PROVOKED VESTIBULODYNIA: A NEUROPATHIC PAIN CONDITION?

by

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Abstract

Provoked Vestibulodynia (PVD) is a common form of chronic genital pain, affecting approximately 12% of premenopausal women. Even though knowledge of vulvodynia has been present in the medical field for many years, it was previously thought to be of psychogenic origin and has never been thoroughly investigated for the purpose of pain classification. When investigating any pain condition, one of the most important distinctions to make is whether or not the pain is neuropathic. Even though this possibility has never been investigated in women with PVD, some have claimed that PVD pain contains elements of neuropathy, even treating this pain with medication created for neuropathic pain conditions. The purpose of this study was to use standardized measures and determine whether PVD may have a neuropathic component.

Women with PVD completed an online survey assessing various pain and psychosocial variables. Their responses were compared with those of pain-free controls and women experiencing an established neuropathic pain condition, post-herpetic neuralgia (PHN). Women with PVD scored above established cut-offs on measures of neuropathic pain (NP). Further, for some NP measures there was no difference in scores between PVD and PHN women. Women with PVD also had similar psychosocial profiles as those with PHN, although women with PHN reported poorer health-related quality of life. Interestingly, the number of NP symptoms did not predict pain/psychosocial disturbance, or vary as a function of pain duration or intensity. Overall, these results lend support to the argument that PVD is a chronic pain condition. Further, these results indicate that women with PVD likely experience some form of NP. These results add to the understanding and classification of PVD, justifying further investigation, for example, via psychophysical testing and functional magnetic resonance imaging.
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Chapter 1

Introduction

Pain is defined by the International Association for the Study of Pain (IASP) as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Merskey, Lindblom, Mumford, & Sunderland, 1994, p. 210). This broad definition encompasses a wide range of experiences that are further separated into distinct categories based on characteristics such as duration, severity, and location. These categories are used to describe the nature of one’s pain, to discuss potential etiology, and to optimize treatment approaches. Accurate categorization is particularly important for pain management, because treatment options are typically based on the specific types of pain reported by a patient (Jovey, 2008). It is assumed that when two conditions fall into the same pain category, they may respond to a particular treatment in a similar way (Jovey). Lacking a complete understanding of a pain condition and where to best classify it can result in misdiagnosis and inaccurate treatment.

The first step of pain classification is pain assessment, which begins by taking an extensive pain history. If obtained responses suggest neuropathic pain, confirmatory tests such as quantitative sensory testing (QST) are conducted (Treede et al., 2008). Validated measures should be used as part of history taking to empirically investigate the nature of various pain conditions. These measures should address the following dimensions of pain: physiologic, sensory, affective, cognitive, behavioural, and sociocultural (Miaskowski, 2005). As part of the sensory dimension, pain can have elements of nociception and neuropathy, each requiring considerably different treatment approaches (Bennett, Smith, Torrance, & Lee, 2006).
Although many conditions have been thoroughly investigated and classified using a range of methods, such rigor has not been applied to all conditions. One such disorder is provoked vestibulodynia (PVD), a chronic pain condition commonly experienced by women. The experience of PVD typically consists of a severe burning and/or sharp pain upon contact, or pressure, to the vaginal opening; this pain occurs in the absence of a visible cause or disorder (Moyal-Barraco & Lynch, 2004). Although PVD was once thought to be of psychological origin (Moyal-Barraco, et al), recent findings suggest that it is better classified as a chronic, perhaps neuropathic, pain condition (e.g., Binik, 2005; Payne, Binik, Amsel, & Khalifé, 2005; Pukall, Reissing, Binik, Khalifé, & Abbott, 2000). However, no systematic study has been conducted to determine the pain type of PVD. In the current study, women with PVD completed a series of validated questionnaires designed to assess neuropathic versus non-neuropathic pain characteristics. Further questionnaires targeted pain-related psychological processes, psychological distress, sleep problems, health-related quality of life, sexual function, and relationship satisfaction. Responses were compared with those of pain-free control women and of those suffering from postherpetic neuralgia (PHN), an established neuropathic pain condition. Results provide additional information about the pain characteristics of women experiencing PVD, and may be used to guide treatment choices.
Chapter 2

Literature Review

Pain Classification

The Canadian Pain Society endorses the following guidelines for the categorization of pain syndromes, based on temporal quality and known or presumed physiological origin (Jovey, 2008). Temporally, pain can be described by the length of time it has been experienced. Acute pain conditions are typically caused by tissue damage, and can last from a few minutes to up to 30 days. Subacute or short-term pain lasts from 30 to 90 days. When pain lasts beyond the normal expectation for any given tissue damage, usually after a minimum of 3-6 months, it is termed chronic pain. Chronic pain is a challenge to manage for patients and healthcare professionals alike. The sensation of pain often persists in the absence of associated tissue damage, and objective physiological explanations for the pain are not present, which complicates treatment options. Understandably, chronic pain is often associated with psychological symptoms such as depression.

Once the temporal nature of the pain is established, it can be described in terms of physiological characteristics. Two broad categories of pain are nociceptive and neuropathic. The experience of nociceptive pain is a negative reaction triggered by the stimulation of nociceptors, which are bare nerve endings that respond to noxious or tissue-damaging stimuli (Popescu, 2005), including inflammation (Jovey, 2008). These nociceptors convey pain signals to the brain through various mechanisms in the spinal cord. Typically, as the body heals the experience of pain decreases, and eventually disappears once the damage has been repaired.
Neuropathic Pain Physical Symptoms

Although the experience of nociceptive pain is normal and adaptive, sometimes pain is experienced when there is no observable injury or when an injury appears to have healed, termed neuropathic pain (NP). The IASP defines NP as “pain arising as a direct consequence of a lesion or disease affecting the somatosensory system” (Treede et al., 2008, p. 1631). In other words,

under physiologic conditions, distinct mechanisms operate in primary sensory neurons, the spinal cord, and the brain to control the flow and the integration of afferent information from peripheral receptors to the CNS so that the nature of a stimulus, its intensity, and its location can be determined with the precision necessary for an appropriate response. In conditions of neuropathic pain, this elaborate system of control derails. … Successful therapy requires an understanding of the pathologic mechanisms that produce this “system failure.” (Scholz & Woolf, 2008; pp. 66-67)

Those with NP conditions typically experience a combination of pain characteristics such as the following (Bennett, 2001; Pappagallo, 2005):

- **Dysaesthesias** (sensations of cutting/lacerating, pins and needles, pricking, tingling, tightness, and numbness)
- **Thermal pain** (sensations of hotness or burning)
- **Paroxysmal pain** (sensations of electric shocks, jumping or bursting, radiating, and stabbing or shooting)
- **Evoked pain** (pain brought on by stimuli such as bedclothes, stroking, tight clothes, cold, and warmth)
• **Autonomic symptoms** (sweating and changes to the affected area such as redness or pinkness, puffiness or swollenness, or a mottled appearance).

• **Hyperpathia** (delayed explosive pain following the application of a noxious stimulus).

NP can occur spontaneously, in the absence of external stimulation, or it can be provoked by stimuli that are physically present (termed stimulus-evoked; Moulin et al., 2007). There are different manifestations of stimulus-evoked pain. When a normally non-painful stimulus is perceived as painful it is called *alldynia*. For example, a person with alldynia might perceive having a piece of wool rubbed on the affected area of skin as being painful, while someone without alldynia may experience this sensation as pleasant or neutral. *Hyperalgesia* occurs when the experience of a painful stimulus is magnified (Moulin et al.). For example, something mildly painful like a pinprick to the affected area would be perceived as moderately or severely painful to an NP patient. In addition to abnormal painful sensations, those with NP may also experience abnormal sensations such as tingling that are non-painful, called *paresthesias*. When a paresthesia turns unpleasant or disturbing, it becomes a dysesthesia, as previously defined (Scholz & Woolf, 2005). Although those with nociceptive pain can experience these symptoms, they are experienced significantly more often by those with NP conditions (Bennett, 2001). Specifically, some clinicians and researchers suggest that certain pain profiles and symptom patterns distinguish those with NP from those with nociceptive pain. Qualities such as hot, cold, sensitive, itchy, and surface pain tend to occur with greater intensity for those with NP (Dworkin, Jensen, Gammaitoni, Olaleye, & Galer, 2007). Indeed, NP is
challenging to diagnose; as such, the use of pain profiles may enhance the diagnostic and treatment process.

**Neuropathic Pain: Associated Symptoms**

In addition to the experience of troubling physical symptoms, those with NP experience a range of life interferences. Clark and colleagues (2000) determined that those with PHN experienced significantly more symptoms of depression and somatization, and a trend towards greater levels of anxiety than those with a non-painful but aversive case of chronic vertigo. In general, patients with various NP conditions tend to report decreased levels of physical and emotional functioning, which can be related to the severity of their pain (Jensen et al., 2007). NP is also associated with an impaired ability to sleep (Galer, Gianas, & Jensen, 2000; Oster, Harding, Dukes, Edelsbery, & Cleary, 2005), the presence of poor pain coping strategies, and inadequate social support (Jensen et al; O’Connor, 2009). Finally, NP is related to decreased health-related quality of life, and it contributes to greater burden on the healthcare system, both in terms of costs and resources (Taylor, 2006; Oster et al.). Because the life interference associated with NP conditions is so pronounced, assessment of these elements is an integral part of the diagnostic and treatment process.

**Neuropathic Pain Classification**

Making a diagnosis of NP can be extremely challenging. Often, physicians encounter problems due to ambiguous definitions and diagnostic methodologies. Further, since many NP conditions are particularly complex, estimates of their incidence and prevalence are often inaccurate (Sadosky, McDermott, Brandenburg, & Strauss, 2008). As a result, even though it has been well established that those with NP suffer greatly and rely heavily on healthcare systems (Taylor, 2006), unless a person suffers from one of the
better known and researched conditions, they may not receive accurate diagnoses or treatment. NP conditions commonly include the following: trigeminal neuralgia (i.e., paroxysmal facial nerve pain; Barker, Jannetta, Bissonette, Larkins, & Jho, 1996), painful diabetic polyneuropathy (e.g., foot ulceration sometimes leading to painful neuropathy and amputation; Tesfaye & Kempler, 2005), and PHN (i.e., persistent pain long after the herpes zoster rash has healed; Dworkin et al., 2008).

Although it is commonly assumed that these classic “clear-cut” NP conditions consist exclusively of NP symptoms, some suggest that they may contain elements of nociceptive or non-neuropathic pain at times (e.g., inflammatory pain; Backonja, 2003). Recently, researchers have suggested that one’s pain experience may fall between nociceptive and neuropathic, and could be described along a spectrum as pain of predominantly neuropathic or nociceptive origin (Bennett et al., 2006). Indeed, there are mixed pain conditions that have both nociceptive and neuropathic characteristics and mechanisms, sometimes referred to as “mixed pain syndromes.” One example of this type of condition is chronic lower back pain (LBP). In a recent review of the literature, Freynhagen and Baron (2009) noted that, in 20-35% of LBP patients, there are distinct neuropathic and nociceptive components, a finding that replicates prior studies (e.g., Freynhagen et al., 2006). Interestingly, a survey of insurance claims in the US stated that back and neck pain with neuropathic involvement were among the most frequently treated NP conditions (Berger, Dukes, & Oster, 2004), suggesting that these mixed pain conditions may be quite common. Indeed, it is important to know what types of symptoms occur in what pain conditions, so that treatment can be more tailored to individual patients.
Neuropathic Pain Assessment

Determining whether pain is predominantly neuropathic is a complex, multi-step procedure that involves various techniques, and many people go undiagnosed (Taylor, 2006). Because visible causes for the pain are often lacking, innovative methods must be used that often vary by physician or researcher (Taylor). In a recent publication on NP, Treede and colleagues (2008) presented a succinct model that describes the stages of this task. When a patient presents with an ambiguous pain condition, the first step is to collect information such as pain history and neuroanatomical distribution, which will guide further confirmatory tests. One would only conduct potentially invasive, painful, and expensive tests (e.g., nerve biopsy, QST, etc.) if the description of the pain closely resembled other NP conditions. Based on these methods, people with pain can be classified as “Unlikely to be NP,” “Unconfirmed as NP,” “Possible NP,” and “Definite NP.” Even though this model was designed for clinical use, it can be applied to a research model: by surveying a population experiencing a given pain condition, one could determine whether there is justification for a more invasive and detailed study.

To accurately determine if a population is experiencing pain of predominantly neuropathic origin, the right questions must be asked. In reviewing the available NP screening tools, Bennett and colleagues (2007) and Benzon (2005) concluded that validated measures could be used to better describe chronic pain conditions than unstandardized interview methods alone. Such measures could potentially identify what pain components are neuropathic and would respond better to NP treatments. It has also been suggested that these measures could be used in epidemiological studies to identify which pain conditions may have an increased risk of having a neuropathic component (Dworkin et al., 2007). This conclusion is bolstered by the emphasis placed on collecting
detailed information about the pain quality, location, and impact present in clinical guidelines for the assessment of NP (e.g., Herr, 2004). Interestingly, one study found that higher scores on self-report measures such as the Self-completed Leeds Assessment of Neuropathic Symptoms and Signs and the Neuropathic Pain Scale are associated with greater clinician certainty when it comes to the diagnosis of neuropathic and nociceptive pain (Bennett et al., 2006), alluding to the validity of such measures. Finally, the use of validated NP screening tools and an associated sensory testing protocol may lead to the ability to predict which treatments would best address the various types of NP (Attal & Bouhassira, 2009; Baron, 2006). Because NP has such a marked impact on many aspects of a person’s life, it is extremely important to provide the best treatment option as quickly as possible.

In addition to measures specifically designed to elicit information about NP, other information is required for the accurate assessment of a pain condition. This information can be grouped into six dimensions of pain, which include specific NP characteristics (Table 1; Miaskowski, 2005). When the history of a given individual comprehensively spans these dimensions, it contributes to an inclusive pain assessment. Utilizing validated measures to assess each dimension is ideal.

Table 1.

*Six Dimensions of Pain and their Associated Components*

<table>
<thead>
<tr>
<th>Physiologic dimension</th>
<th>Sensory dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Etiology or cause of pain</td>
</tr>
<tr>
<td></td>
<td>• Pain duration (acute or chronic)</td>
</tr>
<tr>
<td></td>
<td>• Location</td>
</tr>
<tr>
<td></td>
<td>• Intensity (severity)</td>
</tr>
</tbody>
</table>
• Quality

Affective dimension • Emotional responses (depression, mood, anxiety, worry, helplessness, fear)

• Suffering

• Psychiatric disorders

Cognitive dimension • Thought processes/views of self

• Meaning of pain

• Coping strategies

• Attitudes, beliefs, knowledge

• Level of cognition

Behavioural dimension • Indicators of pain

• Pain control behaviours

• Communication of pain

• Associated symptoms (sleep, pain)

Sociocultural dimension • Demographic variables

• Cultural background

• Personal, family, and work roles

• Family factors

• Caregiver perspectives

**Neuropathic Pain Treatment**

According to the pain management guide endorsed by the Canadian Pain Society, there are three elements to successful treatment: medical, psychological, and physical/rehabilitative (Jovey, 2008). Within each of these categories there are myriad
treatment options from which to choose; however, determining which treatment is most efficacious for a given patient depends on accurate classification of the pain problem. Clinicians are advised to base their treatment choices on the type of pain being experienced and the ways in which the pain interferes with their patient’s life. Certain treatments have historically been more successful for those with NP conditions than other pain conditions.

In terms of medical approaches, the first line of treatment for NP conditions consists of tricyclic antidepressants (TCAs) or Gabapentin. Despite their common use as treatment for depression, TCAs have analgesic properties and are commonly used for those with NP (Moulin et al., 2007). Interestingly, pain improvements occur at lower doses than are used to treat depression and can be observed regardless of whether the person is experiencing depression. Further, the pain-reducing effects occur faster than depression-reducing effects (Lynch, 2001). Gabapentin is classified as an anticonvulsant medication, often prescribed to those with forms of epilepsy as part of a medication regime designed to reduce the frequency of seizures (Chadwick, 1994). However, its effectiveness for pain relief has been observed in NP conditions (Moulin et al., 2007). The mechanisms by which Gabapentin acts to relieve pain are not fully understood, but it is hypothesized to inhibit pain signals both centrally and peripherally (Rose & Kam, 2002). Further, use of Gabapentin is related to improved mood and health-related quality of life when used as a pain management strategy (e.g., Rowbotham, Harden, & Stacey, 1998).

If these treatments are not successful, other medications such as antiepileptics, local anesthetics, and opioids may be attempted (Dworkin, Backonja, Rowbotham, Allen, & Argoft, 2003; Scholz et al., 2005). These medications target the physiological mechanisms of pain, but can also assist in the improvement of depression, anxiety, sleep,
and quality of life (O’Connor, 2009). Unfortunately, treatment is often trial-and-error, and patients are sometimes left to deal with moderate levels of pain (O’Connor). To reduce the length of time for the trial-and-error approach to yield results, it is recommended that treatment be guided by the underlying mechanisms of the pain (Scholz et al.). Unfortunately, when a pain condition is not fully understood, the likelihood that a patient will receive the most efficacious treatment in a timely manner decreases.

To further complicate this process of medical treatment, some have suggested that there are different types of NP that could respond differently to various treatments. Different NP conditions are associated with certain NP symptom profiles, alluding to the heterogeneous nature of these conditions (Attal et al., 2008). Isolating the etiology of an NP condition can be challenging since similar etiologies may result in different symptoms, while similar symptoms may result from discrepant etiologies (Woolf & Mannion, 1999). Although this task is a challenging one, the administration of validated measures could be helpful in identifying symptom profiles and related treatments. This knowledge could help abbreviate the diagnosis and treatment process, alleviating painful conditions sooner and more effectively.

In addition to medical treatments for NP, Haythornthwaite and Benrud-Larson (2001) state that biofeedback (often used in physiotherapy), hypnosis, and cognitive-behavioural therapy are useful for increasing the quality of life in patients with chronic pain and NP. Although psychological treatment alone does not result in the elimination of pain, it can improve the emotional and psychological aspects that are affected when a person experiences chronic pain. It can also lead to improved pain management, which can lead to increased hopefulness and self-efficacy (Turk, Audette, Levy, Mackey, & Stanos, 2010). Relaxation and meditation are also recommended to assist in this effort.
(Turk et al.). Overall, these aspects of pain management are integral to the treatment of NP conditions.

**Could Vulvodynia be a Neuropathic Pain?**

Despite the availability of quality assessment tools, many conditions have not been fully explored. One such condition is vulvodynia, a common but greatly misunderstood female genital pain condition. It is defined by the International Society of Vulvovaginal Disease (ISSVD) as “vulvar discomfort, most often described as burning pain, occurring in the absence of relevant visible findings or a specific, clinically identifiable, neurologic disorder” (Moyal-Barracco & Lynch, 2004, p.775). This pain condition was first termed “burning vulva syndrome” in the 1970s. Throughout the years, this disorder has been described many different ways, including psychosomatic vulvovaginitis, vestibular adenitis, and vulvar vestibulitis syndrome. The term “vulvodynia” has been retained since it does not indicate inflammation (as the suffix –itis implies) and since this specific term was already used in other pain classification tools, such as the International Classification of Disease manual (Moyal-Barracco et al.).

It is estimated that 16% of women in the general population experience some form of vulvodynia (Harlow & Stewart, 2003). For many, these painful experiences begin early in life, even with tampon use and gynecological examinations (Meana, Binik, Khalifé, & Cohen, 1999; Pukall et al., 2000), which may precede the onset of sexual activity (Binik, 2005). When seeking treatment, approximately 60% of women who experience genital pain consult multiple health professionals, yet only 61% receive a diagnosis. Of these, 9% are diagnosed with chronic vulvar pain (Harlow et al.). Given the number of women suffering from this condition and the difficulty they experience obtaining an accurate
diagnosis, it is imperative to understand the characteristics of this pain and its effects on life activities.

The most common form of vulvodynia is provoked vestibulodynia (PVD; previously known as vulvar vestibulitis syndrome), with prevalence rates estimated at 12% (Harlow et al., 2003). The ISSVD defines PVD as idiopathic pain in the area surrounding the entrance of the vagina (i.e., the vestibule), occurring as a result of contact to the area, which can be sexual and/or non-sexual in nature (Moyal-Barracco et al., 2004). Even though knowledge of vulvodynia has been present in the medical field for many years, it was previously thought to be of psychogenic origin. As a result of this conceptualization, diagnosis, research, and treatment focused on psychosocial factors, largely ignoring the pain component. Although most experts presently agree that vulvodynia is best classified as a chronic pain disorder, some still maintain that it is a result of psychological conflict (Masharpa, Boliatto, Lynch, Michelitti, & Benedetto, 2006).

For the most part, however, it is agreed that vulvodynia should be assessed and treated as a chronic pain condition. In a paper that arose from a Consensus meeting (Bachman et al., 2006), a multidisciplinary team came to the following conclusion: “regardless of the etiology and characterization, the panel viewed vulvodynia, similar to headache, as a legitimate medical entity, with a spectrum of etiologies and clinical presentations” (p. 449). This point of view is supported by many studies in the literature. Indeed, vulvodynia shares many characteristics with other chronic pain conditions (see below). These characteristics, however, have never been fully explored. Some clinicians and researchers assume or suspect that PVD contains some neuropathic components (e.g., Boardman, Cooper, Blais, & Raker, 2008; Pukall, Binik, Khalifé, Amsel, & Abbott, 2002;
Weijmar Schultz et al., 2005), but NP screening tools have never been explicitly used to categorize this condition. Given that PVD seems to share characteristics with other chronic pain conditions in general, and with NP in particular, investigating NP components in PVD could potentially lead to better understanding of its etiology, maintenance, and how best to treat it.

**Physiological Symptoms in PVD**

There is a multitude of evidence supporting the conceptualization of PVD as a chronic pain syndrome; some of this evidence suggests that PVD may be neuropathic in origin. First, women with PVD very commonly describe their pain as burning (Bergeron, Binik, Khalifé, Pagidas, & Glazer, 2001), which some suggest should be a key symptom to identify those who might have NP (Marchettini, 2005). This symptom is commonly experienced by people with heterogeneous NP conditions (Bennett et al., 2005) as well as specific NP groups, such as those with PHN and painful diabetic neuropathy (Baron, Tölle, Gockel, Brosz, & Freynhagen, 2009).

Second, there is evidence that women with PVD experience changes in pain processing and sensitivity in the genital region consistent with the processes of allodynia and hyperalgesia. Lowenstein and colleagues (2004) and Pukall and colleagues (2002) found that women with PVD required less heat and pressure, respectively, to elicit pain to the vestibule than pain-free controls. Further, these women reported higher pain ratings than non-affected women in response to painful stimulation. Furthermore, those with more severe PVD were found to be more sensitive to evoked pain than those with less severe pain (Lowenstein et al.), suggesting that this condition may be progressive for some. Perhaps as this condition progresses, symptoms shift from predominantly
nociceptive to predominantly neuropathic. A reliability study confirmed that those with PVD experience allodynia. These women report significantly more tenderness to pressure in the vestibular region than pain-free women (Bergeron et al., 2001). Furthermore, in one study, women with PVD were more sensitive to temperature change at both the urethral and vaginal openings than pain-free controls. Despite the lack of observable physical abnormalities around the urethral and vaginal openings, significant somatosensory dysfunctions were observed at both sites. The authors suggest that these findings indicate peripheral sensitization, a form of NP that results from a lesion to nerves in the peripheral nervous system (Bohm-Starke et al., 2001). This physiological change accompanied by the absence of physical findings may be one reason this condition is difficult to diagnose.

Although physical abnormalities (e.g., infection, inflammation) are often not found upon routine clinical examination of the vulva, biopsy studies have demonstrated increased innervation of the vulvar vestibule (Bornstein, Goldschmid, & Sabo, 2004; Tympanidis, Terenghi, & Dowd, 2003; Weström & Willén, 1998). Similar increased innervation was observed in another study, along with other markers (e.g., an increase subepithelial heparanase activity) linked to the development of painful diabetic neuropathy (Bornstein, Cohen, Zarfati, Sela, & Ophir, 2008). Although many NP conditions typically involve sensory loss in addition to sensory gain (e.g., PHN; Fields, Rowbotham, & Baron, 1998), the increased innervation in PVD provides an example of nerve changes leading only to sensory gains. These sensory gains are consistent with the reduced thresholds demonstrated in previous studies (e.g., Lowenstein et al., 2004; Pukall et al., 2002).
Interestingly, some studies suggest that women with PVD experience more global changes in pain processing and sensitivity. For example, when heat pain was provoked in women with and without PVD on the forearm, women with PVD reported significantly lower pain and unpleasantness thresholds at this non-genital site. This result suggests that these women are more globally sensitive to the experience of pain and that this sensitivity is not restricted to their genitals (Granot, Friedman, Yarnitsky, & Zimmer, 2002; Pukall et al., 2002), further implicating nervous system dysfunction. Similar results have been found for those experiencing other NP conditions. In one study, a group suffering from NP reported more hyperalgesia, allodynia, and a higher pin-prick threshold than those with a nociceptive pain condition when both groups were tested at a non-painful index site (Bennett, 2001). Similar results were also found when a tender point examination was conducted with PVD women (Pukall, Baron, Amsel, Khalifé, & Binik, 2006). These women experienced significantly more intense pain in significantly more areas than pain-free control participants. They also engaged in more pain behaviours, although the intensity of pain they experienced was not accounted for by increased pain catastrophizing or state anxiety. Furthermore, these women reported more general pain complaints than pain-free women. Taken together, this evidence suggests that women with PVD experience significant pain processing changes that target the genital region and may generalize to the whole body, similarly to those with established NP conditions.

Augmented sensory processing in women with PVD, including vestibular allodynia, has also been observed via functional magnetic resonance imaging (fMRI) (Pukall, Strigo, Binik, Amsel, Khalifé, et al., 2005). Not only did PVD women report experiencing pain and unpleasantness in response to pressure to the vestibule, their brain activation patterns during painful stimulation was similar to that observed in
fibromyalgia, idiopathic low back pain, irritable bowel syndrome, and NP. These results suggest that a central processing change occurs in these women in a similar way to those experiencing other pain conditions.

Overall, research indicates that women with PVD experience allodynia both in the genital area (e.g., Bergeron et al., 2001; Bohm-Starke et al., 2001; Pukall et al., 2002) as well as over parts of the body such as the forearm (Granot et al., 2002; Pukall et al., 2002). Lowenstein and colleagues (2004) also observed enhanced pain perception patterns in women with PVD, such as alldynia and hyperpathia. They noted that the “supra-threshold pain magnitude estimation for mechanical and thermal stimuli, as well as increased temporal summation for these modalities… are typically observed in neuropathic pain syndromes” (p. 52). Unfortunately, even though there is evidence that PVD may have neuropathic origins, no empirical study has examined this important topic.

**Associated Symptoms in PVD**

Similar to many other chronic pain conditions, PVD has a psychological component as well as a physical pain component (Haefner et al., 2005). Many studies have found that women with chronic vulvar pain experience impaired sexual functioning, increased pain catastrophizing, fear, and hypervigilance, higher levels of depression and anxiety, as well as increased marital dissatisfaction (for a review, see Desrochers, Bergeron, Landry, & Jodoin, 2008). These patterns of psychosocial symptoms are similar to those experienced by people with NP syndromes such as PHN, painful diabetic neuropathy, and post-stroke pain (e.g., Jensen, Chodroff, & Dworkin, 2007; O’Connor, 2009; Clark et al., 2000), further highlighting the need to investigate the potential NP components of PVD. Such psychosocial variables not only impact one’s quality of life,
they also influence pain processing (Sutton, Pukall, & Chamberlain, 2009b). For example, lower psychosocial functioning is associated with a decrease in pressure-pain threshold and increased pain ratings upon palpation with a cotton-swab in women with PVD. In other words, poor psychosocial functioning could contribute to the increased experience of pain.

**Treatment**

Many treatments have been suggested and implemented for the relief of PVD symptoms. However, similarly to other NP syndromes, PVD is often resistant to treatment (Lowenstein et al., 2004). The most common treatments for PVD are: topical therapies (e.g., lidocaine, estrogen cream), antidepressants and anticonvulsants, pelvic floor biofeedback and physical therapy, steroid injection, and surgery (e.g., local excision, total vestibulectomy, and perineoplasty; Haefner et al., 2005). Prevailing opinions in the literature suggest that a multi-dimensional pain-driven treatment plan best addresses the needs of patients (Binik et al., 2002).

Interestingly, some treatments recommended for NP are already in use for the treatment of PVD. In an article presenting guidelines for vulvodynia diagnosis and treatment, Haefner and colleagues (2005) suggest that vulvodynia may have NP origins, and present corresponding treatment options. However, they provide no evidence for such a conjecture, nor do they suggest methods for assessing the potential NP component in a given patient. Because the medications used for NP involve potentially aversive side effects, their use should not be taken lightly. Further, some have used NP medication in studies of vulvodynia, again neglecting to engage in evidence-based practice. Boardman and colleagues (2008) conducted a retrospective study of topical Gabapentin, a
medication used to treat NP. Out of all the patients being treated for PVD and generalized vulvodynia (GVD; unprovoked genital pain that impacts all or most of the vulva), 24% were treated with topical Gabapentin either alone or in combination with other treatments, including tricyclic antidepressants and topical lidocaine. For women with PVD, this treatment was determined successful; the mean reported pain score decreased significantly from 7.92 to 2.71 (on a scale from 0 to 10) after 8 weeks of combined Gabapentin treatment. Ben-David and Friedman (1999) reached a similar conclusion when they utilized Gabapentin to treat women experiencing idiopathic vulvar pain. This treatment was attempted because these authors recognized the neuropathic characteristics of vulvar pain. Of the 17 patients treated, 14 reported partial or complete relief with Gabapentin therapy, including increased quality of life. These success rates are similar to results found in other chronic pain treatment studies. The success of Gabapentin treatment in these studies indicates that future research should involve examining PVD from a neuropathic pain perspective to further our understanding of this condition and optimize treatment avenues.

**Comparison Groups**

In order to fully grasp the nature of PVD, it is ideal to compare self-reported characteristics with those of the general, pain-free, population. Another approach is to compare one pain group with another to examine differences and similarities between them. Because the goal of this study is to determine whether PVD is an NP condition, it is logical to compare PVD with an established NP condition. PHN is an ideal condition for such a comparison. Herpes zoster (i.e., shingles) is a painful rash that heals over time. If the pain associated with the rash lasts much longer than expected (i.e., 120 days or more) after the skin has healed, it is termed PHN (Dworkin et al., 2008). Approximately 2-12%
of shingles cases result in PHN (Thyregod et al., 2007; Dworkin et al.). Similar to those with PVD, those with PHN experience a variety of NP symptoms such as burning, allodynia, and hyperalgesia (Dworkin et al., Attal et al., 2008). Those with PHN are commonly included in validation studies for questionnaires such as the Neuropathic Pain Symptom Inventory (Bouhassira et al., 2004) and the Self-completed Leeds Assessment of Neuropathic Symptoms Scale (Bennett, Smith, Torrance, & Potter, 2005). Because PHN is an established NP condition that somewhat resembles PVD, it can serve as a good comparison group for establishing whether those with PVD are indeed experiencing significant NP symptoms.
Chapter 3

Research Questions and Hypotheses

The purpose of the current study was to investigate the potential neuropathic characteristics of PVD. This study begins to explore the possibility that women with PVD experience similar difficulties and interference as those who experience other NP conditions. Women with PVD were compared to women with PHN to determine if they have similar pain profiles, and additional comparisons were made with pain-free controls to explore life interference. Specifically, the following research questions were addressed:

1. Do women with PVD display a symptom pattern characteristic of those experiencing NP? It is hypothesized that women with PVD will score above the cutoff on NP measures, but that they will report significantly fewer NP characteristics than women with PHN, a hypothesis that has never been tested in the literature. It is further hypothesized that that they will report significantly more pain-related symptoms than pain-free control participants.

2. Is there a relationship between symptoms of NP and pain/psychosocial variables (e.g., catastrophizing, depression, etc.) in women with PVD or PHN? It is hypothesized that the more neuropathic symptoms are reported, the poorer women will score on these variables. It is further hypothesized that women whose scores exceed published cut-offs or guidelines will report poorer scores on pain/psychosocial variables.

3. Is there a relationship between the severity of PVD, the length of pain experienced, and the number of NP symptoms? It is hypothesized that women with more severe PVD who have experienced their pain for longer periods of time will experience more signs of NP.
Chapter 4

Method

Participants

After examining the data of each eligible participant, women were categorized based on the symptoms they reported. Although several categorizations were created, only three (i.e., pain-free controls, women with PVD, and women with PHN) were examined in the current study. See Table 2 for group categorizations. The inclusion criteria for the PVD group were: pain at the entrance of the vagina during intercourse (average pain ≥ 3/10), a minimum pain duration of 6 months, and pain on at least 70% of intercourse occasions. The inclusion criteria for PHN were: prior history of herpes zoster, pain after the shingles rash has healed (average pain ≥ 1/10), and a minimum pain duration of 3 months. One person reported a pain duration of only 2 months, but because they reported having received a diagnosis of PHN they were retained in the PHN group. Exclusion criteria for both groups were: under the age of 18, lack of fluency in English, and major medical, psychiatric, or other NP conditions that interfere with daily functioning (e.g., diabetes, schizophrenia, trigeminal neuralgia). When examining the age of these groups, a significant effect was observed, $F(2, 155) = 31.52, p < .001$, such that women with PHN ($M = 60.35$, $SD = 15.70$) were significantly older than women with PVD ($M = 37.82$, $SD = 13.71$) and control women ($M = 33.92$, $SD = 13.94$).

Table 2.

<table>
<thead>
<tr>
<th>Participants included</th>
<th>N</th>
<th>Participants excluded</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain-free control</td>
<td>79</td>
<td>Control with other chronic pain</td>
<td>13</td>
</tr>
<tr>
<td>PHN</td>
<td>23</td>
<td>PHN and genital pain</td>
<td>12</td>
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<tr>
<td>-----</td>
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<td>----------------------</td>
<td>----</td>
</tr>
<tr>
<td>PVD</td>
<td>56</td>
<td>Past PHN</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PVD and another pelvic pain</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other genital/pelvic pain</td>
<td>104</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not eligible</td>
<td>39</td>
</tr>
</tbody>
</table>

**Procedures**

This study was approved by the General Research Ethics Board at Queen’s University in Kingston, Ontario. Participants were recruited through word of mouth and advertisements. Previous participants from the Sexual Health Research Lab (SHRL) were contacted, posters were placed around the Kingston area, and advertisements in newspapers and online were taken out (Appendix A). Women interested in participating were directed to the website with the questionnaires. They were also invited to contact a research assistant at the SHRL if they had any questions or concerns. Once participants reached the website, read a letter of information, and consented to participate, they completed a detailed eligibility questionnaire which included questions on pain length, intensity, location, concurrent pain conditions, and established diagnoses. The information from this questionnaire was used post hoc to determine whether participants were eligible for the study, and to which group they were to be assigned. Following this questionnaire, participants completed a variety of validated measures.

**Measures**

A range of validated measures and additional questions addressed each of the six dimensions of the pain experience, as displayed in Table 3. The pain-free control
participants did not answer the questionnaires that directly pertained to the experience of pain.

Once the survey was complete, participants read a debriefing form, and had the opportunity to anonymously enter their e-mail addresses into a monthly draw for one of four prizes valued at $50 each. E-mail addresses were not linked to responses on the questionnaires. After completing or withdrawing from the study, all participants were provided with vulvodynia and PHN resources.

Table 3.

*Measures Associated with the Dimensions of Pain*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Physiologic</th>
<th>Sensory</th>
<th>Affective</th>
<th>Cognitive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Etiology or cause of pain</td>
<td>• Location</td>
<td>• Emotional responses (depression, mood, anxiety, worry, helplessness, fear)</td>
<td>• Thought processes/views of self</td>
</tr>
<tr>
<td></td>
<td>• Pain duration (acute or chronic)</td>
<td>• Intensity (severity)</td>
<td>• Suffering</td>
<td>• Meaning of pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quality</td>
<td></td>
<td>• Coping strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Attitudes, beliefs, knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• General pain questions</td>
<td>• MPQ</td>
<td>• CES-D</td>
<td>• PCS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• S-LANSS</td>
<td>• STAI-T</td>
<td>• PASS-20</td>
</tr>
</tbody>
</table>
• Level of cognition

Behavioural dimension
• Indicators of pain
• Pain control behaviours
• Communication of pain
• Associated symptoms (sleep, pain)

SF-36
PDI
MOS-S
FSFI

Sociocultural dimension
• Demographic variables
• Cultural background
• Personal, family, and work roles
• Family factors
• Caregiver perspectives

WHYMPI
DAS

Note. MPQ = McGill Pain Questionnaire; S-LANSS = Self-Complete Leeds Assessment of Neuropathic Symptoms and Signs; NPSI = Neuropathic Pain Symptom Inventory; PQAS = Pain Quality Assessment Scale; CES-D = Centre for Epidemiological Studies Depression Scale; STAI = State Trait Anxiety Inventory – Trait Version; PSS = Perceived Stress Scale; PCS = Pain Catastrophizing Scale; PASS-20 = Pain Anxiety and Stress Scale-20; SF-36 = Short Form Health Survey – 36; PDI = Pain Disability Index; MOS-S = Sleep Problem Index; FSFI = Female Sexual Function Index; WHYMPI = West Haven Yale Multidimensional Pain Inventory; DAS = Dyadic Adjustment Scale.

Physiologic Dimension

Participants answered a series of questions to explore the development, location, and temporal nature of their pain. Based on the answers to these questions, participants were separated into PVD, PHN, and control groups. Then, they answered a series of validated questionnaires to address the remaining dimensions.

Sensory Dimension

McGill Pain Questionnaire (MPQ; Melzack, 1975). This questionnaire includes 78 adjectives that are commonly used to describe various types of pain, including information about pain location, quality, and severity. Four subscales can be derived that
describe the sensory (e.g., burning, sore, stinging), affective (e.g., tiring, grueling, suffocating), evaluative (e.g., annoying, miserable, unbearable), and miscellaneous (e.g., cool, radiating, nagging) aspects of pain. Total scores range from 0 to 78, with higher scores representing greater pain intensity. A person with NP would typically score 20 or above on this scale (Lynch, Clark, & Sawynok, 2003). PVD and PHN women answered these questions only in regards to their respective PVD and PHN pain. For this sample, high reliability was observed for women with PHN (N = 23) and PVD (N = 56), Cronbach’s $\alpha$ = .97 and .94, respectively.

**Self-complete Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS; Bennett et al., 2005).** This scale measures the degree to which a person’s pain is neuropathic. It consists of seven items describing various pain experiences. Participants respond based on whether or not they have experienced different sensations (i.e., Yes or No), and their answers are weighted based on how ‘neuropathic’ each sensation is. A score of 12 or more is indicative of NP (maximum score of 24). Bennett and colleagues report good reliability (Cronbach’s $\alpha$ = .76) and discriminant validity (odds ratio: 8.1) for this scale. For this sample, low reliability was observed for women with PHN (N = 21) and PVD (N = 46), Cronbach’s $\alpha$ = .59 and .40, respectively.

**Neuropathic Pain Symptom Inventory (NPSI; Bouhassira et al., 2004).** This measure is used to obtain detailed descriptors of neuropathic pains that may have occurred in the last 24 hours. Ten items are rated on a scale from 0 (absence of descriptor) to 10 (most intense experience of descriptor), with the total score ranging from 0 to 100, and two items involve choosing one of five options for duration and frequency of pain. Five subscales can be derived from this measure: burning spontaneous pain, pressing spontaneous pain, paroxysmal pain, evoked pain, and paresthesia/dysesthesia. Bouhassira
et al. have demonstrated that this measure has convergent validity (i.e., relationship with pain score, $r = 0.60, p < .001$), divergent validity (i.e., lack of relationship with anxiety and depression scores, $r = 0.27$ & $0.32$, respectively), and test-retest reliability (intraclass correlation $= .89$). This scale is not designed to distinguish between those with neuropathic and nociceptive pain conditions, thus it does not have a cutoff score to reference. However, Attal and colleagues (2008) report that the evoked pain items are strongly associated with alldynia/hyperalgesia when assessed by quantitative sensory testing, indicating usefulness for PVD population. For this sample, high reliability was achieved for women with PVD ($N = 49$) and PHN ($N = 22$), Cronbach’s $\alpha = .80$ and $.86$, respectively.

**Pain Quality Assessment Scale** (PQAS; Jensen et al., 2006). The purpose of this scale is to provide details about the neuropathic characteristics of pain. It includes 17 items, which involve rating the intensity of certain pain qualities on a scale from 0 (absence of quality) to 10 (most intense manifestation of quality). It also includes an unpleasantness rating, two scales to rate surface and deep pain, and a time quality rating which includes a place to provide a written description of the pain. This scale can be divided into subscales based on the type of pain experienced (i.e., paroxysmal, surface, & deep), and scores range based on the subscale. Victor et al. (2008) demonstrated that the subscales of the PQAS have excellent reliability ($\alpha = .84$, .81, & .80, respectively). This scale is not designed to distinguish between those with neuropathic and nociceptive pain conditions, thus it does not have a cutoff score to reference. For this sample, high reliability was achieved for women with PHN ($N = 23$) and PVD ($N = 53$), Cronbach’s $\alpha = .95$ and $.91$, respectively.
Affective Dimension

**Center for Epidemiologic Studies Depression Scale** (CES-D; Radloff, 1977). This is a 20-item scale measuring the frequency of depressive symptoms over the past week. Participants rate each statement on a scale from 0 (*Rarely or none of the time [less than 1 day]*) to 3 (*Most or all of the time [5-7 days]*). Scores range from 0 to 60, with higher scores representing more symptoms. Radloff demonstrated that this measure has high reliability (*as > 0.84*) and construct validity (moderate correlation [*r = 0.56*] between CES-D scores and ratings of depression severity; moderate correlations [*rs > 0.44*] between CES-D scores and scores on the Hamilton Clinician’s Rating Scale and the Raskin Rating Scale). For this sample, high reliability was achieved (*N* = 156; note that two control participants did not provide enough responses for scale calculation), *Cronbach’s α = .92*.

**State Trait Anxiety Inventory Trait Version** (STAI-T; Spielberger, 1983). This is a 20-item questionnaire that measures general anxiety. Each item is a statement about how one generally feels, rated on a scale from 1 (*Almost Never*) to 4 (*Almost Always*). Higher scores indicate higher levels of anxiety, with scores ranging from 20 to 80. Spielberger reports that the STAI-T has high test-retest reliability (*rs > 0.73*), internal consistency (*as > 0.89*), and construct validity (high correlations between the STAI-T and other trait anxiety measures, *rs > 0.73*). For this sample, high reliability was achieved (*N* = 158), *Cronbach’s α = .95*.

**Perceived Stress Scale** (PSS; Cohen, Kamarck, & Mermelstein, 1983). This 10-item measure determines how much stress an individual experiences in general. Each item consists of a statement (e.g., “In the past month, how often have you felt confident about your ability to handle your personal problems?”), which is rated on a scale from 0
(Never) to 4 (Very Often). Higher scores indicate greater levels of stress each participant perceives, and scores range from 0 to 40. Cohen et al. report that the PSS has adequate reliability (as > 0.84) and validity (e.g., adequately predicts health outcomes, rs > 0.52). For this sample, high reliability was achieved (N = 158), Cronbach’s α = .92.

**Cognitive Dimension**

**Pain Catastrophizing Scale** (PCS; Sullivan, Bishop, & Pivik, 1995). This 13-item measure taps into the thoughts and feelings experienced while in pain. Each item described a different thought or feeling (e.g., “It’s terrible and I think it’s never going to get any better”), and participants rate how frequently they experience each on a scale from 0 (Not at All) to 4 (All the Time). Three summed subscales are derived from this questionnaire: rumination, magnification, and helplessness. A total summed score is also calculated. High scores are indicative of an exaggerated negative orientation towards pain, with scores ranging from 0 to 52. Sullivan et al. demonstrated adequate stability (r = 0.75) and discriminant validity (catastrophizers report more frequent catastrophizing thoughts than noncatastrophizers, t(26) = 3.5, p < .01). For this sample, high reliability was achieved for women with PHN (N = 23) and PVD (N = 56), Cronbach’s α = .94 and .92, respectively.

**Pain Anxiety Symptoms Scale-20** (PASS-20; McCracken & Dhingra, 2002). This 20-item measure assesses thoughts, feelings, and behaviours associated with the experience of pain. Participants rate each thought, feeling, and behaviour (e.g., “I think that if my pain gets too severe, it will never decrease”) in terms of how often they experience each, on a scale from 0 (Never) to 5 (Always). Four components of pain-related fear and anxiety can be extracted from this measure: fear, escape and avoidance, cognitive reactions, and physiological reactions. Subscale scores range from 0 to 25, and
full-scale scores range from 0 to 100, with higher scores indicating higher levels of anxiety. Good internal validity ($rs > .81$) and internal consistency ($\alpha > .73$) have been demonstrated in a chronic pain population (Roelofs et al., 2004). For this sample, high reliability was achieved for women with PHN (N = 22) and PVD (N = 55), $Cronbach’s \alpha = .94$ and .90, respectively.

**Behavioural Dimension**

**Pain Disability Index** (PDI; Pollard, 1984). The PDI is a 7-item measure assessing how much one’s pain interferes with a variety of daily activities (e.g., family/home responsibilities, occupation). These items are measured on a scale from 0 (No Disability) to 10 (Total Disability). Total scores range from 0 to 70, with higher scores indicating greater disability levels. Pollard demonstrated that the PDI has good reliability ($\alpha = .86$) and construct validity (high/low PDI scores predicts pain-related psychological distress, pain description, disability, and pain history). For this sample, high reliability was achieved for women with PHN (N = 22) and PVD (N = 55), $Cronbach’s \alpha = .94$ and .81, respectively.

**Short-Form Health Survey** (SF-36; Ware & Sherbourne, 1992). This set of 36 questions measures health-related quality of life. Both physical and mental health is addressed, as well as health-related limitations, pain experience, and interference. Higher scores are indicative of better health-related quality of life, with scores ranging from 0 to 100. McHorney, Ware, Lu, & Sherbourne (1994) report adequate reliability ($\alpha > .78$) for the general population, which has been replicated in a peripheral NP population ($\alpha > .70$, Meyer-Rosberg, et al., 2001). For this sample, high reliability was achieved (N =
155; note that one participant from each group did not provide enough responses for scale calculation), *Cronbach’s α = .94.*

**MOS sleep scale** (MOS-S; Hays & Stewart, 1992). This scale measures sleep disturbances. Two items assess how long it takes to fall asleep and how much sleep one gets per night. An additional 10 items rated on a scale from 1 (*All of the Time*) to 6 (*None of the Time*) assess the frequency of various sleep problems (e.g., having trouble falling asleep, feeling drowsy during the day). Nine of the items are averaged to create the Sleep Problem Index (Spitzer & Hays, 2003). Total sleep disturbance scores range from 0 to 100. This set of questions has been shown to discriminate between those with and without chronic pain, and is reliable (*α > .63*; Hays, Martin, Sesti, & Spritzer, 2005). For this sample, high reliability was achieved (*N = 157*; note that one participant from the PVD group did not provide enough responses for scale calculation), *Cronbach’s α = .81.*

**Female Sexual Function Inventory** (FSFI; Rosen et al., 2000). This questionnaire measures female sexual function. It consists of 19 items, which are measured on various scales, and six subscales can be derived: desire, arousal, orgasm, lubrication, satisfaction, and pain. Recently, it has been observed that those not presently engaging in sexual activity are classified as having sexual dysfunction when the published scoring criteria are utilized. For this study, modified scoring criteria were used, where only sexually active women were included in the calculation of total score (Meyer-Bahlburg & Dolezal, 2007). Higher scores on this measure are indicative of greater sexual functioning. Rosen and colleagues demonstrated high internal consistency for this measure, with *α = .89*. For this sample, high reliability was achieved (PHN: *N = 8*; PVD: *N = 41*; Control: *N = 63*; total *N = 112*), *Cronbach’s α = .94.*
Sociocultural Dimension

**Dyadic Adjustment Scale** (DAS; Spanier, 1976). This questionnaire measures relationship quality in couples. There are 32 items that are rated on a various scales, and four subscales can be derived: dyadic cohesion, dyadic satisfaction, dyadic consensus and affectional expression. Higher scores on this scale indicate greater levels of relationship satisfaction, with scores ranging from 0 to 151. Spanier reported a very high level of internal consistency ($\alpha = 0.96$) for this questionnaire. For this sample, high reliability was achieved (PHN: N = 15; PVD: N = 47; Control: N = 52; total N = 114), *Cronbach’s $\alpha = .89$*.

**West Haven Yale Multidimensional Pain Inventory** (WHYMPI; Kerns, Turk, & Rudy, 1985). Three subscales from the WHYMPI were used for this study, only for those who have a romantic partner. These subscales address how their partner responds when the participant is in pain (i.e., with solicitous, distracting, or negative responses). This scales consists of 14 items describing different scenarios, and participants rate how often each occurs on a scale from 0 (*Never*) to 6 (*Very Often*). High reliability ($as > 0.72$) was demonstrated by Kerns et al. For this sample, high reliability was achieved for women with PHN (N = 14) and PVD (N = 50), *Cronbach’s $as = .82$ and .74*, respectively.
Chapter 5

Results

Data considerations

Before beginning the data cleaning process, the data from certain participants were removed from the dataset. Of those who visited the website (N = 2273), 1734 did not provide consent or any data. Of those who answered the consent question, eight answered ‘no’ and did not complete the study. Of those who provided consent, 137 did not complete the survey leaving the data from 394 participants. To prevent the analysis of duplicate data, all datasets were screened based on birth date and user response information. Sixteen duplicates were identified. The time between attempts was typically two months, and most only completed the entire survey only once (11/16). In these cases, only the complete dataset was included for analysis. In cases in which two complete datasets were identified, only the most recent dataset was retained for analysis. Of the 378 remaining, 79 were categorized as pain-free control women, 56 women as PVD, 23 women as PHN, and 220 as ineligible (Figure 1.).

![Diagram of data cleaning process]

Figure 1. The number of participants in each stage of data cleaning.
Prior to conducting analyses, the data were examined for missing values, appropriate ranges, normality, and univariate and multivariate outliers. Overall, less than 5% of the data were coded as missing. Missing values were only imputed for validated scales; no missing values were imputed for the sociodemographic and pain-related screening questions. For a given scale, if less than 15% of the questions were missing, those missing values were replaced with group means for that particular item. However, means replacement was not used for two variables since the missingness was not random for women with PVD. These two NP variables (S-LANSS & NPSI) contained questions than many women with PVD declined to respond. The S-LANSS asks women to gently rub and press the painful area as well as a non-painful area to observe any sensation differences. Because women with PVD experience their pain in an intimate area, some may not have been comfortable performing this portion of the test. For the NPSI, one question asks if the pain is provoked by cold contact with the painful area; however, few women experience cold application to their genitals.

Based on skewness and P-P plots, if the variables violated the normality assumption, appropriate transformations were performed until the variables resembled a normal distribution. Analyses, conducted using the Statistical Package for the Social Sciences (SPSS) version 19, were then performed on the transformed and non-transformed variables. If the results of both were similar, the results from the non-transformed variables are presented for ease of interpretation. The data were also checked to make sure they met assumptions for t-tests, analysis of variance, and regression. Where assumptions were not met, appropriate accommodations were made (e.g., non-parametric tests). For all pairwise comparisons, a multi-stage Bonferroni-corrected significance level was used. Otherwise, the significance level was set at \( p < .05 \) and data were expressed as
mean +/- standard deviation. Each section below includes analytic strategies for the appropriate data set.

**Sample Characteristics**

To determine patterns of differences in sample characteristics, three techniques were used. If the variable was continuous and all three groups were being compared, a one-way ANOVA was conducted, with diagnostic group as the independent variable and the characteristic as the dependent variable. If such a test was significant, post-hoc Tukey tests were conducted to determine where the difference lay, and Cohen’s $d$ was used as an indicator of effect size. If only women with PVD and PHN were being compared (e.g., for pain-related variables), independent-samples $t$-tests were conducted. If the variable in question was categorical, a contingency table analysis was conducted to evaluate whether there was any relationship between diagnostic group and various sample characteristics. Cramér’s $V$ was used to report the strength of those relationships. All tests were considered to be significant at the $\alpha = .05$ level. No corrections were used to ensure that any potential covariates would be identified.

Sexual and Relationship History Variables were examined first (Table 4). There was a relationship between diagnostic group and parity, Pearson $\chi^2(2, n = 157) = 10.44, p = .01$, Cramér’s $V = .18$, as well as hormonal contraceptive use, Pearson $\chi^2(2, n = 157) = 11.41, p = .003$, Cramér’s $V = .19$. For age of first intercourse, there was a significant effect of diagnostic group, $F(2, 154) = 4.24, p = .02$. Post-hoc comparisons using the Tukey HSD test indicated that women with PVD had sexual intercourse for the first time at a significantly older age than pain-free controls, $p = .01$, Cohen’s $d = .48$. There was no difference in intercourse age between women with PHN and either of the other groups ($ps > .31$). Further, for pain intensity ratings at first intercourse, there was a significant effect
of diagnostic group, $F(2, 146) = 10.33, p < .001$. Post-hoc comparisons indicated that at first intercourse women with PVD reported greater pain intensity than women with PHN, $p = .02$, Cohen’s $d = .64$, and pain-free controls, $p < .001$, Cohen’s $d = .79$. There was also a significant group effect for unpleasantness ratings at first sexual intercourse, $F(2, 148) = 8.19, p < .001$. Post-hoc comparisons indicated that women with PVD experienced significantly more unpleasantness than women with PHN, $p = .01$, Cohen’s $d = .71$, and controls, $p = .001$, Cohen’s $d = .65$. There was no effect of diagnostic group for the number of lifetime sexual partners, $p = .19$, but there was a significant group effect for intercourse frequency, $F(2, 138) = 12.63, p < .001$. Post-hoc comparisons indicated that pain-free control participants reported engaging in sexual intercourse more frequently over the past 6 months than women with PVD, $p < .001$, Cohen’s $d = .78$, and PHN, $p = .002$, Cohen’s $d = .79$. Finally, there was a relationship between diagnostic group and whether a woman was in a relationship at the time of the survey (e.g., dating one partner regularly, long distance relationship, living with a partner, or married/common law with a partner; Table 4), Pearson $\chi^2(2, n = 158) = 8.64, p = .01$, Cramér’s $V = .17$, and whether she had any sexual activity within the past 6 months, Pearson $\chi^2(2, n = 141) = 9.42, p = .01$, Cramér’s $V = .19$. 
Table 4.

Means (M), Standard Deviations (SD), Medians (Med), Ranges (R), Percent (%) and Sample Size (n) for Sexual and Relationship History Variables

<table>
<thead>
<tr>
<th></th>
<th>PVD M (SD)</th>
<th>PHN M (SD)</th>
<th>Control M (SD)</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age at first intercourse</strong></td>
<td>19.85 (4.87)</td>
<td>19.09 (3.18)</td>
<td>17.39 (5.35)</td>
<td>4.24*</td>
</tr>
<tr>
<td></td>
<td>19.00 (15-30)</td>
<td>19.00 (14-24)</td>
<td>18.00 (14-30)</td>
<td></td>
</tr>
<tr>
<td><strong>First intercourse pain intensity rating (0-10)</strong></td>
<td>5.05 (3.04)</td>
<td>3.05 (2.69)</td>
<td>2.79 (2.49)</td>
<td>10.33***</td>
</tr>
<tr>
<td></td>
<td>5.00 (0-10)</td>
<td>3.00 (0-8)</td>
<td>2.00 (0-8)</td>
<td></td>
</tr>
<tr>
<td><strong>First intercourse pain unpleasantness (0-10)</strong></td>
<td>4.80 (3.36)</td>
<td>2.55 (2.81)</td>
<td>2.92 (2.54)</td>
<td>8.19***</td>
</tr>
<tr>
<td></td>
<td>5.00 (0-10)</td>
<td>1.50 (0-8)</td>
<td>3.00 (0-9)</td>
<td></td>
</tr>
<tr>
<td><strong>Total sexual partners</strong></td>
<td>4.60 (5.82)</td>
<td>10.89 (23.50)</td>
<td>7.71 (13.66)</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>2.00 (1-30)</td>
<td>2.00 (0-100)</td>
<td>4.00 (1-100)</td>
<td></td>
</tr>
<tr>
<td><strong>Intercourse frequency</strong> (per month for 6 months)**</td>
<td>2.31 (3.34)</td>
<td>1.53 (2.24)</td>
<td>7.43 (8.25)</td>
<td>12.63***</td>
</tr>
<tr>
<td></td>
<td>1.00 (0-20)</td>
<td>0.00 (0-6)</td>
<td>5.50 (0-40)</td>
<td></td>
</tr>
<tr>
<td><strong>HC use</strong></td>
<td>27.3% (15)</td>
<td>4.3% (1)</td>
<td>40.5% (32)</td>
<td>11.41**</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td>32.7% (18)</td>
<td>65.2% (15)</td>
<td>29.1% (23)</td>
<td>10.44**</td>
</tr>
<tr>
<td><strong>In a relationship</strong></td>
<td>89.3% (50)</td>
<td>65.2% (15)</td>
<td>69.6% (55)</td>
<td>8.64*</td>
</tr>
<tr>
<td><strong>Intercourse in last 6 months</strong></td>
<td>73.1% (38)</td>
<td>41.2% (7)</td>
<td>79.2% (57)</td>
<td>9.94**</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001
Women with PVD and PHN also provided basic information on the experience of their pain (Table 5). There was no difference in the number of health professionals consulted by the groups, \( p = .30 \). Using a Bonferroni-corrected alpha of 0.0125 for pain intensity and unpleasantness, women with PVD reported significantly higher average pain intensity than women with PHN, \( t(30.62) = -2.71, p = .011 \), Cohen’s \( d = .79 \), equal variances not assumed. Similarly, women with PVD reported higher worst pain intensity than women with PHN, \( t(24.52) = -2.80, p = .01 \), Cohen’s \( d = .97 \), equal variances not assumed. There was no difference in the amount of pain unpleasantness these groups experienced, \( ps > .04 \). There was a relationship between diagnostic group and the amount of time each group had been suffering from their condition. Women with PVD had their pain for significantly longer than women with PHN, Pearson \( \chi^2(2, n = 79) = 25.79, p < .001 \), Cramér’s \( V = .57 \). Not surprisingly, women with PVD reported experiencing pain during intercourse significantly more often than women with PHN, \( t(68) = -9.09, p < .001 \), Cohen’s \( d = 2.69 \). There was also a relationship between diagnostic group and the experience of pain at the most recent gynecological examination (Table 5), Pearson \( \chi^2(2, n = 79) = 30.70, p < .001 \), Cramér’s \( V = .62 \), and pain while using feminine hygiene products, Pearson \( \chi^2(2, n = 78) = 17.46, p < .001 \), Cramér’s \( V = .47 \).
Table 5.

*Pain characteristics of women with PVD and PHN*

<table>
<thead>
<tr>
<th></th>
<th>PVD M (SD)</th>
<th>PHN M (SD)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of health professionals consulted</td>
<td>4.48 (3.48)</td>
<td>3.64 (2.32)</td>
<td>ns</td>
</tr>
<tr>
<td>% of the time intercourse is painful</td>
<td>86.91 (25.52)</td>
<td>13.33 (35.19)</td>
<td>9.09***</td>
</tr>
<tr>
<td>Average pain intensity rating (0-10)</td>
<td>6.96 (1.87)</td>
<td>5.32 (2.59)</td>
<td>2.71*</td>
</tr>
<tr>
<td>Worst pain intensity rating (0-10)</td>
<td>8.78 (1.28)</td>
<td>7.00 (2.86)</td>
<td>2.81*</td>
</tr>
<tr>
<td>Average unpleasantness rating</td>
<td>7.17 (2.09)</td>
<td>6.35 (2.71)</td>
<td>ns</td>
</tr>
<tr>
<td>Worst unpleasantness rating</td>
<td>8.94 (1.35)</td>
<td>7.74 (2.53)</td>
<td>ns</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PVD % (n)</th>
<th>PHN % (n)</th>
<th>Pearson $\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain during gynecological exam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>85.7% (48)</td>
<td>21.7% (5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>14.3% (8)</td>
<td>73.9% (17)</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>0.0% (0)</td>
<td>4.3% (1)</td>
<td>30.70***</td>
</tr>
<tr>
<td>Pain while using feminine hygiene products (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>49.1% (27)</td>
<td>0% (0)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>18.2% (10)</td>
<td>30.4% (7)</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>32.7% (18)</td>
<td>69.6% (16)</td>
<td>17.46***</td>
</tr>
<tr>
<td>Pain duration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 years</td>
<td>1.8% (1)</td>
<td>39.1% (9)</td>
<td></td>
</tr>
<tr>
<td>2-10 years</td>
<td>46.4% (26)</td>
<td>52.2% (12)</td>
<td></td>
</tr>
<tr>
<td>10+ years</td>
<td>51.8% (29)</td>
<td>8.7% (2)</td>
<td>25.79***</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001

*Note.* Intensity was rated on a scale from 0 (no pain at all) to 10 (the worst pain possible). Unpleasantness was rated on a scale from 0 (not unpleasant at all) to 10 (most unpleasant possible).
Women with PHN indicated in which location their worst post-shingles pain was experienced. The most common responses were the upper back (26.1%; n = 6) and face/head (30.4%; n = 7). We also asked women with PVD to indicate any diagnoses they had received for their pain (Table 6). The large majority of participants had received a diagnosis of vulvodynia (a general term describing idiopathic vulvar pain), vulvar vestibulitis (i.e., a previous name for PVD), or PVD. One woman reported a diagnosis of generalized vulvodynia, but her pattern of pain characteristics qualified her for inclusion into the PVD group.

Table 6.

Diagnoses Received for Vestibular Pain

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vulvodynia, Vulvar Vestibulitis Syndrome, or Provoked Vestibulodynia</td>
<td>89.2% (50)</td>
</tr>
<tr>
<td>Generalized Vulvodynia</td>
<td>1.8% (1)</td>
</tr>
<tr>
<td>Other</td>
<td>1.8% (1)</td>
</tr>
<tr>
<td>Decline Response</td>
<td>3.6% (2)</td>
</tr>
<tr>
<td>No diagnosis</td>
<td>3.6% (2)</td>
</tr>
</tbody>
</table>

Women were asked to report on how their PVD pain began (Table 7). The majority of women indicated that their pain began for no apparent reason, with their first sexual experience, or for another reason (e.g., back injury, childbirth, first tampon insertion).
Table 7.

Reasons Endorsed for the Vestibular Pain Starting

<table>
<thead>
<tr>
<th>Reason</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No reason</td>
<td>28.6% (16)</td>
</tr>
<tr>
<td>First sexual experience</td>
<td>30.4% (17)</td>
</tr>
<tr>
<td>Repeated yeast infections</td>
<td>16.1% (9)</td>
</tr>
<tr>
<td>New partner</td>
<td>1.8% (1)</td>
</tr>
<tr>
<td>Repeated bladder or urinary tract infections</td>
<td>7.1% (4)</td>
</tr>
<tr>
<td>Menopause</td>
<td>0.0% (0)</td>
</tr>
<tr>
<td>Gynecological surgery</td>
<td>0.0% (0)</td>
</tr>
<tr>
<td>Life stress</td>
<td>7.1% (4)</td>
</tr>
<tr>
<td>Abortion</td>
<td>1.8% (1)</td>
</tr>
<tr>
<td>Other (e.g., back injury, childbirth, first tampon insertion)</td>
<td>30.4% (17)</td>
</tr>
</tbody>
</table>

Note. Women were able to endorse more than one response.

Women were also asked to report what specific activities caused them vestibular pain (Table 8). The most common response was penile penetration, with 83.9% of women experiencing pain with that activity. Overall, women reported that 95.1% of the time ($SD = 8.10$), the activities they endorsed caused them pain.

Table 8.

Activities that Cause Vestibular Pain for Women with PVD

<table>
<thead>
<tr>
<th>Activity</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetration with fingers</td>
<td>66.1% (37)</td>
</tr>
<tr>
<td>Penetration with sex toys</td>
<td>53.6% (30)</td>
</tr>
</tbody>
</table>
Penetration with a penis 83.9% (47)
Tampon insertion 50.0% (28)
Gynecological examinations in general 71.4% (40)
Any pressure to the area 19.6% (11)
Any contact with the area 28.6% (16)
Other (e.g., diva cup) 3.6% (2)

*Note.* Women were able to endorse more than one response.

Next, women were asked when their PVD pain occurred (Table 9). Most women reported that their pain started or worsened when a penis, finger, or object just started to enter the vagina.

Table 9.

*When Provoked Vestibular Pain Occurs or Worsens During Intercourse or Penetration*

<table>
<thead>
<tr>
<th>Event</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the penis/finger/object starts to enter the vagina</td>
<td>83.9% (47)</td>
</tr>
<tr>
<td>When the penis/finger/object has fully entered and is thrusting</td>
<td>8.9% (5)</td>
</tr>
<tr>
<td>Only after penetration has finished</td>
<td>0.0% (0)</td>
</tr>
</tbody>
</table>

*Note.* Four women declined to answer this question.

Finally, women with PVD were asked to describe the kinds of treatments or changes they used currently and in the past to alleviate their pain (Table 10). The two most common treatments endorsed were changing aspects of one’s sex life, and using creams. Of note, over half (53.4%) of the PVD women had attempted to treat the pain with medication at some point, with 25% currently doing so.
Table 10.

*Treatments Used to Treat Vestibular Pain*

<table>
<thead>
<tr>
<th>Treatment Description</th>
<th>In the past</th>
<th>Currently</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing aspects of sex life (e.g., position, speed, enhancing arousal)</td>
<td>80.4% (45)</td>
<td>67.9% (38)</td>
</tr>
<tr>
<td>Creams (e.g., K-Y, Crisco, moisturizers, corticosteroids, hormonal, anesthetics)</td>
<td>91.1% (51)</td>
<td>53.6% (30)</td>
</tr>
<tr>
<td>Alternative medicine (e.g., vitamins, diets, homeopathic remedies)</td>
<td>41.1% (23)</td>
<td>12.5% (7)</td>
</tr>
<tr>
<td>Physiotherapy/physical therapy or other pelvic floor exercises (Kegels, biofeedback)</td>
<td>50.0% (28)</td>
<td>17.9% (10)</td>
</tr>
<tr>
<td>Psychological treatments (e.g., psychotherapy, hypnosis)</td>
<td>23.2% (13)</td>
<td>3.6% (2)</td>
</tr>
<tr>
<td>Other medical treatments (e.g., hormones, injections)</td>
<td>30.4% (17)</td>
<td>12.5% (7)</td>
</tr>
</tbody>
</table>
Small changes (e.g., cotton underwear, mild soaps)

<table>
<thead>
<tr>
<th></th>
<th>In the past</th>
<th>Currently</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>71.4% (40)</td>
<td>57.1% (32)</td>
</tr>
</tbody>
</table>

Surgery (e.g., vestibulectomy, hymenectomy)

<table>
<thead>
<tr>
<th></th>
<th>In the past</th>
<th>Currently</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16.1% (9)</td>
<td>1.8% (1)</td>
</tr>
</tbody>
</table>

Medications (e.g., Gabapentin, amitriptaline)

<table>
<thead>
<tr>
<th></th>
<th>In the past</th>
<th>Currently</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53.6% (30)</td>
<td>25.0% (14)</td>
</tr>
</tbody>
</table>

**PVD subtypes**

In addition to describing the pain location and situation, women with vulvar pain can be categorized based on the temporal nature of their pain. Some women have experienced their pain since the first vaginal penetration, and others develop their pain after a period of pain-free sexual intercourse (Sutton, Pukall, & Chamberlain, 2009a). Another method of subtyping is considering whether a woman has a comorbid pain condition. Perhaps those PVD women with multiple pain problems experience global increases in their vestibular pain. Before comparing PVD women with PHN women and controls, it was necessary to determine whether the PVD group was homogeneous or not. To achieve this goal, women were grouped based on when they began experiencing their pain (Primary: \( n = 21 \), Secondary: \( n = 35 \)) and whether or not they had a comorbid pain condition (e.g., migraines, low back pain; comorbid pain: \( n = 19 \), no comorbid pain: \( n = 37 \)). They were then compared using independent-samples \( t \)-tests and contingency table
analyses to determine if they were significantly different in mean score or frequency on key pain characteristics.

When comparing PVD women based on these variables, the groups were not significantly different in terms of the number of health professionals they had consulted about their vestibular pain, the percentage of the time that intercourse was painful, or pain intensity/unpleasantness ratings, $p > .08$. Further, there was no relationship between group status and experiencing pain at a recent gynecological examination, use of and pain with internal feminine hygiene products, or pain duration $p > .13$. As such, there is no evidence to suggest that these women could not be considered as a single group for the purposes of further analyses.

**Do women with PVD display a symptom pattern characteristic of those experiencing neuropathic pain?** To answer this question, clinical cut-off scores were referenced; independent-samples $t$-tests, multivariate analysis of variance, the Kruskal-Wallis rank sum test, and the Mann-Whitney U test were used; and symptom profiles were examined.

**Comparisons with Known Cutoff Scores.** The average scores on the MPQ and S-LANSS were compared with published cutoff scores (Bennett et al., 2005; Lynch et al., 2003) for those suffering from NP (Table 11). On the MPQ, those with NP are said to typically score 20 or more on the full scale. On average, women with PVD exceeded this cutoff ($M = 32.00, SD = 11.89$). The S-LANSS has a cutoff score of 12, and on average women with PVD exceeded that cutoff ($M = 13.43, SD = 5.19$). A contingency table analysis was conducted to determine whether the frequency of exceeding these cutoff scores was related to diagnostic group. For the S-LANSS, this relationship was not significant, $p = .47$, indicating that the same proportion of women from each group exceeded the cutoff for the S-LANSS. For the MPQ, the relationship showed a trend
towards significance, Pearson $\chi^2(1, n = 79) = 3.60, p = .06$, Cramér’s $V = .21$. This trend indicates that marginally more women with PVD would be classified as having NP.

Table 11.

*Means (M) and Standard Deviations (SD) of PVD and PHN women on the MPQ and S-LANSS, including how many meet or exceed the NP cutoff*

<table>
<thead>
<tr>
<th>Cutoff</th>
<th>PVD</th>
<th></th>
<th>PHN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>% above (n)</td>
<td>M (SD)</td>
<td>% above (n)</td>
</tr>
<tr>
<td>MPQ</td>
<td>20</td>
<td>32.00 (11.89)</td>
<td>88.0% (49)</td>
<td>33.96 (15.29)</td>
</tr>
<tr>
<td>S-LANSS</td>
<td>12</td>
<td>13.43 (5.19)</td>
<td>67.0% (31)</td>
<td>15.14 (6.10)</td>
</tr>
</tbody>
</table>

*Note.* MPQ = McGill Pain Questionnaire (PVD: $n = 56$, PHN: $n = 23$); S-LANSS = Self-Complete Leeds Assessment of Neuropathic Symptoms and Signs (PVD: $n = 46$, PHN: $n = 21$).

**Comparing NP Characteristics between PVD and PHN Women.** Next, each of the scales and subscales used to measure NP were used to compare women with PVD to women with PHN (Table 12). It was determined that there was no significant difference for total score on the MPQ, $t(33.46) = 0.55, p = .59$, equal variances not assumed. However, women with PVD showed a trend towards choosing significantly fewer words overall on the MPQ, $t(77) = 2.21, p = .03$, Cohen’s $d = .55$. Finally, there were no significant differences on the Sensory, Affective, Evaluative, or Miscellaneous subscales on the MPQ, $ps > .12$. No significant difference was observed on the S-LANSS, $t(65) = 1.18, p = .24$. On the PQAS, women with PVD reported significantly lower levels of surface, $t(25.50) = 3.65, p = .001$, Cohen’s $d = 1.24$, deep, $t(25.85) = 4.38, p < .001$, Cohen’s $d = 1.46$, and paroxymal pain, $t(26.20) = 4.04, p < .001$, Cohen’s $d = 1.33$, equal variances not assumed for all three.
Finally, we used the NPSI to compare these groups of women. Because this measure asks participants to answer the questions specifically about any pain experienced in the past 24 hours, these data were analyzed in two ways. First, all participants were included in the comparisons. When analyzed this way, women with PVD scored significantly lower than women with PHN on the total score $t(27.28) = 3.74, p = .001$, Cohen’s $d = 1.19$, as well as on the pressing $t(27.15) = 2.84, p = .008$, Cohen’s $d = .90$, paroxysmal $t(24.63) = 3.38, p = .002$, Cohen’s $d = 1.16$, and paresthesia subscales, $t(23.98) = 3.87, p = .001$, Cohen’s $d = 1.35$, equal variances not assumed. There were no significant differences for the burning spontaneous pain ($p = .03$) or evoked pain ($p = .04$) subscales, equal variance not assumed. Next, only the participants who had, in fact, experienced pain in the past 24 hours were included in the analysis. Because women with PVD experience provoked pain, many do not have their pain on a daily basis. If a woman did not have intercourse or other contact with the genital area in the past 24 hours, she may not have experienced her pain at all. Interestingly, when only those experiencing pain in the past 24 hours were included, only two subscales remained significantly lower for women with PVD: the paresthesia subscale, $t(25.27) = 3.69, p = .001$, Cohen’s $d = 1.19$, equal variances not assumed, and the transformed version of the paroxysmal subscale, $t(50) = 2.74, p = .01$, Cohen’s $d = .83$. The total NPSI score and the remaining subscales (burning, pressing, & evoked) were not significantly different between the PVD and PHN groups, $ps > .013$. 
Table 12.

*Means and Standard Deviations (SD) for Neuropathic Pain Variables*

<table>
<thead>
<tr>
<th>Measure</th>
<th>PVD Mean (SD)</th>
<th>PHN Mean (SD)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPQ</td>
<td>32.00 (11.89)</td>
<td>33.96 (15.29)</td>
<td>ns</td>
</tr>
<tr>
<td>Number of Words Chosen</td>
<td>11.00 (3.93)</td>
<td>13.26 (4.61)</td>
<td>2.21*</td>
</tr>
<tr>
<td>Sensory</td>
<td>18.38 (7.01)</td>
<td>19.83 (7.10)</td>
<td>ns</td>
</tr>
<tr>
<td>Affective</td>
<td>2.96 (3.03)</td>
<td>4.52 (4.24)</td>
<td>ns</td>
</tr>
<tr>
<td>Evaluative</td>
<td>3.20 (1.54)</td>
<td>2.96 (1.58)</td>
<td>ns</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>7.46 (4.10)</td>
<td>6.65 (4.77)</td>
<td>ns</td>
</tr>
<tr>
<td>S-LANSS</td>
<td>13.43 (5.19)</td>
<td>15.14 (6.10)</td>
<td>ns</td>
</tr>
<tr>
<td>PQAS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Pain</td>
<td>.84 (.89)</td>
<td>2.49 (2.09)</td>
<td>3.65**</td>
</tr>
<tr>
<td>Deep Pain</td>
<td>.75 (1.18)</td>
<td>3.27 (2.65)</td>
<td>4.38***</td>
</tr>
<tr>
<td>Paroxymal</td>
<td>1.10 (1.42)</td>
<td>3.79 (3.06)</td>
<td>4.04***</td>
</tr>
<tr>
<td>NPSI – whole sample</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burning Spontaneous Pain</td>
<td>2.71 (3.68)</td>
<td>4.86 (3.78)</td>
<td>2.28*</td>
</tr>
<tr>
<td>Pressing Spon. Pain</td>
<td>.86 (1.62)</td>
<td>2.66 (2.78)</td>
<td>2.84**</td>
</tr>
<tr>
<td>Paroxysmal Pain</td>
<td>.76 (1.63)</td>
<td>3.48 (3.61)</td>
<td>3.65***</td>
</tr>
<tr>
<td>Evoked Pain</td>
<td>2.05 (2.31)</td>
<td>3.5 (2.75)</td>
<td>2.15*</td>
</tr>
<tr>
<td>Paresthesia</td>
<td>.41 (1.30)</td>
<td>3.11 (3.17)</td>
<td>3.87***</td>
</tr>
<tr>
<td>Total</td>
<td>12.38 (14.30)</td>
<td>33.86 (25.17)</td>
<td>3.74**</td>
</tr>
<tr>
<td>NPSI – Pain in Last 24 hrs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burning Spontaneous Pain</td>
<td>3.87 (3.78)</td>
<td>4.86 (3.78)</td>
<td>ns</td>
</tr>
</tbody>
</table>
Pressing Spon. Pain  1.42 (1.94)  2.66 (2.78)  ns
Paroxysmal Pain  1.22 (1.99)  3.48 (3.61)  2.74**
Evoked Pain  3.32 (2.14)  3.5 (2.75)  ns
Paresthesia  .50 (1.17)  3.11 (3.17)  3.69***
Total  20.10 (13.38)  33.86 (25.17)  ns

*p < .05, **p < .01, ***p < .001
Note. MPQ = McGill Pain Questionnaire (PVD: n = 56, PHN: n = 23); S-LANSS = Self-Complete Leeds Assessment of Neuropathic Symptoms and Signs (PVD: n = 46, PHN: n = 21); PQAS = Pain Quality Assessment Scale (PVD: n = 53, PHN: n = 23); NPSI = Neuropathic Pain Symptom Inventory (PVD: n = 49, PHN: n = 22).

**Evaluating NP Scales.** Next, Pearson correlational analyses were conducted to determine the relationship between each of the pain descriptor scales. It is clear that some of these scales are addressing different constructs, at least to some extent (Table 13).

Table 13.

**Correlations Between the Various Pain Descriptor Scales**

<table>
<thead>
<tr>
<th></th>
<th>PQAS: Surface</th>
<th>PQAS: Deep</th>
<th>PQAS: Par.</th>
<th>S-LANSS</th>
<th>NPSI</th>
<th>MPQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>PQAS: Surface</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PQAS: Deep</td>
<td>.57**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PQAS: Par.</td>
<td>.67**</td>
<td>.75**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S-LANSS</td>
<td>.40**</td>
<td>.15</td>
<td>.35**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPSI</td>
<td>.72**</td>
<td>.69**</td>
<td>.86**</td>
<td>.40**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MPQ</td>
<td>.13</td>
<td>.39**</td>
<td>.38**</td>
<td>-.02</td>
<td>.35**</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001
Note. MPQ = McGill Pain Questionnaire; S-LANSS = Self-Complete Leeds Assessment of Neuropathic Symptoms and Signs; PQAS = Pain Quality Assessment Scale; Par. = Paresthesia; NPSI = Neuropathic Pain Symptom Inventory. A combined PVD/PHN group was used, n = 62-76.
Examining Symptom Profiles. In order to more fully understand the symptoms women are experiencing, each scale was examined individually to see which items each diagnostic group was endorsing. Examining Figures 2-10 illustrates the various symptom profiles reported by each of these groups. Even though both PVD and PHN display signs of being chronic — and perhaps neuropathic — pain conditions, their symptom profiles differ from one another.

Figure 2. Items from the MPQ that correspond with the sensory scale.

Note. For PVD, n = 56; for PHN, n = 23. Question one ranges from 1 (flickering) to 6 (pounding); question two ranges from 1 (jumping) to 3 (flashing); question three ranges from 1 (pricking) to 5 (lancinating); question four ranges from 1 (sharp) to 3 (lacerating); question 5 ranges from 1 (pinching) to 5 (crushing); question six ranges from 1 (tugging) to 3 (wrenching); question 7 ranges from 1 (hot) to 4 (searing); question 8 ranges from 1 (tingling) to 4 (stinging); question 9 (dull) to 5 (heavy); question 10 ranges from 1 (tender) to 4 (splitting).
Figure 3. Items from the MPQ that correspond with the affective scale.

Note. For PVD, \( n = 56 \); for PHN, \( n = 23 \). Question 11 ranges from 1 (tiring) to 2 (exhausting); question 12 ranges from 1 (sickening) to 2 (suffocating); question 13 ranges from 1 (fearful) to 3 (terrifying); question 14 ranges from 1 (punishing) to 5 (killing); question 15 ranges from 1 (wretched) to 2 (blinding).

Figure 4. Item from the MPQ that makes up the evaluative scale.

Note. For PVD, \( n = 56 \), for PHN, \( n = 23 \). Question 16 ranges from 1 (annoying) to 5 (unbearable).
Figure 5. Items from the MPQ that correspond with the miscellaneous scale.

*Note.* For PVD, \( n = 56 \), for PHN, \( n = 23 \). Question 17 ranges from 1 (*spreading*) to 4 (*piercing*); question 18 ranges from 1 (*tight*) to 5 (*tearing*); question 19 ranges from 1 (*cool*) to 3 (*freezing*); question 20 ranges from 1 (*nagging*) to 5 (*torturing*).

Figure 6. Symptom profile based on percent endorsement of each symptom on the S-LANSS.

*Note.* For PVD, \( n = 51-55 \). For PHN, \( n = 20-23 \).
Figure 7. Symptom profile based on the PQAS Surface Pain subscale items. 
Note. For PVD, \(n = 51-53\); for PHN, \(n = 23\). Items are rated on scale from 0 (absence of that pain type) to 10 (most intense pain possible of that type).

Figure 8. Symptom profile based on the PQAS Deep Pain subscale items. 
Note. For PVD, \(n = 51-53\); for PHN, \(n = 23\). Items are rated on scale from 0 (absence of that pain type) to 10 (most intense pain possible of that type).
Figure 9. Symptom profile based on the PQAS Paroxysmal Pain subscale items. 
Note. For PVD, N = 51-53; for PHN, N = 23. Items are rated on scale from 0 (absence of that pain type) to 10 (most intense pain possible of that type).

Figure 10. Symptom profile based on whether women endorsed each symptom on the NPSI. 
Note. For PVD, N = 24. For PHN, N = 21-23. Only PVD women experiencing pain in the last 24 hours are included. Items are rated on scale from 0 (absence of that pain type) to 10 (most intense pain possible of that type).
Comparing Pain-Related Variables between PVD and PHN. To examine pain-related variables, independent-samples t-tests were used to compare women with PVD to women with PHN on measures of pain catastrophizing, anxiety, and pain disability (transformed with a logarithmic function. There was no significant group difference in any of those measures, ps > .08. Women’s partners’ reactions to their pain were compared using three subscales of the MPI. A one-way between-subjects multivariate analysis of variance (MANOVA) was conducted on the partner response variables: solicitous, distracting, and negative responses. The independent variable was diagnostic group (PVD and PHN). With the use of Wilks’ criterion, the combined DVs did not differ significantly based on diagnostic group, F(3, 60) = 1.97, p = .13, partial η² = .09.

Comparing Non-Pain Related Variables between PVD, PHN, and Control Women. A number of variables were examined to determine the life impact of PVD and PHN pain, comparing these groups to pain-free control participants (Table 14). First, a one-way between-subjects multivariate analysis of variance (MANOVA) was conducted on the three mental-health related variables: depression (CES-D), trait anxiety (STAI), and stress (PSS). The independent variable was diagnostic group (PVD, PHN, and pain-free controls). The total n for controls was reduced from 79 to 77 due to non-completion of all scales. With the use of Wilks’ criterion, the combined DVs differed significantly based on diagnostic group, F(6, 304) = 3.43, p = .003, partial η² = .06. Univariate tests revealed that only depression contributed significantly to the overall result, F(2, 153) = 5.27, p = .006, partial η² = .06, although stress showed a trend towards significance, F(2, 153) = 2.51, p = .08, partial η² = .03. The contribution of trait anxiety was non-significant.
Next, planned Helmert contrasts were conducted where the pain-free control group was compared with a combined PVD and PHN group, and subsequently, the PVD group was compared to only the PHN group for all three variables. For depression, a significant difference was observed between controls and PVD/PHN women, contrast estimate = -0.68, \( p = .003 \), with 95% confidence limits from -0.11 to -0.23. For trait anxiety, no significant difference was observed, contrast estimate = -3.36, \( p = .09 \), with 95% confidence limits from -7.23 to 0.51. Finally, a significant difference was observed for stress, contrast estimate = -2.77, \( p = .03 \), 95% confidence limits from -5.32 to -0.23. When the PVD and PHN groups were compared to one another, no significant differences emerged on any of these variables, \( ps > .08 \).

Next, a one-way ANOVA was conducted to determine whether diagnostic group (control, PVD, PHN) impacted ratings on the sleep problems index (MOS). One woman with PVD did not answer enough questions to receive a score on this measure. There was a significant group effect, \( F(2, 154) = 4.66, \ p = .01, \ partial \eta^2 = .06 \). Planned Helmert contrasts revealed a significant difference between controls and PVD/PHN women combined, contrast estimate = -8.31, \( p = .004 \), 95% confidence limits from -13.96 to -2.66. However, there was no significant difference between the PVD and PHN women, \( p = .99 \).

A one-way ANOVA was conducted to determine whether diagnostic group impacted ratings on female sexual function. Only those women who had engaged in sexual activity over the past month were included in this analysis. After applying this criterion, 41 PVD women, 8 PHN women, and 63 control women remained. There was a significant group effect, \( F(2, 109) = 45.06, \ p < .001, \ partial \eta^2 = .45 \). Post-hoc Tukey
comparisons revealed that women with PVD scored significantly lower than women with PHN, 95% confidence limits from -15.07 to -5.20, \( p < .001 \), Cohen’s \( d = 1.78 \), and pain-free controls, 95% confidence limits from -12.56 to -7.43, \( p < .001 \), Cohen’s \( d = 1.80 \). There was no significant difference between women with PHN and controls, \( p = .99 \).

Relationship satisfaction was examined with a one-way ANOVA. Because this questionnaire requires that women be in relationships, not all participants were able to provide data. As such, data were gathered from 47 women with PVD, 15 women with PHN, and 52 control women. Age and relationship length were used as covariates as they were significantly related to relationship satisfaction. Because this did not alter the significance of the test, the original ANOVA results are presented. There was no effect of group on relationship satisfaction, \( F(2, 114) = 1.32, p = .27 \).

Table 14.

Means and SDs for Non Pain-Related Variables

<table>
<thead>
<tr>
<th>Measure</th>
<th>PVD Mean (SD)</th>
<th>PHN Mean (SD)</th>
<th>Control Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CES-D</td>
<td>13.73 (11.02)</td>
<td>18.09 (12.43)</td>
<td>10.53 (8.70)</td>
</tr>
<tr>
<td>STAI</td>
<td>39.39 (12.84)</td>
<td>38.26 (13.86)</td>
<td>35.47 (9.85)</td>
</tr>
<tr>
<td>PSS</td>
<td>15.86 (8.55)</td>
<td>15.96 (9.02)</td>
<td>13.14 (6.44)</td>
</tr>
<tr>
<td>MOS</td>
<td>38.97 (17.48)</td>
<td>38.12 (20.82)</td>
<td>29.84 (16.18)</td>
</tr>
<tr>
<td>FSFI</td>
<td>18.28 (6.11)</td>
<td>28.41 (3.82)</td>
<td>28.27 (5.00)</td>
</tr>
<tr>
<td>DAS</td>
<td>110.00 (12.80)</td>
<td>104.79 (18.14)</td>
<td>110.81 (12.28)</td>
</tr>
</tbody>
</table>

*Note.* CES-D = Centre for Epidemiological Studies Depression Scale (N = 156); STAI = State Trait Anxiety Inventory – Trait Version (N = 158); PSS = Perceived Stress Scale (N = 158); MOS = Sleep Problem Index (N = 157); FSFI = Female Sexual Function Index (PVD: N = 41, PHN: N = 8, Control: N = 63); DAS = Dyadic Adjustment Scale (PVD: N = 47, PHN: N = 14, Control: N = 52).
Comparing Health-Related Quality of Life. Next, women with PVD, PHN, and pain-free controls were compared on health-related quality of life measures (Table 15). The SF-36, measuring health-related quality of life, was the only measure where all but two of the subscales (i.e., Energy/Fatigue, Emotional Well-Being) were extremely skewed, violating the normality assumption of parametric testing. Even after using variance-stabilizing transformations, these variables remained skewed and thus were not analyzed using parametric methods. This skewness occurred because many of the participants from each group did not report any disturbances on a number of the subscales, thus resulting in a ceiling effect. The two variables that were normally distributed were analyzed with one-way ANOVAs. For Energy/Fatigue, there was a significant effect of group, $F(2, 152) = 7.08$, $p = .001$, $partial \eta^2 = .09$. Next, planned Helmert contrasts were applied, where the pain-free control group was compared with a combined PVD and PHN group, and subsequently the PVD group was compared to only the PHN group. A significant difference was observed between controls and PVD/PHN women, contrast estimate $= 12.34$, $p < .001$, with 95% confidence limits from 5.86 to 18.81. There was no significant difference between women with PVD and PHN, $p = .22$. For Emotional Well-Being there was no significant effect of group, although a trend was present, $F(2, 152) = 2.98$, $p = .054$. Planned Helmert contrasts revealed no significant differences between controls and the combined PVD/PHN group, and no differences between PVD women and PHN women, $ps > .14$.

The remaining variables of the SF-36 were analyzed using the Kruskal-Wallis Test, which does not require the assumption of normality to be met. Where group effects were present, follow-up Mann-Whitney U tests were conducted and a Bonferroni-corrected alpha level of .008 was used to determine statistical significance.
For Physical Function, there was a significant group effect, $\chi^2(2) = 37.30, p < .001$. Controls ($M_{rank} = 58.79$) reported significantly greater physical function than women with PHN ($M_{rank} = 21.1$), $U = 211.50, p < .001, abs(r) = .59$. There was also a significant difference between women with PVD ($M_{rank} = 45.76$) and women with PHN ($M_{rank} = 22.09$), $U = 233.00, p < .001, abs(r) = .49$, and a significant difference between controls ($M_{rank} = 73.21$) and women with PVD ($M_{rank} = 58.20$), $p = .01, abs(r) = .22$.

For Role Limitations due to Physical Problems, a significant group effect was observed, $\chi^2(2) = 23.99, p < .001$. Controls ($M_{rank} = 56.34$) reported fewer such problems with role limitations than women with PHN ($M_{rank} = 29.80$), $U = 402.50, p < .001, abs(r) = .47$. Similarly, women with PVD ($M_{rank} = 44.39$) reported fewer such problems than women with PHN ($M_{rank} = 25.53$), $U = 308.50, p < .001, abs(r) = .44$. However, there was no significant difference between controls ($M_{rank} = 69.10$) and women with PVD ($M_{rank} = 64.02$), $p = .31$.

For Role Limitations due to Emotional Problems, a significant group effect was observed, $\chi^2(2) = 7.07, p = .03$. There was a significant difference between controls ($M_{rank} = 53.72$) and women with PHN ($M_{rank} = 39.09$), $p = .02$. There was no significant difference between controls ($M_{rank} = 71.79$) and women with PVD ($M_{rank} = 60.20$), $p = .05$, or between women with PVD ($M_{rank} = 40.31$) and women with PHN ($M_{rank} = 35.73$), $p = .38$.

For Social Functioning, a significant group effect was observed, $\chi^2(2) = 17.83, p < .001$. Control women ($M_{rank} = 56.62$) reported greater levels of social functioning than women with PHN ($M_{rank} = 28.82$), $U = 381.00, p < .001, abs(r) = .42$. Similarly, women with PVD ($M_{rank} = 44.09$) reported greater levels of social functioning than
women with PHN ($M_{rank} = 26.27$), $U = 325.00$, $p = .001$, $abs (r) = .37$. However, there was no significant difference between controls ($M_{rank} = 69.88$) and women with PVD ($M_{rank} = 62.92$), $p = .27$.

For Pain, there was a significant group effect, $\chi^2(2) = 37.47$, $p < .001$. Control women ($M_{rank} = 58.23$) reported significantly less pain than women with PHN ($M_{rank} = 23.09$), $U = 255.00$, $p < .001$, $abs (r) = .52$. Further, control women ($M_{rank} = 78.01$) reported significantly less pain than women with PVD ($M_{rank} = 51.39$), $U = 1286.50$, $p < .001$. Also, PVD women ($M_{rank} = 45.11$) reported significantly less pain than women with PHN ($M_{rank} = 23.73$), $U = 269.00$, $p < .001$, $abs (r) = .44$.

Finally, there was a significant group effect for General Health, $\chi^2(2) = 24.11$, $p < .001$. Controls ($M_{rank} = 56.85$) reported significantly greater general health than women with PHN ($M_{rank} = 27.98$), $U = 362.50$, $p < .001$, $abs (r) = .41$. Further, controls ($M_{rank} = 76.92$) reported significantly greater general health than women with PVD ($M_{rank} = 52.94$), $U = 1371.50$, $p < .001$, $abs (r) = .31$, and there was a significant difference on general health between women with PVD ($M_{rank} = 42.50$) and women with PHN ($M_{rank} = 30.25$), $p = .03$, $abs (r) = .25$. 
Table 15.

Means (M) and SDs for SF-36 subscales, and M ranks for significantly skewed subscales

<table>
<thead>
<tr>
<th>SF 36</th>
<th>PVD M (SD)</th>
<th>PHN M (SD)</th>
<th>Control M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning*</td>
<td>90.55 (15.02)</td>
<td>62.73 (29.79)</td>
<td>95.26 (9.57)</td>
</tr>
<tr>
<td>Role Limitations (Physical)*</td>
<td>82.73 (31.87)</td>
<td>42.05 (45.24)</td>
<td>87.08 (30.13)</td>
</tr>
<tr>
<td>Role Limitations (Emotion)*</td>
<td>67.88 (39.53)</td>
<td>59.09 (42.33)</td>
<td>80.09 (32.35)</td>
</tr>
<tr>
<td>Energy/Fatigue</td>
<td>48.91 (21.87)</td>
<td>42.96 (21.53)</td>
<td>58.27 (16.63)</td>
</tr>
<tr>
<td>Emotional Well-Being</td>
<td>64.58 (19.98)</td>
<td>70.73 (18.61)</td>
<td>72.10 (15.76)</td>
</tr>
<tr>
<td>Social Functioning*</td>
<td>82.73 (20.62)</td>
<td>63.07 (26.30)</td>
<td>86.63 (18.39)</td>
</tr>
<tr>
<td>Pain*</td>
<td>74.68 (18.51)</td>
<td>48.63 (27.17)</td>
<td>86.27 (16.39)</td>
</tr>
<tr>
<td>General Health*</td>
<td>65.09 (20.78)</td>
<td>51.23 (26.20)</td>
<td>77.88 (16.47)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure</th>
<th>PVD M Rank</th>
<th>PHN M Rank</th>
<th>Control M Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Functioning</td>
<td>75.96</td>
<td>31.70</td>
<td>92.49</td>
</tr>
<tr>
<td>Role Limitations (Physical)</td>
<td>80.41</td>
<td>43.82</td>
<td>85.94</td>
</tr>
<tr>
<td>Role Limitations (Emotion)</td>
<td>72.51</td>
<td>63.32</td>
<td>86.01</td>
</tr>
<tr>
<td>Social Functioning</td>
<td>79.01</td>
<td>43.59</td>
<td>86.99</td>
</tr>
<tr>
<td>Pain</td>
<td>68.50</td>
<td>35.52</td>
<td>96.74</td>
</tr>
<tr>
<td>General Health</td>
<td>67.44</td>
<td>46.73</td>
<td>94.27</td>
</tr>
</tbody>
</table>

*Significantly skewed and non-normal

Note. SF-36 = Short Form Health Survey-36 (N = 155)

Is there a relationship between neuropathic pain and pain/psychosocial variables?

Neuropathic Pain Symptoms Predicting Pain/Psychosocial Variables. Next, measures of neuropathic pain symptoms were used to predict pain-related and non-pain variables (Table 16). Interestingly, while the MPQ predicted pain catastrophizing, and
pain anxiety (PVD only), the S-LANSS only predicted sleep problems for PVD women. Further, the NPSI predicted all variables for PHN women, but only sleep problems and pain-related variables for women with PVD.

Table 16.

Pearson Correlations Between Neuropathy and Pain/Psychosocial Variables

<table>
<thead>
<tr>
<th>MPQ total</th>
<th>S-LANSS</th>
<th>NPSI total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVD</td>
<td>PHN</td>
<td>PVD</td>
</tr>
<tr>
<td>PCS</td>
<td>.35**</td>
<td>.57**</td>
</tr>
<tr>
<td>PDI (T)</td>
<td>.05</td>
<td>.27</td>
</tr>
<tr>
<td>PASS-20</td>
<td>.32*</td>
<td>.24</td>
</tr>
<tr>
<td>CES-D</td>
<td>.23</td>
<td>.28</td>
</tr>
<tr>
<td>STAI</td>
<td>.23</td>
<td>.30</td>
</tr>
<tr>
<td>PSS</td>
<td>.13</td>
<td>.32</td>
</tr>
<tr>
<td>MOS</td>
<td>.26</td>
<td>.26</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001

Note. Unless otherwise specified, N for PVD = 53-56, N for PHN = 21-23. Only women experiencing pain during the past 24 hours included in the NPSI analysis. PCS = Pain Catastrophizing Scale; PASS-20 = Pain Anxiety Symptoms Scale-20; PDI = Pain Disability Index; MPI = West Haven Yale Multidimensional Pain Inventory; CES-D = Centre for Epidemiological Studies Depression Scale; STAI = State Trait Anxiety Inventory – Trait Version; MOS = Sleep Problem Index; PSS = Perceived Stress Scale.

In search of other ways to predict these variables, further Pearson correlational analyses were conducted using the pain-related and psychosocial variables to predict each other for the PVD sample alone (Table 17). The strongest correlations were observed among the mental health variables (CES-D, STAI, PSS), and between pain anxiety and
catastrophizing (PASS-20 and PCS). The remaining variables were moderately correlated with one another.

Table 17.

*Bi*variate Correlations Between Pain and Psychosocial Variables

<table>
<thead>
<tr>
<th></th>
<th>PCS</th>
<th>PDI (T)</th>
<th>PASS-20</th>
<th>CES-D</th>
<th>STAI</th>
<th>PSS</th>
<th>MOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDI (T)</td>
<td>.54**</td>
<td>1</td>
<td>.45**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PASS-20</td>
<td>.70*</td>
<td>.45**</td>
<td>.34*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES-D</td>
<td>.38**</td>
<td>.49**</td>
<td>.34*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAI</td>
<td>.38**</td>
<td>.46**</td>
<td>.43**</td>
<td>.84**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSS</td>
<td>.32*</td>
<td>.37**</td>
<td>.38**</td>
<td>.80**</td>
<td>.90**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MOS</td>
<td>.42**</td>
<td>.34*</td>
<td>.44**</td>
<td>.56**</td>
<td>.55**</td>
<td>.49**</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01

*Note*. N = 55 for MOS and PASS-20, N = 56 for all others. PCS = Pain Catastrophizing Scale; PASS-20 = Pain Anxiety Symptoms Scale-20; PDI = Pain Disability Index; MPI = West Haven Yale Multidimensional Pain Inventory; CES-D = Centre for Epidemiological Studies Depression Scale; STAI = State Trait Anxiety Inventory – Trait Version; PSS = Perceived Stress Scale; MOS = Sleep Problem Index.

Comparing Women Above or Below NP Cut-off Scores. Next, pain/psychosocial variables were examined for differences between those who were above and below the NP cutoffs for the MPQ and the S-LANSS. Because the number of PVD women below the cutoffs was so small (Table 11), we used a combined PVD/PHN group for these analyses. Four one-way MANOVAs were computed, with the independent variable being cutoff group (above or below S-LANSS and MPQ scores), and the dependent variables being mental health (CES-D, STAI, and PSS) or pain-related variables (PCS, PASS, PDI).
First, using the MPQ cutoff and Wilks’ criterion we observed no significant effect for the mental health variables, $F(3, 75) = 1.16, p = .33$, partial $\eta^2 = .04$. The S-LANSS cutoff produced a similar result, $F(3, 63) = .85, p = .47$, partial $\eta^2 = .04$. When using the MPQ cutoff scores no significant effect was observed for the pain-related variables, $F(3,72) = 1.26, p = .30$, partial $\eta^2 = .05$. A similar finding was observed using the S-LANSS cutoff, $F(3, 62) = .45, p = .72$, partial $\eta^2 = .02$.

For sleep problems, an independent-samples $t$-test was conducted to determine whether exceeding the NP cutoff was related to sleep problems. When using the MPQ criteria, those above the cutoff had significantly more sleep problems than those below, $t(76) = 2.58, p = .01$, Cohen’s $d = .77$. A similar difference was observed when using the S-LANSS criteria, $t(65) = 2.06, p = .04$, Cohen’s $d = .56$.

**Health-Related Quality of Life and NP.** Finally, four elements of health-related quality of life were examined for how neuropathy is related to each (Tables 18 & 19). These elements were chosen because they are the most likely to bring a person to see a health professional. Using normative data from the Medical Outcomes Study, a dummy code variable was created to categorize PVD and PHN women as either above or below the mean for that particular characteristic. Then, independent-samples $t$-tests were used to compare degree of neuropathy (i.e., MPQ, SLANSS, and NPSI total scores) for the two groups (high functioning, or above the population mean, or low functioning). For the NPSI, only those experiencing pain in the past 24 hours were included.

For Physical Functioning, there was a significant group effect, such that those with low physical functioning reported significantly higher NPSI scores than those with high physical functioning, $t(50) = 2.38, p = .02$, Cohen’s $d = .71$. Similar results were
found with marginally different S-LANSS scores, \( t(63) = 1.96, p = .054 \), Cohen’s \( d = .56 \).

However, there was no significant group effect for MPQ scores, \( p = .85 \).

For Energy/Fatigue, there was no significant group effect for NPSI or S-LANSS scores, \( ps > .09 \). However, those with high energy scored significantly lower on the MPQ than those with lower energy, \( t(75) = 2.92, p = .01 \), Cohen’s \( d = .70 \).

Table 18.

Neuropathy Scores Based on Physical Functioning and Energy/Fatigue

<table>
<thead>
<tr>
<th></th>
<th>Physical Functioning</th>
<th>Energy/Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High M (SD)</td>
<td>Low M (SD)</td>
</tr>
<tr>
<td>MPQ</td>
<td>33.00 (12.54)</td>
<td>33.67 (12.88)</td>
</tr>
<tr>
<td></td>
<td>N = 59</td>
<td>N = 18</td>
</tr>
<tr>
<td>SLANSS</td>
<td>13.29 (5.15)</td>
<td>16.29 (6.13)</td>
</tr>
<tr>
<td></td>
<td>N = 48</td>
<td>N = 17</td>
</tr>
<tr>
<td>NPSI</td>
<td>21.27 (17.06)</td>
<td>34.72 (23.23)</td>
</tr>
<tr>
<td></td>
<td>N = 34</td>
<td>N = 18</td>
</tr>
</tbody>
</table>

\*\( p < .05 \), \**\( p < .01 \), \***\( p < .001 \)

Note. MPQ = McGill Pain Questionnaire; SLANSS = Self-Complete Leeds Assessment for Neuropathic Signs and Symptoms; NPSI = Neuropathic Pain Symptom Inventory.

For Pain, there was a significant group effect, such that those with low physical pain scores reported significantly higher NPSI scores than those with high pain scores, \( t(50) = 3.52, p = .02 \), Cohen’s \( d = 1.03 \). A similar trend was observed with S-LANSS scores, \( t(62.92) = 1.80, p = .08 \), Cohen’s \( d = .44 \), equal variances not assumed. However, there was no effect of group for MPQ scores, \( p = .09 \).

For General Health, there was a significant group effect, such that those with low general health reported significantly higher NPSI scores than those with high general
health, $t(50) = 3.52$, $p = .001$, Cohen’s $d = .97$. A similar effect was observed with S-LANSS scores, $t(63) = 2.38$, $p = .02$, Cohen’s $d = .61$, but not for MPQ scores, $p = .73$.

Table 19.

*Neuropathy Scores Based on Pain and General Health*

<table>
<thead>
<tr>
<th>Pain</th>
<th>General Health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High M (SD)</td>
</tr>
<tr>
<td>MPQ</td>
<td>30.46 (11.55)</td>
</tr>
<tr>
<td>N = 35</td>
<td>N = 42</td>
</tr>
<tr>
<td>SLANSS</td>
<td>12.70 (4.45)</td>
</tr>
<tr>
<td>N = 27</td>
<td>N = 38</td>
</tr>
<tr>
<td>NPSI</td>
<td>14.16 (10.80)</td>
</tr>
<tr>
<td>N = 19</td>
<td>N = 33</td>
</tr>
</tbody>
</table>

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. MPQ = McGill Pain Questionnaire; SLANSS = Self-Complete Leeds Assessment for Neuropathic Signs and Symptoms; NPSI = Neuropathic Pain Symptom Inventory.

**Is there a relationship between NP and pain length or intensity for PVD women?**

**Pain Length.** To determine whether scores on NP measures differed based on how long a woman had experienced her pain, three independent-samples $t$-test were conducted, with pain length group as the independent variable (< 2 years, 2-10 years, 10+ years), and MPQ, S-LANSS, and NPSI scores as the dependent variables. None of these tests were significant, $ps > .24$.

**Pain Intensity.** To determine whether greater pain intensity was related to greater NP, three Pearson correlations were computed between average vestibular pain intensity and MPQ, S-LANSS, and NPSI scores. Higher pain intensity was moderately predictive
of MPQ scores, Pearson’s $r(54) = .38$, $p = .004$. However, pain intensity did not predict S-LANSS or NPSI scores $ps > .26$. 
Chapter 6

Discussion

The purpose of this study was to explore the pain classification of women with PVD. Specifically, the overall goal was to determine whether there might be a neuropathic component to this pain. Although questionnaires alone are not sufficient to fully answer this question, the responses women gave indicate that PVD may indeed consist of some neuropathic components, warranting further investigation.

Sample Characteristics

The first step towards pain classification is history taking, which was achieved in this study through sociodemographic and general pain questions. Of note, women with PVD had their first intercourse experience significantly later than control women, which they described as significantly more painful and unpleasant than women with PHN or control women. Not surprisingly, control women reported engaging in sexual intercourse significantly more frequently than women with PHN or PVD. The frequency of sexual intercourse for PHN women is likely accounted for by their relationship status and older age than the PVD and control women, but the PVD women are likely engaging in sexual intercourse less often due to the pain they feel during such activities. This pattern of infrequent sexual intercourse has been established for PVD in previous studies (Desrosiers et al., 2008; White & Jantos, 1998).

When comparing pain characteristics of PVD and PHN women, important differences and similarities emerged. Because women with PVD were long thought to experience a psychogenic disorder, it is important to note when their characteristics meet or exceed those of another established pain condition. There was no difference in the
number of health professionals each group had consulted about their pain. Some doctors might assume that women with PVD are exaggerating or seeking assistance too often, but based on this finding, these women require as much assistance as a group of women with another established and troubling chronic pain condition. Of interest, women with PVD experienced their pain for significantly longer, and with significantly greater intensity, both in terms of their pain on average and at its worst. These findings underscore the severity of this pain condition. Regardless of whether it can be considered a psychosomatic, chronic, and/or neuropathic pain condition, for many, PVD lasts a significant amount of time and causes a substantial amount of pain.

Women with PVD reported a wide range of pain experiences, alluding to potentially varied etiologies and mechanisms. Even though the majority of women in the PVD sample carried a similar diagnosis (i.e., vulvodynia, vulvar vestibulitis syndrome, or PVD), their pain began under diverse circumstances. Many women experienced the pain since their first tampon insertion or sexual intercourse experience (primary pain), and others had a period of pain-free intercourse before this pain developed (secondary pain), often for no apparent reason. This pain was experienced most often during penile penetration, although other activities such as penetration with other objects, gynecological examinations, and use of tampons were also reported as painful by at least half of the PVD group. Several women with PVD also had a comorbid pain condition along with their PVD pain. Because no differences in pain characteristics were present between the primary and secondary groups or the comorbid pain groups, however, the PVD sample was analyzed as a whole instead of in subgroups. Overall, the pain history information provided by the PVD women in this study is contradictory to certain findings from the
literature suggesting that all women with vulvodynia develop their pain due to interpersonal difficulties (e.g., Lynch, 2008; Masherpa et al., 2006). Indeed, the histories provided by women with PVD were consistent with the perspective that PVD is a chronic pain condition.

**Do women with PVD display a symptom pattern characteristic of those experiencing neuropathic pain?**

**Comparison with Known Cut-off Scores and Means.** Multiple methods were used to address the first research question, beginning with an examination of cut-off scores and published means. It was hypothesized that women with PVD would meet or exceed the established cut-offs for the S-LANSS and published means for the MPQ, and both hypotheses were supported. In fact, using the MPQ criterion, 88% of women with PVD were classified as having NP, and 67% when the S-LANSS criterion was used. Interestingly, the mean S-LANSS score for the PVD group is very similar to a group of patients with “possible neuropathic pain” (Bennett, 2006). However, diagnoses based on self-report alone were found to be not entirely accurate when compared with a full NP assessment. In that study, physicians diagnosed half of those who were suspected of having “possible neuropathic pain” using the S-LANSS criteria with an NP condition. However, some of those without NP conditions were classified as having a “definite neuropathic pain” while some of those with NP conditions were classified as “unlikely NP.” Even though this study utilized a sample of many “classic” NP conditions, it is obvious that diagnosis based on self-report alone is not sufficient. Similarly, in the clinical study validating the S-LANSS, Bennett and colleagues (2005) reported that those in a “mixed” pain group received a median score of 14, similar to the mean of the PVD
group in the current study. Once again, 20-25% of the sample in this study was misclassified, further highlighting the need for further objective evidence (e.g., via QST) before a concrete diagnosis can be made.

In the literature, the MPQ is often utilized to associate specific pain qualities with specific pain conditions (e.g., Dubuisson & Melzack, 1976). However, some report summary scales towards a similar goal, including the total score obtained through the MPQ. In a study in which the MPQ total score was used as a guideline for NP, a group of 66 patients with NP (diabetic neuropathy, PHN, neuropathic orofacial pain or posttraumatic or postsurgical NP) scored an average of 20.00 (Lynch et al., 2003). Another study of 10 NP patients (suffering from post-thoracotomy pain, sensory polyneuropathy, post-radiation plexopathy, neurectomy, sensory poly-neuropathy, and amputation) scored an average of 25.43 on the MPQ (Felsby, Nielsen, Arendt-Nielsen, & Jensen, 1995). Finally, in a study of 19 patients suffering from post-stroke pain, PHN, post-surgical neuralgia, phantom limb pain, brachial plexus avulsion, and diabetic neuropathy, an average score of 27.00 was reported (McQuay et al., 1994). Since the mean total score for the PVD sample in the current study was 33.00, exceeding these published means, it indicates a strong possibility that there is an NP component to PVD. This result is strengthened by the fact that women with PVD also score above the cutoff on the S-LANSS, a measure specifically designed to identify people suffering from an NP condition.

**Evaluating NP Scales.** We also examined the relationship among the various measures to determine if they could be combined into one overall neuropathy measure for the purpose of further analyses. Pearson correlations revealed that while the NPSI was
significantly related to all other neuropathy measures, there was great variability among the rest. The MPQ, one of the most well-established measures of pain, was not significantly related to the S-LANSS or one subscale of the PQAS (i.e., Deep Pain subscale). Further, most of the relationships were only moderate in strength. The NPSI had a strong relationship with the PQAS subscales, but this relationship is not surprising since the structure, scale, and items of these two scales are quite similar. The main differences between them are the number of items (NPSI has 12 and PQAS has 20) and the way subscales are formed for each. The NPSI had a moderate relationship with the S-LANSS in addition to the moderate relationship with the MPQ. This finding suggests that although these measures all address pain qualities, they sometimes target different pain and NP subtypes.

At first, the lack of relationship of these NP measures with the MPQ is concerning, especially because it is one of the most widely-used and validated pain descriptor scale. However, the MPQ was designed for use with a wide array of pain populations. Only some of the descriptor categories commonly occur in those with NP, and others mostly occur for those with non-NP. Even though the MPQ does not specifically address NP in exclusion of other pain symptoms, previous studies have successfully used this measure in the past to discriminate between those with NP and non-NP conditions (e.g., discriminating between patients with diabetic neuropathy and patients with other foot or leg pain of varying etiologies; Masson, Hunt, Gem, & Coulton, 1989). Perhaps examining the MPQ in conjunction with other specific NP screening tools, as done in the current study, is the most useful in creating comprehensive pain descriptions.
It is concerning, however, that the NP scales were not consistent with one another, sometimes leading to different conclusions about the possible NP components in PVD (e.g., women with PVD scored significantly lower than women with PHN on subscales of the PQAS, but were not significantly different on the S-LANSS). In fact, this type of discrepancy has been noted when other NP conditions were studied with various scales measuring neuropathy. In one study, it was concluded that two common measures for NP actually address different NP components, and therefore result in disparate outcomes. In that study, while validating the NPSI for use with an NP population, Bouhassira and colleagues (2004) concluded that, given the types of symptoms and subscales of the NPSI and the Neuropathic Pain Scale (the precursor to the PQAS), these two scales address separate types of NP. Although there was some overlap (e.g., burning, pain induced by touch), symptoms such as dullness, cold, and itching appear on the NPS but not the NPSI, while items relating to pressure and paroxysmal pain, cold allodynia, and paresthesia/dysesthesia appear on the NPSI but not the NPS. Interestingly, the items rejected or retained do not fall under one diagnostic category, such as sensory loss or gain. Thus, both scales target an array of NP symptoms, but the literature points to different symptoms on each to discriminate between NP and non-NP. These discrepancies do not invalidate one measure or the other, but they must be taken into account when the results are being interpreted.

Other studies have found that subtle linguistic and scale composition differences can have a dramatic impact on scores obtained through NP scales, even when they purport to measure the same things. In one study, the Neuropathic Pain Questionnaire and the Neuropathic Pain Scale were both used to observe the characteristics of an NP group
This group included those suffering from PHN in addition to a number of other conditions. These two scales both assess a burning pain quality; one using the phrase “burning pain”, the other using “heat pain.” The frequency with which participants endorsed these items varied greatly despite the fact that these concepts are so closely related: 35/92 participants endorsed heat pain, while 61/92 endorsed burning pain. Interestingly, a similar effect was observed in the current study. When women with PVD responded to the PQAS question about hot pain, their average rating on a scale from 0 (not hot) to 10 (the most hot sensation imaginable) was 2.11. However, on the NPSI, a question asked participants to rate the presence of burning pain on a scale from 0 (no burning) to 10 (worst burning imaginable), their mean rating was 6.38. Overall, even though a measure may address NP qualities in a valid way, different measures do not do so in a consistent manner. This inconsistency does not, however, mean that one or all of the measures are invalid or inaccurate. It is more likely that each scale should be examined individually, in detail, to understand what elements of neuropathy are present for a given population.

Comparing PVD NP Characteristics with PHN Women. To this end, four NP measures were used to compare the scores of women with PVD to women with PHN. It was hypothesized that women with PVD would score significantly lower than women with PHN. These hypotheses were partially supported. There was no significant difference between groups in MPQ total and subscale scores, or S-LANSS scores, but women with PVD scored significantly lower than women with PHN on all three subscales of the PQAS (i.e., deep, surface, and paroxysmal pain). When examining the NPSI, the only differences when considering those women with pain in the past 24 hours were that
women with PVD scored significantly lower than women with PHN on the paresthesia and paroxysmal subscales. There were no significant differences in the remaining scales: burning pain, pressing pain, and evoked pain. The highest-rated scales for PVD women were related to burning pain and evoked pain. These results indicate that women with PVD report symptom patterns that are similar to those experienced in some, but not all, common NP conditions. This pattern of results suggests that women with PVD may be classified as having “possible” NP, and is also consistent with those experiencing mixed pain conditions, where elements of neuropathy and non-neuropathic pain both occur (e.g., low back pain; Freynhagen et al., 2006).

It is important to note that women with PVD did not differ from women with PHN in the affective component of their pain, as measured by the MPQ affective scale. As previously mentioned, some believe that women with PVD suffer from an emotional or psychological disorder that resulted in their pain (Lynch, 2008; Masherpa, et al., 2006). The various subscales of the MPQ illustrate that even though there is an affective component to their pain, it is similar to another established pain condition, and it exists in addition to a significant sensory component.

Excluding Symptom Profiles. After comparing the total and subscale scores of women with PVD and PHN, each measure was used to determine which specific pain characteristics were endorsed by each group. The pain profiles generated during this project illustrated that women with PVD consistently reported experiencing certain types of symptoms. These common symptoms included burning, stabbing, stinging, and grueling pain. Further, these women report pain in response to rubbing and pressure, and sensitivity. Like women with PHN, certain symptoms were endorsed far more often than
others. In fact, on the S-LANSS, more than 70% of PVD women reported that their painful area was sensitive to the touch, and that the pain would be increased by rubbing or pressing. Further, less than 10% reported that their pain came on in bursts or felt like electric shocks. Although the two groups have some pain symptoms in common, women with PHN endorsed symptoms such as tingling, aching, heavy, electric, shooting, and exhausting, which were not often endorsed by women with PVD. Similarly, on the NPSI, PVD women rated burning and provoked pain quite highly, but rated electric shocks, pins and needles, and tingling as less common or problematic. Taken together, this pattern of responses is suggestive of sensory abnormalities in the form of evoked pain (e.g., hyperalgesia, allodynia), accompanied by a lack of negative sensory deficits (e.g., numbness, reduced sensations; Baron, 2006). These problematic symptoms are similar to findings from past studies on vulvodynia that included a QST component (e.g., Lowenstein et al., 2004; Pukall et al., 2002).

The use of pain symptom profiles to characterize NP conditions has been the subject of much attention. Although the utility of such methods has been questioned (Lewis & Said, 2008; Boureau, Doubrère, & Luu, 1990) or not supported (Backonja et al., 2004), others suggest that qualities such as hot, cold, sensitive, itchy, and surface pain may occur with greater intensity for those suffering from NP conditions (Dworkin et al., 2007). In fact, in the current study, women with PVD consistently reported the experience of hot/burning pain as well as increased sensitivity. This finding is especially relevant since burning pain is considered by some as one of the cardinal signs of NP (Marchettini, 2005). Interestingly, Bennett (2001) suggested that the spontaneous characterization of one’s pain as burning might be associated with greater NP diagnostic utility, rather
response to an equivalent item on a predetermined questionnaire. In the current study, 80.0% (N = 45) of PVD women spontaneously reported their pain to be burning in nature, before completing the validated questionnaires, strengthening the conclusion that their pain may contain NP components.

However, multiple symptom lists to discriminate between NP and non-NP conditions have been identified (Table 20). This ambiguity likely arose from the use of different methodologies (e.g., Wilkie, Huang, Reilly, & Cain, 2001: non-NP and NP sites within the same lung cancer patients) and various combinations of patient groups (e.g., homogeneous [diabetic neuropathy and other foot/leg pain]; Masson et al., 1989, and, and heterogeneous [diabetic neuropathy, idiopathic sensory polyneuropathy, and PHN]; Boureau et al., [PHN, post-surgical or post-traumatic nerve lesions, low back fibroarachnoiditis, stump and phantom limb pain]; Dworkin et al., 2007). In all likelihood, several subtypes of NP exist, where certain symptoms are more common for specific subtypes than others, complicating diagnosis and treatment.

Table 20.

Symptoms Used to Identify Neuropathy in Various Published Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>NP symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilkie et al., 2001 (MPQ)</td>
<td>Throbbing, aching, numb, tender, pulling, tugging, pricking, penetrating, punishing, miserable, nagging</td>
</tr>
<tr>
<td>Boureau et al., 1990 (QSDA)</td>
<td>Burning, electric shock, tingling, pricking, itching, cold</td>
</tr>
<tr>
<td>Dworkin et al., 2007 (NPS)</td>
<td>Hot, cold, sensitive, itchy, surface pain</td>
</tr>
</tbody>
</table>

Note. MPQ = McGill Pain Questionnaire; QSDA = Questionnaire douleur Saint Antoine; NPS = Neuropathic Pain Scale.
Of note, no NP condition exists in which every neuropathic symptom is endorsed. Indeed, it has been suggested that those classified as experiencing NP represent a heterogeneous group where those with certain conditions are more likely to experience particular NP symptoms than others (Bouhassira, 2004). Some have even suggested that there are different subtypes of NP, identified by the patterns of sensory changes that do or do not occur. For example, Fields and colleagues (1998) suggest that there are three subtypes of NP for PHN alone: those with no or minimal sensory loss, those with allodynia in addition to pain and temperature sensation loss, and those with spontaneous pain without hyperalgesia and allodynia. This pattern of selective symptom endorsement was present in both the PVD and PHN groups, suggesting that perhaps PVD could be a part of such a heterogeneous group. Taking the results a step further, perhaps PVD would fall into the NP subtype of “no or minimal sensory loss” as it is evident from the results of the current study and past research that these women exhibit sensory gain in all aspects examined thus far (e.g., Lowenstein et al., 2004; Pukall et al., 2002; Tympanidis, Terenghi, & Dowd, 2003).

Overall, there exists a great amount of conflicting information regarding self-report measures and the presence of NP. Some believe that using certain symptoms to differentiate between NP and non-NP is questionable (Backonja et al., 2004; Lewis et al., 2008), and those who endorse such practices often advocate for different types of symptoms (e.g., Boureau, 1990; Dworkin et al., 2007; Wilkie et al., 2001), especially when the same measures are not used. Another confounding factor is the NP group studied. Many believe that NP is comprised of a heterogeneous group of disorders, but these groups are frequently combined when a new measure or certain pain descriptors are
being evaluated. Further, some studies examine individual pain sites within the same subjects, and determine whether each are NP or non-NP (Wilkie et al.), while other studies do not differentiate among pain sites, gathering overall pain ratings (Boureau et al.; Dworkin et al.). At this point, one can only estimate using self-report measures, and validate with in-person follow-up examinations. As such, women with PVD can be classified as experiencing pain of “possible” neuropathic origin.

Comparing Pain-Related Variables between PVD and PHN. Next, the impact of pain on the women in the pain groups was examined. To start, it was hypothesized that women with PVD would express more pain catastrophizing, pain anxiety, and pain disability than women with PHN. However, no significant difference was observed for any of those variables. This finding is especially relevant, since women with PVD have reported greater levels of these variables than control participants (e.g., Payne et al., 2005; Payne, Binik, Pukall, Thaler, Amsel, et al., 2007), and these patterns are also present in a wide range of pain conditions (Keefe, Rumble, Scipio, Giordano, & Perri, 2004), including NP (Haythornthwaite, Clark, Pappagallo, & Raja, 2003; Jensen et al., 2002; Sullivan, Lynch, & Clark, 2005). Further, because PVD relates directly to a person’s romantic relationship, it was expected that women with PVD would report more negative and solicitous responses, and fewer distracting responses from their romantic partners. However, once again, no significant differences were observed, but there was a trend towards significance that suggested women with PHN reported more solicitous responses from their partners. This pattern of non-significance suggests that pain-related life disturbances and cognitions are similar among women with PVD and PHN.
Comparing Non-Pain Related Variables between PVD, PHN, and Control Women. It was hypothesized that women with PVD and PHN would be affected beyond pain-related variables when compared to a pain-free control group, and that women with PVD would report greater life impact than women with PHN. Partial support for these hypotheses was observed. Mental health (i.e., depression, stress, and trait anxiety) differed somewhat based on group membership. Control women reported fewer symptoms of depression and stress than women with pain (either PVD or PHN). There was no difference in trait anxiety among the three groups, and there was no difference in symptoms of depression or stress between women with PVD and PHN. Interestingly, women with PHN exceeded the standard clinical cut-off on the CES-D for depressive symptoms (16.00; Boyd, Weissman, Thompson, & Myers, 1982), while women with PVD did not. Thus, even though both displayed signs of depression and there was no significant statistical difference between the two, perhaps women with PHN do, indeed, suffer from more severe depressive symptoms. Such an effect may have been observed if more women with PHN had taken part in the survey, thus increasing the power to detect significant effects.

Overall, the pattern of psychological distress was statistically the same for PVD and PHN women, which indicates another similarity between these two pain conditions. When comparing these results to the literature on NP conditions, consistency is observed. Clark and colleagues (2000) determined that those with PHN experienced significantly more symptoms of depression and somatization, and a trend towards greater levels of anxiety than those with a non-painful but aversive case of chronic vertigo. In general, patients with various NP conditions tend to report decreased levels of physical and
emotional functioning (Jensen et al, 2007). However, this pattern is not entirely consistent with past literature for PVD women. Previous studies have found mixed results when general distress was measured. Some have reported that women with vulvodynia experience a general deterioration in well-being, psychological distress (Meana, Binik, Khalifé, & Cohen, 1997), and depression (Gates & Galask, 2001), while others report that women with vulvodynia no not differ from controls on such variables (Desrosiers, Bergeron, Meana, Leclerc, Binik, et al., 2008; van Lankveld, Weijenborg, & ter Kuile, 1996). Another difference between findings in our study and past findings in the PVD literature is the fact that anxiety did not differ based on groups. Typically, women with PVD report more symptoms of anxiety than pain-free controls (Gates & Galask, 2001; Granot et al., 2002; Nunns & Mandal, 1997; Payne, Binik, Amsel, & Khalifé, 2005) and patients with dermatological problems (Hallam-Jones, Wylie, Osborne-Cribb, Harrington, & Walters, 2001), but one study found no differences (Payne, Binik, Pukall, Thaler, Amsel, et al., 2007). In a review of this literature, Desrochers (2006) observed that when pain women were recruited from the general population, they were less likely to report significant psychological distress than those recruited from a clinical population. Interestingly, our sample was recruited from the general population, and yet reported significantly more depression and stress than the pain-free control group, also recruited from the general population. Because our recruitment focused heavily on recruiting PVD women from organizations aimed at helping such women (e.g., National Vulvodynia Association), perhaps our sample more closely resembles those examined in other clinical studies.
Next, it was hypothesized that pain women would experience significantly more sleep problems than control women, and that women with PHN would experience more problems than women with PVD. Again, partial support for our hypotheses was found. Control women reported significantly fewer sleep problems than pain women, but there was no difference between women with PVD and PHN. This finding is consistent with literature on chronic pain and sleep disturbance in general, and on NP specifically. Those with NP typically report problems such as drowsiness, difficulty concentrating, lack of energy, and difficulty sleeping overall (Meyer-Rosberg et al., 2001). In fact, sleep, pain, and energy problems have been reported as some of the largest health-related quality of life differences between those suffering from pain and pain-free control participants (Meyer-Rosberg et al.), consistent with the results of this study. Of note, the average sleep problem index score reported by control participants was close to the published average (Hays et al., 1992).

It was hypothesized that PVD women would report significantly lower sexual function than both PHN and control participants. This hypothesis was fully supported, with significant differences between PVD women and both PHN women and controls. There was no significant difference between the sexual functioning of control and PHN women. Such a finding is consistent with prior reports of women with PVD (e.g., Danielson, Sjöberg, & Wikmen, 2000; Desrochers et al., 2006) in which these women reported overall decreases in their sexual functioning. Even though women with PHN were significantly older than controls and women with PVD in the current study, and would therefore potentially experience more age-related sexual difficulties, the pain experiences of PVD women superseded those factors. This pattern highlights the need for
a focus on sexual functioning when treating the pain associated with PVD. Despite the fact that both PVD and PHN are pain conditions and should be treated as such, women with PVD likely require specific treatment to address the sexual effects.

Finally, we hypothesized that women with PVD would report significantly lower relationship satisfaction than PHN women and controls. This hypothesis was not supported, as there was no significant difference in relationship satisfaction among any of the groups. In the literature, there are mixed results when women with vulvar pain report on their relationship adjustment (Desrochers et al., 2006; Smith & Pukall, 2011). Some women with PVD are found to have supportive partners and a relationship quality greater than (Hallam-Jones, Wylie, Osborne-Cribb, Harrington, & Walters, 2001) or not significantly different from a pain-free control population (e.g., Meana, Binik, Khalifé, & Cohen, 1997; Desrosiers et al., 2008; van Lankveld, Weijenborg, & ter Kuile, 1996). In fact, in one study, 65% of women with vulvar pain reported that their partners contributed to the ability to cope with the pain they experienced, although they feared that the pain would impact their relationship negatively (Gordon, Panahian-Jand, McComb, Melegari, & Sharp, 2003). The opposite pattern, however, has also been found (e.g., White et al., 1998). These mixed findings may indicate that women with PVD do experience a negative impact on their relationships, but that impact may manifest in a unique way that is not captured by current validated measures (Smith & Pukall).

Overall, similar to many other chronic pain conditions, PVD has a psychological component as well as a physical pain component (Haefner et al., 2005). Many studies have found that women with chronic vulvar pain experience impaired sexual functioning, increased pain catastrophizing, fear, and hypervigilance, and higher levels of depression.
and anxiety. These patterns of psychosocial symptoms were also observed in the current study, and are similar to those experienced by people with NP syndromes (e.g., Jensen et al., 2007; O’Connor, 2009; Clark et al., 2000).

**Comparing Health-Related Quality of Life.** To determine the specific health-related difficulties experienced by women with pain, eight subscales of the SF-36 were examined. For each, it was hypothesized that women with PVD would score significantly lower than control women, but that women with PHN would score significantly lower than women with PVD, especially since they likely have more age-related problems to compound their pain condition. This hypothesis was partially supported for all variables.

For energy/fatigue and emotional well-being, the combined pain groups scored significantly lower than control women, but there was no difference between PVD and PHN women. For role limitations due to physical problems and social functioning, there was no difference between PVD women and controls, but women with PHN reported significantly poorer function than both groups. For role limitations due to emotional problems, women with PHN reported significantly more problems than control women, but there was no difference between PVD women and controls or between the PVD and PHN groups. For physical function and pain experience, women with PVD and PHN reported significantly more pain than control women, and women with PVD reported significantly less pain than women with PHN. Finally, for general health, women with PVD and PHN both reported significantly poorer general health than controls, and there was a significant difference between women with PVD and PHN, in which PVD women reported poorer functioning.
The findings regarding women with PHN are consistent with the literature. Previous studies have reported that those with established NP conditions experience significantly poorer health-related quality of life (Oster et al., 2005), often associated with an increased burden on the healthcare system (Taylor, 2006). Women with PVD differed from control participants in the domains of energy/fatigue, emotional well-being, pain, physical functioning, and general health. Women with PVD did not report problems related to their social functioning. This lack of difference suggests that although those suffering from PVD experience significant negative effects, these effects do not necessarily radiate into every aspect of these women’s lives, such as their social functioning. Perhaps because this pain is in a private area and typically occurs in the context of sexual activity, its impact may be relatively limited. For women with PHN, their pain can occur in a wide range of circumstances, including social ones. The possibility and likelihood of experiencing pain during social activity may account for the difference in social functioning found in this study. In fact, the pattern of results observed in PVD women is consistent with patterns observed in those suffering from NP. Even though people with NP reported a range of problems, sleep, pain, and energy levels were the most different from the control population (Meyer-Rosberg, et al. 2001). In the current study, significant differences were observed for each of these variables, another observation that is consistent with a NP population.

These findings in the NP population are quite consistent with the results of the current study, lending further support to the idea that PVD involves a NP component. Indeed, women with PVD report symptoms and degree of life interference that are similar to chronic pain conditions, as previously established in the literature (Binik et al., 2001;
Binik et al., 2002; Binik, 2005; Pukall et al., 2000; Pukall, Payne, Binik, & Khalifé, 2003; Payne et al., 2005). This study contributes novel findings to this literature: women with PVD experience some qualities and associated pain problems that are also commonly experienced by people with an established NP condition.

**Is there a relationship between neuropathic pain and pain/psychosocial variables?**

**Neuropathic Pain Predicting Pain/Psychosocial Variables.** We hypothesized that the more neuropathic pain symptoms a woman reported, the greater problems with pain and psychosocial variables she would report. As each of the NP measures seemed to address different aspects of pain, all available total scores were used to predict these outcomes. Each NP measure told a different story. Interestingly, when women with PVD and PHN were considered separately, the pattern of significance was different between the two groups. For the MPQ, higher scores predicted greater pain catastrophizing and pain anxiety, but did not predict pain disability, depression, anxiety, stress, or sleep problems for PVD women. Similarly, for the PHN group, higher scores predicted pain catastrophizing, but none of the other variables. Interestingly, the S-LANSS predicted none of the pain/psychosocial variables for either group. The NPSI was the measure that best predicted the pain/psychosocial variables, especially for the PHN group. For these women, greater NPSI scores predicted higher scores, and therefore poorer functioning for pain catastrophizing, disability, and anxiety, as well as depression, anxiety, stress, and sleep. However, for the PVD women, greater NPSI scores predicted sleep problems and the pain-related variables: pain catastrophizing, disability, and anxiety.
Perhaps the NPSI was better able to predict the pain and psychosocial variables because of how the items are structured. On this measure, each characteristic is rated on a scale from 0 to 10, based on how severely each characteristic is experienced by the woman. The greater the severity on multiple items, the higher the score. On the other hand, the S-LANSS requires women to say whether or not they experienced a given symptom (i.e., they were only able to answer yes/no), and then their answers were weighted based on how ‘neuropathic’ the given symptom was. While this strategy may be useful for determining whether there is a neuropathic component to the pain, this type of measure did not predict psychosocial functioning for women with PVD. The MPQ contains elements of both methods, where a person must select a pain quality from a cluster of increasingly severe characteristics. However, participants are not able to rate how severely they experience each selected characteristic on a scale from 0-10, as is common in other pain rating scales. Perhaps measuring a combination of pain characteristics and specific severity ratings is the best way to predict functioning for this group of women.

There were still several variables, however, that were not predicted by any of the pain measures for PVD women. Specifically, no relationship was found between pain variables and depression, stress, or anxiety. This lack of predictive relationship indicates that these psychosocial variables are relatively independent from the number or severity of neuropathic pain symptoms being experienced by the PVD group. This pattern was only observed for women with PVD. One or more of the pain variables predicted all psychosocial variables for women with PHN. This finding holds implications for the selection of treatment for both of these conditions. For women with PHN, decreasing the
pain may have direct effects on psychosocial functioning. For women with PVD, however, perhaps pain-focused psychological treatment may be necessary to cause significant improvements in psychosocial functioning.

The relationships between the pain/psychosocial variables themselves were also examined. It was predicted that there would be a moderate to strong relationship among these variables, and this hypothesis was supported. The strongest relationships were among the depression, anxiety, and stress measures, and the relationships among the remaining variables were also either moderate or strong. This pattern tells an interesting story for women with PVD, and perhaps explains why psychological treatment has been a successful form of treatment with these women, especially when considered as part of a multidisciplinary treatment plan that also addresses the pain component (as recommended by Binik et al., 2002). For example, Bergeron and colleagues (2001) studied three treatments for women with PVD: pain-focused cognitive behavioral therapy (CBT), biofeedback training, and vestibulectomy (i.e., surgical removal of the superficial tissue of the vestibule). All three treatments resulted in significantly lower pain intensity ratings, even though surgery provided the best results. Furthermore, similar results were observed 2.5 years after treatment was administered. Although pain upon palpation with a cotton swab was still lower for those who underwent surgery, there was no difference in intercourse pain ratings between those who underwent surgery and those who participated in psychotherapy (Bergeron, Khalifé, Glazer, & Binik, 2008). Participants responded to both medical and pain-focused psychological treatment, suggesting that both may play a role in etiology and maintenance of the disorder, and should be equally considered when forming treatment plan.
Overall, while pain characteristics were able to predict pain-related and sleep variables, they were not able to predict other psychosocial characteristics, indicating that women with PVD experience psychological distress above and beyond the pain that they experience.

**Comparing Women Above or Below NP Cut-off Scores.** It was hypothesized that those above the cut-off scores would report significantly poorer pain-related and psychosocial variable scores. However, this hypothesis was largely unsupported. When the mental health variables (depression, anxiety, and stress) were considered together, there was no group effect when using both the MPQ and S-LANSS criteria. A similar result was observed when the pain-related variables (pain catastrophizing, pain anxiety, pain disability) were examined. However, there was a group effect when sleep problems were examined, where those above the cut-off on the MPQ and S-LANSS reported significantly more sleep problems than those below the cut-offs. This pattern is similar to those found in the literature. Those with NP consistently report that they experience problems with sleep (e.g., Jensen et al., 2007; Oster et al., 2005; Galer et al., 2000). This result provides yet another reason to classify women with PVD along the NP spectrum.

One explanation for the lack of significant findings for pain-related and psychosocial variables could be the groups we used. Prior to analysis, it was observed that there were different patterns for PVD and PHN women (e.g., the relationships between neuropathy and pain-related/psychosocial variables were different for PVD and PHN women). Perhaps when these two groups were combined to increase power, some of the potential differences were nullified. It would be useful to recruit a larger sample of PVD women and have the ability to compare larger groups of such women falling above and
below the neuropathic cut-off scores. However, based on the results of this study, we cannot conclude that meeting or exceeding published cut-off scores is related to any increases in psychological or pain-related variables.

**Health-Related Quality of Life and NP.** The SF-36 was used to examine four quality of life elements that were the most likely to be addressed in a health-care professional setting (i.e., physical functioning, energy/fatigue, pain, and general health). It was hypothesized that those with problems in these areas would report greater levels of NP than those without such problems. Again, we used total scores from the three available pain/NP measures. NPSI scores were higher for those reporting problems with physical functioning, pain, and general health, whereas MPQ scores were higher for those with problems with energy/fatigue. Further, S-LANSS scores were higher for those experiencing problems with general health. Once again, the NPSI was the measure that elicited the most significant differences for the variables examined. The greater severity reported for various symptoms were related to life interference on a number of domains. Similar to findings presented previously, the pattern observed when the NPSI was employed is consistent with the experiences of those suffering from NP conditions (e.g., Oster et al., 2005).

**Is there a relationship between NP and pain length or intensity for PVD women?**

**Pain Length and Intensity.** It was predicted that those who had experienced their pain for longer periods of time would report more NP symptoms. However, this hypothesis was not supported. One possible explanation for these results was the ceiling effect that occurred for the pain length variable, because women could select a pain length of maximum 10+ years. This option was selected by a large number of women.
Perhaps more precise estimates of pain length would uncover a significant relationship with number of neuropathic pain symptoms. Another possible explanation is the sample itself. Only one woman with PVD reported experiencing her pain for less than two years. As such, we were likely not able to capture the progression of the PVD pain syndrome. It is possible that if we had more participants who had their pain for less time such a relationship would emerge. Finally, we predicted that those with greater average pain intensity would report more NP symptoms. There was a moderate relationship between pain intensity and scores on the MPQ, but no relationship with the other NP measures. This pattern is somewhat different from that found in the literature on NP. One study found that those with NP conditions reported a relationship between pain intensity and scores on NP measures, although most of those relationships were weak (Backonja et al., 2004). This difference may be accounted for by the measures used to assess NP in women with PVD. Certain symptoms on the NP scales were not endorsed at all, while others were endorsed moderately frequently, likely having an effect of cancelling each other out. Perhaps if more accurate NP measures were applied to this population, a significant relationship between intensity and NP symptoms might be found.

Limitations

Although the current study has many strengths, a number of limitations must be acknowledged. Firstly, all data were collected through self-report. Even though self-report measures are common and used successfully, even in a number of NP studies (e.g., Bennett et al., 2005), it would strengthen the findings if they were validated by the use of objective psychophysical measures, both in clinical and research settings. Even though the majority of PVD women reported receiving a diagnosis, it is likely that diagnosing...
physicians did not make use of validated questionnaires and/or NP sensory testing methods. If clinicians who diagnose and treat PVD were provided with such tools, their diagnoses would lend strength to the conclusions reported here. Similarly, it would be useful to administer validated objective clinical tests in a research setting to determine whether these self-report data are valid.

The diagnosis of an NP disorder is challenging. Physicians and researchers must use criteria that are not always agreed upon, rely on subjective descriptions of pain, anticipate that pain symptoms may change as a disorder progresses, and accept the fact that NP is difficult to treat (Jensen & Baron, 2003). The tools used to assess NP and the criteria for diagnosis change relatively often, with no true gold standard currently existing. In fact, while some believe that certain symptoms are indicative of NP (e.g., burning, electrical, smarting), others believe that such symptoms are not reliable predictors of a NP disorder (Jensen, 2003). Since no gold standard exists, the conclusions that have been drawn cannot be made with absolute certainty. However, the observed patterns of pain and psychosocial is largely consistent with other NP conditions, warranting further investigation.

One of the primary limitations in this study is the lack of validated NP measure for women with PVD. Although the measures used in this study give a preliminary understanding of this pain, measures validated for women with PVD would be of great use. One problem that arose with some NP questionnaires was that some questions did not apply to them, were not inclusive of their experiences, or may have made them somewhat uncomfortable and less likely to answer. One type of question that some women consistently declined to respond was questions asking about time course pattern
of their pain. Sometimes, validated NP questionnaires would present a series of diagrams or descriptions of when the person experiences pain (e.g., constant pain, constant with random pain attacks, no constant pain, etc.). Women with PVD tend to experience their pain upon contact, which does not fit into these available time course patterns. Other questions may have made women uncomfortable, such as those asking women to visually or manually examine or manipulate the painful area. Because pain occurs in the genital area, some women may be uncomfortable participating in and answering such questions. It would be helpful to have a questionnaire for women with genital pain that could identify whether a NP component to their pain is present without making them feel uncomfortable or asking questions that are not inclusive of their experiences.

Another major limitation is the difference in pain course pattern between women with PVD and women with PHN. In PVD, the nature of the pain condition is provoked, thus, the pain is initially experienced upon contact or pressure to the vestibule. For women with PHN, the pain they experience may be evoked, but their pain may also manifest itself spontaneously. Indeed, the most common pain course pattern descriptor for people with PHN is “persistent pain with attacks” (Baron et al., 2009). However, it has been established that people with disparate NP conditions are often considered as part of the same group, even when their sensory symptoms are not identical. In that same study, Baron and colleagues (2009) established that people with painful diabetic neuropathy more commonly experience “persistent pain with slight fluctuations” in addition to less mechanical allodynia than those with PHN. Even though the pain course patterns of women with PVD and PHN are different, women with PVD still manifested similar pain and psychosocial patterns as women with PHN. Perhaps the pain course pattern experienced by PVD women is simply one more variant within the heterogeneous NP
group. It is also possible that other subtypes of vulvodynia, which more closely resemble PHN, would be useful to examine. For example, women with generalized vulvodynia (GVD) experience a fairly constant burning pain at the external genitals (Moyal-Barracco & Lynch, 2004), and some women even experience a mix of provoked and unprovoked pain (Smith, Boyer, Pukall, & Chamberlain, 2009). Perhaps these women would report even more signs of NP than women with PVD since their pain course pattern is more similar to other NP conditions.

A final limitation of this study was the composition of the pain groups. For example, the size of the PHN group was relatively small. As a result, heterogeneity of variance and reduced power to detect differences were observed. Perhaps with a larger group of PHN women, more differences and nuances would have been observed that would increase the accuracy of the results. Further, the PVD sample largely contained women who had experienced their pain for more than two years. One goal was to determine if those having pain for longer periods of time would experience greater degrees of neuropathy. Because such data from women who were just beginning to experience their condition were not available, we were not able to accurately address this question. Also, because the majority of women who completed the study had experienced their pain for such a long time with great severity, they likely represent a subgroup of women with PVD. Therefore, the results of this study may not generalize to women experiencing such pain for less time or with less intensity. Similarly, since women with PHN tend to be older and probably less technologically savvy, the group of PHN women who did complete the study may have been different than the general PHN population (e.g., they may have been younger than the group as a whole). Even though the characteristics of our sample were similar to those published in the literature, these
potential confounds should be considered when examining the results and conclusions presented here.

**Implications and Future Directions**

The results of this study indicate that women with PVD may be experiencing some degree of NP. However, this self-report questionnaire study is only the first step in drawing such conclusions. As in a clinical setting, once a detailed history has been taken and certain questions have been asked, a physiological examination must take place. Many procedures have been used in the past for such purposes, such as QST and skin biopsies (Dworkin et al., 2008). Even though QST methods have been used with this population before (e.g., Lowenstein et al., 2004; Pukall et al., 2002), they have not been employed along with validated NP measures to describe the pain PVD women experience. There are also additional methods that are used with NP populations that could be employed with PVD women (e.g., brushing a piece of wool along the pain site and an index site to test for allodynia; Bennett et al., 2001). If these QST methods are used in conjunction with validated questionnaires, this may validate the use of such questionnaires in a clinical setting, and justify using NP treatments for women with PVD. If clinicians are able to quickly and easily screen for neuropathic pain symptoms it may result in delivering effective treatment to these women in a timely manner.

In addition to determining whether PVD contains an NP component, it is important to establish the type of symptom profile typically experienced by these women. Once such profiles are established, investigations into the etiology and mechanisms of this pain may lead to a greater understanding of how to best treat such pain. Perhaps even more subtypes of PVD exist, such that certain medications would be more effective than
others. Even though the mechanisms and processes involved in NP are not well understood, by identifying more patterns within groups of NP sufferers we may be able to increase our understanding of these complex conditions.

Further, there are other subtypes of vulvodynia that are not as well-researched as PVD. One example of such a condition is GVD. While women with GVD are sometimes included in heterogeneous vulvodynia groups, they are rarely examined independently despite the fact that GVD differs from other vulvar pain conditions in terms of temporal qualities and pain characteristics. Although some experts assume that the pain of GVD is neuropathic in nature due to the descriptors used by affected women (e.g., burning, sharp), no study to date has investigated this issue in any way.
Chapter 7
Conclusions

The current study adds a number of important findings to the research literature:

1. Women with PVD report symptoms that suggest a neuropathic component. Their pain symptom profiles and summary scale scores consistently indicate the presence of various neuropathic pain symptoms.

2. Women with PVD reported a very similar pain and psychosocial profile as women with PHN, a well-established NP condition. This pattern indicated similar ways of psychologically coping with the respective pains, psychological distress, interference with health-related quality of life, relationship satisfaction, and sleep disturbances.

3. For these PVD women, the presence of more neuropathic pain symptoms did not consistently relate to increased disturbances in pain-related and psychosocial variables. Thus, examining pain characteristics alone may not be enough to generate a comprehensive treatment plan for these women.

4. The measures used to describe NP provided inconsistent results, highlighting the need to take scale differences into consideration when considering conclusions.

5. Longer pain length and greater pain intensity were not related to greater degrees of neuropathy.

6. Overall, the findings in this study provide empirical support for conceptualizing PVD as a chronic pain condition possibly containing elements of neuropathy.
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Appendix A

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We need your help!

Who? All English-speaking women, 18+, who fit into 1 (and only 1) of the following 3 groups:

• **Post-Shingles Group:** Women who have previously experienced shingles and still feel pain even though the rash has healed.

• **Genital Pain Group:** Women who currently experience genital and/or abdominal and/or pelvic pain.

• **Pain-Free Group:** Women who do not have a chronic pain condition.

What? Anonymous online or paper questionnaire-based survey


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Contact Person: Emma Dargie, BAH, MSc student, Department of Psychology

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Females needed for online study

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For more information please contact:
Emma Dargie, BAH, MSc student
E-mail: shr1@queensu.ca
Phone: 613-533-3276
Appendix B
Online Study Introduction

Thank you for your interest in this study! We are looking for English-speaking women, 18+, to participate in this important study about pain. Your contribution may change how common pain conditions are diagnosed and treated.

We are looking for women who fit into 1 (and only 1) of the following 3 groups:

- **Post-Shingles Group:** Women who have previously experienced shingles and still feel pain even though the rash has healed.
- **Genital pain group:** Women who currently experience genital/abdominal/pelvic pain
- **Pain-free group:** Women who do not have a chronic pain condition

**You can win one of 4 $50 prizes, drawn monthly. Chances of winning are ~ 1 in 25.**

**This survey takes 30-45 minutes to complete**

Please read the following Letter of Information for details on how to participate, and what the results will be used for.

Thank you!
Appendix C
Letter of Information and Consent Form

Vulvodynia vs. Chronic Pelvic Pain in Women: Neuropathic Pain Conditions?

Investigators:
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Caroline F. Pukall, PhD, Department of Psychology, Queen's University

Introduction
This study is being conducted by Emma Dargie, MSc Student (613-533-3276) and Dr. Caroline Pukall (613-533-3200), Department of Psychology, Queen’s University.

Purposes of the study
Genital/Pelvic/Abdominal Pain
The first purpose of this study is to learn more about misunderstood female pelvic pain conditions. We hope to learn under which categories these pain conditions fall. Classifying these conditions is important because this knowledge could tell us more about where each pain comes from, and even how best to treat it. The names of the conditions are vulvodynia (pain in the external genitals) and interstitial cystitis (pain in the bladder).

Post-Shingles Pain
The second purpose of this study is to learn more about how post-shingles pain impacts the lives of women. Specifically, we would like to explore pain characteristics, sleep, emotional responses, health-related quality of life, and the impact on romantic relationships. The more we know about what women with post-shingles pain experience, the better doctors will be able to design treatment plans to help. We will also determine the impact of these factors on women with genital/pelvic/abdominal pain, and if the two groups differ on these variables.

Eligibility
In order to participate, you must be female and you must have experienced pain in your genital/pelvic/abdominal region for at least six months, OR have previously been diagnosed with herpes zoster (shingles), the rash has healed, and you still experience pain in the area (aka post-shingles pain). You may also participate if you are not currently experiencing a chronic pain condition. You must also be fluent in English and over the age of 18 to participate.

Study procedures
Your participation in this secure online study involves completing a variety of questionnaires. The questionnaires will take approximately 30-45 minutes to complete. Before beginning the survey, you will be asked a few questions to determine your eligibility. If you are not eligible, you will receive a message
thanking you for volunteering. If you are eligible, you will proceed directly to the questionnaires. These questionnaires ask for information on sociodemographic information (e.g., age, relationship status), sexual functioning, relationship functioning, current psychological symptoms, pain characteristics, sleep characteristics, life stress, and health-related quality of life. Members of the research team will be available by phone and email to answer any questions that you may have about the questionnaires and/or the study. You are able to go back to previously-completed pages by pressing the “Back” button. If you cannot complete all questionnaires at the same time, you may press the “Save and Exit” button. You will be given a URL to use when you wish to resume the survey. You may copy this link yourself, or you may choose to have the survey program e-mail you the link. If you Save and Exit, you MUST use this link to resume.

If you prefer to complete the survey on paper, please send us an e-mail at shrl@queensu.ca.

Compensation
Upon completion of the questionnaires, you will have the option to anonymously enter your e-mail address into a draw for one of four $50 prizes that will take place at the end of every month for the duration of the study.

Advantages of participating in this study
The results of this study will aid in the future assessment and treatment of complex pain conditions. Also, at the end of the study you will be provided with additional resources about these pain conditions, and may also access the results of the study once completed.

Disadvantages of participating in this study
There are no known physical, psychological, economic, or social risks associated with this study. However, some of the questions cover sensitive topics, such as depression, pain, and sexual functioning. It is possible that you may experience some discomfort answering these questions. However, you are not obligated to answer any material that you find objectionable or that makes you feel uncomfortable.

You may withdraw from the study at any time by selecting ‘decline response’ for the remaining questions or by closing the browser window. You may still enter into the draw if you choose to withdraw from the study by selecting the decline response options for the remainder of the questions.

Confidential nature of this study
Your participation in this study is strictly confidential. The investigators will take all reasonable measures to protect the confidentiality of your records. You will not be identified in any publication or reports of this research; data will be aggregated in all reports of this study.

Discontinuation of this study
Your participation in this procedure is completely voluntary and you may withdraw from this study at any time without any negative consequences. Furthermore, you are free to refuse to answer any question posed without need of any explanation on your part.

If you would like further information about the study, or have additional questions or concerns, please feel free to contact any of the above researchers. You may also contact Dr. Richard Beninger, Head of the Department of Psychology at Queen's University (533-6000 x74965), e-mail psychead@queensu.ca, or the Chair of the Queen's University General Research Ethics Board, Dr. Joan Stevenson, (613) 533-6000 ext. 74579, email GREB@queensu.ca.

Some of the questions in this survey are sensitive in nature. If you are feeling distressed, please consult the following sources for help:

Telehealth Ontario: 1-866-797-0000
Frontenac Community Mental Health Services (24 hour crisis line): (613) 544-4229
Telehealth Ontario: 1-866-797-0000

Frontenac Community Mental Health Services (24 hour crisis line): (613) 544-4229


Lennox & Addington Community Crisis Centre: (613) 354-7388

Telephone Aid Line Kingston (TALK): (613) 544-1771

Kids Help Phone: Parents Help Phone 1-888-603-9100

Sexual Assault Crisis Centre Kingston (SACCK) (613) 544-6424 or (877) 544-6424

Sexual Health Resource Centre (613) 533-2959

http://www.sexualityandu.com/index_e.aspx

Consent Form

Vulvodynia vs. Chronic Pelvic Pain in Women: Neuropathic Pain Conditions?

Please read the following with regards to your participation in the study entitled ‘Vulvodynia vs. Chronic Pelvic Pain in Women: Neuropathic Pain Conditions?’

I consent to the information contained in the Letter of Information and understand what is required for participation in the study. I understand that I will complete a series of questionnaires online or on paper. I also understand that research assistants are available by telephone or e-mail should I have any questions or require further information about any aspect of the study. I understand that some of the questions may be quite personal in nature, and that some of them concern sensitive topics. I understand that my participation in the study is completely voluntary and that I am free to withdraw at any time. I understand that to withdraw, I may select ‘decline response’ for any remaining questions, and enter the draw without penalty. I also understand that my confidentiality will be protected throughout the study, and that the information I provide will be available only to researchers with relevant scholarly interests.

I understand that that upon completion of all questionnaires, I will be given the option to enter my e-mail address into one of four draws for $50 that will occur at the end of each month for the duration of the study. I understand that my email address will not be linked to my responses as my address and responses are saved to two different databases. I further understand that members of the research team will use this email address to contact me only in the case that I have been selected as a winner of the draw. I recognize that I am under no obligation to provide my email address to members of the research team. I also recognize that I am eligible to enter the draw whether or not I complete the survey or answer all the questions.
Should I have further questions, I understand that I can contact any of the following individuals:

• Emma Dargie (613-533-3276; seed@queensu.ca), MSc Student, Department of Psychology, Queen's University

• Dr. Caroline Pukall (613-533-3200; caroline.pukall@queensu.ca), Associate Professor, Department of Psychology, Queen's University

• Dr. Richard Beninger (533-6000 x74965; psychead@queensu.ca), Head of the Department of Psychology, Queen's University

• Dr. Joan Stevenson (613-533-6000 ext. 74579; GREB@queensu.ca), Chair of the General Research Ethics Board, Queen's University

I have read the above statements and freely consent to participate in this research
Appendix D
Demographic Questions

1. What is your date of birth? ________
2. How old are you? __________
3. What is your gender?
   a) Female
   b) Other: __________
4. What is your mother tongue?
   a) English
   b) French
   c) Other: __________
5. Which of the following best describes your current relationship status?
   a) Not dating at the moment
   b) No regular partner at the moment
   c) Dating one partner regularly
   d) Dating one partner regularly – long distance
   e) Living with a partner
   f) Married / common law
   g) Divorced
   h) Widowed
   i) Other: __________
6. How long have you been in this relationship situation?
   Months: __________
   Years: ________
7. What is your partner’s gender? (If applicable)
   a) Male
   b) Female
   c) No current partner
   d) Other: __________
8. What is your sexual orientation?
   a) Heterosexual
   b) Gay / Lesbian
   c) Bisexual
   d) Queer
   e) Other: __________
9. What is the highest level of formal education you have received?
   a) Some high school
   b) High school graduate
   c) Some trade school
   d) Trade school graduate
   e) Some college / undergraduate degree
   f) College / undergraduate degree
   g) Some graduate school / professional training
   h) Graduate school / professional degree
10. What is your current occupation?
    a) Employed full-time
    b) Employed part-time
    c) Unemployed
    d) Retired
    e) Student
    f) On disability
    g) Other: __________
11. What is your place of birth?
   a) Canada
   b) United States
   c) Eastern Europe
   d) Western Europe
   e) Africa
   f) Asia
   g) Australia
   h) Middle East
   i) Latin / South America
   j) Caribbean
   k) Other: 

12. What culture do you see yourself as most associated with?
   a) Canadian
   b) Quebecoise
   c) American
   d) Irish / Scottish / Welsh
   e) Native American
   f) Greek / Italian
   g) Eastern European
   h) Western European
   i) African
   j) Asian
   k) Australian
   l) Middle Eastern
   m) Latin / South American
   n) Caribbean
   o) Other: 

13. Which religion are you primarily affiliated with?
   a) Christianity
   b) Judaism
   c) Islam
   d) Buddhism
   e) Hinduism
   f) Sikhism
   g) Taoism
   h) Jainism
   i) Spiritual, no label
   j) Other: 
   k) None

14. What is the approximate total annual income of your household? (Canadian dollars)
   *If you are still dependent on your parents in some way, you may include them in this calculation.
   a) $0 - $9,999 CAD
   b) $10,000 - $19,999 CAD
   c) $20,000 - $29,999 CAD
   d) $30,000 - $39,999 CAD
   e) $40,000 - $49,999 CAD
   f) $50,000 - $59,999 CAD
   g) $60,000 CAD and over
Appendix E
Chronic Pain Questions

1. **Have you ever been diagnosed with any chronic pain condition?** (e.g., migraines, chronic low back pain)  
   (YES  NO)
   
   If YES → what condition(s)? How long have you been experiencing these conditions?
   
   _____________________________________________
   
   _____________________________________________
   
   _____________________________________________

2. **Are you currently taking any analgesics (i.e., pain medications)?**  (YES  NO)
   
   If YES → what type, why, and how long?
   
   _____________________________________________
   
   _____________________________________________
   
   _____________________________________________

3. **Are you currently taking any medications (other than analgesics)?**  (YES  NO)
   
   If YES → what type, why, and how long?
   
   _____________________________________________
   
   _____________________________________________
   
   _____________________________________________
Below is a list of symptoms people experience. Please indicate whether you experience each symptom.

If you do experience a symptom, please answer the other 4 questions about that symptom using the scales below the chart:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Do you experience this symptom?</th>
<th>1. What percentage of the time do you experience this symptom? (0-100%)</th>
<th>2. How much does this symptom interfere with your daily functioning? (0-10)</th>
<th>3. How much does this symptom interfere with your sexual functioning? (0-10)</th>
<th>4. How unpleasant do you find this symptom? (0-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbness</td>
<td>a) Yes</td>
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<td>b) Sometimes</td>
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<td>c) No</td>
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<td>Weakness</td>
<td>a) Yes</td>
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<td>b) Sometimes</td>
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<td>c) No</td>
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<td>Uncontrollable Movements</td>
<td>a) Yes</td>
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<td></td>
<td>b) Sometimes</td>
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<td>c) No</td>
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<tr>
<td>Bowel Dysfunction</td>
<td>a) Yes</td>
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<td></td>
<td>b) Sometimes</td>
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<td>c) No</td>
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<tr>
<td>Insomnia</td>
<td>a) Yes</td>
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<td></td>
<td>b) Sometimes</td>
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<td></td>
<td>c) No</td>
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</tbody>
</table>

2. Daily Functioning Interference
   
   No interference
   0 1 2 3 4 5 6 7 8 9 10

3. Sexual Functioning Interference
   
   No interference
   0 1 2 3 4 5 6 7 8 9 10

4. Unpleasantness
   
   Not unpleasant at all
   0 1 2 3 4 5 6 7 8 9 10

The most unpleasant possible
Appendix F
Post-Shingles Pain Questions

Have you ever been diagnosed with or experienced Herpes Zoster (a.k.a. shingles)? YES  NO

**If YES ➔ Please continue with these Q’s. **If NO ➔ Proceed to Gynecological Q’s

Please select from the diagram above where you feel your pain that resulted from shingles. If you have pain in more than one area, **only select the one main area where your worst pain is**.


1. How many times have you suffered from herpes zoster (a.k.a. shingles)? ______

2. How long has it been since the most recent rash healed? ___ (months) ____ (years)

3. Have you ever been diagnosed with Postherpetic Neuralgia? a) YES b) NO

4. In the past week, what percentage of the time did you feel this pain? _____

5. How many physicians have you consulted because of your pain? _____
6. On a **scale** from 0 to 10, with 0 being no pain at all and 10 being the worst pain possible, how would you rate the **average** amount of **pain** you **currently** experience because of your condition? **If you no longer experience pain because of your shingles, please select ‘0.’**

<table>
<thead>
<tr>
<th>No pain at all</th>
<th>The worst pain possible</th>
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</thead>
<tbody>
<tr>
<td>0</td>
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<td>10</td>
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</tbody>
</table>

7. On a **scale** from 0 to 10, with 0 being no pain at all and 10 being the worst pain possible, how would you rate the **worst pain** you **currently** experience because of your condition?

<table>
<thead>
<tr>
<th>No pain at all</th>
<th>The worst pain possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>10</td>
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</tbody>
</table>

8. On a **scale** from 0 to 10, with 0 being not unpleasant at all and 10 being the most unpleasant possible, how would you rate the **average** amount of **unpleasantness** you **currently** experience because of your condition?

<table>
<thead>
<tr>
<th>Not unpleasant at all</th>
<th>The most unpleasant possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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</table>

9. On a **scale** from 0 to 10, with 0 being not unpleasant at all and 10 being the most unpleasant possible, how would you rate the **worst unpleasantness** you **currently** experience because of your condition?

<table>
<thead>
<tr>
<th>Not unpleasant at all</th>
<th>The most unpleasant possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
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<td>10</td>
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</tbody>
</table>

10. **In the area that you experience your worst pain that resulted from shingles, are there any of the following?**

<table>
<thead>
<tr>
<th>Abnormal skin colour changes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal skin dryness</td>
<td></td>
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<tr>
<td>Abnormal swelling</td>
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<tr>
<td>Abnormal sweating</td>
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<td></td>
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<tr>
<td>Skin temperature changes</td>
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</tbody>
</table>
Appendix G
Gynecological Questions

1. **How old were you when you had consensual intercourse for the first time?**
   
   _________ years old. N/A (Have never had consensual intercourse. Skip to question # 5 of this section)

2. On a **scale** of 0 to 10 (0 being no pain at all and 10 being the worst pain possible), please rate the intensity of the pain you experienced during your **first** intercourse. N/A
   
<table>
<thead>
<tr>
<th>No pain at all</th>
<th>The worst pain possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
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</table>

3. On a **scale** of 0 to 10 (0 being not unpleasant at all and 10 being the most unpleasant possible), please rate the degree of unpleasantness you experienced during your **first** intercourse. N/A
   
<table>
<thead>
<tr>
<th>Not unpleasant at all</th>
<th>The most unpleasant possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
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</table>

4. **What is the total number of partners you have had intercourse with (including one-night stands)?**

5. **Have you ever given birth?**
   
   a) YES  b) NO
   
   If YES →
   
   a) **How many children do you have?**

   b) **How many children have you had through vaginal delivery?**

   c) **How many children have you had through caesarean section?**

   d) **Are you currently breast-feeding?**

   a) YES  b) NO

6. **Is there any possibility you might currently be pregnant?**
   
   a) YES  b) NO

7. **What gynecological / medical problems have you had?** (e.g., sexually transmitted infections or parasites; Check all that apply)
   
   a) Chlamydia  
   b) Gardnerella Vaginalis
   c) Genital Herpes  
   d) Genital Warts
   e) Gonorrhea  
   f) H.I.V.
   g) Syphilis  
   h) Trichomoniasis
   i) Bladder / Urinary Infections  
   j) Interstitial Cystitis
   k) P.I.D.  
   l) Endometriosis
   m) Other (please specify: __________________________)  
   n) None
8. **What kind of gynecological intervention(s) have you had?** (e.g., a gynaecological surgery; Check all that apply.)
   
a) Hysterectomy
   
b) Laparoscopy
   
c) Ovariectomy
   
d) Tubal Ligation
   
e) Abortion
   
f) Other (please specify: _________________________)
   
g) None

9. **Over the past 6 months, approximately how many times have you attempted intercourse per month?** _______

10. **Typically, what percentage of intercourse occasions has been painful?** (For example, if you experience pain during 2 of every 10 times, you experience pain 20% of the time) _______

11. **If pain occurs during intercourse, where do you primarily feel the pain?** (Select one)
   a) At the vaginal opening
   b) Everywhere on the vulva
   c) Inside the vagina
   d) In the pelvic or abdominal region
   e) Other: __________________________
   f) N/A (do not experience pain during intercourse)

12. **Do you have any difficulty at all with vaginal penetration or insertion (i.e., other than the pain, does it ever feel like you are so tight that penetration is almost or completely impossible?)**   
   
   → **IF YES**, please describe:
   
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

13. **When was your last gynaecological examination that involved an internal exam?** (An internal examination might include the insertion of a speculum or other medical instrument into your vagina)
   
   dd/mm/yyyy: ____________

14. **Was the gynaecological exam painful?** YES NO N/A

15. **Do you use tampons or any other kind of internal feminine hygiene product (e.g., Keeper/Diva Cup)?**
   
   → **IF YES**
   a) Do you experience pain when you insert/remove tampons/product? YES NO
16. Are you currently on hormonal contraceptives (e.g., the pill, NuvaRing)? YES NO

IF YES, which of the following do you use?

a. The pill
b. Contraceptive patch
c. NuvaRing or equivalent
d. IUD with hormones
e. Hormonal Injections
f. Other: ________

Genital/Bladder/Abdominal Pain Questions
Please use the following diagrams and definitions when considering genital, bladder, and abdominal pain.

A: Abdominal area (higher up in the vagina, bladder, and/or pelvis)

B: Vulvar area (opening of the vagina, urethral opening, clitoris, and labia)

C: The vestibule (opening of the vagina)

D: The urethral opening (where urine comes out)

E: The bladder

F: The cervix and/or uterus
1. Do you currently experience pain in the following areas? (check all that apply)
   a) Your abdominal region  
   b) Your vulva  
   c) Your vestibule  
   d) The urethral opening  
   e) Your bladder  
   f) Your cervix and/or uterus

2. If you experience pain in more than one area, which area is the worst? (check one)
   a) Your abdominal region  
   b) Your vulva  
   c) Your vestibule  
   d) The urethral opening  
   e) Your bladder  
   f) Your cervix and/or uterus  
   g) I do not experience pain in these areas
Appendix H
Worst Genital/Bladder/Abdominal Pain Questions

1. For how long have you had this worst pain? ______ (months) _____ (years)

2. How did your worst pain start? (select all that apply)
   a. With first sexual experience
   b. After repeated yeast infections
   c. For no apparent reason
   d. Change of partner
   e. After repeated bladder or urinary tract infections (UTIs)
   f. With the onset of menopause
   g. After a gynecological surgery (please specify: ___________________)
   h. After a life stress (e.g., marital conflict, financial problems; specify: ___)
   i. After an abortion
   j. Other (please specify: ______________________)

3. In what situations do you feel this worst pain? (please choose only one (a-f) then answer the follow-up questions for that option)
   a) It is always or almost always present
      ➔ IF SELECTED:
      a. In the past week, what percentage of the time did you feel this pain? _____ (0-100%)

   b) During sexual intercourse or activities involving vaginal penetration
      ➔ IF SELECTED
      a. When does the pain START during sexual intercourse or activities involving vaginal penetration? (select the response that best fits)
         a. When the penis/finger/object starts to enter the vagina
         b. When the penis/finger/object has fully entered and is thrusting*
         c. Only after penetration*: How long does it last? _________
      b. Which activities cause you pain in your worst area? (check all that apply)
         a. Penetration with fingers ______
         b. Penetration with sex toys ______
         c. Penetration with a penis ______
         d. Other penetration ______
         e. Tampon insertion ______
         f. Gynaecological examinations ______
         g. Any pressure to the area ______
         h. Any contact with the area ______
         i. Other: ______________
      c. What percentage of these activities results in pain to your worst area? (0%-100%) ______

c) It is always or almost always there, and worsens during sexual intercourse/activities involving vaginal penetration
   → IF SELECTED
   i. When does the pain WORSEN during sexual intercourse or activities involving vaginal penetration? (select the response that best fits)
      1. When the penis/finger/object starts to enter the vagina
      2. When the penis/finger/object has fully entered and is thrusting*
      3. Only after penetration*: How long does it last? ________
   ii. Which activities cause you pain in your worst area? (select all that apply)
       a. Penetration with fingers
       b. Penetration with sex toys
       c. Penetration with a penis
       d. Other penetration
       e. Tampon insertion
       f. Gynaecological examinations
       g. Any pressure to the area
       h. Any contact with the area
       i. Other: ______
   iii. What percentage of these activities results in pain in your worst area? (0%-100%) ______
   iv. In the past week, what percentage of the time did you feel the pain? _____

d) During pregnancy only* (not eligible)

e) During menstruation only* (not eligible)

f) Other: ______________________________________________________________

4. On a scale from 0 to 10, with 0 being no pain at all and 10 being the worst pain possible, how would you rate the average amount of pain you experience at this area?

<table>
<thead>
<tr>
<th>No pain at all</th>
<th>The worst pain possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

5. On a scale from 0 to 10, with 0 being no pain at all and 10 being the worst pain possible, how would you rate the worst pain you experience at this area?

<table>
<thead>
<tr>
<th>No pain at all</th>
<th>The worst pain possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
6. On a scale from 0 to 10, with 0 being not unpleasant at all and 10 being the most unpleasant possible, how would you rate the **average** amount of unpleasantness you experience at this area?

<table>
<thead>
<tr>
<th>Not unpleasant at all</th>
<th>The most unpleasant possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

7. On a scale from 0 to 10, with 0 being not unpleasant at all and 10 being the most unpleasant possible, how would you rate the **worst** unpleasantness you experience at this area?

<table>
<thead>
<tr>
<th>Not unpleasant at all</th>
<th>The most unpleasant possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

8. In the past week, what percentage of the time did you feel this pain? (0-100%) ______

9. **What adjective(s) would you use to describe the pain you feel in this region?**

__________________________________________________________________

__________________________________________________________________

10. **Have you ever received a diagnosis for this pain?**  YES  NO

    → IF YES
    i. **What diagnosis, if any, have you received for your pain?** (select all that apply)
       a. No diagnosis
       b. Vulvodynia or vulvar vestibulitis (VVS)
       c. Generalized vulvodynia (GVD)
       d. Provoked vestibulodynia
       e. Fibromyalgia
       f. Lichens sclerosis
       g. Endometriosis
       h. Chronic pelvic pain
       i. Interstitial cystitis
       j. Other: ______________________

    ii. **How many physicians have you consulted about your pain?** ______

    iii. **Who gave you a diagnosis?** (Check all that apply)
        a. N/A (no diagnosis) ______
        b. Family doctor ______
        c. Gynecologist ______
        d. Specialist ______
        e. Other: ________________

    iv. **How long ago did you receive your diagnosis?** ____ (months) ____ (years)
11. Have you ever undergone any of the following treatments for the pain?

<table>
<thead>
<tr>
<th>Treatment</th>
<th>In the Past</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing aspects of sex life (e.g., position, speed, enhancing arousal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creams (e.g., K-Y, Crisco, moisturizers, corticosteroids, hormonal,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>anesthetics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative medicine (e.g., vitamins, diets, homeopathic remedies)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiotherapy/physical therapy or other pelvic floor exercises (Kegels,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>biofeedback)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological treatments (e.g., psychotherapy, hypnosis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other medical treatments (e.g., hormones, injections)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small changes (e.g., cotton underwear, mild soaps)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery (please specify: __________________________)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications (please specify: __________________________)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: ___________________________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. Is there anything that makes the pain worse (besides penetration activities)? YES NO
   → IF YES, please describe what makes the pain worse: __________________________

13. Is there anything that makes the pain better? YES NO
   → IF YES, please describe what makes the pain better: __________________________

14. In the areas that you experience your worst genital/bladder/abdominal pain, are there any of the following?

<table>
<thead>
<tr>
<th>Abnormal skin colour changes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin temperature changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal swelling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal sweating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal skin dryness</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix I
Pain Questionnaires

MPQ

Some of the words below describe this pain. Place a check next to **ONLY** those words that best describe it. Leave out any category that is not suitable. Use only a single word in each appropriate category – the one that applies best.

<table>
<thead>
<tr>
<th>Pain Experience</th>
<th>matching words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flickering...</td>
<td>Hot</td>
</tr>
<tr>
<td>2. Jumping......</td>
<td>Itchy</td>
</tr>
<tr>
<td>3. Pricking.....</td>
<td>Dull</td>
</tr>
<tr>
<td>4. Sharp..........</td>
<td>Tender</td>
</tr>
<tr>
<td>5. Pinching......</td>
<td>Tiring</td>
</tr>
<tr>
<td>6. Tugging........</td>
<td>Frightening</td>
</tr>
<tr>
<td>7. Hot</td>
<td>Burning</td>
</tr>
<tr>
<td>8. Tingling......</td>
<td>Smarting</td>
</tr>
<tr>
<td>9. Dull</td>
<td>Sore</td>
</tr>
<tr>
<td>10. Tender.......</td>
<td>Taut</td>
</tr>
<tr>
<td>11. Tiring.......</td>
<td>Exhausting</td>
</tr>
<tr>
<td>12. Sickening....</td>
<td>Drawing</td>
</tr>
<tr>
<td>13. Frightful....</td>
<td>Cool</td>
</tr>
<tr>
<td>14. Punishing....</td>
<td>Gruelling</td>
</tr>
<tr>
<td>15. Wretched.....</td>
<td>Blinding</td>
</tr>
<tr>
<td>16. Annoying.....</td>
<td>Miserable</td>
</tr>
<tr>
<td>17. Spreading....</td>
<td>Intense</td>
</tr>
<tr>
<td>18. Tight.........</td>
<td>Numb</td>
</tr>
<tr>
<td>19. Cool..........</td>
<td>Squeezing</td>
</tr>
<tr>
<td>20. Freezing......</td>
<td>Tearing</td>
</tr>
</tbody>
</table>

Pumping
Beating
Pulsing
Throbbing
Peeling
Tenderness
Pressing
Gnawing
Cramping
Crushing
Drawing
Squeezing
Tearing
Lancinating
Stabbing
Pricking
Boring
Drilling
Lacerating
People agree that the following 5 words represent pain of increasing intensity. Which word best describes your pain? Please check one.

- Mild
- Discomforting
- Distressing
- Horrible
- Excruciating

---

**PCS**

**Directions:** Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

We are interested in the types of thoughts and feelings that you have when you are experiencing pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with your pain. Please indicate the degree to which you have these thoughts and feelings when you are experiencing this pain. To indicate your answer, please check one box per question.

<table>
<thead>
<tr>
<th>When I am in pain…</th>
<th>Not at all</th>
<th>To a slight degree</th>
<th>To a moderate degree</th>
<th>To a great degree</th>
<th>All the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>I worry all the time about whether the pain will end.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel I can’t go on.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It’s terrible and I think it’s never going to get any better.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It’s awful and I feel that it overwhelms me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel I can’t stand it anymore.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I become afraid that the pain will get worse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I keep thinking of other painful events.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I anxiously want the pain to go away.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can’t seem to keep it out of my mind.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I keep thinking about how much it hurts.

I keep thinking about how badly I want the pain to stop.

There’s nothing I can do to reduce the intensity of the pain.

I wonder whether something serious may happen.

**MPI**

*Only for those who have a partner*

In this section, we are interested in knowing how your significant other responds to you when he or she knows that you are in pain. On the scale listed below each question, choose a number to indicate how often your significant other generally responds to you in that particular way when you are experiencing this pain.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignores me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asks me what he/she can do to help.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reads to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expresses irritation at me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takes over my jobs or duties.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Talks to me about something else to take my mind off the pain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expresses frustration at me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tries to get me to rest.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tries to involve me in some activity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expresses anger at me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gets me some pain medications.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encourages me to work on a hobby.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gets me something to eat or drink.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turns on the T.V. to take my mind off my pain.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PDI**

**Instructions:** The rating scales below are designed to measure the degree to which several aspects of your life are presently disrupted by chronic pain. In other words, we would like to know how much this pain is preventing you from doing what you would normally do, or from doing it as well as you normally would. Respond to each category by indicating the *overall* impact of this pain in your life, not just when the pain is at its worst.

For each of the 7 categories of life activity listed, please choose the number on the scale which describes the level of disability you typically experience. A score of 0 means no disability at all, and a score of 10 signifies that all of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Total Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Disability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Disability Rating (0-10)</td>
</tr>
</tbody>
</table>

1. **Family/Home Responsibilities**  
   This category refers to activities related to the home or family. It includes chores or duties performed around the house (e.g., yard work) and errands or favours for other family members (e.g., driving the children to school).

2. **Recreation**  
   This category includes hobbies, sports, and other similar leisure time activities.

3. **Social Activity**  
   This category refers to activities that involve participation with friends and acquaintances other than family members. It includes parties, theatre, concerts, dining out, and other social functions.

4. **Occupation**  
   This category refers to activities that are a part of or directly related to one’s job. This includes non-paying jobs as well, such as that of a house-wife or volunteer worker.

5. **Sexual Behaviour**  
   This category refers to the frequency and quality of one’s sex life.

6. **Self-Care**  
   This category includes activities which involve personal maintenance and independent daily living (e.g., taking a shower, driving, getting dressed, etc.)

7. **Life-Support Activity**  
   This category refers to basic life-supporting behaviours such as eating, sleeping, and breathing.
S-LANSS

In the area where you have pain, do you also have ‘pins and needles’, tingling or prickling sensations?

- □ NO – I don’t get these sensations
- □ YES – I get these sensations often

Does the painful area change colour (perhaps looks mottled or more red) when the pain is particularly bad?

- □ NO – The pain does not affect the colour of my skin
- □ YES – I have noticed that the pain does make my skin look different from normal

Does your pain make the affected skin abnormally sensitive to touch? Getting unpleasant sensations or pain when lightly stroking the skin might describe this.

- □ NO – The pain does not make my skin in that area abnormally sensitive to touch
- □ YES – My skin in that area is particularly sensitive to touch

Does your pain come on suddenly and in bursts for no apparent reason when you are completely still? Words like ‘electric shocks’, jumping and bursting might describe this.

- □ NO – My pain doesn’t really feel like this
- □ YES – I get these sensations often

In the area where you have pain, does your skin feel unusually hot like a burning pain?

- □ NO – don’t have burning pain
- □ YES – I get burning pain often

Gently rub the painful area with your index finger and then rub a non-painful area (for example, an area of skin further away or on the opposite side from the painful area). How does this rubbing feel in the painful area?

- □ The painful area feels no different from the non-painful area
- □ I feel discomfort, like pins and needles, tingling or burning in the painful area that is different from the non-painful area

Gently press on the painful area with your finger tip than gently press in the same way onto a non-painful area (the same non-painful area that you chose in the last question). How does this feel in the painful area?

- □ The painful area does not feel different from the non-painful area
- □ I feel numbness or tenderness in the painful area that is different from the non-painful area
You are suffering from pain that may be due to injury or disease of the nervous system. This pain may be of several types. You may have spontaneous pain, i.e. pain in the absence of any stimulation, which may be long-lasting or occur as brief attacks. You may also have pain provoked or increased by brushing, pressure, or contact with cold in the painful area. You may feel one or several types of pain. This questionnaire has been developed to evaluate the various types of pain you may feel.

We wish to know if you feel spontaneous pain, that is pain without any stimulation. For each of the following questions, please select the number that best describes your average spontaneous pain severity during the past 24 h. Select the number 0 if you have not felt such pain (circle one number only)

Q1. Does your pain feel like burning?

<table>
<thead>
<tr>
<th>Response</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No burning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worst burning imaginable

Q2. Does your pain feel like squeezing?

<table>
<thead>
<tr>
<th>Response</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No squeezing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worst squeezing imaginable

Q3. Does your pain feel like pressure?

<table>
<thead>
<tr>
<th>Response</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worst pressure imaginable

Q4. During the past 24 h, your spontaneous pain has been present:
Select the response that best describes your case

- Permanently
- Between 8 and 12 h
- Between 4 and 7 h
- Between 1 and 3 h
- Less than 1 h

We wish to know if you have brief attacks of pain. For each of the following questions, please select the number that best describes the average severity of your painful attacks during the past 24 h. Select the number 0 if you have not felt such pain (circle one number only).

Q5. Does your pain feel like electric shocks?

<table>
<thead>
<tr>
<th>Response</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>No electric shocks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worst electric shocks imaginable
Q6. Does your pain feel like stabbing?

No stabbing  0 1 2 3 4 5 6 7 8 9 10  Worst stabbing imaginable

Q7. During the past 24 h, how many of these pain attack have you had?

Select the response that best describes your case

More than 20  
Between 11 and 20  
Between 6 and 10  
Between 1 and 5  
No pain attack

We wish to know if you feel pain provoked or increased by brushing, pressure, contact with cold or warmth on the painful area. For each of the following questions, please select the number that best describes the average severity of your provoked pain during the past 24 h. Select the number 0 if you have not felt such pain (circle one number only).

Q8. Is your pain provoked or increased by brushing on the painful area?

No pain  0 1 2 3 4 5 6 7 8 9 10  Worst pain imaginable

Q9. Is your pain provoked or increased by pressure on the painful area?

No pain  0 1 2 3 4 5 6 7 8 9 10  Worst pain imaginable

Q10. Is your pain provoked or increased by contact with something cold on the painful area?

No pain  0 1 2 3 4 5 6 7 8 9 10  Worst pain imaginable

We wish to know if you feel abnormal sensations in the painful area. For each of the following questions, please select the number that best describes the average severity of your abnormal sensations during the past 24 h. Select the number 0 if you have not felt such sensation (circle one number only).

Q11. Do you feel pins and needles?

No pins and needles  0 1 2 3 4 5 6 7 8 9 10  Worst pins and needles imaginable

Q12. Do you feel tingling?

No tingling  0 1 2 3 4 5 6 7 8 9 10  Worst tingling imaginable
PASS-20

Individuals who experience pain develop different ways to respond to that pain. We would like to know what you do and what you think about when experiencing this pain. Please use the rating scale below to indicate how often you engage in each of the following thought or activities. Select any number from 0 (NEVER) to 5 (ALWAYS) for each item.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>NEVER</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I think that if my pain gets too severe, it will never decrease…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>When I feel pain I am afraid that something terrible will happen…</td>
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<tr>
<td>3</td>
<td>I go immediately to bed when I feel severe pain…</td>
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<tr>
<td>4</td>
<td>I begin trembling when engaged in activity that increases pain…</td>
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<tr>
<td>5</td>
<td>I can’t think straight when I am in pain…</td>
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<tr>
<td>6</td>
<td>I will stop any activity as soon as I sense pain coming on…</td>
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<tr>
<td>7</td>
<td>Pain seems to cause my heart to pound or race…</td>
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<tr>
<td>8</td>
<td>As soon as pain comes on I take medication to reduce it…</td>
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<tr>
<td>9</td>
<td>When I feel pain I think that I may be seriously ill…</td>
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<tr>
<td>10</td>
<td>During painful episodes it is difficult for me to think of anything else besides the pain…</td>
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<tr>
<td>11</td>
<td>I avoid important activities when I hurt…</td>
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<tr>
<td>12</td>
<td>When I sense pain I feel dizzy or faint…</td>
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</tr>
<tr>
<td>13</td>
<td>Pain sensations are terrifying…</td>
<td></td>
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<tr>
<td>14</td>
<td>When I hurt I think about the pain constantly…</td>
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<tr>
<td>15</td>
<td>Pain makes me nauseous (feel sick)…</td>
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<tr>
<td>16</td>
<td>When pain comes on strong I think I might become paralyzed or more disabled…</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I find it hard to concentrate when I hurt…</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>18</td>
<td>I find it difficult to calm my body down after periods of pain…</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>19</td>
<td>I worry when I am in pain…</td>
<td></td>
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</tr>
<tr>
<td>20</td>
<td>I try to avoid activities that cause pain…</td>
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<td></td>
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</tr>
</tbody>
</table>
Instructions: There are different aspects and types of pain that patients experience and that we are interested in measuring. Pain can feel sharp, hot, cold, dull, and achy. Some pains may feel like they are very superficial (at skin-level), or they may feel like they are from deep inside your body. Pain can also be described as unpleasant.

This scale helps us measure these and other different aspects of your pain. For one patient, a pain might feel extremely hot and burning, but not at all dull, while another patient may not experience any burning pain, but feel like their pain is very dull and achy. Therefore, we expect you to rate very high on some of the scales below and very low on others.

Please use the 19 rating scales below to rate how much of each different pain quality and type you may or may not have felt OVER THE PAST WEEK, ON AVERAGE.

Place an “X” through the number that best describes your pain.

Please use the scale below to tell us how intense your pain has been over the past week, on average.

<table>
<thead>
<tr>
<th>No pain</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
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</tr>
</tbody>
</table>

The most intense pain sensation imaginable

Please use the scale below to tell us how sharp your pain has felt over the past week. Words used to describe sharp feelings include “like a knife,” “like a spike,” or “piercing.”

<table>
<thead>
<tr>
<th>Not sharp</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</tbody>
</table>

The most sharp sensation imaginable (“like a knife”)

Please use the scale below to tell us how hot your pain has felt over the past week. Words used to describe very hot pain include “burning” and “on fire.”

<table>
<thead>
<tr>
<th>Not hot</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</tr>
</tbody>
</table>

The most hot sensation imaginable (“burning”)

Please use the scale below to tell us how dull your pain has felt over the past week.

<table>
<thead>
<tr>
<th>Not dull</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</thead>
<tbody>
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</tbody>
</table>

The most dull sensation imaginable

Please use the scale below to tell us how cold your pain has felt over the past week. Words used to describe very cold pain include “like ice” and “freezing.”

<table>
<thead>
<tr>
<th>Not cold</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Please use the scale below to tell us how **sensitive** your skin has been to light touch or clothing rubbing against it over the past week. Words used to describe sensitive skin include “like sunburned skin” and “raw skin.”

Not sensitive 0 1 2 3 4 5 6 7 8 9 10

The most **sensitive** sensation imaginable (“raw skin”)

Please use the scale below to tell us how **tender** your pain is when something has pressed against it over the past week. Another word used to describe tender pain is “like a bruise.”

Not tender 0 1 2 3 4 5 6 7 8 9 10

The most **tender** sensation imaginable (“like a bruise”)

Please use the scale below to tell us how **itchy** your pain has felt over the past week. Words used to describe itchy pain include “like poison ivy” and “like a mosquito bite.”

Not itchy 0 1 2 3 4 5 6 7 8 9 10

The most **itchy** sensation imaginable (“like poison ivy”)

Please use the scale below to tell us how much your pain has felt like it has been **shooting** over the past week. Another word used to describe shooting pain is “zapping.”

Not shooting 0 1 2 3 4 5 6 7 8 9 10

The most **shooting** sensation imaginable (“zapping”)

Please use the scale below to tell us how **numb** your pain has felt over the past week. A phrase that can be used to describe numb pain is “like it is asleep.”

Not numb 0 1 2 3 4 5 6 7 8 9 10

The most **numb** sensation imaginable (“asleep”)

Please use the scale below to tell us how much your pain sensations have felt **electrical** over the past week. Words used to describe electrical pain include “shocks,” “lightning,” and “sparking.”

Not electrical 0 1 2 3 4 5 6 7 8 9 10

The most **electrical** sensation imaginable (“shocks”)

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Please use the scale below to tell us how **tingling** your pain has felt over the past week. Words used to describe tingling pain include “like pins and needles” and “prickling.”

Not tingling  0  1  2  3  4  5  6  7  8  9  10

The most **tingling** sensation imaginable (“pins and needles”)

Please use the scale below to tell us how **cramping** your pain has felt over the past week. Words used to describe cramping pain include “squeezing” and “tight.”

Not cramping  0  1  2  3  4  5  6  7  8  9  10

The most **cramping** sensation imaginable (“squeezing”)

Please use the scale below to tell us how **radiating** your pain has felt over the past week. Another word used to describe radiating pain is “spreading.”

Not radiating  0  1  2  3  4  5  6  7  8  9  10

The most **radiating** sensation imaginable (“spreading”)

Please use the scale below to tell us how **throbbing** your pain has felt over the past week. Another word used to describe throbbing pain is “pounding.”

No throbbing  0  1  2  3  4  5  6  7  8  9  10

The most **throbbing** sensation imaginable (“pounding”)

Please use the scale below to tell us how **aching** your pain has felt over the past week. Another word used to describe aching pain is “like a toothache.”

Not aching  0  1  2  3  4  5  6  7  8  9  10

The most **aching** sensation imaginable (“like a toothache”)

Please use the scale below to tell us how **heavy** your pain has felt over the past week. Other words used to describe heavy pain are “pressure” and “weighted down.”

Not heavy  0  1  2  3  4  5  6  7  8  9  10

The most **heavy** sensation imaginable (“weighted down”)

---

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Now that you have told us the different types of pain sensations you have felt, we want you to tell us overall how unpleasant your pain has been to you over the past week. Words used to describe very unpleasant pain include “annoying,” “bothersome,” “miserable,” and “intolerable.” Remember, pain can have a low intensity but still feel extremely unpleasant, and some kinds of pain can have a high intensity but be very tolerable. With this scale, please tell us how unpleasant your pain feels.

Not unpleasant 0 1 2 3 4 5 6 7 8 9 10

The most unpleasant sensation imaginable (“intolerable”)

Finally, we want you to give us an estimate of the severity of your deep versus surface pain over the past week. We want you to rate each location of pain separately. We realize that it can be difficult to make these estimates, and most likely it will be a “best guess,” but please give us your best estimate.

HOW INTENSE IS YOUR DEEP PAIN?

No deep pain 0 1 2 3 4 5 6 7 8 9 10

The most intense deep pain sensation imaginable

HOW INTENSE IS YOUR SURFACE PAIN?

No surface pain 0 1 2 3 4 5 6 7 8 9 10

The most intense surface pain sensation imaginable

Pain can also have different time qualities. For some people, the pain comes and goes and so they have some moments that are completely without pain; in other words the pain “comes and goes”. This is called intermittent pain. Others are never pain free, but their pain types and pain severity can vary from one moment to the next. This is called variable pain. For these people, the increases can be severe, so that they feel they have moments of very intense pain (“breakthrough” pain), but at other times they can feel lower levels of pain (“background” pain). Still, they are never pain free. Other people have pain that really does not change that much from one moment to another. This is called stable pain. Which of these best describes the time pattern of your pain (please select only one):

- I have intermittent pain (I feel pain sometimes but I am pain-free at other times).
- I have variable pain (“background” pain all the time, but also moments of more pain, or even severe “breakthrough” pain or varying types of pain).
- I have stable pain (constant pain that does not change very much from one moment to another, and no pain-free periods).
## SF-36

1. **In general, would you say your health is:**
   - a. Excellent
   - b. Very Good
   - c. Good
   - d. Fair
   - e. Poor

2. **Compared to one year ago, how would you rate your health in general now?**
   - a. Much better now than one year ago
   - b. Somewhat better now than one year ago
   - c. About the same as one year ago
   - d. Somewhat worse now than one year ago
   - e. Much worse than one year ago

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Yes, Limited a lot</th>
<th>Yes, Limited a little</th>
<th>No, Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf</td>
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<tr>
<td>c. Lifting or carrying groceries</td>
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<tr>
<td>d. Climbing several flights of stairs</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>e. Climbing one flight of stairs</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>f. Bending, kneeling, or stooping</td>
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<tr>
<td>g. Walking more than a mile</td>
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<tr>
<td>h. Walking several blocks</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>i. Walking one block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Bathing or dressing yourself</td>
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</tbody>
</table>

4. **During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?**
   - a. Cut down the amount of time you spent on work or other activities
   - i. Yes
   - ii. No
   - b. Accomplished less than you would like
   - i. Yes
   - ii. No
c. Were limited in the kind of work or other activities
   i. Yes
   ii. No

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?
   a. Not at all
   b. Slightly
   c. Moderately
   d. Quite a bit
   e. Extremely

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?
   a. Cut down the amount of time you spent on work or other activities
      i. Yes
      ii. No

7. How much bodily pain have you had during the past 4 weeks?
   a. None
   b. Very mild
   c. Mild
   d. Moderate
   e. Severe
   f. Very severe

b. Accomplished less than you would like
   i. Yes
   ii. No

c. Didn’t do work or other activities as carefully as usual
   i. Yes
   ii. No

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
   a. Not at all
   b. A little bit
   c. Moderately
   d. Quite a bit
   e. Extremely
9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks

<table>
<thead>
<tr>
<th>Question</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>A good bit of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Did you feel full of pep?</td>
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<tr>
<td>b. Have you been a very nervous person?</td>
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<tr>
<td>c. Have you felt so down in the dumps that nothing could cheer you up?</td>
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<tr>
<td>d. Have you felt calm and peaceful?</td>
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<tr>
<td>e. Did you have a lot of energy?</td>
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<tr>
<td>f. Have you felt downhearted and blue?</td>
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<tr>
<td>g. Did you feel worn out?</td>
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<tr>
<td>h. Have you been a happy person?</td>
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</tr>
<tr>
<td>i. Did you feel tired?</td>
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</tbody>
</table>

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?
   a. All of the time
   b. Most of the time
   c. Some of the time
   d. A little of the time
   e. None of the time

11. How TRUE or FALSE is each of the following statements for you?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Definitely true</th>
<th>Mostly true</th>
<th>Don’t know</th>
<th>Mostly false</th>
<th>Definitely false</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I seem to get sick a little easier than other people</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>b. I am as healthy as anybody I know</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. I expect my health to get worse</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>d. My health is excellent</td>
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</table>
## CES-D

**Directions:** Using the scale below, indicate the number which best describes how often you felt or behaved this way – DURING THE PAST WEEK.

1 = Rarely or none of the time (less than 1 day)
2 = Some or a little of the time (1-2 days)
3 = Occasionally or a moderate amount of time (3-4 days)
4 = Most or all of the time (5-7 days)

**DURING THE PAST WEEK:**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>I was bothered by things that usually don’t bother me.</td>
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<tr>
<td>I did not feel like eating; my appetite was poor.</td>
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<tr>
<td>I felt that I could not shake off the blues, even with the help</td>
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<td></td>
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<tr>
<td>from my family or friends.</td>
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<tr>
<td>I felt that I was just as good as other people.</td>
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<td></td>
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<tr>
<td>I had trouble keeping my mind on what I was doing.</td>
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<tr>
<td>I felt depressed.</td>
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<tr>
<td>I felt that everything I did was an effort.</td>
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<tr>
<td>I felt hopeful about the future.</td>
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<tr>
<td>I thought my life had been a failure.</td>
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<tr>
<td>I felt fearful.</td>
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<tr>
<td>My sleep was restless.</td>
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<tr>
<td>I was happy.</td>
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<tr>
<td>I talked less than usual.</td>
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<tr>
<td>I felt lonely.</td>
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<tr>
<td>People were unfriendly.</td>
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<tr>
<td>I enjoyed life.</td>
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<tr>
<td>I had crying spells.</td>
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<tr>
<td>I felt sad.</td>
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<tr>
<td>I felt that people disliked me.</td>
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<tr>
<td>I could not get “going”.</td>
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</tbody>
</table>
### STAI

**INSTRUCTIONS:** A number of statements which people have used to describe themselves are given below. Read each statement and then choose the appropriate response to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

<table>
<thead>
<tr>
<th></th>
<th>Almost never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel pleasant.</td>
<td></td>
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<tr>
<td>I feel nervous and restless.</td>
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<tr>
<td>I feel satisfied with myself.</td>
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<tr>
<td>I wish I could be as happy as others seem to be.</td>
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<tr>
<td>I feel like a failure.</td>
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<tr>
<td>I feel rested.</td>
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<tr>
<td>I am “calm, cool, and collected.”</td>
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<tr>
<td>I feel that difficulties are piling up so that I cannot overcome them.</td>
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<tr>
<td>I worry too much over something that doesn’t really matter.</td>
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<tr>
<td>I am happy.</td>
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<tr>
<td>I have disturbing thoughts.</td>
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<tr>
<td>I lack self-confidence.</td>
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<tr>
<td>I feel secure.</td>
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<tr>
<td>I make decisions easily.</td>
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<tr>
<td>I feel inadequate.</td>
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<tr>
<td>I am content.</td>
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<tr>
<td>Some unimportant thought runs through my mind and bothers me.</td>
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<tr>
<td>I take disappointments so keenly that I can’t put them out of my mind.</td>
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<tr>
<td>I am a steady person.</td>
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<tr>
<td>I get in a state of tension or turmoil as I think over my recent concerns and interests.</td>
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</tbody>
</table>
**PSS**

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way.

In the last month, how often have you:

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Been upset because of something that happened unexpectedly?</td>
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<tr>
<td>2. Felt that you were unable to control the important things in your life?</td>
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<tr>
<td>3. Felt nervous and “stressed”?</td>
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<tr>
<td>4. Dealt successfully with irritating life hassles?</td>
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<tr>
<td>5. Felt that you were effectively coping with important changes that were occurring in your life?</td>
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<tr>
<td>6. Felt confident about your ability to handle your personal problems?</td>
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<tr>
<td>7. Felt that things were going your way?</td>
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<tr>
<td>8. Found that you could not cope with all the things that you had to do?</td>
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<tr>
<td>9. Been able to control irritations in your life?</td>
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<tr>
<td>10. Felt that you were on top of things?</td>
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<tr>
<td>11. Been angered because of things that happened that were outside of your control?</td>
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<tr>
<td>12. Found yourself thinking about things that you have to accomplish?</td>
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<tr>
<td>13. Been able to control the way you spend your time?</td>
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<tr>
<td>14. Felt difficulties were piling up so high that you could not overcome them?</td>
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</tbody>
</table>
Sleep Scale

1. How long did it usually take for you to fall asleep during the past 4 weeks? (Circle One)
   0-15 minutes........................................1
   16-30 minutes.................................2
   31-45 minutes.................................3
   46-60 minutes.................................4
   More than 60 minutes.......................5

2. On the average, how many hours did you sleep each night during the past 4 weeks?
   Write in number of hours per night: ________

3. How often during the past 4 weeks did you:

<table>
<thead>
<tr>
<th>All of the Time</th>
<th>Most of the Time</th>
<th>A Good Bit of the Time</th>
<th>Some of the Time</th>
<th>A Little of the Time</th>
<th>None of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feel that your sleep was not quiet (moving restlessly, feeling tense, speaking, etc., while sleeping)?</td>
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<tr>
<td>Get enough sleep to feel rested upon waking in the morning?</td>
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<tr>
<td>Awaken short of breadth or with a headache?</td>
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<tr>
<td>Feel drowsy or sleepy during the day?</td>
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<tr>
<td>Have trouble falling asleep?</td>
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<tr>
<td>Awaken during your sleep time and have trouble falling asleep again?</td>
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<tr>
<td>Have trouble staying awake during the day?</td>
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<tr>
<td>Snore during your sleep?</td>
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<tr>
<td>Take naps (5 minutes or longer) during the day?</td>
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<tr>
<td>Get the amount of sleep you needed?</td>
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</tbody>
</table>
FSFI

INSTRUCTIONS: These questions ask about your sexual feelings and responses during the past 4 weeks. Please answer the following questions as honestly and clearly as possible. Your responses will be kept completely confidential. In answering these questions the following definitions apply:

Sex, sexual activity, lovemaking, and foreplay refer to:
- caressing, kissing, manual stimulation of the genitals/anus/breasts by yourself or your partner
- oral stimulation of the genitals/anus/breasts
- vaginal or anal penetration with fingers, tongue or sex toys

Sexual intercourse refers to:
- receiving vaginal/anal penetration with fingers, or sex toys
- penetration of your partner’s vagina/anus with fingers or sex toys

Sexual stimulation refers to sexual situations such as the following:
- foreplay with your partner, stimulating your partner, receiving stimulation from your partner
- self-stimulation (masturbation), sexual fantasy
- viewing erotic films, pictures, or reading erotic material

Sexual desire or interest is a feeling that includes wanting to have a sexual experience, feeling receptive to a partner’s sexual initiation, and thinking or fantasizing about having sex.

PLEASE SELECT ONLY ONE ANSWER PER QUESTION.

1. Over the past 4 weeks, how satisfied have you been with your overall sexual life?
   a. Very satisfied
   b. Moderately satisfied
   c. About equally satisfied and dissatisfied
   d. Moderately dissatisfied
   e. Very dissatisfied
   f. Not applicable (have never been sexual with partner)

2. Over the past 4 weeks, how often did you feel sexual desire or interest?
   a. Almost always or always
   b. Most times (more than half the time)
   c. Sometimes (about half the time)
   d. A few times (less than half the time)
   e. Almost never or never

3. Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?
   a. Very high
   b. High
   c. Moderate
   d. Low
   e. Very low or none at all

4. Over the past 4 weeks, did you engage in sexual activity of any kind with a partner and/or by yourself (e.g., masturbation)?
   a. No sexual activity (neither with a partner nor by myself)
   b. Sexual activity with a partner only
   c. Sexual activity by myself only
   d. Sexual activity both with a partner and by myself
Sexual arousal is a feeling that includes both physical and mental aspects of sexual excitement. It may include feelings of warmth or tingling in the genitals, lubrication (wetness), or muscle contractions.

5. Over the past 4 weeks, how often did you feel sexually aroused (“turned on”) during sexual activity or intercourse?
   a. No sexual activity
   b. Almost always or always
   c. Most times (more than half the time)
   d. Sometimes (about half the time)
   e. A few times (less than half the time)
   f. Almost never or never

6. Over the past 4 weeks, how would you rate your level of sexual arousal (“turn on”) during sexual activity or intercourse?
   a. No sexual activity
   b. Very high
   c. High
   d. Moderate
   e. Low
   f. Very low or none at all

7. Over the past 4 weeks, how confident were you about becoming sexually aroused during sexual activity or intercourse?
   a. No sexual activity
   b. Very high confidence
   c. High confidence
   d. Moderate confidence
   e. Low confidence
   f. Very low or no confidence

8. Over the past 4 weeks, how often have you been satisfied with your arousal (excitement) during sexual activity or intercourse?
   a. No sexual activity
   b. Almost always or always
   c. Most times (more than half the time)
   d. Sometimes (about half the time)
   e. A few times (less than half the time)
   f. Almost never or never

9. Over the past 4 weeks, how often did you become lubricated (“wet”) during sexual activity or intercourse?
   a. No sexual activity
   b. Almost always or always
   c. Most times (more than half the time)
   d. Sometimes (about half the time)
   e. A few times (less than half the time)
   f. Almost never or never

10. Over the past 4 weeks, how difficult was it to become lubricated (“wet”) during sexual activity or intercourse?
    a. No sexual activity
    b. Extremely difficult or impossible
    c. Very difficult
    d. Difficult
    e. Slightly difficult
    f. Not difficult

11. Over the past 4 weeks, how often did you maintain your lubrication (“wetness”) until completion of sexual activity or intercourse?
    a. No sexual activity
    b. Almost always or always
    c. Most times (more than half the time)
    d. Sometimes (about half the time)
    e. A few times (less than half the time)
    f. Almost never or never

12. Over the past 4 weeks, how difficult was it to maintain your lubrication (“wetness”) until completion of sexual activity or intercourse?
    a. No sexual activity
    b. Almost always or always
    c. Most times (more than half the time)
    d. Sometimes (about half the time)
    e. A few times (less than half the time)
    f. Almost never or never
13. Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you reach orgasm (climax)?
   a. No sexual activity
   b. Almost always or always
   c. Most times (more than half the time)
   d. Sometimes (about half the time)
   e. A few times (less than half the time)
   f. Almost never or never

14. Over the past 4 weeks, when you had sexual stimulation or intercourse, how difficult was it for you to reach orgasm (climax)?
   a. No sexual activity
   b. Extremely difficult or impossible
   c. Very difficult
   d. Difficult
   e. Slightly difficult
   f. Not difficult

15. Over the past 4 weeks, how satisfied were you with your ability to reach orgasm (climax) during sexual activity or intercourse?
   a. No sexual activity
   b. Very satisfied
   c. Moderately satisfied
   d. About equally satisfied and dissatisfied
   e. Moderately dissatisfied
   f. Very dissatisfied

16. Over the past 4 weeks, how satisfied have you been with the amount of emotional closeness during sexual activity between you and your partner?
   a. No sexual activity
   b. Very satisfied
   c. Moderately satisfied
   d. About equally satisfied and dissatisfied
   e. Moderately dissatisfied
   f. Very dissatisfied

17. Over the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?
   a. No sexual activity
   b. Very satisfied
   c. Moderately satisfied
   d. About equally satisfied and dissatisfied
   e. Moderately dissatisfied
   f. Very dissatisfied

18. Over the past 4 weeks, how often did you experience discomfort or pain during vaginal penetration?
   a. Did not attempt intercourse
   b. Almost always or always
   c. Most times (more than half the time)
   d. Sometimes (about half the time)
   e. A few times (less than half the time)
   f. Almost never or never

19. Over the past 4 weeks, how often did you experience discomfort or pain following vaginal penetration?
   a. Did not attempt intercourse
   b. Almost always or always
   c. Most times (more than half the time)
   d. Sometimes (about half the time)
   e. A few times (less than half the time)
   f. Almost never or never

20. Over the past 4 weeks, how would you rate your level (degree) of discomfort or pain during or following vaginal penetration?
   a. Did not attempt intercourse
   b. Very high
   c. Moderate
   d. Low
   e. Very low or none at all
1. Most persons have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item on the following list.

<table>
<thead>
<tr>
<th></th>
<th>Always Agree</th>
<th>Almost Always Agree</th>
<th>Occasionally Disagree</th>
<th>Frequently Disagree</th>
<th>Almost Always Disagree</th>
<th>Always Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling finances</td>
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<td>Matters of recreation</td>
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<td>Religious matters</td>
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<td>Demonstrations of affection</td>
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<td>Friends</td>
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<td>Sex Relations</td>
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<td>Conventionality (correct or proper behaviour)</td>
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<tr>
<td>Philosophy of life</td>
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<tr>
<td>Ways of dealing with parents or in-laws</td>
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<tr>
<td>Aims, goals, and things believed important</td>
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<tr>
<td>Amount of time spent together</td>
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<tr>
<td>Making major decisions</td>
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<td>Household tasks</td>
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<td>Leisure time interests and activities</td>
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<tr>
<td>Career decisions</td>
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</table>

2. How often do you discuss or have you considered divorce, separation, or termination of your relationship?

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>More often than not</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Never</th>
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</thead>
<tbody>
<tr>
<td>How often do you or your mate leave the house/apartment after a fight?</td>
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<tr>
<td>In general, how often do you think that things between you and your partner are going well?</td>
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<tr>
<td>Do you confide in your mate?</td>
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<td>Do you ever regret that you married (or lived together) (or dated)?</td>
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<td>How often do you and your partner quarrel?</td>
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<tr>
<td>How often do you and your mate get on each others’ nerves?</td>
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</table>
3. When you can, do you kiss your mate?
   g. Every day
   h. Almost every day
   i. Occasionally
   j. Rarely
   k. Never

4. Do you and your mate engage in outside interests together?
   a. All of them
   b. Most of them
   c. Some of them
   d. Very few of them
   e. None of them

5. How often do the following occur between you and your mate?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Less than once a month</th>
<th>Once or twice a month</th>
<th>Once or twice a week</th>
<th>Once a day</th>
<th>More often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have a stimulating exchange of ideas</td>
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<tr>
<td>Laugh together</td>
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<tr>
<td>Calmly discuss something</td>
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<tr>
<td>Work together on/help each other with a project</td>
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</tbody>
</table>

6. There are some things about which couples sometime agree and disagree. Indicate if either item caused differences of opinions or were problems in the past few weeks.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being too tired for sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not showing love</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. The numbers on the following line represent different degrees of happiness in your relationship. The middle point, “happy,” represents the degree of happiness of most relationships. Please choose the number above the phrase which best describes the degree of happiness, all things considered, of your relationship.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extremely Unhappy</td>
</tr>
<tr>
<td>2</td>
<td>Fairly Unhappy</td>
</tr>
<tr>
<td>3</td>
<td>A Little Unhappy</td>
</tr>
<tr>
<td>4</td>
<td>Happy</td>
</tr>
<tr>
<td>5</td>
<td>Very Happy</td>
</tr>
<tr>
<td>6</td>
<td>Extremely Happy</td>
</tr>
<tr>
<td>7</td>
<td>Perfect</td>
</tr>
</tbody>
</table>

8. Which of the following statements best describes how you feel about the future of your relationship? Choose one statement.

   f. I want desperately for my relationship to succeed, and would go to almost any length to see that it does.
   g. I want very much for my relationship to succeed, and will do all I can to see that it does.
   h. I want very much for my relationship to succeed, and will do my fair share to see that it does.
   i. It would be nice if my relationship succeeded, but I can’t do much more than I am doing now to keep the relationship going.
   j. It would be nice if it succeeded, but I refuse to do any more than I am doing now to keep the relationship going.
   k. My relationship can never succeed, and there is no more that I can do to keep the relationship going.
Appendix K
Debriefing Form

Vulvodynia vs. Chronic Pelvic Pain in Women: Neuropathic Pain Conditions?

The purpose of this study was to investigate – using established screening tools for the assessment of neuropathic pain – whether provoked vestibulodynia (PVD), generalized vulvodynia (GVD), and interstitial cystitis (IC) are neuropathic pain conditions. A secondary purpose was to compare characteristics of women with PVD and GVD to those with IC and postherpetic neuralgia (post-shingles pain), and to determine the impact of post-shingles pain on women’s lives.

This study was conducted for educational purposes. We recruited four main groups of participants: women experiencing GVD, women experiencing PVD, women experiencing IC, and women who had pain after experiencing shingles. All participants experienced their pain for at least six months, were over the age of 18, and were fluent in English.

Vulvodynia is a neglected women’s health problem. Because it is poorly understood, it is often difficult to diagnose and even more difficult to treat. One aim of this study was to learn more about what type of pain these women suffer from. This information could also potentially explain how the pain develops, which could have implications for prevention, diagnosis, and treatment.

As stated previously, all information that you provided throughout the study is confidential. The research team members working directly on this project are the only individuals who have access to your responses, and they will not link your name with your responses. If you provide your email address or phone number in the monthly draw for one of four $50 cash prizes, your email address will not be linked to the data you provided. Your data and email address are saved in two different databases. If you provide your email address, it will only be used to contact you in the case that you win one of the four $50 cash prizes. If you wish to withdraw from the study and/or do not wish to have us access your data, please contact the Sexual Health Research Laboratory at (613) 533-3276 or SHRL@queensu.ca.

Thank you for your participation in this study – it is greatly appreciated. Should you have any further questions, comments or concerns, or wish to obtain more information, please do not hesitate to contact the Sexual Health Research Laboratory at (613) 533-3276, or SHRL@queensu.ca, or Dr. Caroline Pukall (phone: (613) 533-3200; e-mail: caroline.pukall@queensu.ca). You may also contact Dr. Richard Beninger, the
Head of the Department of Psychology at Queen's University (533-6000 x74965), e-mail psychead@queensu.ca, or the Chair of the Queen's University General Research Ethics Board, Dr. Joan Stevenson, (613) 533-6000 ext. 74579, email GREB@queensu.ca.

If you would like more information about vulvodynia, IC, or neuropathic pain, please visit the following websites or contact our research team.

http://psyc.queensu.ca/faculty/pukall/whatisvulvodynia.htm
http://psyc.queensu.ca/faculty/pukall/advice.htm
http://psyc.queensu.ca/faculty/pukall/relationship.htm
http://www.ichelp.org/
http://www.iasp-pain.org/AM/Template.cfm?Section=Home
http://pain.com/
http://canadianneuropathyassociation.org/pages/neuropathy/neuropathic-pain.php

Some of the questions in this survey were sensitive in nature. If you are feeling distressed, please consult the following sources for help:

Telehealth Ontario: 1-866-797-0000

Frontenac Community Mental Health Services (24 hour crisis line): (613) 544-4229


Lennox & Addington Community Crisis Centre: (613) 354-7388

Telephone Aid Line Kingston (TALK): (613) 544-1771

Kids Help Phone: Parents Help Phone 1-888- 603-9100

Sexual Assault Crisis Centre Kingston (SACCK) (613) 544-6424 or (877) 544-6424

Sexual Health Resource Centre (613) 533-2959

http://www.sexualityandu.com/index_e.aspx
Appendix L
Prize Draw Form

Thank you so much for your participation in our research! If you would like to be entered into the $50 prize draws, please provide us with an e-mail address or phone number below, and mail this form to us along with your questionnaires. This information will not be connected to your answers; it will only be used to contact you if you win a draw.

Phone/e-mail: ________________________________

**Would you like to be contacted for future surveys?

Yes _____  No _______  Decline Response ________

**Would you like to be contacted for future in-person studies (in Kingston, ON)

Yes _____  No _______  Decline Response ________
Appendix M: Ethical Approval

September 9, 2010

Dr. Caroline Pukall
Department of Psychology
Queen’s University

GREB ref. #: GPSYC-472-09
Title: “Vulvodynia vs. Chronic Pelvic Pain in Women: Neuropathic Pain Conditions?”

Dear Dr. Pukall:

The General Research Ethics Board (GREB) has reviewed and approved your request for renewal of ethics clearance for the above-named study. This renewal is valid for one year from October 29, 2010. Prior to the next renewal date you will be sent a reminder memo and form to reapply.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB if applicable, of any adverse event(s) that occur during this one year period (details available at webpage http://www.queensu.ca/ors/researchethics/GeneralREB/forms.html - Adverse Event Report Form). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes in study procedures or implementations of new aspects into the study procedures on the Ethics Change Form that can be found at http://www.queensu.ca/ors/researchethics/GeneralREB/forms.html - Research Ethics Change Form. These changes must be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or irving@queensu.ca prior to implementation. Mrs. Irving will forward your request for protocol changes to the appropriate GREB reviewers and / or the GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

[Signature]

Joan Stevenson, Ph.D.
Professor and Chair
General Research Ethics Board

c.c.: Emma Dargie, Co-investigator
Dr. Leandre Fabrigar, Chair, Unit REB
Marie Tooley, Dept. Admin.

think Research
think Queens

JS/gi