

Fear Avoidance and Self-efficacy in Relation to Pain and Sexual Impairment in Women With Provoked Vestibulodynia

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Background: Provoked vestibulodynia is believed to be the most frequent cause of vulvodynia in women of childbearing age, with prevalence rates of up to 12% in the general population. Despite this high prevalence and the fact that vestibulodynia impacts negatively on quality of life, in particular sexual functioning, there has been a paucity of sound research to elucidate the condition's etiology. More specifically, few studies have focused on the role of psychologic factors in the experience of vulvo-vaginal pain and associated sexual impairment.

Objectives: The present study aimed to determine the extent to which fear avoidance variables (catastrophizing, anxiety, fear of pain, hypervigilance) and self-efficacy differentially influenced changes in levels of induced and intercourse pain and also associated sexual dysfunction in these women.

Methods: Data were obtained from 75 vestibulodynia participants who completed a gynecologic examination, structured interview, and standardized questionnaires.

Results: The results of regression analyses revealed that higher catastrophizing, fear of pain, and hypervigilance in addition to lower self-efficacy together accounted for 15% of the variation in increased intercourse pain intensity. Among these, only catastrophizing contributed unique variance to intercourse pain. Results also showed that higher state anxiety and fear of pain (escape/avoidance) and also lower self-efficacy explained 22% of the variation in women's sexual impairment. However, only self-efficacy was found to be an independent correlate of sexual impairment.

Conclusion: Findings support a theoretical model of vestibulodynia as a pain disorder influenced among others by cognitive and affective factors.

Key Words: vestibulodynia, dyspareunia, chronic pain, sexual functioning, anxiety, catastrophizing, fear of pain, hypervigilance, self-efficacy

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Provoked vestibulodynia—previously known as vulvar vestibulitis syndrome—is believed to be the most frequent cause of vulvodynia in women of childbearing age,¹ with prevalence estimates of up to 12% in the general population.² Despite this high prevalence and the fact that women with vestibulodynia experience impairments in their sexual and psychosocial functioning,^{1,3,4} the etiology of provoked vestibulodynia still remains largely unknown. It is thought that vestibulodynia may involve abnormal pain perception resulting from sensitization of vestibular nerve fibers and the establishment of a sympathetically maintained pain loop activated by repetitive and/or prolonged inflammatory reactions triggered during intercourse.⁵ Other studies have shown that afflicted women report more repeated yeast infections than controls^{5–7} and that early and prolonged use of oral contraceptives could increase the risk of developing vestibulodynia.⁸

Little is known, however, about psychologic contributors to the experience of this recurrent pain. In fact, available vestibulodynia studies pertaining to psychologic factors have been merely descriptive, leaving unanswered the question of whether these variables may modulate pain.⁹ This important gap may be partly explained by the fact that vestibulodynia is still conceptualized and classified in a dualistic fashion—either as a psychogenic sexual dysfunction or as a biomedical condition.¹⁰ To address this gap, this study examined the degree to which specific cognitive and affective factors contributed to the prediction of pain and associated sexual impairment in women with provoked vestibulodynia.

In the field of chronic pain, it is now well documented that psychologic variables significantly contribute to predict induced and clinical pain intensity and also associated disability.^{11,12} Among those, state-trait anxiety, catastrophizing, fear of pain and hypervigilance to pain have received much empirical attention, particularly since the publication of the fear-avoidance model.^{13,14} Numerous studies have shown that these factors predict pain intensity and also perceived and objective disability, in addition to contributing to pain maintenance and chronicity.¹⁴ However, most of this research has focused on nonspecific musculoskeletal pain problems.¹⁴ More recently, studies have supported the implication of another psychologic variable, self-efficacy, as a significant contributor to pain intensity and related disability.^{15,16}

Vestibulodynia has been conceptualized as a provoked, chronic inflammatory and potentially neuropathic pain disorder⁵ that interferes with sexual intercourse,¹⁷ albeit with scant empirical evidence to support this view.

Some researchers in the field now propose that vestibulodynia is comparable with other chronic musculoskeletal or neuropathic pain disorders, thus influenced by the same biopsychosocial factors.² Specifically, controlled studies have shown that afflicted women report more state-trait anxiety and more catastrophizing toward their pain than women from control groups report toward other types of pain.^{1,18–25} Likewise, 2 recent studies^{23,24} revealed that women with vestibulodynia also report more subjective fear and hypervigilance toward pain and show more cognitive interference toward pain stimuli than matched controls. Taken together, these findings suggest that state-trait anxiety, catastrophizing, fear of pain, and hypervigilance to pain may play a role in the experience of vestibulodynia. However, the studies conducted thus far have not addressed the relative contribution of the above cognitive and affective factors to the experience of vulvo-vaginal pain and related sexual impairment, nor have they examined the role of self-efficacy.

Although recent theoretical conceptualizations of vestibulodynia have proposed that it be viewed as a pain disorder influenced by biopsychosocial factors, this model has received very little empirical validation.¹⁷ Accordingly, this study aimed to determine whether higher levels of state-trait anxiety, catastrophizing, fear of pain, and hypervigilance to pain, and also lower levels of self-efficacy, could contribute to greater induced and intercourse pain intensity in addition to sexual impairment, in women with vestibulodynia. Another goal of the study was to examine the degree to which each of these variables explained unique variance to pain (induced and intercourse pain) and sexual impairment.

METHODS

Participants

Potential participants were recruited through local media announcements and from gynecologist referrals in a large metropolitan area, as part of the recruitment for a randomized treatment outcome study (ie, convenience sample). They were initially screened during a short preliminary telephone contact to determine their eligibility based on inclusion and exclusion criteria. Eligible women were then invited to take part in an assessment at a participating gynecologist's office, where the study procedures were first reexplained and informed consent was obtained. Participants were reimbursed for their transportation costs. Inclusion criteria were the following: (1) pain during intercourse which is/was subjectively distressing and occurs/occurred on most (75%) intercourse attempts for at least 6 months; (2) pain limited to intercourse and other activities involving pressure to the vestibular area (eg, tampon insertion); (3) moderate to severe pain at one or more locations of the vestibule during the cotton-swab test (see Procedure), with a minimum mean of at least 4 on a Likert scale from 0 no pain at all to 10 worst pain ever felt [ie, Vestibular Pain Index (VPI)]; (4) age between 18 and 45 years. Exclusion criteria were (1) pelvic or vaginal pain not related to intercourse or pressure to the vestibular area; (2) major medical or psychiatric illness; (3) presence of (a) active infection, (b) vaginismus, (c) dermatologic lesion, or (d) deep dyspareunia; (4) cooccurring treatment for vestibulodynia; (5) pregnancy; (6) insufficient fluency in written English or French.

Procedure

Structured Interview

Sociodemographic information and relationship, gynecologic, and vulvo-vaginal pain history were collected during a structured interview.

Gynecologic Examination

The gynecologic examination was performed according to a standardized protocol and consisted of the following procedures: (1) vaginal cultures to evaluate the presence of infections (*Candida*, *Gardnerella*, and *Trichomonas*); (2) a short interview carried out by the gynecologist concerning obstetric-gynecologic history, medication, and vulvo-vaginal pain; (3) palpation with a finger of the following areas: vagina, uterus, and ovaries; (4) a standard bimanual palpation of the uterus and ovaries; (5) randomized cotton-swab test palpation of 3 vestibular sites. The cotton-swab test consists of the palpation with a dry cotton swab of 3 locations around the part of the vestibule surrounding the hymeneal ring (ie, 3–6–9 o'clock). A research assistant recorded the pain rating for each palpation site on a Likert scale from 0 no pain at all to 10 worst pain ever felt and scores were averaged to form one single index of vestibular pain. The diagnosis was also noted on a standardized form by the gynecologist. In an earlier study, κ analyses showed interrater reliability, values ranging from 0.42 to 0.64, $P < 0.001$. Also, vestibular participant pain ratings were found to correlate significantly between gynecologists for each palpation site, with correlation coefficients of 0.61 to 0.80, $P < 0.001$.²⁶

Measures

Although they were waiting to take part in the structured interview or the gynecologic examination, participants were asked to complete a battery of 6 self-report questionnaires. English and French versions of each questionnaire were available.

Dependent Variables

Intercourse Pain

Pain during intercourse was assessed using the McGill-Melzack Pain Questionnaire (MPQ)—short form,^{27,28} with reference to pain during intercourse. The MPQ—short form is probably the most widely used questionnaire for pain measurement and has demonstrated excellent psychometric properties across acute and chronic pain populations.^{27,28} We used this measure to assess the intensity of pain during intercourse using the 5-point Present Pain Intensity (PPI) scale with reference to the average intensity of pain during intercourse in the last 6 months. The MPQ also yields a more global and multidimensional evaluation of pain severity called the Pain Rating Index through 78 adjectives that describe the pain experience. In this study, the PPI score was used as the intercourse pain dependent variable in the analyses.

Induced Pain

Induced pain was evaluated using the VPI—an average pain rating score during the gynecologic examination (see Gynecologic Examination section). Participants were asked to indicate verbally their level of pain during the cotton-swab test for each of the 3 palpation sites on a scale of (0) no pain at all to (10) worst pain ever felt. These scores were then averaged to reflect a global pain rating.

Sexual Functioning

The Female Sexual Function Index (FSFI)²⁹ was used to assess global sexual functioning. As sexual functioning represents the activity with which vestibulodynia pain interferes, we used this score as a measure of functional disability for the purpose of the study. The FSFI is a 19-item brief self-report questionnaire composed of 6 subscales related to the 6 dimensions of female sexual function: desire, arousal, lubrication, orgasm, sexual satisfaction, and pain. The FSFI has demonstrated good psychometric properties (Cronbach $\alpha > 0.80$) with sexually functional and dysfunctional samples and serves to differentiate clinical from nonclinical populations.^{29–31} Moreover, a recent study has confirmed a stable factorial structure and has established a clinical cutoff point (below 26.55).³² However, as the French version of this questionnaire has not been validated, analyses were done to confirm the comparability of the translated French version to the original English one. Results showed a good internal consistency (Cronbach $\alpha = 0.73$) and a similar factorial structure.

Independent Variables

Anxiety

The Spielberger State-Trait Anxiety Inventory (STAI; ASTA)^{33,34} is a 40-item, well-known, and widely used measure of state and trait anxiety that has demonstrated very good psychometric properties in various clinical and nonclinical samples including pain populations.^{33,35–37} Also, intraclass correlation coefficients are found to be high, suggesting that this instrument is able to discriminate between patients (ICC = 0.39 to 0.89).³⁸

Pain-related Fear

The Pain Anxiety Symptoms Scale-20 (PASS-20)³⁹ is a shorter version adapted from the original 40-item questionnaire.⁴⁰ It is a self-report measure of pain-related fear designed for individuals with chronic pain problems and has been adapted for use in a sexual context (ie, the word sexual has been added before the word activity for several items). Items are measured on a 6-point Likert scale with the end points (0) never and (5) always. This questionnaire includes 4 subscales: Cognitive Anxiety, Escape/Avoidance, Fearful Appraisal, and Physiological Anxiety. The PASS-20 has demonstrated good internal consistency, test-retest reliability, and a stable factorial structure.^{39,41} Correlations with measures of pain, depression, and disability are similar to those obtained in studies using the original version.³⁹ Finally, the questionnaire used in this study was translated from English to French. Factorial analyses confirmed that the factorial structure of the French version is comparable with that of the English one. Results also showed a good internal consistency with a Cronbach α of 0.86.

Pain Catastrophizing

The Pain Catastrophizing Scale (PCS-CF; PCS)^{42,43} consists of 13 items measuring exaggerated negative thoughts and feelings about the meaning of pain.⁴³ Items are scored on a 5-point scale with the end points (0) not at all and (4) all the time. The PCS is divided into 3 subscales to assess the different components of catastrophic thinking: rumination (eg, “I keep thinking about how much it hurts”), magnification (eg, “I wonder whether something serious may happen”) and helplessness (eg, “There is

nothing I can do to reduce the intensity of the pain”). The PCS is a reliable and valid measure and has demonstrated a stable factorial structure across clinical and general populations.^{11,42–46} This measure has also been shown to correlate with pain and disability measures in various chronic pain populations^{43,47} and to discriminate well between participants (ICC = 0.72).⁴⁸

Hypervigilance to Pain

Hypervigilance to pain during intercourse was assessed by the Pain and Vigilance Awareness Questionnaire (PVAQ).⁴⁹ This is a 16-item measure of attention to pain that has been used to evaluate awareness, consciousness, and vigilance to pain in various clinical and nonclinical populations.^{49–52} It shows good test-retest reliability and internal consistency; several studies have also demonstrated good construct validity for chronic pain populations.^{49–52} In addition, this questionnaire was translated from English to French. Internal consistency of the French version is good (Cronbach $\alpha = 0.71$).

Pain Self-efficacy

The Painful Intercourse Self-Efficacy Scale is a 20-item questionnaire with subscales measuring the 3 dimensions of self-efficacy associated with pain during intercourse: (1) self-efficacy for sexual function, (2) self-efficacy for controlling other symptoms, and (3) self-efficacy for controlling pain during intercourse. This questionnaire was adapted from the Arthritis Self-Efficacy Scale,⁵³ developed to assess perceived self-efficacy in arthritis patients. Participants indicated their perceived ability to carry out sexual activity or to achieve specific outcomes in pain management. Responses were recorded on a 10-point scale ranging from (10) very uncertain to (100) very certain. Validity and reliability of the original version are supported in an arthritis sample with good internal consistency (Cronbach α ranging from 0.76 to 0.89) and satisfactory test-retest reliability.⁵³ However, the adapted version has not been fully validated. In this sample, analyses showed good internal consistency for the total score (Cronbach $\alpha = 0.89$) and subscales (Cronbach α ranging from 0.76 to 0.88). Factorial analyses yielded a factorial structure identical to that of the original scale.

Data Analysis

Pearson product moment correlations and descriptive statistics were computed for all study variables and examined to confirm assumptions required for further analysis (normality, homoscedasticity, multicollinearity), and also to identify potential covariates to further include in the regressions analysis. A series of multiple regressions were then conducted to evaluate the relative contribution of the significant correlates ($P \leq 0.05$) to the variance of intercourse pain as measured by the McGill Pain Questionnaire, and sexual functioning, as measured by the FSFI total score using a $P \leq 0.05$ level of significance. Owing to the exploratory purpose of this study, the choice of potential correlates to be included in the regressions analyses was based on correlation results, so that significant correlates were entered in the regression using the SPSS Enter method. The SPSS Enter method is well known to be more conservative and to represent a good way of controlling for spurious relations (eg, Ref. 54).

RESULTS

Final Sample Size

The final sample included 75 participants selected from a pool of 93 women assessed throughout the 2-year recruitment period. Of this initial pool, 13 women were excluded at the screening phase or during the gynecologic examination because of the presence of an infection or another dermatologic condition (eg, lichen sclerosis). No further data were collected from these women. Another 5 women filled out the questionnaires but were excluded because of missing data. *T* tests and χ^2 analyses confirmed that these 5 nonparticipants were not different from participants on any of the sociodemographic or dependent variables.

Sample Characteristics

Sociodemographic characteristics of the sample are presented in Table 1. Participants in this study were found to be fairly young, with a mean age of 27 years (*SD* = 6.1), and well educated, with a mean of 16 years of education (*SD* = 2.0). The majority of participants were in a committed relationship (61.3%). The mean relationship duration was 2.5 years (*SD* = 1.9). Participants also reported a mean pain duration of 5.7 years (*SD* = 4.9). These results are similar to those obtained in earlier studies on vestibulodynia.^{1,23,24}

Mean and *SD* scores on measures of global sexual functioning (FSFI), intercourse pain (MPQ-PPI), induced pain (VPI), state-trait anxiety (STAI), fear of pain (PASS), hypervigilance to pain (PVAQ), catastrophizing (PCS), and

TABLE 1. Sample Characteristics and Participants Scores on Dependent/Independent Variables

Characteristics	N or ×	SD or %
Age (y)	27	6.1
Education (y)	16	2.0
Cultural affiliation		
French Canadian	62	82.7
English Canadian	2	2.7
European	5	6.7
Others	6	7.9
Marital status		
Single	8	10.7
Dating	29	38.7
Cohabiting with partner	28	37.3
Married	10	13.3
Relationship duration	2.5	1.9
Pain duration (y)	5.7	4.9
VPI	7.50	1.96
MPQ-PRI	37.84	3.28
MPQ-PPI	3.28	1.092
FSFI	19.5	5.87
STAI-S	41.20	11.42
STAI-T	43.19	11.64
PASS	48.96	14.28
PVAQ	56.39	9.57
PCS	27.11	11.25
PISES	64.20	13.72

N = 75.

FSFI indicates Female Sexual Function Index; MPQ-PPI, McGill Pain Questionnaire-Present Pain Intensity; MPQ-PRI, McGill Pain Questionnaire-Pain Rating Index; PASS, Pain Anxiety Symptom Scale; PCS, Pain Catastrophizing Scale; PISES, Painful Intercourse Self-Efficacy Scale; PVAQ, Pain Vigilance and Awareness Questionnaire; STAI, State-Trait Anxiety Inventory; VPI, Vestibular Pain Index.

self-efficacy (PISES) can be found in Table 1. For dependant variables, the mean global sexual functioning score (mean = 19.5; *SD* = 5.87) suggests levels of sexual dysfunction in the clinical range (ie, clinical cutoff point = below 26) and is similar to scores reported in sexual dysfunction populations.⁴³ The mean score on the MPQ—PPI (mean = 3.28; *SD* = 1.09) indicates that women with vestibulodynia's experience of pain is comparable with that of individuals with chronic low-back pain and other musculoskeletal pain problems.^{27,28} Finally, the mean score on the VPI (mean = 7.50; *SD* = 1.96) is comparable with other studies in the field^{1,23,26} suggesting a representative sample of women with provoked vestibulodynia.

Zero-order Correlations Among Variables

Table 2 shows simple correlations between measures of pain, sexual functioning (dependant variables), state-trait anxiety, fear of pain, hypervigilance to pain, catastrophizing, and self-efficacy (independent variables). First, none of the sociodemographic variables correlated significantly with the dependent measures, including relationship and pain duration. Induced pain (VPI) was not found to be significantly correlated with any of the psychologic factors. Intercourse pain (MPQ-PPI) was significantly correlated with the PASS ($r = 0.33$, $\rho < 0.01$), PVAQ ($r = 0.30$, $\rho < 0.05$), PCS ($r = 0.36$, $\rho < 0.01$), and PISES ($r = -0.26$, $\rho < 0.05$). Finally, global sexual functioning (FSFI) was found to correlate significantly with state anxiety ($r = -0.26$, $\rho < 0.05$), the PASS—particularly the escape/avoidance subscale ($r = -0.28$, $\rho < 0.05$)—and the PISES ($r = 0.42$, $\rho < 0.001$). The correlation between intercourse pain and sexual functioning did not reach the significance level.

Correlates of Intercourse Pain

A multiple linear regression analysis was conducted to establish the relative contribution of each psychologic variable to intercourse pain (MPQ-PPI). As shown in Table 3, the independent variables were all added together to the regression model (PVAQ, PASS-full scale, PCS-full scale, and PISES-full scale) to evaluate their relative contribution to intercourse pain. The model significantly explained 15% of the variance in pain of women with provoked vestibulodynia [$F(4,70) = 4.18$, $P = 0.004$]. Examination of the β weights for this model indicated that only catastrophizing (PCS-full scale) contributed unique variance ($\beta = 0.29$, $P = 0.046$) to the prediction of intercourse pain.

Correlates of Sexual Functioning

The second linear regression analysis examined which psychologic variables were related to variations in global sexual functioning (FSFI)—the equivalent of functional disability in other chronic pain populations. As none of the sociodemographic variables correlated with the dependent variable, all potential correlates (STAI-S, PASS-escape/avoidance, and PISES-full scale) were entered together in the analysis. Results are shown in Table 4. The model accounted for 22% of the variance in global sexual functioning of women with vestibulodynia [$F(3,71) = 7.85$, $P = 0.00$]. Further examination of the β weights showed that only self-efficacy (PISES-full scale) contributed significant unique variance ($\beta = 0.31$, $P = 0.008$) to sexual functioning. A trend was also found for the PASS escape-avoidance ($\beta = -0.21$, $P = 0.06$).

TABLE 2. Zero-order Correlations Between Pain, Sexual Functioning, and Psychologic Variables

	MPQ-PPI	VPI	FSFI	STAI-S	STAI-T	PASS	PVAQ	PCS
VPI	0.21							
FSFI	-0.01	-0.03						
STAI-S	0.09	-0.05	-0.26*					
STAI-T	0.10	0.01	-0.19	0.64***				
PASS	0.33**	0.08	-0.28*	0.37**	0.35**			
PVAQ	0.30*	0.09	-0.12	0.28*	0.29*	0.42***		
PCS	0.36**	0.08	-0.14	0.33**	0.53***	0.59***	0.40***	
PISES	-0.26*	-0.21	0.42***	-0.27*	-0.40***	-0.42***	-0.26*	-0.23*

P* < 0.05, *P* < 0.01, ****P* < 0.001.

FSFI indicates Female Sexual Function Index; MPQ-PPI, McGill Pain Questionnaire-Present Pain Intensity; PASS, Pain Anxiety Symptom Scale; PCS, Pain Catastrophizing Scale; PISES, Painful Intercourse Self-Efficacy Scale; PVAQ, Pain Vigilance and Awareness Questionnaire; STAI, State-Trait Anxiety Inventory; VPI, Vestibular Pain Index.

DISCUSSION

This study is the first to assess the relative contribution of specific cognitive and affective variables to pain and associated sexual impairment in women with provoked vestibulodynia—a highly prevalent but understudied vulvo-vaginal pain condition. As a whole, results suggest that higher levels of hypervigilance to pain, fear of pain, catastrophizing and lower levels of self-efficacy are related to increased intercourse pain, thus confirming our initial hypothesis. Findings also reveal that only catastrophizing is an independent correlate of intercourse pain, indicating that catastrophic thinking is directly related to increased intercourse pain intensity. In addition, the pattern of relationships obtained in this diagnosis-specific sample is similar to that of results emanating from studies involving nonspecific medical diagnoses,^{12,14} which (1) lends support to a theoretical model of vestibulodynia as a pain disorder influenced among others by cognitive and affective factors and (2) suggests that these factors are also important in the explanation of specific nonmusculoskeletal pain problems. Indeed, results concerning the modulation of pain by hypervigilance, fear of pain, catastrophizing, and self-efficacy are consistent with those of earlier studies focusing on vulvodynia and chronic pain.

Of particular interest to this study is the finding that pain catastrophizing is the only variable to contribute unique variance in intercourse pain, suggesting that this factor plays an important role in the exacerbation of the experience of pain in women with vestibulodynia. This finding corroborates previous results reviewed by Keefe

et al,⁵⁵ showing that catastrophizing is the best predictor of pain intensity in several chronic pain populations. With regards to this study, this finding may be interpreted using the Communal Coping Model, whereby catastrophizing is conceptualized as a coping strategy that activates the individual’s social environment, for instance, by soliciting the partner’s supportive or punishing responses.^{55,56} It has been found that the association between catastrophizing and pain intensity is greater among patients cohabiting with their partner,⁵⁷ and pain catastrophizers tend to be more expressive when they experience pain in an interpersonal context as opposed to alone.⁵⁸ Interestingly, perceived supportive (solicitous) or punishing responses from significant others are associated with higher pain intensity in patients.^{57,59} Thus, in the context of a vulvo-vaginal pain elicited primarily within a highly intimate dyadic interaction, anticipation of the partner’s reaction may allow catastrophizing to have an impact on intercourse pain above and beyond the influence of other psychologic factors.

Contrary to our expectations, affective and cognitive variables did not significantly correlate with induced pain in women with provoked vestibulodynia. This is not coherent with findings in the chronic pain literature whereby higher catastrophizing, hypervigilance, and fear of pain have been associated with higher induced pain intensity.^{12,60} It is possible that even if the pain was intense, the time-limited and less emotionally charged context of the pain experience did not lead to pain-related fears such as those elicited during intercourse, where the pain builds over time and threatens one’s sexual activities and romantic relationship.

As for the sexual functioning outcome, results show that only state anxiety, fear of pain (escape/avoidance), and

TABLE 3. Results of Multiple Linear Regression Analysis With Intercourse Pain (MPQ-PPI) as Dependent Variable

	Standardized β	<i>P</i>
Step 1		
$\Delta R^2 = 0.15, F = 4.18, P = 0.004;$ PVAQ	0.104	0.400
PASS-total	0.043	0.774
PCS-total	0.294	0.046
PISES-total	-0.117	0.329

MPQ-PPI indicates McGill Pain Questionnaire-Present Pain Intensity (intercourse pain); PASS, Pain Anxiety Symptom Scale (fear of pain); PCS, Pain Catastrophizing Scale (catastrophizing); PISES, Painful Intercourse Self-Efficacy Scale (self-efficacy); PVAQ, Pain Vigilance and Awareness Questionnaire (hypervigilance).

TABLE 4. Results of Multiple Linear Regression Analysis With Global Sexual Functioning (FSFI) as Dependent Variable

	Standardized β	<i>P</i>
Step 1		
$\Delta R^2 = 0.217, F = 7.85, P = 0.000;$ STAI-S	-0.138	0.210
PISES-total	0.309	0.008
PASS-escape/avoidance	-0.214	0.062

FSFI indicates Female Sexual Function Index total score (global sexual functioning); PASS, Pain Anxiety Symptom Scale (fear of pain); PASS-escape/avoidance, Pain Anxiety Symptom Scale-subscale escape/avoidance (avoidance); PISES, Painful Intercourse Self-Efficacy Scale (self-efficacy).

self-efficacy significantly contributed to its variance, thus partially confirming our initial hypothesis. Indeed, it appears that the more women report becoming anxious, avoiding pain and having lower self-efficacy, the more they experience important sexual impairment. Furthermore, results show that only self-efficacy may be considered as an independent contributor to sexual functioning, although results also revealed a trend toward significance for fear of pain ($P = 0.06$). Interestingly, these findings concerning sexual impairment, or disability, do not corroborate the current state of evidence in the chronic pain literature, which indicates that catastrophizing, fear of pain, and hypervigilance lead to avoidance behavior which, in turn, leads to greater disability.¹² This may be partly explained by research showing that self-efficacy might be a stronger correlate of disability than the fear-avoidance variables.^{61,62} Indeed, a more recent study by Woby et al¹⁶ demonstrated that when the effect of self-efficacy is taken into account, fear of pain, hypervigilance, and catastrophizing are no longer significant contributors to pain disability, indicating that disability may be mediated by level of self-efficacy. These authors also suggest the inclusion of self-efficacy in the fear-avoidance model of chronic pain.

From a theoretical perspective, self-efficacy corresponds to the ability of an individual to organize and perform behaviors to achieve goals.⁶³ Thus, it refers both to the confidence in being efficacious in performing adequate behaviors and to the confidence in having a sense of control over events or our experience in performing these behaviors.⁶⁴ In the context of pain management, self-efficacy can be conceptualized as a set of beliefs held by an individual regarding his capacity to cope with his pain and to control it to some extent. Some chronic pain studies now show that giving individuals a choice of coping strategies increases pain tolerance, particularly for the ones reporting high self-efficacy, although not for those with low self-efficacy.^{65,66} Interestingly, it is thought that self-efficacy develops through childhood experiences.⁶³ Thus, these beliefs would typically precede the onset of the pain condition. In that sense, catastrophizing, avoidance, fear of pain, and hypervigilance may be influenced by vestibulodynia patients' beliefs about their ability to cope with threatening, pain eliciting situations, such as sexual intercourse. Self-efficacy could thus moderate the relation between fear avoidance variables and sexual impairment, which could explain the absence of results concerning the impact of these variables on sexual impairment in this research. Nevertheless, according to social learning theory,⁶³ self-efficacy beliefs are at least partly developed through personal experiences having accumulated over the long term. Consequently, it is also possible that repeated experiences of pain—for some women from their very first intercourse attempt—and persistent impaired sexual functioning may lead to poor self-efficacy beliefs about sexuality. Recurrent pain during intercourse could thus have a negative impact on perception of control over one's body and on sexual desire which may, in turn, negatively affect perception of self-efficacy of these women's overall ability to cope with vestibulodynia and to have a "normal" sex life.

This study has some limitations, each of which points toward directions for future research. First, data were collected from self-report measures, with their inherent biases including social desirability, retrospective recall, and shared method variance. However, this study aimed to explore constructs that are difficult to assess without self-

reporting, in particular because of the nature of the medical condition—vulvo-vaginal pain, and the main context in which it occurs—sexual activity. Second, the correlational and cross-sectional aspects of the design do not allow the establishment of causal inferences. It is thus important to consider that pain and impaired sexual functioning may lead to more fear-avoidance (anxiety, fear of pain, hypervigilance, and catastrophizing) and diminished self-efficacy. From a theoretical standpoint, some researchers have proposed a bidirectional relationship between psychologic factors, pain, and impaired sexual functioning.¹⁰ This is coherent with the fear-avoidance model of chronic pain whereby the impact of psychologic factors is conceptualized as part of a feedback loop in which the first pain experience leads to pain-related fear and avoidance which, in turn, lead to more intense pain and disability and so on.^{12,14} Third, we did not directly measure the time since the last sexual intercourse—a possible confounding variable considering that we asked participants to evaluate their pain and sexual functioning in reference to pain during intercourse in the last 6 months. Thus, future studies should consider including a question about this in the interview or ask participants to complete the MPQ with reference to the last sexual intercourse experience. Finally, correlation coefficients found in this study were all in the low to moderate range, with the explained variances in pain and sexual impairments ranging from 15% to 22%, respectively, which suggests that other factors than those investigated in this study may be important to consider. Consequently, the present findings must be interpreted with caution.

Despite the above limitations, the results of this investigation have a number of significant implications. From a theoretical standpoint, this research provides further support to the conceptualization of vestibulodynia as a pain disorder rather than as a sexual dysfunction. As a whole, results obtained in this study indicate that vestibulodynia-type pain appears to be influenced by similar psychologic factors as those playing a role in other chronic pain conditions, at least with regard to the clinical pain experience, that is, during intercourse. Furthermore, findings highlight the importance of reconsidering the actual classification of vestibulodynia as a sexual pain disorder (ie, dyspareunia) in the *Diagnostic and Statistical Manual of Mental Disorder-IV-TR*, classification that neglects to take into account the central symptom of this condition—pain—unfortunately focusing more on the activity with which it interferes—sex.¹⁷

These data also have broader implications concerning the experience of pain. Indeed, the differences observed between the fear-avoidance model of chronic musculoskeletal pain and the results obtained in this study raise questions about the universality of this model. First, vestibulodynia is viewed as a possible inflammatory and/or neuropathic pain problem for which the causes seem to be multiple and not related to an identified injury. Thus, these women may not be able to understand what is happening to them—an experience generating a good dose of uncertainty, which has been associated with higher anxiety.²⁹ Moreover, a recent population-based study has shown that only 60% of vestibulodynia patients seek help from a physician, of which only 40% receive a proper diagnosis.⁶⁷ It is not surprising, then, that beliefs about their self-efficacy may become important in the variation of their sexual functioning disability. Taking this into account,

perhaps the fear-avoidance model applies less to situations in which the cause of the pain cannot be easily explained by the patients themselves and by the health professionals treating them. Findings of this study highlight the need to further study self-efficacy in relation to other psychological pain-related factors.

Finally, our data shed new light on the impact of the relational context of the pain experience. Vulvo-vaginal pain is probably the most “relational” of all types of pain by its occurrence during a sexual interaction. In this context, pain is not only present, but interferes directly with activities supposed to fulfill affective needs of the individual and maintain intimacy in the couple relationship. Thus, results of this study may be particularly relevant to pain problems that are embedded in a relational context such as vulvodynia, female and male pelvic pain, because they suggest that individual psychological factors are important but not sufficient to clearly understand such conditions. Moreover, findings are in line with recent pleas to investigate further the broader influence of relationship variables on disease and nondisease-related pain and emphasize the need to study the social context of pain.⁶⁸

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