SANITATION RISK ASSESSMENT AMONG SUB URBAN COMMUNITY IN PALEMBANG

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ABSTRACT

Sanitation is still a problem in the border areas of cities and villages or Sub Urban. Distant access to the city center is an obstacle in providing sanitation facilities. Sanitation risk needs to be done to assess the magnitude of risk and interventions that will be given to the area. This study aims to assess sanitation risk in Sub Urban areas. This study was quantitative research with an analytical observation research design with a cross sectional approach, using a questionnaire guided by the Environmental Health Risk Assessment questionnaire from the Ministry of Health, the population in this study were housewives. The sample of this study was 77 respondents, the sampling technique in this study was simple random sampling. The results of the study found that the risk of environmental sanitation in the Sub Urban area of Karya Jaya village in the form of ownership of trash bins 50 were less risky categories, domestic waste 74 were very high categories and unhealthy behavior 78 were very high categories. The conclusion of this study is the lack of maternal knowledge about personal hygiene behavior and lack of awareness about the importance of personal hygiene.

Keywords: Sanitation, Personal Hygiene, Sub Urban Area

Introduction

Sanitation remains a critical issue in Indonesia. The World Health Organization (WHO) report elucidates that Indonesia ranks third among countries with the poorest or inadequate sanitation levels in 2017, with India and China securing the first and second positions, respectively. This underscores the urgent need for concerted efforts to ameliorate the nation's sanitation conditions. Recent data also reveals that the proportion of the global population residing in slum areas is highest in Africa (62%), followed by South Asia (35%), Southeast Asia (31%), and East Asia (28%). Indonesia itself contributes significantly to the challenge of slum settlements in Southeast Asia, encompassing a total slum area of 38,641 hectares. Contemporary data demonstrates that in 2017, approximately 827,000 individuals in developing nations succumbed annually to issues stemming from inadequate water, sanitation, and hygiene. Furthermore, an estimated 480,000 children under five years old perish each year due to diarrheal diseases, positioning it as the second leading cause of death among this age group, following pneumonia. Consequently, strategic and sustainable measures are imperative to address the persisting sanitation challenges faced by Indonesia and its neighboring countries, aiming to enhance the quality of life for its residents and reduce preventable mortality rates [1-3]

In the outskirts of our city, there is a suburban enclave facing significant challenges in the realm of sanitation, resulting in a precarious public health situation. The local community in this sub-urban area is grappling with inadequate waste disposal systems and a lack of proper sanitation infrastructure, creating an environment that is ripe for health hazards to thrive. Consequently, the inhabitants in this area are at a heightened risk of contracting diseases due to the unsanitary conditions. Recent data highlights the seriousness of the situation, showing a worrying increase in cases of waterborne illnesses like cholera and typhoid fever in this suburban area. These diseases thrive in the absence of clean water sources and inadequate waste management. Adding to the problem is the region's remote location, bringing numerous demographic challenges.[4]

The urban village of Karya Jaya, located in the suburban area of Palembang City, has the highest population density compared to Keramasan and Kertapati. The environment in Karya Jaya is far from clean, and some residents live in stilt houses situated in swamp areas, which may increase the risk of diseases. These areas are commonly known as slums. In addition, it is important to address the issue of poor sanitation in Karya Jaya urban village as it remains a prevalent problem in developing nations, including Indonesia, and contributes to the spread of diseases.[5, 6]

According to data sourced from the Central Bureau of Statistics of Palembang City for the year 2018, Karya Jaya Village exhibited a population of 9,260 residents within a geographical expanse of 16 km^2. The quantified residential density of housing units within Karya Jaya urban village during the same period was noted as 579 per km^2. Remarkably, as of 2018, the provision of clean water services had extended to 93.7% of Palembang City's territory. However, it is notable that Karya Jaya Urban Village of Palembang City represents a locality grappling with deficient sanitation conditions. The community residing within Karya Jaya Urban Village experiences a notable scarcity in terms of the percentage of houses that adhere to the requisites of hygienic living environments.[5, 7]

Analysis of the extant housing units within Karya Jaya urban village indicates a total of 1,983 dwellings. From this pool, 1,876 households were identified as maintaining conditions of satisfactory sanitation. Moreover, data emanating from the Karya Jaya Village Health Centre underscores that a total of 2,025 individuals possess access to sanitation facilities in the form of healthy latrines. Further, a breakdown of water sources reveals that 124 individuals utilize clean water sources within the Karya Jaya sub-district. Additionally, the utilization of protected wells originating from clean water sources is documented to involve 1,478 individuals. This confluence of data elucidates the prevailing state of sanitation and water infrastructure within Karya Jaya Village and the challenges faced by its residents.[8] Therefore, this study was aimed to assess sanitation risk among community in Karya Jaya (Sub Urban Area).

Methods

This study was executed in Karya Jaya Village, which is a sub-urban area of Palembang City. It was conducted from September to December 2022 over a period of three months. The study employed a quantitative research methodology and utilized the Environmental Health Risk Assessment (EHRA) technique, developed by the Ministry of Health of the Republic of Indonesia, to investigate the state of hygiene and sanitation facilities that pose a risk to public health on a household level. The study employed a quantitative research methodology and utilized the Environmental Health Risk Assessment (EHRA) technique, developed by the Ministry of Health of the Republic of Indonesia, to investigate the state of hygiene and sanitation facilities that pose a risk to public health on a household level. Technical term abbreviations are explained upon first use. Data collection techniques were carried out through observation in cases where the research related to human behavior. Additionally, direct observation was conducted to evaluate existing sanitation. The goal was to collect information pertaining to sanitation data and behaviors that potentially pose a public health risk in Karya Jaya Village. The population of this study were all households in Karya Jaya Village. The sample in this study were all houses in Karya Jaya Village as many as 76 respondents using Simple Random Sampling. The respondents in the study were household members who were found when conducting research allowing interviews. Sample criteria include inclusion criteria. Inclusion criteria, namely where research subjects can represent in a qualified research sample. The inclusion criteria in this study are: Housewives or married daughters aged 18 to 60 years and residing in Tanjung Raja Village, If there were two or more people in the household, one of them was taken as a sample. Data analysis was carried out using the available data analysis program, namely the Ms. Excel Template program from the Ministry of Health.
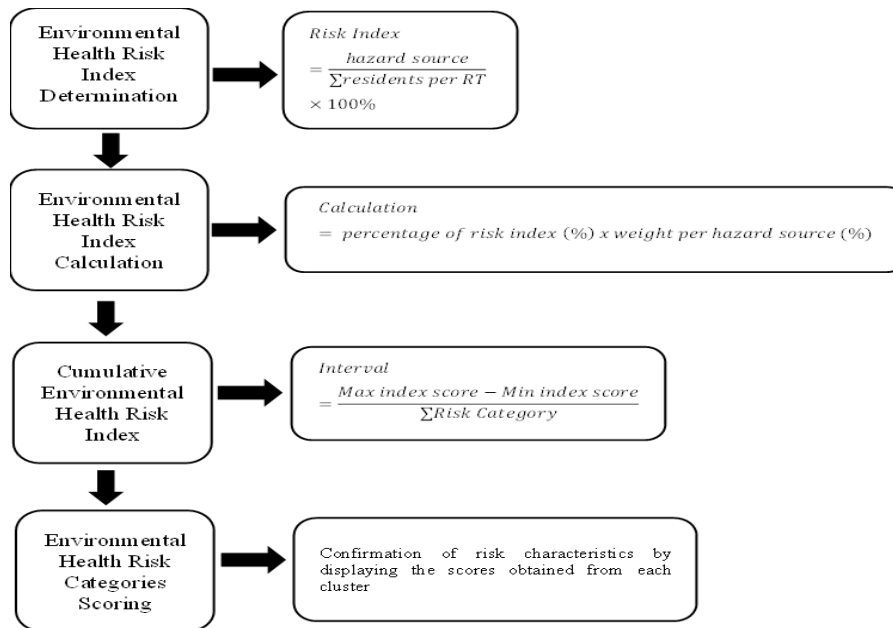
Figure 1. Steps for Environmental Health Risk Assessment (Ministry of Health EHRA Study)

Source: Ramadhan, Ardillah (9)

This study examined various variables related to environmental sanitation risk, as assessed through the Ministry of Health's EHRA questionnaire. The sanitation risk variable was determined by observations and measurements of water availability, which was assessed through observations of the quality (including physical characteristics such as colour, odour, and tastelessness) and quantity (including scarcity of clean water) of available clean water. Furthermore, we evaluated the availability of waste receptacles by observing the presence of bins that were used for garbage disposal and collection. The ownership of latrines was determined by assessing their feasibility and construction. This included checking that the septic tank was closed and watertight, had a gooseneck and a floor, was not visible to others, contained an adequate supply of water, did not contaminate the soil or surface water and was situated at least 10 meters away from the water source. Another variable was waste water disposal, assessed by observing bathroom and kitchen disposal methods and the presence of stagnant water around the house. Hand washing with soap behaviour was assessed through five key interviews: (1) after defecation, (2) after washing children, (3) before eating, (4) before feeding infants/toddlers, and (5) before preparing food for the family. The variable for household waste management was measured through observation of practices such as hoarding or burning. Meanwhile, the open defecation variable was assessed through interviews. Ethical approval for this study was granted by the ethics committee of the Faculty of Public Health, Sriwijaya University.

Results

Table 1 shows the characteristics of the respondents.

Table 1. Characteristic of Respondents

Variables	Freq	(%)
Personal Hygiene		
Poor	72	(93,5%)
Good	5	(6,5%)
Age		
≥ 40 years	38	49.4%
< 40 years	39	50.6%
Education		
Not graduated	8	(10.4%)
Elementary school	40	(51.9%)
Junior High school	17	(22.1%)
Senior High School	9	(11.7%)
Vocational School	1	(1.3%)
Bachelor Degree	2	(2.6%)
Income		
Low	71	(92.2%)
High	6	(7.8%)
Personal Hygiene Knowledge		
Poor	58	(75,3%)
Good	19	(24,7%)
Sanitation Facilities		
Poor	57	(74%)
Good	20	(26%)

In this study, it was observed that most respondents exhibited inadequate personal hygiene behaviors, with 72 individuals (93.5%) falling into this category. A small minority of respondents, namely five individuals (6.5%), reported good personal hygiene habits. Most respondents were over 40 years of age, totaling 40 individuals (50.6%), while a smaller number, namely 39 individuals (49.4%), were under 40 years old. In this study, the education level of most respondents was found to be elementary school graduates, represented by 40 respondents (51.9%), followed by junior high school graduates with 17 individuals (22.1%). A small number of respondents, namely 8 (10.4%), did not attend formal education. Additionally, 9 respondents (11.7%) had completed senior high school, and 1 respondent (1.3%) had graduated from a vocational school. Finally, only 2 respondents (2.6%) had graduated from university. Most respondents had low income, with 71 people (92.2%) falling into this category. A small proportion reported having a high income, comprising only 6 people (7.8%). Additionally, most respondents demonstrated poor knowledge of personal hygiene behavior, with 58 people (75.3%) falling into this group. However, there were also 19 people (24.7%) who reported having good knowledge of personal hygiene behavior. The sanitation conditions were subpar for most of the respondents, with 57 individuals (74%) reporting poor conditions. Only a handful of individuals, approximately 20 (26%), reported having good sanitation conditions.

Table 2. Environmental Health Risk Index Calculation

Variables	Answers	Freq	%
Waste Bin Ownership	None	2	2,60
	Yes, but inadequate	75	97,40
Domestic Waste			
Toilet Ownership	None	33	42,86
Wastewater of Sewerage	None	70	90,91
Household waste is directed to the courtyard	Yes	69	89,61
Unhealthy Behavior			
Rubish management	No, managed	72	93,51
Handwashing with soap	Yes	77	100
Open defecation	Yes	34	44,16

Table 3. Environmental Health Risk Index Cumulative

Variabel	Kelurahan Karya Jaya
Waste Bin Ownership	50
Domestic Waste	74
Unhealthy Behavior	78
Total	202

Table 4. Environmental Health Risk Category

	Risk Value Limit	Note
Total Risk Index Max	78	
Total Index Min	50	
Interval	7	
Risk Area Category	**Lower Limit**	**Upper Limit**
Less Risk	50	57
Medium Risk	58	65
High Risk	66	73
Very High Risk	74	81

Table 5. Environmental Sanitation Risk Score

	Environmental Sanitation Risk Index Value	Score	Category
Waste bin Ownership	50	1	Less Risk
Domestic Waste	74	4	Very high Risk
Unhealthy Behavior	78	4	Very high risk

The initial stage in assessing the environmental health risk is to calculate the risk index for each source and its constituents, dividing it by the total population or respondents, and multiplying it by 100% (Maliga, 2020). The second stage involves identifying the environmental health hazard by evaluating the components of the hazard sources and the possibility of being exposed to it. The aim, therefore, is to compute the environmental health risk index depicted in Table 3 objectively. The

calculation of the index for environmental health risks is performed by assigning a weight of 100% to each risk factor, which is then divided according to the number of components present in the factor. The distribution of weight is contingent on the severity of each component, as well as its classification as serious or acceptable by the researcher. The weight for each individual component is determined as outlined in (Alfat et al., 2020). The Environmental Health Risk Index value is determined by summing the hazard source and likelihood of occurrence based on weighting results. The index represents the cumulative environmental health risk and is used to categorize such risks (Amirus et al., 2022).

Based on Table 4, one can determine the total number of each risk factor. The sum of all values is referred to as the environmental health risk index (IRKL) value (Susilawaty et al., 2018) The IRKL value is then utilized to categorize environmental health risks, using intervals calculated for both the Maximum Total Risk Index and Minimum Total Risk Index. To determine the interval, the lowest score is subtracted from the highest score and divided by the number of risk categories. There are four risk categories, namely low risk, medium risk, high risk, and very high risk, as identified (Lestari et al., 2022). In the case of the village of Karya Jaya, the calculation of risk indicates that domestic waste and unhealthy behaviour within the community pose a very high risk.

Discussion

Waste is a solid by-product of everyday human activities or processes which must be managed in a safe and appropriate manner to create a clean and safe environment. The spread of disease vectors and contamination through waste significantly increases risk factors. Although most households possess refuse bins, they often fail to meet the necessary requirements.[10] According to research, refuse bins can serve as a food source for vectors. The study established that 2 households - or 2.6% - were exposed to environmental health hazards due to the absence of rubbish bins. Furthermore, 75 out of 77 households - or 97.4% - were found to have waste bins that did not meet the required standards.

A latrine serves as a secure facility for defecation and is essential in providing sanitation.[9, 11, 12] A survey conducted on the sanitation facilities in Karya Jaya village revealed that 42.8% or 33 out of 77 households were facing an environmental health risk due to lack of latrine ownership. Households without latrines in Karya Jaya urban village typically rely on public toilets, parent/relative latrines, or rivers for defecation. The use of public toilets can decrease open defecation, thus enhancing environmental health. The behavior of individuals who continue to defecate in open areas and the unsafe construction of latrines are contributing factors to potential health hazards.

Sewage networks are essentially an equipment for the disposal of wastewater in the form of pipes or soil excavations. They drain kitchen, bathroom, and laundry waste which typically contain

hazardous substances that pose risks to both human health and the environment. Sewage that remains uncovered often become breeding grounds for vectors and cause an aesthetic decline, leading to the spread of diseases and health risks.[13] Based on the research findings conducted in Karya Jaya urban village, 90.9% or 70 households face environmental health risks that have no Sewage, Sanitation, and Solid Waste Management. Household waste flowing into the garden can spread disease, and unsafe waste disposal sites can pollute the environment, particularly water and soil. Research carried out in Karya Jaya urban village highlighted an environmental health risk of 89.6%, or 69 households, due to the improper disposal of household waste into outdoor spaces. Thus, stagnant water around a property can result in heightened public health risks and environmental issues. The EHRA study reveals that the risk of stagnant water in a yard is directly proportional to its quantity, with increased quantities representing higher risks.

Managing household waste according to its type can reduce the amount of waste generated. A study in Kelurahan Karya Jaya found that 93.5 per cent, or 72 households, posed a risk to the environment and health due to the mismanagement of their waste. Burning waste as a means of disposal presents severe environmental and public health concerns, as there are inadequate facilities and infrastructure to transport the waste. Indiscriminate disposal of waste pollutes the environment and heightens the risk of pollution. Additionally, the risk of vectors spreading from the waste increases.[14, 15]

Handwashing with soap and clean running water can reduce the risk of spreading disease. It should be performed at five key moments, namely after using the toilet, after handling animals, before eating, before feeding children, and before preparing food. According to research conducted in Karya Jaya village, 77 out of 100 respondents who did not regularly perform handwashing at the five key moments were found to be at risk of environmental health problems. This is due to insufficient understanding of HWWS 5 key moments and inadequate public recognition of the importance of washing hands with soap and running water.[16-18]

Based on research conducted in Karya Jaya village, open defecation behaviour poses an environmental health risk of 44.1%. This applies to 34 households that still practice open defecation. Increasing the likelihood of contamination by pathogenic bacteria or infection and significant environmental pollution means that bacteria found in faeces can contaminate water sources and community food. This increases the risk of disease exposure. Households without access to latrine facilities that still practice open defecation have a 1.32 times greater risk of being exposed to acute diarrhea.

Based on the research findings, the variables identified as potential sources of risk in this study include ownership of rubbish bins, household sewage, and unhealthy habits. How to identify the level

of danger posed by environmental health threats in Karya Jaya village is determined by a ranking of risks using the environmental health risk index, which is then weighted based on the sources of the danger. The component with the highest weight (50%) is attributed to the ownership of the respondent's waste bin, whereby a lack of a waste bin was identified in 13 cases, and existing bins did not meet requirements in 48 cases. Technical terms will be explained upon their first occurrence. 33% weight is allocated to the component of domestic wastewater, specifically ownership of latrines, which yielded 14 results, ownership of Sewage, which yielded 30 results, and household waste flowing into the yard, which yielded 28 results. Another 33% weight is allocated to the component of unhealthy behaviour, which includes waste management that yielded 31 results, hand washing at five crucial times that yielded 33 results, and open defecation behavior that yielded 14 results. The components of each risk variable are assigned weights which are then added together to generate an environmental health risk index. The ownership of the respondent's refuse bin component is valued at 50, household waste at 74, and unhealthy behavior at 78, resulting in a total risk index of 202.

The cumulative value for each risk source is calculated, resulting in the environmental health risk index value. This value serves as a basis for assigning risk categories, which are determined by calculating the maximum and minimum index values and dividing the difference by the number of categories. The cumulative value for each risk source is calculated, resulting in the environmental health risk index value. It is important to note that these categories are expressed in interval values. The preferred quantity of risk categories is equal to the number of categories utilised in this study, which is four (low, medium, high, and very high risk). Based on the calculation results, the maximum risk index totals 78 factors relating to unhealthy behaviour, while the minimum risk index consists of 50 factors relating to waste ownership. Additionally, the interval is 7. Consequently, it can be determined that waste bin ownership falls into the low risk category, domestic waste falls into the very high risk group, and unhealthy behaviour falls into the very high risk category.

Conclusion

Environmental health risk research conducted in Karya Jaya urban village in 2022 found that unhealthy behaviour and domestic waste were both categorized as very high risk, while latrine ownership was deemed less risky. Therefore, it is important for the community to prioritize personal hygiene and maintain a clean living environment in order to prevent the spread of disease. It is also expected that the community will refrain from littering in the nearby river.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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