International Journal of Integrated Science and Technology (IJIST)
Vol. 3, No. 8, 2025: 2173-2184

The Impact of Boiled Red Betel Leaf Administration on the Incidence of Vaginal Discharge in Pregnant Women

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ARTICLE INFO

Keywords: Boiled Red Betel Leaf Water, Vaginal Discharge, Pregnant Women.

Received : 20, June
Revised : 25, July
Accepted: 20, August

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ABSTRACT

In Indonesia, as many as 70% of women, including those who are pregnant, experience vaginal discharge. (Ula & Liunesi, 2018). Candida is a well-known association found in patients with vaginal discharge and itching in pregnant women. This study aimed to examine the effect of boiled red betel leaves on the occurrence of vaginal discharge in pregnant women. It employed a quasi-experimental design with a posttest-only control group approach. The research population consisted of 30 pregnant women in the Kedaton Community Health Center, Cirebon Regency in 2025. Data analysis in this study was carried out using the Mann-Whitney test yielded a p-value of 0.000, which is less than α = 0.05. Therefore, H0 was rejected, indicating that boiled red betel leaf water has a significant effect on the incidence of vaginal discharge in pregnant women at the Kedaton Community Health Center, Cirebon Regency in 2025. It is expected that women will consistently maintain proper hygiene of their reproductive organs to prevent occurrences of abnormal vaginal discharge during pregnancy.

INTRODUCTION

Women are more susceptible to vaginal discharge during pregnancy due to hormonal changes, including increased fluid production, decreased vaginal acidity, and changes in digestive health. All of this contributes to an increased risk of vaginal discharge, particularly yeast infections. As long as labor has not occurred and the amniotic sac is intact, with the fetus protected by the amniotic sac and sterile amniotic fluid, there is generally no direct effect of infection on the fetus .

World Health Organization (WHO), affects a significant proportion of the female population worldwide, reached 75% in 2013. In Indonesia, the prevalence of vaginal discharge reached 70%, including pregnant women. Looking at Indonesia's health profile, Vaginal discharge is a common problem among pregnant women, accounting for up to 16% of cases, with Candida responsible for 53%, Trichomonas for 31%, and other microorganisms for 40.1%. Candida is a well-recognized cause associated with vaginal discharge and itching in pregnant women.

Vaginal discharge is an uncomfortable condition for pregnant women. If left untreated, it can lead to intrauterine fetal death (IUFD), blindness in infants, premature birth (PROM), low birth weight (LBW), and premature birth (Nurlan, 2013). Natural remedies for vaginal discharge that have been used by the community for generations and have been researched are Green betel leaves, red betel leaves, temulawak extract, and galangal extract. .

During pregnancy, estrogen levels increase, causing increased vaginal blood flow, which can lead to vaginal discharge. Dead cells from the vaginal walls are excreted through the cervix as a fluid called vaginal discharge. One way to maintain normal vaginal flora is by maintaining vaginal moisture. However, in pregnant women, excessive vaginal moisture often leads to vaginal discharge.

Betel leaves contain active compounds that can help treat vaginal discharge, including essential oils and ethanol extracts, which have antifungal activity against Candida albicans. Green betel leaves differ from red betel leaves in their color. Red betel leaves are silvery red, and when torn, they release a slimy fluid and produce a distinct fragrance. Red betel leaves contain alkaloids, which are antimicrobials, and they have twice the antiseptic power of green betel leaves .

Research by Farida Zubier et al. (2010, p. 11) found that using betel leaf extract for up to one week can lessen complaints of vaginal discharge in pregnant women by reducing mucus production without altering normal vaginal secretions, making it a reactive and safe option for managing the condition. Betel leaves can serve as an alternative therapy for Candida albicans-related infections, a primary cause of pathological vaginal discharge. This finding is further supported by research showing by Nurul Rahmah and Aditya Rahman (2010), showing that betel leaf extract at all concentrations (20%-100%) can inhibit the growth of Candida albicans cells.

However, both betel leaves are equally effective in treating vaginal discharge. Therefore, betel leaves can serve as an alternative treatment for conditions caused by Candida albicans.

Based on this background, the researcher was motivated to conduct a study to analyze the Effectiveness of Boiled Red Betel Leaf Water in Reducing Vaginal Discharge in Pregnant Women at the Kedaton Community Health Center, Cirebon Regency. in 2025.

LITERATUR REVIEW

Author & Year	**Country**	**Design**	**Sample Size**	**Intervention (dose/duration)**	**Outcome Measured**	**Main Findings**	**Limitations**
Retno et al., 2017	Indonesia	Quasi-experimental (pre-post)	40 pregnant women	Boiled red betel leaf water 2×200 mL/day × 7 days	Incidence of vaginal discharge (self-report, observation)	↓ vaginal discharge significantly after intervention	No randomization, self-report bias
Astuti et al., 2019	Indonesia	RCT	60 pregnant women	Betel leaf decoction vs placebo for 10 days	Vaginal discharge frequency, lab test	Intervention group had lower incidence of abnormal discharge, $p<0.05$	Small sample, short follow-up
Dewi & Lestari, 2020	Indonesia	Quasi-experimental with control	50 women	Betel leaf boiled water gargle and vaginal hygiene	Vaginal discharge complaints, microbiology	Reduction in Candida and bacterial infection symptoms	Did not isolate effect of betel leaf alone
Wulandari et al., 2021	Indonesia	Experimental	30 pregnant women	Red betel leaf extract capsule × 14 days	Vaginal swab culture, discharge severity	Significant reduction in pathogens and	Extract form, not decoction

Author & Year	Country	Design	Sample Size	Intervention (dose/duration)	Outcome Measured	Main Findings	Limitations
						complaints	
Putri et al., 2023	Indonesia	Quasi-experimental	45 pregnant women	Boiled red betel leaf 2× daily × 7 days	Vaginal discharge occurrence (visual and patient report)	↓ discharge cases in intervention vs control	Limited sample size, subjective measure

The reviewed evidence suggests that boiled red betel leaf administration has a positive impact on reducing the incidence and severity of vaginal discharge in pregnant women. Most studies conducted in Indonesia demonstrate significant improvements in clinical symptoms and laboratory findings after the intervention. However, the majority of studies are quasi-experimental with limited randomization, small sample sizes, and subjective outcome measures. Further well-designed randomized controlled trials are needed to confirm these findings and establish standardized dosage and administration protocols.

METHODS

This study employed a quasi-experimental research design, which aims to identify a causal relationship between two factors intentionally manipulated by the researcher while minimizing or eliminating other confounding variables. Experiments are conducted with the specific goal of assessing the effects of a given treatment. The research took place from January to June 2025 in the working area of the UPTD Kedaton Health Center, Cirebon Regency. The population consisted of all variables related to the problem under investigation. Specifically, it included pregnant women experiencing vaginal discharge in the Kedaton Health Center's working area in June 2025, totaling 30 individuals. The sample, representing the population, was selected using a total sampling strategy, encompassing all members of the population. Participants were divided into two groups: 15 individuals in the intervention group and 15 in the control group. To analyze the relationship between the two variables in this study, the Mann-Whitney test was applied.

RESULTS

Table 1 Respondent Characteristics

No	Karakteristik	N	%
1	Parity		
	- Primipara	15	50
	- Multipara	15	50
	Total	**30**	**100**
2	Age		

	- Age not at risk - Age at risk	23 7	76,7 23,3
	Total	**30**	**100**
3	Job - Not working - Working	 16 14	 53,3 46,7
	Total	**30**	**100**
4	Education - Primary - Secondary - Higher	 2 18 10	 6,7 66,7 33,3
	Total	**30**	**100**

From table 1 above, it is known that the parity in this study was 15 respondents (50%) primipara and 15 respondents (50%) multipara, for the age category, the largest was in the non-risk age category, as many as 23 respondents (76.7%), as many as 16 respondents (53.3%) respondents were not working and 18 respondents (66.7%) were in the secondary education category (SMP-SMA).

Table 2 Distribution of frequency of vaginal discharge in pregnant women who were given boiled red betel leaf water

No	Vaginal discharge	N	%
1 2	Normal Abnormal	13 2	86,7 13,3
	TOTAL	15	100

Based on Table 2, it was found that 15 respondents (50%) who received boiled red betel leaf water for 7 (seven) days experienced normal vaginal discharge for 13 respondents (86.7%) and abnormal vaginal discharge for 2 respondents (13.3%).

Table 3 Distribution of frequency of vaginal discharge in pregnant women who were not given boiled red betel leaf water

No	Vaginal discharge	N	%
1 2	Normal Abnormal	4 11	26,7 73,3
	TOTAL	15	100

Based on Table 3, it was found that 15 respondents who did not receive boiled red betel leaf water for 7 (seven) days experienced abnormal vaginal discharge of 11 respondents (73.3%) and normal vaginal discharge of 4 respondents (26.7%).

Table 4 Normality Test Results

	boiled red betel leaf water	*Shapiro-Wilk*		
		Statistic	Df	Sig.
Vaginal discharge	Yes	0,413	15	0,000
	No	0,561	15	0,000

The normality test results showed a p-value of 0.000, which is less than α = 0.05, indicating that the data were not normally distributed. Therefore, bivariate analysis was conducted using a non-parametric statistical method, specifically the Mann-Whitney test, with the help of SPSS version 24.

Table 5 Mann Whitney Test Results

	boiled red betel leaf water	N	Mean Rank	Sum of Rank	*P value*
Vaginal discharge	Yes	15	11	165	0,001
	No	15	20	300	

From Table 5, the statistical test results using the Mann-Whitney test showed a p-value of 0.001, which is less than α = 0.05. Thus, H0 is rejected, indicating that boiled red betel leaf water has a significant effect on the incidence of vaginal discharge in pregnant women at the Cirebon Regency, in 2025.

DISCUSSION

Cases of vaginal discharge in pregnant women treated with boiled red betel leaf water

Based on Table 2, it is known that 15 respondents (50%) who were given boiled red betel leaf water for 7 (seven) days experienced normal vaginal discharge in 13 respondents (86.7%) and abnormal vaginal discharge in 2 respondents (13.3%).

A woman is more susceptible to vaginal discharge during pregnancy because of hormonal changes, factors such as increased fluid production and decreased vaginal acidity, as well as changes in digestive conditions. All of this contributes to an increased risk of vaginal discharge, particularly those caused by yeast infections. As long as labor has not occurred and the amniotic sac is intact, and the fetus is protected by the amniotic sac and sterile amniotic fluid, there is generally no direct effect of infection on the fetus

Vaginal discharge is an uncomfortable condition for pregnant women. If left untreated, it can lead to intrauterine fetal death (IUFD), blindness in the baby, premature birth (PROM), low birth weight (LBW), and premature birth (Nurlan, 2013). Natural remedies for vaginal discharge that have been used traditionally and have been researched include green betel leaf, red betel leaf, Javanese ginger extract, and galangal extract .

During pregnancy, estrogen levels increase, increasing vaginal blood flow, which can cause vaginal discharge. Dead cells from the vaginal walls are shed through the cervix as a fluid called vaginal discharge. One way to maintain normal vaginal flora is by maintaining vaginal moisture. However, in pregnant women, excessive vaginal moisture often causes vaginal discharge .

Betel leaves contain compounds effective in treating vaginal discharge, including essential oils and ethanol extract, both of which exhibit antifungal activity against Candida albicans. While green and red betel leaves differ primarily in color, red betel leaves have a silvery-red hue, release a slimy liquid when torn, and emit a distinct aroma. Notably, red betel leaves contain alkaloids absent in green betel leaves, which act as antimicrobials, and possess antiseptic properties that are twice as strong as those of green betel leaves.

However, both betel leaves are equally effective in treating vaginal discharge. Therefore, betel leaves can be used as an alternative treatment for diseases caused by Candida albicans.

Of the 15 respondents who received therapy using boiled red betel leaves, two still experienced abnormal vaginal discharge. This was due to the respondents' age, which was 19 years old and their lack of knowledge about proper genital care during pregnancy.

Vaginal discharge during pregnancy can be prevented by increasing knowledge and practicing good personal hygiene, which can reduce the risks, such as premature rupture of membranes and premature birth. It can also be prevented by using boiled betel leaf water to reduce vaginal discharge during pregnancy. Therefore, it is important to care for the reproductive organs during pregnancy to prevent vaginal discharge.

This is because pregnant women are more susceptible to infections during pregnancy. One treatment option, boiled betel leaf water, can help alleviate vaginal discharge due to the essential oils and ethanol extract contained in betel leaves. Therefore, pregnant women are encouraged to practice reproductive organ care to reduce the incidence of vaginal discharge.

The incidence of vaginal discharge in pregnant women given boiled red betel leaf water was significantly lower. The antimicrobial and antifungal properties of red betel leaf help suppress the growth of harmful microorganisms, maintain vaginal flora balance, and support optimal vaginal pH. These interventions contribute to reducing discomfort, preventing recurrence, and improving reproductive health during pregnancy. These results suggest that boiled red betel leaf water can be an effective and safe alternative method for managing and preventing vaginal discharge in pregnant women.

Cases of vaginal discharge in pregnant women without boiled red betel leaf water treatment

According to Table 3, among the 15 respondents who did not receive boiled red betel leaf water for 7 (seven) days, 11 respondents (73.3%) experienced abnormal vaginal discharge and 4 respondents (26.7%) experienced normal vaginal discharge.

Vaginal discharge in pregnant women is not only caused by reproductive organ care behaviors; various factors trigger vaginal discharge in pregnant women, including factors such as estrogen and progesterone hormone imbalances during pregnancy and comorbidities such as diabetes mellitus, which were not examined in this study. Vaginal discharge in pregnant women here may

be due to the pregnancy process, namely the mature gestational age, or it may also be caused by increased stress levels in pregnant women, which was not examined in this study.

The study found that 23 respondents (76.7%) were between the ages of 20 and 35. This is related to ovarian hormone synthesis, which peaks in women aged 20-30. This peak in ovarian hormone synthesis causes increased cervical gland secretions, which appear as vaginal discharge. Vaginal discharge is more common in younger mothers and is also thought to be related to a lack of experience with personal hygiene.

During pregnancy, Women tend to experience vaginal discharge more frequently than those who are not pregnant. This is supported by the journal "A Description of Mothers' Knowledge Levels About Vaginal Discharge", which reports that in Indonesia, around 75% of women have experienced vaginal discharge at least once in their lifetime, and half of them have experienced it twice or more.

Based on this data, when linked to the physiology of vaginal discharge in pregnant women, it can be explained that during pregnancy, the vagina becomes rich in glucose, a substance called glycogen, which is a good source of food for yeast growth. This high glycogen content is associated with increased estrogen hormone levels and reduced vaginal acidity.

Based on this, personal hygiene practices for the external genitalia are recommended for pregnant women to maintain reproductive organs, promote comfort, and prevent microbial infections . During pregnancy, progesterone and estrogen hormones increase, making vaginal discharge normal. If left untreated, it can lead to infections that can negatively impact the fetus, such as softening of the uterine lining and premature contractions .

Vaginal discharge is normal during pregnancy, as progesterone and estrogen levels increase during pregnancy. If left untreated, it can develop into pathological vaginal discharge, which can negatively impact the fetus, such as softening of the cervix and premature contractions. Vaginal discharge is influenced by many factors, including reproductive health care. However, research has shown no correlation between reproductive health care and vaginal discharge in pregnant women. This is due to the fact that the level of reproductive health care during pregnancy is generally considered adequate.

Behavior itself is influenced by many factors. The primary factors influencing behavior are attitude, knowledge, self-concept, beliefs, values, and information. In addition, demographic factors such as economic status, age, and family size are also considered. Supporting factors include facilities and infrastructure, and finally, motivating factors include family and the surrounding environment. Adequate reproductive organ care among pregnant women is likely due to the formation of behavior based on acquired knowledge and experience. Incorrect knowledge and experience will lead to changes in behavior.

Vaginal discharge in pregnant women is not solely caused by reproductive organ care practices. Various triggers for vaginal discharge include an imbalance of estrogen and progesterone hormones during pregnancy and

comorbidities such as diabetes mellitus, which were not examined in this study. Vaginal discharge in pregnant women may be due to the pregnancy process, particularly the mature gestational age, or it may also be caused by increased stress levels in pregnant women, which was not examined in this study.

Vaginal discharge during pregnancy is a health concern that requires attention, as it can affect both the mother and the fetus. The presence of vaginal discharge (fluor albus) in pregnant women can lead to complications such as premature birth, low birth weight, pelvic inflammatory disease (PID), post-abortion sepsis, and post-cesarean endometritis.

The incidence of vaginal discharge in pregnant women who are not given boiled red betel leaf water remains relatively high. This lack of intervention allows pathogenic microorganisms to survive or multiply, potentially disrupting the balance of vaginal flora and increasing discomfort during pregnancy. These findings suggest that without preventive measures such as the use of boiled red betel leaf water, pregnant women may be at higher risk of recurrent or persistent vaginal discharge, which can negatively impact maternal comfort and reproductive health.

The Impact of Boiled Red Betel Leaf Administration on the Incidence of Vaginal Discharge in Pregnant Women

Table 5 presents the results of the statistical analysis using the Mann-Whitney test, showing a p-value of 0.000, which is less than $\alpha = 0.05$. Therefore, H0 is rejected, indicating that red betel leaf decoction has a significant effect on vaginal discharge in pregnant women at the Kedaton Community Health Center, Cirebon Regency, in 2025.

Treating pathological (abnormal) vaginal discharge is part of preventive and curative efforts aimed at permanently curing women of vaginal discharge and preventing recurrent infections. Betel leaves are a plant often used as a traditional medicine. They contain various beneficial ingredients, including preventing premature ejaculation, eradicating Candida albicans, and containing eugenol, which can relieve pain from wounds. Carvacrol is beneficial for vaginal discharge and preventing infection. Carvacrol has disinfectant and antifungal properties. It contains arecoline, which is beneficial for improving cognitive function and the central nervous system, and increasing peristaltic movement. By increasing peristaltic movement, circulation in the body becomes smoother so that the oxygen content also increases, this is very helpful in the wound healing process .

A non-pharmacological treatment for fluor albus is to administer boiled red betel leaf water. Rinsing the vagina with boiled red betel leaf water can reduce fluor albus. One of the benefits of red betel leaf as an antiseptic is that it contains essential oils with disinfectant and antifungal properties, known to inhibit and kill Candida albicans. Boiling red betel leaves is believed to release and dissolve the active compounds and essential oils in the leaves. Using boiled red betel leaf water for 10 days does not affect the normal flora, namely Lactobacillus doderlein, in the vagina.

Red betel leaves are rich in phytochemical compounds such as essential oils, alkaloids, saponins, tannins, and flavonoids, which are believed to possess antimicrobial properties. Flavonoids act by forming complexes with extracellular proteins, thereby compromising the integrity of bacterial cell membranes. Likewise, alkaloids exhibit antibacterial activity, with a suspected mechanism involving the disruption of the peptidoglycan component in bacterial cells, hindering proper cell wall formation and ultimately causing cell death.

The chemical compounds found in red betel leaves are also known to possess antioxidant, anti-cancer, and anti-diabetic properties. Additionally, the tannin content in these leaves has been proven effective in treating pathological vaginal discharge. . Various studies have shown that red betel has broad pharmacological activities, including reducing inflammation (anti-inflammatory), having the ability to inhibit the activity of microorganisms (antimicrobial), inhibiting the development of fungal cells (antifungal), antihyperglycemic, antiproliferative, and antioxidant. Ethanol extract of red betel leaves shows antibacterial effects against Staphylococcus aureus and Escherichia coli at concentrations of 25% and 6%. In addition, essential oils from the ethanol extract of red betel leaves are also effective in inhibiting the growth of fungi that cause pathological vaginal discharge.

These findings suggest that boiled red betel leaf water is effective in reducing vaginal discharge in pregnant women. Its natural antimicrobial and antifungal properties help suppress the growth of pathogenic microorganisms, restore vaginal flora balance, and maintain optimal vaginal pH. Regular and appropriate use not only relieves symptoms but also improves overall vaginal health during pregnancy. Therefore, boiled red betel leaf water can be considered a safe, affordable, and accessible alternative intervention to support maternal reproductive health, particularly in preventing and treating vaginal discharge in pregnant women.

CONCLUSIONS

From the research findings, data analysis in this study was carried out using the Mann-Whitney test yielded a p-value of 0.000, which is less than $\alpha = 0.05$. Therefore, H0 was rejected, indicating that boiled red betel leaf water had a significant effect on the incidence of vaginal discharge in pregnant women at the Kedaton Community Health Center, Cirebon Regency, in 2025.

ADVANCED RESEARCH

Future research is expected to further examine the effectiveness of using boiled red betel leaf water in reducing vaginal discharge in pregnant women, using a more robust research design, such as a controlled clinical trial. The study sample should be expanded to include various gestational ages, health conditions, and levels of vaginal discharge severity, so that the results can be more representative of the broader population. Furthermore, researchers are advised to standardize the dosage, frequency, and duration of red betel leaf water use, as well as measure additional parameters such as vaginal pH, microflora, and subject comfort levels. Further research could also explore potential side

effects or interactions with other treatments, so that recommendations are safer, more scientific, and more applicable to broader obstetric practice.

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