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The VSQ: a questionnaire to measure vulvovaginal symptoms in postmenopausal women

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Abstract

Objective—The purpose of this study was to develop a vulvovaginal symptoms questionnaire (VSQ) to study symptoms, emotions, life-impact, and sexual-impact of vulvovaginal symptoms in postmenopausal women.

Methods—We developed questionnaire focused on vulvovaginal symptoms based on modifications to the Skindex-16, a validated questionnaire to measure the impact of skin disease. We then recruited postmenopausal women seeking routine gynecologic care to test the psychometric properties of the VSQ. Test-retest reliability was assessed 2 to 4 weeks after their initial recruitment and measured utilizing intra-class coefficients. Four distinct *a priori* scales of the VSQ were developed: symptoms, emotions, life-impact, and sexual-impact. Confirmatory factor analysis was performed to verify the four *a priori* scales by evaluating the goodness-of-fit of a final confirmatory factor analysis model. The internal consistency of the scales was assessed through the calculation of Cronbach's α coefficient.

Results—The VSQ is a 21-item written questionnaire with four scales, symptoms, emotions, life-impact, and sexual impact. One hundred twenty postmenopausal women participated in the psychometric validation of the VSQ. The test-retest reliability the four scales measured by intra-class coefficients were 0.75, 0.60, 0.55, and 0.65 for symptoms, emotions, life-impact and sexual-impact. The goodness-of –fit of the confirmatory factor response model was confirmed. Cronbach's α coefficients were 0.76, 0.87, 0.83, and 0.82 for the scales.

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Conclusion—The VSQ is a reliable and internal consistent instrument to measure vulvovaginal symptoms in postmenopausal women.

Keywords

atrophic vaginitis; menopause; vulvovaginal symptoms

INTRODUCTION

Vulvovaginal atrophy and related vulvovaginal symptoms represent a unique and understudied constellation of symptoms in postmenopausal women. Postmenopausal vulvovaginal symptoms include dryness, burning, pruritus, and dyspareunia.(1, 2) Vulvovaginal symptoms are common and have been reported by 9.6% to 44.4% of postmenopausal women.(2–4) To date, there has been limited information on the impact of vulvovaginal symptoms on postmenopausal women's lives.

Currently, a validated instrument to measure vulvovaginal symptoms and disease-specific quality-of-life in postmenopausal women is not available.(5) In the absence of a disease-specific quality-of-life questionnaire, many trials measuring the efficacy of vaginal estrogen therapy have used the most bothersome symptom approach. (6–8) A validated scale to elicit both vulvovaginal symptoms and quantify life-impact in postmenopausal women is necessary to allow for future studies in response to treatments for these symptoms. The purpose of this study was to develop a vulvovaginal symptoms questionnaire (VSQ) to study symptoms, emotions, life impact and sexual impact of vulvovaginal symptoms in postmenopausal women.

METHODS

Preliminary questionnaire development

Approval was obtained through the Institutional Review Board at Yale University. We developed a preliminary questionnaire focused on vulvovaginal symptoms based on modifications to the Skindex-16, a validated questionnaire to measure the impact of skin disease symptoms on quality-of-life, as a written instrument in English.(9, 10) Specifically "your skin condition" in the Skindex-16 was change to "your vulva" for the VSSQ. Input from an expert panel of three gynecologists, a dermatologist, and an expert in survey methodology was used to add additional questions specifically related to vulvovaginal symptoms. We added questions to explore specific vulvovaginal concerns (e.g. odor and discharge) as well as a domain of questions regarding sexual function. As in the original Skindex-16, each question was asked in the form of "during the past week, how often have you been bothered by […]," with responses consisting of a continuous Likert scale of never bothered (no effect) to always bothered (maximal effect). Because the confirmatory factor analysis demonstrated that the response categories of "never bothered" vs. "any bother" performed better than continuous scale, all analyses were performed using the dichotomous categories. The final VSQ is a 21-item written questionnaire. (Appendix A—Supplemental Digital Content 1, http://links.lww.com/MENO/A50) We did not expect all women to understand the term "vulva." The VSQ instrument had both an introductory paragraph and a picture that explained the anatomy and correct terminology of vulva and vagina.

To test the face validity of these developed questions, face-to-face "think aloud" cognitive interviews were held with five postmenopausal women seeking routine gynecologic care. These interviews further explored the pertinence and quality of both the questions and answer responses. These interviews confirmed that all pertinent issues related to vulvovaginal symptoms were covered and women understood the questions.

Study population

We then recruited postmenopausal women seeking routine gynecologic care at a general gynecology practice and a gynecology practice serving women seeking treatment for pelvic floor disorders. Participants were excluded if they had a known vulvar dermatoses including: Lichen Sclerosus, Lichen Planus, Psoriasis, Behcet's disease, Hidradenitis Suppurativa, ano-rectal Crohn's disease, or Herpes Simplex virus. Participants were also excluded if they required immediate treatment of vulvovaginal symptoms.

Test-retest reliability

Test-retest reliability was assessed by asking the women to fill out the VSQ approximately 2 to 4 weeks after their initial recruitment in this study. The second VSQ was given to women with a self-addressed, stamped envelope at the conclusion of the initial recruitment visit with instructions to complete and return in 2 to 4 weeks by mail. This interval was chosen to allow enough time to pass between when the women completed the original VSQ and the retest to avoid rote recall of questions. If the second VSQ was not received in three weeks, one reminder post-card was mailed and two reminder phone calls were placed. Women who were diagnosed with active candida vulvovaginitis at the time of initial enrollment were treated and excluded from the test-retest analysis. Test-retest reliability was measured for individual questions using Kappa coefficient. Kappa values of ≤ 0.4 were considered poor, 0.41 to 0.60 moderate, 0.61 to 0.80 substantial, and >0.80 almost perfect.(11) The test-retest reliability for the sum score of the different scales (symptoms, emotion, life-impact, and sexual-impact) were assessed with intra-class coefficient (ICC) using random-effect analysis of variance (ANOVA) mixed model. ICC values of ≤ 0.4 were considered poor, 0.41 to 0.60 moderate, 0.61 to 0.80 good, and >0.80 excellent.(12)

Construct validity

Construct validity is demonstrated by testing a new instrument against a gold standard. There is currently no gold standard for the assessment of vulvovaginal skin symptoms in older women.(5, 13) This presented a challenge in establishing the construct validity of the VSQ. In the absence of a gold standard, we compared the VSQ to other disease specific quality of life instruments measuring symptom bother and life impact of common gynecologic disorders in postmenopausal women. We hypothesized that women with increased bother from other gynecologic conditions, such as pelvic floor disorders and sexual dysfunction, would have increased vulvovaginal symptom bother. We expected fair correlations between other disease-specific quality-of-life questionnaires in gynecology and the VSQ. We measured disease-specific bother from two validated questionnaires for female pelvic floor disorders, the Pelvic Floor Distress Inventory-short form 20 (PFDI-20) and the Pelvic Floor Impact Questionaire-7 (PFIQ-7).(14) Increased scores on the PFDI-20 and the PFIQ-7 indicate increased symptom bother from female pelvic floor disorders. We further tested the correlation of the VSSQ with two sexual function questionnaires, the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12) and the Female Sexual Function Index (FSFI).(15, 16) Construct validity of the VSSQ was tested by using the Spearman-Brown correlation coefficient (ρ) to compare the VSSQ with the PFDI-20, the PFIQ-21, the PISQ-12, and the FSFI. Correlations of $0 < |\rho| \leq .25$ were considered low. Correlations of $.25 < |\rho| \leq .5$ were considered fair. (17)

To further test the construct validity of the VSQ, a comprehensive vulvar examination was performed that included vulvar sensory testing to measure vulvar pain and vaginal maturation index and vaginal pH to measure vulvovaginal atrophy.(7, 8) Comprehensive vulvar examinations were conducted by board-certified gynecologists. These examinations included visual inspection of the vulva and vagina (to evaluate for skin changes and possible vulvar intraepithelial neoplasia), normal saline preparation of vaginal secretions (for

evaluation of infectious vaginitis), potassium hydroxide preparation (for evaluation of current vulvovaginal candidiasis), a yeast culture if indicated (for confirmation of current vulvovaginal candidiasis), and pH assessment of vaginal secretions. Vulvar sensory testing using a cotton swab (cotton swab testing) classified 23 areas around the vulva as free of discomfort (0), mild discomfort (1), moderate discomfort (2), or severe discomfort (3) for a total score ranging from 0 (symptom-free in all areas) to 69 (severe discomfort in all areas).(18, 19) Vulvar sensory testing scores were not normally distributed; therefore, the Spearman-Brown correlation coefficient was used to compare the VSSQ with vulvar sensory testing scores. The vaginal maturation index was obtained for all women in the manner described by Freedman et al.(8) Vaginal maturation index scores range between 0 and 1, with 1 indicating greater atrophic vaginitis.

Logical consistency

In order to test whether women were answering questions with logical consistency, we divided women into two groups: women who reported having one or more of seven vulvovaginal symptoms (itching, burning, hurting, irritation, dryness, discharge, and odor) and women who denied any symptoms. Women's responses to the emotions and life-impact scales were then examined with the expectation that women without vulvovaginal symptoms would not report any emotional or life-impact.

Confirmatory factor analysis

The Skindex-16 has three distinct scales of symptoms, emotions, and functioning. In developing the VSQ, four distinct *a priori* scales of the VSQ were developed as symptoms, emotions, life-impact, and sexual-impact. Confirmatory factor analysis was performed to verify the four *a priori* scales of the VSQ utilizing Mplus software (*Muthen & Muthen, Los Angeles, CA*). Confirmatory factor analysis was done twice since only 75 of 120 women reported being sexually active and completed the sexual impact scale of the VSQ. First, we performed confirmatory factor analysis modeling on all 120 women (regardless of current sexual activity) on the first three scales of the VSQ (symptoms, emotions, and life-impact). Next, we performed confirmatory factor modeling including all four scales (symptoms, emotions, life-impact, and sexual-impact) of the VSQ of the 75 women with complete data. The goodness-of-fit of the confirmatory factor analysis models were evaluated utilizing the following indices and cutoff levels: comparative fit index (≥ 0.95), Tucker Lewis Index (≥ 0.95) root mean square error of approximation (<0.1), and weighted root mean square residual (<0.9).(20–22)

Internal consistency

After confirming the distinct scales of the VSQ to be symptoms, emotions, life-impact, and sexual-impact, the internal consistency of the questions was assessed through the calculation of Cronbach's α coefficient.

Sample size

Recommendations for adequate sample size to conduct factor analysis are between 50 and 250 with most authors recommending at least 100 subjects. (23–25) We recruited 120 women to account for attrition. All data analyses were performed using SAS 9.2 (*SAS Institute, Cary, NC*) unless otherwise specified. For parametric data, Fisher's exact test, student's t-test and chi-square testing were utilized as appropriate. For nonparametric data, the Wilcoxon rank sum test was used as appropriate.

RESULTS

Study population

One hundred twenty postmenopausal women participated in the psychometric validation of the VSQ. The mean age was 66.3 years (±10.9, SD) and ages ranged from 48 to 91 years. The majority of women identified their race/ethnicity as non-Hispanic white (91.7%). Black women represented 2.5% of the cohort and Hispanic women represented 2.5% of the cohort. Ten women (8.3%) currently used systemic estrogen therapy and 35 women (29.2%) reported current vaginal estrogen use. Seventy-five women (62.5%) reported currently being sexually active with a partner. (Table 1)

Questionnaire

All 120 women were able to complete the VSQ without assistance. Over 99% of questions had complete data. Ninety-nine women (82.5%) reported having at least one of the seven vulvovaginal symptoms in the last week. (Table 2)

Test-retest reliability

Three women were diagnosed and treated for active candida vulvovaginitis and excluded from the test-retest reliability testing. Ninety-one of 117 women (77.8%) completed and returned the second VSQ within 4 weeks. Ninety percent (19/21) of individual items had a Kappa of > 0.41 indicating moderate reliability. (Table 3) The test-retest reliability for the scores of the 4 scales was measured utilizing ICC and were 0.75, 0.60, 0.55, and 0.65 for symptoms, emotions, life-impact and sexual-impact, respectively.

Construct validity

The Spearman-Brown correlations of the VSQ to other disease specific quality of life questionnaires were 0.41 for the PFDI-20 measuring pelvic floor symptom distress, 0.45 for the PFIQ-7 measuring pelvic floor life impact, and 0.42 for the PISQ-12 measuring sexual function. (Table 4) The Spearman-Brown correlation coefficient for the VSQ with the FSFI was −0.16.

Comprehensive vulvar examination

Three of the ninety-nine women who reported vulvar symptoms were diagnosed active candida vulvovaginitis based on KOH testing and confirmed with yeast culture. All three women diagnosed with active candida infections reported vulvovaginal symptoms. Vulvar sensory testing scores were significantly higher in women with symptoms (n =99) compared with women without symptoms (n=21) (median = 0, interquartile range(IQR) [0, 4]) vs. median = 0, IQR [0, 1], p= .02). (Table 1) The Spearman-Brown correlation coefficient of the VSQ compared with the vulvar sensory testing scores was 0.36. We analyzed the three individual symptoms on the VSQ involving burning, hurting, and irritation with vulvar sensory testing scores. Women who reported vulvar *burning or stinging* had a higher median vulvar sensory testing score compared with women who did not report *burning or stinging* (median = 2, IQR [0, 9]) vs. median = 0, IQR [0, 1], p<.001). Women who reported *hurting* had a higher median vulvar sensory testing score compared with women who did not report *hurting* (median = 2, IQR [0, 12]) vs. median = 0, IQR [0, 2], p=.002). Women who reported *being irritated* had a higher median vulvar sensory testing score compared with women who did not report *being irritated* (median = 1, IQR [0, 6]) vs. median = 0, IQR [0, 1], p=.002). Mean vaginal pH (5.8 [± 0.8] vs. 5.5 [± 0.5], p=.11) and mean vaginal maturation indices (0.56 [± 0.23] vs. 0.53 [± 0.25], p=.59) were similar in women with and without symptoms.

Logical consistency

Among the 21 women who reported no vulvovaginal skin symptoms, none reported any emotional impact, life-impact, or sexual-impact of vulvovaginal symptoms.

Confirmatory factor analysis

Confirmatory factor analysis modeling was performed with the answer choices from all 120 women for emotions and life-impact scales. When we performed confirmatory factor analysis on the original continuous answer responses, the goodness-of-fit of the model was not confirmed. When the answer responses were converted from the continuous scale to a dichotomous response of no bother vs. any bother, the goodness-of-fit of the confirmatory factor analysis model was confirmed.(18–20) The indices of confirmatory factor analyses that confirmed model fit were: comparative fit index= 0.98, Tucker Lewis Index= 0.99, root mean square error of approximation= 0.07, and weighted root mean square residual= 0.82.

The second confirmatory factor analysis model was performed including the sexual-impact scale that was completed by 75 women who reported current sexual activity. The indices of confirmatory factor analyses that confirmed model fit including all four scales (symptoms, emotions, life-impact and sexual-impact) were: comparative fit index= 0.97, Tucker Lewis Index= 0.98, and root mean square error of approximation= 0.09. The weighted root mean square residual was 0.97. Although the weighted root mean square residual was higher than the cut-off level of <0.9, the factor structure of the four scales were not ruled out by the indices of fit.

Internal consistency

Cronbach's alpha coefficient was calculated to determine the internal consistency of the four scales, symptoms, emotions, life-impact, and sexual impact. Cronbach's alpha coefficients were 0.76, 0.87, 0.83, and 0.82 for the scales of symptoms, emotions, life-impact and sexual-impact, respectively. (Table 5)

DISCUSSION

The VSQ is a questionnaire designed for the measurement of disease-specific quality-of-life impact of vulvovaginal symptoms in postmenopausal women. To date, there has been limited information on the presence of vulvovaginal symptoms in postmenopausal women and their impact on quality-of-life. As standardized methods for evaluating these symptoms are developed, our understanding of the prevalence and life-impact will progress.

In the absence of a gold-standard for the quantification of vulvovaginal symptoms and life-impact, we have tested the validity of the VSQ with other validated gynecologic questionnaires and physical exam findings. We based our instrument to measure vulvovaginal symptoms on the Skindex-16. The Skindex has been adapted and used in the study of numerous skin conditions, including psoriasis, atopic dermatitis, and leg ulcers.(26) The Skindex has also been used to study the life-impact of vulvodynia in women.(27) The flexibility of the Skindex in studying the life-impact of many skin conditions made this the ideal instrument to base our questions. We demonstrated fair correlations between the VSQ and other questionnaires measuring other gynecologic diseases in older women, namely the PFDI-20 and the PFIQ-7. We also demonstrated a fair correlation between the PISQ-12, a validated instrument to study sexual function in women with pelvic floor disorders, and the VSQ. However, we found a low correlation between the FSFI and the VSQ. This may be due to the different focus of the FSFI on six different aspects of sexual function (desire, arousal, lubrication, orgasm, satisfaction, and pain) when the VSQ focuses on pain, bleeding, and dryness with intercourse.(16)

Additionally, we assessed vulvar discomfort with cotton swab testing and found a correlation of 0.36 between cotton swab testing scores and VSQ scores. Cotton swab testing scores are dependent on a women's report of mild, moderate, or severe pain when each location on the vulva is touched. Pain can be present without any visual abnormalities observed which is likely why we observed a fair correlation between the cotton swab testing and the VSQ. Consistent with the original Skindex, a women's report of skin symptoms were not consistently related to visual observation of physical exam findings.(28) Although there were no women with significant visual physical exam findings without symptoms, many women reported symptoms without physical exam findings.

We diagnosed active candida vulvovaginitis by 1) symptoms, 2) KOH prep and 3) yeast culture; however we did not use polymerase chain reaction (PCR). Recently, PCR has been demonstrated to be a more sensitive method of diagnosing vulvovaginal candidiasis in women with the diagnosis of recurrent vulvovaginal candidiasis.(29)

We found test-retest reliability of the VSQ to be adequate 2 to 4 weeks after women initially completed the VSSQ. As skin symptoms are dynamic and the VSQ asks about symptoms "in the past week," it is possible that women's vulvovaginal symptoms changed during the time interval from the initial completion of the VSQ and the second time they completed the questionnaire. Other validated measures of general skin symptoms (not specific to vulvovaginal symptoms) have reduced the time interval to measure test-retest reliability to 72 hours.(9, 28) We did have lower Kappa and ICC values than reported on the psychometric testing of the Skindex-16. This was likely due to our choice of a longer time interval between completion of the initial and the follow up VSQ.

This research is limited by the population of women studied. Women were recruited at gynecology practices. Women seeking routine gynecologic care are likely more bothered from gynecologic conditions and likely have a higher prevalence of vulvovaginal symptoms than women who do not seek gynecologic care. We hypothesize that the true prevalence of vulvovaginal symptoms in all postmenopausal women is lower than this current study population. However, studying the VSQ in a population of women with a high prevalence of vulvovaginal symptoms allowed us to demonstrate the psychometric properties of the VSQ. Additionally, we tested the VSQ for face validity among 5 women seek routine gynecologic care. Further testing of face validity may be necessary among different populations (e.g. postmenopausal women not seeking medical care).

Future study is needed to determine if dichotomous answer responses are truly the best answer choices to evaluate these symptoms. In using a Likert scale consistent with the original phrasing of the Skindex-16, women were asked about frequency ("how often have you been bothered") but not severity. Future studies will determine if severity of bother ("how much") might be a preferred question/answer response pair compared with the current dichotomous answer responses (Yes/No). Authors have advocated analyzing the most bothersome symptom in addition to recording the presence of vulvar symptoms in the study of treatments for vulvovaginal atrophy.(6) We believe that exploring both frequency and severity of vulvovaginal symptom bother is important and we expect future research will demonstrate severity of bother will the most informative answer choice for the VSQ instrument. In addition to asking about most bothersome symptom, we concur with Simpson and Murphy that quality-of-life impact from vulvovaginal symptoms also needs to be explored which is why the VSQ has emotional, life-impact, and sexual-impact scales.(5) Finally, we demonstrated that postmenopausal women without symptoms did not have emotional or life-impact; therefore, we propose that women who answer "no" to the first seven symptom questions do not need to complete the remaining three scales of the VSQ.

CONCLUSION

In conclusion, the VSQ is a reliable and internal consistent instrument to measure vulvovaginal symptoms in postmenopausal women. We have demonstrated reasonable validity of the VSQ in the absence of a gold-standard to measure vulvovaginal symptoms. We recognize that the 3 psychometric properties a good questionnaire demonstrates are validity, reliability, and sensitivity to change. In this first study, we have demonstrated the psychometric properties of validity and reliability. As we develop this questionnaire to have clinical implications, the responsiveness, or sensitivity to change, of the VSQ to measure symptoms and life-impact of treatments will be tested in future investigations. Finally, in order to confirm the VSQ can measure the impact of clinical treatment, the final step in this instrument's development will be to define a minimally important difference of change in this scale that reflects a clinically meaningful difference in a women's life.

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Appendix A

The Vulvovaginal Symptom Questionnaire

The following questions were developed to assess skin symptoms of women. The skin surrounding the vagina is called the vulva. Just like skin in other parts of the body, the vulva can sometimes become irritated. Many women experience discomfort in the region of the vulva. These symptoms may be mild, but can sometimes be severe. The following questions will ask you about your vulvar skin symptoms during the past week.

During the past week, have you been bothered by:			
1.	Your vulva itching?	$_0$☐ No	$_1$☐ Yes
2.	Your vulva burning or stinging?	$_0$☐ No	$_1$☐ Yes
3.	Your vulva hurting?	$_0$☐ No	$_1$☐ Yes
4.	Your vulva being irritated?	$_0$☐ No	$_1$☐ Yes
5.	Your vulva being dry?	$_0$☐ No	$_1$☐ Yes
6.	Discharge from your vulva or vagina?	$_0$☐ No	$_1$☐ Yes
7.	Odor from your vulva or vagina?	$_0$☐ No	$_1$☐ Yes
8.	Worry about your vulvar symptoms? (for example, that it will spread, get worse, scar, etc.)	$_0$☐ No	$_1$☐ Yes
9.	The appearance of your vulva?	$_0$☐ No	$_1$☐ Yes
10.	Frustration about your vulvar symptoms?	$_0$☐ No	$_1$☐ Yes
11.	Embarrassment about your vulvar symptoms?	$_0$☐ No	$_1$☐ Yes
12.	The effects of your vulvar symptoms on your interactions with others?	$_0$☐ No	$_1$☐ Yes
13.	The effects of your vulvar symptoms on your desire to be with people?	$_0$☐ No	$_1$☐ Yes
14.	Your vulvar symptoms making it hard to show affection?	$_0$☐ No	$_1$☐ Yes
15.	The effects of your vulvar symptoms on your daily activities?	$_0$☐ No	$_1$☐ Yes
16.	Your vulvar symptoms affecting your desire to be intimate?	$_0$☐ No	$_1$☐ Yes
17.	Are you currently sexually active with a partner? ☐ No→ Thank you. You are done with this questionnaire. ☐ Yes→ Please proceed with the next 4 questions		
18.	The effects of your vulvar symptoms on your sexual relationships?	$_0$☐ No	$_1$☐ Yes
19.	Your vulvar symptoms causing pain during sexual activity?	$_0$☐ No	$_1$☐ Yes
20.	Your vulvar symptoms causing dryness during sexual activity?	$_0$☐ No	$_1$☐ Yes
21.	Your vulvar symptoms causing bleeding during sexual activity?	$_0$☐ No	$_1$☐ Yes

Table 1

Demographics and physical exam findings of postmenopausal women (N= 120)

	Women with symptoms (n =99)	Women with no symptoms (n=21)	*P*
Age (Year, Mean ± SD)	65.8 (± 10.6)	68.7 (± 12.2)	.26
Race/Ethnicity			.33
White	92 (92.9)	18 (85.7)	
Black	2 (2.0)	1 (4.8)	
Hispanic, non-Black	2 (2.0)	1 (4.8)	
Other	1 (1.0)	1 (4.8)	
BMI (kg/m^2, mean, ±SD)	28.6 (± 6.4)	27.3 (± 5.5)	.42
Current topic estrogen use	30 (30.3)	5(23.8)	.61
Vaginal Maturation index (mean, ±SD)	0.56 (± 0.23)	0.53 (± 0.25)	.59
Vaginal pH (mean, ±SD)	5.8 (± 0.84)	5.5 (± 0.52)	.11
Vulvar sensory testing score (median, IQR)	0 (0, 4)	0 (0, 1)	.02
Active candidal vulvovaginitis	3 (3.0)	0	.58
Current bacterial vaginosis	0	0	1.0

Values reported as n (%) unless otherwise stated
SD = standard deviation; BMI = body mass index; IQR = interquartile range

Table 2

Vulvovaginal symptoms report by postmenopausal women (N=120)

Symptom	n (%)
Itching	49 (40.8)
Burning	41 (34.2)
Hurting	29 (24.2)
Irritation	49 (40.8)
Being dry	52 (43.3)
Discharge	33 (27.5)
Odor	62 (51.7)

* Women could report more than one symptom.

Table 3

Test-Retest reliability of the Vulvovaginal Symptom Questionnaire

Scales/Items	Kappa	ICC of sum score
Symptoms		0.75
Your vulva itching, n=91	0.50	
Your vulva burning or stinging, n=91	0.72	
Your vulva hurting, n=90	0.45	
Your vulva being irritated, n=90	0.53	
Your vulva being dry, n=90	0.57	
Discharge from the vulva or vagina, n=64	0.50	
Odor from the vulva or vagina, n=66	0.65	
Emotions		0.60
Worry about your vulvar symptoms, n=84	0.53	
The appearance of your vulva, n=87	0.45	
Frustration about your vulvar symptoms, n=91	0.50	
Embarrassment about your vulvar symptoms, n=90	0.39	
Life-impact		0.55
The effects of your vulvar symptoms on your interactions with others, n=89	0.42	
The effects of your vulvar symptoms on your desire to be with people, n=86	0.52	
Your vulvar symptoms making it hard to show affection, n=85	0.49	
Your vulvar symptoms making it hard to work or do what you enjoy, n=91	0.52	
Sexual-impact		0.65
Your vulvar symptoms affecting your desire to be intimate, n=84	0.61	
The effects of your vulvar symptoms on your sexual relationships, n=61	0.49	
Your vulvar symptoms causing pain during sexual activity, n=61	0.52	
Your vulvar symptoms causing dryness during sexual activity, n=61	0.31	
Your vulvar symptoms causing bleeding during sexual activity, n=48	0.46	

ICC = intra-class coefficient

Table 4

Spearman-Brown Correlations for the Vulvovaginal Symptom Questionnaire

Tool	ρ
Pelvic Floor Distress Inventory-20	0.41
Pelvic Organ Prolapse Distress Inventory-6	0.29
Colorectal-Anal Distress Inventory-8	0.33
Urinary Distress Inventory-6	0.34
Pelvic Floor Impact Questionnaire-21	0.45
Urinary Impact Questionnaire-7	0.31
Colorectal-Anal Impact Questionnaire-7	0.42
Pelvic Organ Prolapse Impact Quesitonnaire-7	0.35
Pelvic Organ Prolapse/Urinary Incontinence Questionnaire-12	0.42
Female Sexual Function Index	−0.16

Table 5

Cronbach's alpha coefficient for internal consistency of the Vulvovaginal Symptom Questionnaire

Scales/Items	α
Symptoms (N = 120)	
All items in symptom scale	0.76
Your vulva itching	0.71
Your vulva burning or stinging	0.69
Your vulva hurting	0.71
Your vulva being irritated	0.70
Your vulva being dry	0.74
Discharge from the vulva or vagina	0.80
Odor from the vulva or vagina	0.77
Emotions (N = 120)	
All items in emotions scale	0.87
Worry about your vulvar symptoms	0.84
The appearance of your vulva	0.87
Frustration about your vulvar symptoms	0.80
Embarrassment about your vulvar symptoms	0.80
Life-impact (N = 120)	
All items in life-impact scale	0.83
The effects of your vulvar symptoms on your interactions with others	0.74
The effects of your vulvar symptoms on your desire to be with people	0.75
Your vulvar symptoms making it hard to show affection	0.81
Your vulvar symptoms making it hard to work or do what you enjoy	0.82
Sexual-impact (N = 75)	
All items in sexual-impact scale	0.82
Your vulvar symptoms affecting your desire to be intimate	0.78
The effects of your vulvar symptoms on your sexual relationships	0.77
Your vulvar symptoms causing pain during sexual activity	0.76
Your vulvar symptoms causing dryness during sexual activity	0.76
Your vulvar symptoms causing bleeding during sexual activity	0.85