ASSOCIATION OF SANITARY PADS AND CLOTHING WITH VULVOVAGINITIS

ASSOCIAÇÃO DE ABSORVENTES HIGIÊNICOS INTIMOS E VESTIMENTAS COM VULVOVAGINITES

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ABSTRACT

Introduction: Vulvar occlusion and moisture buildup resulting from the use of sanitary pads, synthetic underwear and/or tight pants are considered risk factors for the development of vulvovaginitis (VV). However, this association is still poorly elucidated. Objective: To associate the use of sanitary pads and clothing with the presence of bacterial vaginitis (BV) and vaginal candidiasis (VC). Methods: Cross-sectional study aimed at analyzing the use of sanitary pads and clothing in 307 volunteers from 18 to 45 years old, with and without BV and/or VC. A questionnaire comprehending six domains was applied individually to the volunteers, in an outpatient gynecology clinic at a university hospital (University of Campinas, Brazil). This study analyzed three of six domains. Vaginal material was collected for microbiologic diagnosis of BV (Nugent criteria) and VC (Gram stain and culture of the fungus in Sabouraud). Exclusion criteria were: use of antibiotics within 15 days, history of cancer, positive HIV and/or syphilis and immunosuppressive disease. Statistical analysis were made with Fischer and chi-square tests, using the software EPI INFO 0.5. Significance level was set at p<0.05. Results: In total, 141 (46%) women were diagnosed with VV. The mean age was 32 (±6.8) years and most women were Caucasian (52%), had a steady partner (83%) and were using hormonal contraceptives (64.5%). Women with presence of VV used more panties made of synthetic fabric (10.6% x zero), had more menstrual cycles (72.3 x 55.4%) than those without VV (p<0.005 and p<0.0001) and showed patterns of sanitary pads similar to those without VV. Conclusion: Habits of usage of sanitary pads is not associated with the presence of VV. Presence of menstrual cycle and use of synthetic underwear have been related with greater frequency of VV.

Keywords: vaginitis; bacterial; candidiasis; vulvovaginal; hygiene; absorbent pads; clothing; type of underwear.

INTRODUCTION

Vulvar epithelial tissue differs from other regions of the human body because of its structure, occlusion, hydration and susceptibility to friction, but as well as other epithelial tissues, its function is to protect the organism from harmful agents through defense cells(9). However excessive occlusion and humidity in the area of vulva caused by synthetic underwear, tight pants, menstruation and the use of sanitary pads may have a negative influence on the skin barrier and cause changes in temperature and pH of the region, making the vulva susceptible to vulvovaginal diseases(2-4). The most common types of vulvovaginitis in the reproductive age of women are bacterial vaginitis (BV) and vulvovaginal candidiasis (VC), and they usually manifest as vaginal discharge accompanied by bad odour and itching, respectively(9).

Vaginal discharge — either physiological or caused by vulvovaginitis — is usually disturbing for women, and one of the main reasons of this population’s seeking for gynecological care(6). This is also one of the main factors that lead women to use sanitary pads outside of the menstrual period, the so-called panty liners(7). Currently, panty liners are widely used by women, regardless of their social group. Around 50% of North-American and North-European females use them in their reproductive age(9). In Brazil, although these data are only disseminated by non-scientific publications, they reach similar values(7). Medical-scientific literature, on the other hand, raises a series of questions about the potential risks of long-term use of sanitary pads to women’s health(8,9,10).

The most common concern among women is the sanitary pad, which in contact with the vulva increases the local temperature,
maintain the natural humidity of the area in contact with the skin, and change vulvar or vaginal pH, causing physiological changes that could favor fungus and bacteria growth; therefore, vaginal infections such as vulvovaginal candidiasis (VC) could install much more easier\textsuperscript{(13)}. Runeman et al.\textsuperscript{(5)} performed a study with 58 women used to wear non breathable sanitary pads, with a plastic layer, for three menstrual cycles in between flow days (panty liners). Vulvar temperature, pH and humidity increased significantly compared to women not using them or using breathable types. In another study, the same authors\textsuperscript{(9)} found a large number of aerobic microorganisms in the vulva of women who had used non breathable pads compared to women who had used breathable types or did not use the product.

Just like the sanitary pads, clothing may also cause changes in the genital microbial flora due to humidity and changes in temperature, thus causing alterations in the genital ecosystem and irritations, allergies or discharge\textsuperscript{(10)}. The traditional skirts and dresses have been replaced by jeans, and cotton by synthetic panties, which impairs the ventilation to external genitalia, and it can be worsened by the use of files stocking\textsuperscript{(11)}. Elegbe and Botu\textsuperscript{(12)} reported that women using loose pants had less episodes of VV by Candida albicans. Another study made an association of swelling and other morbidities in the female urethral region with the use of tight clothing\textsuperscript{(13)}. Reed\textsuperscript{(14)} concluded that very little is known about the influence of tight clothing on the recurrence of vaginal candidiasis.

Other studies\textsuperscript{(3,10)} have assessed changes in vulvovaginal ecosystem by clothing and sanitary pads and, although results suggest that breathable pads are safe for females’ health, the relation between the use of pads and types of clothes with the occurrence of genital infections has not been completely elucidated. The present study was aimed at assessing and comparing the habit of using sanitary pads and certain types of clothes in women with bacterial vaginitis and/or vulvovaginal candidiasis.

\section*{METHODS}

This is a cross-sectional cohort study performed in a University Hospital (Universidade Estadual de Campinas, Brazil) conducted with 314 women aging 18-45 from March to November, 2013. Women who had used antibiotics in the previous 15 days, who were pregnant, had chronic and degenerative diseases (cancer, diabetes, immunosuppression), diagnosed with syphilis, HIV or hepatitis were excluded from the sample.

A questionnaire about daily habits and intimate care, with 60 questions (I – genital washing; II – use of sanitary pads; III – under-wear; IV – genital waxing; V – genital ornaments (piercings and tattoos), and IV – sexual activity) was applied confidentially and individually to women, always by the same researcher. This study analyzed domains I and II. The tool was specifically drawn up for this research, because literature had no other available that was scientifically validated.

After the interview, females were submitted to gynecological examination, with performance of vaginal swab for microbiological assessment. The swab was prepared in a glass slide, stained by the Gram method, and analyzed by optical microscopy. Fungi culture in Agar-Sabouraud growth media was made to identify fungal infections, as well as the Whiff test, and pH measurement using a colorimetric reaction scale (Merck\textsuperscript{®}-Germany) ranging from 0 to 14.

In order to diagnose BV, the criteria by Nugent et al.\textsuperscript{(15)} were applied. To diagnose VC, we considered the presence of white discharge with mycelium or blastopore growing at swab. To assess these data, two main groups were created: women with vulvovaginitis (BV, VC, BV + VC) and women without it. Therefore, females previously undiagnosed and without inflammation at the swab (more than four leukocytes per field boost) composed the control group. Eighteen women refused to participate, and seven were excluded from the sample due to suspicion of endocervicitis (n=3) and desquamative inflammatory vaginitis (n=4).

This study was approved by the Ethics Committee of the Medical Sciences School of UNICAMP (protocol 3816/2013), and all participants signed the informed consent form. Statistical analysis considered frequency, percentage, mean and standard deviation (SD), and the \(\chi^2\) and Fischer Exact tests were used to established associations between domains of the questionnaire and vulvovaginitis (BV, VC and both). Significance level was set at \(p<0.05\).

\section*{RESULTS}

Among 307 participants, 166 (54.07\%) women were not diagnosed with vulvovaginitis and 141 (45.93\%) were: 61 had VC, 72 had BV and 8 had both (VC + BV). Patients’ mean age was 33 (±7), mean body mass index (BMI) was 27.1 (±5.5), with mean time of study of 10.2 (±3.3) years. Most females (83\%) were married or had a fix partner, used hormonal contraceptive methods (63.5\%), and did not smoke (89.3\%). Almost half of the sample was composed of white (52.8\%) and catholic (51.5\%) patients. No statistically significant differences were found between groups as to these variables. Women with vulvovaginitis, total and isolated (VC, BV and both), had more menstrual cycles than the group without it (\(p<0.0002\)).

The number of sanitary pads used in the heavier days of the menstrual cycle, use of tampons, use of panty liners, type of pads used in between cycles, vulvar sensitivity according to the patients’ referral, and vulvar irritation caused by the sanitary pads were identical in both groups (Table 1). Irritations mentioned were: hyperemia, swelling, epithelial desquamation, fissuring and itching (Table 1).

Most of the women investigated were used to wearing cotton panties (VC=59\%, BV=47.2\%, VC + BV=62.5\%, without VV=64.5\%). However, women presenting vulvovaginitis (10.6\%), especially BV (15.3\%), were more likely to wear synthetic panties (\(p<0.0001\)) than those without it (0\%). The variables design of the underwear, patient’ perception of allergic reactions to synthetic tissues, sensation of genital compression by the clothes, use of tight pants and the number of tissue layers in contact with the vulva at bedtime were similar between groups (Table 2).

\section*{DISCUSSION}

In our study, women with VV had more periods than women without it. Menstrual flow makes women wear more sanitary pads, which may favor the onset of infections. Nevertheless, many other...
The literature holds some questionings about the potential risks of long-term use of sanitary pads to women’s health, once there is an increase in the temperature of the area, change in vulvar or vaginal pH, and maintenance of humidity, which can favor bacterial and fungus growth, and, therefore, vulvovaginal infections\(^1,5,8-10,19\). But we found no differences as to this aspect. Maybe it applies to women with recurrent VV, not to those presenting acute episodes, and this requires deep further investigation.

Runeman et al.\(^19\) performed a study with 58 women who used neutral non breathable panty liners (with plastic layer) between three menstrual cycles, and reported that vulvar temperature, pH and humidity increased significantly compared to women who did not use it or used breathable types. Another study by the same authors\(^9\) showed a high rate of aerobic microorganisms in the vulva of women using non breathable panty liners compared to those not using them. Jancovic et al.\(^18\) found a higher incidence of VC in women who were used to wear underwear with cotton lining between menstrual cycles in comparison to those no wearing them (p=0.0001). However, Giraldo et al.\(^20\) did not find significant difference as to the presence of candidiasis or bacterial vaginitis in women using breathable sanitary pads for 75 consecutive days in comparison to the Control Group, composed of women using only cotton underwear in the same period, which suggests that breathable sanitary pads are safe to women’s health.
It is noteworthy that 59.3% of women chose to wear cotton underwear daily. However, 63.2% wear tight pants very frequently, which could even zero the benefits related to ventilation of cotton underwear. Synthetic underwear is strongly recommended by gynecologists who support that this type of fabrics favors ventilation compared to synthetic ones, and this could contribute positively with the maintenance of the vulvar microbiota. Conversely, these properties are said to be zeroed by the use of tight pants, especially jeans, which prevents ventilation and compress the region, causing local occlusion, friction and ischemia. This type of clothing can potentially change the temperature, humidity and pH of the region.

Data from our study suggests that women with vulvovaginal infections wear more synthetic underwear (p<0.0001), in particular those with bacterial vaginosis (p<0.0001), and that over 60% of the sample wore tight pants routinely. This was not observed among the cases of candidiasis, which confronts general remarks. This is still a controversial matter in the literature, and, although most studies have not found differences between women of the control group and with candidiasis as to tight clothing and synthetic underwear, our findings agree with those by Guaschino et al., who found an association of Candida sp. and bacterial vaginosis with frequent wearing of synthetic underwear and tight pants, among other female habits.

The authors say that the lack of ventilation, obstruction of transpiration, warm environments, vaginal discharge full of bacteria, and the microtraumas caused by the clothes’ rubbing on the skin favor microorganism multiplication. This result was not expected though, once synthetic underwear with cotton lining has not been related to changes. We believe that the presence of cotton lining does not change the occlusion caused by synthetic materials. Moreover, we found no significant differences in the number of layers of nightclothing between groups. This non relation between types of nightclothing and period are also associated with acute episodes of vaginal candidiasis, and specially bacterial vaginitis.

The limitations of this study were related to the nature of the sample (free demand on a University Hospital). However, the high rate of women who accepted to take part in the study may actually balance this aspect. The tendency to misleading responses may have occurred when it came to the number of sanitary pads used in their period’s heaviest flow day, type of sanitary pad used (facing uncertainty of their knowledge about the plastic layers of panty liners). However, as the researcher who made the interviews was the same during the entire study, she tried to avoid it.
CONCLUSION

The habit of using sanitary pads is related to the presence of VV. Menstrual cycles, on its turn, and use of synthetic underwear is more frequently related to vulvovaginitis.

Conflict of interests

The authors report no conflict of interests.

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Received on: 06.17.2014
Approved on: 07.17.2014