OF ENVIRONMENTAL SANITATION AND INFECTION DISEASE AS A DETERMINING WASTING AGED 0-59 MONTHS IN ACEH BARAT DISTRICT

Khairunnas, Teuku Muliadi, Rona Arnisa, Enda Silvia Putri

DOI: <https://doi.org/10.54443/morfai.v2i1.198>

4. CONCLUSION

Our results show that sanitation factors and a history of infectious diseases will gradually decrease Z scores in children 0-59 months in West Aceh Regency. We identified that toddler households in west Aceh had not used many latrines, resulting in toddlers' infectious diseases such as diarrhea. Diarrheal conditions that will later cause the occurrence of wasting.

REFERENCES

- Adriani M & Bambang W. (2014). *Gizi dan Kesehatan Balita (Peranan Mikro Zinc pada pertumbuhan balita)*. Jakarta. Kencana. ISBN 978-602.9413.22-9
- Ahmad, Z. F., & Indah, S. S. N. (2019). Faktor Lingkungan dan Perilaku Orang Tua pada Balita Stunting di Kabupaten Gorontalo. *Jurnal Ilmiah Umum Dan Kesehatan*. 4(2). 87–96.
- Ahmadi, D., Amarnani, E., Sen, A., Ebadi, N., Cortbaoui, P., & Melgar-Quiñonez, H., (2018). Determinants of Child Anthropometric Indicators in Ethiopia. *BMC Public Health*, 18(626).
- Arnawa, I. G. S., & Darsana, I. M. (2021). Pengaruh Budaya Organisasi dan Kepemimpinan Terhadap Loyalitas Dosen Dengan Mediasi Spiritualitas Kerja. *JURNAL EKUIVALENSI*, 7(2), 265-279.
- Balqis, Z. ., & Khaddafi , M. . (2022). Analisis Penerapan PSAK 72 Terkait Pengakuan Pendapatan Kontrak Dengan Pelanggan Pada PT PLN (Persero) Kota Lhokseumawe. *Jurnal Sistem Informasi, Akuntansi & Manajemen*, 2(1), 194-203. Retrieved from <https://adaindonesia.or.id/journal/index.php/sintamai/article/view/261>
- Bhandari D and Choudhary SK. (2006) An epidemiological study of health and nutritional status of under-five children in the semi-urban community of Gujarat. *Indian J Public Health*.50(4): 213–219
- Di Giovanni V, Bourdon C, Wang DX, et al., (2016). Metabolomic changes in serum of children with different clinical diagnoses of malnutrition. *J Nutr*.146:2436–2444
- Dwan Vilcins, M.Peter & Paul Jagals. (2018). Environmental Risk Factors Associated with Child Stunting: A Systematic Review of the Literature. *Ann Glob Health* 84(4): 551–562.
- halkey RK, Aranda-Jan C, Marx S, et al., (2015). A systematic review of current efforts to quantify the impacts of climate change on undernutrition. *Proc Natl Acad Sci USA*.112(33): E4522–4529. DOI: 10.1073/pnas.1409769112
- Hammer, Jeffrey & Spears, Dean, (2013). Village sanitation and children's human capital: evidence from a randomized experiment by the Maharashtra government," Policy Research Working Paper Series 6580, The World Bank.
- Ikeda N, Irie Y and Shibuya K. (2013). Determinants of reduced child stunting in Cambodia: Analysis of pooled data from three demographic and health surveys. *Bull World Health Organ*.91(5): 341–349. DOI: 10.2471/BLT.12.113381
- Khadafi, M., Marzuki, M., Akhyar, C., Chalirafi, C., Fuadi, F., Sinta, I., & Ilham, R. N. (2021). Analysis of Financial Ratio Determinants for Increasing Operating Profit in MSMEs Service Sector: an Empirical Case Study from Barber Shop Business in Indonesia. *Management Research and Behavior Journal*, 1(2), 68-73.
- Kementerian Kesehatan RI. (2018). Laporan Nasional Riskesdas 2018. Kementerian Kesehatan RI.
- Muliadi, T., Khairunnas, Syafiq.A. Pentingnya Intervensi Gizi Anak Usia Diatas 24 Bulan untuk Pertumbuhan dan Perkembangan Kognitif (A Systematic Review). *Majalah Kesehatan*.8(1): 54-63.

- Nasrul. (2018). Pengendalian Faktor Risiko Stunting Anak Balita di Sulawesi Tengah. *Jurnal Kesehatan Masyarakat*, 8(2), 131–146.
- Richard SA, Black RE, Gilman RH, et al., (2013). Diarrhea in early childhood: short-term association with weight and long-term association with length. *Am J Epidemiol*. 178:1129–1138
- Richard, S.A., Black, R.E., Gilman, R.H., Guerrant, R.L., Kang, G., Rasmussen, Z.A., Sack, R.B., Valentiner-branth, P., & Lanata, C.F., (2012). Wasting Is Associated with Stunting in Early Childhood. *The Journal of Nutrition*. 142:1291-1296.
- Riinawati, R. (2022). Financial Management at Muhammadiyah Educational Institutions in Banjarmasin. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 5(1).
- Saaka, M., & Galaa, S.Z., (2016). Relationships between Wasting and Stunting and Their Concurrent Occurrence in Ghanaian Preschool Children. *Journal of Nutrition and Metabolism*, 11.
- Spears D, Ghosh A and Cumming O. (2013) Open defecation and childhood stunting in India: An ecological analysis of new data from 112 Districts. *PLoS One*. 8(9). DOI: 10.1371/annotation/9ffcb740-f394-41af-bbbc-800c7cc25ea8
- Spears D. (2013) How much international variation in child height can sanitation explain? *The World Bank*; DOI: 10.1596/1813-9450-6351
- Sutrisno, D., Angresani, L., & Khadafi, M. (2022). Persepsi Mahasiswa Stikes Harapan Ibu Jambi Terhadap Pembelajaran Daring Via Zoom Pada Masa Pandemi Covid-19. *Academy Of Education Journal*, 13(1), 141-152. <https://doi.org/10.47200/aoej.v13i1.968>
- Tjetjep Syarif Hidayat & Noviati Fuada. (2011). Relationship Between Environmental Sanitation, Morbidity And Nutritional Status Of Under-Five Children In Indonesia. *The Journal of Nutrition and Food Research*. 34(2). <http://ejournal.litbang.depkes.go.id/index.php/pgm/>
- TNP2K. (2017). 100 Kabupaten/Kota Prioritas Untuk Intervensi Anak Kerdil (Stunting). *Tim Nasional Percepatan Penanggulangan Kemiskinan: Jakarta*.
- UNICEF/WHO/World Bank., (2018). *Global Overview Child Malnutrition Regional Trends*. In UNICEF/WHO/World Bank.
- WHO. (2013). *Nutrition Status for Children*, Geneva: World Health Organization
- William Jayadi Iskandar, I Wayan Sukardi & Yati Soenarto. (2015). Risk of nutritional status on diarrhea among under-five children. *Paediatrica Indonesia*. 55(4). DOI: <https://doi.org/10.14238/pi55.4.2015.235-8>
- World Health Organization., (2010). *Nutrition Landscape Information System (NLIS) Country Profil Indicators: Interpretation Guide*. WHO Press.
- Yuniarti, T. S., Margawati, A., & Nuryanto. (2019). Faktor Risiko Kejadian Stunting Anak Usia 1-2 Tahun di Daerah Rob Kota Pekalongan. *Jurnal Riset Gizi*, 7(2), 83–90.
- Hafeez, S., & Hasnu, S. (2010), "Customer satisfaction for cellular phone in Pakistan: A case study of Mobilink," *Business and Economics Research Journal*, Vol.1 No. (3), pp. 35-44.
- Hafeez, S. and Muhammad, B. (2012), "The Impact of Service Quality, Customer Satisfaction and Loyalty Programs on Customer's Loyalty: Evidence from Banking Sector of Pakistan," *International Journal of Business and Social Science*, Vol.3 No. 16, pp. 200-209.

**IMPACT OF ENVIRONMENTAL SANITATION AND INFECTION DISEASE AS A
DETERMINING WASTING AGED 0-59 MONTHS IN ACEH BARAT DISTRICT**

Khairunnas, Teuku Muliadi, Rona Arnisa, Enda Silvia Putri

DOI: <https://doi.org/10.54443/morfai.v2i1.198>

Heriyadi, Listiana, E. and Lay, YN. (2018). An Analysis of the Influence of Service Quality, Personal Selling and Complaint Handling and Trust on Customer Retention (Survey of Bank Harda International Savings Customers, Pontianak Branch). Volume 7 Number 2.

Kotler.P. (2008). Marketing Principles 2. Twelfth Edition. Jakarta: Erlangga.