

## THE RELATIONSHIP BETWEEN *PERSONAL HYGIENE* AND THE INCIDENCE OF *PITYRIASIS VERSICOLOR* IN SUKAWINATAN LANDFILL SCAVENGERS

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### ABSTRAK

*Pityriasis versicolor* merupakan penyakit kulit superfisial akibat jamur dan telah menjadi masalah kesehatan global. Pemulung yang bekerja di bawah terik matahari dengan perilaku tidak segera mandi setelah bekerja, jarang mengganti pakaian kerja, dan menggunakan handuk yang lembab dapat meningkatkan risiko terjadinya *P. versicolor*. Penelitian ini bertujuan untuk mengetahui hubungan *personal hygiene* dengan kejadian *Pityriasis versicolor* pada pemulung TPA Sukawinatan. Jenis penelitian merupakan analitik observasional dengan desain *cross sectional* dan teknik *total sampling*. Subjek penelitian yang memenuhi kriteria inklusi dan eksklusi berjumlah 48 pemulung. Data *personal hygiene* diperoleh dari kuesioner dan data *P. versicolor* diperoleh dari gejala klinis dan pemeriksaan lampu Wood. Hasil penelitian menunjukkan sebanyak 22,9% pemulung TPA Sukawinatan mengalami *P. versicolor*, melalui uji *Fisher's Exact* terhadap *personal hygiene* dengan kejadian *P. versicolor* menunjukkan nilai *p value* sebesar 0,002 ( $p < 0,05$ ) dan *Prevalence Ratio* (PR) sebesar 5,200 ( $PR > 1000$ ). Oleh karena itu, terdapat hubungan yang bermakna antara *personal hygiene* dengan kejadian *P. versicolor* pada pemulung TPA Sukawinatan.

### ABSTRACT

**The Relationship Between Personal Hygiene and The Incidence of *Pityriasis Versicolor* In Sukawinatan Landfill Scavengers.** *Pityriasis versicolor* is a superficial fungal skin disease and a global health concern. Scavengers working under the scorching sun with behaviors such as not showering immediately after work, rarely changing work clothes, and using damp towels are at an increased risk of developing *P. versicolor*. This study aimed to determine the relationship between personal hygiene and the occurrence of *P. versicolor* among scavengers at the Sukawinatan landfill. The research employed an analytical observational method with a cross-sectional design and total sampling technique. Forty-eight scavengers who met the inclusion and exclusion criteria were included as study subjects. Personal hygiene data were collected through questionnaires, while data on *P. versicolor* were obtained from clinical symptoms and examinations using a Wood's lamp. The results showed that 22.9% of the scavengers at the Sukawinatan landfill had *P. versicolor*. Fisher's Exact test revealed a significant relationship between personal hygiene and the occurrence of *P. versicolor*, with a *p-value* of 0.002 ( $p < 0.05$ ) and a *Prevalence Ratio* (PR) of 5.200 ( $PR > 1.000$ ). In conclusion, there is a significant relationship between personal hygiene and the occurrence of *Pityriasis versicolor* among scavengers at the Sukawinatan landfill.

## INTRODUCTION

*Pityriasis versicolor*, or *tinea versicolor*, is the most common fungal skin disease and has become a global health problem. *Pityriasis versicolor* is caused by dimorphic lipophilic fungi of the genus *Malassezia*.<sup>1</sup> *Malassezia* is part of the normal skin flora but can be potentially pathogenic in excessive sebaceous secretion and high humidity.<sup>2</sup> Hypopigmented or hyperpigmented patches due to *Pityriasis versicolor* can spread and coalesce to become larger and disturb one's body image.<sup>3,4</sup>

In tropical countries, *Pityriasis versicolor* is spread worldwide; its prevalence reaches 50%.<sup>1</sup> Indonesia is a tropical country with high humidity, and the prevalence of fungal infections has reached a high rate. However, until now, there has been no prevalence data regarding *Pityriasis versicolor* in Indonesia.<sup>5</sup> The disease is found in low socioeconomic populations and is associated with personal hygiene.<sup>6</sup> The lack of personal hygiene in *Pityriasis versicolor* sufferers shows the lack of public attention to this disease. In research at the DV Polyclinic of RSMH Palembang, it was found that during the period January 2014 - December 2018, *Pityriasis versicolor* became the most common case of superficial mycosis other than dermatophytes with a percentage of 34.6%.<sup>7</sup>

Personal hygiene is a set of behaviors that help to keep the body clean and healthy, playing a role in health promotion and disease prevention.<sup>8,9</sup> Fungal skin infections are diseases that often affect landfill scavengers. Landfill scavengers do much physical activity that triggers sweating. Poor personal hygiene practices among scavengers, such as not bathing immediately after work, bathing less than twice a day, rarely changing work clothes, and wearing sweaty or damp clothes, affect the incidence of *P. versicolor*.<sup>10</sup>

Research conducted at Darul Yatim Demak Orphanage showed no influence between personal hygiene and the incidence of *Pityriasis versicolor*.<sup>11</sup> However, research on male students at Pondok Pesantren Nurul Haramain NW Narmada showed a significant relationship between poor personal hygiene and the prevalence of *Pityriasis versicolor* 58.7%.<sup>12</sup> Research on students at the boarding school in Pondok Pesantren Qodratullah Langkan showed an influential relationship between personal hygiene and the incidence of *Pityriasis versicolor* 64.8%.<sup>13</sup>

Proper knowledge and behavior about personal hygiene can improve personal health.<sup>14</sup> Sukawinatan landfill scavengers, whose activities produce much sweat, can trigger skin health problems such as *Pityriasis versicolor* if they do not apply good personal hygiene. Although *Pityriasis versicolor* is common and mild, it can cause emotional distress, lack of confidence, and negative stigma, affecting a person's quality of life.<sup>15</sup> If left untreated, cases of *Pityriasis versicolor* in landfill scavengers will increase and cause recurrence. Although previous studies have examined personal hygiene and *Pityriasis versicolor* among students and pesantren populations, no studies have been conducted among landfill scavengers a high-risk group frequently exposed to humid and unhygienic environments. Therefore, this study provides novel insights into the relationship between personal hygiene and *Pityriasis versicolor* incidence in scavengers at the Sukawinatan landfill.

## METHODS

This type of research is an observational analytic with a cross-sectional design from April to October 2024. The research sample comprised Sukawinatan landfill scavengers who were taken by total sampling. The sample size was 48 scavengers who fulfilled the inclusion and exclusion criteria. Inclusion criteria included scavengers at the Sukawinatan landfill who were willing to participate

by signing informed consent and were actively working at the site. Exclusion criteria included scavengers who were not present during data collection, those who were undergoing treatment or had received therapy for *Pityriasis versicolor* within the last 14 days, and those with a history of immunodeficiency diseases such as diabetes mellitus or HIV infection. Personal hygiene data on landfill were collected using a questionnaire consisting of three components of personal hygiene: skin hygiene, clothing hygiene, and towel hygiene.

Diagnosis of *Pityriasis versicolor* was established based on anamnesis, physical examination, and supporting examination using a Wood's lamp. The anamnesis included questions about the presence of hypopigmented or hyperpigmented patches, enlargement of the lesions, and itching—especially when sweating. Physical examination was performed to observe hypopigmented or hyperpigmented scaly patches on the skin. The Wood's lamp examination showing yellow–orange fluorescence in positive cases. Subjects were instructed not to wash the examined area before the test, and to close their eyes during the procedure to prevent corneal injury. The result was considered positive for *Pityriasis versicolor* if both characteristic clinical symptoms and yellow–orange fluorescence were present. If neither clinical symptoms nor fluorescence were found, the result was negative for *Pityriasis versicolor*. The Wood's lamp examination and interpretation were performed by trained researchers under the supervision of a general practitioner. The data will be processed and analyzed using univariate and bivariate analysis with Chi-Square or Fisher's Exact test. This study received ethical approval from the Health Research Ethics Committee, Faculty of Medicine, Universitas Sriwijaya (Protocol No. 375-2024).

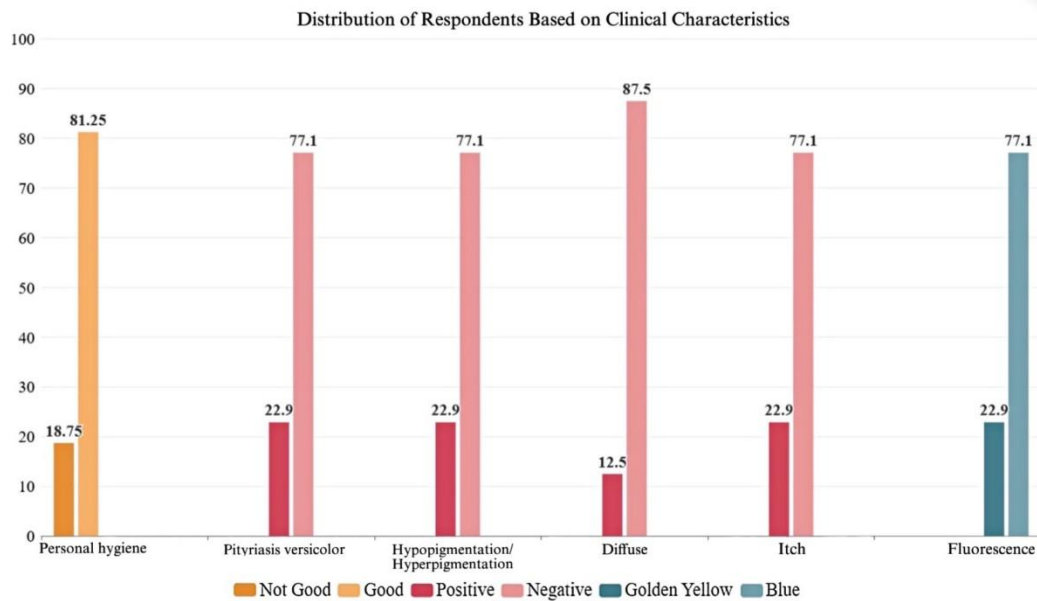
## RESULTS

### Univariate Analysis

**Table 1: Distribution of Respondents Based on Sociodemographic Characteristics**

| Variabel                   | Jumlah (n) | Persentase (%) |
|----------------------------|------------|----------------|
| <b>Usia</b>                |            |                |
| Muda (< 15 tahun)          | 0          | 0              |
| Produktif (15 – 64 tahun)  | 48         | 100            |
| Non produktif (≥ 65 tahun) | 0          | 0              |
| <b>Jenis Kelamin</b>       |            |                |
| Laki-laki                  | 23         | 47,9           |
| Perempuan                  | 25         | 52,1           |
| <b>Pendidikan</b>          |            |                |
| Tidak bersekolah           | 4          | 8,3            |
| SD                         | 19         | 39,6           |
| SMP                        | 8          | 16,7           |
| SMA/SMK                    | 16         | 33,3           |
| Strata 1                   | 1          | 2,1            |

Table 1 shows the distribution of respondents based on age, gender, and education. The respondents in this study were in the productive age range (15 - 64 years), as many as 48 people (100%). In the research at TPA Sukawinatan, the female gender dominated, totaling 25 people (52.1%). The respondents education level was dominated by elementary school graduates, with as many as 19 people (39.6%) of the total respondents.



**Figure 1. Distribution of Respondents Based on Clinical Characteristics**

Figure 1 presents a graph of the distribution of respondents based on personal hygiene assessed from three components, namely skin hygiene, clothing hygiene, and towel hygiene. Based on the assessment of personal hygiene in general, nine people (18.75%) were in the poor personal hygiene category out of the total respondents. In addition, there is an incidence of *P. versicolor* based on clinical symptoms and fluorescence findings. Clinical symptoms in hypopigmented or hyperpigmented patches and itching were found in 11 people (22.9%), and as many as six people (12.5%) had diffuse patches from all respondents. All respondents with clinical symptoms continued with Wood's lamp examination; 11 people (22.9%) had golden yellow fluorescence, and 37 people (77.1%) had blue fluorescence under Wood's lamp on normal skin. Based on the study's results, 11 respondents (22.9%) were optimistic about *P. versicolor*, and 37 (77.1%) were pessimistic about *P. versicolor*.

**Table 2. Distribution of *Pityriasis versicolor* Positive Respondents Based on Predilection (n=11)**

| Predilection       | Number (n) | Percentage (%) |
|--------------------|------------|----------------|
| Back               | 8          | 72,7           |
| Neck               | 1          | 9,1            |
| Chest              | 1          | 9,1            |
| Between the Thighs | 1          | 9,1            |
| <b>Total</b>       | <b>11</b>  | <b>100</b>     |

Table 2 presents the distribution of optimistic respondents for *P. versicolor* (n=11) based on the examination location. The study showed that eight people (72.7%) were found in the back area and one person (9.1%) each in the neck, chest, and between the thighs.

### Bivariate Analysis

Table 3 presents the relationship of all independent variables to the incidence of *P. versicolor*. Based on the results of the study, the relationship between personal hygiene and the

incidence of *P. versicolor* showed a significant relationship with a p-value = 0.002 ( $p < 0.05$ ) and PR = 5.200 (PR > 1.000), indicating that respondents with poor personal hygiene had a chance of developing *P. versicolor* by 5.200 times compared to respondents with good personal hygiene. Furthermore, the relationship between skin hygiene and the incidence of *P. versicolor* did not show a significant relationship with a p-value = 0.221 ( $p > 0.05$ ). The relationship between clothing hygiene and the incidence of *P. versicolor* had a p-value = 0.327 ( $p > 0.05$ ), indicating no significant relationship between clothing hygiene and the incidence of *P. versicolor*. The relationship between towel hygiene and the incidence of *P. versicolor* also showed no significant relationship with a p-value = 0.235 ( $p > 0.05$ ).

Table 3. Bivariate Analysis Results

| Variables          | Pityriasis versicolor |      |          |      |       |     | PR<br>(95% CI)   | p_value |
|--------------------|-----------------------|------|----------|------|-------|-----|------------------|---------|
|                    | Positive              |      | Negative |      | Total |     |                  |         |
|                    | n                     | %    | n        | %    | n     | %   |                  |         |
| Personal hygiene   |                       |      |          |      |       |     |                  |         |
| Not good           | 6                     | 66,7 | 3        | 33,3 | 9     | 100 | 5,200            | 0,002   |
| Good               | 5                     | 12,8 | 34       | 87,2 | 39    | 100 | (2,032 - 13,309) |         |
| Skin Hygiene       |                       |      |          |      |       |     |                  |         |
| Not good           | 2                     | 66,7 | 2        | 33,3 | 4     | 100 | 2,444            | 0,221   |
| Good               | 9                     | 12,8 | 35       | 87,2 | 44    | 100 | (0,782 - 7,644)  |         |
| Clothing Hygiene   |                       |      |          |      |       |     |                  |         |
| Not good           | 3                     | 42,9 | 4        | 57,1 | 7     | 100 | 2,196            | 0,327   |
| Good               | 8                     | 19,5 | 33       | 80,5 | 41    | 100 | (0,763 - 6,324)  |         |
| Towel Cleanliness* |                       |      |          |      |       |     |                  |         |
| Not good           | 7                     | 30,4 | 16       | 69,6 | 23    | 100 | 1,902            | 0,235   |
| Good               | 4                     | 16,0 | 21       | 84,0 | 25    | 100 | (0,639 - 5,659)  |         |

Description:

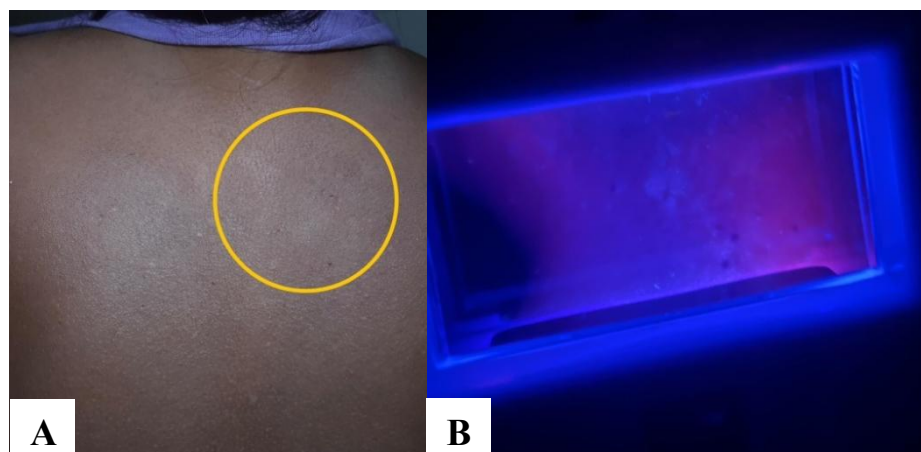
\* = Chi-Square test

## DISCUSSION

The prevalence of *P. versicolor* in scavengers of the Sukawinatan landfill in Palembang City, whose diagnosis was confirmed by clinical symptoms, and Wood's lamp examination found golden yellow fluorescence of 22.9% ( $n = 48$ ). Research conducted by Wardana in 2020 at Pondok Pesantren Darussa'adah Mojo Agung Lampung Tengah found the prevalence of *P. versicolor* as much as 21.4% ( $n = 70$ ) from the examination of clinical symptoms and the findings of "spaghetti and meatballs" through skin scrapings with 10% KOH.<sup>16</sup> In contrast to previous studies, a study conducted by Nasution and Hazlianda in 2024 at SMAN 1 Medan showed a lower prevalence of 17% ( $n=100$ ) positive for *P. versicolor*.<sup>17</sup> Variations in the prevalence of *P. versicolor* can be caused by various factors such as different numbers of respondents/samples, internal risk factors such as immune deficiency, genetics, level of knowledge, and external risk factors such as environment (temperature and humidity), and personal hygiene.<sup>2</sup>

Research conducted on Sukawinatan landfill scavengers showed that all scavengers who were positive for *P. versicolor* developed clinical symptoms in the form of hypopigmented or hyperpigmented patches based on the anamnesis results and physical examination. Continuous exposure to sunlight stimulates the production of azelaic acid by *Malassezia* and causes the appearance of hypopigmented patches on darker skin colors. Azelaic acid inhibits the tyrosinase enzyme, destroys melanocytes, and disrupts melanin production. The pityrialactone contained in *Malassezia spp.* It causes absorption and filtration of ultraviolet rays from sun exposure and disrupts the normal skin equalization process.<sup>18</sup>

Hyperpigmented lesions are caused by a thicker corneal layer, larger melanocytes, and inflammatory reactions due to having a higher number of causative agents.<sup>18</sup> Most *P. versicolor*-positive scavengers have patches on their backs, as *Malassezia spp.* Fungi depend on exogenous lipids because they lack fatty acid synthase genes, so they grow in areas of the skin with high oil content, such as the head, neck, and back. In addition, combined lesions can also be caused due to the asymptomatic nature of *P. versicolor*, resulting in unawareness of the infection.<sup>19</sup> The prevalence of itching depends on the area of fungal involvement and predisposing factors such as sun exposure, bathing, and sweating. This suggests that a moist environment increases the virulence of the fungus, which manifests as itching.<sup>20</sup>



**Pityriasis versicolor lesion findings on the back (A). Wood lamp examination with golden yellow fluorescence (B).**

All Sukawinatan landfill scavengers who were positive for *P. versicolor* in this study had golden yellow fluorescence under Wood's lamp. The golden yellow fluorescence color can appear because the skin contains natural phosphors such as collagen and elastin, so when UV light irradiates, invisible light becomes visible.<sup>21</sup> The different fluorescence colors in *P. versicolor* cases are due to different causative agents. *M. globosa* causes a yellow-orange or greenish-yellow fluorescence color due to the porphyrin content of pityrialactone.<sup>21</sup> The golden yellow fluorescence color on Wood's lamp examination is caused by *M. furfur* because it produces fluorochrome pigments with tryptophan as the only nitrogen.<sup>18</sup>

Based on the results of research at the Sukawinatan Landfill, Palembang City, with the Fisher's Exact method as an alternative test, it was found that there was a significant relationship between personal hygiene and the incidence of *P. versicolor* with a p-value = 0.002 and a PR value = 5.200 (95% CI = 2.032 - 13.309). These results are in line with research conducted by Irwanto & Prakoeswa in 2023 at Pondok Pesantren Al-Muayyad Surakarta, which showed a p-value = 0.000, which means there is a significant relationship between personal hygiene and the incidence of *P.*

*versicolor*.<sup>22</sup> In addition, there is also research on residents in Bulak Banteng Village, Kenjeran District, Surabaya City by Azzahra in 2024, which shows a p-value = 0.000 where there is a significant relationship between personal hygiene and the incidence of *P. versicolor* skin disease.<sup>22</sup> In contrast, research conducted at the Darul Yatim Demak Orphanage by Zahra showed no significant relationship between personal hygiene practices, which include bathing practices, towel exchange, and clothing exchange, with the incidence of *P. versicolor* with a p-value = 0.382.<sup>11</sup> In this study, apart from exogenous factors, endogenous factors can influence such as immune deficiency. Poor immunity can be one of the factors of *P. versicolor*.<sup>2</sup> This study's research sample consisted of scavengers who fulfilled the inclusion and exclusion criteria. Sukawinatan landfill scavengers were asked about their history of immunodeficiency disease so as not to bias the results between the influence of endogenous factors and exogenous factors that can affect the occurrence of *P. versicolor*.

Poor towel hygiene practices are the highest among skin and clothing hygiene practices. In line with research conducted in RT 01 RW 07 Bulak Banteng Village, Surabaya City, by Azzahra, I will win them more together for daily bathing.<sup>22</sup> However, research conducted by Tumilaar on male students of the Faculty of Medicine, Sam Ratulangi University class of 2015 - 2018 showed that 61.9% (n = 42) dried towels outside.<sup>23</sup> in the towel hygiene component. This can be different because, based on the observations, questions, and answers, related elementary school education has the highest value of 19 people (39.6%). Most Sukawinatan landfill scavengers do not know the importance of using and cleaning towels.

Paying attention and keeping clothes clean is an effort to prevent *P. versicolor* infection.<sup>24</sup> The use of clothing is in direct contact with the skin, so clothes absorb a lot of sweat, fat, and dirt released by the body, which can become breeding grounds for fungi on the skin.<sup>6</sup> Based on the results of observations and questions and answers, respondents who do not dry clothes outdoors or under direct sunlight are due to lack of room or land for drying. In addition, the behavior of rarely changing clothes after work can be caused by the limited number of clothes. As a result, the clothes used for work are rarely washed.

Hot and humid environmental conditions and high activity make a person sweat easily. Sweat that stays on the skin for a long time will become a place for *P. versicolor* to live.<sup>25</sup> Unclean and unkempt skin can become a place for the growth and development of *Malassezia spp.*<sup>23</sup> Based on the results of observations and questions and answers, respondents who work from morning to evening have hours of rest but do not have time to clean themselves and after finishing work the respondent does not immediately shower because of fatigue so rest first.

In respondents with good personal hygiene but positive for *P. versicolor*, it can be caused by a person with a long time exposure under the sun, causing excessive sweat output and resulting in the growth of fungi that cause *P. versicolor*.<sup>17</sup> In addition, based on the research results, it was found that all respondents had an age in the productive range (15 - 64 years), where sebum production by the sebaceous glands increased.

This study demonstrated a significant association between personal hygiene and the incidence of *P. versicolor* among scavengers at the Sukawinatan landfill. However, several limitations should be acknowledged. The personal hygiene data were obtained from self-reported questionnaires, which may lead to reporting bias. Other potential confounding factors such as immune status, genetic predisposition, environmental conditions, and socioeconomic factors were not fully controlled. Furthermore, the diagnosis of *P. versicolor* was based on clinical features and Wood's lamp examination without microscopic confirmation.

Despite these limitations, this study contributes to the development of medical science by highlighting the influence of hygiene behavior on fungal skin infections in high-risk populations. These findings can serve as a reference for preventive strategies and public health interventions in similar environments. Further studies with larger sample sizes and broader variable analysis including knowledge level, occupation, and environmental factors are recommended to strengthen the evidence.

## CONCLUSIONS

The prevalence of *P. versicolor* in scavengers of the Sukawinatan landfill in Palembang City was 22.9%, and as many as 18.75% had poor personal hygiene. Based on the study's results, there was a significant relationship between personal hygiene and the incidence of *P. versicolor* in scavengers of the Sukawinatan landfill in Palembang City. It is recommended that health education programs be conducted among scavengers to improve personal hygiene practices and reduce the incidence of *P. versicolor*. Regular screening and provision of hygiene facilities at the landfill site are also suggested.

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