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Vulvovaginal health – preferred practices in women's intimate hygiene

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Abstract
Background: Intimate hygiene (IH) plays a significant role in women's quality of life. The aim of the study was to investigate women's preferred daily care practices in relation to vaginal discomfort (VD) and vulvovaginal health.
Methods: A cross-sectional descriptive study was conducted on a sample of 201 women with a mean age of 25.85 years (± 6.25). A self-constructed questionnaire with pilot testing was used for data collection. The data were analysed using descriptive and inductive statistics.
Results: The majority of women preferred using cleansing products (61%) or washing with water (47%) for IH. As many as 80% of respondents had experienced VD, which may indicate inadequate IH or untreated infections. Statistically significant differences in IH awareness and practices of IH were observed based on the type of school attended, education level, and relationship status. Women with healthcare education demonstrated better awareness of VD and infections; university-educated women practiced IH at a more satisfactory level, while single women were less likely to consult a physician about vulvovaginal problems.
Conclusion: The results highlight the need for health education programs focused on women's vulvovaginal health. It is crucial to focus not only on treating symptoms of VD but also on understanding current epidemiological trends and promoting preventive measures in IH, as this may contribute to a significant reduction in the risk of vulvovaginal infections.

Keywords: Intimate hygiene; Intimate hygiene practices; Vaginal discomfort; Vulvovaginal health

Introduction

The issue of vulvovaginal health is gaining increasing importance, with a growing tendency among individuals to rely on unverified online sources rather than evidence-based qualified medical recommendations. This trend is particularly evident in intimate hygiene (IH) practices, where potentially inappropriate methods are often promoted. The use of certain cosmetic products may disrupt vaginal microbiota and increase the risk of infections. Recurrent vulvovaginal infections have become not only an epidemiological and clinical concern but also a condition with significant social and psychological consequences.

Education on IH should be incorporated into health promotion programs to raise awareness and prevent vulvovaginal infections. These affect over 75% of women in Slovakia, representing a major public health issue that negatively impacts women's overall health and quality of life (Kalia et al., 2020; National Health Portal, 2018). The International Society for the Study of Vulvovaginal Disease (ISSVD) defines vulvodynia as a chronic vulvar pain syndrome, which may present in acute or chronic forms with a tendency for recurrence. The most common causes of acute discomfort are bacterial vaginosis and vaginal candidiasis (Koliba, 2013). According to Bergeron et al. (2020), vulvodynia affects approximately 8–10% of the female population across age groups and is characterized by persistent vulvar pain, which may occur during sexual activity (dyspareunia) or in response to non-sexual stimuli. Vulvodynia also negatively impacts women's quality of life, including their intimate relationships, and imposes a significant economic burden on individuals and healthcare systems.

Existing scholarly literature demonstrates a significant lack of research on the potential role of female IH in the management of vulvovaginal infection symptoms and its impact on the overall health of the urogenital system (Murina et al., 2023). There is no universal hygiene model, as practices vary considerably across different cultures and countries. Unfortunately, the side effects of inappropriate hygiene practices and their consequences are not systematically documented in the current medical literature (Ruiz et al., 2019). Several authors emphasize that proper IH involves daily vulvar cleansing to prevent the accumulation of vaginal discharge, urine, and faecal contamination. However, other evidence suggests that certain products containing spermicides or antimicrobial

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agents may disrupt vaginal microbiota to such an extent that the risk of infection increases substantially. This also applies to practices such as vaginal douching (Graziottin, 2024; Chen et al., 2017; Holdcroft et al., 2023). There is a notable lack of evidence-based medical guidelines (EBM) providing specific recommendations for female intimate hygiene. The Guideline for Female Genital Hygiene for the Middle East and Central Asia, developed by a professional advisory board, recommends "keeping the genital area clean and dry to preserve lactobacilli dominance that protects against vaginal infections" (Murina et al., 2023). Optimal practice involves using mild, hypoallergenic liquid cleansers with an acidic pH that do not compromise the protective function of the genital mucosa. Contact with fragranced soaps, shower gels, or bubble baths should be avoided (Murina et al., 2020, 2023). The guidelines highlight the importance of preserving the lactobacilli layer as a barrier against infections (Holdcroft et al., 2023). Clinical evidence identifies vaginal douching and spermicide use as the highest-risk practices for infection development (Cleveland Clinic, 2022; Gonçalves et al., 2016). Female hygiene products (such as female razors, sprays, douches, yeast creams, and hair removal oils) are widely used worldwide, despite their potential to negatively alter the vaginal environment. Unfortunately, this area remains insufficiently researched. Although these products do not directly cause vaginal discomfort (VD), their use may lead to symptoms mimicking VD, such as discharge or irritation, or may mask symptoms of vulvar and vaginal infections, potentially complicating diagnosis and treatment (Bardin et al., 2022). Sexual practices, such as oral sex, could introduce abnormal flora or lactobacillus phages into the vagina, or salivary mediators might alter vaginal flora and promote vulvovaginal infections (Bardin et al., 2022). Similarly, drug use, sexual activity, and excessive genital hygiene may also disrupt the natural protective barrier mechanisms of the reproductive organs (Kelčíková et al., 2017, 2020; Ruiz et al., 2019). During menstruation, women are advised to pay increased attention to IH. Ideally, showering twice daily (morning and evening) and changing sanitary pads, tampons, or menstrual cups more frequently is recommended, as moist and warm conditions create a favourable environment for yeast growth (Gandhi et al., 2022; Kelčíková et al., 2017). Failure to adhere to proper IH practices may increase women's risk of reproductive tract infections. Appropriate hygiene measures, including adequate genital washing, are crucial for maintaining optimal hygiene during the menstrual cycle (Daher et al., 2022; Vishwakarma et al., 2021).

To objectively assess current IH practices among women, this study aimed to analyse preferred IH routines in relation to VD and vulvovaginal health. The study focused on women's awareness of IH, identifying differences in IH practices based on sociodemographic variables, and examining the prevalence and subjective experience of VD.

Although this topic is intimate and often stigmatized, it is essential to address it systematically and establish evidence-based recommendations for IH and vulvovaginal health. Emphasis should be placed on preventive measures, educational initiatives, and the implementation of health promotion strategies to raise awareness and support women's health across various reproductive life stages.

Materials and methods

A quantitative cross-sectional study design was employed.

Sample

The research sample (*n*) consisted of 201 respondents selected through purposive sampling. The following inclusion criteria were established: women of reproductive age, including those with a history of VD, who agreed to complete the questionnaire and allow the use of collected data for research purposes. The mean age of respondents was 25.85 (± 6.25) years, indicating that the majority of participants were younger. The youngest respondent was 17 years old, while the oldest was 63 years old. The age range of 17–63 years was selected to ensure relevance to the study topic, it included: *Reproductively active women* (a life stage in which IH habits are most important for preventing infections, managing hormonal changes, and maintaining sexual health). The upper age limit of 63 was determined by the oldest participant who took part in the study. Some women may experience late menopause (even after age 55) and may have long-term experience with VD. *Women with long-term experiences across different life stages:* (1) adolescents (17–19 years, undergoing puberty-related changes and frequent infections, e.g., yeast infections); (2) young adult women (20–40 years, experiencing active sexual health, pregnancy, childbirth, contraception); and (3) perimenopausal and menopausal women (40+ years, a life stage characterized by a decline in oestrogen levels, vaginal dryness, and an increased risk of infections). Although the menopause typically begins around age 50, some women may experience symptoms (e.g., vaginal atrophy) even later, which may influence their hygiene practices. All women, regardless of their residence or education, had the opportunity to participate in the research. In terms of education, the majority of respondents had completed secondary education with a diploma (57.7%), followed by those with university education (34.3%). Regarding relationship status, 33.8% of respondents were single, while 47.3% lived with a partner without being married. In terms of residence, more than half of the respondents (57.7%) lived in urban areas. In terms of educational specialization, 70.6% of women attended non-medical schools, while 29.4% studied at healthcare-oriented schools. The selection and examination of this variable allowed for assessing whether professional education influences women's hygiene practices, which may be crucial for designing preventive and educational strategies.

Data collection and research instrument

Data collection was conducted using a combined approach (in-person and electronically) between November 2023 and January 2024. The process was anonymous, and by completing the questionnaire and demographic data, the respondents consented to participate in the study in accordance with Act No. 18/2018 Coll. on Personal Data Protection, allowing the use of collected data for research purposes. The electronic method was implemented via Google Forms platform, in collaboration with the social network Instagram and profiles dedicated to IH (where direct contact with a community of women discussing vulvovaginal infections was anticipated). 65 questionnaires were distributed in-person, of which 53 were returned, yielding a response rate of 81.54%. 263 women were contacted electronically, and 148 questionnaires were completed (response rate: 56.27%). In total, 201 out of 328 contacted women completed the questionnaire, achieving an overall response rate of 61.28%.

A self-constructed questionnaire was used to collect relevant data, tailored to the study's objectives and the specificity of the research topic. This tool allowed a focus on women's individual preferences and IH practices not adequately covered

by standardized instruments (e.g., FSFI, VHIS). The Female Sexual Function Index (FSFI) (Rosen et al., 2000) and Vaginal Health Index Score (VHIS) (Bachmann and Nevadunsky, 2000) primarily focus on symptoms (e.g., burning, itching), sexual function, and clinical diagnoses (e.g., infections), but do not capture routine hygiene habits (use of intimate soaps, washing frequency, type of pads, etc.). Despite the excellent psychometric quality of FSFI (Meyer-Bahlburg and Dolezal, 2007) and the weak correlations between VHIS, laboratory markers, and subjective symptoms (Alvisi et al., 2019), these instruments lack a comprehensive evaluation of hygiene's impact on intimate health. The development of the questionnaire was based on a review of current academic literature and studies, incorporating cultural and local specifics (e.g., product availability, preferences, traditions, and local myths).

Given the use of a self-constructed tool, a pilot study was conducted with 15 women, leading to modifications of problematic item formulations based on pilot results. The final version of the questionnaire focused on preferred IH practices (∑ 10 questions) and subjective experiences of VD (∑ 6 questions). The term VD was chosen because the study targeted a broad spectrum of women with varying education levels, assuming that not all respondents could accurately distinguish whether their discomfort stemmed from infections or other factors. It was expected that VD would more easily evoke women's recall of unpleasant vulvar/vaginal sensations, thereby allowing them to describe their knowledge and practices more clearly than with the term "vulvovaginal infection".

The research focused on the hygiene products used by women for IH, the perception of VD, and the treatment of VD symptoms. The occurrence, recurrence, and duration of vulvovaginal infections / VD were investigated. Responses were evaluated using a 5-point Likert scale: 5 – strongly agree; 4 – somewhat agree; 3 – neutral / don't know; 2 – somewhat disagree; 1 – strongly disagree.

Data analysis

To analyse the data, descriptive and inductive statistical methods were applied, including the chi-square test. The following parameters were used to evaluate the results of the questionnaire and its subscales: research sample (n), mean value (d), standard deviation (SD), minimum/maximum values, percentage (%) representation. A result was considered statistically significant at $p < 0.05$. Statistical processing (calculations, tables) was performed in Microsoft Office Excel 365 and the statistical software JAMOVI.

Results

Awareness of vulvovaginal infections among women was insufficient. Only 59% of women had satisfactory knowledge, while 22% were unable to identify the cause of their VD. The analysis of questionnaire data revealed women's preferences regarding IH practices and their relationship to VD and vulvovaginal health.

According to the results, 86.07% (1.56 ± 1.05) of respondents practiced IH daily, while 20.90% (4.04 ± 1.52) used inappropriate shampoos or shower gels for washing. Only 47.76% (3.04 ± 1.73) of women correctly used only clean water for IH, whereas 61.19% (2.46 ± 1.68) preferred soap specifically designed for IH. More than half, 69.15% (2.08 ± 1.36), practiced IH after sexual intercourse. Feelings or experiences with vulvovaginal problems / VD were reported by 98% (n = 196) of respondents from the total sample (n = 201). Among women who had experienced VD (n = 196), less than half, 41.33% (2.79 ± 1.73), did not consult a doctor about their problems. The remaining 62.05% (2.46 ± 1.62) managed VD on their own using over-the-counter pharmacy products. A positive finding was that 83.67% (4.39 ± 1.25) of women attempted to address and treat VD, with 32.65% (3.53 ± 1.62) of them using alternative methods such as herbs or garlic. Sexual abstinence during VD was practiced by 70.92% (2 ± 1.42) of women. By identifying subjective experience with VD within the study group, we gained insight into the incidence, recurrence, and symptoms of this health issue.

In the research sample (n = 201), it was found that 80.10% (4.32 ± 1.12) of women had experienced vulvovaginal problems / VD at least once. At the same time, 18.50% (4.32 ± 1.12) of respondents stated that they were unaware of having VD, which may indicate a lack of awareness regarding this issue. Most women correctly identified symptoms such as itching (82.60%; 3.38 ± 1.21), burning (72.60%; 3.38 ± 1.21), and changes in discharge (67.70%; 3.38 ± 1.21). Only 7.50% (3.38 ± 1.21) of women mentioned additional symptoms such as redness around the vaginal opening. The duration of VD varied, with the most common response (41.80%; 1.96 ± 0.99) being 4 to 7 days, while 36.30% (1.96 ± 0.99) reported a duration of 1 to 3 days. Recurrence of VD occurred in 43.08% (3.26 ± 1.66) of respondents, with no uniform frequency. Recurrence every 3 months and every 6 months was reported by 28.79% (3.76 ± 1.55), while 21.21% (3.76 ± 1.55) of respondents experienced monthly recurrence. Pain during sexual intercourse was reported by 59.20% (3.52 ± 1.59) of respondents.

Differences in IH practices related to VD / vulvovaginal infections based on sociodemographic variables

A chi-square test was used to analyse statistical significance (Table 1). The categorical variable of age was classified into two groups: women aged 17 to 25 years and women aged 26 to 63 years.

The analysis revealed statistically significant differences (asymptotic significance at the 0.05 level) depending on what the participants studied at school. More women with healthcare education (72.9%) demonstrated better awareness of vulvovaginal infections and their manifestations (Table 2) compared to women without healthcare-focused education.

Table 1. Association between sociodemographic variables and women's awareness of vulvovaginal infections and their symptoms (n = 201)

	Age	Education	Relationship status	Residence	Healthcare-focused studies
Chi-square value	2.16	9.98	4.31	1.72	7.60
p-value	0.34	0.13	0.64	0.42	**0.02***

Note: * $p < 0.05$

Table 2. Difference in women's awareness of vulvovaginal infections and their manifestations by *school focus*

	Attended a healthcare-focused school	Did not attend a healthcare-focused school
Agree	43 (72.9%)	76 (53.5%)
Unsure / Don't know	9 (15.3%)	26 (18.3%)
Disagree	7 (11.9%)	47 (23.4%)

The analysis revealed statistically significant differences (asymptotic significance at the 0.05 level) depending on *education* (Table 3). Women with lower education levels tended to practice less appropriate IH methods, with 37.5% of women with primary education and 50% of women with secondary education (without school-leaving exam) using unsuitable products for IH, such as shower gel or shampoo. In contrast, women with higher education used these inappropriate hygiene practices in only 15.9% of cases (Table 4).

Table 3. Association between sociodemographic variables and the use of IH products (shower gel/shampoo) (*n* = 201)

	Age	Education	Relationship status	Residence	Healthcare-focused studies
Chi-square value	3.28	12.54	9.52	0.64	1.13
p-value	0.19	**0.05***	0.15	0.73	0.57

Note: * $p < 0.05$

Table 4. Difference in the use of IH products (shower gel/shampoo) by *education*

	Primary education	Secondary education without school-leaving exam	Secondary education with school-leaving exam	University education
Agree	3 (37.5%)	4 (50%)	24 (20.7%)	11 (15.9%)
Unsure / Don't know	0	0	1 (0.9%)	5 (7.2%)
Disagree	5 (62.5%)	4 (50%)	91 (78.4%)	53 (76.8%)

The analysis of *relationship status* revealed statistically significant differences (asymptotic significance <0.05) (Table 5). More than half (64.1%) of single women who had ever experienced vulvovaginal problems/VD did not discuss this problem with a doctor. In comparison, 34.7% of women in a relationship did not talk about their problems with a doctor (Table 6).

Table 5. Association between sociodemographic variables and seeking medical care for vulvovaginal problems (*n* = 196)

	Age	Education	Relationship status	Residence	Healthcare-focused studies
Chi-square value	5.78	4.22	27.28	1.17	0.75
p-value	0.06	0.65	**0.00***	0.56	0.69

Note: * $p < 0.05$

Table 6. Seeking medical care for vulvovaginal problems by *relationship status*

	Single	Married	Cohabiting	Divorced/Other
Agree	23 (35.9%)	22 (71.0%)	55 (57.9%)	4 (66.7%)
Unsure / Don't know	0	4 (12.9%)	7 (7.4%)	0
Disagree	41 (64.1%)	5 (16.1%)	33 (34.7%)	2 (33.3%)

Discussion

The research findings regarding preferred IH practices were not entirely satisfactory in all aspects. The use of shower gels or shampoos for IH purposes emerged as problematic, with 21% of women in the total sample (*n* = 201) reporting this method. Several authors have noted that the use of inappropriate products, such as shower gels and shampoos, can disrupt the natural vaginal defense mechanisms and reduce skin hydration (Fait, 2019; Gandhi et al., 2022; Koliba and Koliba, 2013). Despite these warnings, a significant proportion of women continue to use these products. Similar recommendations can be found in guidelines for Central Asia, where soaps with a pH range of 4.2–5.6 are recommended for IH (Hisham et al., 2011). The standard vaginal pH of 4.5, essential for maintaining a healthy vaginal immune barrier, can be disrupted by such practices (Daher et al., 2022; Gandhi et al., 2022). For comparison, research conducted by Kelčíková et al. (2017) in a similar region showed that up to 36% of women used inappropriate products for IH, indicating a decline in this practice over seven years. This trend can be considered a positive shift towards healthier IH habits.

Performing IH after sexual intercourse was reported by nearly 70% of women, representing a slight improvement compared to the results of Kelčíková et al. (2017), where less

than 66% of respondents declared this practice. This increase may also be considered a positive indicator of growing awareness among women regarding appropriate IH practices. It may reflect an upward trend in awareness due to education through online resources and campaigns. The stronger adherence to better hygiene practices in our study could be attributed to: *the sample population* – higher education levels among respondents, *social desirability bias* – a tendency to report "correct" behaviour, or *review-based education* – participants may have been more motivated to educate themselves during the pandemic.

Regarding the question of performing IH once daily, our research showed that 86% of women practice this activity regularly every day. For comparison, in the study by Kelčíková et al. (2017), approximately 70% of respondents did so. According to the Central Asia Guideline, it is recommended to maintain vulvar cleanliness through daily IH (Hisham et al., 2011). Graziottin (2024) also states that washing the vulva once daily (maximum twice daily) using a gentle cleanser with a balanced pH is optimal. Several studies confirm that washing with clean water is the most suitable form of IH (Imam et al., 2024; Koliba and Koliba, 2013). In our research, 47% of women reported this practice. This result represents significant progress compared to the study by Kelčíková et al. (2017), where only 12% of respondents used clean water for IH. However, Imam et al. (2024) and Koliba and Koliba (2013) also point out that washing with clean water may not be sufficient for some women. They recommend specialized IH products that help maintain optimal vaginal pH and alleviate symptoms of VD. In our study, the use of these products was reported by 61% of women, which may be attributed to their wide availability and intensive marketing to promote sales. This trend indicates the growing popularity of products specifically designed for IH.

Women's IH is influenced by various factors, such as personal preferences, cultural and social norms. For example, vaginal douching is a common practice for many women, although there are no scientifically proven health benefits. On the contrary, vaginal douching can disrupt the natural immunity of the vagina, increasing the risk of infections. This practice is also associated with a higher risk of pelvic inflammatory disease, endometriosis, and sexually transmitted infections (Chen et al., 2017; Gandhi et al., 2022). Several sources state that douching with water or even soapy water is inappropriate for asymptomatic women, as it can disrupt the balance of the vaginal microenvironment. On the other hand, douching with benzydamine solution has been shown to be effective in treating acute infections and preventing recurrent vulvovaginitis (Imam et al., 2024; Yıldırım et al., 2020). While vulvar douching may serve as a useful adjunct to pharmacological treatment, it does not cure the infection itself. Routine washing of the vulva is essential to prevent the accumulation of vaginal discharge, sweat, urine, and faecal contamination, thereby minimizing unpleasant body odours. Currently, there is a lack of official guidelines detailing the links between inadequate hygiene and the development of complications such as dyspareunia, vulvovaginal infections, and vulvodynia. IH represents a complex issue that intersects with various medical fields. Therefore, it should be addressed not only by gynaecologists but also other healthcare professionals. In recent years, there has been a significant increase in products designed for IH, used for cleansing and odour reduction. However, some of these products may disrupt the pH balance of the vulvovaginal area, negatively affecting the composition of the normal microflora, which is crucial for protection against infections (Chen et al., 2017; Długosz et al., 2024). One of the predisposing factors for the development of infection / VD is a disrupted vaginal ecosystem. Excessive hygiene practices, as well as the use of various cosmetic products and shaving of the intimate area, may impair these natural barrier mechanisms. Changing sexual partners may also pose a risk, as stable sexual partners are accustomed to each other's specific microbiome.

Nearly 71% of our study respondents reported practicing sexual abstinence during periods when they experience VD, which aligns with professional recommendations. After symptoms subside, women should resume sexual activity (Fait, 2019; Hill and Taylor, 2021). Dyspareunia, as a complex issue, affects not only physical but also mental health, making it crucial to identify and eliminate potential influences and risk factors, such as dysbiosis or current infections. Brown and Drexler (2020) emphasize that accurate differential diagnosis of infections associated with VD is essential for effective treatment. Their study highlights a high rate of diagnostic errors (nearly 50% of cases), which can lead to inadequate treatment and increase the risk of recurrence. Goje (2023) notes that despite the widespread availability of over-the-counter antifungals for treating vaginal mycosis (VM), there remains insufficient patient awareness of their correct use. In clinical guidelines, Farr et al. (2021) caution that asymptomatic VM does not require treatment. However, when symptoms manifest, thorough treatment is necessary to prevent chronicity and recurrence. The low rate of women seeking professional help may be due to persistent taboos surrounding intimate health issues and social stereotypes (Bergeron et al., 2020). This situation calls for systematic awareness campaigns aimed at increasing knowledge about VM and the accessibility of objective information.

In the subsequent analysis, the subjective experience of VD among women was examined to gain an overview of its incidence, recurrence, and symptoms. In terms of frequency, a total of 80.10% of women reported experiencing VD symptoms at least once, and 21% of women experienced recurring VD every month, highlighting the need for professional medical examination regarding their vaginal health, as recommended by Havránek (2007). Another 18.50% of women were unable to answer the question, suggesting a potential knowledge gap in this area. The most common symptom of VD in our sample was itching, reported by 83% of respondents. Itching is one of the main symptoms of vaginal infections, such as trichomoniasis or vulvovaginal candidiasis (Chen et al., 2017; Leclair and Stenson, 2022). Recurrent VD was regularly reported by 43% of women in our study, indicating that the issue may be more serious than temporary dysbiosis. Recurrent vulvovaginal candidiasis (RVVC) occurs in up to 5% of women (Cooke et al., 2022). Bradfield Strydom et al. (2023) even report that RVVC affects up to 10% of women of reproductive age, emphasising the need for professional medical examination regarding their vaginal health and supporting the argument for educational intervention.

Another less satisfactory finding was that more than half (62%) of women try to manage VD with over-the-counter pharmacy products. According to professional recommendations, it is safe to treat occasional VD episodes with over-the-counter products, but for recurring issues, it is necessary to visit a gynaecologist and undergo precise diagnostic testing (Farr et al., 2021). The low level of awareness about this issue points to inadequate patient education in gynaecological practices, where healthcare professionals (physicians and midwives) provide insufficient or only marginal guidance on proper VD treatment. A study conducted in 2020 in the USA reported a possible reluctance among healthcare professionals

to initiate conversations about sexual health or advise people in this area (Ezhova et al., 2020). Such behaviour is inappropriate, as midwives, in particular, should demonstrate openness and willingness in providing advice and care related to reproductive and sexual health (Imura, 2021). This situation may be attributed to multiple factors, including limited time for consultations or underestimation of the clinical significance of this issue. It was also found that only 55% of women were aware of the aetiology of their VD, which may be related to social taboo surrounding intimate health issues. As a result, patients often avoid professional examination and prefer inadequate self-treatment, which may not lead to effective therapy (Krejčí, 2022).

In our research sample, the women predominantly had higher education, which correlated with better knowledge regarding IH. Their preferred practices in this area largely aligned with standards and professional recommendations.

The analysis showed statistically significant differences in IH awareness and practices depending on *age* and *education*. Following the division of participants into two age groups, it was found that 5% more women aged 17–25 considered it necessary to seek medical help in the case of recurrent VD. Women with the lowest education (primary and secondary without school-leaving exam) were more likely to use inappropriate products for IH, such as shower gels or shampoos (in 37.5% and 50% of cases, respectively). Lower educational attainment was associated with reduced IH awareness, highlighting the need for targeted educational interventions and outreach to these groups in future initiatives. This segment of women may rely more on commercial advertisements, traditional practices, or unverified sources, and may more frequently use potentially harmful products (e.g., scented pads, harsh soaps), making them more susceptible to myths and incorrect practices, which represent risky IH behaviours.

In terms of *relationship status*, statistical significance ($p < 0.05$) was demonstrated, where 64% of single women experiencing VD reported a lack of willingness to discuss their concerns with a physician, compared to married women, where only 15% of respondents disagreed with the necessity of seeking professional help. This finding is crucial, as it highlights the insufficient knowledge and practices of single women regarding vulvovaginal infections.

One of the methodological limitations of this study is the relatively low representativeness of the sample, which may have slightly influenced the results concerning differences across sociodemographic variables. The study focused on women with experience in vulvovaginal health, including those who had previously suffered from VD (such as a 63-year-old respondent). The inclusion of the 63-year-old participant was intentional, as this woman could provide valuable data on long-term hygiene practices and changes over her lifetime. The study was not designed as nationally representative but rather as exploratory research targeting this age group. The chosen range of 17–63 years was intended to encompass: (1) reproductive-age women (who constituted the majority of the sample); (2) women with long-term experience, including postmenopausal participants; and (3) a biologically relevant period during which IH most affects health. Although the sample achieved a certain degree of representativeness, the conclusions of the study can be applied only to the conditions of this specific sample.

Some limitations are also associated with the use of a self-developed questionnaire and the potential risk of bias in subjective responses, which may have been influenced by recall effects or social desirability. In future research, we plan to focus more on the representativeness of the sample and to select participants more intentionally to ensure variability and balance. We also aim to complement the tool with standardized items, such as a Visual Analogue Scale (VAS) for measuring the intensity of discomfort.

The contribution of this study lies in its detailed exploration of IH – a topic that was largely under-researched in the past. Compared to studies conducted in 2015 and 2016 addressing similar topics, women's knowledge in this area appears to have improved. This positive trend may be linked to the increased prevalence of vulvovaginitis, which is the main reason for visits to gynaecologists (Guinot et al., 2019).

Based on these results, we consider it essential to emphasize the importance of health education on IH, as well as the educational role of healthcare professionals, particularly targeting at-risk groups of women with lower educational attainment. It is necessary to increase public interest in the topic of IH, and to inform women about vulvovaginal infections, their symptoms, risks, and consequences for women's health. Similarly, it is important to monitor and disseminate current recommendations and the latest trends in this area based on Evidence-Based Medicine (EBM) principles and publish these findings in public domains.

Conclusion

The results of the analysis of preferred IH practices in the context of vulvovaginal health and infection prevention are important for supporting arguments in favour of systematic professional education and health awareness initiatives. These efforts should focus on increasing awareness of proper IH practices and their implementation into daily routines. Educational campaigns targeting the general public – specifically women without medical training – should be launched in accessible formats that take into account the specific needs of different life stages regarding this issue. Additionally, topics on vulvovaginal health should be integrated into general education. It is essential to continue educating the female population, emphasizing the prevention of vulvovaginitis and other vulvovaginal problems. Systematic monitoring of these factors is vital for effective planning of preventive strategies, evaluating the effectiveness of public health interventions, and optimizing healthcare policies in this field.

Author contributions

S.K.: Conceptualization, Methodology, Validation, Writing – original draft preparation, Writing – review and editing, Supervision, Project administration. *E.F.:* Validation, Writing – original draft preparation, Statistical analysis, Visualization. *N.Š.:* Formal analysis, Statistical analysis, Visualization. *N.M.:* Formal analysis, Language editing, Visualization. *L.M.:* Validation, Writing – original draft preparation, Supervision, Visualization. All authors have read and approved the final version of the manuscript.

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Ethical aspects and conflict of interest

The authors have no conflict of interest to declare.

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