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ORIGINAL ARTICLE

The relationship between the implementation of the five pillars of Community-Led Total Sanitation (CLTS) and the incidence of stunting at Sei Bejangkar Community Health Center

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ABSTRACT

Researchers were interested in studying the impact of Community-based total sanitation on stunting in the service area of the Sei Bejangkar Health Center since the first survey indicated that 90 toddlers were stunted owing to the effects of inadequate sanitation. The study used a quantitative, cross-sectional methodology. This research was carried out near the Sei Bejangkar Health Center. All of the infants and toddlers in the puskesmas's operational region served as the study's population. Total sampling was used during the sampling process. Univariate, Bivariate, and Multivariate tests were utilized to analyze both main and secondary data in this study. Based on the data, it appears that there is no connection between the halt defecation movement and stunting in toddlers in the sei anchor health center's service area (P value of 0.529 or more than 0.05). Toddlers at the Sei Bejangkar Health Center are less likely to be stunted if open defecation is reduced. The p-value is 0.000, which means it's significantly larger than 0.05 ($0.000 > 0.05$).

Keyword: sanitation (CLTS), stunting, open defecation free, community health center

Introduction

Sanitation is a major issue contributing to poor environmental health and negatively impacting public health. Inadequate hygiene negatively affects a person's health. Environmental hygiene is a crucial factor. Clean water, latrines, house floors, waste management, and other environmental aspects can all contribute to a healthy and clean living situation.^{1,2}

Sanitation can be defined as the process of reducing risks to human health, their ability to grow physically, and their ability to withstand the influences of their environment. One of the initiatives to achieve the MDGs is Community-Led Total Sanitation (CLTS), which was initiated in 2008 by the Ministry of Health through Ministerial Decree No. 852/2008. Ministerial Regulation No. 3 of 2014 updated the CLTS policy, replacing the old regulation deemed outdated due to technological advancements.^{3,4} Currently, stunting prevalence can be reduced by up to 70 percent with simple interventions such as improved sanitation and

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hygiene.⁵ When children do not practice good hygiene, they risk losing nutrients that promote growth. Stunting is a sign of malnutrition, and its presence indicates a larger problem of inadequate dietary patterns in the past. It is a long-lasting disease caused by poor eating habits.^{6,7} The source of this problem is insufficient intake of nutritious food.⁸

When determining whether someone is too short for their age, we use the height-for-age Z-index (HAZ). A low HAZ Z-score is interpreted as a sign of stunting.⁹ UNICEF considers a child to be stunted if their height is below the WHO normative growth charts by two standard deviations (for moderate and severe stunting) or three standard deviations (for chronic stunting). According to the World Health Organization (WHO) criteria for identifying stunting prevalence, a rate greater than or equal to 30 percent is considered very high. There are 44 countries with very high stunting rates. According to WHO data, 20% or fewer children in 60 out of 134 countries are stunted. The World Health Organization has set Global Nutrition Targets for 2025 and Sustainable Development Goals for 2030, with stunting as a top priority.¹⁰ The aim of this study is to investigate the relationship between the implementation of the five pillars of Community-Led Total Sanitation (CLTS) and the incidence of stunting among toddlers in the service area of the Sei Bejangkar Community Health Center.

Method

This study employed a quantitative survey research technique. The quantitative survey research utilized a cross-sectional design and questionnaires. The research commenced in January 2023 and continued until completion, located at Sei Bejangkar Community Health Center. A total of 90 toddlers were included as part of the sample for this study. For the research findings, SPSS will be used to analyze the data collected through questionnaires and surveys. Data analysis in this study included univariate and bivariate analysis.

Results

Details on the gender of children under five years old are as follows, according to the characteristics table provided by respondents: 43 boys (47.8 percent) and 47 girls (52.22 percent). There were 23 children (25.55 percent) aged between 37 and 48 months, 12 children (13.34 percent) aged between 49 and 59 months, and 10 children (11.11 percent) aged between 0 and 24 months.

Meanwhile, among mothers who responded to the survey, we found that 64 (71.11 percent) were aged between 25 and 35, and 26 (28.89 percent) were aged between 35 and 45. In terms of mothers' education, we found that 4.45 percent completed Primary School, 5.55 percent completed Junior High School, 60 percent completed Senior High School, and 27 percent completed Higher Education (30 percent). According to the mothers' occupation data, 7.78 percent of mothers worked in government, 24.67 percent were self-employed, 45.55 percent worked as farmers or agricultural laborers, and 18.2 percent worked full-time as homemakers.

Table 1. Characteristics of the respondents

Variables	f	%
Gender		
Male	43	47,78
Female	47	52,22
Age of baby		
0 – 24 months	10	11,11
25 – 36 months	45	50.00
37 – 48 months	23	25.55
49 – 59 months	12	13,34
Age of Mother		
25-35 years	64	71,11
35-45 years	26	28.89
Education of Mother		
Elementary School	4	4.45
Junior High School	5	5.55
Senior High School	54	60
University or Higher Education	27	30
Occupation of mother		
Civil Servant	7	7,78
Entrepreneur	24	26,67
Farmer/Laborer	41	45.55
Housewife	18	20

Total	90	100
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Based on the frequency distribution table for interventions aimed at stopping excessive water wastage, 28 respondents (31.11%) scored in the 10-13 interval, categorized as good. The majority, 59 respondents (65.56%), fell into the sufficient category, and 3 respondents (3.33%) were in the poor category. These results indicate that 65.56% of respondents prioritized the "sufficient" group. This suggests that, on average, households have a good grasp of household water management, enabling them to avoid wasteful water use. The frequency distribution table also shows that 18 respondents (20%) scored in the 10–13 interval for good responses. Most respondents, 62 (68.89%), were in the 14–17 score interval, categorized as sufficient. Lastly, 10 respondents (11.11%) were in the 18–20 score interval, categorized as poor. Consequently, we conclude that 68.89% of respondents found their answers within the "sufficient" category.

Frequency distribution table for Household Drinking Water and Food Management showed that 44.44% of respondents with scores in the 7-9 interval were in the good category, 50% of respondents with scores in the 10-12 interval were in the sufficient category, and 5.56% of respondents with scores in the 13-14 interval were in the poor category. From this, we can conclude that most respondents' top choices fell within the "sufficient" category.

Table 2. Univariate analysis

Interval Score	n	%	Category
Cessation of open defecation			
10 – 13	28	31,11	Good
14 – 17	59	65,56	Adequate
18 – 20	3	3,33	Inadequate
Washing hands with soap			
10 – 13	18	20	Good
14 – 17	62	68,89	Adequate
18 – 20	10	11,11	Inadequate
Drinking water and household food management			
7 – 9	40	44,44	Good
10 – 12	45	50	Adequate
13 – 14	5	5.56	Inadequate
Household waste management			
10 – 13	49	53,33	Good
14 – 17	40	44,45	Adequate
18 – 20	1	1,12	Inadequate
Securing household liquid waste			
7 – 9	34	37,78	Good
10 – 12	43	47,78	Adequate
13 – 14	13	14,44	Inadequate

Similarly, based on the 2011 frequency distribution data for Household Liquid Waste Management, 34 respondents (37.78%) provided answer scores in the 7-9 interval, categorized as good. 43 respondents (47.78%) scored in the 10-12 interval, categorized as sufficient, and 13 respondents (14.44%) scored in the 13-14 interval, categorized as poor. Consequently, we can conclude that 47.78% of respondents considered the amount they provided to be sufficient.

Among 90 reported cases of stunting in toddlers, 83 toddlers (92.22%) included in the study were found to be stunted. The remaining children, not affected by stunting, constituted 7 to 10 percent (7.78%).

The chi-square test yielded a p-value of 0.529, which is greater than the significance level of 0.05. Therefore, it can be concluded that there is no statistically significant relationship between indiscriminate and wasteful water disposal and the incidence of stunting in toddlers at Puskesmas Sei Bejangkar. Here's the translated text, focusing on clarity and academic tone. Statistics from a survey of 90 samples indicate that 83 (92.22%) toddlers were stunted, while 7 (7.78%) were not. The chi-square test yielded a p-value of 0.000, which is greater than the significance level of 0.05. Therefore, it seems reasonable to assume that indiscriminate water wastage contributes to the incidence of stunting in children at Puskesmas Sei Bejangkar.

Data from the table shows that 83 (92.22%) of the 90 sampled children experienced stunting, whereas only 7 (7.78%) did not. Based on the chi-square test, the p-value was 0.343, which is above the 0.05 significance level ($p > 0.05$). Thus, it can be stated that the incidence of stunting in toddlers at Puskesmas

Sei Bejangkar is not related to household drinking water and food management. Regarding household solid waste management, as seen in the table, there were 90 cases of stunting in toddlers. 83 (92.22%) toddlers in this study were stunted, while only 7 (7.78%) were not. The chi-square test produced a p-value of 0.632, which is statistically significant at the 0.05 level, meaning it is "higher than 0.05" ($0.632 > 0.05$). Consequently, the findings from Puskesmas Sei Bejangkar suggest no relationship between the prevention of toddler stunting and the protection of domestic wastewater staircases (likely referring to safe disposal access).

Table 3. Bivariate analysis

Variables	f	%	Stunting	Normal	
Cessation of open defecation					
Good	28	31,11	83	7	0,529
Adequate	59	65,56	(92,22%)	(7,78%)	
Inadequate	3	3,33			
Washing hands with soap					
Good	18	20	83	7	0.000
Adequate	62	68,89	(92,22%)	(7,78%)	
Inadequate	10	11,11			
Drinking water and household food management					
Good	40	44,44	83	7	0,343
Adequate	45	50	(92,22%)	(7,78%)	
Inadequate	5	5.56			
Household waste management					
Good	49	53,33	83	7	0,632
Adequate	40	44,45	(92,22%)	(7,78%)	
Inadequate	1	1,12			
Securing household liquid waste					
Good	34	37,78	83	7	0,001
Adequate	43	47,78	(92,22%)	(7,78%)	
Inadequate	13	14,44			

Finally, regarding the correlation between household liquid waste security and stunting, as shown in the table below, there were 90 cases of stunting in toddlers. 83 (92.22%) toddlers in this study were stunted, while only 7 (7.78%) were not. The results of the chi-square test showed a p-value of 0.001, which is less than 0.05 ($0.001 < 0.05$) when using a 0.05 significance level. This indicates that the incidence of stunting in toddlers at Puskesmas Sei Bejangkar correlates with the level of care taken to secure household liquid waste.

Discussion

According to the chi-square test results, the p-value was 0.529, which is above the established statistical significance threshold of 0.05. This means there's no statistically significant relationship between stopping open defecation and stunting. Short children were reported at the Sei Bejangkar health facility due to an erratic water supply. Regarding the frequency distribution of open defecation cessation, 28 respondents (31.11%) scored in the 10-13 interval, categorized as "good." A majority, 59 respondents (65.56%), fell into the "sufficient" category, while 3 respondents (3.33%) were in the "poor" category. These results show that 65.56% of respondents prioritized the "sufficient" group. This suggests that the average mother is reasonably competent in managing her household and children's activities, thus reducing the need for open defecation.

Open defecation negatively impacts health by introducing pollutants into the environment, leading to dirt, foul air, and the proliferation of insects like flies and worms. If unsealed food is consumed, there's a risk of diarrhea.¹¹ It's crucial to note that once a fly becomes a vector, it can transmit diseases, contaminate food and beverages, and even spread germs on its body. When children eat fly-contaminated food, they may develop diarrhea. Diarrhea in children often leads to loss of appetite and, consequently, weight loss. Long-term exposure to this can have serious consequences for a child's health and nutrition, particularly concerning markers like height-for-age differences and stunting.^{12,13} Therefore, inadequate hygiene can contribute to childhood stunting. Furthermore, poor hygiene, especially regarding defecation habits, can put children at

risk of worm infections.¹⁴ The chi-square test yielded a p-value of 0.000, which is below the 0.05 significance threshold. This strongly indicates a statistically significant relationship between handwashing with soap and stunting among toddlers at the Sei Bejangkar Public Health Center. The frequency distribution of handwashing with soap revealed that 18% of respondents scored in the 10-13 interval ("good"), 62% in the 14-17 interval ("sufficient"), and 10% in the 18-20 interval ("insufficient"). These results show that 68.89% of respondents were in the "sufficient" category.

A study by Hafid et al.¹⁵ found a significant relationship between handwashing with soap and stunting in children aged 6–23 months ($p < 0.005$). Rahma's research observed a 15% reduction in stunting when mothers and other caregivers washed their hands with soap before and after feeding or cleaning up waste. This suggests that this factor may influence the vulnerability of residential waste disposal systems to disruption. Children who wash their hands under running water with soap likely use their fine and gross motor skills. A mother's involvement is critical here because a child's ability to adapt to their environment and develop during the first thousand days depends on the quality of their home and the cleanliness of their surroundings.

The chi-square test yielded a p-value of 0.343, which exceeds the established statistical significance threshold of 0.05. Therefore, it can be concluded that there is no statistically significant relationship between household drinking water and food management and the prevalence of stunting in toddlers at Puskesmas Sei Bejangkar. Based on the frequency distribution of household water, beverage, and food management, 40 respondents (44.44%) scored in the 7-9 interval ("good"), 45 respondents (50%) in the "sufficient" category, and 5 respondents (5.56%) in the "poor" category. This indicates that the majority of respondents (at least 50%) consider their management to be sufficient.

This study confirms the findings of Wanda Lestari et al.'s 2014 study, "Stunted Children." In most situations, children were fed by parents who were not highly competent in this regard ($OR=4.59\%$, $p=0.0001$). Poor parenting practices were found to increase the likelihood of stunting in children aged between 6 and 24 months. Quality drinking water is obtained through careful management of food and water supplies. Drinking water, or water that has been purified for consumption, is water consumed daily and kept tightly sealed to prevent bacteria and germs from entering and causing illness. When storing prepared and served food, it's essential to consider temperature, humidity levels, food type, and storage methods.

The Chi-Square test yielded a p-value of 0.632, which exceeds the statistical significance threshold ($p\text{-value } 0.632 > 0.05$). Thus, toddler stunting at Puskesmas Sei Bejangkar is not related to the safety of liquid waste on household stairs. Based on the data presented, 49 respondents (53.33%) scored in the 10-13 interval ("good") for statements on handwashing frequency with soap, 40 respondents (44.49%) were in the "sufficient" category, and 1 respondent (1.12%) was in the "poor" category. From this, we can conclude that respondents rated "Good" as their top category, with 53.33% of their responses.

Securing household waste involves sorting, recycling, and reusing items in line with the "reduce, reuse, recycle" principles. Public health and environmental hazards can occur at every stage of waste management, including, but not limited to, collection, transport, processing, recycling, and disposal. Soeracmad et al.¹⁶ indicated that in the case group, among 22 respondents from households not managing waste safely, all 22 experienced stunting. However, in the control group, zero individuals experienced stunting. Among 88 respondents who managed their household waste safely, stunting was reported at a rate of 60% (33) in the case group and 100% (55) in the control group. The chi-square test yielded a p-value of 0.001, which is more than five times greater than the established statistical significance threshold of 0.05 ($0.001 > 0.05$). Therefore, there is a statistically significant relationship between the lack of proper household liquid waste management and the incidence of stunting in children at Puskesmas Sei Bejangkar.

Based on the frequency distribution results for household drinking water and food management, 34 respondents (37.78%) scored in the 7-9 interval ("good"), 43 respondents (47.78%) in the 10-12 interval ("sufficient"), and 13 respondents (14.44%) in the 13-14 interval ("poor"). Consequently, we can conclude that 47.78% of respondents considered the amount they provided to be sufficient. Research indicates that poor waste collection and disposal are linked to an increased risk of childhood stunting. The primary goal of managing household waste and refuse is to eliminate the need for long-term waste accumulation inside the home, thereby protecting the health of occupants and the environment. Soeracmad et al.¹⁶ concluded that there was a connection between improper waste handling and an increased risk of stunting in children. Environmental sanitation showed a positive correlation with stunting rates in the study area of Puskesmas Kerkep, North Bengkulu Regency ($p=0.08$), according to research by Wulandari et al.¹⁷. A lack of clean water and poor sanitation are primary causes of stunting in children. Increased infection rates due to

insufficient clean water and sanitation facilities can divert energy intended for growth towards fighting infection, making it harder for the body to absorb nutrients. However, bivariate analysis showed no relationship between the presence of household sanitation facilities and the incidence of stunting in toddlers aged 25–59 months in Lumajang Regency (Pearson chi-square value = 3.257, significance value = 0.196; p -value > 0.05). This finding was not statistically significant when comparing data from case and control groups. The significance of sanitation facilities, specifically waste disposal, proved to be insignificant.

Conclusion

At Puskesmas Sei Bejangkar, there was no association between massive water wastage and the incidence of stunting in toddlers. The p -value was 0.529, which is greater than the significance threshold of 0.05 ($0.529 > 0.05$). However, child growth retardation at Puskesmas Sei Bejangkar was associated with the prevalence of open defecation. The p -value was 0.000, indicating a statistically significant relationship ($0.000 < 0.05$). Based on a p -value of 0.343, there was no association between poor household water, food, and sanitation management and stunting in children at the Sei Bejangkar health facility. Stunting in toddlers is increasing at Puskesmas Sei Bejangkar, and researchers found a relationship between the safety of household liquid waste and this issue. A p -value of 0.001 indicates statistical significance (p -value < 0.05). Conversely, at Puskesmas Sei Bejangkar, no correlation was observed between the lack of safe household liquid waste disposal and the prevalence of stunting in young children. From this data, we can conclude that the p -value was 0.632, which is greater than 0.05 ($0.632 > 0.05$), and thus not statistically significant.

References

1. Agustin AM. Evaluasi Program Sanitasi Total Berbasis Masyarakat (STBM) Pilar Pertama. Media Husada J Environ Heal [Internet]. 2021 Dec 30;1(1):36–43. Available from: <https://mhjeh.widyagamahusada.ac.id/index.php/mhjeh/article/view/7>
2. Okesanya OJ, Eshun G, Ukoaka BM, Manirambona E, Olabode ON, Adesola RO, et al. Water, sanitation, and hygiene (WASH) practices in Africa: exploring the effects on public health and sustainable development plans. Trop Med Health. 2024 Oct 9;52(1):68.
3. Prayitno J, Widati S. Study of The Health Promotion Strategy of Community Led Total Sanitation (CLTS) in Kejawan Putih Tambak Village Surabaya City. J Kesehat Lingkung. 2018 Dec 4;10(3):267.
4. Harter M, Mosch S, Mosler HJ. How does Community-Led Total Sanitation (CLTS) affect latrine ownership? A quantitative case study from Mozambique. BMC Public Health. 2018 Dec 21;18(1):387.
5. Mudadu Silva JR, Vieira LL, Murta Abreu AR, de Souza Fernandes E, Moreira TR, Dias da Costa G, et al. Water, sanitation, and hygiene vulnerability in child stunting in developing countries: a systematic review with meta-analysis. Public Health. 2023 Jun;219:117–23.
6. Metwally AM, El-Sonbaty M, El Etreby LA, El-Din EMS, Hamid NA, Hussien HA, et al. Stunting and its Determinants among Governmental Primary School Children in Egypt: A School-based Cross-sectional Study. Open Access Maced J Med Sci. 2020 Sep 15;8(B):650–7.
7. Francis J, Mildon A, Stewart S, Underhill B, Tarasuk V, Di Ruggiero E, et al. Vulnerable mothers' experiences breastfeeding with an enhanced community lactation support program. Matern Child Nutr. 2020 Jul 26;16(3).
8. Lopa AFA, Darmawansyah D, Helvian FA. Hubungan Pelaksanaan 5 Pilar Sanitasi Total Berbasis Masyarakat Dengan Kejadian Stunting. UMI Med J. 2022 Jun 30;7(1):26–36.
9. de Onis M, Branca F. Childhood stunting: a global perspective. Matern Child Nutr. 2016 May 17;12(S1):12–26.
10. World Health Organization. Global Nutrition Targets 2025. Stunting Policy Brief. 2014.
11. Cameron L, Gertler P, Shah M, Alzua ML, Martinez S, Patil S. The dirty business of eliminating open defecation: The effect of village sanitation on child height from field experiments in four countries. J Dev Econ. 2022 Nov;159:102990.
12. Manetu WM, M'masi S, Recha CW. Diarrhea Disease among Children under 5 Years of Age: A Global Systematic Review. Open J Epidemiol. 2021;11(3):207–21.
13. Ghosh K, Chakraborty AS, Mog M. Prevalence of diarrhoea among under five children in India and its contextual determinants: A geo-spatial analysis. Clin Epidemiol Glob Heal. 2021 Oct;12:100813.
14. Sulistianah R, Handayani D, Farakhin N. Gambaran Personal Hygiene dengan Gejala Cacingan pada Anak di Kampung Pasar Keputran Kota Surabaya. J Kesehat. 2021 Nov 16;14(2):95–101.
15. Hafid F, Nasrul N. Faktor Risiko Stunting Pada Anak Usia 6-23 Bulan di Kabupaten Jeneponto (Risk Factors of Stunting among Children Aged 6-23 Months in Jeneponto Regency). Indones J Hum Nutr. 2016 Jul 1;3(1):42–53.
16. Soeracmad Y, Ikhtiar M, S AB. Hubungan Sanitasi Lingkungan Rumah Tangga Dengan Kejadian Stunting Pada Anak Balita Di Puskesmas Wonomulyo Kabupaten Mandar Tahun 2019. J-KESMAS J Kesehat Masy. 2019 Nov 30;5(2):138.
17. Wulandari WW, Rahayu F, . D. Hubungan sanitasi lingkungan dan riwayat penyakit infeksi dengan kejadian stunting di wilayah kerja Puskesmas Kerkap Kabupaten Bengkulu Utara Tahun 2019. Avicenna J Ilm. 2019 Sep 18;14(2):6–13.