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The Use of Herbal Preparations of Sour Turmeric and Betel Leaf on the Duration of Accelerated Healing in Adolescent Girls Who Experience Recurrent Vaginal Discharge in Palembang

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Abstract: Recurrent vaginal discharge is a common problem among adolescent girls and may cause discomfort and affect daily activities. Herbal preparations such as sour turmeric (Curcuma xanthorrhiza) and betel leaf (Piper betle L.) are known for their antibacterial and anti-inflammatory properties that may accelerate the healing process. This study aimed to compare the effectiveness of sour turmeric and betel leaf herbal preparations in accelerating the healing duration of recurrent vaginal discharge among adolescent girls in Palembang in 2024. This experimental study used a two-group post-test-only design. The independent variable was the type of herbal preparation (sour turmeric and betel leaf), while the dependent variable was the duration of accelerated healing. The sample consisted of junior high school and Islamic boarding school students who experienced recurrent physiological vaginal discharge. Data were analyzed using the independent t-test with a significance level of 0.05. The findings showed a significant difference in healing duration between the two groups ($p < 0.05$). The betel leaf group experienced a faster recovery, with an average healing time 2.3 days shorter than the sour turmeric group. Betel leaf herbal preparation was more effective in accelerating the healing of recurrent vaginal discharge compared to sour turmeric. It is recommended for women as a natural alternative therapy for managing vaginal discharge.

Keywords: Adolescent girls; Betel leaf; Herbal therapy; Sour turmeric; Vaginal discharge

Introduction

Vaginal discharge is a common condition experienced by women worldwide, including in Indonesia. Medically, vaginal discharge refers to the release of fluid from the vagina that varies in color, consistency, and quantity. While physiological vaginal discharge plays an essential role in maintaining vaginal moisture and cleaning dead cells, abnormal discharge may indicate infection or other pathological conditions (Gao et al., 2021; Imam et al., 2024; Kulsum, 2020; Sim et al., 2020).

According to Indonesian health statistics Ministry of Health of the Republic of Indonesia (2020) unhealthy behavior among the 43.3 million adolescents aged 15–24 years has contributed to the increased incidence of vaginal discharge. More than 70% of Indonesian women experience vaginal discharge caused by fungal or parasitic infections such as *Candida albicans* or *Trichomonas vaginalis*. Indonesia's high humidity and

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tropical climate create a favorable environment for the growth of microorganisms that cause vaginal infections.

In South Sumatra Province, health profile data showed that 35% of 40,580 adolescent girls experienced vaginal discharge in 2021. Although there was a temporary decline in 2022, the number increased again in 2023, reaching 35% of 40,662 adolescents. These fluctuations indicate that vaginal discharge remains a significant reproductive health issue among adolescents, influenced by hygiene practices, limited access to health education, and environmental factors (Ihsanpuro, 2025; Kenzi et al., 2024; Saadah et al., 2024).

In the modern era, the use of traditional herbal medicine remains prevalent in Indonesia. The Basic Health Research (Riset kesehatan dasar, 2018) reported that 48% of the population uses ready-made herbal preparations, 31.8% still prepare herbs at home, and 24.6% rely on family medicinal plants (*TOGA*). This shows a strong public trust in herbal medicine as an alternative to pharmacological treatment. Non-pharmacological interventions can be effective in treating vaginal discharge, as they utilize natural bioactive compounds with antibacterial and anti-inflammatory effects while minimizing side effects commonly associated with antibiotics (Abdy et al., 2019).

One of the most widely used herbal plants for vaginal health is the betel leaf (*Piper betle L.*), which has long been recognized in traditional medicine for its antiseptic and antimicrobial properties (Etnis et al., 2021). The essential oils in betel leaf contain phenolic compounds such as chavicol and eugenol, which inhibit bacterial growth and reduce inflammation (Maulidiyah, 2020). Meanwhile, sour turmeric (*Curcuma xanthorrhiza Roxb.*) contains curcumin and xanthorrhizol, known for their potent antibacterial, antioxidant, and anti-inflammatory activities that help restore vaginal flora balance and accelerate tissue healing (Khopipah, 2024).

Previous research by Marwang et al. (2024) demonstrated that a decoction of betel leaf and turmeric effectively reduces vaginal discharge in adolescent girls due to the synergistic effects of their essential oils. However, comparative studies examining the difference in healing duration between sour turmeric and betel leaf preparations remain limited. Therefore, this study was conducted to determine the comparative effectiveness of sour turmeric and betel leaf herbal preparations on the duration of accelerated healing in adolescent girls experiencing recurrent vaginal discharge in Palembang. This research is expected to provide scientific evidence supporting the use of natural herbal preparations as a complementary approach in maintaining adolescent reproductive health.

Method

This study aimed to determine the effect of sour turmeric and betel leaf herbal preparations on the duration of accelerated healing in adolescent girls who experienced recurrent vaginal discharge in Palembang in 2024. The study was conducted for three months, from October to December 2024.

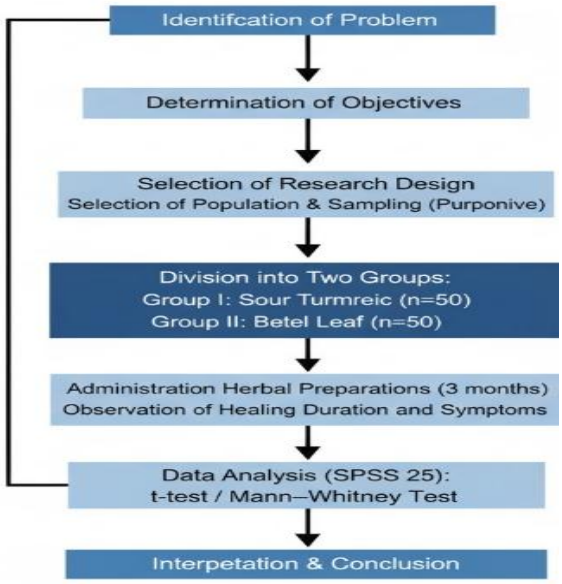

Figure 1. Flowchart

Research Design

This research employed a quasi-experimental design with a two-group post-test-only approach. The independent variable was the type of herbal preparation (sour turmeric and betel leaf), and the dependent variable was the duration of accelerated healing of vaginal discharge.

Population and Sample

The study population consisted of adolescent girls (junior high school and Islamic school students) in Palembang who experienced recurrent vaginal discharge. A total of 100 respondents were included in the study and divided equally into two groups using purposive sampling: (a) Group I (n = 50): Received sour turmeric herbal preparation. (b) Group II (n = 50): Received betel leaf herbal preparation.

Data Collection Procedure

a) Screening and recruitment of participants who met inclusion criteria (adolescent girls experiencing recurrent physiological vaginal discharge).
b) Grouping of participants into two treatment groups.

c) Administration of herbal preparations for a determined duration under supervision.
d) Observation and recording of healing duration (days until symptoms subsided).
e) Data analysis using statistical tests.

Data Analysis

Data were analyzed using univariate (to describe respondents' characteristics) and bivariate (to determine differences between groups) analyses. The Independent Sample *t*-test was used if data were normally distributed. The Mann–Whitney test was applied if data were not normally distributed. All analyses were performed using SPSS version 25 with a significance level of $p < 0.05$.

Result and Discussion

Based on the data in table 1, it is known that the description of each of the research variables is as follows, namely the average length of time to heal vaginal discharge in the group of sour turmeric herbal preparations is 9.00, the median is 9.00, the standard deviation is 1.826 (95% CI 7.69 -10.31) with the fastest time being 6 days and the latest time being 12 days. Meanwhile, the average healing time of vaginal discharge in the betel leaf herbal preparation group was 6.70, the median 5.53 standard deviation was 1.636 (95% CI 5.53 -7.87) with the fastest time being 4 days and the latest time being 9 days.

Based on table 2 above, it can be seen that the difference in the time difference in the healing days in the sour turmeric and betel leaf groups is 2.3 days. This means that the time in the day of healing of vaginal discharge is faster, the betel leaf group ± 2-3 days faster in the sour turmeric group.

Table 1. The average length of time the group healed was given sour turmeric herbal preparations and betel leaf herbal preparations

Variable	Mean Median	SD	Min- Max	CI 95%
Sour Turmeric Herbal Preparations	Mean : 9.00 Median : 9.00	1.826	6-12	7.69-10.31
Betel Leaf Herbal Preparations	Mean : 6.70 Median : 5.53	1.636	4-9	5.53 – 7.87

Table 2. Difference in the Average Length of Healing Time of the Group Given Herbal Preparations of Sour Turmeric and Betel Leaves

Duration of Accelerated Healing of Vaginal Discharge	Group		Difference
	Sour Turmeric	Betel Leaf	
Drop Time in Days	9.00	6.70	2.3

Table 3. Normality Test Results

	Kolmogorov - smirnov			Shapiro - wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
Sour Turmeric	.108	10	.200*	.984	10	.982
Betel Leaf	.187	10	.200*	.934	10	.487

Table 3 shows the results of the normality test using *Shapiro-Wilk* values of 0.982 (sour turmeric) and 0.487 (betel leaf). Since the p-value of the Shapiro-Wilk test > 0.05, it can be concluded that the data is normally distributed. Based on these results, the statistical analysis used in this study is a *parametric test* , namely an independent sample t test, to draw conclusions from the hypothesis test.

Table 4. Analysis of the Use of Sour Turmeric and Betel Leaf Herbal Preparations on the Duration of Accelerated Healing in Adolescent Girls Who Experience Recurrent Vaginal Discharge in Palembang in 2024

Groups	N	t	Asymp. Sig (2 – Talled
Sour Turmeric	50	2.967	0.008
Betel Leaf	50		

Based on the results of the independent sample t test different test research, it is known that Asymp. Sig (2 – Talled) has a value of 0.008, because 0.008 < 0.05 it can be concluded that the hypothesis is accepted. This means that there is a difference in the use of sour turmeric and betel leaf herbal preparations on the length of accelerated healing in adolescent girls who experience recurrent vaginal discharge in 2024.

The results of the study showed that there was a significant difference in the healing time of vaginal discharge in adolescent girls who consumed herbal preparations of sour turmeric and betel leaves. In the group that consumed betel leaves, the healing of vaginal discharge occurred faster with an average difference of about 2-3 days compared to the group that consumed sour turmeric.

This study is not in line with the Marwang et al. (2024) study which explained that there was no significant difference in the administration of betel leaf decoction and turmeric decoction to overcome vaginal discharge, in this case both betel leaf decoction and turmeric decoction can both overcome vaginal discharge.

Vaginal discharge (fluor albus, white discharge, lukorea) is a symptom of discharge from the vagina other than menstrual blood. Vaginal discharge (fluorine albus) is physiological (normal) and some are pathological (abnormal). Albus fluorine can be described as a normal (physiological) condition or as a sign of a disease (pathological). Normal albus fluorine is usually clear to whitish, odorless and does not cause complaints. Pathological albus fluorine is characterized by the presence of a yellowish/greenish/grayish color, fishy/rotten smell, the amount of secrets is generally large and causes complaints such as itching, redness (erythema), edema, burning in the intimate area, pain during sexual intercourse (dyspareunia) or pain when urinating (Yunita et al., 2023).

The triggering factors of vaginal discharge can be divided into two, namely infectious factors and non-infectious factors. Infection factors can be caused by bacteria, fungi, parasites, or viruses. Meanwhile, non-infectious factors are caused by poor cleanliness of the vaginal area, the entry of foreign objects, rarely changing underwear and sanitary napkins during menstruation, improper menstrual care, and the use of pants that do not absorb sweat (Khopipah, 2024).

The impact of vaginal discharge Normal and abnormal vaginal discharge has an effect on women. Normal vaginal discharge causes discomfort in women so that it can affect their confidence. Pathological vaginal discharge that lasts continuously will interfere with the function of the female reproductive organs, especially in the ovarian canal, which can cause infertility (Saputri et al., 2023).

Turmeric rhizome (*Curcuma domesticae*) is a medicinal plant belonging to the Zingiberaceae family. This plant has long been used in traditional medicine because of its active compound content, including steroid compounds, saponins, flavonoids, glycosides, curcumin, essential oils, tannins, and alkaloids (Risviana et al., 2024). These compounds provide a wide range of therapeutic effects, including anti-inflammatory, antimicrobial, and antioxidant properties. The concentration of turmeric rhizome extract that showed the largest inhibitory zone against microorganisms was at a concentration of 45%, with an inhibitory zone diameter of 12.5 mm, which is included in the category of strong inhibitors (Tahir et al., 2024).

Meanwhile, another study by Khopipah (2024) showed that the concentration of turmeric extract that effectively inhibits fungal growth was 0.005% (w/v), with an average growth zone diameter of 8.6 mm. This suggests that turmeric has a strong potential in inhibiting the growth of microorganisms, especially fungi, which can lead to a variety of health problems, including vaginal discharge caused by fungal infections.

An effective natural antimicrobial to fight infections has been researched, namely green betel (Piper batle L.). Green betel leaf has been proven to have antibacterial power Green betel leaf contains essential oils consisting of betelphenol, cavicol, sesquiterpene, hydroxyavinol, cavibetol, estragol, eugenol, and cavrakol. Essential oils and their extracts can fight several gram-positive and gram-negative bacteria (Wulan, 2019).

Betel leaves are used as anti-canker sores, anti-cough, astrigent, and antiseptic. The chemical content of betel plants is saponins, flavonoids, polyphenols, and astarian oil. Saponin compounds function as antimicrobials. Green betel leaf (Piper betle L.) is a plant that has been scientifically proven to have antibacterial activity. Based on research, purified extracts at a concentration of 20 mg/mL have very strong antibacterial activity against Propionil bacterium acnes bacteria (Kulsum, 2020).

Green betel leaves are believed to have various benefits for health. One of them is for vaginal discharge and to maintain vaginal hygiene. Betel leaves are known to contain a chemical compound called eugenl. This compound is anti-fungal. This compound can ward off the fungus candida albicans, which is known to be one of the causes of vaginal discharge. In addition to being anti-fungal, betel leaves are also anti-bacterial. One of these bacteria is named neisseria gonorrhoeae. This anti-bacterial property is believed to be due to the content of polyphenols and flavonoids in it (Widayati et al., 2021).

Based on the description of the theory, researchers can conclude that betel leaves have an advantage in accelerating the healing of vaginal discharge compared to sour turmeric because of the content of active compounds in it which has a direct effect on the healing process and infection control. One of the main compounds in betel leaves is eugenol, which is known for its antiseptic, antibacterial, and antifungal properties. Eugenol works effectively in killing bacteria, fungi, and viruses that can cause infections in the female genital area. By addressing the cause of infection, betel leaves help speed up healing and reduce inflammation that often occurs due to vaginal discharge.

In addition, betel leaves have the ability to maintain pH balance in the vaginal area. Vaginal discharge caused by bacteria or fungi is often associated with a pH imbalance in the intimate area, which can facilitate the growth of pathogenic microorganisms. Betel leaves can help restore optimal pH, thus preventing the growth of

microorganisms that cause excessive vaginal discharge and infections, which in turn speeds up the healing process. Another advantage is its ability to stimulate blood circulation in the female area. Smooth blood circulation will speed up the healing process of infected tissues, as well as help reduce pain and inflammation. It plays an important role in the recovery process, as the blood carries oxygen and nutrients necessary for tissue healing and regeneration.

While sour turmeric has anti-inflammatory and antimicrobial properties thanks to its curcumin content, its effects are more focused on reducing inflammation and fighting some types of bacteria and fungi. However, sour turmeric does not have the same ability to maintain pH balance or improve blood circulation as betel leaf has. Therefore, in terms of accelerating the healing of vaginal discharge, betel leaves are superior because of their more direct and comprehensive impact on the cause of infection and the healing process in the female area so that previous research in order to overcome vaginal discharge more effectively, the administration in combination of sour turmeric and betel leaf is given at the same time.

Conclusion

Based on the results and discussion, it can be concluded that the use of herbal preparations of sour turmeric and betel leaf has a significant effect on the duration of accelerated healing in adolescent girls who experience recurrent vaginal discharge in Palembang. The average healing time in the sour turmeric group was 9.00 days, while in the betel leaf group it was 6.70 days, showing that the betel leaf preparation accelerated healing by approximately 2–3 days compared to sour turmeric. Statistical analysis using the independent sample t-test obtained a significance value of 0.008 ($p < 0.05$), indicating a significant difference between the two treatments. These findings suggest that betel leaf herbal preparations are more effective than sour turmeric in accelerating the healing of recurrent vaginal discharge, likely due to their stronger antibacterial and anti-inflammatory properties. The results of this study support the potential use of betel leaf as a natural and affordable alternative therapy for maintaining reproductive health among adolescent girls.

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Author Contributions
T.R., D.A., N.A., S.R., L., D.A., N.S. Contributed to the conceptualization,data collection process, data processing, and article writing

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Conflicts of Interest
The authors declare no conflict of interest.

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