ORIGINAL ARTICLE

Factors Affecting the Quality of Life Among Households Residing Near Waste Disposal Sites in Bandar Lampung City: A Multivariate Approach

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ABSTRACT

Introduction: In 2020, Indonesia generated approximately 67.8 million tons of waste, with 40.85% remaining remaining inadequately managed. This conditions poses significant threats to both environmental and public health. Living near temporary waste disposal sites may increase exposure to pollutants and potentially degrades the quality of life (QoL). This study aims to identify factors associated with QoL among residents living near temporary waste disposal sites in Bandar Lampung city, Indonesia. **Methods:** A cross-sectional study was conducted between September and December 2024 involving 265 participan residing within 200 meters of 56 waste sites across 20 sub-districts. QoL was assessed using the WHOQOL-BREF questionnaire, while sanitation and personal hygiene were measured using validated instruments. **Results:** The results showed that age, education, sanitation, and personal hygiene were significantly associated with QoL ($p< 0.05$), whereas gender and marital status showed no significant effect. In multivariate analysis, education (OR = 1.94; 95% CI: 1.15–3.29), sanitation (OR = 2.01; 95% CI: 1.15–3.50), and personal hygiene (OR = 2.51; 95% CI: 1.43–4.39) remained significant predictors, with personal hygiene being the most influential factor. **Conclusion:** These findings underscore the importance of improving environmental conditions, strengthening hygiene behavior, and increasing access to education as key strategies to enhance the quality of life among populations living near unmanaged waste sites.
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INTRODUCTION

Indonesia is currently facing major challenges in managing its waste. In 2020, approximately 67.8 million tons of waste were generated, with 40.85% of this amount remaining inadequately managed (1). This waste is commonly collected at temporary storage facilities before being transported to final disposal sites. However, many of these temporary facilities are not properly maintained. This condition poses serious threats to both environmental and public health issue.
Inadequate waste management can lead to various forms of environmental pollution, which in turn contribute to a wide range of health problems, particularly among communities living in the close proximity to waste disposal sites (2). Several studies have demonstrated that living in close proximity to waste disposal sites is associated with an increased prevalence of gastrointestinal infections, respiratory diseases, skin disorders, and even psychological disorders such as depression (3–5). Furthermore, the long-term exposure to pollution from these environments may also degrade surrounding ecosystems and negatively affect the quality of life (QoL) of nearby residents (6).

Quality of life (QoL) can be defined as an individual's perception of their position in life, shaped by cultural background, value systems, personal goals, and concerns that influence their everyday experiences (7). The World Health Organization (WHO) has developed a quality of life assessment framework, known as WHOQOL,

which conceptualizes quality of life across four broad domains: physical health, psychological well-being, social relationships, and environmental conditions. This framework aims to provide a more comprehensive and equitable assessment, ensuring that quality of life is not viewed solely in terms of health or illness. Nevertheless, exposure to inadequately managed waste can negatively affect all four of these domains (8).

Communities residing near waste disposal sites, frequently face serious health risks due to air, water, and soil pollution. In these environments, residents often report various health problems, including respiratory disorders, diarrhea, and skin diseases (9). Poor sanitation systems represent one of the key factors that exacerbate these conditions. In the absence of adequate sanitation, the risk of infection is still increase, ultimately undermining the overall well-being of the affected communities and contributing to a decline in the quality of life of affected communities (10–12).

Inadequate waste management often creates condition that serve as breeding grounds for harmful microorganisms and vectors of various disease. For instance, flies that come into contact with waste and subsequently land on food can transmit gastrointestinal infections. Contaminated groundwater may also contain hazardous substances, including teratogens that pose serious risks to pregnant women (13). Under these environmental conditions, personal hygiene has been shown to be a crucial protective factor. Good hygiene practices can reduce the risk of infection and are closely associated with better physical and psychological health outcomes (14,15).

Living near waste disposal sites also has psychological impacts that have limited attention. Residents in these areas, frequently report higher levels of stress and emotional discomfort. These effects appear to be influenced by poor environmental sanitation and dissatisfaction with the quality of water (6). Although multiple factors contribute to these psychological impacts, educational attainment plays an important role. Individuals with higher levels of education tend to have better health literacy and more effective coping mechanisms, which are positively associated with psychological well-being (16). Other sociodemographic factors, including age, gender, and marital status, have also been reported to contribute to the variations in community quality of life (QoL). These factors are known to influence health-related behaviors, access to resources, and vulnerability to environmental hazards (17).

This study aims to explore factors associated with quality of life (QoL) among individuals living near waste disposal sites. This study is necessary given the highly complex relationship between environmental exposure and human well-being. Specifically, the study examines the associations between six predictive factors i.e. sanitation, education, age, gender, marital status, and personal hygiene and QoL. This approach is intended to provide a deeper understanding of how interactions between environmental and individual factors shape the QoL in affected communities.

MATERIALS AND METHODS

Study design

This study employed a cross-sectional design and was carried out between September and December 2024. Data were collected from households located within a 200-meter radius of temporary waste disposal sites, a distance considered to represent potential exposure to waste-related hazards. In total, data were gathered from 56 waste disposal sites distributed across 20 sub-districts in Bandar Lampung City. The required sample size was 264, calculated using Lemeshow formula based on proportions reported in previous study (6). Participants were selected with proportionate random sampling, with the number of respondents in each sub-district proportional to the number of waste diposal sites. The inclusion criteria were (a) living in 200 m radius to the waste disposal site, (b) having lived in the area for at least six months before the study, (c) aged 18 years old, and (d) willing to sign an informed consent form. Exclusion criteria were individuals with cognitive limitations, mental health disorders, or impairments in hearing and speech that could hinder communication during the interview.

Instrumen and data collection

The Quality of Life (QoL) of participants was assessed using the WHOQOL-BREF questionnaire, which consists of 26 questions covering four domains of QoL: physical health, psychological health, social relationships, and environmental conditions (8). This questionnaire has been tested for validity and reliability widely with different languages. Each item was scored on a 1-5 Likert scale. Domain scores were calculated by averaging all items scores within each domain and multiplying the result by four, in accordance with WHOQOL-BREF guidelines. Scores were then transformed to a 0-100 scale. For further analysis, QoL was dichotomized into “low” and “high” based on the median of the overall score. Sanitation was evaluated using a questionnaire adapted from Nasution et al (2019) (18). It consisted of 20 items divided into four domains: toilet facilities, water sources, waste management, and wastewater drainage. Each domain contained five questions with "yes" (scored as 1) or "no" (scored as 0) responses. The total score was categorized into “good” or “poor” sanitation using the median as the cut-off. The instrument demonstrated validity (r>0.361) and reliability (Cronbach’s alpha>0.6). Personal hygiene was evaluated using a questionnaire adapted in prior research, which demonstrated validity (r> 0.312) and reliability (Cronbach’s alpha=0.749) (19). The questionnaire includes 11 items related to daily hygiene practices such as handwashing, bathing, and clothing care. Responses were coded as “yes (scored as 1) or “no” (socred as 0). Total scores were categorized into “good” or “poor” hygiene based on the median. Data on age, gender, marital status, and educational attainment were also collected. All data were collected through face-to-face interviews conducted by trained third- and fourth-year medical students from the University of Lampung. To minimize bias, interviewers followed a standardized protocol and participants were assured that their responses would remain confidential.

Statistical analysis

In this study, descriptive statistics were used to summarized respondent characteristics and QoL scores. Association between independent variables (age, gender, marital status, education, sanitation, and personal hygiene) and QoL as dependent variable were examined using the Chi Square test. Variables with a p-value <0.25 were entered into a multivariate binary logistic regression model to identify the most influential factors associated with QoL. The data processing was conducted using Microsoft Excel for data entry and the Statistical Package for the Social Sciences (SPSS) version 29.0 for statistical analysis.

Ethical approval

This study received ethical clearance from the Health Research Ethics Committee of the Faculty of Medicine, University of Lampung with approval number: 5104/UN26.18/PP.05.02.00/2024, and formal permission from the Department of Investment and One-Stop Integrated Services of Bandar Lampung City. Before data collection began, all participants were given clear and detailed information about the study’s objectives and procedures to ensure they fully understood their involvement. Participation was entirely voluntary, and informed consent was obtained from each participant through a signed consent form. Participants were assured that their responses would remain confidential and anonymous. They were also informed of their right to withdraw from the study at any time without any negative consequences, ensuring their autonomy and rights were respected throughout the process.

RESULTS

General characteristics of participants

This study included 265 participants resinding within 200 meters of temporary waste disposal sites. Most participants were age ≥ 60 years (83.7%), with an average age of 44.26 years. The majority were female (85.3%) and married (89.2%). In terms of education, 54.7% had higher education (senior high school and university), while 45.2% had lower education (elementary, junior high school, or no formal education). The detailed characteristics of participants are presented in Table I.

These demographic features highlight potential vulnerabilities as well as protective factors. A higher proportion of women respondents may reflect household roles in sanitation and hygiene management. Previous studies have also shown that education level strongly influences individual health behaviors and QoL outcomes (6,16).

Table I: General characteristics of participants

Factors		Number of subjects N (%)
Age	<60	43 (16.2)
	≥ 60	222 (83.7)
Gender	Female	226 (85.2)
	Male	39 (14.7)
Marital Status	Unmarried	29 (10.9)
	Married	236(89.2)
Educational level	Lower education	120 (45.2)
	Higher education	145 (54.7)
Personal hygiene	Poor personal hygiene	163 (61.5)
	Good personal hygiene	102 (38.4)
Sanitation	Poor sanitation	84 (31.6)
	Good sanitation	181 (68.3)

Quality of Life (QoL) of paricipants

In this study, the QoL analysis showed that most participants reported poor physical health (66%), whereas psychological well-being (60.8%) and social relationships (71.3%) were perceived positively. In the environmental domain, the distribution between low and high scores was relatively balanced, with slightly more participants reporting high scores (56.2%). Overall, these findings indicate that most participants perceive their quality of life as high (63%), although variations exist across the different domains (Table II).

This finding suggests that despite environmental risks, psychological factors and social relationships may help maintain perceived well-being. Phan et al. (2021), similarly reported that individuals near waste facilities often adapt psychologically, even though physical health outcomes are negatively affected (6).

Factors associated with QoL

This study show that age, educational level, personal hygiene, and sanitation were significantly associated with QoL (p<0.05), while gender and marital status were not. Participants with higher educational level, good

Table II: Quality of life (QoL) of the research participants

Domain	Mean score ± SD	Low QoL	High QoL
		n (%)	n (%)
Physical health	59.20 ± 10.86	175 (66)	90 (34)
Psychological health	62.56 ± 12.41	104 (39.2)	161 (60.8)
Social relation	69.18 ± 13.96	76 (28.7)	189 (71.3)
Environment	63.04 ± 12.58	116 (43.8)	149 (56.2)
Overall score	63.49 ± 9.71	98 (37)	167 (63)

personal hygiene, and good sanitation reported higher QoL. Older participants also showed a tendency toward better QoL (Table III).

These results are consistent with studies showing that environmental and behavioral factors have stronger impacts on QoL than gender or marital status (10–13). The insignificant association of gender may also indicate that exposure to waste-related health risks affects both sexes similarly in this context.

Table III: The association of factors related with QoL based on the chi-squared test

Factors	Overall QoL		*P*
	Low QoL	High QoL	
Age <60 ≥ 60	20 (46.5) 75 (33.7)	23 (53.4) 147 (66.2)	0.023
Gender Female Male	139 (61.5) 28 (71.7)	87 (38.4) 11 (28.2)	0.294
Marital Status Unmarried Married	10 (34.4) 148 (62.7)	19 (65.5) 88 (37.2)	0.927
Educational level Lower education Higher education	55 (45.8) 102 (70.3)	65 (54.1) 43 (29.6)	0.010
Personal hygiene Poor personal hygiene Good personal hygiene	72 (44.1) 76 (74.5)	91 (55.8) 26 (25.4)	0.003
Sanitation Poor sanitation Good sanitation	43 (51.1) 124 (68.5)	41 (48.8) 57 (31.4)	0.010

Multivariate logistic regression analysis

Multivariate analysis confirmed education, personal hygiene, and sanitation as significant predictors of QoL, while the effect of age was no longer significant (Table IV). Personal hygiene was the most influential factor (OR=2.508; 95% CI: 1.433-4.391; p=0.001), followed by sanitation (OR = 2.006; 95% CI: 1.151–3.495; p = 0.014) and education (OR = 1.942; 95% CI: 1.146–3.292; p = 0.014).

DISCUSSION

This study found that personal hygiene was the most influential factor affecting the quality of life (QoL) among people living near temporary waste disposal sites. This result is consistent with Saarela et al. (2021), who also reported a significant relationship between personal hygiene and QoL (p = 0.010) (15). Maintaining personal hygiene plays a critical role in disease prevention by reducing the risk of exposure to pathogenic microorganisms. Within a 200-meter radius of waste disposal sites, residents are highly exposed to environmental pollutants, including contaminated water and disease vectors. This proximity increases vulnerability to groundwater pollution from leachate infiltration (17) and facilitates fly mobility, enabling pathogens to spread from decomposing waste to households (20). In these high-risk settings, personal hygiene becomes a frontline defense against disease transmission, directly influencing both physical health and overall well-being (13).

Table IV: Final model of multivariate logistic regression analysis

Factors	B	OR	95%CI	P-value
Educational level	0.664	1.942	1.146-3.292	0.014
Personal Hygiene	0.920	2.508	1.433-4.391	0.001
Sanitation	0.696	2.006	1.151-3.495	0.014

In this study, personal hygiene was assessed through key practices such as handwashing, bathing, and clothing hygiene. These behaviors are vital in preventing communicable diseases. Handwashing with soap and water, for example, effectively removes microorganisms and significantly reduces the risk of diarrhea and respiratory infections (14). Regular bathing helps eliminate sweat, dirt, and pathogens, while clean clothing prevents the accumulation of bacteria and fungi that may cause skin and respiratory illnesses (21). Together, these behaviors form a protective strategy for maintaining health and enhancing QoL, underscoring the need to strengthen public awareness and education regarding hygiene practices.

Beyond hygiene, this study also identified education and sanitation as significant predictors of QoL. Although their odds ratios were smaller than that of personal hygiene, both contributed meaningfully to overall outcomes. Higher education levels were associated with better QoL, reflecting the role of cognitive skills, critical thinking, and health literacy in promoting healthy lifestyles and resilience (6,22). In contrast, low educational attainment is linked to greater psychological stress, including anxiety and depression (23), and reduced adoption of healthy behaviors (13,15).

Sanitation also demonstrated a strong association with QoL. Participants with good sanitation practices reported better QoL, consistent with findings by Sclar et al. (2018) and Joannes et al. (2023) (11, 24). Adequate sanitation, such as proper toilet facilities, safe water sources, and effective waste management, helps prevent infections by eliminating sources of contamination (25). Conversely, poor sanitation increases the likelihood of disease transmission and worsens physical health, a key determinant of QoL (9).

Age was found to be associated with QoL in the bivariate analysis, with participants aged ≥60 years reporting higher QoL. This is consistent with Bidzan-Bluma et al. (2020), who observed that older adults often report greater life satisfaction and QoL due to psychological adaptation, maturity, and acceptance (17). Older individuals may also experience less anxiety and stress due to more stable perspectives on life (16). However, in the multivariate model, age lost its significance, suggesting that its effect is mediated by education, sanitation, and hygiene.

Overall, these findings emphasize the importance of promoting personal hygiene practices, improving sanitation infrastructure, and expanding access to education in communities living near waste disposal facilities. Integrating these elements into community health promotion programs and public policy will not only enhance QoL but also serve as a preventive measure against disease outbreaks, thereby reducing the burden on healthcare systems.

CONCLUSION

This study found that personal hygiene, education, and sanitation were the main determinants of QoL among households living near temporary waste disposal sites in Bandar Lampung City, with personal hygiene emerging as the most influential factor. Gender and marital status showed no significant association, while the effect of age was mediated by other variables. These findings highlight the need to strengthen hygiene promotion, improve sanitation infrastructure, and expand access to education in waste-exposed communities as part of integrated health and environmental policies. Future studies should incorporate socioeconomic and environmental assessments, including objective water quality testing, to provide a more comprehensive understanding of factors affecting QoL in high-risk populations.

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