



The Availability of Basic Sanitation to the Incidence of Stunting in Toddlers in the Coastal Area of Tamangapa Village, Pangkep Regency

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A B S T R A C T

The problem of malnutrition, including stunting, is greatly influenced by environmental sanitation and personal hygiene. This paper examines the influence of the availability of trash bins, Waste Water Drainage Channels (Saluran Pembuangan Air Limbah or SPAL), and toilets on the incidence of stunting in toddlers in the Coastal Area of Tamangapa Village. This paper was a quantitative descriptive study. This study was conducted in Tamangapa Village from September to November 2024. The population was mothers with toddlers in Tamangapa Village, Pangkep Regency. The sample consisted of 72 respondents. The data source used primary data obtained through questionnaires. The analysis test used regression analysis. The results showed that the availability of trash bins ($p = 0.000$), SPALs ($p = 0.000$), and toilets ($p = 0.003$) affected the incidence of stunting in toddlers. In conclusion, the availability of basic sanitation (including trash bins, wastewater disposal channels, and toilets) has a significant impact on the incidence of stunting in toddlers in the coastal area of Tamangapa Village, Pangkep Regency.

INTRODUCTION

Stunting is a physical growth disorder characterized by a decrease in growth rate, resulting from a nutritional imbalance (Losong & Adriani, 2017). According to the World Health Organization (WHO) Child Growth Standard, stunting is defined by the length-for-age index (L/A) or height-for-age index (H/A) with a limit (z-score) of less than -2 SD. The causes of stunting include nutritional intake and health status, which include food security (availability, affordability, and access to nutritious food), social environment (norms, baby and child food, hygiene, education, and workplace), health environment (access, preventive and curative services), and residential environment (water, sanitation, building conditions) (Ministry of Health of the Republic of Indonesia, 2023).

WHO data in 2022 showed that the rate of stunting in Asia reached more than 20%, indicating that stunting remains a persistent community nutrition issue. According to World Bank data, 54% of the workforce experienced stunting as infants, meaning that 54% of the current workforce are survivors of stunting (Slodia et al., 2022; H, 2023). According to data from the Implementation of the Acceleration of Stunting Reduction of South Sulawesi Province in 2023, the number of stunting toddlers in Pangkep Regency increased from 33.1% to 34.2%. Considering the abundant natural resources in Tamangapa

Village, which boasts a significant agricultural and fisheries sector, the stunting rate should not exceed 20%. However, in fact, the figure was still relatively high, reaching 20% or as many as 59 toddlers. Stunting remains a persistent nutritional issue in Indonesia that has yet to be resolved. It will have long-term impacts, including impaired physical, mental, intellectual, and cognitive development. The management of stunting will be challenging for children when they continue to have stunting up to the age of 5 years, so that it will continue into adulthood, and can increase the risk of the next generation with low birth weight (LBW) (Wicaksono & Harsanti, 2020; Flora, 2021).

Currently, sanitation and clean water are basic human needs. One of the Sustainable Development Goals (SDGs) focuses on the environmental sector to ensure that all people have universal access to clean water and sanitation. Specifically, the six SDGs aim to achieve universal and equitable access to safe and affordable drinking water by 2030, eliminate open defecation, enhance water quality by reducing pollution, and implement environmentally friendly water management systems. (Nations, 2018; Endrinikapoulos et al., 2023; Seyedsayamdost, 2020). Inadequate water and sanitation services, or even their lack of structure, efficiency, and quality, can lead to exponential increases in diseases, especially waterborne diseases. Intestinal infectious diseases, such as diarrhea caused by the consumption of unsafe drinking water, are a significant cause of death for children in low-income countries (Wolf et al., 2014). Good waste management reflects a nation's capacity for adequate waste management and a safe drinking water supply (Freeman et al., 2014). In addition, handwashing to maintain hygiene, especially after contact with feces, acts as an essential barrier against the spread of fecal-oral diseases and reduces secondary transmission of pathogens (Awalia et al., 2023). Poor hygiene practices can lead toddlers to experience diarrhea, which can result in deficiencies in essential nutrients necessary for growth (Puspitasari et al., 2020).

Based on field observations, the sanitation conditions in Tamangapa Village were quite concerning. There was no access to clean water in the village located on the coast of the Pangkep Islands; the community obtained water by purchasing it from a water supplier. Meanwhile, people with a low economic level often relied on dug well water, which did not meet the physical requirements of clean water. The water looked cloudy, was colored, smelled bad, and tasted unpleasant. In this coastal area, "flying toilets" were also frequently found on the edge of community fish ponds, where human waste was discarded into the ponds, potentially polluting the pond habitat. Then, piles of garbage could be found on several sides of the village, both in rivers, ponds, gutters, and around people's homes. Wastewater disposal was also widely channeled around the home environment, seeping into the ground, and some was also channeled directly into fish ponds or rivers. This paper examines the influence of the availability of trash bins, Waste Water Drainage Channels (*Saluran Pembuangan Air Limbah* or SPAL), and toilets on the incidence of stunting in toddlers in the Coastal Area of Tamangapa Village.

METHOD

This paper was a quantitative descriptive study. The study was conducted from September to November 2024 at Integrated Health Service Post (IHSP), also known as Posyandu, in Tamangapa Village, Pangkep Regency. The population was mothers with toddlers in Tamangapa Village, Ma'rang District, Pangkep Regency. The sample consisted of 72 respondents using the Lameshow formula. The data source used primary data obtained through questionnaires. The analysis test used regression analysis.

RESULT

Table 1 reveals that half of the respondents are between 31 and 45 years old, specifically 43 people (59.7%). In addition, most of the respondents' children are girls (69.4%) and are between 0 and 2 years old (86.1%).

Table 1. The Characteristics of Respondents

The Characteristics of Respondents	Frequency (n)	Percentage (%)
Mother's Age Group		
15-30 Years old	28	39.9
31-45 Years old	43	59.7
46-60 Years old	1	1.4
Child's Sex		
Boy	22	30.6
Girl	50	69.4
Child's Age group		
0-2 Years old	62	86.1
3-4 Years old	10	13.9

Table 2 indicates that half of the respondents' children are stunted (50%), and the other half have a normal height (50%). In addition, most respondents have a wastewater drainage channel that meets the standard (73.6%). However, most have trash bins that do not meet the standard (62.5%), and half have toilets that do not meet the standard (52.8%).

Table 2. The Incidence of Stunting, The Availability of Trash Bins, Wastewater Drainage Channels, and Toilets

Variables	Frequency (n)	Percentage (%)
The Incidence of Stunting		
Normal	36	50
Stunting	36	50
The Availability of Trash Bins		
Meet the standard	27	37.5
Not meet the standard	45	62.5
The Availability of Wastewater Drainage Channels		
Meet the standard	53	73.6
Not meet the standard	19	26.3
The Availability of Toilets		
Meet the standard	34	47.2
Not meet the standard	38	52.8

Respondents with trash bins that did not meet the standard had children with stunting (44%). The regression analysis yielded $p = 0.000$ ($p < \alpha$), indicating a significant influence of the availability of trash bins on the incidence of stunting in toddlers in the coastal area of Tamangapa Village (Table 3).

Table 3. The Effect of The Availability of Trash Bins on the Incidence of Stunting

The Availability of Trash Bins	The Incidence of Stunting				<i>p</i>
	Normal		Stunting		
	(n)	(%)	(n)	(%)	
Meet the standard	23	31.9	4	5.6	0.000
Not meet the standard	13	18.1	32	44.4	
Total	36	50	36	100	

Respondents with wastewater drainage that met the standard had children with normal height (44%). The regression analysis yielded $p = 0.000$ ($p < \alpha$), indicating a significant influence of the availability of wastewater drainage channels on the incidence of stunting in toddlers in the coastal area of Tamangapa Village (Table 4).

Table 4. The Effect of The Availability of Wastewater Drainage Channels on The Incidence of Stunting

The Availability of Wastewater Drainage Channels	The Incidence of Stunting				<i>p</i>
	Normal		Stunting		
	(n)	(%)	(n)	(%)	
Meet the standard	32	44.4	21	29.2	0.000
Not meet the standard	4	5.6	15	20.8	
Total	36	50	36	50	

Respondents with toilets that did not meet the standard had children with normal height (34.7%). The regression analysis yielded a p -value of 0.003 ($p < \alpha$), indicating a significant influence of the availability of toilets on the incidence of stunting in toddlers in the coastal area of Tamangapa Village (Table 5).

Table 5. The Effect of The Availability of Toilets on The Incidence of Stunting

Availability of Toilets	The Incidence of Stunting				<i>p</i>
	Normal		Stunting		
	(n)	(%)	(n)	(%)	
Meet the standard	11	15.3	23	31.9	0.003
Not meet the standard	25	34.7	13	18.1	
Total	36	50	36	50	

DISCUSSION

The Influence of The Availability of Trash Bins on The Incidence of Stunting

Environmental problems and infectious diseases contribute to stunting. Environmental sanitation conditions, including improper waste management, are the primary causes of various contagious diseases. Communicable diseases, such as diarrhea, can disrupt the digestive process and hinder nutrient absorption, potentially leading to weight loss in toddlers. If this condition persists for an extended period and is not balanced with adequate nutritional intake to support the healing process, it can result in stunted growth in toddlers (Rahmuniyati & Sahayati, 2021).

Based on the analysis conducted in this study, the results indicated that the availability of trash bins had an impact on the incidence of stunting in Tamangapa Village, Pangkep Regency (Table 3). This finding aligns with a previous study. The study found that families with waste management that did not meet the standard had a 1.17 times higher risk of having children with stunting (95% CI 1.05-1.29) compared to families who implemented waste management that met the requirements (Badriyah & Syafiq, 2017).

Waste is a contributing factor to stunting. Trash bins that do not meet the standard are one of the factors contributing to the occurrence of stunting in toddlers due to poor household waste management. For example, irregularities in separating organic and inorganic waste, as well as the absence of a cover on the trash can, cause waste to become a breeding ground for vectors such as flies and cockroaches. These vectors act as intermediate hosts in the spread of environmentally related diseases. In addition, many people only dispose of garbage within their home environment and burn it in the yard. If household waste management is carried out correctly, the likelihood of children experiencing stunting will be reduced. This condition is associated with a lower possibility of toddlers having environmentally transmitted diseases.

Meanwhile, from a regional perspective, Tamangapa Village is situated on the coast, very close to the sea, allowing people to access sources of protein, such as fish. However, in reality, not all family members in this investigation had the habit of consuming fish. It may be because most families had low incomes, so they could not afford to buy fish for the protein needs of toddlers. Fathers were more concerned with buying cigarettes than meeting their children's protein needs. At the same time, mothers were mainly busy working as seaweed farmers, often facing economic and time constraints that prevented them from preparing protein-rich foods. The results of the interviews with respondents also revealed that toddlers frequently buy snacks freely and consume instant noodles.

The Influence of The Availability of Wastewater Drainage Channels on The Incidence of Stunting

Wastewater that is carelessly disposed of into the environment can pollute it. Waste that is discharged into the gutter can attract vectors to nest there. Vectors can act as a medium for transmitting disease. Therefore, when wastewater is not discharged in a sanitary manner, environmental health problems can arise in the area. Waste disposal, as one of the elements of ecological sanitation, can impact infectious diseases such as worms because it has the potential to spread worm eggs into the environment. The requirements for SPAL include having smooth channels and flows, special reservoirs, and being sanitary (the distance between SPAL and the water source must be at least 10 meters) (Balitbangkes, 2015).

The study's results showed that the availability of wastewater drainage channels affects the incidence of stunting in toddlers in Tamangapa Village, Ma'rang District, Pangkep Regency (Table 4). Most respondents had SPALs that did not meet the standard compared to those that met. People in Tamangapa Village generally disposed of wastewater directly into the area around their homes. Additionally, they also discharged wastewater into nearby ponds and rivers. Economic limitations were a predisposing factor in

the people of Tamangapa Village's decision to choose an open drainage system. This research aligns with previous studies, which found that the incidence of stunting is influenced by the availability of SPAL that does not meet health requirements (Soraya et al., 2022; Yuniastuti et al., 2024).

Wastewater drainage channels can be in the form of gutters or pipes used to drain wastewater from its source. Wastewater from households (domestic sewage) includes used bathwater, leftover water from washing clothes, as well as water from cleaning furniture and food ingredients, and other sources. Stagnant wastewater can pollute the environment around the house, cause environmental harm, and become a breeding ground for germs (Opu & Hidayat, 2021).

The Influence of the Availability of Toilets on The Incidence of Stunting

Two critical components of environmental sanitation practices are the presence of toilets in every home that meet hygiene standards and the habit of washing hands with soap. In addition to the availability of clean water, parental education level, and family income, stunting can also be caused by the availability of toilets and handwashing habits. Toilets must meet the requirements set by the Regulation of the Minister of Health of the Republic of Indonesia No. 3 of 2014 to achieve adequate hygiene standards (Regulation of the Minister of Health No. 3 of 2014, 2014).

This paper showed that the availability of toilets had a significant influence on the incidence of stunting in Tamangapa Village. This result is in accordance with several previous studies that showed a relationship between the availability of healthy toilets and the incidence of stunting (Fatmawati et al., 2015) (Puspitasari et al., 2024). However, this finding differs from the study, which found that the availability of toilets ($p = 0.313$) did not have a significant correlation with the level of stunting (Gea et al., 2023).

Most reports suggest that recurrent diarrheal disease can hinder optimal child growth, leading to decreased growth (Vilcins et al., 2018; Soraya et al., 2022).

A prior study found a significant correlation between the type of toilet used for children and the incidence of stunting. Children who did not have a proper toilet, not goose necks, were 1.3 times more likely to be stunted compared to children who had a proper toilet (Losong & Adriani, 2017). Tamangapa Village is located in the coastal area. Many respondents had fish ponds. There were many "flying toilets" (toilets whose feces were thrown into fish ponds), which contributed to the incidence of stunting in the area. The direct disposal of toddler feces or the improper disposal of toddler feces in unhealthy toilets can cause environmental pollution. Furthermore, it will facilitate the spread of pathogens originating from feces and increase stunting rates in children (Olo et al., 2020).

Family toilets are one of the most important aspects of household hygiene. Having a healthy family toilet will reduce the risk of stunting in children (Susianti & Lestari, 2020). Not only is the lack of food intake causing toddlers to suffer from stunting, but environmental factors also. Thus, stunting management requires cross-sector cooperation to prevent it. Stunting, which can increase susceptibility to infectious

diseases, is often caused by inadequate sanitation. Providing healthy toilet facilities is one way to prevent and stop the transmission of diseases (Angraini et al., 2022).

CONCLUSION

The availability of trash bins, wastewater disposal channels (SPALs), and toilets has an impact on the incidence of stunting in toddlers in the coastal area of Tamangapa Village, Pangkep Regency.

REFERENCES

- Angraini, W., Febriawati, H., & Amin, M. (2022). *ACCESS TO HEALTHY TOILETS IN STUNTING TODDLERS* . 9 , 356–363.
- Awalia, N., Alwi, MK, Puspitasari, A., Patimah, S., & Yusuf, RA (2023). Factors Associated with the Incidence of Diarrhea in Children Aged 1-4 Years at the Antang Health Center. *Window of Public Health Journal* , 4 (2), 224–256.
- Badriyah, L., & Syafiq, A. (2017). The Association Between Sanitation, Hygiene, and Stunting in Children Under Two-Years (An Analysis of Indonesia's Basic Health Research, 2013). *Makara Journal of Health Research* , 21 (2). <https://doi.org/10.7454/msk.v21i2.6002>
- Balitbangkes. (2015). Short (Stunting) in Indonesia, Problems and Solutions. In *Balitabangkes* .
- Endrinikapoulos, A., Afifah, DN, Mexitalia, M., Andoyo, R., Hatimah, I., & Nuryanto, N. (2023). Study of the importance of protein needs for catch-up growth in Indonesian stunted children: a narrative review. *SAGE Open Medicine* , 11 . <https://doi.org/10.1177/20503121231165562>
- Fatmawati, Arbianingsih, & Musdalifah. (2015). Factors influencing the incidence of diarrhea in children aged 3-6 years in kindergarten. *Journal of Islamic Nursing* , 1 (1), 21–32.
- Flora, R. (2021). *Stunting in Molecular Studies* . UPT. Publisher and Printing of Sriwijaya University 2021. [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://repository.unsri.ac.id/46448/1/Buku_Stunting.pdf](https://repository.unsri.ac.id/46448/1/Buku_Stunting.pdf)
- Freeman, M.C., Stocks, M.E., Cumming, O., Jeandron, A., Higgins, JPT, Wolf, J., Prüss-Ustün, A., Bonjour, S., Hunter, P.R., Fewtrell, L., & Curtis , V. (2014). Systematic review: Hygiene and health: Systematic review of handwashing practices worldwide and update of health effects. *Tropical Medicine and International Health* , 19 (8), 906–916. <https://doi.org/10.1111/tmi.12339>
- Gea, W., Nababan, D., Sinaga, J., Marlindawani, J., & Anita, S. (2023). The Relationship between Environmental Sanitation and Stunting Incidence in Toddlers in the Lotu Health Center Uptd Area, North Nias Regency in 2023. *Preliminary: Journal of Public Health* , 7 (3), 16336–16356. <https://doi.org/10.31004/prepotif.v7i3.20706>
- H, H. (2023). The Incidence of Stunting in Infants and Toddlers. *Sandi Husada Journal of Health Sciences* , 12 (1), 224–229.
- Regulation of the Minister of Health No. 3 of 2014, (2014). <https://ejournal.bioscientifica.com/view/journals/eje/171/6/727.xml>
- Ministry of Health of the Republic of Indonesia. (2023). *Getting to Know More About Stunting* . https://yankes.kemkes.go.id/view_artikel/2657/mengenal-lebih-jauh-tentang-stunting
- Losong, NHF, & Adriani, M. (2017). Differences in Hemoglobin Levels, Iron Intake, and Zinc in

- Stunting and Non-Stunting Toddlers. *Amerta Nutrition* , 1 (2), 117. <https://doi.org/10.20473/amnt.v1i2.6233>
- Nations, U. (2018). *Goal 6: Ensure access to water and sanitation for all* . <https://www.un.org/sustainabledevelopment/water-and-sanitation/>
- Olo, A., Mediani, HS, & Rakhmawati, W. (2020). Facts on the Implementation of Authentic Assessment in State Kindergarten 2 Padang. *Jurnal Obsesi: Journal of Early Childhood Education* , 5 (2), 1035–1044 . <https://doi.org/10.31004/obsesi.v5i2.521>
- Opu, S., & Hidayat, H. (2021). The Relationship between Community-Based Total Sanitation (STBM) and Efforts to Reduce Stunting Rates in Toddlers. *Sulolipu: Media for Communication of Academics and Society* , 21 (1), 140. <https://doi.org/10.32382/sulolipu.v21i1.1967>
- Puspitasari, A., Abdullah, N., & Alimuddin, H. (2024). Environmental Sanitation and Levels of Animal Protein Intake on the Incident of Stunting in Toddlers. *An Idea Health Journal* , 9 (2), 45–50.
- Puspitasari, A., Hikmah B, N., & Rahman, H. (2020). Study of Bacteriological Quality of Refill Drinking Water Depot in the Working Area of Tamangapa Public Health Center, Makassar City. *Window of Public Health Journal* , 1 (1), 16–21.
- Rahmuniyati, ME, & Sahayati, S. (2021). Implementation of Community-Based Total Sanitation Program (STBM) to Reduce Stunting Cases in Health Centers in Sleman Regency. *PREPOTIF: Journal of Public Health* , 5 (1), 80–95. <https://doi.org/10.31004/prepotif.v5i1.1235>
- Seyedsayamdost, E. (2020). Sustainable development goals. *Essential Concepts of Global Environmental Governance* , 0042 , 251–253. <https://doi.org/10.4324/9780367816681-102>
- Slodia, MR, Ningrum, PT, & Sulistiyani, S. (2022). Analysis of the Relationship Between Environmental Sanitation and Stunting Incidents in Cepu District, Blora Regency, Central Java. *Indonesian Journal of Environmental Health* , 21 (1), 59–64. <https://doi.org/10.14710/jkli.21.1.59-64>
- Soraya, S., Ilham, I., & Hariyanto, H. (2022). Environmental Sanitation Study on Stunting Incidents in the Simpang Tuan Health Center Work Area, East Tanjung Jabung Regency. *Journal of Sustainable Development* , 5 (2), 98–114. <https://doi.org/10.22437/jpb.v5i1.21200>
- Vilcins, D., Sly, P. D., & Jagals, P. (2018). Environmental risk factors associated with child stunting: A systematic review of the literature. *Annals of Global Health* , 84 (4), 551–562. <https://doi.org/10.29024/aogh.2361>
- Wicaksono, F., & Harsanti, T. (2020). Determinants of stunted children in Indonesia: A multilevel analysis at the individual, household, and community levels. *Public Health* , 15 (1), 48–53. <https://doi.org/10.21109/kesmas.v15i1.2771>
- Wolf, J., Prüss-Ustün, A., Cumming, O., Bartram, J., Bonjour, S., Cairncross, S., Clasen, T., Colford, J.M., Curtis, V., De France, J., Fewtrell, L., Freeman, M.C., Gordon, B., Hunter, P.R., Jeandron, A., Johnston, R.B., Mäusezahl, D., Mathers, C., Neira, M., & Higgins, J. P. T. (2014). Systematic review: Assessing the impact of drinking water and sanitation on diarrheal disease in low- and middle-income settings: Systematic review and meta-regression. *Tropical Medicine and International Health* , 19 (8), 928–942. <https://doi.org/10.1111/tmi.12331>
- Yuniastuti, A., Hidayah, I., Susanti, R., & Pratikwo, S. (2024). The Relationship between Environmental Sanitation Factors and the Incidence of Stunting in Toddlers Aged 6-59 Months in Pekalongan City in 2023. *Pekalongan City Research and Development Journal* , 22 (1), 28–35. <https://doi.org/10.54911/litbang.v22i1.301>