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Association of Environmental Sanitation and Personal Hygiene with Skin Health Complaints among Residents in Ibul Besar II

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Skin health problems remain a common public concern, influenced by poor environmental sanitation and inadequate personal hygiene practices. Ibul Besar II Village is a suburban locale traversed by a tributary of the Ogan River. Data from the Pegayut Public Health Center in 2022 shows only 991 residents had access to proper sanitation. Moreover, of the 748 houses surveyed, only 284 were classified as healthy housing. In 2023, skin diseases ranked among the top ten most common illnesses at the Pegayut Public Health Center, with 115 cases reported. This study aimed to examine the association between environmental sanitation, personal hygiene, and skin complaints among residents of Ibul Besar II Village. Using a cross-sectional design with 142 respondents meeting the inclusion criteria, data were analyzed through univariate, bivariate (Chi-square test), and multivariate (multiple logistic regression) methods. The bivariate results showed significant associations between skin complaints and factors such as Bathing habits (p = 0.001; OR = 3.402; 95% CI: 1.670–6.931), hand and nail hygiene (p = 0.012; OR = 2.532; 95% CI: 1.276–5.027), Clothing hygiene (p = 0.021; OR = 3.000; 95% CI: 1.240–7.255), bedding and bed linen hygiene (p = 0.011; OR = 2.548; 95% CI: 1.286–5.047), feces disposal facilities (p = 0.011; OR = 2.919; 95% CI: 1.331–6.402), and wastewater disposal systems (p = 0.001; OR = 4.067; 95% CI: 1.804–9.167). Multivariate analysis showed that inadequate wastewater disposal systems had the strongest association with skin health complaints (p = 0.003; OR = 3.959; 95% CI: 1.605–9.758). To prevent skin health issues, priorities should include improving wastewater disposal facilities and promoting better hygiene of bedding and linen. Additionally, community members are encouraged to improve personal hygiene and maintain environmental sanitation to reduce the risk of skin disorders.

Keywords: Environmental, Personal Hygiene, Sanitation, Skin health complaints

INTRODUCTION

Skin health disorders remain a significant global public health concern. According to the Global Burden of Disease study, skin and subcutaneous diseases collectively rank among the leading causes of years lived with disability worldwide, affecting over one billion individuals at any given time (Karimkhani et al., 2017). Across 50 Asian countries, skin and subcutaneous diseases are described as having a high burden, with disability-adjusted life years (DALYs) varying by region and socioeconomic status. infectious skin diseases (e.g., fungal infections, scabies, leprosy-like conditions) are more common in low-income countries, while higher-income countries bear more inflammatory dermatoses burden (Urban, 2020).

In Indonesia, skin diseases remain among the ten most common illnesses in primary health care settings, particularly in communities with poor sanitation and hygiene, where environmental conditions facilitate the transmission of bacterial, fungal, and parasitic infections. this burden is also reflected in remote eastern regions such as Sumba, where more than half of teledermatology cases involve skin infections and infestations (Adella et al., 2024), while national estimates indicate that approximately 7.7 million Indonesians annually suffer from serious fungal diseases, including skin and scalp infections (Wahyuningsih et al., 2021).

Skin problems arise from overlapping biological vulnerability, personal behaviors, and surrounding living conditions. Evidence from community, clinical, and global studies supports the idea that hygiene practices, environmental sanitation, and socio-economic context jointly determine exposure to infectious agents and dermatological outcomes. The skin can be damaged by infection and environmental exposure, leading to great morbidity, disfigurement, and distress (Shaigan et al., 2023).

Despite substantial evidence linking poor sanitation and hygiene to skin diseases, most previous studies have examined these factors independently, with

limited attention to their interaction within specific ecological contexts. Furthermore, existing research often overlooks how unique environmental settings, such as swamp and riverine ecosystems. From an environmental health pathway perspective, contaminated water sources and inadequate sanitation infrastructure can serve as transmission media that facilitate indirect or direct contact with pathogens, particularly when the disposal or leakage of wastewater contaminates springs, rivers, reservoirs, estuaries, groundwater, and even piped water supplies used for drinking or cooking (Izah & Ogwu, 2025; Upfold et al., 2021). Simultaneously, the socio-ecological model suggests that hygiene behaviors are shaped by environmental conditions such as access to clean water and housing density; however, studies integrating these factors in relation to skin health remain limited, particularly in rural Indonesia.

Ibul Besar II Village represents a distinctive environmental context characterized by the presence of swamp areas and a tributary of the Ogan River, which potentially serve as alternative water sources for the community. However, suboptimal water quality limits their safe utilization, thereby increasing reliance on inadequate sanitation practices. Additionally, housing conditions in the area remain substandard, with only 284 out of 748 houses meeting the criteria for healthy housing. These environmental challenges are compounded by population density and limited access to sanitation facilities, which may collectively influence the occurrence of skin health complaints. In 2023, skin diseases were among the ten most common illnesses reported in the Pegayut Public Health Center service area, with 115 documented cases, indicating a persistent public health issue in the community.

Given this context, this study aims to examine the combined association of environmental sanitation and personal hygiene with skin health complaints in Ibul Besar II Village. The findings are expected to provide context-specific evidence to support public health interventions and policies aimed at improving sanitation conditions and promoting effective hygiene practices in rural and environmentally vulnerable communities.

METHODS

Study Design and Sampling

This study employed an analytical quantitative approach using a cross-sectional design, in which independent and dependent variables were measured simultaneously at a single point in time. The target population consisted of all residents of Ibul Besar II Village, Ogan Ilir Regency.

The sample size was calculated using a two-proportion hypothesis test based on Lemeshow's formula, referring to estimates from previous studies, resulting in a minimum required sample of 142 respondents. A purposive non-probability sampling technique was applied to recruit participants who met predefined inclusion criteria. This approach was considered appropriate given the absence of a comprehensive sampling frame and the study's focus on a population with specific environmental characteristics. The study aimed to examine context-specific associations rather than to produce population-level estimates.

Participants were recruited through household visits with the assistance of local community leaders and village administrative records to identify eligible individuals. Inclusion criteria were: (1) residents who had lived in the study area for at least six months; (2) aged between 18 and 60 years; and (3) willingness to participate. Exclusion criteria included individuals who were seriously ill at the time of data collection, not present during the survey period, or declined participation.

Data Collection and Measurement

Primary data were collected through direct observation and face-to-face interviews using a structured questionnaire. Skin health complaints were assessed using four self-reported indicators commonly associated with dermatological conditions, such as itching, redness, skin lesions, and scaling. Respondents were classified as having skin health complaints if they reported at least one symptom.

This operational definition was adopted to increase sensitivity in identifying potential skin problems at the community level, particularly in settings with limited access to clinical diagnosis. While this approach may lead to an overestimation of prevalence, it is considered appropriate for public health screening and exploratory epidemiological studies. However, the absence of clinical validation may introduce misclassification bias.

Environmental sanitation variables included clean water supply, latrine availability, wastewater disposal systems, and solid waste management facilities. Personal hygiene variables comprised bathing habits, hand and nail hygiene, clothing hygiene, and bedding cleanliness. Each variable was scored and categorized, with a threshold of ≥75% indicating adequate environmental sanitation or good personal hygiene, and <75% indicating inadequate or poor conditions.

Instrument Validity and Reliability

The questionnaire was pre-tested among 30 respondents in the Talang Aur Public Health Center service area, which shares similar characteristics with the study location. Validity testing was conducted using Pearson correlation analysis, with items considered valid when the correlation coefficient exceeded the critical value ($r > 0.361$) at a 5% significance level.

Reliability testing was conducted to assess the internal consistency of the questionnaire using Cronbach's alpha coefficient. All variables demonstrated acceptable reliability, with Cronbach's alpha values exceeding the minimum threshold, indicating good internal consistency of the measurement instrument.

Data Analysis

Data processing included editing, coding, entry into SPSS software, and data cleaning to ensure completeness and accuracy. Univariate analysis was performed to describe the distribution of variables using frequencies and percentages. Bivariate analysis was conducted using the Chi-square test with a 95% confidence level ($\alpha = 0.05$) to assess associations between independent and dependent variables. The strength of association was expressed as odds ratios (ORs) with 95% confidence intervals (CIs).

Variables with p-values < 0.25 in bivariate analysis were included in the multivariate model. Multivariate analysis was performed using multiple logistic regression to identify the most dominant factors associated with skin health complaints while controlling for potential confounders. Multicollinearity was assessed using the Variance Inflation Factor (VIF), and no multicollinearity was identified among the variables retained in the final model. Model goodness-of-fit was evaluated using the Hosmer–Lemeshow test, which indicated an adequate fit ($p > 0.05$).

Bias and Study Limitations

This study has several potential sources of bias. First, the use of purposive non-random sampling may introduce selection bias, as the sample may not fully represent the broader population. Consequently, the findings should be interpreted as context-specific and may not be generalizable to other settings.

Second, data on personal hygiene practices and skin health complaints were self-reported, which may be subject to information bias, including recall bias and social desirability bias, as well as potential misclassification due to the absence of clinical confirmation.

Third, several potential confounding variables, such as age, sex, occupation, and socioeconomic status, were not included in the analysis due to data limitations. This may result in residual confounding and limit the causal interpretation of the findings.

Ethical Considerations

This study was approved by the Health Research Ethics Committee, Faculty of Public Health, Sriwijaya University (378/UN9.FKM/TU.KKE/2023). The study was declared ethically appropriate in accordance with the seven WHO (2011) standards, including: (1) social value, (2) scientific validity, (3) equitable assessment of benefits and burdens, (4) risk–benefit assessment, (5) avoidance of coercion and exploitation, (6) confidentiality and privacy, and (7) informed consent, as outlined in the CIOMS 2016 Guidelines. All procedures involving human participants were conducted in accordance with these ethical principles. Informed consent was obtained from all individual participants included in the study prior to data collection. Participants were fully informed about the purpose, procedures, and voluntary nature of the study, and confidentiality and anonymity were strictly maintained throughout.

RESULTS AND DISCUSSION

The results of this study are presented through univariate, bivariate, and multivariate analyses, presented in tabular form and accompanied by descriptive interpretations.

Univariate Analysis

Table 1

Frequency Distribution of Skin Health Complaint Variables in Ibul Besar II

Skin Health Complaints	n	%
Yes	79	55.6
No	63	44.4
Total	**142**	**100**

Out of the total 142 respondents in this study, 79 (55.6%) reported experiencing skin health complaints, while 63 (44.4%) did not report any complaints. These results suggest that skin health issues and complaints remain common among the study group, with over half of the respondents experiencing symptoms in the last six months. Skin complaints were evaluated using four main indicators: recurrent itching, reddish patches, bumps or spots, and dry, peeling, or scaly skin. These parameters were designed to cover a wide range of common dermatological symptoms

Bivariate Analysis

Bivariate analysis was conducted to examine the association between the dependent variable namely skin health complaints, and the independent variables namely environmental sanitation and personal hygiene, as presented in Table 2.

Table 2

Bivariate Analysis of Environmental Sanitation and Personal Hygiene Variables Associated with Skin Health Complaints in Ibul Besar II

Variables	Skin Health Complaints				OR	95% CI		*p-value*
	No		Yes					
	n	%	n	%		Lower	Upper	
Personal Hygiene								
Bathing Habits								
Good	46	56.8	35	43.2	3.402	1.670	6.931	0.001
Poor	17	27.9	44	72.1				
Hand and Nail Hygiene								
Good	34	57.6	25	42.4	2.532	1.276	5.027	0.012
Poor	29	34.9	54	65.1				
Clothing Hygiene								
Good	55	50.0	55	50.0	3.000	1.240	7.255	0.021
Poor	8	25.0	24	75.0				
Bedding and Bed Linen Hygiene								
Good	35	57.4	26	42.6	2.548	1.286	5.047	0.011
Poor	28	34.6	53	65.4				
Environmental Sanitation								
Clean Water Supply								
Adequate	25	55.6	20	44.4	1.941	0.949	3.969	0.100
Inadequate	38	39.2	59	60.8				
Feces Disposal Facilities								
Adequate	23	63.9	13	36.1	2.919	1.331	6.402	0.011
Inadequate	40	37.7	66	62.3				
Wastewater Disposal Systems								
Adequate	25	69.4	11	30.6	4.067	1.804	9.167	0.001

Variables	Skin Health Complaints							*p-value*
	No		Yes		OR	95% CI		
	n	%	n	%		Lower	Upper	
Inadequate	38	35.8	68	64.2				
Solid Waste Disposal Facilities								
Adequate	17	63.0	10	37.0	2.550	1.073	6.060	0.052
Inadequate	46	40.0	69	60.0				

Note: OR = Odds Ratio; CI = Confidence Interval; n = number of respondents; % = percentage.

The results of the bivariate analysis showed that several personal hygiene variables were significantly associated with skin health complaints. Bathing habits were significantly associated with skin health complaints (p = 0.001). The odds ratio (OR) was 3.402 (95% CI: 1.670–6.931), indicating that respondents with poor bathing habits had 3.402 times higher odds of experiencing skin health complaints compared with those who practiced good bathing habits. Similarly, hand and nail hygiene was significantly associated with skin health complaints (p = 0.012), with an OR of 2.532 (95% CI: 1.276–5.027). This indicates that respondents with poor hand and nail hygiene had 2.532 times higher odds of experiencing skin health complaints compared with those who maintained good hand and nail hygiene.

Clothing hygiene was also significantly associated with skin health complaints (p = 0.021), with an OR of 3.000 (95% CI: 1.240–7.255). This indicates that respondents with poor clothing hygiene had 3.000 times higher odds of experiencing skin health complaints compared with those who maintained good clothing hygiene.In addition, bedding and bed linen hygiene showed a significant association (p = 0.011), with an OR of 2.548 (95% CI: 1.286–5.047), indicating that respondents with poor bedding and bed linen hygiene had 2.548 times higher odds of experiencing skin health complaints compared with those who maintained adequate hygiene practices.

Regarding environmental sanitation, feces disposal facilities were significantly associated with skin health complaints (p = 0.011), with an OR of 2.919 (95% CI: 1.331–6.402), indicating that respondents with inadequate feces disposal facilities had 2.919 times higher odds of experiencing skin health complaints. Similarly, wastewater disposal systems were significantly associated (p = 0.001) with an OR of 4.067 (95% CI: 1.804–9.167). In contrast, no statistically significant association was observed between clean water supply (p = 0.100) with an OR of 1.941 (95% CI: 0.949–3.969) and solid waste disposal facilities (p = 0.052) with an OR of 2.550 (95% CI: 1.073–6.060) with skin health complaints.

Multivariate Analysis

Table 3

Initial Multivariate Logistic Regression Analysis Using Variables Selected from Bivariate Analysis

Variables	*p-value*
Bathing Habits	0.001
Hand and Nail Hygiene	0.012
Clothing Hygiene	0.021
Bedding and Bed Linen Hygiene	0.011
Feces Disposal Facilities	0.011
Wastewater Disposal Systems	0.001

Multivariate analysis was conducted to identify the variables most strongly associated with skin health complaints while controlling for other related factors. In this study, all variables in the initial multivariate model had p-values of less than 0.05 (Table 3). The results of the final multivariate analysis are presented in Table 4.

Table 4

Multivariate Analysis of Environmental Sanitation and Personal Hygiene Variables Associated with Skin Health Complaints in Ibul Besar II

Variables	B	Exp (B)	*p-value*	95% CI	
				Lower	Upper
Bedding and Bed Linen Hygiene	0.833	2.300	0.038	1.046	5.058
Wastewater Disposal Systems	1.376	3.959	0.003	1.605	9.758

Based on the multivariate logistic regression analysis, two variables remained statistically significant after adjustment for other covariates in the model. Bedding and bed linen hygiene was significantly associated with skin health complaints (p = 0.038), with an odds ratio (OR) of 2.300 (95% CI: 1.046–5.058). These findings indicate that respondents with poor bedding and bed linen hygiene had 2.300 times more odds of experiencing skin health complaints compared with those who maintained adequate hygiene practices, after controlling for other personal hygiene and environmental sanitation variables included in the model.

Similarly, inadequate wastewater disposal systems were associated with skin health complaints (p = 0.003), with an OR of 3.959 (95% CI: 1.605–9.758). The magnitude of this odds ratio suggests a stronger association than that of the other variables retained in the model. Specifically, respondents residing in households with inadequate wastewater disposal systems had 3.959 times higher odds of reporting skin health complaints compared with those living in households with adequate systems, independent of other factors considered in the analysis. Although the confidence intervals are relatively wide, they do not cross 1.0, indicating statistical significance. Among the variables retained in the final model, wastewater disposal systems had the highest odds ratio, suggesting the strongest association with the outcome in this multivariate analysis.

Association Between Environmental Sanitation and Skin Health Complaints

Environmental sanitation in this study was assessed using four indicators: clean water supply, feces disposal facilities, wastewater disposal systems, and solid waste disposal facilities. The findings indicated that feces disposal facilities and wastewater disposal systems were significantly associated with skin health complaints, whereas clean water supply and solid waste disposal facilities were not statistically significant.

The clean water supply was not significantly associated with skin health complaints (p = 0.100). This outcome may be attributed to the fact that not all respondents consistently utilized river water, particularly during the dry season when water scarcity compelled households to purchase clean water or rely on piped water systems. Furthermore, several respondents reported treating river water prior to use, such as through chlorination and storage in water tanks.

These observations are consistent with Gusni et al. (2021), who observed no significant correlation between access to clean water and skin disease complaints among female students at one of Boarding School, in Kampar Regency (p = 0.739). Similarly, a cross-sectional study conducted in the Canal Anil area and Anil district, Brazil, involving 744 residents, assessed quality of life, sanitation conditions, and health complaints including skin problems. Found that although residents in the areas reported poorer water and sanitation conditions, they reported fewer skin health complaints compared to those in neighboring areas with relatively better water conditions (Barros et al., 2024). Nonetheless, access to safe and sufficient water remains an indispensable component of daily life and public health, as poor water quality and availability may elevate the risk of waterborne and environmentally mediated diseases, including diarrhea and skin conditions (Organization, 2023).

The disposal facilities for feces were markedly associated with skin health complaints (p = 0.011). A considerable proportion of respondents continued to utilize unimproved latrines, particularly hanging latrines devoid of toilets or septic tanks, thereby resulting in the direct discharge of feces into soil or water bodies. Such conditions create favorable environments for flies and other disease vectors, facilitating the transmission of pathogenic microorganisms to human skin.

This observation corroborates the findings of Gumangsari et al., (2025) among communities residing at Endut, Batu Mekar Village (p = 0.010) who indicated a significant association between feces disposal facilities and skin disease complaints. Adequate sanitation serves as a primary barrier against infection by preventing the entry of pathogens into the environment (Freeman et al., 2017). Proper sanitation infrastructure can effectively interrupt the transmission pathways of waterborne pathogens. In Brazil, investments in water and sanitation infrastructure have significantly reduced the number of hospitalizations due to waterborne diseases (Ferreira et al., 2021). Limited ownership of improved sanitation facilities increases the propensity for open defecation practices, thereby elevating the risk of communicable diseases, including skin disorders (Mitjà et al., 2017; Prüss-Ustün et al., 2019).

A majority of respondents reported having open or poorly maintained drainage systems, characterized by stagnant water accumulation, unpleasant odors, and obstruction by solid waste. These environmental conditions encourage the proliferation of disease vectors such as flies and rodents, thereby increasing human exposure to pathogenic microorganisms and elevating the risk of dermatological conditions.

This finding aligns with prior studies by (Zahtamal et al., 2022), which reported a significant association between wastewater disposal systems and skin disease complaints (p = 0.02) among communities residing at Ranah Village. From a public health perspective, improperly treated or untreated domestic wastewater contains high levels of pathogenic bacteria Auma et al., (2025), and onsite wastewater treatment systems such as septic tanks may also contribute to groundwater contamination with fecal indicators and pathogens when their design, location, or operation is inadequate (Humphrey et al., 2024; Wang et al., 2021). Such contamination can increase human exposure through direct or indirect contact with polluted water, potentially contributing to adverse health outcomes, including skin health complaints.

The data indicate that solid waste disposal facilities were not significantly associated with skin health complaints (p = 0. 052). This outcome may be due to the fact that many respondents routinely disposed of household waste at designated temporary collection sites, supported by regular waste collection services. Furthermore, several households reported practicing waste segregation.

Several studies have shown that not all aspects of waste management or exposure to waste facilities are directly associated with skin health complaints. For example, a study conducted in Yogyakarta found no significant relationship between waste management practices and environmental health complaints (p = 0.491) (Ardhianingrum et al., 2025). However, evidence on this association remains limited, as most previous studies have focused on broader health impacts rather than specifically on the association with skin health complaints. Poor solid waste management may increase exposure to pathogenic microorganisms. Supporting this mechanism, a study in Hue, Vietnam comparing residents living within a 2 km radius of a solid waste management facility (SWMF) with those living farther away found a significant association between residential proximity and higher rates of dermatological and gastrointestinal diseases (p < 0.05) (Phan et al., 2021).

Inadequate waste management creates breeding grounds for disease vectors and causes air, soil, and water pollution, thereby indirectly increasing the risk of various diseases in the community, including infections and skin disorders, particularly among residents living near landfill sites (Megna et al., 2017; Tohit et al., 2019). Consequently, ongoing efforts to promote waste segregation, the utilization of covered containers, recycling of inorganic waste, and composting of organic waste are vital components of comprehensive environmental health strategies.

Collectively, the findings indicate that sanitation components related to human waste management and domestic wastewater disposal, particularly feces disposal facilities and wastewater drainage systems, showed the strongest association with skin health complaints in this study. It should be noted that this cross sectional design permits inference of association only and does not establish causality. The findings are consistent with global evidence from low- and middle-income country settings, where inadequate wastewater and excreta management have been identified as key environmental risk factors for skin infections (Freeman et al., 2017).

Association Between Personal Hygiene and Skin Health Complaints

Personal hygiene in this study was assessed using four indicators: bathing habits, hand and nail hygiene, clothing hygiene, and bedding and bed linen hygiene. The results of the Chi-square test demonstrated statistically significant associations for all four variables with skin health complaints.

Bathing habits were found to be statistically significantly associated with skin health complaints (p = 0.001). The findings are consistent with previous studies conducted in Nepal and India. Pathak et al. (2023) reported that less frequent bathing significantly increased the risk of infectious dermatoses among Nepalese children (p = 0.014). Similarly, Haradanhalli et al. (2019) found that not bathing daily was significantly associated with skin diseases among students in an urban school setting in India (p < 0.01).

Furthermore, previous studies have shown that bathing practices and frequency can influence susceptibility to skin conditions. Infrequent bathing has been significantly associated with an increased risk of skin infections. On the other hand, excessively frequent bathing may also damage the skin barrier. Bathing can increase skin pH and reduce natural skin lipids, thereby weakening barrier function and facilitating the penetration of irritants and allergens (Perkin et al., 2024). Collectively, these factors help explain why improper bathing practices may lead to skin dryness, irritation, and increased susceptibility to skin health complaints.

Hand and nail hygiene are also significantly associated with skin health complaints (p = 0.012). Observational findings showed that many respondents did not practice proper handwashing techniques, including not using running water or soap. In addition, irregular nail trimming led to long nails that may cause microabrasions during scratching, thereby facilitating the entry of pathogenic microorganisms.

These results are consistent with previous studies Ginting et al., (2022), in a community-based case–control study, reported that handwashing behavior was significantly associated with dermatitis incidence (p = 0.001). Poor nail conditions, such as splitting, hyperkeratosis, and damaged nail plates, as well as periungual irritation, may compromise the skin barrier and facilitate pathogen colonization, particularly when combined with frequent handwashing and glove use (Brudniak et al., 2025). From a public health perspective, proper handwashing with soap, as recommended by the World Health Organization and the Ministry of Health, remains a simple yet effective preventive measure to reduce the risk of skin infections.

Some respondents reported not changing clothes promptly after sweating during daily activities. Clothing that remains damp with sweat can provide a medium for microbial growth during prolonged skin contact. Previous studies conducted in a coastal Indonesian community reported that poor clothing hygiene was associated with skin disease (p = 0.001) (Sianturi et al., 2025).

Biologically, the accumulation of sweat and dirt on textile fibers can create an environment that promotes excessive microbial growth. When textiles come into direct contact with the skin, sweat, sebum, and microorganisms are transferred to the fabric. Experimental studies have also shown that skin-associated microbes tend to grow more effectively under higher sweat concentrations, highlighting that excessive sweating can provide a favorable substrate for bacterial proliferation (Swaney et al., 2022).

In the multivariate logistic regression, bedding and bed linen hygiene associated with skin health complaints (p = 0.038). A considerable proportion of respondents reported infrequent changing of bed linens and rare sun-drying of mattresses and pillows. Fabrics in direct contact with the skin can serve as reservoirs for bacteria, fungi, and mites. Proper cleaning and maintenance of bed linens, including the use of antimicrobial polymer-treated fabrics, has been shown to significantly reduce total bacterial load and MRSA by approximately 80–87%, suggesting that improved bedding hygiene may reduce the risk of skin-related infections in vulnerable populations (Della Motta et al., 2026; Farid et al., 2025).

Collectively, these findings indicate that personal hygiene dimensions play a consistent and significant role in skin health complaints. As with all cross-sectional findings, however, these associations should not be interpreted as causal relationships. This study reinforces the theoretical framework that interactions between individual behaviors and the household microenvironment are important determinants of community-based skin health outcomes.

CONCLUSION

The results of the Chi-Square test for environmental sanitation variables indicated no significant association between clean water supply and solid waste disposal facilities and skin health complaints. However, there was a significant association between feces disposal facilities and wastewater disposal systems with skin health complaints. Regarding personal hygiene variables, demonstrated significant associations between bathing habits, hand and nail hygiene, clothing hygiene, and bedding and bed linen hygiene with skin health complaints.

Furthermore, in a multivariate logistic regression analysis, two variables remained significantly associated with skin health complaints after simultaneous adjustment are wastewater disposal systems and bedding and bed linen hygiene. It is important to note that this

cross-sectional study establishes statistical association only and does not support causal inference. Nevertheless, among the variables examined, wastewater disposal systems demonstrated the strongest independent association with skin health complaints in the adjusted model among residents of Ibul Besar II Village.

SUGGESTION

Several practical and policy-oriented recommendations are proposed. Strengthening community-based health promotion through Clean and Healthy Living Behavior programs is essential, alongside intensified health education and community empowerment by primary health care providers. At the policy level, local governments should improve access to sanitation infrastructure, including wastewater management systems, hygienic latrines, and safe water supply. Community participation is also crucial, particularly in maintaining household hygiene, avoiding open defecation and improper waste disposal, and improving personal hygiene practices to reduce skin health complaints.

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