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The Relationship Between Pantyliner Use, Vaginal Washing, and Personal Hygiene with Vaginal Discharge in Women of Childbearing Age in 2024

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Abstrack

Background: The anatomy of the vagina, which has a urethra that is shorter and straighter than the male urethra, makes the vagina more open and easily moist, increasing its susceptibility to infection. Infections of the genital organs are often characterized by vaginal discharge. Women's habits, such as incorrect use of pantyliners, vaginal washing, and poor personal hygiene, are frequently associated with these infections.

Objective: This study examines the relationship between the use of pantyliners, vaginal washing, and personal hygiene and the incidence of vaginal discharge in women of childbearing age in 2024.

Methods: This observational analytical study with a cross-sectional design was conducted at massage parlors and spas in Makassar City. A total of 70 women of childbearing age who worked as therapists participated in the study. Data were collected using questionnaires and analyzed using the chi-square test.

Results: The results showed a significant relationship between the use of pantyliners (p=0.008), vaginal washing (p=0.002), and personal hygiene (p=0.049) and the incidence of vaginal discharge.

Conclusion: There is a significant relationship between the use of pantyliners, vaginal washing, and personal hygiene and the incidence of vaginal discharge in women of childbearing age.

Keywords: Vaginal Discharge, Pantyliner, Vaginal Washing, Hygiene

Introduction

Women of childbearing age are women aged 20–45 years with good reproductive function. Women aged 20–29 years are at their peak fertility and therefore need to maintain optimal reproductive health.[1] The anatomical structure of the vagina, which has a shorter and straighter urethra than men, causes the vagina to be more open, moist, and susceptible to infection.[2] The World Health Organization (WHO) reports that in 2020 there were 374 million new cases of sexually transmitted infections (STIs) with common manifestations of vaginal discharge.[3] Vaginal discharge may be physiological or pathological, and abnormal discharge is commonly associated with changes in color, odor, consistency, itching, burning, or irritation that warrant further evaluation.[4] Pathological vaginal discharge that is left untreated can lead to complications such as infertility and even death.[5]

Several previous studies have shown a relationship between women's behavior and vaginal discharge. A study in Palembang found that the use of pantyliners increases the risk of pathological vaginal discharge.[6] Another study mentioned that most *pantyliner* users experience vaginal discharge with a significant risk (OR 18.5).[7] However, some researchers argue that pantyliners that are used correctly and changed regularly can help maintain hygiene.[8]

Using vaginal cleansers to maintain reproductive organ hygiene by rinsing or spraying liquid into the vagina can disrupt the pH and good bacteria in the vagina, allowing bad bacteria to multiply rapidly and increasing the risk of vaginal discharge. This is because the antiseptic soap used in vaginal cleansers contains many chemicals that can damage the skin and ecosystem inside the vagina, especially the pH and good bacteria. If the pH is disrupted, harmful bacteria can easily multiply, causing the vagina to experience symptoms of vaginal discharge.[9] Another study also shows that 86.4% of women of childbearing age who use vaginal cleansers experience vaginal discharge.[7]

Personal hygiene is also one of the external factors that can affect vaginal pH balance and is an important aspect of maintaining women's reproductive health. Studies show that poor personal hygiene is significantly associated with vaginal discharge.[7] Meanwhile, good genital hygiene practices have been proven to prevent pathological vaginal discharge and improve physical and psychological health.[10] This emphasizes the importance of hygienic behavior in preventing reproductive health disorders.

Based on the above description, this research is important because vaginal discharge is still a reproductive health issue that is often overlooked, even though it has a serious impact on the quality of life of women of childbearing age. The novelty of this study lies in the selection of a specific population, namely women of childbearing age who work as therapists in massage parlors and spas, who have different risk factors from the general population. Specifically, female massage and spa therapists represent an occupational group with distinct risk exposures compared to the general population. Their job requires long working hours and sustained physical activity in humid spa environments, which promotes excessive sweating in the perineal region. Furthermore, back-to-back client schedules frequently restrict their access to restroom facilities, preventing timely hygiene practices and the periodic changing of pantyliners (ideally every 4–6 hours). The combination of high local humidity, long working hours, and prolonged pantyliner wear creates a localized microclimate conducive to pathogenic microbial growth and microflora

imbalance. The purpose of this study is to analyze the relationship between the use of pantyliners, vaginal douching, and personal hygiene and the incidence of vaginal discharge in women of childbearing age, thereby contributing to scientific knowledge and providing a basis for reproductive health education.

Methods

This quantitative study used an observational analytical procedure with a *cross-sectional* approach. The population in this study was women of childbearing age who worked as therapists at massage parlors or spas in Makassar City. The study sample consisted of women who met the inclusion and exclusion criteria. The inclusion criteria were women aged 20-45 years, working as therapists at massage parlors or spas in Makassar City, present during the study, and willing to be respondents. Questionnaires that were not completed were excluded from this study. The sample size was calculated using the *Isaac and Michael* table because the population size was known to be 70, resulting in a minimum sample size of 59 with *a sampling error* of 5%.

The data collected included demographic characteristics of respondents (such as age, education, ethnicity, marital history, coitus history, parity history, and abortion history) as well as research variables using a validated questionnaire.[11] The variables in this study were operationally categorized based on specific criteria derived from the questionnaire. Pantyliner use was categorized into four frequencies: *Never Use*, *Always Change* (<4 hours), *Change Often* (4–6 hours), and *Sometimes Replace* (>6 hours). Vaginal washing was categorized into *Never Use*, *Sometimes Use* (1–3 times/month), *Frequently Use* (4–5 times/month), and *Always Use* (>5 times/month). Personal hygiene was classified into *Poor* and *Good* based on the total score of hygiene practices. In general, participants' personal hygiene practices were quantitatively assessed using a self-administered, structured questionnaire adapted from a validated instrument by Putri (2022). The questionnaire specifically evaluated key daily sanitation behaviors, including hand hygiene, genital cleanliness, and the appropriate use of personal hygiene products. The instrument comprised 20 items evaluated on a 4-point Likert scale. Favorable items were scored as 4 (*Always*), 3 (*Frequently*), 2 (*Sometimes*), and 1 (*Never*), whereas unfavorable items were reverse-scored (4 = *Never*, 3 = *Sometimes*, 2 = *Frequently*, 1 = *Always*). Cumulative total scores ranged from 20 to 80. To allow for categorical analysis, personal hygiene level was dichotomized based on a 50% cut-off score of the maximum attainable score (40 points). Participants were categorized into two distinct groups: Good hygiene practice for scores ≥50% and Poor hygiene practice for scores <50%. Meanwhile, vaginal discharge was categorized into *Physiological* (normal fluid without bothersome symptoms) and *Pathological* (abnormal discharge characterized by changes in color, odor, thick consistency, or accompanied by itching and irritation). The data were then processed and analyzed using *Microsoft Excel 2013* and *Statistical Package For The Social Sciences (SPSS)*. Continuous data were presented as mean ± SD, while categorical data were presented as frequencies (n%). Bivariate analysis was initially performed using the Chi-square test. However, if the Chi-square assumptions were violated (e.g., cell counts of zero or expected frequencies less than 5), Fisher's Exact Test was applied instead to determine statistical significance. This study obtained ethical approval with approval number No.E.080/KEPK/FKIK/XI/2024, granted by Alauddin State Islamic University Makassar.

Results

A total of 70 samples were taken as respondents who met the inclusion and exclusion criteria. Further information regarding the results of this study can be found in the tables and explanations presented in detail. The characteristics of the respondents are presented in Table 1.

Table 1. Distribution of Respondent Characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
20-29	40	57.1
30-39	20	28.6
40-45	10	14.3
Education		
Elementary	2	2.9
Junior High School	10	14.2
High School/Vocational School	44	62.9
D3/S1	14	20.0
Tribe		
Makassar	51	72.9
Bugis	12	17.1
Toraja	3	4.3
Mandar	1	1.4
Javanese	3	4.3
Marital Status		
Not Married	41	58.5
Married Once	23	32.9
Married more than once	6	8.6
Coital history		
Never	37	52.9
Ever	33	47.1
Parity history		
Nulliparous	44	62.9
Primipara	8	11.4
Multipara	17	24.3
Grandemultipara	1	1.4
History of Abortion		
Never	64	91.4
1 time	3	4.3
2 times	2	2.9
3 times	1	1.4
Total	70	100

Based on the age of the respondents, the majority of respondents were in the 20-29 age range, totaling 40 people (57.1%), with an average age of 29.77±6.479 years. In terms of occupation, all respondents worked as therapists, and some had additional jobs as personal trainers, totaling 2 people. In terms of education, the majority of respondents were high school/vocational school graduates, totaling 44 people (62.9%), while the minority of respondents were elementary school graduates, totaling 2 people (2.9%). In terms of ethnicity, the majority of respondents were Makassar, totaling 51 people (72.9%). Based on marital status, the majority of respondents were unmarried, totaling 41 people (58.5%). Most respondents (52.9%) also reported that they had never had sexual intercourse. In terms of parity history, the majority of respondents were nulliparous, totaling 44 people (62.9%). Based on the history of

abortion experienced by the respondents, the majority of respondents had never experienced an abortion, totaling 64 people (91.4%).

Table 2. Distribution of Pantyliner Use, Vaginal Washing, Personal Hygiene, and Vaginal Discharge

Category	Frequency (n)	Percentage
Pantyliner Use		
Never Used	12	17.1
Always Change	12	17.1
Change Often	14	20.0
Sometimes Replace	32	45.8
Vaginal washing		
Never Used	8	11.4
Sometimes Use	12	17.1
Frequently Use	19	27.2
Always Use	31	44.3
Personal Hygiene		
Good	49	70.0
Poor	21	30.0
Vaginal discharge		
Physiological	9	12.9
Pathological	61	87.1
Total	70	100

The distribution of *pantyliner* use, vaginal washing, personal hygiene, and vaginal discharge is presented in Table 2. Based on pantyliner use, there were 12 respondents (17.1%) who never used pantyliners, and the majority of respondents who used pantyliners changed *them* occasionally (>6 hours once) (32 respondents, 45.8%) out of 70 respondents. Regarding the use of vaginal washing, of the 70 respondents studied, 8 respondents (11.4%) never used vaginal washing, and the majority of respondents who used vaginal washing did so frequently, always using vaginal washing (>5 times a month), totaling 31 respondents (44.3%). Regarding personal hygiene, the results showed that out of the 70 respondents studied, the majority had good personal hygiene, totaling 49 people (70%). Based on data on vaginal discharge, it was found that out of the 70 respondents studied, the majority experienced pathological vaginal discharge, totaling 61 people (87.1%).

Table 3. Analysis of the Relationship between Pantyliner Use and Vaginal Discharge in Women of Childbearing Age in 2024

Pantyliner Use	Vaginal Discharge				Total		*p**	OR
	Physiological		Pathological					
	n	%	n	%	n	%		
Never Used	5	41.7	7	58.3	12	100	0.008	4.444
Always Replace	2	16.7	10	83.3	12	100		
Frequently Changing	0	0	14	100	14	100		
Sometimes Replace	2	6.3	30	93.7	32	100		
Total	9	12.9	61	87.1	70	100		

**Fisher's Exact Test*

The cross-tabulation analysis of the relationship between pantyliner use and vaginal discharge among respondents is presented in Table 3. Table 3 shows that of the 12 respondents who never used pantyliners, 5 experienced physiological vaginal discharge (41.7%) and 7 experienced pathological vaginal discharge (58.3%). Then, of the 12 people who always changed pantyliners, 2 experienced physiological vaginal discharge (16.7%) and 10 experienced pathological vaginal discharge (83.3%). Then, of the 14 people who often changed pantyliners, all experienced pathological vaginal discharge (100%). Meanwhile, of the 32 women who occasionally changed their pantyliners, 2 experienced physiological vaginal discharge (6.3%) and 30 experienced pathological vaginal discharge (93.7%). Data analysis using Fisher's Exact test yielded $p = 0.008$. This indicates that there is a significant relationship between pantyliner use and the incidence of vaginal discharge in women of childbearing age in 2024.

Table 4. Analysis of the Relationship between Vaginal Washing and Vaginal Discharge in Women of Childbearing Age in 2024

Use of Vaginal Washing	Vaginal Discharge				Total		*p**	OR
	Physiological		Pathological					
	n	%	n	%	n	%		
Never Used	5	62.5	3	37.5	8	100	0.002	2.017
Sometimes Uses	1	8.3	11	91.7	12	100		
Frequent Use	1	5.3	18	94.7	19	100		
Always Use	2	6.5	29	93.5	31	100		
Total	9	12.9	61	87.1	70	100		

**Fisher's Exact Test*

The cross-tabulation analysis of the relationship between vaginal washing and vaginal discharge among respondents is presented in Table 4. Based on the table above, it was found that of the 8 people who never used vaginal washing, 5 experienced physiological vaginal discharge (62.5%) and 3 experienced pathological vaginal discharge (37.5%). Meanwhile, of the 12 people who sometimes used vaginal douching, 1 experienced physiological vaginal discharge (8.3%) and 11 experienced pathological vaginal discharge (91.7%). Then, out of 19 people who often used vaginal douching, there was 1 person who experienced physiological vaginal discharge (5.3%) and 18 people who experienced pathological vaginal discharge (94.7%). Then, of the 31 women who always used vaginal douching, 2 experienced physiological vaginal discharge (6.5%) and 29 experienced pathological vaginal discharge (93.5%). Data analysis using Fisher's Exact test yielded

p = 0.002. This indicates that there is a significant relationship between the use of vaginal douching and the occurrence of vaginal discharge in women of childbearing age in 2024.

Table 5. Results of Statistical Test Analysis of the Relationship Between Personal Hygiene and the Occurrence of Vaginal Discharge in Women of Childbearing Age in 2024

Personal Hygiene	Vaginal Discharge				Total		p*	OR
	Physiological		Pathological					
	n	%	n	%	n	%		
Good	9	18.4	40	81.6	49	100	0.049	2.947
Poor	0	0	21	100	21	100		
Total	9	12.9	61	87.1	70	100		

**Fisher's Exact Test*

Table 5 shows that of the 49 people with good personal hygiene, 9 experienced physiological vaginal discharge (18.4%) and 40 experienced pathological vaginal discharge (81.6%). Meanwhile, of the 21 people with poor personal hygiene, all experienced pathological vaginal discharge (100%). Fisher's Exact Test yielded p = 0.049. This indicates that there is a significant relationship between personal hygiene and the incidence of vaginal discharge in women of childbearing age in 2024.

Discussion

Respondent Characteristics

The results of this study indicate that the majority of women of childbearing age are between 20 and 29 years old. At this age, women reach their peak fertility with a 95% chance of becoming pregnant because their reproductive organs are fully developed, but the risk of contracting sexually transmitted diseases also increases at this age.[1] There is an influence of marital status on the incidence of vaginal discharge in women of childbearing age.[12] The quality of marriage is greatly influenced by the adjustment that shows the ability of two different individuals to be united in a bond as a couple. A decline in the quality of marriage will cause unhappiness and stress for both women and men. The majority of respondents had no history of coitus. Women who have had coitus are at greater risk of vaginal discharge, either due to physiological changes during ovulation or exposure to germs from their partners.[13]

The majority of respondents used pantyliners, especially with a replacement frequency of >6 hours. Infrequent replacement of pantyliners has been shown to increase the risk of vaginal discharge, so it is recommended to replace them regularly every 4 to 6 hours to prevent the growth of fungi and bacteria that cause infection.[6,8] The results showed that most respondents washed their vaginas more than 5 times a month. Vaginal douching is generally practiced to maintain personal hygiene, but based on research results, the benefits of vaginal douching are still debatable.[14,15] Most therapists understand the practice of genital hygiene. Normally, there are a number of organisms in the vagina, including *Lactobacillus acidophilus, Diphtheroids, Candida*, and other flora with a physiological pH of around 4.0, which prevent the growth of pathogenic bacteria.[16] Therefore, maintaining physical and spiritual hygiene is important for improving health, preventing disease, improving personal hygiene, and boosting self-confidence. This study shows that most respondents experience pathological vaginal discharge, while others experience

physiological vaginal discharge. Pathological discharge is characterized by the discharge of fluid with a high leukocyte count, yellowish-green, grayish, or milky in color, thick in texture, and accompanied by complaints of pain or itching.[17]

The Relationship Between Pantyliner Use and Vaginal Discharge

This study found that women who never used pantyliners had the highest number of respondents with physiological vaginal discharge. In contrast, women who occasionally changed their pantyliners (>6 hours apart) mostly had pathological vaginal discharge and had the highest number of respondents with pathological vaginal discharge. Then, women who frequently changed pantyliners (every 4 to 6 hours) all experienced pathological vaginal discharge, and among women who always changed pantyliners (<4 hours), most had pathological vaginal discharge. This study shows a significant relationship between pantyliner use and vaginal discharge in women of childbearing age, in line with previous studies that also found a significant association between pantyliner use and fluor albus. Pantyliner usage can elevate local temperature and humidity in the vulvovaginal area, creating a microenvironment that facilitates the proliferation of pathogenic bacteria and fungi responsible for vaginal infections. These findings must be interpreted within the specific occupational context of spa and massage therapists. Long working hours combined with high indoor ambient humidity in spa facilities create a microenvironment conducive to excessive perspiration and genital moisture retention. Moreover, qualitative observations during data collection indicated that therapists often wear panty liners for extended periods due to continuous client appointments and limited break times. This occupational constraint prevents frequent liner changes, exacerbating vulvovaginal occlusion and predisposing these workers to altered microbial flora and fluor albus. Therefore, their use should be done wisely, only for short periods, and replaced regularly every 4–6 hours to prevent disruption of the vaginal flora balance and the risk of pathological vaginal discharge.[7,18]

The Relationship Between Vaginal Washing and Vaginal Discharge

In this study, it was found that women who had never used vaginal douching mostly had physiological vaginal discharge. In contrast, women who had used vaginal douching, whether occasionally (1 to 3 times a month), frequently (4 to 5 times a month), or always (>5 times a month), mostly had pathological vaginal discharge. This study shows a significant relationship between the use of vaginal douching and vaginal discharge in women of childbearing age, in line with previous studies at SMAN 1 Lembah Gumanti and Dr. H. Abdul Moeloek Regional General Hospital, which reported a link between vaginal douching and vaginal discharge and vaginal candidiasis. This practice can disrupt the balance of normal vaginal flora, leading to inflammation, chronic discharge, and discomfort.[19] To maintain vulvovaginal health and prevent pathological vaginal discharge, implementing evidence-based genital hygiene practices is critical. As highlighted in a literature review by Laksmi et al. (2022), citing guidelines from the Royal College of Obstetricians and Gynecologists (RCOG) and Middle East and Central Asia (MECA), the external genitalia (vulva) should ideally be cleansed using plain water with a small amount of mild soap, limited to once daily to avoid irritant contact dermatitis. Cleansing should be performed gently using hands rather than sponges, followed by drying with a soft towel. Crucially, the cleansing direction must strictly follow a front-to-back approach (from the vulva to the anus) to prevent the translocation of enteric pathogens into the vaginal canal. Furthermore, routine

use of panty liners, harsh antiseptics, and internal douching products should be avoided to preserve the physiological acidic pH and protective microflora of the vagina.[14] Therefore, education is needed so that women understand that the vagina has a natural cleansing mechanism and should adopt proper external hygiene while avoiding internal douching, which poses a risk to reproductive health.[19]

The Relationship Between Personal Hygiene and Vaginal Discharge

Among women of childbearing age with good *personal hygiene*, some respondents still experienced vaginal discharge, but it was physiological in nature. Conversely, among respondents with poor *personal hygiene*, all experienced pathological vaginal discharge. These findings indicate a relationship between *personal hygiene* and the occurrence of vaginal discharge in women of childbearing age. These results support the alternative hypothesis that *personal hygiene* greatly influences the occurrence of vaginal discharge in women of childbearing age. These results support studies showing that women who practice poor *personal hygiene* experience vaginal discharge. In addition, a significant relationship was found between *personal hygiene* and vaginal discharge in 11th-grade female students at SMK Laniang Makassar.[20] Other similar studies also state that there is a significant relationship between *personal hygiene* and vaginal discharge in adolescent girls.[21]

Poor vaginal hygiene can trigger pathological vaginal discharge due to disruption of the vaginal ecosystem balance. A decrease in acidity and moisture allows the growth of pathogenic bacteria and fungi, so good personal hygiene practices are necessary to keep female organs clean and healthy. Maintaining proper genital hygiene encompasses several essential evidence-based practices, such as cleansing the external genitalia with clean water and mild soap, strictly wiping from front to back after elimination, and practicing proper hand hygiene before and after changing sanitary pads. Additionally, routinely changing underwear and adhering to hygienic practices during menstruation are critical to preventing local irritation and reducing the risk of reproductive tract infections.[22] Poor personal hygiene has a direct impact on the incidence of vaginal discharge in women. Maintaining good personal hygiene habits is crucial for preventing infections and maintaining reproductive health. Education and awareness about the importance of personal hygiene need to be improved so that women can avoid health problems related to vaginal discharge.

This study has several limitations that should be acknowledged when interpreting the findings. First, the cross-sectional design restricts the ability to establish temporal sequence or direct causal relationships between the evaluated behavioral factors and pathological fluor albus. Second, data regarding personal hygiene, panty liner usage, and vaginal washing were collected via self-reported questionnaires, which may introduce recall bias or social desirability bias. Third, the statistical evaluation was intentionally limited to bivariate analysis to determine direct associations with primary behavioral practices; consequently, potential confounding variables-such as age, coital history, and parity-were evaluated narratively rather than controlled through multivariate logistic regression modeling. Future research should implement multivariate frameworks to adjust for these covariates. Finally, data collection faced field-level operational constraints, including complex administrative licensing procedures and strict privacy policies in

certain spa and massage facilities, which prolonged the research timeline, limited direct interview access, and restricted optimal health education delivery to the participants.

Conclusion

Based on the statistical analysis, this study concludes that there are significant relationships between pantyliner usage, vaginal washing, and personal hygiene with the incidence of vaginal discharge in women of childbearing age ($p<0.05$). Practically, these findings highlight the critical need for targeted reproductive health education, particularly for women working in high-humidity environments such as spa and massage therapists. Educational programs should emphasize evidence-based hygiene practices—including proper pantyliner replacement schedules (every 4–6 hours), avoiding unnecessary chemical vaginal douching, and maintaining proper genital hygiene. Additionally, workplace management should support female workers by providing adequate break times and appropriate sanitary facilities to ensure optimal hygiene maintenance during working hours.

Conflict of Interest

The author states that there is no conflict of interest in the research, writing, or publication of this article.

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