



**Genital hygiene practices in women with and without symptoms of vulvo-vaginal dermatoses in a tertiary care centre in coastal Karnataka.**

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**Abstract**

**Introduction:** Vulvo-vaginal dermatoses, affecting women's well-being, embody a complex challenge with discomforting symptoms. While inadequate genital hygiene has been hypothesized as a contributor, this relationship remains a gap in knowledge. This study unravels the interplay between hygiene practices, awareness, and vulvo-vaginal dermatoses prevalence.

**Objectives:** To investigate the association between vaginal hygiene practices and the development of genital dermatoses in young Indian women and to study the awareness of vaginal health and hygiene practices among these women.

**Methods:** A cross sectional, hospital based qualitative study was conducted including 88 girls aged 18-45 years over a period of 2 months. Utilizing a pre-formed digital

questionnaire, the research explored general genital and menstrual hygiene.

Genital Hygiene Behavior Scale (GHBS) using a five-point likert scale was used. Data was statistically analyzed using percentage, mean, standard deviation and chi-squared test.

**Results:** The analysis revealed that over 85% changed underwear daily (97.7%), washed hands after toileting (95.5%), used sanitary pads exclusively during menses (88.6%), and washed hands after pad changes (89.8%). About 67% exhibited low awareness (GHBS 23-53), but no significant correlation was found between genital hygiene awareness and vulvo-vaginal dermatoses symptoms

**Conclusion:** While societal awareness about proper genital hygiene remains low, the study did not find a significant correlation between the two variables. This suggests hygiene education is crucial, but genetics, immunity, and environment may have greater roles in dermatoses. These insights advance understanding and highlight the necessity of comprehensive, multidisciplinary approaches for investigation and management.

**Keywords:** Awareness of Vaginal Health, Genital Hygiene, Menstrual Hygiene, Vulvo-Vaginal Dermatoses.

### **Introduction**

Genital hygiene encompasses a spectrum of practices, including general hygiene such as regular washing of the genitals with water, douching, menstrual hygiene, and sexual hygiene.

The natural vaginal flora consists of a balance of bacteria, yeast, and other microorganisms that help maintain a healthy environment. Poor vaginal hygiene practices can disrupt this balance, leading to an

overgrowth of harmful bacteria and yeast, and the development of various dermatological conditions. Due to the discomfort in the well-being and negative interference in the quality of life for women, the occurrence of vulvovaginitis can be considered a public health problem [1,2].

### **Factors and Causes**

Infections can stem from bacterial, viral, fungal, protozoal, or parasitic sources.

Noninfectious causes include foreign-body insertion, contact dermatitis, friction, moisture, and humidity.

### **Contributors to Dermatological Conditions**

Certain products like vaginal douches, spermicides, medicated creams, depilatories, and sanitary napkin liners may trigger irritant/allergic contact dermatitis.

Inadequate cleaning of external genitalia, use of harsh chemicals and fragrances, tight-fitting clothing, and underwear can also contribute to these conditions.

Menstrual disturbances are the commonest presenting complaint in the adolescent age group and unhygienic practices during menstruation can lead to untoward consequences like pelvic inflammatory diseases and even infertility [3,4].

Unhygienic menstrual products and unsanitary washing practices create abnormal moist conditions in the genital area and alter vaginal pH.[5,6,7,8].

Menstrual cups and sanitary pads were also associated with a low prevalence of sexually transmitted diseases, particularly Chlamydia trachomatis and Trichomonas vaginalis but not Neisseria gonorrhoea[9].

Certain over-the-counter vaginal products may affect the vaginal epithelium [10] and have cytotoxic effects on beneficial Lactobacillus species[11].

Vulvo-vaginal dermatoses, affecting women's well-being, embody a complex challenge with discomforting

symptoms. While inadequate genital hygiene has been hypothesized as a contributor, this relationship remains a gap in knowledge.

This study unravels the interplay between hygiene practices, awareness and vulvo-vaginal dermatoses prevalence.

### **Aims and Objectives**

1. To investigate the association between vaginal hygiene practices and the development of genital dermatoses in young Indian women.
2. To study the awareness of vaginal health and hygiene practices among these women.

### **Materials and Methods**

**Source of Data:** This is hospital based study conducted at Dermatology OPD of a tertiary care centre in Karnataka.

**Study Design:** Cross sectional study

**Study Duration:** 2 months (1st April, 2023 - 31st May, 2023)

**Sampling Technique:** Convenient sampling

**Sample Size:** 88

On the basis of the study conducted by Dr. Neelima Sharma et al assuming  $P=67.62\%$ , 95% Confidence Interval, 10% absolute allowable error(L), the sample size estimated for the study is 88.

Using the formula:  $n = (z_{1-\frac{\alpha}{2}})^2 \propto P(1-P)/L^2$

88 women aged between 18-45 years were included in the study.

Informed consent was obtained from all the participants included in the study and institutional ethics committee clearance was obtained.

**Approval Number:** AJEC/REV/112/2023, dated: 27,04,2023 of A.J. Institute of Medical Sciences and Research Centre. DCGI Reg. No. EC/NEW/INST/2020/741.

All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2013.

The participants were explained regarding the objectives as well as the method of study. An assurance to the patient about confidentiality of the patient's data was ensured.

All the participants were screened for exclusion criteria. Only the individuals satisfying the inclusion criteria and exclusion criteria were selected.

Only the qualifying participants fulfilling the inclusion criteria were sent the semi structured, digital questionnaire comprising of 30 questions via electronic medium and response was collected.

The objective of our research is to evaluate the level of awareness of genital hygiene practices among Indian women and investigate its relationship with the development of vulvo-vaginal dermatoses. To achieve this, we will use the Genital Hygiene Behavior Scale (GHBS), which is a validated questionnaire that measures the awareness of genital hygiene practices. The scale will use a 5-point Likert-type response format, which ranges from "Don't agree" to "Strongly agree".

### **Statistical Analysis**

- Data was entered in Microsoft Excel and analysed using statistical package for the social sciences (SPSS) software programme, version 23.
- Categorical data will expressed as percentage.
- Quantitative data will be expressed as mean and standard deviation.
- Chi square test will be used to test the association of awareness and the association between hygiene practices and vulval dermatopathy.

- $p < 0.05$  will be considered statistically significant.

### Inclusion Criteria

1. Females in the reproductive age group (18-45 years)
2. Females with and without vulvo-vaginal dermatoses.

### Exclusion Criteria

1. Age <18years.
2. Age >45years.
3. Unwilling to give consent for the study.
4. Diabetic Patients
5. Patients on immunosuppressive drugs.

### Results

A total of 88 participants were enrolled in the study.

The analysis revealed that over 85% changed underwear daily (97.7%), washed hands after urination and defecation (95.5%), used sanitary pads exclusively during menses (88.6%), and washed hands after changing sanitary pads (89.8%)[Table 1].

Analysis of Menstrual Hygiene Product Preferences [Figure 1]

The bar chart presents a clear preference in the choice of menstrual hygiene products among a surveyed group. The survey data depicts a predominant preference for sanitary pads among respondents, with 78.4% using them exclusively. A combination of sanitary pads and menstrual cups is preferred by 9.1%, while sanitary pads with tampons are used by 4.5%. Standalone usage of menstrual cups is at 2.3%. Other product combinations have marginal usage: sanitary pads with period panties are at 3.4%, and both sanitary pads with cloth pads and the combination of sanitary pads, menstrual cups, and cloth pads are each at 1.1%.

Hair Removal Methods Usage Insights [Figure 2]

A survey on hair removal methods has revealed that 65.9% of participants primarily use razor blades, making it the most favored method. Waxing is the next popular choice, accounting for 17.0% of responses. Lesser-used methods include scissors and herbal powder, each at 4.6%. Other methods such as laser hair removal, shaving cream, depilatory creams, and trimmers are less common, with no individual method exceeding 4.6% usage among respondents.

These findings highlight a strong preference for traditional shaving with razor blades and waxing, with other hair removal methods being significantly less prevalent.

Vaginal Wash Usage: Survey Results [Figure 3.]

In a recent survey regarding intimate hygiene practices, 28.4% of respondents reported using a vaginal wash. Conversely, the larger portion, 71.6%, indicated they do not use these products, suggesting a preference for alternative hygiene methods or the natural approach to intimate care.

Prevalence of Genital Health Concerns in a Surveyed Population [Figure 4.]

According to the collected data, a portion of the population, accounting for 36.4%, has reported experiencing genital infections, skin reactions, or dermatitis. In contrast, the majority, 63.6%, have not reported such health concerns.

Sexual Health and Practices [Table 2.]

Regarding sexual activity, 59.1% were sexually active, and 40.9% were not. All participants (100.0%) reported that their partner did not have any genital dermatological conditions. Lastly, 25.4% reported urinating after sexual intercourse, whereas 74.6% did not.

Genital Hygiene Behaviour Scale (GHBS) Survey Findings

The Genital Hygiene Behaviour Scale (GHBS), a validated questionnaire designed to measure awareness of genital hygiene, was recently administered to a group of individuals. The GHBS employs a 5-point Likert-type response format ranging from "Don't agree" (1 point) to "Strongly agree" (5 points), allowing for nuanced insight into personal hygiene practices.

Participants' responses were scored across a range from 23 to 115, with different tiers indicating levels of hygiene awareness: scores from 23 to 53 were classified as 'low', scores from 54 to 84 as 'moderate', and scores above 84 as 'high'.

In the surveyed cohort, the results were quite positive: no individuals fell into the 'low' awareness category. A total of 25 participants (28.4%) were assessed to have 'moderate' awareness of genital hygiene, while the majority, 63 participants (71.6%), demonstrated 'good' awareness according to the GHBS criteria.[Table 3]

This distribution underscores a high level of genital hygiene awareness among the respondents, with a significant majority scoring in the 'good' range. Such findings could be indicative of effective health education and accessibility to hygiene resources within the surveyed population.

However, when exploring the association between the level of genital health awareness and the incidence of vulvo-vaginal dermatoses, no statistically significant correlation was found. The Chi-square test result was 0.592, indicating non-significance (NS). This suggests that while the majority of participants show a commendable level of awareness about genital health, this awareness does not necessarily correlate with a lower occurrence of vulvo-vaginal dermatoses within the population studied. [Table 4]

[Table 1]

Don't agree	1	DA
Neutral	3	N
Somewhat agree	4	SA
Somewhat don't agree	2	SDA
Strongly agree	5	STA

	DA		SDA		N		SA		STA		Total	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
1. I have a bath at least once a week.	14	16.5%	2	2.4%	2	2.4%	3	3.5%	64	75.3%	85	100.0%
2. I change my underwear every day.	0	0.0%	0	0.0%	1	1.1%	1	1.1%	86	97.7%	88	100.0%
3. My underwear is generally white.	24	27.9%	10	11.6%	22	25.6%	20	23.3%	10	11.6%	86	100.0%
4. My underwear is generally made of cotton.	1	1.1%	1	1.1%	10	11.4%	22	25.0%	54	61.4%	88	100.0%
5. I use my underwear alone.	3	3.4%	0	0.0%	7	8.0%	4	4.5%	74	84.1%	88	100.0%
6. I iron my underwear.	52	59.1%	14	15.9%	12	13.8%	9	10.2%	1	1.1%	88	100.0%
7. I change my underwear every 3-4 days.	59	72.0%	3	3.7%	1	1.2%	3	3.7%	16	19.5%	82	100.0%
8. I wash my hands before going to the toilet.	22	25.0%	5	5.7%	21	23.9%	17	19.3%	23	26.1%	88	100.0%
9. I wipe from front to back following urination or defecation.	9	10.5%	1	1.2%	13	15.1%	16	18.6%	47	54.7%	86	100.0%

10. I use toilet paper following each urination or defecation to be dried.	28	32.2%	3	3.4%	17	19.5%	16	18.4%	23	26.4%	87	100.0%
11. I wash my hands after urination and defecation.	0	0.0%	0	0.0%	0	0.0%	4	4.5%	84	95.5%	88	100.0%
12. I clean pubic hair frequently.	1	1.1%	1	1.1%	7	8.0%	17	19.3%	62	70.5%	88	100.0%
13. I only use disposable ready sanitary pads in my menstrual periods.	3	3.4%	0	0.0%	2	2.3%	5	5.7%	78	88.6%	88	100.0%
14. I use cloth pads in my menstrual periods.	78	90.7%	1	1.2%	4	4.7%	1	1.2%	2	2.3%	86	100.0%
15. I wash my hands before changing sanitary pads in my menstrual periods.	16	18.2%	7	8.0%	17	19.3%	12	13.6%	36	40.9%	88	100.0%
16. I wash my hands after changing sanitary pads.	3	3.4%	1	1.1%	0	0.0%	5	5.7%	79	89.8%	88	100.0%
17. Even if my pad is not full, I regularly change it every 3-4 hours.	6	6.8%	6	6.8%	15	17.0%	28	31.8%	33	37.5%	88	100.0%
18. I sometimes take a warm bath in my menstrual periods.	7	8.0%	6	6.8%	19	21.6%	22	25.0%	34	38.6%	88	100.0%
19. I do not change my underwear in my menstrual period unless it gets dirty.	61	69.3%	15	17.0%	5	5.7%	6	6.8%	1	1.1%	88	100.0%
20. I change my pad in my menstrual period only when it is completely full.	49	55.7%	17	19.3%	12	13.6%	7	8.0%	3	3.4%	88	100.0%

22. I see a doctor in case of an itching or burning sensation in my genital region. *	4	4.5%	6	6.8%	18	20.5%	15	17.0%	45	51.1%	88	100.0%
23. I see a doctor in case of a foul odor and different color vaginal discharge.	5	5.7%	4	4.5%	8	9.1%	13	14.8%	58	65.9%	88	100.0%
24. I do not pay attention to the symptoms of a disease in my genital region.	65	73.9%	6	6.8%	10	11.4%	3	3.4%	4	4.5%	88	100.0%

Figure 1: Analysis of Menstrual Hygiene Product Preferences

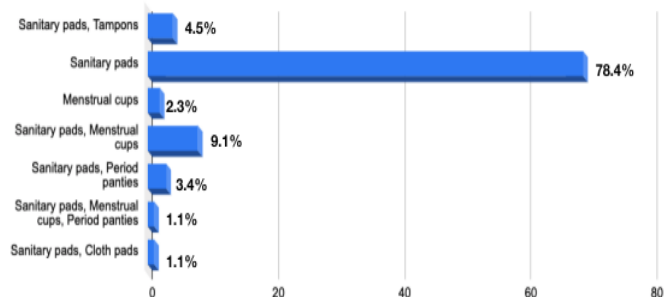


Figure 2: Materials do you use for hair removal

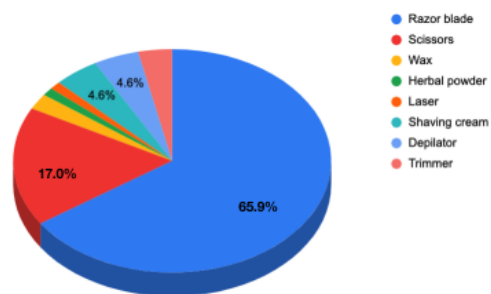


Figure 3: Frequency of use of vaginal wash

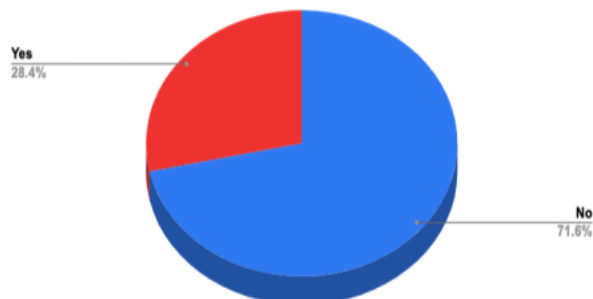


Figure 4: Prevalence of Genital Health Concerns in a Surveyed Population

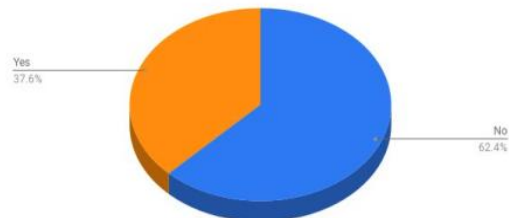




Table 2: Questions pertaining to sexual hygiene

	No		Yes		Total	
	Count	Row N %	Count	Row N %	Count	Row N %
Are you sexually active?	52	59.1%	36	40.9%	88	100.0%
Does your partner have any dermatological condition pertaining to the genitals?	63	100.0%	0	0.0%	63	100.0%
Do you urinate after sexual intercourse?	15	25.4%	44	74.6%	59	100.0%

Table 3: Result of Genital Hygiene awareness as per GHBS

	Count	Column N %
Low	0	0.0%
Moderate	25	28.4%
Good	63	71.6%
Total	88	100.0%

Table 4: Statistical correlation between genital hygiene and vulvo-vaginal dermatoses

Have you ever experienced genital infections/skin reactions/dermatitis	chi square(C)/Fishers exact test(F)	p value	
1. I have a bath at least once a week.	F	0.720	NS
2. I change my underwear every day.	F	0.447	NS
3. My underwear is generally white.	C	0.993	NS
4. My underwear is generally made of cotton.	F	0.491	NS
5. I use my underwear alone.	C	0.929	NS
6. I iron my underwear.	C	0.852	NS
7. I change my underwear every 3-4 days.	F	0.110	NS
8. I wash my hands	C	0.068	NS

before going to the toilet.			
9. I wipe from front to back following urination or defecation.	C	0.906	NS
10. I use toilet paper following each urination or defecation to be dried.	C	0.625	NS
11. I wash my hands after urination and defecation.			
12. I clean pubic hair frequently.	F	0.422	NS
13. I only use disposable ready sanitary pads in my menstrual periods.	F	0.491	NS
14. I use cloth pads in my menstrual periods.	C	0.117	NS
15. I wash my hands before changing sanitary pads in my menstrual periods.	C	0.761	NS
16. I wash my hands after changing sanitary pads.	C	0.629	NS
17. Even if my pad is not full, I regularly change it every 3-4 hours.	C	0.500	NS
18. I sometimes take a warm bath in my menstrual periods.	C	0.369	NS
19. I do not change my underwear in my menstrual period unless it gets dirty.	C	0.306	NS
20. I change my pad in my menstrual period only when it is completely full.	C	0.673	NS

21. I use the following during my menstrual period (select more than one, if applicable)	F	0.285	NS
22. I see a doctor in case of an itching or burning sensation in my genital region. "	C	0.395	NS
23. I see a doctor in case of a foul odor and different color vaginal discharge.	C	0.648	NS
24. I do not pay attention to the symptoms of a disease in my genital region.	C	0.467	NS
25. What materials do you use for hair removal?	F	0.479	NS
27. Do you use a vaginal wash?	C	0.655	NS
28. Are you sexually active?	C	0.346	NS
29. Does your partner have any dermatological condition pertaining to the genitals?			
30. Do you urinate after sexual intercourse?	C	0.957	NS

**Discussion**

Choosing the right underwear material is key to reducing the risk of urinary and genital infections. There is a commercial trend to make nylon and synthetic underwear more attractive to women, especially younger ones. These types of underwear, however, do not absorb perspiration as much as cotton underwear does, causing the perineum to remain humid and leading to an increased risk of genital tract infections [12,13,14]. The

study by Sevil et. al. found a notable increase in genital infections among individuals wearing satin or flannel underwear ( $p < 0.05$ ) [7]. In our study we saw 86.4% women agreed to wearing cotton underwear and with a p value of 0.491 we found no association between the material of underwear and genital dermatoses(0.491).

According to the study by Ardin et. al , 64% of women changed their underwear everyday and 36% changed their underwear 2-3 times a week[15]. Whereas, in our study we found women 98.9% women agreed to changing their underwear everyday. Our study showed no association between frequency of changing underwear everyday and vulvo-vaginal dermatoses(0.447).

It has been described by the previous studies that wrong perineal hygiene practices (i.e. back to forward) may lead to infections due to the transfer of microorganisms from the anus to the vagina [18,19]. The study by Cangol reported the frequency of genital infections as 35.1% among the participants practicing correct genital hygiene vs. 38.1% in those who clean the genital area incorrectly [16]. Likewise, Hacıalioglu et al. found a higher incidence of genital infections among women using incorrect cleaning practices [17]. In our study 73.3% women practiced correct genital hygiene but no association between cleaning practices and vulvovaginal dermatoses( $p=0.906$ ).

It was determined that more than half of the students “sometimes” washed their hands before entering the toilet, and the majority of them “always washed” their hands after the toilet (96.6%)[15]. In our study, we found majority “strongly agreed” that they washed hands after urination and defecation(95.5%).

According to the study by Dr. Neelima et. al. 82% (144girls) were reported to have the habit of washing



hands after changing pads [3]. 95.5% of women in our study washed their hands after changing sanitary pads.

Menstrual products, pivotal in women's health, have transformed remarkably over time. Today's array, including sanitary napkins, tampons, and menstrual cups, mirrors advancements in health awareness and technological innovation, underscoring a commitment to safe, efficient, and comfortable menstrual care.

The data on menstrual product preferences among our respondents reveals a predominant use of sanitary pads at 78.4%, while 9.1% also incorporate menstrual cups, reflecting a trend towards combining products. Exclusive menstrual cup usage is modest at 2.3%. Dual usage of pads and tampons is at 4.5%, and a small proportion utilizes cloth pads, with or without other products, totaling 2.2%. These figures highlight a strong preference for pads while indicating a gradual shift towards diverse and sustainable menstrual products.

152 girls (86.36%) were using sanitary napkins as absorbent material during their menstrual cycle, while 10.79% (19 girls) were practicing cloth or sanitary towel and used 1.7% tampons as menstrual absorbent as we found during the study done by Dr. Neelima et. al. which is in accordance with Adhikari P et al 2007 and Juyal et al 2012 [3,20,21]. But in studies done previously completely different scenario was seen where cloth was used mainly as menstrual absorbent. 22, 23, 24, 25, 26 Popularity of tampons has been declined tremendously because of more incidences of toxic shock syndrome with tampons.

Effective menstrual hygiene hinges on how frequently pads are changed. The upcoming data illuminates current practices, underscoring their significance for health and well-being. The data indicates that the majority of participants are proactive with menstrual hygiene, with

37.5% reporting they change their sanitary pad every 3-4 hours, even if the pad is not fully saturated. This practice, consistently followed by over a third of respondents, suggests a commitment to hygiene and comfort during the menstrual cycle. 72% (n=126) of girls used to change their pads 6 hourly during first 2 days of their menstrual cycles[3]. Despite the meticulous practice of changing sanitary pads every 3-4 hours by 37.5% of respondents, our study found no correlation with the occurrence of vulvo-vaginal dermatoses, indicating that other variables may influence the onset of these dermatological conditions (p=0.500).

The study's findings on hair removal practices reveal that razor blades are the predominant choice, favored by 65.9% of participants, with waxing also notable at 17%. Other methods, such as scissors, herbal powder, and various grooming devices, are utilized to a lesser extent. The study by Felix et. al. indicates that hair removal in the genital area, practiced by all women surveyed, is predominantly done using a razor blade, with 68% overall usage. The study found a significant association between depilatory practices and infections or reactions, with a statistically significant occurrence of infection (OR=3.3, p=0.0438) linked to depilation.[27] Whereas, our study found no such association (p=0.479). There is no consensus in the literature regarding the removal of hair from the genital area, although there is a recommendation for its removal due to the accumulation of residues and disruption of the genitalia, which facilitate the occurrence of infections. On the other hand, the periodic mechanical removal of the hairs, using a razor blade or other depilatory products, may promote irritation and inflammation of the region and should be as short as possible. Therefore, some recommendations suggest that the hair in the genital area should be cut

approximately 0.5 cm, instead of being completely removed, to help maintain the health of the genital area, and genital depilation should respect the individual sensitivity of each woman[28,29].

Within the study's cohort, 59.1% of participants reported not being sexually active, while 40.9% indicated that they are. Interestingly, none of the participants' partners were reported to have any dermatological conditions related to the genitals. Furthermore, post-coital practices were examined, with a significant 74.6% of the respondents stating that they urinate after sexual intercourse, a practice often recommended to prevent urinary tract infections. The results showed that being sexually active ( $p=0.346$ ) and urinating after sexual intercourse ( $p=0.957$ ) were not statistically significant factors associated with the condition. This suggests that these factors do not have a discernible impact on the occurrence of vulvo-vaginal dermatoses among the participants.

To assess the level of awareness of genital hygiene among our respondents, we utilized the Genital Hygiene Behaviour Scale (GHBS), a validated questionnaire that gauges awareness using a 5-point Likert-type response format ranging from "Don't agree" to "Strongly agree," resulting in a total score range of 23 to 115. The score categories are as follows: 23 to 53 indicates low awareness, 54 to 84 signifies moderate awareness, and scores above 84 indicate high awareness[30].

Among the 88 participants, 71.6% (63 individuals) demonstrated moderate awareness (scores between 54 and 84), while 28.4% (25 individuals) exhibited low awareness (scores ranging from 23 to 53).

Despite the majority of participants displaying moderate awareness of genital health, our analysis did not reveal any statistically significant correlation between the level

of genital health awareness and the presence of symptoms related to vulvo-vaginal dermatoses. The chi-square test yielded a result of 0.592, indicating a non-significant relationship (NS).

### **Conclusion**

In conclusion, our study delved into the realm of genital hygiene practices among women and their potential correlation with vulvo-vaginal dermatoses. Notably, our investigation revealed a high adherence to essential genital hygiene practices, such as daily underwear changes, post-toileting hand washing, and proper hygiene during menstruation through the use of sanitary pads.

Unexpectedly, our findings suggest no significant correlation between specific genital hygiene practices, including vaginal douching and the use of vaginal wash, and the occurrence of vulvo-vaginal dermatoses within our study population.

This surprising outcome emphasizes the importance of considering broader aspects that could influence genital health. Factors such as the diversity and composition of the vaginal microbiome, hormonal fluctuations during the menstrual cycle, sexual behavior and partner dynamics, antibiotic usage, and immune system health may all play critical roles.

Understanding the intricacies of these factors is vital for a comprehensive approach to women's genital health. It underscores the necessity for comprehensive health education programs that encompass not only genital hygiene but also the broader spectrum of women's health. Addressing lifestyle factors and incorporating routine gynecological check-ups will further contribute to optimal genital health outcomes.

Furthermore, we recommend future research that thoroughly investigates these multifaceted influences on

genital health. A comprehensive analysis will pave the way for tailored interventions and evidence-based public health strategies, ensuring the overall well-being and quality of life for women in our community.

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