



THE INFLUENCE OF HYGIENE AND SANITATION BEHAVIOR AND SOCIAL CAPITAL ON THE INCIDENCE OF DIARRHEA IN TODDLERS

Handayani Sri Lestari^{1*}, Arsita Eka Prasetyawati³, Anik Lestari³, Hari Wahyu Nugroho³, Siti Khoiriyah²

¹Master of Public Health Program, Graduate School, Universitas Sebelas Maret, Jl. Ir. Sutami No.36A, Jebres, Surakarta, Jawa Tengah 57126, Indonesia

²Doctoral of Environmental Science Program, Graduate School, Universitas Sebelas Maret, Jl. Ir. Sutami No.36A, Jebres, Surakarta, Jawa Tengah 57126, Indonesia

³Faculty of Medicine, Universitas Sebelas Maret, Jl. Ir. Sutami No.36A, Jebres, Surakarta, Jawa Tengah 57126, Indonesia

*yaanie9999@gmail.com

ABSTRACT

Diarrheal disease among children under five remains a critical public health challenge, significantly contributing to early childhood morbidity and mortality due to behavioral and socio-environmental determinants. This research evaluates how hygiene practices and community social capital affect the occurrence of diarrhea among toddlers in Lamongan Regency. Utilizing an analytical observational design with a cross-sectional framework, the study sampled 339 mothers of children aged 0 to 59 months from the Solokuro and Paciran Districts via systematic random sampling. Data were collected using a structured questionnaire that had been tested for validity and reliability, demonstrating excellent internal consistency (Cronbach's alpha = 0.915) and evaluated using Chi-square and multiple logistic regression tests ($\alpha = 0.05$). The findings demonstrate a statistically significant correlation between diarrheal episodes and both sanitation hygiene practices ($p = 0.000$) and social capital ($p = 0.000$). Multivariate analysis identified sanitation hygiene as the primary determining factor ($B = 1.828$; $p = 0.000$), with social capital serving as a significant secondary predictor ($B = 0.464$; $p = 0.042$). Both hygiene behaviors and community social capital play a vital role in determining the incidence of childhood diarrhea. Therefore, there is a pressing need to enhance sanitation education initiatives, reinforced by robust community networks.

Keywords: diarrhea; sanitation hygiene; social capital; toddlers

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INTRODUCTION

Globally, diarrheal disease continues to represent a critical public health crisis, largely driven by its substantial morbidity and mortality impact on children under five years old (Troeger et al., 2018; Abiyu et al., 2024). According to the World Health Organization, diarrhea persists as a primary cause of early childhood mortality worldwide, especially within developing nations that struggle with inadequate sanitation and limited access to potable water (Bose et al., 2024; Tag et al., 2025). Beyond triggering severe acute dehydration, these infections hinder nutrient uptake, compromise overall nutritional health, and significantly elevate the likelihood of childhood stunting (Freeman et al., 2017; Sangalang et al., 2022). Nevertheless, because diarrhea is fundamentally an environmentally driven illness, it remains highly preventable through the implementation of comprehensive water, sanitation, and hygiene (WASH) strategies (Wolf et al., 2022).

Within Indonesia, childhood diarrhea continues to pose a substantial public health threat, demonstrating fluctuating prevalence rates across different regions (Purnama et al., 2025). Lamongan Regency stands out as a specific area persistently struggling with a high burden of this disease. According to records from the Lamongan Regency Health Office, diarrheal infections reached 28,740 cases in 2020. Although this figure declined to 17,315 in 2021, a concerning 12,646

cases were still reported in 2023. The unique geographical characteristics of Lamongan's northern coastal zone (pantura) which is marked by restricted access to clean water and compromised environmental sanitation are believed to be primary catalysts for these elevated infection rates, particularly among the toddler population.

Although regional authorities have enacted Community-Based Total Sanitation initiatives and championed Open Defecation-Free (ODF) status across various villages, these milestones have not consistently translated into a proportional decline in household-level diarrhea cases. This discrepancy highlights that merely supplying physical sanitation infrastructure is inadequate without enduring shifts in the community's everyday hygiene practices (Cronin et al., 2016).

Household hygiene and sanitation practices, such as handwashing with soap (CTPS), child feeding, clean water use, and safe management of toddler feces, play a crucial role in breaking the chain of fecal-oral transmission of diarrhea (Agustina et al., 2019; Khan et al., 2021). Toddlers are particularly vulnerable to exposure to pathogenic microorganisms due to their high oral and exploratory phase. Therefore, maternal or caregiver behavior is a crucial factor in preventing diarrhea in toddlers.

In addition to individual behavioral factors, social environmental factors also influence the successful implementation of clean and healthy living behaviors. From a Social Cognitive Theory perspective, health behavior is influenced by the interaction between personal factors, the environment, and the behavior itself (Bandura, 1986; Zhai et al., 2023). One environmental factor that plays a role is social capital, which includes social trust, community participation, and norms of mutual cooperation within the community (Kawachi et al., 2008; Putnam, 2000). Strong social capital can increase community compliance with sanitation practices and support the success of community-based health programs (Rodgers et al., 2022). In light of these circumstances, this research seeks to examine the impact of sanitation hygiene practices and social capital on the prevalence of diarrhea among toddlers in Lamongan Regency

METHOD

This research employed an analytical observational design utilizing a cross-sectional framework. The target population consisted of all mothers with toddlers residing in Lamongan Regency. From this population, a sample of 339 participants from the Solokuro and Paciran Districts was recruited through a probability sampling method, specifically applying a systematic random sampling approach.

The study examined sanitation hygiene practices and social capital as the independent variables, whereas the occurrence of diarrhea among toddlers served as the dependent variable. Data were collected using a structured questionnaire. Prior to data collection, the instrument underwent validity and reliability testing. Reliability analysis was performed using Cronbach's Alpha, yielding a coefficient of 0.915, indicating excellent internal consistency of the questionnaire.

Statistical evaluation began with univariate analysis to outline the distribution of the study's variables. This was followed by bivariate analysis utilizing the Chi-square test to assess the correlations between these variables. Finally, multivariate analysis via multiple logistic regression was conducted to identify the most prominent factors driving the incidence of childhood diarrhea. All statistical tests were evaluated using a significance threshold of $\alpha = 0.05$.

RESULT

Bivariate analysis conducted via the Chi-square test revealed a statistically significant correlation linking both sanitation hygiene practices and social capital with the occurrence of diarrhea among

toddlers. Comprehensive details regarding the distribution of this data are presented in Tables 1 and 2.

Table 1.

Relationship between Hygiene and Sanitation Behavior and the Incidence of Diarrhea in Toddlers

Behavior Category	Diarrhea (n)	No Diarrhea (n)	Total (n)	p-value
Bad	111	6	117	0,000
Enough	69	33	102	
Good	27	93	120	
Total	207	132	339	
<i>(Source: Processed Primary Data, 2026)</i>				

As illustrated in Table 1, the majority of respondents exhibiting poor sanitation hygiene practices (111 individuals) reported that their toddlers experienced diarrhea. In contrast, among those demonstrating good hygiene behaviors, the majority (93 individuals) reported no diarrheal episodes. Statistical analysis yielded a p-value of 0.000 ($p < 0.05$), confirming a highly significant association between sanitation hygiene practices and the occurrence of diarrhea in toddlers.

Table 2.

Relationship between Social Capital and the Incidence of Diarrhea in Toddlers

Social Capital Category	Diarrhea (n)	No Diarrhea (n)	Total (n)	p-value
Bad	69	13	82	0,000
Enough	108	44	152	
Good	30	75	105	
Total	207	132	339	
<i>(Source: Processed Primary Data, 2026)</i>				

Table 2 illustrates a comparable trend: among participants with limited social capital, the majority (69 respondents) reported that their toddlers contracted diarrhea. In contrast, within the group exhibiting strong social capital, the predominant share of respondents (75 individuals) observed no such episodes. Statistical evaluation confirmed this observation with a p-value of 0.000 ($p < 0.05$), thereby establishing a significant association between social capital and the prevalence of childhood diarrhea.

Next, to determine which factors most dominantly influence the incidence of diarrhea, a multivariate analysis using multiple logistic regression was conducted. The results are presented in Table 3.

Table 3.

Results of Logistic Regression Analysis of Factors Associated with the Incidence of Diarrhea

Variables	B	SE	Wald	p-value
Behavior Category	1,828	0.231	62,871	0,000
Social Capital Category	0.464	0.228	4,139	0.042
Constant	-5,397	0.582	85,973	0,000
<i>(Source: Processed Primary Data, 2026)</i>				

As detailed in table 3, the multiple logistic regression analysis confirmed that sanitation hygiene behavior is the predominant factor driving the occurrence of diarrhea among toddlers. This is supported by the highest Wald statistic of 62.871, alongside a B coefficient of 1.828 and a p-value of 0.000. Additionally, social capital was shown to exert a significant impact, evidenced by a B coefficient of 0.464 and a p-value of 0.042 ($p < 0.05$). The positive B coefficients associated with both predictors indicate that poorer hygiene practices and diminished community social capital are substantially linked to an elevated risk of diarrheal infections in young children.

DISCUSSION

The findings of this research indicate that household-level sanitation and hygiene behaviors serve as the primary determinants of diarrheal episodes among toddlers in Lamongan Regency. Mothers exhibiting inadequate hygiene habits are more likely to report a history of diarrhea in their children compared to those demonstrating proper sanitary practices. Fundamental routines such as

handwashing with soap prior to food preparation, washing hands post-defecation, and the safe disposal of infant feces are essential in interrupting the transmission pathways of diarrhea-causing pathogens (Berhanu et al., 2022; McClelland et al., 2022). The critical nature of these behaviors is further amplified because toddlers are actively in an oral and exploratory developmental stage, which inherently elevates their vulnerability to environmental contaminants (Hartati & Nuraliza, 2018; Ko & Sakai, 2022). Consequently, deficient hygiene and sanitation routines can perpetuate a continuous cycle of recurrent pathogenic exposure within the home environment.

These results align with prior research emphasizing that the success of water, sanitation, and hygiene (WASH) interventions relies heavily on behavioral modifications within the family unit (Mernie et al., 2022; Rehana et al., 2021). Merely providing sanitation infrastructure is inadequate without the concurrent adoption of routine hygienic practices in everyday life. Similarly, Khan et al. (2021) demonstrated that poor adherence to handwashing with soap is strongly linked to a heightened risk of childhood infectious diseases in low-income populations. Consequently, maternal vigilance in ensuring food safety, maintaining clean play environments, and upholding overall household sanitation remains a fundamental element in safeguarding toddlers against diarrheal diseases.

Beyond individual behavioral factors, the findings indicate that social capital significantly impacts the prevalence of childhood diarrhea ($p=0.042$). These outcomes underscore the applicability of Social Cognitive Theory in understanding the broader dynamics of community health. Within this framework, social capital acts as a mechanism of social reinforcement that shapes and sustains positive health practices across a population (Snelgrove et al., 2021). Communities characterized by strong social trust and active civic engagement typically exhibit greater collective adherence to environmental sanitation standards. This includes more effective implementation of the Community-Based Total Sanitation (STBM) initiative and a notable decrease in open defecation practices (Bushen et al., 2022; Gebeyehu et al., 2024).

High social participation allows for the formation of collective norms regarding clean and healthy living behaviors. In communities with strong social cohesion, individuals tend to be motivated to maintain environmental cleanliness due to informal social control and support among residents (Rodgers et al., 2022; Story et al., 2020). Conversely, weak social capital can reduce community awareness of environmental sanitation management and hinder the success of community-based health programs.

These results further corroborate earlier research indicating that social capital is intricately tied to the successful execution of environmental health initiatives. For instance, Bushen et al. (2022) observed that community-driven sanitation strategies achieve greater efficacy in populations characterized by robust social participation. Additionally, Gebeyehu et al. (2024) highlighted that communal social support can significantly boost compliance with proper sanitation and household hygiene routines. Ultimately, social capital serves a pivotal role by facilitating the dissemination of health information, bolstering trust in healthcare professionals, and cultivating a supportive communal atmosphere that fosters enduring behavioral modifications.

CONCLUSION

This research demonstrates that both sanitation hygiene practices and social capital are crucial determinants of diarrheal incidence among toddlers in Lamongan Regency. Sanitation hygiene behavior emerged as the most dominant factor, evidenced by a B coefficient of 1.828 and a p-value of 0.000. Inadequate hygiene habits particularly poor adherence to handwashing with soap, improper food handling, and substandard household sanitation heighten toddlers' risk of exposure to pathogenic microorganisms. Furthermore, social capital significantly impacts the occurrence of diarrhea, supported by a B coefficient of 0.464 and a p-value of 0.042. Robust social participation,

mutual trust, and collective community norms effectively promote the adoption of cleanliving behaviors and superior environmental sanitation management.

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