Provoked Vestibulodynia and the Health Care Implications of Comorbid Pain Conditions

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Abstract

Objective: Sexual pain secondary to provoked vestibulodynia (PVD) is a chronic pain condition affecting up to 16% of women. Women with PVD may report other chronic pain conditions. The goals of this study were (1) to identify the prevalence of self-reported chronic pain conditions in a sample of women with a diagnosis of PVD and seeking treatment, and (2) to compare demographic and clinical characteristics and health care needs of women with PVD alone and women with PVD and two or more self-reported chronic pain conditions.

Methods: We assessed the characteristics of 236 women with PVD alone and 55 women with PVD and comorbid chronic pain using a standardized questionnaire, the Beck Depression Inventory, the State-Trait Anxiety Inventory, the Pain Vigilance and Awareness Questionnaire, and the Female Sexual Distress Scale.

Results: Compared with women with PVD alone, women with PVD and other concurrent pain reported a significantly longer duration of pain, pain radiating to other parts of the vulva, and pain interfering in a variety of daily activities. This group was also significantly more likely to have seen more gynaecologists, and to have had more office visits with their gynaecologist than women with PVD alone. They were more likely to have tried anticonvulsants, antidepressants, and stress/relaxation therapy for their PVD and were also more likely to have allergies and skin sensitivities. Finally, this group of women had higher symptoms of depression, trait anxiety, and showed a trend towards more pain vigilance.

Conclusion: Taken together, these findings suggest that physicians caring for women with PVD and concurrent chronic pain must be alert to the potentially greater health needs among this subsample of women.

Key Words: Provoked vestibulodynia, vulvodynia, genital pain, health care needs, health disparities, sexual dysfunction

Competing Interests: None declared.

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Résumé

Objectif : La douleur sexuelle attribuable à la vestibulodynie provoquée (VDP) est un trouble de douleur chronique qui affecte jusqu'à 16 % des femmes. Les femmes qui présentent une VDP pourraient en venir à signaler d'autres troubles de douleur chronique. Cette étude avait pour objectif (1) d'identifier la prévalence des troubles de douleur chronique auto-signalés au sein d'un échantillon de femmes ayant obtenu un diagnostic de VDP et cherchant à obtenir un traitement; et (2) de comparer les caractéristiques démographiques et cliniques et les besoins en soins de santé des femmes qui ne présentent qu'une VDP et des femmes qui présentent une VDP et au moins deux troubles de douleur chronique auto-signalés.

Méthodes : Nous avons évalué les caractéristiques de 236 femmes ne présentant qu'une VDP et de 55 femmes présentant une VDP et une douleur chronique comorbide au moyen d'un questionnaire standardisé, de l'Inventaire de dépression de Beck, du *State-Trait Anxiety Inventory*, du *Pain Vigilance and Awareness Questionnaire* et de la *Female Sexual Distress Scale*.

Résultats : Par comparaison avec les femmes qui ne présentaient qu'une VDP, les femmes qui présentaient celle-ci et une autre douleur concomitante ont signalé une douleur d'une durée significativement prolongée, une douleur irradiant vers d'autres parties de la vulve et une douleur nuisant à diverses activités de la vie quotidienne. Les femmes de ce groupe étaient également significativement plus susceptibles que les femmes ne présentant qu'une VDP d'avoir consulté un plus grand nombre de gynécologues et de s'être rendues un plus grand nombre de fois au cabinet de leur gynécologue. Elles étaient plus susceptibles d'avoir fait l'essai d'anticonvulsivants, d'antidépresseurs et d'une thérapie anti-stress / de relaxation pour contrer leur VDP, et également plus susceptibles de connaître des allergies et des sensibilités cutanées. Enfin, les femmes de ce groupe présentaient des symptômes accrus de dépression, une anxiété réactionnelle et une tendance envers une vigilance accrue en ce qui concerne la douleur.

Conclusion : Considérées dans leur ensemble, ces constatations semblent indiquer que les médecins qui offrent des soins à des femmes qui présentent une VDP et une douleur chronique concomitante doivent être sensibles aux besoins de santé potentiellement accrus au sein de ce sous-groupe de femmes.

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INTRODUCTION

Provoked vestibulodynia, a type of vulvodynia, is a chronic pain disorder with an estimated prevalence of 8% to 16%.[1,2] PVD is the most common cause of painful intercourse in premenopausal women, and it has a profound negative effect on a woman's sexual health, her emotional well-being, and on her relationship with her partner.[3–7] Furthermore, women with vulvodynia may report multiple other chronic pain conditions that adversely affect health, such as fibromyalgia, irritable bowel syndrome, interstitial cystitis/painful bladder syndrome, temporomandibular joint disorder, chronic fatigue syndrome, migraine headache, and multiple chemical sensitivities.[8–15] These pain conditions are often found together and are termed "chronic overlapping pain conditions" according to the National Institutes of Health workshop on the topic.

Recent research exploring the relationship between PVD and other chronic pain conditions has shown that women with fibromyalgia, interstitial cystitis, or irritable bowel syndrome are 2.3 to 3.3 times more likely to have vulvodynia than women with no chronic pain at all.[9] This odds ratio increases to > 5 as the number of comorbid pain conditions increases to three or more.[9] Likewise, the presence of vulvodynia increases risk (odds ratio 2.3 to 3.4) of suffering from one or more other chronic pain conditions.[9] In fact, Nguyen and colleagues[16] found that 45% of women with vulvodynia also self-reported one or more of the following pain conditions: chronic fatigue syndrome, endometriosis, fibromyalgia, interstitial cystitis, or irritable bowel syndrome.

Despite anecdotal evidence, research on the impact of multiple pain conditions, including PVD, on a woman's overall health is limited. Nguyen et al. found that women with vulvodynia and one or more comorbid pain conditions self-reported significantly higher levels of invalidation and isolation than their counterparts with no comorbid pain.[16]

ABBREVIATIONS

BDI	Beck Depression Inventory
CBT	cognitive-behavioural therapy
COPC	chronic overlapping pain conditions
FSDS	Female Sexual Distress Scale
IBS	irritable bowel syndrome
IC	interstitial cystitis
MVP	Multidisciplinary Vulvodynia Program
PBS	painful bladder syndrome
PVAQ	Pain Vigilance and Awareness Questionnaire
PVD	provoked vestibulodynia
STAI	State-Trait Anxiety Inventory

Furthermore, these perceptions were shown to increase with the number of comorbid pain disorders. Given that treatment of vulvodynia alone is multi-faceted, long-term, and is usually individualized for every woman,[17] dealing with one or more chronic pain conditions in addition to vulvodynia adds additional complexity. The goals of this study were therefore:

1. to identify the prevalence of two or more self-reported chronic pain conditions in a sample of women with a diagnosis of PVD and seeking treatment; and
2. to compare the demographic and clinical characteristics and the health care needs of women with PVD alone to those of women with PVD and two or more self-reported chronic pain conditions.

METHODS

The original study sample included 316 women with a diagnosis of PVD who participated in a Multidisciplinary Vulvodynia Program from 2008 to 2013. Women included in the MVP were between the ages of 18 to 45 years, were premenopausal, had had dyspareunia secondary to PVD for at least six months, and were able to participate in group educational sessions. Women whose complaint was primarily unprovoked chronic vulvovaginal discomfort and women whose dyspareunia was likely due to another etiology (e.g., lichen sclerosus) were excluded.

Participants in this study completed questionnaires immediately before their participation in the MVP. No remuneration was provided. The characteristics of women with PVD who reported two or more COPCs were compared to those of women with PVD and no concurrent pain. We excluded women with PVD and one other COPC, because our data were self-reported and we wanted to ensure two distinct populations: one with a chronic pain syndrome (multiple coexisting chronic pain conditions) and one without. Although data were obtained through self-reporting, chronic pain history was verified during the gynaecologist's diagnostic assessment. All participants provided written consent.

Women were identified as having COPCs if, in addition to PVD, they reported having two or more of the following pain conditions (provided on a checklist on their intake questionnaire): fibromyalgia, interstitial cystitis, irritable bowel syndrome, temporomandibular joint pain, or chronic headache. While coexisting endometriosis and vulvodynia has been the focus of some research,[16] endometriosis was not considered to be a COPC in our study because it often presents with tangible findings on clinical examination and has been associated with retrograde menstruation as

an underlying cause.[18] Chronic fatigue was also excluded because it can be diagnosed without the presence of chronic pain.[19]

We used a standard questionnaire with investigator-derived items to obtain information regarding PVD characteristics, demographics, medical history, and pain history. A subset of the larger sample who completed a more extensive version of the questionnaire also completed information regarding previous visits to health care professionals, medication use, and allergies.

We measured the degree to which women's vulvovaginal pain symptoms interfered with her daily life activities, including aerobic activity, caring for children, clothing choices, cycling, employment, household chores, sexual foreplay, sitting, sleeping, tampon use, having a genital examination, and walking, and women reported the degree of interference as "not at all," "limited," or "extremely limited."

We used the Beck Depression Inventory[20] to assess symptoms of depression. The BDI is a 21-item self-reported questionnaire that is sensitive to treatment effects on severity of depressive symptoms. Each item is rated along a four-point scale (0 to 3), with higher numbers reflecting increasing depressive severity, and total BDI scores ≥ 15 denoting probable depression. In a sample of college students, the internal consistency was excellent at 0.90, and concurrent validity was good ($r = 0.76$).[21]

The State-Trait Anxiety Inventory (STAI)[22] is a validated measure of dispositional and in-the-moment anxiety. The STAI has 20 items in each of two subscales (state and trait) with items rated on a four-point Likert scale.

Pain hypervigilance was measured by the 16-item Pain Vigilance and Awareness Questionnaire, which is found to have good internal consistency (Cronbach $\alpha = 0.86$).[23] Over a two-week period, test–retest reliability was found to be high ($r = 0.80$). Roelofs et al.[24] found the reliability and validity of the PVAQ to be supported among three samples of fibromyalgia patients. Furthermore, strong convergent validity has been found between PVAQ scores and other pain related self-report constructs. A higher total score reflects more vigilance to pain.

We measured sex-related distress using the Female Sexual Distress Scale.[25] The FSDS is a 12-item self-reported questionnaire with scores that can range from 0 to 48, with higher scores representing higher levels of distress. The FSDS has been shown to have good discriminant validity in differentiating between sexually dysfunctional and functional women, with 88% correct classification rate, and a clinical cut-off score of 15.[25] The FSDS has satisfactory internal consistency (ranging from 0.86 to 0.90), excellent test–retest reliability over 4 weeks (0.91), and moderate correlations with other measures of nonsexual distress.

Between-group comparisons were carried out using SPSS 19.0 (IBM Corp., Armonk NY). All questions with categorical responses were analyzed with chi-square tests and those with continuous data were analyzed with independent sample *t* tests comparing the concurrent PVD and chronic pain group to the PVD alone group. In all cases a two-tailed test was performed with alpha set at 0.05.

All procedures were approved by the Clinical Research Ethics Board of the University of British Columbia as well as the Vancouver Coastal Health Research Institute.

RESULTS

Of 316 women with a diagnosis of PVD, we included 291 women with either no chronic pain or two or more chronic pain conditions in our analyses. Of these 291 women, 55 (18.9%) reported having multiple COPCs, and the remaining 236 women (81.1%) had no concurrent chronic pain. Twenty-five of the initial 316 women reported having PVD with one other chronic pain condition and were excluded from analysis.

The groups differed significantly in age, with the self-identified COPC group being older on average (31.2 ± 6.7 years, mean $\pm$ SD) than the women without any concurrent pain (28.4 ± 6.3 years; $P = 0.003$). There were no significant group differences in marital status, and the average relationship length was 5.6 ± 5.4 years. The majority of women (52.6%) in our analysis were married or living in a common-law relationship. The sample was well-educated, with 93.1% having at least some post-secondary education, and 58.4% having completed a four-year university degree or higher. In total, 39.9% of women had an annual household income > $60 000 per year. There were no significant group differences for level of education or annual income. Most participants were Euro-Canadian (70.8%) and heterosexual (90.0%), with no significant subgroup differences for either ethnicity or sexual orientation (Table 1).

There were no significant subgroup differences in PVD type (primary versus secondary). Women with COPCs experienced a significantly longer duration of PVD symptoms (97.5 ± 91.6 months) compared to their counterparts with no concurrent pain (67.6 ± 64.7 months ($P = 0.027$). Despite this difference, the average length of time with PVD before diagnosis was not significantly different between the groups. The COPC group was

Table 1. Characteristics of women with PVD from the total sample, women with PVD alone, and women with PVD and multiple COPCs

	Total sample N = 291	PVD alone n = 236	PVD and COPCs n = 55
Mean age, years (± SD)*	28.9 ± 6.4	28.4 ± 6.3	31.2 ± 6.7
PVD type acquired			
Lifelong, n (%)	47.4 (35.0)	47.5 (35.6)	45.4 (32.7)
Mean length of relationship, months (± SD)	66.9 ± 64.6	64.6 ± 64.6	77.9 ± 64.6
Marital status, %			
Single or dating	41.6	42.8	36.4
Married	34.7	33.9	36.4
Common-law	18.2	17.4	21.8
Separated	2.7	3.0	1.8
Divorced	2.4	2.1	3.6
Sexual orientation, %			
Heterosexual	90.4	90.2	89.1
Bisexual	4.1	5.1	0
Lesbian	0.3	0.4	0
Ethnicity, %			
Euro-Canadian	71.1	67.8	83.6
East Asian	10.0	11.0	5.4
Indo-Canadian	5.1	5.1	5.4
Hispanic	2.1	2.5	0
African-Canadian	1.4	1.7	0
Persian	1.7	1.7	1.8
First Nations	0	0	0
Other	5.8	6.8	1.8
Formal education, %			
Some high school	0.7	0.4	1.8
Graduated high school	6.2	6.8	3.6
Some college	20.3	19.9	21.8
2 years college	14.4	14.8	12.7
4 years college	32.3	32.2	30.9
Post-graduate degree	26.1	25.8	27.3
Annual income, $, %			
< 20 000	17.5	19.1	10.9
20 000 to 39 999	14.4	14.0	16.4
40 000 to 59 999	17.9	18.6	14.5
60 000 to 79 999	12.4	11.9	14.5
80 000 to 99 999	9.3	9.3	9.1
> 100 000	18.2	17.4	21.8

Note: percentages may not add up to 100 because of missing data

*Significant group differences, $P < 0.01$

Table 2. Pain characteristics of women with PVD from the total sample, women with PVD alone, and women with PVD and multiple COPCs

	Total sample N = 291	PVD alone n = 236	PVD and COPCs n = 55
Mean duration of PVD symptoms, months (± SD)	73.4 ± 71.5	67.6 ± 64.7	97.5 ± 91.6
Mean duration of PVD symptoms until diagnosis, months (± SD)	46.0 ± 54.8	42.1 ± 48.7	61.5 ± 73.0
Ever been free of symptoms since onset (%)	20.6†	19.9†	23.6†
Symptoms constant/all the time (%)*	14.8	12.9	25.4
Symptoms intermittent (%)**	25.1	21.2	41.8
Symptoms cyclic (monthly) (%)*	15.5	13.1	25.4
Pain with any touch/pressure on vulva (e.g., tight clothing)*	44.7	41.1	60.0
Pain with non-penetrative sexual activity**	43.3	39.0	61.8
Pain with penetrative sexual activity	94.2†	94.1	94.5†
Pain radiates to other areas*	32.0†	29.2†	43.6†
Pain deep in pelvis (%)	33.3†	32.2†	38.2†

Significant group differences: *$P < 0.05$; **$P < 0.01$

†Percentages may underestimate true proportions because of missing data.

significantly more likely to experience symptoms constantly ($P = 0.019$), intermittently ($P = 0.003$), and in a cyclic/monthly fashion ($P = 0.036$) than the group without any concurrent pain (Table 2).

Most women in the sample (94.5%) reported pain with penetrative sexual activity and this frequency did not vary between groups. (The remaining 5.5% were not engaged in penetrative sexual activity.) Compared with those without other pain, women with COPCs experienced significantly more pain with any touch or pressure to the vulva ($P = 0.015$), more pain with non-penetrative sexual activity ($P = 0.002$), and more pain radiating to other areas of the vulva ($P = 0.031$) (Table 2).

In terms of interference with daily activities, women in the COPC group were significantly more likely to experience interference with aerobic exercise ($P < 0.031$), caring for children ($P = 0.027$), choice of clothing ($P = 0.001$), cycling ($P = 0.01$), employment ($P < 0.001$), sitting ($P = 0.004$), sleeping ($P = 0.008$), and tampon use ($P = 0.043$). There were no group differences in the degree to which pain interfered with doing household chores, sexual foreplay, sexual penetration, having a gynaecological examination, or walking.

Information on women's self-reported physician visits is summarized in Table 3. Women with COPCs reported seeing an average of 3.5 ± 2.6 gynaecologists regarding their vulvodynia, significantly more than the average 1.5 ± 1.2 gynaecologists seen by women without concurrent pain ($P = 0.034$). Women in the COPC group had also visited their gynaecologists a mean of 5.0 ± 3.9 times, significantly more often than their non-COPC counterparts (2.7 ± 2.5; $P = 0.025$). Overall, and for both groups of women, there were more visits regarding pain to a family doctor than to any other health care provider.

Women were asked about past use of medications or therapies commonly prescribed for the treatment of vulvodynia (Table 4). Women with COPCs were significantly more likely to have tried anticonvulsants ($P = 0.001$), antidepressants ($P < 0.001$), and stress/relaxation therapy ($P = 0.008$) than women with no concurrent chronic pain.

Significantly more women in the COPC group reported experiencing food allergies ($P = 0.02$) (Table 5). This group of women was also significantly more likely to follow a specific type of diet than women without other chronic pain ($P = 0.001$). While there were no subgroup differences in skin, scalp, hair, or nail complaints, skin sensitivities (e.g., to soaps and perfumes) were significantly more prevalent among women in the COPC group ($P = 0.01$). There were no significant differences between groups in reports of environmental allergies and no significant subgroup differences for drug allergies.

However, the COPC group exhibited significantly higher depressive symptoms than their counterparts without concurrent pain ($P = 0.045$) (Table 6). There was also significantly more trait anxiety in the women reporting COPCs than in women with PVD alone ($P = 0.022$). No significant difference was found between the groups in reported sexual distress.

Table 3. Number of physician visits in the total sample, women with PVD alone, and women with multiple COPCs, shown as mean ± SD

	Ever seen for symptoms of dyspareunia?*		Total sample N = 291	PVD alone n = 236	PVD and COPCs n = 55
Family doctor	88.5%	Total no. seen	1.6 ± 1.2	1.5 ± 1.1	2.2 ± 1.5
		Total no. visits	4.0 ± 4.6	4.2 ± 4.8	2.9 ± 1.8
Gynaecologist	86.9%	Total no. seen†	1.7 ± 1.5	1.5 ± 1.2	3.4 ± 2.6
		Total no. visits†	2.9 ± 2.7	2.7 ± 2.5	5.0 ± 3.9
Dermatologist	6.6%	Total no. seen	0.07 ± 0.3	0.06 ± 0.3	0.1 ± 0.3
		Total no. visits	0.08 ± 0.4	0.08 ± 0.4	0.06 ± 0.25
Alternative medicine practitioner	15.6%	Total no. seen	0.12 ± 0.4	0.12 ± 0.4	0.13 ± 0.3
		Total no. visits	0.60 ± 3.1	0.44 ± 2.2	1.7 ± 6.2
Physiotherapist	27.0%	Total no. seen	0.26 ± 0.57	0.22 ± 0.51	0.54 ± 0.88
		Total no. visits	1.2 ± 3.0	1.2 ± 3.1	0.75 ± 1.4
Counsellor	17.2%	Total no. seen	0.16 ± 0.45	0.14 ± 0.40	0.29 ± 0.73
		Total no. visits	0.50 ± 1.8	0.44 ± 1.6	0.92 ± 3.3
Other	12.3%	Total no. seen	0.22 ± 0.76	0.20 ± 0.76	0.27 ± 0.80
		Total no. visits	0.18 ± 0.67	0.16 ± 0.61	0.31 ± 1.0

Note: percentages may underestimate true proportions because of missing data

*Information on physician visits was obtained from a subset of the entire sample (n = 122)

†Significant difference between groups: $P < 0.05$

DISCUSSION

Previous research has explored the prevalence and psychosocial impact of concurrent pain disorders in women with PVD,[9,16] but their experience with PVD and the health care system has not been explored. We assessed 291 premenopausal women with physician-confirmed PVD using online questionnaires. We found that women with PVD and multiple COPCs generally have a greater burden of pain symptoms, use more medication, pay more visits to their gynaecologists, and have more allergies and sensitivities than their counterparts with isolated PVD.

The most prevalent self-reported comorbid pain disorders in our sample of women with PVD were IBS (12.71%) and chronic headaches (10.65%). IC (8.25%), temporomandibular joint disorder (7.90%), and fibromyalgia (2.75%) were also commonly reported. Although we found lower rates of comorbid pain in PVD patients than previously reported, they still fit the general prevalence trend. For instance, Nguyen et al. described a self-reported prevalence of 25.3% for IBS, 17.5% for IC, and 12.6% for fibromyalgia in a sample of women with vulvodynia.[16] In contrast, the prevalences of IBS, IC, and fibromyalgia in the general female population have been reported as 14%,[26] 2.70-6.53%,[27] and 4.9%,[28] respectively. Thus, while IBS has been shown to be one of the most common comorbid pain disorders in women with PVD, our results now show that chronic headaches are also frequently reported in these women.

We also found that women with COPCs were older, on average, than their counterparts with PVD alone. This is not surprising, given the strong association between older age and incidence of chronic pain.[29–31] Nevertheless, there was no significant difference in duration of PVD symptoms between the two groups. This may have been because women with comorbid pain experience a later onset of PVD symptoms than their counterparts with PVD alone. However, there was no difference in the proportion of primary versus secondary PVD in the two groups.

Women with PVD and multiple COPCs reported significantly more visits to a gynaecologist regarding their PVD, and visited a greater total number of gynaecologists than women without COPCs. This may indicate an increased burden of PVD in women with multiple comorbid pain conditions. It is possible that women with PVD and other comorbid pain require more complex care and consequently need multiple visits to their gynaecologist. Increased levels of invalidation in women with PVD and comorbid pain may be due to misdiagnosis (or lack of diagnosis) by physicians,[16] but our findings suggest that this may not be the case in our sample. Regardless, it is plausible that women with COPCs are not satisfied with the care they are receiving, causing them to seek care from multiple gynaecologists. Future research

Table 4. Medication use in the total sub-sample, women with PVD alone, and women with multiple COPCs

	Total sub-sample*† n = 122 %	PVD alone† n = 104 %	PVD and COPCs n = 18 %	*P*
Topical xylocaine gel	42.6	43.3	33.3	0.44
Antifungal (vaginal)	35.2	34.6	38.9	> 0.99
Corticosteroid creams	30.3	26.9	50.0	0.10
Antifungal (oral)	26.2	25.0	27.8	> 0.99
Education regarding pain signals	24.6	24.0	27.8	> 0.99
Antidepressants	23.8	16.3	61.1	< 0.001
Physiotherapy	22.9	21.1	33.3	0.37
Estrogen cream	22.9	22.1	27.8	0.77
Dietary change	19.7	16.3	38.9	0.06
Non-prescription analgesics	13.9	12.5	22.2	0.30
Antibiotics (oral)	13.1	11.5	16.7	0.70
Counselling	13.1	10.6	27.8	0.13
Barrier creams	12.3	12.5	11.1	> 0.99
Stress/relaxation therapy	11.5	7.7	33.3	0.008
Antibiotics (vaginal)	11.5	12.5	5.6	0.69
Oral anticonvulsants	8.2	3.8	33.3	0.001
Herbs/vitamins	7.4	6.7	11.1	0.63
Prescription analgesics	6.6	4.8	16.7	0.11
Relationship therapy	6.6	4.8	16.7	0.11
Sexual counselling	5.7	5.8	5.6	> 0.99
Surgery	4.9	4.8	5.6	> 0.99
Progesterone cream	1.6	1.0	5.6	0.29
Testosterone cream	1.6	1.9	0.0	> 0.99
Anti-herpes medication (oral)	0.8	1.0	0.0	> 0.99
Botox injections	0.0	0.0	0.0	N/A
Group cognitive-behavioural therapy	0.0	0.0	0.0	N/A

*Information on medication use was obtained from a subset of the sample (n = 122)

†Percentages may underestimate true proportions because of missing data

should focus on the reasons why these women access the health care system more frequently than other women with PVD. Women with PVD and comorbid pain had used antidepressants, oral anticonvulsants, and stress/relaxation therapy significantly more often than women with PVD alone, but these three therapies are frequently used in the management of other chronic pain disorders.[32–35] We cannot determine whether the prescription of antidepressants was for pain relief or for depressive symptoms; the latter is likely, given the higher prevalence of depression in the COPCs group. None of our participants had taken part in group cognitive-behavioural therapy, yet this is one of the most effective non-pharmacological treatments for chronic pain.[36] This finding may reflect the cost of CBT, a lack of availability, or lack of knowledge by referring physicians that this is an effective treatment.

We found that women with multiple chronic pain disorders reported significantly more skin and food sensitivities than women with PVD alone. Not surprisingly, the COPC group was also more likely to follow a specific diet than their counterparts. The prevalence of environmental allergies did not differ between the groups; however, the reported prevalence in the entire cohort was high (42.3%). Although Harlow and Gunther Stewart found a correlation between seasonal allergies and vulvodynia,[2] our data suggest that the presence of COPCs may not increase the prevalence of allergies. Allergies and skin sensitivities have been associated with other chronic pain disorders such as IC,[37] but research comparing allergies in populations with comorbid pain versus populations with only one chronic pain disorder is lacking. Rates of self-reported skin and food sensitivities were increased

Table 5. Proportions of women with self-reported allergies in the total sample, women with PVD alone, and women with multiple COPCs

	Total sample* N = 291 %	PVD alone* n = 236 %	PVD and COPCs n = 55 %	*P*
Problems with skin, scalp, hair, and/or nails	32.6	30.5	41.8	0.11
Skin sensitivities to soaps, perfumes	36.1	32.6	50.9	0.01
Use of any specific diet	27.8	22.9	49.1	< 0.001
Drug allergies	24.4	22.5	32.7	0.11
Food allergies	22.3	19.5	34.5	0.02
Environmental allergies	42.3	40.7	49.1	0.29

*Percentages may underestimate true proportions because of missing data

Table 6. Mean scores for depressive symptoms (BDI), anxiety (STAI), pain vigilance and awareness (PVAQ), and sex-related distress (FSDS) in the total sample, women with PVD alone, and women with multiple chronic overlapping pain conditions (COPCs), shown as mean ± SD

	Total sample* N = 291	PVD alone* n = 236	PVD and COPCs n = 55	*P*
BDI	10.5 ± 7.7	9.8 ± 7.2	14.8 ± 9.6	0.05
STAI (trait anxiety)	42.8 ± 10.8	42.0 ± 10.6	46.1 ± 11.5	0.02
STAI (state anxiety)	40.6 ± 11.0	40.28 ± 11.2	41.94 ± 10.0	0.29
PVAQ	40.5 ± 12.9	39.8 ± 12.8	43.3 ± 12.8	0.07
FSDS	30.9 ± 10.6	30.9 ± 10.2	30.5 ± 12.2	0.22

*Numbers may not represent true proportions due to missing data

Measure ranges: BDI: 0 to 63; STAI: 20 to 80; PVAQ: 0 to 80; FSDS: 0 to 48

among women with COPCs, but drug and environmental allergies were not; this may have implications for the underlying pathophysiology of vulvodynia in association with multiple chronic pain conditions, and should be further explored.

Women with COPCs were significantly more likely to report constant vulvar pain, intermittent pain, and cyclic symptoms than women with PVD alone. While the concurrent significance of all three symptom patterns seems counterintuitive, it shows the diversity of the pain experience among women with COPCs. It is also possible that women with comorbid pain are more vigilant about PVD symptoms than women without COPCs, generating a heightened awareness of potential patterns. We assessed hypervigilance to pain using the PVAQ and found no significant differences between the groups, suggesting that vigilance alone is not responsible for the increased awareness of vulvar pain in the COPCs group. It is also possible that women in the COPC group may have had a higher prevalence of undiagnosed endometriosis, given the association between PVD and endometriosis.[16] This, in turn, could lead to increased occurrence of vulvar pain in this group.

The COPC group also reported significantly more pain with any touch or pressure to the vulva, pain with non-penetrative sexual activity, and pain radiating to other areas. Thus, it appears that the overall PVD pain experience of women with overlapping pain conditions is intensified compared to women with PVD in isolation. Other studies have shown that pain, in general, is increased as the number of comorbid pain conditions increases. Nickel et al. showed that the pain associated with IC increased with concurrent IBS and chronic fatigue syndrome.[38] Similarly, Peters et al. found that levator pain in patients with IC was significantly greater in those with comorbid vulvodynia.[11] Further research examining these pain correlations in overlapping chronic pain conditions is indicated.

Our finding of significantly increased levels of depression in women with COPCs is consistent with previous research showing that women with PVD and comorbid chronic pain experienced higher levels of invalidation and isolation than their counterparts without concurrent pain. Physicians should therefore be equipped with resources for managing these increased depressive rates in this population of women.

Trait anxiety has been shown to correlate with both pain severity and disability in patients with chronic pain.[39] We found that women in the COPC group had significantly more trait anxiety than women with isolated PVD. This correlation has been shown before in women with PVD and orofacial pain[15] but not in women with multiple COPCs. It is unclear whether this trait anxiety preceded the onset of pain symptoms or followed it, but this finding suggests that women with COPCs have a higher need for psychological support than women with PVD alone.

Several mechanisms have been proposed to explain the pathophysiology of PVD,[40] although central sensitization is a favoured explanation.[41] Central sensitization refers to a dysregulation of the central nervous system in which normally non-noxious stimuli are interpreted as painful by the CNS.[10,40,42] In addition, the CNS response to noxious stimuli is greatly amplified so that the perception of low levels of pain is intensified.[40] Previous research showing that women with vulvodynia have greater pain sensitivity in both vulvar and peripheral regions than controls supports this idea of altered central pain processing.[43] Central sensitization has also been proposed as underlying many chronic pain disorders such as fibromyalgia, IBS, and temporomandibular joint disorder.[40,44–48] Indeed, the fact that chronic pain disorders present comorbidly much more often than would be expected by chance supports this hypothesis.[40] In our study, women with COPCs reported significantly more pain with any touch to the vulva than those with PVD alone. This is consistent with the central sensitization hypothesis, in which any touch can be misinterpreted by the CNS as painful. Thus, central sensitization appears to be implicated in both isolated PVD and in women with PVD and COPCs. Women with COPCs also experienced higher rates of pain radiating to other areas; this may reflect the receptive field expansion seen in central sensitization.[42] Thus, although our findings support the central sensitization hypothesis as an etiology of PVD in women with multiple coexisting pain disorders, it remains unclear to what extent central sensitization underlies the etiology in women with PVD alone. Zolnoun et al. have suggested that the underlying mechanism of PVD may differ in various groups of women, given the range of symptoms and response to therapy seen in clinical practice.[41]

Our findings have several clinical implications. Women presenting with PVD should be assessed for coexisting chronic pain conditions, particularly because women in this subgroup report that their pain interferes more extensively in many of their daily life events. This suggests that clinicians should validate the self-reported chronic pain of women with PVD in order to classify them into a particular category. This includes consulting previous medical records and obtaining a thorough history of symptoms. When possible, clinicians should also use standardized objective measures of assessment when a previously undiagnosed pain condition is suspected. For instance, the BDI has been used as a validated measure of depression; however, for other pain conditions where such measures are not available (such as IC) and specific medical procedures may be required, gynaecologists and other clinicians should refer the patient to the appropriate professional for a definitive diagnosis.

Differentiating between chronic pain and a chronic pain syndrome also has implications for the management of women with PVD. Our findings suggest that those with PVD and COPCs not only experience a greater burden of vulvar pain, but are more likely to be affected by their vulvar pain in everyday life than those with PVD alone. This has implications for treatment of PVD. While topical creams, oral medications, and pelvic floor physiotherapy are commonly used in the management of PVD, CBT has been shown to be the most effective treatment for chronic pain sufferers in general.[36] Psychological therapy reduces pain severity, depressed mood, and interference with activity[49]; each of these has been shown here to be more prevalent in women with COPCs than women with PVD alone. Given these findings, it may be beneficial for gynaecologists and other health care providers to recommend psychological therapy as first-line treatment to women with PVD and coexisting pain suggestive of a chronic pain syndrome. However, it must be noted that the cost of such therapy and limited access to appropriately qualified professionals can be barriers.

We recommend that physicians screen for psychosexual dysfunction in all patients with PVD. The increased rates of depression and trait anxiety among women with coexisting pain, and the negative effects this can have on health and the outcome of treatment,[50,51] warrant a careful psychological assessment in these women. Health care providers should refer women with COPCs and coexisting anxiety and/or depression to the appropriate health care professional, and should inform the patient that addressing these psychological conditions is an important and legitimate part of chronic pain management.

Previous research has explored the prevalence and psychosocial impact of concurrent pain disorders in women with PVD,[9,16] but not their experience with PVD and the health care system. Our findings revealed that, overall, women with PVD and multiple COPCs generally experience a greater burden of pain symptoms, use more medication, pay more visits to their gynaecologists, and

have more allergies and sensitivities than their counterparts with isolated PVD.

This study has some limitations. First, our study sample was a population of treatment-seeking women who were able and willing to participate in our program. The characteristics of these women may differ from those who have not sought therapy for their vulvar pain, and thus may not be representative of the larger population of women with PVD. It is also important to note that the women in our study had a high level of education, and our study population may thus represent a subset of women seeking treatment for vulvar pain; women with less education who sought treatment may have been less likely to be referred to our clinic by their family physicians. A further limitation is that our data were obtained through self-reported questionnaires. While the diagnosis of PVD was confirmed on physical examination by a gynaecologist, all other self-reported chronic pain conditions could not be validated clinically. Finally, the cross-sectional design of our study meant that causation cannot be inferred from our results. Although our study showed that women with COPCs tend to experience a greater burden of disease than women with isolated vulvodynia, this was an association only, and does not confirm cause and effect.

CONCLUSION

Chronic overlapping pain conditions in the presence of provoked vestibulodynia have profound effects on the health care experience in these individuals. Women with PVD as part of a chronic pain syndrome experience a longer duration of pain, more pain with non-penetrative sexual activity, and more interference in daily activities than those with PVD alone. They also report more visits to gynaecologists, more allergic reactions, and have tried using more therapies for their pain, and have increased symptoms of depression and trait anxiety compared to women with PVD alone.

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