Public Health of Indonesia
E-ISSN: 2477-1570 | P-ISSN: 2528-1542

Original Research

Factors related to open defecation behavior: A cross-sectional study in Serang City, Banten, Indonesia

Nia Kurniatillah[1*], Fauzul Hayat[2], and Anis Masyruroh[3]

[1] Health Administration Studies Program, University of UNBAJA, Serang, Indonesia
[2] Public Health Studies Program, University of Faletehan, Serang, Indonesia
[3] Environmental Engineering Studies Program, University of UNBAJA, Serang, Indonesia

DOI: https://doi.org/10.36685/phi.v9i2.682
Received: 6 May 2023 | Revised: 19 May 2023 | Accepted: 15 June 2023

Corresponding author:
Nia Kurniatillah, SKM., M.KM.
Health Administration Studies Program, University of UNBAJA, Serang, Indonesia
Email: niakurniatillah@unbaja.ac.id
Phone: +6281383754900

Abstract

Background: Open defecation remains a public health problem in Indonesia, contributing to various diseases such as diarrheal diseases within communities. Open defecation can be influenced by several factors, including socio-demographic, cultural, financial, and poor sanitation factors. However, these factors remain poorly investigated.

Objective: This study aimed to determine the association between age, gender, level of education, knowledge, attitude, family income, local government support, availability of clean water, and family latrines with open defecation behavior in Serang City, Banten Province, Indonesia.

Methods: A cross-sectional study design was selected, using purposive sampling in the study area. Data were collected from 220 respondents using a structured questionnaire from June to October 2022. Chi-square test was used to analyze the data.

Results: The majority of the respondents were females (52.7%), and the dominant age group was >30 years old (50.9%). Bivariate analysis showed a significant relationship between gender (OR = 8.190, 95% CI =4 .460-15.038), attitude level (OR = 2.391, 95% CI = 1.271-4.500), family income (OR = 35.964, 95% CI = 8.477-152.582), local government support (OR = 4.540, 95% CI = 2.073-9.943), availability of clean water (OR = 2.834, 95% CI =1.632-4.922), and family latrines (OR = 19.260, 95% CI = 9.612-38.591) with open defecation behavior ($p < 0.05$). There was no significant relationship between age, level of education, and knowledge with open defecation behavior ($p > 0.05$).

Conclusion: The main variables that significantly influenced open defecation behavior were female gender, family income, local government support, and family latrines. Therefore, there is a need for a policy shift to involve female empowerment and local government support to construct affordable and effective latrines, aiming to improve the current practice and eliminate open defecation.

Keywords: sanitation; diarrhea; water; demography; open defecation; Indonesia

Background

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). This practice is predominantly observed

among the poor population living in rural areas. In Indonesia, the Health Research conducted in 2018 (RISKESDAS) revealed that the proportion of individuals practicing open defecation was 88.2% (94.2% in urban areas and 80.9% in rural areas) (Kementerian Kesehatan Republik Indonesia, 2022). The target for achieving Open Defecation Free (ODF) status in Indonesia is set at 100% (Kementerian Kesehatan Republik Indonesia, 2022).

In Banten Province, based on the health profile data from 2021, the proportion of villages that have successfully eliminated open defecation is 16.3% out of 253 villages. Specifically, in Serang city, this proportion is even lower, standing at 10.6%, which is the lowest among other areas in Banten Province.

Open defecation is associated with an increased risk of various diseases, particularly diarrheal diseases in children. Diarrheal disease ranks as the second leading cause of death among children under the age of five globally, resulting in 1.7 million illnesses and 760,000 deaths annually (Gebru et al., 2014). Similarly, in Indonesia, diarrheal disease is a major cause of death in children under the age of five. According to the Health Research conducted in 2018 (RISKESDAS), there are approximately 1,017,290 cases of diarrheal diseases reported each year in Indonesia, with a prevalence rate of 11% among children (Kementerian Kesehatan Republik Indonesia, 2022).

Open defecation practices facilitate the transmission of microorganisms that cause diarrheal diseases (Belay et al., 2022b), with children being particularly vulnerable (Paul et al., 2022). A study has shown that the prevalence of diarrhea is four times higher in communities practicing open defecation compared to areas with proper sanitation facilities (Ayalew et al., 2018). The Ministry of Health of the Republic of Indonesia has implemented the Community Based Total Sanitation (CBTS) approach since 2008, aiming to promote hygienic and sanitary behavior change through community empowerment, specifically through the use of triggering techniques (Fasya et al., 2022). Despite these efforts, many regions in Banten Province, including Serang City, have not yet been declared Open Defecation Free (ODF). The persistence of open defecation issues in Serang City indicates the complex nature of the problem, requiring further attention and interventions.

Open defecation is influenced by various factors, as evidenced by studies. Research has shown that a significant proportion of open defecation practices occur in rural areas among low-income families (Delaire et al., 2022), indicating the association between poverty and open defecation. Additionally, the ownership and availability of latrines have been identified as crucial factors in open defecation behavior (Yulyani et al., 2021). Furthermore, socio-demographic factors, such as household financial status, and poor sanitation conditions have been found to be associated with open defecation (Sari et al., 2022). The support provided by local governments, cultural practices, and regional variations have also been identified as influential factors in open defecation behavior (Ntaro et al., 2022).

These studies highlight the multidimensional nature of open defecation, with socio-economic, cultural, and environmental factors playing significant roles in its prevalence and persistence. Understanding and addressing these factors are crucial for implementing effective interventions and achieving Open Defecation Free (ODF) status. Interventions targeting the improvement of human excreta disposal facilities have been shown to be effective in preventing fecal-borne diseases (Bauza et al., 2020). Therefore, the objective of this study was to examine the relationship between various factors, including age, gender, level of education, knowledge, attitude, family income, local government support, availability of clean water, and family latrines, with open defecation behavior in Serang City, Banten Province, Indonesia.

Methods

Study Design

This study utilized a quantitative descriptive statistical method with a cross-sectional study design.

Setting

The research was conducted in Kilasah Village, located in Serang City, Banten Province, Indonesia. Kilasah Village is predominantly a plain area, with an average elevation of 500-700 meters above sea level and an average annual rainfall of

approximately 7.52 mm (Badan Pusat Statistik Serang, 2021). The residents of Kilasah Village primarily engage in farming as their livelihood.

Samples/Participants

The study population consisted of all families residing in Kilasah Village, Serang City, Banten, totaling 1,703 families. The samples were selected using purposive sampling technique, resulting in a sample size of 220 families. The sample size calculation was performed using the Lemeshow formula (Levy & Lemeshow, 2013). The inclusion criteria for the participants were individuals living in the study area, willing to participate, able to provide the necessary data, and capable of effective communication.

Instruments

The research questionnaire was developed based on the Precede Lawrence Green Model and previous studies (Terry, 2021; Yulyani et al., 2021). The questionnaire underwent validity and reliability tests on a sample of 30 households in Kilasah Village, Serang City, Banten, to ensure its accuracy and consistency. The validity and reliability tests specifically focused on the attitude questions. The results of these tests confirmed that the questionnaire was valid and reliable for use in the study (with a correlation coefficient value (r) of 0.88 >0.70 and a Cronbach's alpha value of 0.88).

The questionnaire included questions regarding gender, with response options of male or female. The level of education was divided into two categories: Low (Junior High School or below) and High (Senior High School & University). Family income was categorized as either Low (≤ Regional Minimum Wage, IDR 3,827,000) or High (> Regional Minimum Wage, IDR 3,827,000).

The knowledge questionnaire consisted of 15 questions, with a scoring system where a correct answer received a score of 1 and an incorrect answer received a score of 0. The attitude questionnaire included 10 questions, utilizing a Likert scale. For positive statements, respondents could choose from strongly agree, agree, disagree, and strongly disagree, with scores of 4, 3, 2, and 1, respectively. Negative statements were scored in the reverse order (Jebb et al., 2021).

The questionnaire also included sections on local government support, availability of clean water, and family latrines, categorized as "No" or "Yes," with a correct answer receiving a score of 1 and an incorrect answer receiving a score of 0. Open defecation behavior was categorized as either "Bad" or "Good."

Data Collection

Data collection for this study took place from June to October 2022. The researchers distributed the questionnaires to residents who met the sample criteria of 220 families in Kilasah Village, Serang City, Banten. Two trained enumerators were responsible for conducting the study in each subdistrict. The data was collected using a structured questionnaire. The main interview included questions pertaining to various sociodemographic characteristics, such as age, gender, level of education, and family income. Additionally, the questionnaire covered topics related to the level of knowledge, level of attitude, local government support, availability of clean water, family latrines, and open defecation behavior.

Data Analysis

The collected data was analyzed using IBM SPSS Statistics 20 software, with a significance level set at 0.05. The demographic data were analyzed using frequency and percentage distribution tables, providing an overview of the characteristics of the study participants. For the bivariate analysis, the Chi-square test was employed to examine the associations 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 quantify the strength of the associations between variables and open defecation behavior. The odds ratio indicates the likelihood of open defecation based on the presence or absence of certain factors, while the confidence interval provides a range of values within which the true population odds ratio is likely to fall.

Ethical Considerations

This research study adhered to ethical guidelines and underwent an ethical review by the Research Ethics Committee of the Health Faculty of Faletehan University, Indonesia. The study received ethical approval with the reference number No. 198/KEPK.UF/VII/2022.

Results

Based on **Table 1**, the results of the study found that the number of respondents who were over 30 years old was 50.9%. In terms of gender, 52.7% of the respondents identified as female. In regard to education, the majority of respondents had a lower school education level (82.3%). The study also indicated that respondents exhibited a good level of knowledge (81.1%) and a positive level of attitude (75.9%). Furthermore, respondents reported that their family income was below the regional minimum wage of Serang City (75%). A significant proportion of respondents did not receive local government support (78.2%) and had limited access to clean water (56.4%) and family latrines (60%). Overall, respondents displayed favorable defecation behavior (55.9%).

Table 1 Characteristics of respondents

Characteristics	n	(%)
Age (year)		
≤30	108	49.1
>30	112	50.9
Gender		
Male	104	47.3
Female	116	52.7
Level of education		
Low (Junior High School & below)	181	82.3
High (Senior High School & University)	39	17.7
Level of knowledge		
Bad	40	18.2
Good	180	81.8
Level of attitude		
Negative	53	24.1
Positive	167	75.9
Family Income		
Low ≤ Regional Minimum Wage (IDR. 3.827.000)	165	75.0
High **>** Regional Minimum Wage (IDR. 3.827.000)	55	25.0
Local Government support		
No	172	78.2
Yes	48	21.8
Availability of clean water		
No	96	43.6
Yes	124	56.4
Availability of family latrines		
No	88	40.0
Yes	132	60.0
Open defecation behavior		
Bad	97	44.1
Good	123	55.9

Table 2 reveals a statistically significant relationship between several factors and open defecation behavior. Specifically, gender (p <0.001), level of attitude (p = 0.007), family income (p <0.001), local government support (p <0.001), availability of clean water (p value = 0.001), and availability of family latrines (p <0.001) all demonstrate a significant association with open defecation behavior. The odds ratio (OR) and corresponding 95% confidence intervals (CI) for these factors are as follows: gender (OR = 8.190, 95% CI = 4.460-15.038), level of attitude (OR = 2.391, 95% CI = 1.271-4.500), family income (OR = 35.964, 95% CI = 8.477-152.582), local government support (OR = 4.540, 95% CI = 2.073-9.943), availability of clean water (OR = 2.834, 95% CI = 1.632-4.922), and family latrines (OR = 19.260, 95% CI = 9.612-38.591). On the other hand, there is no significant relationship between age (p = 0.786), level of education (p v = 0.157), and knowledge (p = 0.078) with open defecation behavior.

Table 2 Association between each independent variable and open defecation behavior

Variable	Open defecation behavior				OR (CI 95%)	p-value
	Bad		Good			
	n	%	n	%		
Age (year)						
≤30	49	45.4	59	54.6	1.107 (0.650-1.886)	0.786
>30	48	42.9	64	57.1		
Gender						
Male	72	69.2	32	30.8	8.190 (4.460-15.038)	<0.001
Female	25	21.6	91	78.4		
Level of education						
Low	84	46.4	97	53.6	1.732 (0.837-3.583)	0.157
High	13	33.3	26	66.7		
Level of knowledge						
Bad	23	57.5	17	42.5	1.938 (0.969-3.878)	0.078
Good	74	41.1	106	58.9		
Level of attitude						
Negative	32	60.4	21	39.6	2.391 (1.271-4.500)	0.007
Positive	65	38.9	102	61.1		
Family Income						
Low ≤ Regional Minimum Wage (IDR. 3.827.000)	95	57.6	70	42.4	35.964 (8.477-152.582)	<0.001
High **>** Regional Minimum Wage (IDR. 3.827.000)	2	3.6	53	96.4		
Local Government support						
No	88	51.2	84	48.8	4.540 (2.073-9.943)	<0.001
Yes	9	18.8	39	81.3		
Availability of clean water						
No	56	58.3	40	41.7	2.834 (1.632-4.922)	<0.001
Yes	41	43,9	83	66.9		
Availability of family latrines						
No	72	81.8	16	18.2	19.260 (9.612-38.591)	<0.001
Yes	25	18.9	107	81.1		

Discussion

This study aimed to determine the association between age, gender, level of education, knowledge, attitude, family income, local government support, availability of clean water, and family latrines with open defecation behavior.

Regarding gender, the results of this study revealed a significant relationship between gender and open defecation (OD) behavior (p <0.001) and (OR = 8.190, 95% CI = 4.460-15.038). Males exhibited a worse defecation behavior (69.2%) compared to females (21.6%). According to Kuang et al. (2020), this relationship is likely to be stronger for women than for men. Gender differences have been observed in both the perceived risk of sanctions and conformity. The deterrence effect suggests that women tend to perceive a higher risk of sanctions, including shame and embarrassment, than men. Women are also more sensitive to social influence, including the peer pressures associated with deviating from common behaviors within their social groups. Women were more likely to expect social sanctions for OD when they perceived more community members using family latrines. One perspective that offers an explanation is that women tend to be more relationship-oriented than men (Johnson, 2021).

In terms of attitude, the results showed that out of 53 people with bad defecation behavior, 32 respondents (60.4%) had negative attitudes. On the other hand, among 167 people with good defecation behavior, 102 respondents (60.9%) had positive attitudes. Based on the researcher's assumptions and the study results, it can be observed that the majority of the participants had good attitudes, while only a small portion of the community had a negative attitude towards open defecation behavior. This positive attitude within the community may be due to

the respondents' perception that open defecation is a harmful behavior that can lead to diseases. There was a significant relationship between the level of attitude and open defecation behavior (p = 0.007) and (OR = 2.391, 95% CI = 1.271-4.500). This study aligns with the research conducted by La Patilaiya and Ishak (2022), which indicates that attitude influences open defecation behavior (p <0.001). The findings of this study demonstrate that defecation behavior is influenced by attitude. Individuals who possess a diverse range of knowledge and insights are more likely to exhibit positive attitudes towards practicing defecation in family latrines.

Regarding family incomes, the findings showed that out of 165 people with bad defecation behavior, 95 respondents (57.6%) had low family incomes. On the other hand, among 55 people with good defecation behavior, 53 respondents (96.4%) had high family incomes. The findings indicate that the majority of the participants in the study have low family incomes, which contributes to their open defecation behavior. Individuals with limited financial resources face challenges in constructing family latrines, despite having knowledge about the benefits and importance of latrines for family and health. There was a significant relationship between family income and open defecation behavior (p-value = 0.000) and (OR = 35.964, 95% CI = 8.477-152.582). This study is consistent with the research conducted by Immurana et al. (2022), which suggests that higher levels of financial inclusion are associated with a reduced likelihood of open defecation and sharing of toilet facilities among households in Ghana. The income variable indicates that individuals who are economically well-off are more likely to afford and construct latrine facilities, thereby influencing the usage and utilization of latrines.

In terms of local government support variable, the results showed that out of 172 people with bad defecation behavior, 88 respondents (51.2%) did not receive local government support. On the other hand, among 48 people with good defecation behavior, 39 respondents (81.3%) had local government support. The findings indicate that the majority of the participants in the study lacked local government support regarding open defecation behavior. It is widely acknowledged that local governments in Indonesia bear the primary responsibility for providing sanitation services, including family latrines. However, due to governance factors, local governments often invest insufficiently in sanitation services, leading to weak service delivery (Chong et al., 2016). There was a significant relationship between local government support and open defecation behavior (p-value = 0.000) and (OR = 4.540, 95% CI = 2.073-9.943). Common challenges identified included limited access to improved sanitation facilities and inadequate water supply. However, some villages reported overcoming these perceived constraints through community support mechanisms and receiving funding support from the village government. These findings will guide local government approaches, strategies, and priorities in accelerating the elimination of open defecation (Odagiri et al., 2020)

In terms of availability of clean water, the results showed that out of 96 people with bad defecation behavior, 56 respondents (58.4%) did not have access to clean water. On the other hand, among 124 people with good defecation behavior, 83 respondents (66.9%) had access to clean water. This indicates that the availability of clean water supports the convenience of using family latrines (Sari et al., 2022). There is a significant relationship between the availability of clean water and open defecation behavior (p = 0.001) and (OR = 2.834, 95% CI = 1.632-4.922). Households with limited access to drinking water were more likely to practice open defecation. This finding is supported by a study conducted in Dangilla, Ethiopia, which found an association between limited water access and open defecation practices (Belay et al., 2022a). This can be attributed to the fact that households experiencing water shortages may struggle to maintain proper hygiene and may not have sufficient water for toilet usage.

In regards to family latrines, the results showed that out of 88 people with bad defecation behavior, 72 respondents (81.8%) did not have access to family latrines. On the other hand, among 132 people with good defecation behavior, 107 respondents (81.1%) had access to family latrines. The presence of family latrines significantly reduces the likelihood of open defecation compared to when family latrines are not available. Owning a latrine has a significant impact on its utilization by the family (La Patilaiya & Ishak, 2022). There is a significant relationship between the availability of family latrines and open defecation

behavior (p <0.001) and (OR = 19.260, 95% CI = 9.612-38.591). This finding is supported by a study conducted in Dangilla, Ethiopia, which revealed an association between limited access to family latrines and open defecation practices (Belay et al., 2022a). It has been observed that families without access to family latrines resort to using rivers, fields, gardens, backyards, and artificial ponds as places for feces disposal due to their inability to purchase materials for latrine construction (Januariana, 2022).

In this study, there is no significant relationship between age and open defecation behavior (p = 0.786, >0.05). According to the Health Research conducted in 2018 (RISKESDAS), the proportion of households practicing open defecation in Indonesia is evident. However, studies indicate that as the age of the household head increases, the likelihood of open defecation practices decreases. This may be attributed to the fact that as people age, they tend to have more limited mobility outside their homes (Maliti, 2021).

Additionally, there is no significant relationship between level of education and open defecation behavior (p = 0.157, >0.05). Based on the data, it is evident that the majority of respondents had a junior high school education level, indicating lower educational attainment. Researchers state that the level of education does not always directly influence a person's behavior. This is exemplified by the community in Kilasah village, where despite lower education levels, they already have an understanding of good defecation behavior. The local public health center (Puskesmas) conducts regular outreach activities and monitors the use of family latrines. This finding is supported by a study in sub-Saharan Africa, which demonstrates that educated household heads have a better understanding of the importance of sanitation facilities and the consequences of open defecation practices.

Also, higher education levels can increase households' income-earning capacity, which is a significant constraint in constructing toilet facilities (Belay et al., 2022b). There is no significant relationship between the level of knowledge and open defecation behavior (p = 0.078, >0.05). This finding aligns with the research conducted by Yustina and Lubis (2020), which also found no association between knowledge level and open defecation behavior in Bener Meriah Regency. Our study reveals that individuals with high knowledge about the negative consequences of open defecation may still choose to engage in this behavior if they perceive no immediate problems or discomfort. It is challenging to change long-standing habits, even with adequate knowledge and awareness.

Conclusion

The main factors associated with open defecation behavior in Serang City are the female gender, family income, local government support, and the availability of family latrines. Consequently, there is a need for a policy shift that focuses on female empowerment and increased support from local governments to construct high-quality latrines at a lower cost. These measures are crucial in order to improve the current practices and ultimately eliminate open defecation.

Declaration Conflicting Interest
The authors declared no conflicting interest.

Funding
None.

Acknowledgment
The authors sent the deepest gratitude to all respondents and parties involved in this research.

Author Contribution
All authors were involved from the beginning of the research activity to the publication process. All authors read and approved the final manuscript to be published.

Author Biography

Nia Kurniatillah is a Lecturer in the Health Administration Studies Program at the University of UNBAJA in Serang, Indonesia.

Fauzul Hayat is a Lecturer in the Public Health Studies Program at Faletehan University in Serang, Banten, Indonesia.

Anis Masyruroh is a Lecturer in the Environmental Engineering Studies Program at the University of UNBAJA in Serang, Indonesia.

References

Ayalew, A. M., Mekonnen, W. T., Abaya, S. W., & Mekonnen, Z. A. (2018). Assessment of diarrhea and its associated factors in under-five children among open defecation and open defecation-free rural settings of Dangla District, Northwest Ethiopia. *Journal of Environmental and Public Health*, *2018*.

Badan Pusat Statistik Serang. (2021). *Kota Serang Dalam Angka 2021*. Badan Pusat Statistik Serang

Bauza, V., Majorin, F., Routray, P., Sclar, G. D., Caruso, B. A., & Clasen, T. (2020). Child feces management practices and fecal contamination: A cross-sectional study in rural Odisha, India. *Science of The Total Environment*, *709*, 136169. https://doi.org/10.1016/j.scitotenv.2019.136169

Belay, D. G., Asratie, M. H., Aragaw, F. M., Tsega, N. T., Endalew, M., & Gashaw, M. (2022a). Open defecation practice and its determinants among households in sub-Saharan Africa: Pooled prevalence and multilevel analysis of 33 sub-Saharan Africa countries demographic and health survey. *Tropical Medicine and Health*, *50*(1), 28. https://doi.org/10.1186/s41182-022-00416-5

Belay, D. G., Chilot, D., & Asratie, M. H. (2022b). Spatiotemporal distribution and determinants of open defecation among households in Ethiopia: A mixed effect and spatial analysis. *Plos one*, *17*(5), e0268342. https://doi.org/10.1371/journal.pone.0268342

Chong, J., Abeysuriya, K., Hidayat, L., Sulistio, H., & Willetts, J. (2016). Strengthening local governance arrangements for sanitation: Case studies of small cities in Indonesia. *Aquatic Procedia*, *6*, 64-73. http://doi.org/10.1016/j.aqpro.2016.06.008

Delaire, C., Kisiangani, J., Stuart, K., Antwi-Agyei, P., Khush, R., & Peletz, R. (2022). Can open-defecation free (ODF) communities be sustained? A cross-sectional study in rural Ghana. *Plos One*, *17*(1), e0261674. https://doi.org/10.1371/journal.pone.0261674

Fasya, A. H. Z., Ibad, M., & Handayani, D. (2022). Comprehensive sanitation situation analysis based on complete components in community-based total sanitation. *Bali Medical Journal*, *11*(3), 1176-1179. http://doi.org/10.15562/bmj.v11i3.3536

Gebru, T., Taha, M., & Kassahun, W. (2014). Risk factors of diarrhoeal disease in under-five children among health extension model and non-model families in Sheko district rural community, Southwest Ethiopia: Comparative cross-sectional study. *BMC Public Health*, *14*(1), 1-6. https://doi.org/10.1186/1471-2458-14-395

Immurana, M., Kisseih, K. G., Yusif, H. M., & Yakubu, Z. M. (2022). The effect of financial inclusion on open defecation and sharing of toilet facilities among households in Ghana. *Plos One*, *17*(3), e0264187. https://doi.org/10.1371/journal.pone.0264187

Januariana, N. E. (2022). Factors that influence community behavior of incidental defeat at Desa Jawa Belakang, Kecamatan Langsa, Kota Langsa. *International Archives of Medical Sciences and Public Health*, *3*(1), 75-85.

Jebb, A. T., Ng, V., & Tay, L. (2021). A review of key Likert scale development advances: 1995–2019. *Frontiers in Psychology*, *12*, 637547. https://doi.org/10.3389/fpsyg.2021.637547

Johnson, B. T. (2021). Toward a more transparent, rigorous, and generative psychology. *Psychological Bulletin, 147*(1), 1-15. https://doi.org/10.1037/bul0000317

Kementerian Kesehatan Republik Indonesia. (2022). *Hasil Utama RISKESDAS 2018*. Jakarta: Kementerian Kesehatan Republik Indonesia

Kuang, J., Ashraf, S., Shpenev, A., Delea, M. G., Das, U., & Bicchieri, C. (2020). Women are more likely to expect social sanctions for open defecation: Evidence from Tamil Nadu India. *Plos One*, *15*(10), e0240477. https://doi.org/10.1371/journal.pone.0240477

La Patilaiya, H., & Ishak, S. N. (2022). Behavioral determinants of open defecation free to families in Soligi Village. *International Journal of Health and Pharmaceutical (IJHP)*, *3*(1), 101-107.

Levy, P. S., & Lemeshow, S. (2013). *Sampling of populations: Methods and applications*. John Wiley & Sons.

Maliti, E. (2021). Evolution of open defecation prevalence in Tanzania 2002–2015: Evidence from national demographic and health surveys. *Development in Practice*, *31*(1), 112-124. https://doi.org/10.1080/09614524.2020.1828283

Ntaro, M., Owokuhaisa, J., Isunju, J. B., Mulogo, E., & Ssempebwa, J. C. (2022). Contextual and psychological factors influencing open defecation free status: an exploratory qualitative study in rural South Western Uganda. *BMC Public Health*, *22*(1), 1-15. https://doi.org/10.1186/s12889-022-12759-z

Odagiri, M., Cronin, A. A., Thomas, A., Kurniawan, M. A., Zainal, M., Setiabudi, W., Gnilo, M. E., Badloe, C., Virgiyanti, T. D., & Nurali, I. A. (2020). Achieving the Sustainable Development Goals for water and sanitation in Indonesia–Results from a five-year (2013–2017) large-scale effectiveness evaluation. *International Journal of Hygiene and Environmental Health*, *230*, 113584. https://doi.org/10.1016/j.ijheh.2020.113584

Paul, B., Jean Simon, D., Kiragu, A., Généus, W., & Emmanuel, E. (2022). Socio-economic and demographic factors influencing open defecation in Haiti: A cross-sectional study. *BMC Public Health*, *22*(1), 1-16. https://doi.org/10.1186/s12889-022-14619-2

Sari, A. F. K., Azizah, R., Jalaludin, J., Rahmawati, I., Sulistyorini, L., Yudhastuti, R., Sumantri, A., Jauharoh, S. N., Zulkarnain, O. F., & Rizaldi, M. A. (2022). A Review of Open Defecation (OD) in Indonesia and the control with logic model. *Malaysian Journal of Medicine and Health Sciences*, *18*(2), 157-165.

Terry, P. E. (2021). Health promotion planning and an interview with Dr. Lawrence Green. In (Vol. 35, pp. 760-765): SAGE Publications Sage CA: Los Angeles, CA.

Yulyani, V., Febriani, C. A., Shaharuddin, M., & Hermawan, D. (2021). Patterns and determinants of open defecation among urban people. *Kesmas: Jurnal*

Kesehatan Masyarakat Nasional (National Public Health Journal), *16*(1).

Yustina, I., & Lubis, N. L. (2020). Effect of Predisposing Factors (Education, Economic Level, Knowledge and Attitude) on Defecation Behavior in Bener Meriah Regency. *Britain International of Exact Sciences (BIoEx) Journal*, *2*(1), 142-149. https://doi.org/10.33258/bioex.v2i1.122

Cite this article as: Kurniatillah, N., Hayat, F., & Masyruroh, A. (2023). Factors related to open defecation behavior: A cross-sectional study in Serang City, Banten, Indonesia. *Public Health of Indonesia, 9*(2), 57-65. https://doi.org/10.36685/phi.v9i2.682