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Prevalence of Open Defecation Practice and Associated Factors Poverty and Geography in Palembang Indonesia

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Abstract

Palembang is one of the large cities in Indonesia which has a specific geography. A study was conducted to estimate the prevalence and determine poverty factors associated with open defecation practices.An analytical cross-sectional study was conducted for one year among 397 respondents as a sampling. Prevalence was calculated with 95% confidence intervals and binary logistic regression analysis was performed to determine factors associated with open defecation.32.5 percent of people still practice open defecation which is influenced by poverty and geographical factors. Influence of income) AOR of 13,891 (Cl 8,345 – 23,123), education AOR of 20,328 (Cl 11,881 – 34,780), clean AOR 6,192 (Cl 3,747 – 10,234), water source AOR of 28,882 (16,403 - 50,854), characteristics of the house AOR of 3,977 (2,555 – 6,191), facilities or the availability of toilets at home AOR of 7,066 (4,167 – 11,983), geographical location of the house towards the river or water AOR of 478.995 (173.112 – 1325.1399), knowledge of open defecation behavior AOR of 3.607 , attitudes AOR of 3.277. Respondents who practice open defecation have low income and education, no water source available from the government, geographical location of the house near a river or swamp, no defecation facilities, lack of knowledge and bad behavior.

Keywords: *Open, Defecation, Factors, Poverty, Geography.*

Introduction

Defecating in open areas such as fields, streams, or trenches without properly disposing of human waste is known as "open defecation (OD),[1]Open defecation practice continues to be a significant public health issue in Indonesia. According to the World Health Organization (WHO) report in 2021, more than 494 million people in the country practice open defecation (Belay et al., 2022a). WHO data, it is estimated that 1.1 billion people, or 17% of the world's population, still defecate in open areas. People defecate in open areas, namely, India (58%), Indonesia (12.9%), China (4.5%), Ethiopia (4.4%), Pakistan (4.3%), Nigeria (3%), Sudan (1.5%), Nepal (1.3%), Brazil (1.2%), and Niger (1.1%) [4]. The results of the WHO study state that in the proportion of the world's population, Indonesia occupies the second-highest level after India, namely, 58,000,000 people who still practice open defecation [WHO, 2018)

OD has been included in Sustainable Development Goals (SDG) target 6.2, which seeks to "ensure access to adequate and equitable sanitation and hygiene for all and eradicate OD by 2030, paying special. The target for achieving Open Defecation Free (ODF) status in Indonesia is set at 100% (Kementerian Kesehatan Republik Indonesia, 2022). Health development is an effort carried out by all components of the nation to increase awareness, willingness, and ability to live healthy for everyone. It is hoped that there will be an increase in the highest degree of public health. One of the government's efforts to improve public health is the National CommunityBased Total Sanitation (STBM) program [5]The STBM program also contributed to the success of the 2015–2030 SDGs program targets, which contain 17 goals, one of which is the availability of access to clean water and sanitation. Each country must be able to implement the SDGs targets with sustainable development goals [7)

The city of Palembang is one of the big cities in Indonesia, with the characteristics of the area, some of it is on the banks of the Musi River and some of it is swamps. Others are dry plains. These specific regional characteristics shape people's behavior towards open defecation (OD). Palembang City, as one of the big

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cities in Indonesia, has an ODF target of 2023 (Palembang City Health Service). In fact, in the field, OD is still widely carried out by the community, to help the government. Various factors that influence OD need to be studied, so that the ODF goal can be achieved. There are many factors that cause Palembang City not to have 100% ODF, these factors are due to poverty. Several sub-districts in Palembang City are still pockets of poverty.

Based on several research results, it was found that the percentage of households that practice open defecation. Indirectly, people's behavior regarding open defecation and latrine ownership is influenced by the level of education (Mumbi et al., 2018). Open defecation, education, and poverty are highly correlated with each other. The percentage of households that practice open defecation tends to be poor and low-educated (Cowman, 2017). Those with low education are 2.692 times more likely to have no toilet than those with high education (Faidah, 2020). According to this study, people who live in permanent homes have a 4800 times greater chance of using latrines than those who live in semi-permanent residences. Those who express comfort with latrines permanently installed with septic tanks have a 303 times greater chance of using latrines (Oktarizal et al., 2022).The negative impact of water quality (Aida et al., 2022a). The water quality during the rainy season was relatively better than during the dry season (Aida et al., 2022b).

There are many factors causing ODF not yet achieved in Palembang City, so it is hoped that the findings in this research will become input for the Sanitation Cleanliness program, which contributes to national goals and is in line with target 3 of SDG 3, and target 2 of SDG 6. In addition, the results will provide practical insights for public health interventions, helping to accelerate ODF in similar settings.

Materials and Methods

Study Area

This research was carried out in Sei Selincah Village, Kalidoni District, which is one of the villages where most of the population is on the banks of the Sei Selincah River and in 16 Ulu Village, Seberang Ulu II District, where the majority of the population is in the swampy areas of Palembang City.

Research Design

This research uses quantitative analytical observational research with a cross-sectional research design (Notoatmodjo, 2010) (Nugrahaeni & Mauliku, 2011). The population in this study was the people of Sei Selincah Subdistrict and 16 Ulu Subdistrict, Palembang City, totaling 10,534 heads of families. The sample size was measured using the Slovin formula (31). The total sample was 397, the model was taken using a simple random sampling method with statistical analysis using logistic regression

Result

The collected data was analyzed using SPSS software, with a significance level set at 0.05. Data on respondent characteristics were analyzed using frequency and percentage distribution tables, which provide an overview of the characteristics of research participants. For bivariate analysis, Chisquare test was used to test the relationship between different variables. This test helps determine whether there is a statistically significant relationship between variables. Odds ratios (OR) and 95% confidence intervals (CI) were calculated to measure the strength of the relationship between variables and open defecation behavior. Odds ratios indicate the probability of open defecation based on the presence or absence of certain factors, whereas confidence intervals provide a range of values within which the true population odds ratio is most likely to be lowered.

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Table 1: Characteristics of respondents

Characteristics	N	(%)
Open Defecation (OD)		
Yes	129	32,5
No	268	67,5
Income		
Low	126	31.7
higt	271	68,3
Education		
Low	144	36,3
Tall	253	63,7
Water sources		
Non PDAM	133	33,5
PDAM	264	66,5
Availability of Clean Water		
No	93	23,4
Available	304	76,6
House Characteristics		
Stage	158	39,8
Not Stage	239	60,2
Defecation Facilities		
Not available	84	21,2
Available	313	76,6
Geographical location		
Near River/Water	89	22,4
Far From the River /Water	308	77,6
Knowledge		
Not enough	155	39,0
Good	242	61,0
Attitude		
Not good	152	38,3
Good	245	61,7

Based on Table 1, the research results found that the number of respondents who defecated was 32.5%. Respondents with low income < IDR 2,000,000 per month were 31.7%, respondents with low education who had not completed high school (36.3%). Research also shows that respondents who do not have clean water are (23.4%) and respondents whose water source does not come from PDAM are (33.5%). Furthermore, based on field observations, respondents who had the characteristics of stilt houses were (39.8%). Some respondents in their homes do not have defecation facilities (21.2%), respondents whose geographical location is close to a river or in a swamp are (22.4%), respondents who have poor knowledge about defecation are (29.1%) and respondents who had unfavorable attitudes towards defecation behavior were (38.3%).

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Table 2: Relationship of each independent variable with open defecation behavior

Variabel	*Open defecation*				A OR (Cl 95 %)	P *Value*
	ya		Tidak			
	N	%	N	%		
Income Low Tall	89 40	69,0 31,0	37 231	13,8 86,2	13,891 (8,345 – 23,123)	0,000
Education Low Tall	102 27	79,1 20,9	42 226	15,7 84,3	20,328 (11,881 – 34,780)	0,000
Water sources Not PDAM PDAM	102	79,1	31	11,6	28,882(16,403 – 50,854)	0,000
Water Availability No Available	60 69	46,5 53,5	33 235	12,3 87,7	6,192 (3,747 – 10,234)	0,000
House Characteristics Stage Not Stage	80 49	62,0 38,0	78 190	29,1 70,9	3,977(2,555 – 6,191)	0,000
Defecation facilities Not available Available	57 72	44,2 55,8	27 241	10,1 98,9	7,066(4,167 – 11,983)	0,000
Geographical location Near River/Water Far from rivers / water	70 59	54,3 45,7	19 249	7,1 92,9	478,995(173,112 – 1325,1399)	0,000
Knowledge Not enough Good	77 52	59,7 40,3	78 190	29,1 70,9	3,607(2,324 – 5,598)	0,000
Attitude Not good Good	74	57,4	78	29,1	3,277(2,116 – 5,075)	0,000

Table 2 shows a statistically significant relationship between factors indicating poverty and open defecation behavior in Sei Selincah and 16 Ulu sub-districts, Palembang City. Open defecation behavior is significantly related to income (p<0.000) with an AOR of 13.891 (Cl 8.345 – 23.123), meaning that respondents with low income have a tendency to defecate in the open 13.891 times compared to respondents with high income. Open defecation behavior is significantly related to education level (p<0.000) with an AOR of 20.328 (Cl 11.881 – 34.780), meaning that respondents with low education have a tendency to defecate in the open 20.328 times compared to respondents with high education. Open defecation behavior is significantly related to the availability of clean water (p<0.000) with an AOR of 6.192 (Cl 3.747 – 10.234), meaning that respondents who do not have clean water have a tendency to defecate in the open 6.192 times compared to respondents who have access to water. clean.

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Open defecation behavior is significantly related to the water source (p<0.000) with an AOR of 28.882 (16.403 - 50.854), meaning that respondents whose water source is not PDAM have a tendency to open defecate 28.882 times compared to respondents whose water source comes from PDAM (government). Open defecation behavior is significantly related to the characteristics of the house (p<0.000) with an AOR of 3.977 (2.555 – 6.191), meaning that respondents whose house characteristics are on stilts have a tendency to defecate in the open 3.977 times compared to respondents whose house characteristics are not on stilts.

Open defecation behavior is significantly related to the availability of defecation facilities or the availability of toilets at home (p<0.000) with an AOR of 7.066 (4.167 – 11.983), meaning respondents who do not have defecation facilities at home or in other words Not having a toilet has a tendency to defecate in the open 7.066 times compared to respondents who have defecation facilities at home or who have a toilet. Open defecation behavior is significantly related to the geographical location of the house towards the river or water (p<0.000) with an AOR of 478.995 (173.112 – 1325.1399), meaning that respondents whose geographical location is close to the river or which is in a swamp area have The tendency to defecate openly was 478,995 times compared to respondents whose geographical location was far from rivers or swamps. .

Open defecation behavior is significantly related to respondents' knowledge of open defecation behavior (p<0.000) with an AOR of 3.607 (2.324 - 5.598), meaning that respondents who do not have good knowledge of open defecation behavior have a tendency to defecate in the open 3.607 times. compared to respondents who have good knowledge of open defecation behavior. Open defecation behavior is significantly related to respondents' attitudes towards open defecation (p<0.000) with an AOR of 3.277 (2.116 - 5.075), meaning that respondents who do not have a good attitude towards open defecation behavior have a tendency to defecate in the open 3.a77. times compared to respondents who have a good attitude towards open defecation behavior,

Discussion

The influence of family income factors on open defecation behavior, the findings show that of the 397 respondents who had bad defecation behavior, there were 129 respondents (32.5%), who had low family income. Those who defecate openly were 89 respondents (69%). The findings show that respondents with low income were more likely to OD. This is because low-income respondents have limited ability to live a healthy life and are more likely to fulfill basic needs. There is a significant relationship between family income and open defecation behavior (p-value = 0.000) and (OR = 13.891 (8.345 – 23.123) , meaning that respondents with low incomes are 13,891 times more likely to defecate in the open. This research is in line with that conducted by Immurana et al (2022), which states that a higher level of financial inclusion is associated with a reduced likelihood of defecating in the open Income shows that economically capable individuals are more likely to purchase and build latrine facilities, thereby influencing latrine use and utilization.

Education influences defecation behavior, where of the 129 respondents who had OD, 102 (79.1%) had OD behavior (p<0.000) with an AOR of 20.328 (11.881 – 34.780), respondents with low education who did not graduate from high school had 20.328 times tendency to OD compared to respondents with higher education. This finding is in line with the results of research in a project in Ethiopia, women who have formal education have good behavior towards ODF (Aleumu et al., 2024).

Regarding the availability of clean water, the research results showed that of the 129 respondents with poor defecation behavior, there were 60 respondents (46.5%). This shows that the availability of clean water supports health sanitation. There is a significant relationship between the availability of clean water and open defecation behavior (p = 0.000) and (OR 6.192 (3.747 – 10.234)). Households with limited access to clean water are limited and there is a 6,192 tendency to dispose of clean water carelessly. The convenience of using a family toilet is greatly supported by the availability of water. This could be because households experiencing water shortages will have difficulty maintaining cleanliness and will not have enough water to use the toilet. This finding is supported by the results of research conducted in Ethiopia, which found a

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relationship between limited access to water and open defecation practices (Belay et al., 2022a). Comfort of using the family toilet (Sari et al., 2022).

Support for clean water from the government is very important, this research found that respondents who did not receive a water source from the government had a tendency to defecate in the open. Of the 196 respondents who defecated in the open, 102 respondents (71.9%) whose water source was not from the government (p = 0.000) and (28,882(16,403 – 50,854) respondents whose water source was not from the government had a tendency to defecate 28,882 times compared to those who the water source is from the government. This finding is in line with research conducted in West India's Bihar, the presence of water supply from the government encourages the use of household toilets. People are more susceptible to OD when their water supply is inadequate supply from the government (Mut Hukumaran et al., 2024).

House characteristics influence defecation behavior in Palembang City, respondents whose houses are on stilts, have a tendency to defecate Semarangan (p = 0.000) 3.977(2.555 – 6.191) This is the case. People whose houses are on stilts usually have their houses close to rivers or are in swamps. swamp so there is a close relationship between the characteristics of the house and the geographical location of the house to the water. People whose houses are close to water have a tendency to (p = 0.000) OD 478.995(173.112 – 1325.1399). The geographical location is a specific location of the City of Palembang which supports people to practice open defecation, whose houses are close to the OD River directly into the river, whose houses are above the OD swamp directly in the swamp without having a latrine. The results of this research are in line with the research of Oktarizal et al (2022), people in the Hitterland region of the Batam Islands have a tendency to Od. From these findings, people whose houses are close to rivers or above swamps have a 478.995 times tendency for OD, as well as people whose houses are on stilts have a tendency of 3.977 times for OD.Several activities that affect water quality in inland water, Househol waste induce eutropication (Aida *et al.*, 2024)

People who have low knowledge have a tendency to OD, from the results of research from 129 respondents with less knowledge, 77 respondents (59.7%), had a significant effect on behavior (p = 0.000) 3.607(2.324 – 5.598). Respondents who have less knowledge have a tendency to OD 3.607 times than those who have sufficient or high knowledge. Respondents' knowledge influences attitudes, where respondents who have less knowledge will have negative attitudes towards ODF and have a tendency to OD, where of the 197 respondents who are OD, 74 (57.4%) have unfavorable attitudes (p = 0.000) OR 3.277(2.116 – 5.075), where respondents who have unfavorable attitudes have a tendency of 3.277 times to OD. This finding is in line with research conducted in Serang City, Banten, where respondents who had negative attitudes had a tendency to OD (Kurniatillah et al., 2023). This research is also in line with research conducted by La Patilaiya and Ishak (2022) which shows that attitudes influence open defecation behavior (p<0.001). The findings of this study indicate that defecation behavior is influenced by attitude. Individuals who have a variety of knowledge and insight are more likely to show a positive attitude towards the practice of defecating in the family latrine.

Conclusion

The prevalence of open defecation practices in Palembang City is still relatively high even though on paper it is stated that the ODF target has been achieved. Many factors that influence the practice of open defecation have been identified, these factors are an indication of poverty and disadvantage, namely income, education, resources. and availability of clean water, availability of toilets at home, house characteristics which are influenced by geographical specifications, knowledge and attitudes. Overcoming this problem requires government intervention and support as well as policy changes between departments so that collaboration is targeted and focused on increasing access to safe sanitation facilities and encouraging behavior change communication (for example the use of mass media). This gives rise to complex problems that have a significant impact on public health and society. Additionally, careful consideration of geographic and socio-demographic factors is essential when designing and implementing programs aimed at accelerating ODF. Furthermore, the results of this research will support Palembang's achievement as a healthy city and Indonesia's ODF target in 2024 and be aligned with Sustainable Development (SDG)

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Targets 3.3 and 6.2, which address infectious diseases, as well as access to adequate and fair sanitation and hygiene for all people, and end open defecation. Because this creates complex problems that have a significant impact on public health and society.

Conflict of Interest Declaration

The authors declare no conflict of interest**.**

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Author Contributions

All authors were involved from the beginning of research activities to the publication process. All authors read and approved the final manuscript for publication.

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