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# Analysis of Sanitation Infrastructure on the Incidence of Dermatitis in the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency

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***Abstract***

*This study aims to analyse the relationship between sanitation infrastructure and the incidence of dermatitis. The location was in Sungsang Slum Area, Banyuasin II District, Banyuasin Regency, South Sumatra Province. This study is an analytical observational study using cross sectional study design including univariate and bivariate analysis, using chi-square test (α < 0.05). The results showed a significant relationship between access to water, fulfilment of water needs, drainage conditions, household waste disposal and waste transportation from home to temporary/final disposal site with the incidence of dermatitis, while no significant relationship was found between access and technical feasibility of defecation facilities with the incidence of dermatitis. This study emphasises the importance of improving sanitation infrastructure in slums to reduce health risks such as dermatitis. Further research and co-operation between the government, NGOs and communities is needed to effectively address the slum challange and improve the health and well-being of the community.*

***Keywords:*** *Sanitation Infrastructure, Dermatitis, Skin Disease, Sanitation Issues, Slum Area*

## 1. Introduction

Slum settlements are settlements that are unfit for habitation because of the irregularity of the buildings, high levels of building density, and the quality of the buildings and facilities and infrastructure that do not meet the requirements. The criteria for Slum Housing and Slum Settlements include buildings, environmental roads, drinking water supply, environmental drainage, waste water management, waste management and fire protection (JDIH - Jaringan Dokumentasi Dan Informasi Hukum PUPR, n.d.). In Indonesia, the problem of slum settlements has become a development issue that has become quite a polemic (Shermin & Rahaman, 2021). One of the challenges faced by the government is how to organize slum settlements, especially in areas where growth is quite rapid (Agung et al., 2023; Isunju et al., 2011). Handling slum areas actually needs to be done not only in slum areas in metropolitan cities or big cities, but also needs to be done in slum areas in medium- sized cities, slum areas in small towns and coastal areas (Santi et al., 2017).

Coastal and seaside communities are faced with various problems caused by their location and environment (Chapter 2 General Scenario of Sanitation Problems in Coastal and Waterfront Communities--A Literature Review | Minimum Cost Housing Group - McGill University, n.d.), especially the impact of sanitation on human resources through its implications for health ((PDF) WATER, SANITATION AND HEALTH STATUS OF AILA AFFECTED COASTAL AREA OF BANGLADESH, n.d.). Weak control of space utilization, use of water catchment areas, and the lack of slum settlements in river basins and coastal areas as well as inadequate support for infrastructure services result in excessive use of ground water, soil pollution, and pollution of surface water quality, resulting in rivers not running smoothly. flow regulation, lowering of water levels, flooding and disease transmission (Surya et al., n.d.). Poor sanitation often occurs, one of which is skin itching (Nursiah et al., 2016)which is still a public health problem in the world, including Indonesia (Wulandari & Saftarina, 2023).

Based on data from the Health Research and Development Agency of the Indonesian Ministry of Health, it was reported that the prevalence of dermatitis in Indonesia reached

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67.8% ( Hutagalung AL, Hazlianda CP, 2017) . Dermatitis is an inflammatory eczema skin disease (Litchman et al., 2023). One of the main causal factors that greatly influences the incidence of skin diseases caused by allergies (dermatitis) is caused by environmental factors apart from socio-economic factors, occupational factors and individual hygiene (Marniati et al., 2021). These environmental factors include sources of clean and drinking water, household latrines, waste water disposal channels (SPAL) (Mosites et al., 2020; Proceeding of the 2 Nd International Conference in Health Sciences (ICHS), 2018; Sajida et al., 2013). The sanitary conditions do not meet the requirements for good sanitation due to the very narrow condition of the house resulting in poor drainage conditions. (Lisafitri et al., 2021). Although there is no link between dermatitis and mortality, this disease can be persistent or often recur if the causative factor is not identified and continuous exposure occurs. . This can disrupt the patient's quality of life and cause a decrease in productivity (Murphy PB, et.al, 2022).

At the Technical Implementation Unit of the Sungsang Community Health Center, Banyuasin II District, Banyuasin Regency, it was found that the number of sufferers of allergic skin disease ( Dermatitis ) was 3184 cases. Dermatitis is in the top 10 diseases that occur in the Sungsang Health Center UPT work area in second place. Based on these problems, this research aims to analyze the sanitation infrastructure for dermatitis in the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency.

## 2. Methods

### Research sites

The research location is in the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency, South Sumatra Province , especially in the Sungsang Slum Area, Banyuasin II District with the coordinates at 357 □38'14" N and 104 □53'55" S Figure .

This type of research is analytical observational which aims to examine the relationship between two or more variables by simply observing without intervening on the research subject. This research design is a cross sectional study design which aims to carry out measurements or observations at the same time or at one time (Ang et al., 2020; Setia, 2016; VERNBERG, 1962). This research does not mean that all research subjects are studied simultaneously at the same time, but each subject is only observed once and measurements of subject variables are carried out at that time (Harlan and Johan, 2018). Data analysis uses univariate and bivariate data analysis . To see the relationship between the independent variable and the dependent variable, a statistical test was carried out using the chi-square test (α <0.05).

### Population and Sample

According to Sugiyono (2015: 117), he believes that population is a generalized area in the form of objects or subjects that have certain qualities and characteristics. The total population in this study was 3,695 heads of families in the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency. Samples were taken using a sampling technique with the Slovin formula, namely:

$$n = \frac{N}{1 + Ne^2}$$

Information:
n = number of samples N = total population
e = maximum tolerable error limit or significance level is 0.05 (5%)

So after calculating using the Slovin formula with a significance level of 0.05 (5%), the minimum number of samples that must be taken is 360 respondents.

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**Data source**

This research was conducted using primary data and secondary data. Primary data is taken from surveys and direct observations in the field and secondary data is taken from relevant agencies relating to disease data, administrative maps and area maps. The research instruments used in this research are questionnaires and checklist formats as well as documentation in the field which includes disease incidence and sanitation infrastructure, namely drinking water supply, environmental drainage conditions, Waste Water Management Conditions, and Waste Management Conditions.

## 3. Results and Discussion

Ten Most Common Diseases in UPT Puskesmas Sungsang in 2022

Table 1
List of the 10 most common diseases in the UPT Puskesmas Sungsang in 2022

| No. | Disease Name | Number of Visits |
|---|---|---|
| 1 | Pen. High blood pressure | 3298 |
| 2 | Pen. Allergic Skin | 3184 |
| 3 | Diabetes | 2540 |
| 4 | Pen. On the Muscle & Bone System | 1480 |
| 5 | Other Acute Infections of the Upper Respiratory Tract | 1096 |
| 6 | Gastritis | 641 |
| 7 | Pen. Skin Due to Fungus | 558 |
| 8 | Refractive Disorders | 449 |
| 9 | Miscellaneous Eye Diseases | 220 |
| 10 | Dental caries | 192 |

*Source: Data Processing*

**Sungsang Slum Area Profile**

The Sungsang slum area is a slum area in the medium slum category, located in the typology of lowland slum settlements along river banks with urban slum characteristics. The verification area at the Sungsang location is 53.2124 ha (Table 1).

Table 1. Profile of the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency

| No. | Area Name | : | Breech |
|---|---|---|---|
| 1 | Subdistrict/Village | : | Breech |
| 2 | Subdistrict | : | Banyuasin II |
| 3 | Village Settlement Area | : | 53.2124 hectares |
| 4 | Number of Heads of Household | : | 2557 KRT |
| 5 | Number of Heads of Family | : | 3,695 families |
| 6 | Number of Heads of MBR Households | : | 1101 KRT |
| 7 | Number of Non-MBR Household Heads | : | 1456 KRT |
| 8 | Number of Male Population | : | 7854 Souls |
| 9 | Number of Female Population | : | 7070 Souls |
| 10 | Total population | : | 14924 Soul |

*Source: Sungsang Community Health Center Annual Profile 2022*

Table 3. Frequency Distribution of Respondents

| No. | Characteristics | n | % |
|---|---|---|---|
| **1** | **Skin disease** | | |
| | - No | 62 | 17.2 |
| | - Yes | 298 | 82.8 |

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| | | | |
|---|---|---|---|
| **2** | **Water Supply** | | |
| | a. Access to water (Drinking/Washing/Bathing) | | |
| | - Not suitable (Rainwater/Bottled Water/Refill Water/Unprotected Wells/Unprotected Springs/Rivers/Lakes/Ponds/Tanks/Cars/Water Carts) | 360 | 100.0 |
| | - Eligible (Metered/SR Plumbing, Unmetered Plumbing, Drilled/Pumped Wells, Protected Wells, Protected Springs) | 0 | 0.0 |
| | b. Meeting water needs | | |
| | - No | 339 | 94.2 |
| | - Yes | 21 | 5.8 |
| **3** | **Environmental Drainage** | | |
| | **(** The condition of the drainage network at residential locations is of minimum adequate quality) | 360 | 100.0 |
| | - Inadequate | 0 | 0.0 |
| | - Adequate | | |
| **4** | **Waste Water Management** | | |
| | a. Access to defecation facilities | | |
| | - Family/Shared Toilet | 307 | 85.3 |
| | - Public Toilet | 2 | 0.6 |
| | - Not in the Latrines | 51 | 14.2 |
| | b. Technical Feasibility of Defecation Facilities | 357 | 99.2 |
| | - Not feasible | 3 | 0.8 |
| | - Worth | | |
| **5** | **Waste management** | | |
| | a. Household Waste Disposal | | |
| | - Does not comply with technical requirements (in a hole/burned,open space/empty land/irrigation channel/lake/sea/drainage) | 360 | 100.0 |
| | - In accordance | 0 | 0.0 |
| | b. .Transporting Waste from Home to TPS/TPA | 360 | 100.0 |
| | - Not using TPS/TPA | 0 | 0.0 |
| | - > 2 x a week | 0 | 0.0 |
| | - <1 x a week | | |

*Source: Data Processing*

Based on table 3. above, it is known that 298 respondents (82.8%) had skin diseases, 360 respondents (100%) had access to inadequate drinking water, 21 respondents (5.8%) had their water needs met. ). Respondents who had inadequate drainage network conditions were 360 respondents (100%), respondents who had access to defecation facilities in family/shared toilets were 307 respondents (85.3%), public toilets were 2 respondents (0.6% ), and 51 respondents (14.2%) did not have toilets, of which 357 (99.2%) of the facilities were in poor condition. Meanwhile, for household waste disposal that did not comply with technical requirements, there were 360 respondents (100%).

Table 4. Relationship between water access and the incidence of dermatitis

| Water Access | Dermatitis Occurrence | | | | Total | | *p-Value* |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| Not feasible | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |
| Worthy | 0 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 4. above, it can be concluded that of the 360 respondents who had access to inadequate water, 298 respondents (82.8%) experienced dermatitis. The results of statistical tests using the chi-square test show that the p-value = 0.000 < α so that H0 is rejected, meaning there is a significant relationship between water access and the incidence of dermatitis in the communit.

Table 5. Relationship between meeting water needs and the incidence of dermatitis

| Fulfillment of Water Needs | Dermatitis Occurrence | | | | Total | | p-Value |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| No | 51 | 14.2 | 288 | 80.0 | 339 | 94.2 | |
| Yes | 11 | 3.0 | 10 | 2.8 | 21 | 5.8 | <.001 |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 5. above, it can be concluded that of the 360 respondents whose water needs were sufficient, 288 respondents (80.0%) experienced dermatitis. The results of statistical tests using the chi-square test show that the p-value = 0.001 < α so that H0 is rejected, meaning there is a significant relationship between meeting water needs and the incidence of dermatitis in the community.

Table 6. Relationship between environmental drainage conditions and the incidence of dermatitis

| Environmental Drainage | Dermatitis Occurrence | | | | Total | | p-Value |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| Inadequate | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |
| adequate | 0 | 0 | 0 | 0 | 0 | 0 | 0,000 |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 6. above, it can be concluded that of the 360 respondents whose environmental drainage conditions were adequate, 298 respondents (82.8%) experienced dermatitis. The results of statistical tests using the *chi-square test* show that the *p-value* =0.000 < α so that H0 is rejected, meaning there is a significant relationship between environmental drainage conditions and the incidence of dermatitis in the community.

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Table 7. Relationship between access to defecation facilities and the incidence of dermatitis

| Access to defecation facilities | Dermatitis Occurrence | | | | Total | | p-Value |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| Family/Shared Toilet | 55 | 15.3 | 252 | 70.0 | 307 | 85.3 | 0.620 |
| Public Toilet | 0 | 0.0 | 2 | 0.6 | 2 | 0.6 | |
| Not in the Latrines | 7 | 1.9 | 44 | 12.2 | 51 | 14.1 | |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 7. above, it can be concluded that of the 360 respondents who had access to defecation facilities in family latrines, 252 respondents (70.0%) experienced dermatitis, 2 respondents (0.6%) experienced dermatitis in public latrines and none 44 respondents (12.2%) used toilets. The results of statistical tests using the *chi-square test* show that the *p-value* = 0.620 > α so that H0 is accepted, meaning there is no significant relationship between access to defecation facilities, both those that meet the requirements (family/shared toilets) and those that do not meet the requirements. (public latrines/notlatrines) with the incidence of dermatitis in the community.

Table 8. Relationship between the technical feasibility of defecation facilities and the incidence of dermatitis

| Technical Feasibility of Defecation Facilities | Dermatitis Occurrence | | | | Total | | p-Value |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| Not feasible | 61 | 16.9 | 296 | 82.2 | 357 | 99.1 | 0.458 |
| Worthy | 1 | 0.3 | 2 | 0.6 | 3 | 0.9 | |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 8. above, it can be concluded that of the 360 respondents whose defecation facilities met technical feasibility, 296 respondents (82.2%) experienced dermatitis. The results of statistical tests using the *chi-square test* show that the *p-value* = 0.458 < α so that H0 is accepted, meaning there is no significant relationship between the technical feasibility of defecation facilities and the incidence of dermatitis in the community.

Table 9. Relationship between household waste disposal and the incidence of dermatitis

| Household Waste Disposal | Dermatitis Occurrence | | | | Total | | p-Value |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| Does not meet technical requirements | 62 | 17.2 | 298 | 82.8 | 360 | 100 | 0,000 |
| According to Technical Requirements | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 9. above, it can be concluded that of the 360 respondents whose household waste disposal did not comply with technical requirements, 298 respondents (82.8%) experienced dermatitis. The results of statistical tests using the *chi-square test* show

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that the *p-value* = 0.000 < α so that H0 is rejected, meaning there is a significant relationship between the suitability of household waste disposal and the incidence of dermatitis in the community.

Table 10. Relationship between transporting waste from home to TPS/TPA with the incidence of dermatitis

| Transporting Waste from Home to TPS/TPA | Dermatitis Occurrence | | | | Total | | p-Value |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | | | |
| | n | % | n | % | n | % | |
| Not using TPS/TPA | 62 | 17.2 | 298 | 82.8 | 360 | 100 | 0,000 |
| > 2 x a week | 0 | 0 | 0 | 0 | 0 | 0 | |
| < 1 x a week | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total | 62 | 17.2 | 298 | 82.8 | 360 | 100 | |

*Source: Data Processing*

Based on table 10. above, it can be concluded that of the 360 respondents who did not use TPS/TPA, 298 respondents (82.8%) experienced dermatitis. The results of statistical tests using the *chi-square test* show that the *p-value* = 0.000 < α so that H0 is rejected, meaning there is a significant relationship between transporting household waste to TPS/TPA and the incidence of *dermatitis* in the community.

Slum areas give rise to many issues including poverty, unemployment, access to clean water, access to residential buildings, environmental pollution, uninhabitable housing, inadequate sanitation, and so on (Mundhe, 2019). Indonesia is the country in second placeas a country with a population that has low access to sanitation(Diana Putri Wijayanti et al., 2023; Sedrak et al., 2018)

Based on the results of research conducted in the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency, South Sumatra Province, it was found that the main problem that arises in this slum area is that the majority of people in the Sungsang Slum Area have poor *infrastructure facilities,* including:

a. Community access to safe drinking water, bathing and washing is still not met;
b. The lack of drainage network conditions in residential locations that have a minimum adequate quality, means that there are still many pools of dirty water originating from household waste, factory waste or other activity waste around residential areas.
c. Inadequate wastewater management conditions include access to family latrines/shared latrines that meet technical requirements as well as separate household wastewater drainage channels from environmental drainage channels;
d. The condition of waste infrastructure and facilities does not comply with the requirements and conditions for waste management do not comply with technical standards which causes the accumulation of waste.

Low sanitation, disorder and inadequate infrastructure in residential areas can cause dangerous environments and health problems(Henson et al., 2020) namely health in children, diarrhea (Buttenheim, n.d.)and *dermatitis* . The process and results of improving slum settlements, especially sanitation facilities and infrastructure, can address various variables that determine environmental health (Corburn & Sverdlik, 2017).

## 4. Conclusions and suggestions

From this article, it can be concluded that slum settlements in Indonesia, especially in the Sungsang Slum Area, Banyuasin II District, Banyuasin Regency, face various problems related to sanitation which have an impact on public health. Poor sanitation infrastructure, such as inadequate access to drinking water, lack of environmental drainage, inadequate wastewater management, and waste handling that does not meet standards, can cause an increase in cases of skin diseases such as dermatitis. Therefore, concrete steps are needed

to improve the conditions of slum settlements, including increased investment in improving sanitation facilities and infrastructure, cooperation between the government, non-governmental organizations and the community itself, as well as further research to identify more effective strategies in dealing with the problem of slum settlements and their impact on the health and welfare of the community.

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