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ORIGINAL ARTICLE

Demographic factors and open defecation practices: A cross-sectional study in Gunungtua Jae Village, Padang Lawas Utara

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Abstract

Open defecation (OD) remains a significant public health concern, particularly in rural areas of developing countries. This study aimed to investigate the association between demographic factors and OD practices in Gunungtua Jae Village, Padang Lawas Utara, Indonesia. A cross-sectional study was conducted involving 82 households. Data were collected using structured questionnaires and analyzed using Chi-square test and logistic regression. The findings revealed a significant association between several demographic factors and OD practices. These factors included household head knowledge (p = 0.000), occupation (p = 0.002), attitude (p = 0.000), education level (p = 0.000), and income level (p = 0.000). The study highlights the importance of considering demographic factors when addressing OD practices in public health interventions. Comprehensive efforts are needed to enhance community knowledge, particularly among household heads, regarding the significance of adequate sanitation and the detrimental impacts of OD practices. Collaboration between community health centers (puskesmas) and various stakeholders is essential for the sustainable implementation of the Total Sanitation Based on Community Approach (STBM) program. This program can effectively raise awareness and promote positive behavioral changes towards environmental hygiene and personal health, with a primary focus on encouraging proper sanitation practices and preventing environmental pollution.

Keywords: open defecation, demographic factors, practice

Introduction

Developing countries, including Indonesia, face serious problems in sanitation and hygiene. One example is the habit of open defecation, which is deeply rooted in the culture of the community. This poses many challenges, especially those related to access or availability of adequate latrines.[1] Open defecation is an unhealthy lifestyle in which people defecate in random places such as fields, bushes, or rivers. This practice pollutes the environment and can trigger various diseases.[2] Data from the World Health Organization (WHO) in 2020 show that there are still 494 million people worldwide who practice open defecation. The reasons behind this habit vary, ranging from a lack of toilet facilities, unsafe or inconvenient places, knowledge, and other factors.[3] Open defecation practice is a matter of concern in Indonesia. Data shows that Indonesia has the second highest prevalence of open defecation in the world, with 58 million people practicing open defecation.[4] In Sumatera Utara, based on data from the Sumatera Utara Provincial Office, which covers 33 cities/districts, 6.113 villages/sub-districts, and 3.365.596 households, in 2021 there were 540.144 households still practice open defecation.[5]

Health behavior is a person's response to health problems, the use of health services, lifestyle, and the environment that affects health behavior. Demographic factors are factors contained in the population structure and its development, such as gender, age group, education, occupation, and marital status.[6] The results of previous studies state several factors that cause open defecation practice, namely, the knowledge

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of the head of the family, occupation, attitude, education, and income, and the results of previous studies also mention that the lack of knowledge and information from people with low education in planning program activities is limited. In highly educated communities who already have family latrines and have open defecation practice in latrines, the poorest and poorest households have a higher risk of open defecation compared to middle-class households. This is because the poorest households do not have a budget to build proper sanitation, latrines, or clean water.[7] In addition, in the education factor, the percentage of open defecation practice among those who have jobs in the formal sector is less than the percentage of jobs in the non-formal sector; thus, there is a statistically significant relationship between work and open defecation practice. Respondents with non-formal jobs have a behavioral risk 3.535 times greater for open defecation practice than those with formal jobs.[8] The results of previous studies also revealed that there was a relationship between education, knowledge, attitudes, and habits and open defecation practice, but there was no relationship between age and open defecation behavior in Silo Lama Village, Silau Laut District.[9]

Padang Lawas Utara Regency consists of 9 sub-districts and obtained data on households that have permanent healthy latrines of 4.139 households (5.5%), households that have semi-permanent healthy latrines of 11.541 households (20.2%), households that do not have latrines or are still sharing in the use of latrines of 4.728 (9.5%). However, 28.404 households (65.19 %) still defecated in the open.[10] An initial survey of 458 households in Gunungtua Jae Village, Padang Bolak Subdistrict, revealed a persistent prevalence of open defecation within the community despite ongoing efforts to eliminate the practice. There were 19 households with semi-permanent healthy latrines, 304 households with permanent healthy latrines, 90 households with sharing latrines, and 45 households with OD latrines (people who do not have latrines). Gunungtua Jae Village has been a recipient of the Stop Open Defecation Program, a foundational component of the Community-Based Total Sanitation initiative. Despite this intervention, a significant portion of the village populace exhibits a deficiency in environmental health consciousness. This assertion is corroborated by the disparity between the stipulated minimum standard of 80% for family latrine access and the actual coverage within the village, which stands at a mere 62.31%. The persistence of open defecation practices, occurring in locations such as rivers, gardens, and residential backyards, underscores this issue.[11] The purpose of this study was to analyze the influence of demographic factors on open defecation behavior in Gunungtua Jae Village.

Method

This research employed an analytical cross-sectional design, where all variables of interest were simultaneously examined and collected. The study was conducted in Gunungtua Jae Village, Padang Bolak District, Padang Lawas Utara Regency, from July 2023 to March 2024. The population encompassed all 82 household heads residing in the village. Total sampling was utilized to select the study participants.

A structured questionnaire served as the primary data collection instrument. The questionnaire comprised sections on respondent demographics (name, gender, occupation, age), education, occupation, income, knowledge (10 questions), attitude (10 questions), and sanitation practices (3 questions). Knowledge questions assessed the respondents' understanding of sanitation practices and their associated health implications. Examples include: “Using a hygienic latrine is a healthy behavior”, “Open defecation can lead to diseases like typhoid, dysentery, and diarrhea”, “Open defecation pollutes the environment and water sources”, “Every household should have a latrine”, and “A septic tank is an effective means of wastewater treatment”.

Attitude questions gauged the respondents' perceptions and beliefs regarding sanitation practices. Examples include: ”Latrines should be flushed and cleaned after use”, “Do you agree that open defecation is acceptable while working in fields or gardens?”, “Open defecation has become a tradition in your community”, “There should be village regulations prohibiting open defecation”, “You feel embarrassed when practicing open defecation”, “Everyone should use a latrine for defecation”, “If family members defecate in open spaces, it harms their health”, “It is advisable to have a septic tank for wastewater disposal”, and “All family members should consistently use the latrine for defecation”. Sanitation practices questions assessed the respondents' actual behaviors related to latrine usage and open defecation.

Examples include: “Do you have a latrine?”, “Do you use a hygienic latrine?”, and “Do you ever practice open defecation?”.

Data analysis employed both bivariate and multivariate techniques. Bivariate analysis utilized the Chi-square (X2) test to examine associations between two variables at a 95% confidence level (α=0.05). A p-value of less than 0.05 indicated a statistically significant relationship. Multivariate analysis employed multiple logistic regression to evaluate the influence of multiple independent variables, accounting for potential correlations among them.

Results

Table 1 shows the association between several risk factors and open defecation practice. People with lower education levels were more likely to practice open defecation (20.1%) compared to those with higher education (29.9%). This suggests a correlation between education and hygiene practices. Similar to education, those with poor knowledge about hygiene were more likely to practice open defecation (22.6%) compared to those with good knowledge (27.4%). There seems to be a positive association between attitude and open defecation practice. People with negative attitudes towards sanitation were more likely to defecate in the open (26.8%) compared to those with positive attitudes (23.2%).

Table 1. Association between education, knowledge, attitude, occupation, income with open defecation practice (n=82)

Risk factor	Open defecation practice				p
	At risk		Not at risk		
	n	%	n	%	
Education					
Low	8	20,1	25	12,9	0.000
High	42	29,9	7	19,1	
Knowledge					
Poor	11	22.6	26	14.4	0.000
Good	39	27.4	6	17.6	
Attitude					
Negative	38	26,8	6	17.2	0.000
Positive	12	23.2	26	14.8	
Occupation					
Not employed	38	42,7	32	27.3	0.002
Employed	12	7,3	0	4,7	
Income (in Rupiah)					
<1.000.000	1	6.1	9	3.9	0.000
1.000.000 - 2.000.000	18	22.6	19	14.4	
>2.000.000	31	21.3	4	13.7	

Unemployment has a strong association with open defecation practice. A significantly higher proportion of unemployed people (42.7%) defecated in the open compared to employed people (7.3%). This suggests that employment might be a factor influencing access to sanitation facilities. The income data shows a similar trend to education and knowledge. People with lower income (less than 1 million Rupiah) were more likely to practice open defecation (6.1%) compared to those with higher income brackets. Overall, the table suggests that several factors, including education, knowledge, attitude, occupation, and income, are associated with open defecation practice. Addressing these factors could be crucial in promoting better hygiene practices and sanitation.

Table 2 shows the results of a multivariate analysis examining factors associated with open defecation practice. Attitude and knowledge have coefficients with positive signs and insignificant p-values, indicating no statistically significant association with open defecation practice at the 5% significance level. However, the exponentiated coefficients (Exp(B)) suggest that a one-unit increase in attitude and knowledge scores might be associated with a slight increase in the odds of open defecation practice, although the effect is likely very weak due to the very large standard errors.

Education has a negative coefficient with a significant p-value, suggesting that higher levels of education are associated with a lower likelihood of open defecation practice. The exponentiated coefficient (Exp(B)) closer to 0 indicates a stronger negative association. Occupation and Income also have negative coefficients, but their p-values are very high, indicating no statistically significant association with open defecation practice. It's important to note the extremely large standard error for occupation, making the interpretation of its coefficient unreliable.

Table 2. Results of multivariate analysis

Variable	B	S.E.	Sig.	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
Attitude	.886	41.016	1.000	2.425	.000	.
Knowledge	1.494	41.016	1.000	4.456	.000	.
Education	-1.516	.730	.038	.220	.052	.920
Occupation	-18.823	11.209	.999	.000	.000	.
Income	-1.361	.623	.029	.256	.076	.870

In summary, while attitude and knowledge show no statistically significant association, education is the only factor with a significant negative association with open defecation practice in this analysis. This suggests that people with higher levels of education are less likely to practice open defecation.

Discussion

This study found an influence of family head knowledge on open defecation practice. This finding is in line with a previous study that showed a significant relationship between knowledge and open defecation practice.[12] However, this finding is different from those of other studies, which showed no significant relationship between knowledge and open defecation behavior. This may be due to the almost equal proportion of respondents with poor and good knowledge of open defecation. However, most respondents with good knowledge tend not to practice open defecation.[13] Other studies have shown that the level of community knowledge about environmental health is very important, as it influences their behavior in terms of procuring family latrines, sanitation facilities, and their utilization and maintenance.[14]

There was a significant relationship between the education level of the family head and open defecation practice. The results of this study are in line with previous research[9], which showed a significant relationship between educational level and open defecation practice. Respondents with low or basic education had a four times higher risk of practicing open defecation than highly educated respondents. This is in accordance with Green's theory[15], which states that education is a factor that influences the formation of a person's knowledge, attitudes, perceptions, beliefs, and judgment of health. Therefore, it can be concluded that the higher a person's level of education, the higher their awareness of and concern for personal and environmental hygiene.[9] This finding was reinforced by another study, which showed that respondents with low education had a 4.230 times higher risk of open defecation practice than respondents with high education.[8]

Statistical analysis showed a significant relationship between the attitudes and open defecation practice. Of the 44 household heads with open defecation habits, 26.8% had a negative attitude towards open defecation, while 23.2% had a positive attitude. Another study supported these findings, showing a significant relationship between attitude and open defecation behavior.[9] Attitudes are a fundamental component of human behavior, influencing the way individuals perceive and respond to different situations. In the context of open defecation, attitudes shape the willingness to adopt hygienic practices and use proper sanitation facilities. Studies have demonstrated that individuals with positive attitudes towards sanitation are more likely to engage in hygienic behaviors, such as using toilets, while those with negative attitudes tend to engage in open defecation practices.[16,17] Cultural and social factors also play a significant role in shaping attitudes towards open defecation. For instance, in some communities, open defecation may be a traditional practice, and individuals may not see it as a problem. However, when these communities are educated about the health risks and social benefits of using toilets, their attitudes towards open defecation can change, leading to a reduction in open defecation practices.[18]

Data analysis also showed a significant association between occupation and family income with open defecation practice. Previous research indicates a significant association between occupation, family income, and open defecation practices. Studies in rural India and Indonesia found that lower socioeconomic status, including low family income and labor occupations, was strongly linked to higher rates of open defecation.[19–22] In rural Bhopal, occupation and socioeconomic status were significant predictors of open defecation.[19]. Similarly, in Haryana, open defecation was more prevalent among laborers and those with low family income.[20] In Indonesia, family income was a key factor influencing open defecation behavior.[21] A study in rural Nandivargam village found a significant association between lower socioeconomic status and open air defecation.[22] These findings suggest that economic factors play a crucial role in sanitation practices, highlighting the need for targeted interventions to address open defecation in low-income communities.

Conclusion

The study highlights the importance of considering demographic factors when addressing OD practices in public health interventions. Comprehensive efforts are needed to enhance community knowledge, particularly among household heads, regarding the significance of adequate sanitation and the

detrimental impacts of OD practices. Collaboration between community health centers (puskesmas) and various stakeholders is essential for the sustainable implementation of the Total Sanitation Based on Community Approach (STBM) program. This program can effectively raise awareness and promote positive behavioral changes towards environmental hygiene and personal health, with a primary focus on encouraging proper sanitation practices and preventing environmental pollution.

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