



The Effectiveness of Betel Leaf Herbal Soap in Reducing Bacterial Contamination on Fishermen's Hands with Contact Dermatitis Incidents in Pasar Belakang Subdistrict, Sibolga City District in 2025

Meiyati Simatupang

Public Health Study Program, STIKes Nauli Husada Sibolga

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ABSTRACT

Contact dermatitis is a skin health problem often experienced by fishermen due to exposure to seawater, sunlight, and suboptimal hand hygiene. This study aims to determine the effectiveness of betel leaf herbal soap (*Piper betle* L.) in reducing bacterial contamination on the hands of fishermen with contact dermatitis incidents in Pasar Belakang Village, Sibolga City District. The study design used was a pre-experimental one group pretest-posttest. The study sample consisted of 30 fishermen who used betel leaf soap twice a day for 14 days. Data were collected through symptom observation and laboratory tests on the number of bacteria on the hands, then analyzed using a paired t-test. The results showed a significant decrease in the average score of contact dermatitis symptoms from 5.4 to 2.1, as well as a decrease in the number of bacterial colonies with a p value = 0.000. This proves that betel leaf herbal soap is effective in reducing bacterial contamination and reducing symptoms of contact dermatitis in fishermen.

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Corresponding Author:

Meiyati Simatupang,
S1 Public Health Study Program
STIKes Nauli Husada Sibolga,
Jln. Kader Mani No.02 Kelurahan Aek Muara Pinang Sibolga Selatan,
Email: Meiyati1965@gmail.com

1. Introduction

Contact dermatitis is one of the most common occupational skin diseases, especially among informal sector workers such as fishermen. (Dermatis, 2024), (Asa, 2024) Exposure to sea water, sunlight, and poor hand hygiene are the main factors that increase the risk of skin irritation and infection. (Annisia & Annisa, 2023), (Septiana, 2023). World Health Organization (WHO) data in 2020 recorded more than 130 million cases of dermatitis globally, while in Indonesia the prevalence of dermatitis reached 6.8% according to the 2018 Basic Health Research (Riskesdas). Fishermen as a coastal community group are very vulnerable due to limited access to sanitation and low knowledge about skin care. (Amraeni & Nirwan, 2021), (My Asi, 2022).

One potential solution is the use of local herbal ingredients as natural antiseptics. (Auriella et al., 2024), (Suliasih & Mun'im, 2022) Betel leaves (*Piper betle* L.) have long been used in traditional medicine due to their active compounds, such as eugenol, cavicol, and tannins, which have antibacterial, antifungal, and anti-inflammatory effects. Several previous studies have shown that betel leaf extract is effective in inhibiting bacterial growth and accelerating the healing of minor wounds. (Laksmidara et al., 2024), (Triantari, 2024).

However, research related to the use of betel leaf extract-based soap as a bacterial contamination prevention agent in fishing groups is still limited.(Lampulo, Arfi, & ferdiansyah Alhafizh, 2019),(Wardani & Saleh, 2021)Based on this, this study was conducted to evaluate the effectiveness of betel leaf herbal soap in reducing bacterial contamination on fishermen's hands and its relationship with reducing symptoms of contact dermatitis.(Umami, 2019)The research results are expected to provide an alternative, safe, affordable, and locally context-appropriate preventive solution for coastal communities in maintaining skin hygiene and preventing occupational skin diseases.(Shaleha, Saputra, Hayati, & Rahayu, 2023),(Surahman, Surahman, & Apt, 2016).

2. Methods

2.1 Research Design

This study used a pre-experimental one-group pretest-posttest design. This design was chosen to evaluate the effectiveness of using betel leaf (*Piper betle* L.) herbal soap in reducing bacterial contamination on fishermen's hands and reducing symptoms of contact dermatitis.(Sutanto, 2021),(Mizrotun, Tivani, & Purwantiningrum, 2021)In this design, respondents are given treatment in the form of using betel leaf soap, then their conditions are measured before (pretest) and after the intervention (posttest) to determine any differences that occur.

2.2 Population and Sample

The population in this study were all fishermen living in Pasar Belakang Village, Sibolga City District, in 2025. The research sample consisted of 30 fishermen selected based on inclusion criteria, namely fishermen who were actively working, had a history of mild to moderate contact dermatitis symptoms, and were willing to participate in the intervention of using betel leaf herbal soap during the study period. The sampling technique was carried out using a purposive sampling method to ensure that respondents were in accordance with the research objectives. All respondents were given the same treatment, namely the use of betel leaf soap twice a day for 14 consecutive days.(Hasanah & Dewi, 2020),(Ernawati, 2018).

2.3 Data Collection Techniques and Instrument Development

Data collection was carried out in two stages, namely clinical examination of contact dermatitis symptoms and laboratory testing of the number of bacteria on respondents' hands.

a. Primary Data

Clinical observation: conducted to assess the severity of contact dermatitis, including redness, itching, and irritation of the skin on the hands. Assessments were conducted before and after the intervention. Microbiological examination: hand swabs were taken from respondents before and after the intervention, and bacterial colony counts were performed in the microbiology laboratory.

b. Research Instruments

Contact dermatitis symptom observation sheet. Bacterial culture media for colony count measurement. Betel leaf herbal soap formulated with specific concentrations.

c. Secondary Data

Information on the number of dermatitis sufferers in the research area was obtained from reports from the local Community Health Center and Health Service.

2.4 Analysis Techniques

This research data analysis uses:

a. Univariate Analysis

Used to describe respondent characteristics, the distribution of contact dermatitis symptoms, and the number of bacterial colonies before and after the intervention. The analysis results are presented in the form of frequency distribution tables, averages, and percentages.

b. Bivariate Analysis

This study was used to test the effectiveness of betel leaf herbal soap in reducing contact dermatitis symptoms and bacterial colony counts. The statistical test used was a paired t-test with a 95% significance level ($\alpha = 0.05$). Results were considered significant if the p-value was <0.05 .

3. Results and Discussion

Based on the table above, it can be seen that of the 70 respondents, the majority, 54 respondents (77.6%), had inadequate rabies prevention measures. Meanwhile, only 16 respondents (22.4%) had adequate rabies prevention measures. This data indicates that rabies prevention measures in Pondok Batu Village are still relatively low.

Age Group	Frequency (n)	Percentage (%)
< 30 years	5	16.7
30–39 years	12	40.0
40–49 years	8	26.7
≥ 50 years	5	16.6
Total	30	100

Based on Table 1, the majority of respondents were in the 30–39 age group (12 people (40.0%), followed by the 40–49 age group (8 people (26.7%). The <30 and ≥50 age groups each had 5 people (16.7% and 16.6%), respectively. This indicates that most respondents were of productive age and actively worked as fishermen, thus exposing them to greater risk factors for contact dermatitis.

Symptom Categories	Before Intervention (n%)	After Intervention (n%)
Light	6 (20.0%)	18 (60.0%)
Currently	18 (60.0%)	10 (33.3%)
Heavy	6 (20.0%)	2 (6.7%)
Total	30 (100%)	30 (100%)

Table 2 shows the distribution of contact dermatitis symptoms before and after the intervention. Before the intervention, moderate symptoms dominated, with 18 people (60.0%), followed by mild symptoms with 6 people (20.0%) and severe symptoms with 6 people (20.0%). After the 14-day intervention with betel leaf herbal soap, the number of respondents with mild symptoms increased to 18 people (60.0%), while moderate symptoms decreased to 10 people (33.3%), and severe symptoms remained with only 2 people (6.7%).

Measurement	Average Score	Standard Deviation
Before Intervention	5.4	1.2
After Intervention	2.1	0.9

Table 3 shows a decrease in the mean contact dermatitis score from 5.4 (SD=1.2) before the intervention to 2.1 (SD=0.9) after the intervention. These results demonstrate a significant clinical improvement in contact dermatitis symptoms in fishermen.

Measurement	Colony Average ($\times 10^3$ CFU/ml)	Standard Deviation	p-value
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Before Intervention	125	30	-
After Intervention	48	15	0,000

Table 4 shows that the average number of bacterial colonies before the intervention was 125×10^3 CFU/ml (SD=30), while after the intervention it decreased to 48×10^3 CFU/ml (SD=15). The paired t-test yielded a p-value of 0.000, thus concluding that betel leaf herbal soap had a significant effect in reducing bacterial contamination on respondents' hands.

4. Conclusion

The majority of respondents were fishermen of productive age, primarily aged 30–39 years (40%). Contact dermatitis symptoms decreased from moderate (60%) to mild (60%) after the intervention. The average contact dermatitis score decreased from 5.4 to 2.1 after using betel leaf herbal soap. The number of bacterial colonies on respondents' hands decreased significantly from 125×10^3 CFU/ml to 48×10^3 CFU/ml ($p=0.000$). Betel leaf herbal soap was proven effective in reducing bacterial contamination and improving contact dermatitis symptoms in fishermen.

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