

## RELATIONSHIP BETWEEN ENVIRONMENTAL FACTORS WITH THE INCIDENCE OF STUNTING IN TODDLERS IN MALAWILI COMMUNITY HEALTH CENTER AND KLAMONO COMMUNITY HEALTH CENTER, SORONG DISTRICT, SOUTHWEST PAPUA PROVINCE

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### Abstract

**Background:** Environmental factors such as sanitation, clean water, and handwashing habits greatly influence the incidence of stunting. The results of this study can serve as a basis for further efforts to improve environmental sanitation and family welfare in Sorong Regency. This study aims to determine the relationship between environmental factors and the incidence of stunting at the Malawili Health Center and Klamono Health Center in Sorong Regency, Southwest Papua Province. **Research Methods:** This study is a Descriptive Analytic study with a cross-sectional approach. The research population consists of families with stunted toddlers, totaling 60 cases. The research instruments used questionnaires to gather information on clean water sources, latrine ownership, and handwashing habits, utilizing both primary and secondary data collection techniques. **Research Results:** The statistical test results using Chi-Square obtained values of ( $p=0.973$ ) for clean water sources, ( $p=0.829$ ) for latrine ownership, and ( $p=0.559$ ) for handwashing habits. **Conclusion:** There is no relationship between clean water sources, latrine ownership, and handwashing habits with the incidence of stunting.

*Keywords: Environment, Stunting*

### 1. INTRODUCTION

Stunting is a condition of impaired growth and development in children, primarily caused by chronic malnutrition during the critical first 1,000 days of life. According to the World Health Organization (WHO), stunting is defined as a height-for-age index more than two standard deviations below the WHO Child Growth Standards median [1]. Beyond limiting physical growth, stunting negatively impacts brain development, cognitive function, and immunity, making it a serious public health issue [2].

Globally, an estimated 149.2 million children under the age of five were stunted in 2021, with the highest prevalence reported in Asia and Africa [3]. In Indonesia, the prevalence of stunting among children under five reached 21.6% in 2022 [4]. In West Papua Province, the rate was higher, at 30% [5]. Specifically, in Sorong Regency, the prevalence declined from 28.7% in 2021 to 23.8% in 2022 [6]. Preliminary reports from Malawili and Klamono Community Health Centers recorded 41 and 19 cases of stunting, respectively [6].

Stunting is influenced by complex biological mechanisms, particularly the disruption of growth hormone (GH) and insulin-like growth factor 1 (IGF-1) pathways, which are essential for linear growth [7]. However, these processes are also significantly affected by external environmental factors, including limited access to clean water, inadequate sanitation facilities, and poor hygiene practices [8]. Several studies have

demonstrated that environmental conditions such as lack of toilet ownership, unsafe waste disposal, and poor handwashing behavior are strongly associated with stunting [9,10].

Beyond the health consequences, stunting places emotional, social, and economic burdens on families. Parents may experience financial strain due to increased healthcare needs and emotional stress in managing the child's condition [2]. Given the high prevalence of stunting in Sorong Regency, it is essential to understand the environmental determinants contributing to this issue. Identifying these factors will be critical in developing effective public health interventions aimed at improving child nutrition, environmental sanitation, and overall family well-being.

This research aims to explore the relationship between environmental factors and the incidence of stunting in toddlers in the working areas of Malawili and Klamono Community Health Centers, Sorong District, Southwest Papua Province.

## 2. RESEARCH METHODS

### A. Type and Design of the Study

This research is a descriptive analytic study with a cross-sectional approach to determine the relationship between environmental factors (clean water availability, toilet ownership, and handwashing habits) and stunting in children under five. A cross-sectional design collects data at one specific point in time to assess current conditions (Sugiyono, 2019).

### B. Population and Subjects

1. Population: Families with stunted children in Sorong Regency, with a total of 60 cases identified at Malawili and Klamono Health Centers.
2. Subjects: All families of stunted children meeting the inclusion and exclusion criteria.
  - a. Inclusion Criteria:
    - 1). Willingness to participate.
    - 2). Parents with children aged 0–59 months residing in Sorong.
    - 3). Children diagnosed with stunting and recorded in health centers.
    - 4). Children without chronic medical conditions affecting growth.
  - b. Exclusion Criteria:
    - 1). Children with a history of chronic medical conditions (e.g., congenital heart disease, congenital hypothyroidism).

### C. Sample Size:

The sample size was calculated using the Taro Yamane formula, resulting in 52 samples with a 5% margin of error.

### d. Sampling Technique:

Purposive sampling based on inclusion and exclusion criteria.

### e. Location and Time

The study was conducted in Malawili and Klamono Health Centers, Sorong Regency, West Papua Province, in April 2024.

### f. Data Collection Techniques

1. Preparation: Preliminary study, proposal preparation, and revisions.
2. Implementation: Field data collection through interviews with consented families.
3. Final Evaluation: Data entry, report writing, and result presentation.

### g. Data Processing

1. Editing: Checking for completeness and accuracy of data (Sugiyono, 2019).
2. Scoring: Assigning scores to responses based on predefined indicators.

3. Coding: Assigning numerical codes to categorized data.
  4. Tabulating: Organizing data into master tables. Data are presented in frequency distributions and percentages.
- h. Data Analysis
1. Univariate Analysis: Descriptive statistics (percentages) for demographic data.
  2. Bivariate Analysis: Chi-square test used to assess the relationship between environmental factors and
  3. Stunting, with a significance level of 0.05 (95% confidence level).
- i. Research Ethics
1. Informed Consent: Participants are informed about the study and sign a consent form.
  2. Anonymity: Respondent names are not recorded; only codes are used.
  3. Confidentiality: Data are used solely for research purposes and are not disclosed.

### 3. RESEARCH RESULTS

Stunting in Toddlers at Malawili and Klamono Health Centers, 2024

Table a. Characteristics of Parents (n=36)

Variable	Category	n	%
Gender	Female	36	100.0
Age (mean ± SD, range)			28.5 ± 7.56 (18–45)
Address	Maibo	9	25.0
	Kurwato	8	22.2
	Warmon	4	11.1
	Prawisata	6	16.7
	Malasaum	2	5.6
	Magusa	3	8.3
	Klamono	4	11.1
Education Level	No schooling	2	5.6
	Elementary	10	27.8
	Junior High	8	22.2
	Senior High/Vocational	13	36.1
	Diploma (D3)	2	5.6
	Bachelor (S1)	1	2.8
Occupation	Housewife	27	75.0
	Farmer	3	8.3

	Fisherman	3	8.3
	Entrepreneur	1	2.8
	Honorary worker	1	2.8
	Civil servant	1	2.8
Monthly Income	< Rp 3,282,000	35	97.2
	≥ Rp 3,282,000	1	2.8
Household Size			7.47 ± 4.90 (3–20)

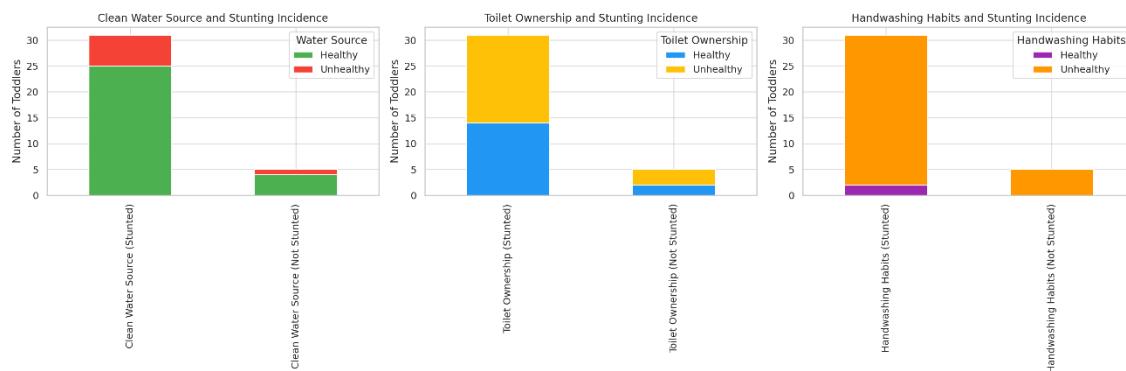
#### Analisis Of Table 1

Based on Table 1, all respondents were female (100%), with an average age of 28.5 years (SD = 7.56), ranging from 18 to 45 years. Respondents came from various areas including Maibo (25.0%), Kurwato (22.2%), and others. In terms of education, most had a high school education (36.1%), followed by elementary (27.8%) and junior high school (22.2%). The majority of respondents were housewives (75.0%). Most families (97.2%) had an income below the provincial minimum wage. The average number of family members was 7.47 (SD = 4.90), ranging from 3 to 20 individuals.

### a. Bivariate Analysis

#### 1. Relationship Between Clean Water Source and Stunting Incidence

Based on Table 15, there is no significant relationship between the source of clean water and the incidence of stunting among toddlers in the working areas of Puskesmas Malawili and Klamono, Papua Barat Daya Province ( $p$ -value = 0.973 > 0.05). Among the 36 toddlers studied, 31 (86.1%) experienced stunting. Of these, 25 (69.4%) used a healthy clean water source, while 6 (16.7%) used an unhealthy source. Additionally, 4 toddlers (11.1%) who used healthy water sources experienced wasting, and 1 toddler (2.8%) using an unhealthy water source also experienced wasting.



Here are the visual graphics showing the relationship between:

1. **Clean Water Source and Stunting Incidence**
2. **Toilet Ownership and Stunting Incidence**
3. **Handwashing Habits and Stunting Incidence**

These bar charts clearly show the number of stunted vs. not stunted toddlers in each environmental factor category. Let me know if you'd like this in infographic format or want to include p-values and annotations directly on the chart.

## 2. Relationship Between Toilet Ownership and Stunting Incidence

According to Table 16, there is no significant relationship between toilet ownership and stunting incidence among toddlers in the working areas of Puskesmas Malawili and Klamono, Papua Barat Daya Province ( $p\text{-value} = 0.829 > 0.05$ ). Out of 36 toddlers, 31 (86.1%) were stunted. Of these, 14 (38.9%) came from households with healthy toilets, while 17 (47.2%) came from households without healthy toilets. Among the 5 toddlers who experienced wasting, 2 (5.6%) were from families with healthy toilets and 3 (8.3%) from those without.

## 3. Relationship Between Handwashing Habits and Stunting Incidence

Table 17 shows no significant relationship between handwashing habits and stunting among toddlers in the working areas of Puskesmas Malawili and Klamono, Papua Barat Daya Province ( $p\text{-value} = 0.559 > 0.05$ ). Of the 36 toddlers studied, 31 (86.1%) were stunted. Only 2 (5.6%) of them came from families with good handwashing habits, while 29 (80.6%) came from families with poor handwashing habits. None of the toddlers from families with good habits experienced wasting, whereas 5 (13.9%) from families with poor habits did.

## 4. CONCLUSION

Based on the results and discussion, the following conclusions can be drawn:

- a. There is no significant relationship between access to clean water and the incidence of stunting in children under five ( $p\text{-value} = 0.973$ ).
- b. There is no significant relationship between latrine ownership and the incidence of stunting in children under five ( $p\text{-value} = 0.829$ ).
- c. There is no significant relationship between handwashing habits and the incidence of stunting in children under five ( $p\text{-value} = 0.559$ ).

Although the statistical analysis did not show significant associations, environmental factors such as access to clean water, proper sanitation, and hygienic behavior remain essential in the prevention of stunting. Therefore, integrated and collaborative efforts involving the government, non-governmental organizations, and the community are needed to improve environmental conditions and reduce the prevalence of stunting in Sorong Regency.

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