

Original Article

# Socio-demographic And Household Sanitation Factors Affect the Quality of Life

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ABSTRACT

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**Background:** In any society, it is widely accepted that the productive age population's Quality of life (QoL) determines the nation's development. As Indonesia is a developing country, an assessment of the QoL of this group needs concern. Empirical studies have found various factors related to quality of life. However, ecological theory states that environmental factors, including household factors, influence individuals. This study investigates factors associated with the quality of life among productive ages in the general population, including individual factors and home sanitation.


**Methods:** A population-based cross-sectional study was carried out in 23 provinces in Indonesia. The modified 38-item Indonesia Family Life Survey (IFLS) questionnaire measured quality of life. The total number of productive age people aged 15-64 was 14953 subjects, and 6806 households were used as the population. Determinant factors tested in this study are socio-demographics (age, gender, education, marital status, and primary activity in the past week) and home sanitation. Data analysis was conducted using multilevel logistic regression.

**Results:** 50.96% (7.620) of productive age have a good quality of life. The study confirmed that age, gender, marital status, education, and primary activity were significant to the QoL. The main finding of this study was that home sanitation had a contextual effect on productive age's quality of life (ICC = 32.4%, CI = 0.289 - 0.520).


**Conclusion:** Investigation of essential factors related to QoL determines appropriate policy programs and interventions in an effort to improve quality of life. Evaluation of quality of life should concern home sanitation. Sanitation Affects broader aspects of physical and mental health.

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
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## Introduction

A country's level of development is directly related to the quality of people in the productive age group, which is a vital human resource. These serve the requirements of unproductive ages. Despite this, most research on quality of life (QoL)

has been conducted on adults over 65. There has been much empirical research done on elderly individuals, and a lot of it is either evaluations of therapies or is limited to groups with specific morbidities or disabilities. At the same time, people in the productive age group have been the subject



of very few of these studies. Assessing the quality of life of people in the productive age group has received relatively little attention.

In a broad sense, quality of life (QoL) pertains to overall well-being and the capacity to thrive and experience contentment within one's surroundings (Jacinto et al., 2023). Bronfenbrenner's ecological model states that people are influenced by their immediate environment, which encompasses family and immediate surroundings (McLeroy, Bibeau, Steckler, & Glanz, 1988). Various tools have been employed to evaluate quality of life (QoL), with the specific choice of instrument contingent upon the researcher's perspective (Gasper, 2010). Some commonly used instruments in health-related quality of life assessment are the World Health Organization Quality of Life (WHOQoL), the Short Form 36 (SF-36), and the EQ-5D. Nevertheless, a significant inclination exists towards advancing tools aimed at evaluating the overall quality of life. In Korea, a novel generic health-related quality of life (QoL) measure consisting of 20 items, known as HINT-20, was created and subsequently validated [4]. The QLICD-CG V2.0 is a questionnaire consisting of 39 items that were made in China. It aims to evaluate the self-perceived quality of life health among individuals diagnosed with chronic gastritis (Quan et al., 2018). The selection of dimensions employed is contingent upon factors such as the intended objective, temporal context, spatial location, and target demographic of the study. In their research, El-Din et al. (2013) presented a comprehensive framework of seven dimensions contributing to assessing quality of life (QoL). These dimensions encompass several facets: environmental, physical, mobility, social, psychological, economic, and political. Multidimensional additional

characteristics of quality of life encompass cultural, demographic, and spiritual aspects (Folayan et al., 2023; GDB, 2024; Grabowska, Antczak, Zwierzchowski, & Panek, 2022; Ondieki, Akunga, Warutere, & Kenyanya, 2022).

Prior investigations about QoL have predominantly concentrated on predisposing factors (Yuniati & Kamso, 2021). Recent research, however, indicates that environmental factors impact life quality. Numerous environmental factors, including household sanitation, may also affect quality of life. The purview of household sanitation encompasses issues such as clean water, household waste disposal, sewage and feces, vectors, food hygiene, environmental pollution, and residential health. The residential health system and the surrounding household environment directly impact the community's well-being and health condition (Doherty et al., 2018; Streimikiene, 2015). Inadequate infrastructure for safe water, sanitation, hygiene, and unhygienic practices associated with these areas constitute a significant public health concern (Doherty et al., 2018; Shrestha et al., 2017).

In rural areas, many individuals use open defecation due to the lack of proper sanitation facilities (Id, Muangi, Aunger, Massa, & Curtis, 2019). This open toilet attracts flies, vectors for many infectious diseases (Pickering et al., 2019). Historically, research investigating QoL found ineffective sanitation and hygiene services, causing a high incidence of diseases, especially diarrheal conditions (Baker et al., 2016; Doherty et al., 2018; Feachem, Bradley, & Mara, 1984; Suwardianto & Sari, 2020). Aside from the hygiene and sanitation of the environment, the house's physical condition also impacts the quality of life, such as the kitchen layout and proper ventilation. The kitchen's

cooking activities produce a lot of harmful particles inside the house, either using wood or LPG fuel. In this study, we investigated the individual and household factors associated with the QoL of Indonesian individuals in the productive age group. This study employed data from the Indonesian Family Life Survey (IFLS) 2014 (Strauss, Witoelar, & Sikoki, 2016).

## Methods

This population-based cross-sectional study used secondary data from the IFLS5 2014 [15]. The Indonesia Family Life Survey is a longitudinal socioeconomic and health survey. The household sample represented around 83% of Indonesia's population, who lived in 13 of the 26 provinces since 1993. The survey covered health, education, and socioeconomic status. IFLS5 fielded in late 2014 and early 2015 on the same set of IFLS households and split-offs: The 2014 IFLS5 survey included 16,204 families and 50,148 individuals [16]. The QoL was measured using IFLS5 data for 38 items. To test the validity and reliability of this quality of life measurement tools, we conducted a Confirmatory Factor Analysis (CFA). Both individual factors (age, sex, marital status, education, primary activity during the past week) and household factors (including household sanitation) were included in the analysis.

The target population in this study was individuals in the productive age group in the 2014 IFL5 data of 31,661 people. The inclusion criteria were sex (male and female), age (15–64 years), and complete individual and household data. Eligible subjects who qualified for the criteria were 14,953 subjects and 6806 households. The instrument pretest was done since IFLS1 to assess the validity of the questionnaire and module. The pretest was carried out in November 2013 to test additional questions in the IFLS5. The primary purpose of the

pretest was to evaluate the contents of the new questionnaire with significant changes. Another objective was to assess the length of the survey and the burden imposed on various types of respondents (Jo et al., 2017).

Quality of life was the primary outcome measure. The composite index of QoL was derived from 38 items. 10 questions pertained to subjective well-being (overall life satisfaction, level of life satisfaction, current level of welfare, welfare 5 years ago, welfare expectations for the next 5 years, keeping standards of living today and for the next 5 years, meeting household needs, food consumption and health care, happiness). Ten questions pertained to trust in the environment: helping people, being aware of the environment, having more belief in fellow tribes and neighbors, and environmental security. Trust in society includes attitudes towards neighbors and residents of different religions. Five questions related to health: general health, comparison of health conditions now with health a year ago, health expectations for the next year, comparison of health with the health of another person of the same age and sex, and health expectations for the next 5 years. Responses to all the above questions were rated using a Likert scale (range, 1–4). Seven questions pertained to the physical ability to carry a heavy load, walk for 1 km, bow, squat, kneel, stand up from sitting on the floor without help, dress without help, bathe, and get out of bed; six questions pertained to psychological factors, i.e., concentration, depression, future, sleep disorder, happiness, and being active.

Our analysis considered two hierarchical levels: individual and household (home sanitation). Individual factors consisted of age (categorized into 15–25 years, 26–35 years, 36–45 years, 46–

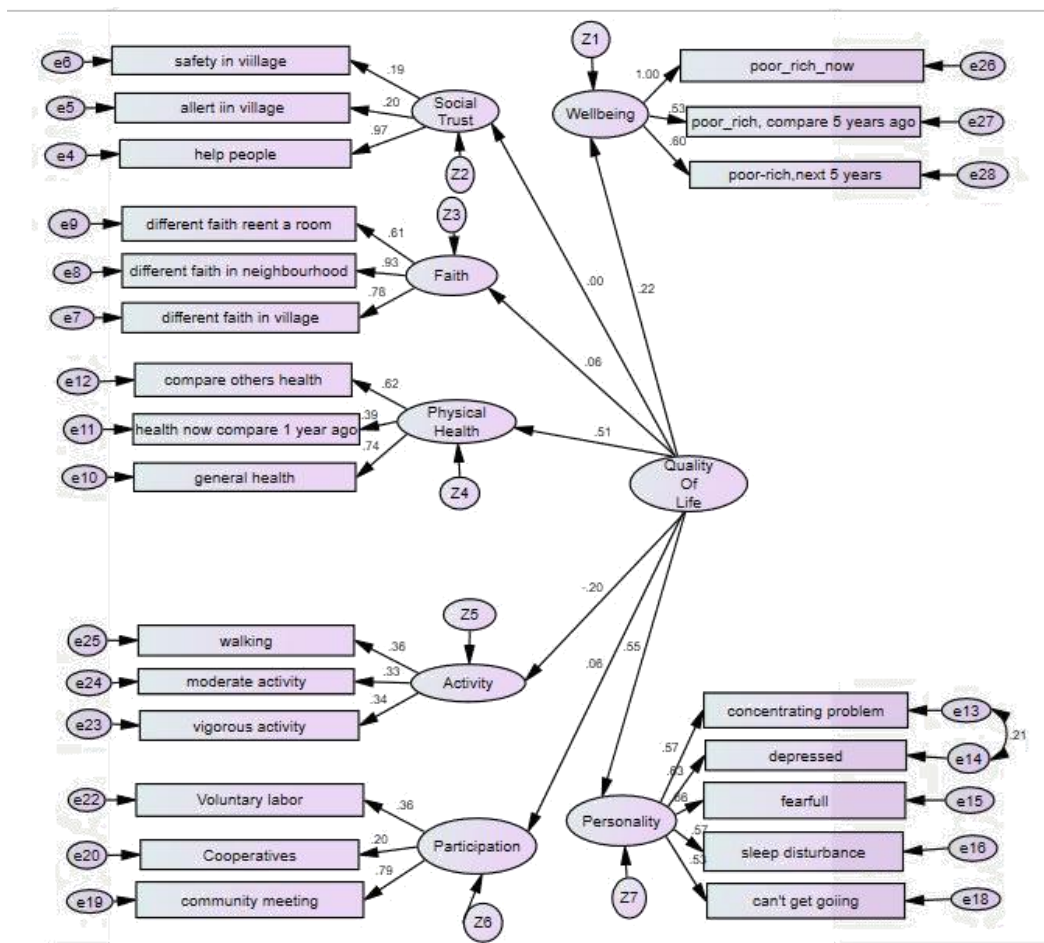
55 years, and 56–64 years) and sex (male and female). Others, marital status was categorized as single or married. The educational variable was the highest education level. The responses were categorized as: elementary school, junior high school, senior high school, and college/university. Primary activities during the past week were categorized into attending school, working/trying to work/helping to earn income, job searching, retiring, housekeeping, and sick/disabled. The household level factor was a composite variable of household sanitation, which was the result of enumerator observations including lots of human and animal excreta around the house; lots of flies; puddles of water; cattle under or next to the home; adequate ventilation; a cleaned yard; an adequate yard; a kitchen separated from the main room; cooking and sleeping in the same room (score 1 for good sanitation; score 0 for poor sanitation).

A Confirmatory factor analysis (CFA) was used to build a QoL construct. The model's goodness-of-fit was evaluated using the following statistical indices (Wang et al., 2019). The model  $\chi^2$  test, the adjusted goodness-of-fit index (AGFI), the Tucker Lewis index (TLI); the comparative fit index (CFI); and the root mean square error of approximation (RMSEA) The good parameters of the fit model were GFI, AGFI, TLI, CFI  $>.90$ , and RMSEA  $<.08$ . Furthermore, the QoL score was categorised as poor or good based on mean QoL scores. Bivariate analysis of QoL with independent numerical variables was performed using the

independent t-test and the Chi-squared test for the categorical independent variables. Descriptive analysis was performed to obtain the frequencies and mean  $\pm$  standard deviation. A multilevel analysis was conducted to examine the influence of sociodemographic factors and household-level factors on QoL. Multilevel analysis, or hierarchical models, is an analytical approach that permits simultaneous assessment of the effects of individual and group-level variables on outcome variables. The intraclass correlation coefficient (ICC) quantifies the level of homogeneity of quality of life scores within clusters (households). A higher ICC signifies a stronger correlation of quality of life scores within a cluster. The approach allows simultaneous examination of the effects of household-level and individual-level predictors (Zhou, Ru, & Hearst, 2014). This study had an ethical clearance number 249/EC/LPPM/STIKES/KH/XII/2020, from Ethical Committee Faculty of Public Health University of Indonesia (Approval Number: 771/UN2.F10/PPM.00.02/2018).

## Results

A Confirmatory factor analysis (CFA) was conducted to assess the suitability of the proposed quality of life factor model. The model was comprised of seven first-order factors and one second-order factor. The proposed model consisted of seven dimensions, namely well-being, social trust, faith, physical health, physical activity, social participation, and psychological (Fig. 1).



**Figure 1. Confirmatory Factor Analysis of the Quality of Life Model**

First, we performed a Spearman correlation test. We excluded several items because of the low correlation ( $r < 0.3$ ). Of the 38 items, we selected 23 items as CFA input data. Goodness-of-fit indices associated with the proposed factor solution were: GFI = 0.981; AGFI = 0.977; TLI = 0.939; CFI = 0.946; RMSEA = 0.03;  $\chi^2 = 0.000$ . The results indicated a fit model; however, some items had standardized loading factors  $< 0.3$ . A further modification was done by adding constraints on concentrating problems with feeling

depressed, which showed the largest indices modification value.

The results showed an improvement in the validity indicators (GFI = 0.983; AGFI = 0.979; TLI = 0.945; CFI = 0.952; RMSEA = 0.028;  $\chi^2 = 0.000$ ). The parameter values showed better results; therefore, it can be concluded that this is a QoL-fit model. CFA produces non-normally distributed QoL scores (min = 1.79, max = 6.30, mean = 4.66, median = 4.76, SD = 0.597). Furthermore, to conduct a multilevel logistic regression analysis, the QoL scores were grouped into

poor (score < 4.76) and good (score ≥ 4.76), using the median score as the cut-off point. Out of the 14,953 individuals in Indonesia between the ages of 15 and 64, nearly half had a good quality of life (68.2%), while the rest (31.8%) had a low quality of life. Ages 25 to 35 comprised the majority of respondents (31.1%). 56.4% of the participants were female, while most individuals (12701, 84.9%) were married. Only a small percentage (14.9%) had undergraduate education, while the majority (35.1%) only graduated from

elementary school and 30.6% had completed senior high school. During the past week, 66.9% of people in the productive age group attended school; a few of those were sick or disabled (0.9%) and did not work. Around 0.8% of individuals among the working-age population were engaged in working as their major activity over the past week. Home sanitation had a Z-score of 0 to 9, with a mean of 6.94 and an SD of 1.409 (Tabel 1)

**Table 1. Characteristics of Indonesia's productive age and the association with quality of life**

n=14953 Individuals		Quality of life					
Variable		Poor	Good	P-value			
Age	n (%)	n (%)	n (%)				
15-25	1425 (9.5)	794 (10.7)	631 (8.4)	0.004*			
25-35	4655 (31.1)	2333 (31.5)	2322 (30.8)				
36-45	4361 (29.1)	2063 (27.9)	2298 (30.4)				
46-55	2974 (19.9)	1432 (19.3)	1542 (20.4)				
56-64	1538 (10.3)	783 (10.6)	755 (10)				
Marital Status							
Single	2252 (15.1)	1271 (17.2)	981 (13)	0.000*			
Married	12701 (84.9)	6134 (82.8)	6567 (87)				
Gender							
Women	8438 (56.4)	4282 (57.8)	4156 (55.1)	0.001*			
Men	6515 (43.6)	3123 (42.2)	3392 (44.9)				
Education							
Primary	5243 (35.1)	2752 (37.2)	2491 (33)	0.000*			
Secondary	2912 (19.5)	1533 (20.7)	1379 (18.3)				
Tertiary	4572 (30.6)	2169 (29.3)	2403 (31.8)				
College	2226 (14.9)	951 (12.8)	1275 (16.9)				
Primary <sup>1</sup> Activity							
1	4493 (30)	2286 (30.9)	2207 (30)	0.176			
2	127 (0.8)	75 (1)	52 (0.8)				
3	88 (0.6)	55 (0.7)	33 (0.6)				
4	10002 (66.9)	4820 (65.1)	5182 (66.9)				
5	113 (0.8)	51 (0.7)	62 (0.8)				
6	130 (0.9)	118 (1.6)	12 (0.9)				
Home Sanitation Score	Univariate	Bivariate					
n=6806 household	Min Max	Mean±SD	SE	T	Mean Diff	P-value	CI



0	9	6.94±1.409	0.012	-5.719	-0.132	0.000*	-0.177 to -0.087
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\* $p < 0.01$  by Student *t*-test or Chi-squared.

<sup>1</sup>Primary Activity: 1, Housekeeping; 2, Working; 3, Find a job; 4, Attending school; 5, Pension; 6, Sick/disabled.

The QoL was highest in the age range of 25–35 years but decreased from 46. There was a noticeable drop in QoL. Multivariate analysis (Table 2) revealed that, in contrast to other age groups, the 46–55 age group had the highest likelihood of having a good quality of life. That probability fell after the age of 55. There was a significant difference ( $p < 0.001$ ) in the QoL of married versus unmarried individuals. Men also had a considerably higher likelihood than women of having a higher quality of life ( $p < 0.001$ ). There was no evidence that primary activity in the past week influenced QoL. The main finding of this study is that household sanitation is an essential determinant of the QoL. High scores for household sanitation were associated with better QoL ( $p < 0.001$ ). The single most striking finding of this study was that home sanitation contextualized productive age’s quality of life (ICC = 32.4%, CI = 0.289 – 0.520).

**Table 2. Factors Related to Quality of Life**

<i>Individual level</i>	Baseline-model			Fit-model			
	Coeffisien	SE	P-value	Coeffisien	SE	P-value	OR
<b>age</b>							
15-25	Reff	Reff	Reff	Reff	Reff	Reff	Reff
25-35	0.166	0.058	0.025	0.197	0.073	0.007	1.217
36-45	0.289	0.076	0.000	0.317	0.075	0.000	1.374
46-55	0.318	0.080	0.000	0.332	0.078	0.000	1.393
56-64	0.283	0.091	0.002	0.276	0.089	0.002	1.318
<b>Marital status</b>							
single	Reff	Reff	Reff	Reff	Reff	Reff	Reff
married	0.333	0.057	0.000	0.343	0.057	0.000	1.410
<b>Gender</b>							
Female	Reff	Reff	Reff	Reff	Reff	Reff	Reff
Male	0.103	0.044	0.019	0.100	0.037	0.007	1.105
<b>Education</b>							
Primary	Reff	Reff	Reff	Reff	Reff	Reff	Reff
Secondary	0.031	0.055	0.572	0.027	0.055	0.627	1.027
Tertiary	0.260	0.051	0.000	0.264	0.050	0.000	1.302
College	0.494	0.065	0.000	0.484	0.062	0.000	1.622
<b>Household-level</b>							
Home Sanitation	0.058	0.014	0.000	0.058	0.014	0.000	
Constanta	-1.081	0.128	0.000	-1.128	0.123	0.000	
Random Effect	Estimate	SE	CI	Estimate	SE	CI	



Variance	0.632	0.088	0.482-0.830	0.658	0.089	0.505-0.857
IOR = 1.643-0.684						
X = 0.000						

\* $p < 0.001$  by Multilevel Logistic Regression; Ref, reference; SE, standar error; CI, confidence interval 95%; OR, odds ratio. ICC = Interclass Correlation Coefficient

## Discussion

This finding identified the association between individual factors and quality of life. In the present study, the age group of 25–45 years demonstrated the best QoL; the QoL showed a significant decrease starting at the age of 46 years. The result confirms prior studies indicating an aging-related reduction in QoL in the physical, mental, and social domains (Zimmermann, Silva, Galvao, & Pereira, 2017) (Lee, Xu, & Wu, 2020). This finding aligns with other findings revealing that men have higher levels of QoL than women. Women tend to be more susceptible to experiencing mental health issues that negatively impact their quality of life (K.-T. Han, Park, Kim, Kim, & Park, 2014). A higher quality of life was noticed among those who were married. A spouse's and family's affection and support may improve mental health and emotional well-being. Additionally, marriage protects against the onset of psychological problems in later life (Gutiérrez, Oscar, Esparza, & Villar, 2018).

Education impacts the quality of life by providing knowledge and skills to improve work prospects, income levels, and overall well-being (Yuniati & Kamsu, 2021). Education is also related to social life as it enables individuals to develop into more responsible and engaged members of society. It promotes awareness of the surrounding world and empowers individuals to contribute to the community (Crosnoe, 2021; Zhao, Chang, Yu, & Sohail, 2022). Conversely, a lack of knowledge is associated with adverse health outcomes, such as shorter life expectancy, increased morbidity, and higher degrees of disability (Feachem et al., 1984; K. Han, Park, Kim, Kim, & Park, 2014).

Globally, an estimated 2.6 billion people do not have access to adequate sanitation. Lack of sanitation contributes to approximately 10% of the global disease burden, mainly due to diarrheal diseases (Agustina et al., 2021). The practice of open defecation contributes to severe health outcomes, leading to enduring adverse impacts on the QoL, particularly in the lower-middle-income nations in which it is most frequent (Feachem et al., 1984). The significant health risks connected with open defecation are mainly attributed to infectious diseases caused by human excrement. Infected human excrement contains many microorganisms, including viruses, bacterial pathogens, protozoan cysts, and helminth eggs (Kuberan et al., 2015). Hence, establishing appropriate sanitation facilities can enhance environmental health and reduce the spread of diseases (Organisation for Economic Co-operation and Development, 2011). Household wastewater, rubbish, and feces substantially contribute to water pollution in community dwellings. Ensuring community participation in mitigating pollution is a critical concern of public health and environmental health area. The Indonesian government has implemented a community-based sanitation program to promote hygienic practices. This program focuses on the proper use of toilets for defecation, handwashing with soap, access to clean water, proper treatment of food, and effective management of household waste, including solid and liquid waste. Waste management adheres to the concepts of reduction, reuse, and recycling. The main goal of managing domestic liquid waste is to prevent the transmission of diseases (Kementerian Kesehatan RI, 2014).





Another remarkable study concerned the tangible characteristics of the house. The layout and ventilation of a residential kitchen can have a substantial impact on the quality of indoor air and, consequently, on health (Tsang, Wong, Mui, & Poon, 2023). The windows enable the entry of natural light and provide air circulation [34]. Inadequate ventilation in the kitchen might lead to the accumulation of cooking pollutants. The levels of indoor particulate matter were significantly impacted by the utilization of coal, kerosene, and biomass fuels for cooking, leading to health problems such as lung and eye irritation and the severity of illnesses like asthma and bronchitis. Enhancing house ventilation and optimising kitchen layout can be accomplished by implementing well-designed ventilation systems, utilising range hoods, and ensuring regular maintenance of these systems. Implementing these procedures can effectively mitigate the accumulation of pollutants, moisture, and airborne grease, thereby enhancing indoor air quality and fostering improved health (Vardoulakis et al., 2020). Evidence has demonstrated that using eco-friendly cooking fuel can decrease both direct medical costs and expenses related to food supplements, transportation, and end-of-life care (Aunan et al., 2013). Design and healthy home amenities promote independence in everyday tasks, lessen social isolation, and enhance residents' quality of life (Orrell et al., 2013). A yard's availability can fulfill many requirements, such as privacy, mobility, gardening, outdoor cooking, and socializing (Fien, Charlesworth, Fien, & Charlesworth, 2012). Satisfying human needs contributes to enhancing the quality of life.

Both sociodemographic factors and household characteristics impact the quality of life of people in the productive age group. Nevertheless, these findings indicate that the effect of household sanitation on the quality of life (QoL) is more substantial than the effects of individual characteristics. Public health is responsible for the implementation of home

sanitation. Academic and research institutes have the potential to contribute to the improvement of the sanitation sector actively. The primary components of support encompass the advancement of sanitation technology, the psychological facets of individual behavior, and the monitoring and evaluation of outcomes (K. Han et al., 2014). Effective collaboration between the government and the community is crucial to ensuring the success of interventions. Nevertheless, a study has indicated that the most significant obstacle in rural regions is sustaining healthy practices to promote better home sanitation.

It is essential to consider this study's limitations when interpreting the findings. This study used a cross-sectional design, meaning it is impossible to make causal inferences based on the results. The evaluation of quality of life relied simply on self-reports, without any objective measures or assessments conducted on the seven recommended criteria. The household sanitation scores were derived from a single time-point observation, which may introduce bias in the results. The Indonesia Family Life Survey is secondary data, necessitating the adjustment of the Quality of Life (QoL) instrument to align with the QoL dimension theory. Even though the QoL model is consistent with the goodness-of-fit parameter, some loading factor values were below 0.3.

This study is an initial assessment of Indonesian persons' overall quality of life (QoL) in the productive age group, utilizing data from the IFLS dataset. The study found that differences in household sanitation had a more significant effect on the quality of life than individual variables. Due to the current demographic transition in Indonesia, the population's productive age exceeds the non-productive age. The findings of our study generate precious information for establishing interventions focused on optimizing Indonesia's productive age's quality of life.

## Conclusion

This study presents empirical information regarding sociodemographic characteristics and some aspects of household sanitation and its effect on quality of life (QoL). Education is vital for attaining social prosperity. To promote healthy behaviors among people, families, and communities and enhance the quality of life, information, education, and communication interventions related to hygiene and household sanitation are necessary.

## Authors Contributions

The author(s) is responsible for the entire study, data analysis, and manuscript writing.

## Conflicts of Interest

The author(s) declared no potential conflicts of interest concerning this article's research, authorship, and publication.

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