

ORIGINAL PAPER

EXAMINING THE DETERMINANTS OF INTIMATE HYGIENE FOR YOUNG WOMEN WITH AN EMPHASIS ON BEHAVIOR RELATED TO RISK OF VULVOVAGINAL INFECTIONS

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Abstract

Aim: The aim of the study was to identify risk determinants of intimate hygiene (IH) for young women (15–22 years) regarding the protection and promotion of their sexual health. **Design:** The study was designed as a descriptive cross-sectional study. **Methods:** A specially designed questionnaire was used – Cronbach alpha coefficient was 0.747. The questionnaire was distributed to a sample of female students ($n = 360$) aged 15–22 years. The response rate was 76% ($n = 275$). Data were analyzed by means of descriptive statistics and the Chi-square (χ^2) test ($p < 0.05$). **Results:** We identified the determinants of IH in terms of risky behavior, namely: complete hair removal in the intimate area (favored by 94.75%), non-performance of hygiene before and after sexual intercourse (SI) (not performed prior to SI by 38.58%, and after SI by 34.36%), not changing a wet swimming costume for dry (not performed by 58.06%), and the wearing of unsuitable undergarments. We identified a statistically significant influence of education and age on certain determinants of IH: the use of special preparations to wash intimate areas while bathing, the wearing of thongs, the changing of wet swimsuits for dry, the frequency of changing tampons during menstruation, and the performance of IH before and after SI ($p < 0.05$). Younger respondents (15–18 years), and those with lower education demonstrated worse IH habits with respect to the study determinants, which may be associated with lower awareness. **Conclusion:** We identified possible risk determinants of IH that are associated with sexual health. Our study points toward the need to improve knowledge and habits regarding appropriate and safe IH, with special focus on the risk of vulvovaginal infections.

Keywords: young women (15–22 years), Intimate hygiene, Intimate hygiene determinants, Risky behavior, prevention of vulvovaginal infections.

Introduction

Intimate hygiene (IH) is currently a relevant topic in terms of the protection and promotion of sexual health, with an emphasis on the prevention of vulvovaginal infections, a very common female health issue. In the past, the subject was taboo. However, nowadays, thanks to the Internet (as a primary source of information), advertising, and marketing trends, women have become less inhibited about the topic of IH. Nevertheless, experts have paid only marginal attention to IH, mostly in connection with the prevention of genital infections and discomfort (Low et al., 2006; Brotman, 2011; Lowdermilk et al., 2012; Kestřánek et al., 2013; Sevil et al., 2013). Palas (2013), and Sevil et al. (2013) reported that IH plays an essential role in the prevention of genital infections. Vyas et al. (2015)

found a significant correlation between hygiene of the perineal area and infections of the urinary tract. Comprehensive information, relevant research, and clinical studies are unavailable for Slovakia. IH in a broader context includes determinants (conditioning factors, causes) that may influence vulvovaginal infections, and may have an impact on the overall health of individuals. The vaginal environment consists of a set of microbial relationships, and infections occur due to disturbance of the vulnerable vaginal ecosystem. Dysmicrobia can be evoked by exogenous, but, in some circumstances, also endogenous, microorganisms (Brotman, 2011; Kestřánek et al., 2013). Published clinical studies deal with the prevalence of vulvovaginal infections and bacterial vaginosis, including specific varieties of these conditions (Rylander et al., 2004; Klebanoff et al., 2011; Bradshaw et al., 2013; Bilardi et al., 2016). In terms of the general principles of IH, the following are considered preventive behavior/ habits: the daily washing of genitalia, hygiene after defecation (wiping front to back), use of wet wipes,

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showering, sufficient drying, daily changing of underwear, changing of wet swimwear for dry, appropriate hygiene during menstruation (replacement pads and tampons, menstrual cups), and hygiene before and after SI. Literature describes evidence associating inadequate IH with the development of bacterial vulvovaginal infections, or genital discomfort (Low et al., 2006; Klebanoff et al., 2011; Delago, Finkel, Deblinger, 2012; Sevil et al. 2013; Attieh et al., 2016; Cemek et al., 2016). Studies by Sevil et al. (2013) have shown that the frequency of genital infections was higher in female students with inadequate IH (underwear, and hygiene during menstruation and after toilet visits were surveyed). Cemek et al. (2016) cites poor personal hygiene and the use of foam bath as some of the factors that contribute to inflammation of the genital area. They mentioned several factors affecting personal hygiene (wiping forward, self-cleaning after defecation, use of toilet paper, wet wipes, showering, bathing in a seated position, and the wearing of tight clothing). Geng et al. (2016) described frequent vaginal lavage as a risk factor for vaginitis. Klebanoff et al. (2011) demonstrated that frequent vaginal lavage might be causally linked to bacterial vaginosis. Information flow (internet, advertising, trends), improved living standards, and the availability of personal hygiene products influence IH awareness and habits; however, not always for the better.

Aim

The aim of this study was to identify the determinants of IH for young women regarding the protection and the support of their sexual health. In addition, we examined the correlation between the determinants of IH and socio-economic factors (age, education). With respect to determinants of IH, we focused in particular on the execution of IH (frequency, preparations, used, how it is performed), on IH during menstruation, the performance of IH before and after SI, and the effects of wearing tight underwear (and the cut of underwear), depilation, and the changing of wet swimsuits for dry after swimming.

Methods

Design

A quantitative cross-sectional study was used.

Sample

The cohort consisted of 267 respondents. The selection of respondents was targeted/non-random. The inclusion criteria were as follows: an age of 15–22 years, and the written consent of the respondents

to be included in the study. From the total sample of 267 women, 58.80% were aged 18 or under (16.86 ± 0.98), and 41.19% (20.76 ± 1.20) were aged 19 or older. In terms of education, 61.05% (2.17 ± 1.13) had completed primary education, and 38.95% (20.73 ± 1.44) had completed secondary school, or higher education. Vaginal inflammation had affected 10.86% of respondents. Most of the respondents had experienced no inflammatory episodes (89.13%). In the group of respondents who reported experience of inflammation, the minimum age was 16 years.

Data collection

The relevant data were collected by means of a non-standardized questionnaire of our own design. A pilot study was conducted on 12 female respondents, which led to the modification of the problematic wording of certain items. The questionnaire was designed to identify the determinants of IH, and contained 34 entries, three of which were devoted to demographics. Respondents selected answers from the following list of responses: 1 – strongly agree; 2 – agree; 3 – do not know; 4 – disagree; 5 – completely disagree. To assess the reliability of the questionnaire, we used a standardized Cronbach alpha coefficient ($\alpha = 0.747$). Empirical data collection was conducted from January 2016 to April of the same year. We chose to administer the questionnaires in a combined form (face to face and online) 260 hard copies of questionnaires were distributed to secondary vocational schools in Žilina (a secondary medical school and a private business academy). The majority of young women gave their written consent to the research. In terms of representativeness, the conclusions of the research should be interpreted only according to this sample. The completed questionnaires were posted in designated mailboxes (located in buildings of the selected schools). The response rate to the “hard” questionnaires was 78.84% ($n = 205$). An online questionnaire was also distributed. It was accessible on multiple websites via a weblink. At the beginning of the questionnaire information was provided about the research objectives, the anonymity of data collection, the need for the consent of the respondent to enrollment, and for whom the study was intended (female students aged 15–22 years). A brief describing how to complete individual questions was also given. 70 online questionnaires were received. Overall, 330 questionnaires were distributed. Eight questionnaires were withdrawn from the total of 275 questionnaires returned. Questionnaires were excluded due to failure to meet the inclusion criteria, or their non-completion. For the purpose of this study, 267 questionnaires were used.

Data analysis

Statistical analysis was performed with the SPSS 15.0 software, and Microsoft Office Excel. Statistical tests were carried out using univariate descriptive statistics. Regarding the whole questionnaire and also its individual items we examined average (d), standard deviation (SD), median (med), and the minimum (min) and maximum (max) values.

To detect differences between the selected groups we used the Chi square test. The result of the analysis

was considered statistically significant if the p-value of the test was less than 0.05 ($p < 0.05$).

Results

Table 1 describes the selected descriptive characteristics of IH focusing on hygiene of the intimate area. The descriptive evaluation of the determinants in this area is based on the merger of the average scale values 1 + 2 (*strongly agree or agree*).

Table 1 Intimate Hygiene

Answers	The research sample (n = 267)					d	SD	med	min	max
	1	2	3	4	5					
I use ordinary personal hygiene products (e. g. shower gels, shampoos) to wash my intimate areas	11.24	23.97	3.75	36.33	36.33	3.39	1.38	4	1	5
To maintain IH, I wash my intimate parts once a day	50.19	19.85	1.50	2.62	25.84	2.34	1.69	1	1	5
To maintain IH, I prefer taking a shower	79.03	9.74	0.00	0.75	10.49	1.54	1.25	1	1	5
To maintain IH, I prefer taking a bath	23.60	20.60	0.75	4.87	50.19	3.37	1.75	5	1	5
To maintain IH, I prefer using a bidet	2.25	2.62	5.62	10.49	79.03	4.61	0.88	5	1	5
Each family member has their own towel for IH	57.68	24.72	4.49	9.74	3.37	1.76	1.12	1	1	5

IH – Intimate hygiene; d – average scale values; 1 – I completely agree; 2 – I agree; 3 – I do not know; 4 – I do not agree; 5 – I completely disagree; SD – standard deviation

We found that special preparations for IH were used by 74.53% of the respondents (*strongly agree or agree* 1 + 2). IH was carried out once a day by 70.04% of the respondents, and after each defecation by 16.85%. Showering was favored as a means of IH by the majority of respondents (88.77%), 44.20% preferred bathing, and use of a bidet was preferred by only 4.87% of female respondents. The highest average scale value was 4.61. A majority (82.40%)

of the respondents stated that each family member had their own towel for IH (*strongly agree, agree*), with an average scale value of 1.76.

Table 2 describes the selected descriptive characteristics of IH focusing on the wearing of underwear, and changing of wet swimsuits for dry.

Table 2 Wearing underwear and the changing of wet swimsuits

Answers	The research sample (n = 267)					d	SD	med	min	max
	1	2	3	4	5					
I change my underwear daily	91.01	8.61	0.37	0.00	0.00	1.09	0.30	1	1	3
In terms of cut of underwear, I prefer thongs	14.61	16.48	5.62	7.87	55.43	3.73	1.59	5	1	5
Regarding health aspects, thongs are appropriate underwear	1.50	6.37	25.47	43.07	23.60	3.81	0.92	4	1	5
In terms of health, it is important to change a wet swimsuit for a dry one	37.83	27.34	27.72	4.87	2.25	2.06	1.03	2	1	5
After swimming I change my wet swimsuit for a dry one	19.48	22.47	11.99	34.08	11.99	2.97	1.35	3	1	5
I change my wet swimsuit for a dry one each time I leave the water	4.12	0.75	7.49	15.73	71.91	4.51	0.97	5	1	5
During my period I change tampons 3–6 times a day	29.96	8.99	3.00	1.12	56.93	3.46	1.84	5	1	5

d – average scale values; 1 – I completely agree; 2 – I agree; 3 – I do not know; 4 – I do not agree; 5 – I completely disagree; SD – standard deviation

The majority (99.62%) of respondents changed their underwear on a daily basis (strongly agree, agree), min. 1 and max. 3; the average scale value of answers was 1.09. Recommended underwear (i.e., classic cut panties) was favored by 58.43% of respondents. Thongs were preferred by 31.09% of the respondents (strongly agree, agree); the average scale value was 3.73. Of the total of 267 respondents 25.47% had no knowledge of whether thongs were appropriate underwear with regard to health, and 7.87% thought that thongs were suitable (strongly agree, agree). More than half (65.17%) of the respondents thought that, with regard to health, it was important to change from a wet bathing suit to a dry one after swimming. However, this was actually performed by less than half of all respondents (41.95%); the average scale value of answers was 2.97. Only 4.87% of all respondents always changed their swimsuits after swimming (strongly agree, agree); the average scale

value of answers was 4.51.

The descriptive characteristics of IH focusing on menstruation revealed that 57.30% (2.89 ± 1.77) of female students had bleeding with intensity (5–7 inserts per day). More than half the respondents performed personal hygiene twice a day during menstruation (59.17%; 2.68 ± 1.79). Changing of tampons during menstruation was favored by 50.57% (3.10 ± 1.81), of which 38.95% (3.46 ± 1.84) performed 3–6 tampon changes daily (Table 2).

Within the descriptive characteristics of IH, most of the respondents removed hair from intimate areas 94.75% (1.40 ± 0.82).

Table 3 describes the selected descriptive characteristics of IH relating to sexual intercourse.

Table 3 Intimate hygiene in relation to sexual intercourse

Answers	The research sample (n = 267)									
	1	2	3	4	5	d	SD	med	min	max
I have already had sexual intercourse	52.81	19.85	2.25	7.87	17.23	2.17	1.55	1	1	5
I perform IH before sexual intercourse	35.96	25.47	27.72	7.49	3.37	2.17	1.10	2	1	5
I perform IH after sexual intercourse	36.70	28.84	25.84	5.62	3.00	2.09	1.06	2	1	5

IH – Intimate hygiene; d – average scale values; 1 – I completely agree; 2 – I agree; 3 – I do not know; 4 – I do not agree; 5 – I completely disagree; SD – standard deviation

72.65% of all respondents had already had experience of sexual intercourse (strongly agree, agree). In the group of girls aged up to 18 years, 35.95% reported experience of sexual intercourse. In the group of girls aged over 19 years, 36.70% reported experience of sexual intercourse; the average scale value of the answers was 2.17. IH was performed by 61.43% of respondents before sexual intercourse; the average scale value was 2.17. 65.54% practiced IH after sexual intercourse; the average scale value was 2.09.

The analysis of the determinants of IH related to age and education of young women.

Table 4 reflects statistically significant effects of selected determinants of IH related to age (up to 18 years, above 19 years) and education (primary, secondary and higher education) of young women, using Chi-square test of independence with a degree of significance (significant level) $p < 0.05$.

Table 4 Statistically significant influence of determinants of intimate hygiene in relation to age and education

Answers	Age		Education	
	chi2	p	chi2	p
I use special intimate hygiene products to wash my intimate areas	2.695	0.610	12.393	0.015
I use ordinary personal hygiene products (e.g. shower gels, shampoos) to wash my intimate areas	7.889	0.096	15.518	0.004
I perform IH once a day	7.824	0.098	12.872	0.012
To maintain IH, I prefer taking a bath			12.040	0.017
In terms of cut of underwear, I prefer thongs	9.030	0.060	12.905	0.012
In terms of health, thongs are appropriate underwear	12.172	0.016	8.403	0.078
In terms of health, it is important to change a wet swimsuit for a dry one	20.406	0.000	20.342	0.000
During my period I change tampons 3-6 times a day	15.798	0.003	21.709	0.000
I have already had sexual intercourse	30.389	< 0.000	31.765	< 0.000

IH – Intimate hygiene; chi2 – value of Chi-squared test; p – statistically significant at $p < 0.05$

Age had a statistically significant effect on determinants of IH. Respondents under 18 years old demonstrated worse health habits. They regarded thongs to be suitable underwear significantly more often (Chi = 12.172; $p = 0.016$; 8.92% vs 6.37%), had a lower tendency to change wet swimsuits for dry after swimming (Chi = 20.406; $p = 0.000$; 56.05% vs 78.18%); replaced tampons 3–6 times daily during menstruation with moderate intensity (Chi = 15.798; $p = 0.003$; 29.94% vs 51.82%); had less experience of sexual intercourse (Chi = 30.389; $p < 0.000$; 61.15% vs 89.09%); performed IH before and after sexual intercourse with lower frequency (Chi = 22.452; $p = 0.000$; 50.95% vs 76.37%; Chi = 27.212; $p = 0.000$; 56.05% vs 79.09%, respectively), and underwent preventive gynecological examinations (PGEs) less frequently compared to female respondents older than 19 (Chi = 43.760; $p < 0.000$; 42.68% vs 80.00%) (Table 4). This, however, may be affected by legislation in the Slovak Republic, involving PGEs in women of 18 years and older, or women after their first pregnancy. Other determinants of IH were not significantly influenced by age.

A statistically significant effect was demonstrated in various examined determinants of IH regarding education of the probands. Respondents with lower (elementary) education demonstrated worse health habits, preferring to wear thongs more often (chi2 = 12.905; $p = 0.012$; 31.90% vs 29.81%), to take baths to wash intimate areas (Chi = 12.040; $p = 0.017$; 49.08% vs 39.54%), to use special preparations with significantly lower frequency (chi2 = 12.393; $p = 0.015$; 76.92 vs 73.0%); to perform IH less often (once daily) (chi2 = 12.872; $p = 0.012$; 64.42% vs 78.85%); to change wet swimsuits for dry less often (Chi = 20.342; $p = 0.000$; 55.83% vs 79.81%); and to replace tampons 3–6 times daily during menstruation with moderate intensity (Chi = 21.709; $p = 0.000$; 28.83% vs 54.81%); they have had less experience of sexual intercourse (Chi = 31.765; $p < 0.000$; 60.73% vs 91.35%); perform IH less often before and after intercourse (Chi = 22.084; $p = 0.000$; 51.53% vs 76.93%; Chi = 23.897; $p = 0.000$; 56.44% vs 79.81%, respectively); and undergo preventive gynecological examinations less frequently (Chi = 40.489; $p < 0.000$; 42.94% vs 81.73%) compared to female respondents with higher education (Table 4). No statistically significant effects of education were discovered for other determinants of IH examined.

Discussion

The results of the quantitative studies reveal that the majority of respondents (99.25%) perceived IH to be an important health factor, and were able to identify

potential risk determinants of IH which can lead to vulvovaginal infections. More than half of the respondents (74.53%) stated that they used special formulations (gels, soaps, foams, napkins) for IH, which is a positive factor, as traditional soaps have an alkaline pH, and are not recommended for use in the acidic vaginal environment. It has been demonstrated that use of water and toilet paper for genital hygiene lower the incidence of genital infections among female students ($p < 0.05$) (Sevil et al., 2013). A Study by Attieh et al. (2016) observed the personal care habits and awareness of Lebanese women. Pure water was used for rinsing the vagina by 33% ($n = 249$). The use of irritants (perfumed soaps) has been proven to be a risk factor for inflammation of the genitals, and discomfort (Delago, Finkel, Deblinger, 2012; Cemek et al., 2016). A study by Delago, Finkel, Deblinger (2012) focused on analysis of symptoms in relation to exposure to irritants, and demonstrated an association between inadequate genital hygiene, tight clothing, and the use of toiletries with dysuria and genital discomfort (pain, itching) ($p < 0.05$).

In the present study 44.22% of respondents favored bathing, and only 4.87% used a bidet as a means of IH, which may be related to a lack of bidets in Slovak households. Swimming can increase the prevalence of infections of the genitals and urinary tract, especially during menstruation, when the cervical canal is widened (Ozdemir et al., 2012). According to a study by Sevil et al. (2013), an increased frequency of vaginal infections (VIs) of female students is associated with a seated position while bathing ($p < 0.05$), and less frequent VIs were associated with drying of the genital area after washing ($p < 0.05$). After washing of the genital area, drying is recommended, since a damp environment allows and encourages the growth of microorganisms.

The present study established that IH is performed once a day by 70.04% of respondents, which can be considered optimal. Vulvovaginal infections occur as a result of a compromised vaginal ecosystem. It may occur as a result of insufficient IH, but also, conversely, as a result of excessive IH (e.g., frequent vaginal douching) (Klebanoff et al., 2011; Shaaban et al., 2013; Geng et al., 2016).

98.87% of the female students questioned perform suitable IH after defecation, wiping from front to back. Cemek et al. (2016) demonstrated an association between hygiene habits and vulvovaginitis in prepubertal girls (wiping from back to front (42.9%), cleaning by herself after defecation

(89.3%), using toilet paper (60.7%), wet wipes (21.4%), showering (14.3%), and bathing (46.4%).

Most of the respondents (99.54%) in our study changed their underwear on a daily basis. Underwear is a determinant that can foster the occurrence of inflammation in the genital area (Sevil et al., 2013; Bruschi, 2015). The type and cleanliness of the underwear, as well as the frequency of changing, are important factors relating to the risk of urinary and genital tract infections (Reid, Bruce, 2003; Attieh et al., 2016). Sevil et al. (2013) cited Ozkan, Demir (2002) and Kisa (2007), who found that 53.4% of women changed their underwear every two-three days. In this group of women the occurrence of vaginitis was, as expected, higher compared to the group of women who changed their underwear on a daily basis. Contrary to previous findings, the study by Sevil et al. (2013) revealed no correlation between the frequency of changing underwear and genital infections ($p < 0.05$), but a significantly higher frequency of vaginal infections was demonstrated in female students according to the material of which underwear is made satin ($p = 0.004$) and cotton ($p = 0.018$) ($p < 0.05$). The study by Attieh et al. (2016) showed that respondents were aware of the advisability of wearing cotton underwear to reduce the risk of vaginal infections. Regarding the cut of the underwear, the current study identified positive habits in 58.43% respondents, who preferred classic cotton panties (43.44% of French cut, and boxers and briefs 35.21%), while 31.09% preferred thongs. Thongs are less suitable, as they are predominantly made from synthetic materials (more attractive to younger women), which are relatively impermeable, thus causing build-up of a moisture barrier that facilitates the spread of vulvovaginal infections. Moreover, they tend to move when worn, and may thus result in the transmission of contaminants from the environment surrounding the anus to the vagina.

As a part of the prophylaxis against vaginal yeast infection, it is recommended that women change wet swimsuits for dry and avoid wearing wet or damp underwear (Gupte, Patil, Pawaskar, 2009; Vulvar Care, 2012; Sevil et al., 2013; Koliba, Příhodová, 2014). The present study showed that 65.17% of respondents thought that in terms of health, it was important to swap wet swimsuits for dry after swimming, but less than half actually do so (41.09%). Satisfactory IH habits were adopted by 59.17% of respondents during menstruation (IH realized twice a day). During menstruation, the majority (80.35%) of respondents used sanitary pads for collecting menstrual blood, which were exchanged 3–

6 times a day in 60.03% of cases (moderate bleeding). Some studies indicate that female students routinely use sanitary pads during menstruation (Reid, Bruce, 2003; Palas, 2013; Tegegne, Sisay, 2014; Upashe, Tekelab, Mekonnen, 2015). The study by Sevil et al. (2013) showed a higher frequency of vaginal infection in female students using sanitary pads ($p < 0.05$). Tampons were favored by 50.57% of respondents. In 38.95% (3.46 ± 1.84) of cases tampons were exchanged 3–6 times a day at moderate intensity of bleeding.

In our study 4.12% of all respondents ($n = 267$) favored menstrual cups. Age may be among the reasons why this product is used less frequently. This was confirmed in the study by Stewart, Powell, Greer (2009), which concluded that interest in the use of menstrual cups rises with the age of respondents. During menstruation, it is recommended that pads be changed every three to four hours, meaning six to eight times a day (Sevil et al., 2013). Failure to change sanitary pads often enough (four–six times a day) increases the risk of infection. Infections are usually induced by the accumulation of blood in the pad, resulting in a warm and humid environment that encourages the growth of microorganisms.

In our study we identified determinants of IH correlated to the complete removal of hair in intimate areas, performed by 82.39% of respondents (69.28% used disposable shaving razors; 75.28% stated that they would never share a disposable razor). The fashion for pubic hair removal was also reported by Attieh et al. (2016). Hardly any of the respondents [97.37% (4.64 ± 0.57)] attended saloons providing intimate depilation (Weigle, 2009). Most women aged between 18–37 years of age regard hygiene as the main benefit of intimate depilation. Sevil et al. (2013) found significantly lower frequency ($p < 0.05$) of genital infections among female students who performed genital hair removal once every two months or less. The changing trends in intimate depilation are perceived less positively by gynecologists. Pubic hair plays an important protective role, especially for women who suffer from recurrent vaginitis or various vaginal discharges. The hair holds microbial flora that is needed to stimulate the immunity of the vaginal opening. Health complications associated with intimate depilation were reported by 60% of women (who had experienced at least one female health problems as a result of intimate depilation (DeMaria, Flores, Hirth, 2014).

A further studied determinant was IH before and after sexual intercourse. We found that IH was not practiced before SI by 38.58%, and after SI by

34.36% of all respondents. 72.65% of all respondents ($n = 267$) reported experience of SI. Only minimal differences were recorded regarding age in terms of first sexual contact. 58.05% of 18 year-old or older respondents visited gynecologists for preventive examinations and/or sex-related reasons. Literature suggests that sexual intercourse is an important risk factor in the etiopathogenesis of urinary tract infections. Sexual behavior and IH of the genital organs can play an etiological role in the lives of women with recurrent episodes of urinary symptoms (Baráni, 2011; Kudela, 2011; Bradshaw et al., 2013; Bilardi et al., 2016). Bacterial vaginosis (BV) is the most common vaginal disorder that affects women of reproductive age, affecting 10% to 30% of women who have sex with men (Valiani et al., 2011; Bilardi et al., 2016), and 20 to 50% of women who have sex with women (Evans et al., 2007; Marrazzo et al., 2010; Valiani et al., 2011).

The results presented in our study confirm a significant influence of education and age on the following determinants of IH: the use of special preparations, bathing to wash intimate areas, the wearing of a thong, the changing of wet swimsuits for dry, the changing of tampons during menstruation (three to six times per day), and the implementation of IH before and after sexual intercourse. We conclude that younger respondents (15–18 years of age) and those with lower education demonstrate worse habits of IH in the studied determinants, with a special focus on vulvovaginal infections whose etiopathogenesis could be associated with incorrect or insufficient IH as a result of possible ignorance. The effect of age may be related to the fact that female students with basic education were younger than female students with college or higher education.

Limitations of the study

The limitations of the study should be taken into account when considering the results and findings. The deliberate sampling of respondents represents a major limitation of the study. Therefore, the study results can be generalized and interpreted only within the selected cohort. In addition, the relatively low number of respondents ($n = 267$), and the regional restriction of the study (the Zilina region – School of nursing, Private business school) prevent extrapolation of our findings to the entire population of young Slovak women. In this respect, our study can be considered only partial. It will be necessary to conduct extensive future research on this issue (supra-regional, nationwide, eventually international), using the same methodology to determine the extent to which our findings are

relevant and specific to all young Slovak women. It will then be possible to compare results obtained in different contexts, e.g., other types of educational institutions (II. grade of elementary schools, secondary schools, universities), or other age groups.

It is also possible that the questionnaire used may not fully reflect the determinants, behavior, and habits of young women regarding IH (relying on subjective statements of young women without the possibility of supporting the data obtained with interviews and/or medical documentation). Mixed research involving interviews with gynecologists, teachers, and parents would be beneficial for the objectification of our findings, and an explanation regarding why worse IH habits correlate with education. The accuracy of our results may also be affected by the intimate nature of the questions asked, with respondents possibly reluctant to answer honestly. It is also important to emphasize that the content and scope of the work is somewhat narrow considering the broadness of the problem of IH. Nevertheless, in spite of the aforementioned limitations, we believe that our study has shed more light on the topic and will promote further IH education.

Conclusion

This study identified certain risk factors of IH in young women, and revealed the significant influence of education and age on the determinants examined. It is an important argument for effective education in this matter, especially from health care professionals (gynecologists, midwives, nurses) with appropriate experience and knowledge. Education from professionals may guarantee adoption of good hygiene habits. Furthermore, they should be the preferred source of information. Education and IH counseling programs should be seen as an important aspect of the protection and promotion of the reproductive health of young women. It should be emphasized that IH plays a key role in the prevention of vulvovaginal infections, and underlines the preventive measures necessary to protect and improve the health of young women, particularly as these issues are considered intimate. We believe there is a call for comprehensive studies that can reveal the relationship between IH and vulvovaginal infections, with a particular emphasis on pregnancy, menopause, and other socio-demographic factors.

Ethical aspects and conflict of interest

Our study complies with standard ethical rules. The school principals signed an agreement regarding recognition of the research at the schools involved.

All participants were provided with information about the study objectives and methods. Data collection was anonymous, and all participants expressed their willingness to be included in the study. The authors declare that they are not aware of any conflict of interest.

Author contributions

Concept and study design (SK, LM), data analysis and interpretation (SK, LM, LK), processing the draft of the manuscript (SK, LM), critical revision of the manuscript (SK, LM), article finalization (SK).

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