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# UNDERSTANDING VULVODYNIA: DIAGNOSTIC CHALLENGES AND MULTIMODAL INTERVENTIONS

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**ABSTRACT**

**Background:** Vulvodynia is defined as vulvar pain lasting at least three months and remains a challenging condition of unknown etiology. Despite its high prevalence and significant impact on quality of life in women, data on its prevalence in the Polish population is lacking. Due to its complexity, vulvodynia is often underdiagnosed.
**Aim:** This study aims to review the current literature on vulvodynia. A systematic review of relevant publications was conducted to summarize existing evidence and clinical approaches for this condition.
**Material and Methods:** Relevant articles on vulvodynia were searched
**Results:** The reviewed studies indicate that the etiological factors of vulvodynia remain unconfirmed, with potential factors that may either initiate or aggravate the condition. This complexity complicates diagnostic pathways due to the lack of a clear clinical reference point. Due to the multifactorial nature of vulvodynia, clinicians may need to prescribe multiple therapies, such as oral therapy, physiotherapy, surgical procedures, targeting different pain mechanisms to achieve effective symptom management.
**Conclusions:** Further research is essential to explore effective treatment strategies and to better understand the challenges faced by women facing vulvodynia.

**KEYWORDS**

Vulvodynia, Women's Health, Pelvic Pain, Pain Management

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## 1. Introduction

Vulvodynia is a chronic vulvar pain condition of unknown origin lasting at least 3 months , affecting approximately 4–16% of women across all age groups and backgrounds [1]. It is classified as a form of chronic pelvic pain syndrome—a broader category of pain conditions that has been described by the World Health Organization as neglected and under prioritized in health care systems [2], often misdiagnosed as vaginitis [3]. Most patients describe vulvodynia as a sensation of burning, stinging, irritation, or rawness. The symptoms may be localized or widespread—affecting the entire vulva (generalised vulvodynia), the clitoris (clitorodynia), or the vestibule of the vagina (vestibulodynia) [1]. Despite its prevalence and significant impact on quality of life, vulvodynia remains underdiagnosed and frequently misunderstood. The pathophysiology is multifactorial, involving biological, psychological, sexual, and social components. Women affected by vulvodynia often face emotional distress, relationship challenges, and invalidating experiences within the healthcare system. Effective management therefore requires a multidisciplinary, individualized approach that addresses both the physical and psychosocial dimensions of the condition.

## 2. Materials and methods

This study is a literature review. Relevant articles on vulvodynia were searched in PubMed and Google Scholar using keywords such as *"vulvodynia "prevalence"*, *"etiology"*, and *"management"*. Articles in English focusing on adult women and providing data on prevalence or treatment were included. Selected studies were analyzed, and key findings were summarized to identify trends and gaps in current knowledge.

**3. Discussion:**

- **Prevalence**

Quantitative research demonstrates that an estimated prevalence of vulvodynia may vary from 4 to 16% [4]. Although it is difficult to assess due to its heterogeneous presentation form, frequent association with other comorbidities, and neuromodulation through anxiety status or estrogen deficiency. [5] It may affect women of any age, with the rate of the first onset greatest before the age of 25. It is the most common cause of pain during sexual intercourse in premenopausal women. [6] Despite the relatively high prevalence, little is known about the underlying etiology, with several causative factors likely, including embryology, neuropathic pain, infections , which may all contribute to the experience of pain differently for different women. [7]

- **Pathophysiology**

Multiple pathophysiological mechanisms continue to be proposed in the development of vulvodynia, as genetic factors, local inflammation mechanisms, hormonal deficiencies, peripheral neuropathic pain, pelvic floor muscle dysfunctions. [8]

- **Predisposing Factors involved in vulvodynia**
  - **Genetic factors**

Some studies suggest that some women have a genetic predisposition to suffer from vulvodynia. [9] Other studies have not found that the proposed genetic polymorphisms contribute to the development of vulvodynia [10]. What is more, genetic features may predispose women to the development of neuropathic pain. Specifically, allele 2 of interleukin 1 beta (IL-1 beta) receptor antagonist (an inflammatory mediator) may be associated with an exaggerated response to inflammation due to decreased ability to downregulate the inflammatory activity .[11]

  - **Inflammatory factors**

An inflammatory pathogenesis for vulvodynia has been hypothesized secondary to recurrent bacterial or candida infections, or in some cases, following trauma to the vestibular mucosa.[12]. What is more, in different studies it has been suggested that there is a relationship between natural killer cell count deficiencies. [13] Several groups have proposed the study of vaginal or plasma pro-inflammatory cytokine profiles as possible biomarkers of vulvodynia. [14] Elevated levels of bradykinin receptors in vestibular fibroblasts of LPV patients imply that bradykinin plays a significant role in mediating inflammatory pain. Activation of these receptors leads to increased production of proinflammatory mediators like IL-6. [15] However, the results of these studies are inconsistent. The current evidence is limited and contradictory.[16]

Subsequent studies have not demonstrated an association between HPV and vulvodynia. [18]

  - **Hormonal factors**

It has thus been postulated that low estrogen levels could lead to vulvodynia and dyspareunia. Nevertheless, the results of different studies are inconsistent. [17]

  - **Peripheral neuropathic pain**

Recent publications continue to sustain that vulvodynia is a neuropathic pain that in some cases is associated with a dysfunction of the pelvic floor muscles [19]

  - **Pelvic floor muscle dysfunction**

It may be the result of a protective reflex to prevent penetration or painful contact - not causally related to the aetiology of vulvodynia itself. [20] What is more, Vulvodynia, has been associated with dysfunction of the pelvic floor muscles such as hyperactivity, increased pelvic floor tone as rest deficits in muscle control, and the presence of myofascial trigger points. [21]

  - **Psychological factors**

The association between anxiety and sexual problems and pelvic pain has been suggested by several studies [22]

  - **Childhood Sexual Abuse and Psychosocial Correlates of Vulvodynia**

Childhood abuse, higher pain intensity, and rumination have been identified as vulnerability factors negatively associated with sexual satisfaction and an increase in subjective symptoms in patients diagnosed with vulvodynia [23]. Some studies have also found that catastrophizing is related to greater pain intensity and interference; however, changes in catastrophizing, fear, or anxiety were not significantly associated with changes in pain levels or sexual functioning over a one-year period [24]. Nonetheless, other research suggests that the interaction between childhood abuse and the development of vulvodynia may not be statistically significant [25].

- **Precipitating factors**

These factors have been considered as potentially triggering, exacerbating symptoms, or preceding the onset of vulvodynia. However, this remains speculative, and current research is insufficient to confirm or establish these factors as definitive causes. [26]

1. Comorbidities and other pain syndromes (e.g. painful bladder syndrome, fibromyalgia, irritable bowel syndrome and temporomandibular disorder)
2. Genetics
3. Hormonal factors (e.g. pharmacologically induced-hormonal pills)
4. Inflammation
5. Musculoskeletal factors (e.g. pelvic muscle overactivity, myofascial factors and biomechanical factors)
6. Neurologic mechanisms (e.g. central [spine or brain] or peripheral [neuro-proliferation])
7. Psychosocial factors (e.g. mood, interpersonal relationship, coping, role and sexual function)
8. Structural defects (e.g. perineal descent)

At present, based on current knowledge, these factors are considered both precipitating and potentially triggering in the development of the disease. However, available data are insufficient to determine which factors may precede the onset of vulvodynia, contribute to its worsening, or do both.

- **Potential causes of local hyperalgesia**

Research indicates that local hyperalgesia in vulvodynia (specifically in localized provoked vestibulodynia) arises from a multifaceted interplay of factors, including inflammation, nerve proliferation, hormonal influences, and genetic predispositions. [27] The mucosa in patients diagnosed with vulvodynia is often presented with an allodynia (sensation of pain from a light touch) or hypersensitivity to mechanical stimuli such as touch, pressure and vaginal penetration.[28] In addition, alterations in the vaginal microbiota, such as aerobic vaginitis and Candida infections, have been linked to increased pain severity in localised provoked vestibulodynia. These microbial changes can induce chronic inflammation, leading to heightened pain sensitivity. [29]

- **Signs and symptoms**

The pain of vulvodynia may be described as itching, burning, or stabbing and is often accompanied by dyspareunia. Vulval pain can be experienced as a form of burning, soreness or throbbing in the vulval area. [30] Many patients report a history of recurrent vaginitis, with negative laboratory findings and symptoms persisting despite treatment.. What is more, women with vulvodynia may not tolerate anything touching their vulva, such as tight clothing, or even prolonged sitting.

Vulvodynia significantly impacts patients' quality of life and can be the source of physical, psychosexual, and relationship distress for affected women. Even with adjuvant drugs and opioids, women with vulvodynia reported an average pain intensity score of 6.7 out of 10. [31]. Vulvodynia pain can be localized to one area, generalized to multiple areas, or mixed (localized and generalized). Pain can be either provoked (by vaginal penetration or contact to the vulva), spontaneous, or mixed (provoked and spontaneous). The onset of pain is either primary (with first intercourse or tampon insertion) or secondary (occurring later). The pain pattern can be either continuous or constant, rhythmic or intermittent, and transient or brief. The 2 most common types of vulvodynia are provoked vestibulodynia (PV) and generalized vulvodynia.

- **Clinical diagnosis**

Suspecting vulvodynia requires a detailed examination of the vulvar anatomy performed for allodynia ( painful reaction to a non painful stimulus) using a cotton swab. Gentle pressure is applied with a cotton swab starting at the thigh and moving medially to the labia majora, interlabial sulcus, clitoral hood, labia minora, and sites within the vulvar vestibule at 2, 4, 6, 8, 10, and 12 o'clock. Pain intensity should be assessed using a 0–10 numeric rating scale (NRS). If the pain is confined to the vulvar vestibule, the diagnosis is localized vestibulodynia; if the pain extends to areas outside the vulvar vestibule, the diagnosis is generalized vulvodynia. [32] Pain history should include its precipitating factors, what may provoke it, whether there is any palliation or radiation, its severity on a scale, how it has changed over time, whether it interferes with daily activities, and what treatments have been used so far. Key symptoms that suggest an alternative diagnosis include a history of vulvar itch that the patient reports as scratching (dermatitis), abnormal vaginal bleeding and/or discharge (lichen planus), pain with sitting and bowel movements, or other neurologic symptoms (eg, pudendal neuralgia). In selected cases, additional investigations such as biopsy should be considered to rule out vulvar intraepithelial neoplasia. The key criteria for diagnosing Localized Provoked Vestibulodynia are a history of severe pain during attempted vaginal entry and tenderness to pressure (palpation with a cotton swab) localized

to the vestibule in the absence of other pathology. If there is no cervical tenderness during the vaginal examination but allodynia is present in the vulvar vestibule, it should draw the attention of the professional. Moreover, a more comprehensive medical history should be obtained, and infections should be excluded. However, obtaining a diagnosis of vulvodynia is often time-consuming and difficult, most likely due to diagnostic complexity plus a lack of awareness among healthcare professionals. The patient should be informed at the beginning of the first visit that it will require more than one appointment to complete her assessment. [32]

- **Clinical management**

The first step in helping the woman and her partner is to validate that the pain is real and that it has a name, namely "vulvodynia." The second step is to provide suggestions regarding skin care and symptom management. It is essential to review the patient's personal hygiene practices and to recommend proper care—ensuring adequate hydration and moisturizing of the vulva. Daily use of a hypoallergenic moisturizer or barrier cream applied to the vulva should be recommended to help hydrate and protect the skin. For sexual intercourse, mild discomfort may be reduced with the application of topical anesthetics, such as 2%–5% lidocaine, prior to penetration. Recommending local estrogen replacement in perimenopausal and postmenopausal women with vulvodynia is the first step in addressing vulvar discomfort in this age group. Patients who have been suffering for 3–6 months may respond to reassurance regarding the benign nature of the condition, simple skin care, and pain relief recommendations. While the natural history of vulvodynia is unknown, spontaneous remission rates of up to 56% have been reported**.** [33]

- **Treatment**

Actually, there is no general consensus on the treatment of vulvodynia, mainly due to the limited availability of randomized clinical trials with placebo controls. [34] As a result, treatment is often individualized and may involve one or more of the following seven therapeutic categories.

**Seven treatment groups have been proposed:**

1. Topical treatments
2. Diazepam Vaginal Suppositories and Tablets
3. Oral Medications
4. Pelvic Floor Physical Therapy and Multimodal Therapy and Acupuncture
5. Injections
6. Psychological Interventions - Cognitive Behavioral Therapy
7. Surgical Interventions

The following medications or devices are being used off-label for the treatment of vulvodynia: amitriptyline, desipramine, nifedipine, milnacipran, botulinum toxin type A, low-molecular-weight heparin, and electromyography (EMG) biofeedback.

- **Topical treatments**

Its use in treating vulvodynia include 5% lidocaine ointment, capsaicin, corticosteroids, antiepileptics, tricyclic antidepressants (TCAs), hormones, mast cell stabilizers, and calcium channel blockers. [32] Topical lidocaine with 2–5% gel or cream, a local anesthetic, is prescribed as a gel, ointment, or cream and is used to numb the burning pain of vulvodynia. Intermittent topical use of lidocaine may be useful for women with intense vestibular touch pain and may be used prior to vaginal penetration.

- **Diazepam Vaginal Suppositories and Tablets**

Diazepam is an antispasmodic and anticonvulsant that acts on gamma-amino butyric acid (GABA) receptors located in the brain. GABA is the main inhibitory neurotransmitter in the central nervous system. Diazepam vaginal suppositories and tablets have been prescribed to treat vulvodynia and vulvar pain related to hypertonic pelvic floor muscles. [35] Efficacy of diazepam vaginal suppositories and tablets needs to be tested in larger RCTs.

- **Oral medications**

Oral medications are often prescribed if topical and intravaginal treatments offer incomplete relief. Oral antifungals (such as Fluconazole, Itraconazole) are initially prescribed for women's common symptoms of vulvar burning and itching with or without confirmatory laboratory testing for vulvar vaginitis. Oral TCAs, serotonin norepinephrine reuptake inhibitors (SNRIs), selective serotonin reuptake inhibitors (SSRIs), and antiepileptics are prescribed for chronic neuropathic pain. TCAs, SNRIs, SSRIs, and antiepileptics can reduce neuropathic pain by influencing neurotransmitters affecting pain in the central and peripheral nervous systems. Their ability to reduce pain in women with vulvodynia has been inconsistent. [35]

- **Pelvic Floor Physical Therapy and Multimodal Therapy and Acupuncture**

Pelvic floor physical therapy is used to treat pelvic floor dysfunction and hypertonic pelvic floor muscles associated with vulvodynia. Pelvic floor physical therapy includes dilators, EMG biofeedback, and TENS. [36]

The physiologic mechanisms of acupuncture include increased release of mu opioids and beta endorphins, both important in reducing the sensation of pain. Acupuncture in an RCT significantly reduced vulvar pain and dyspareunia in vulvodynia.

- **Injections**

Botulinum toxin type A injections and low-molecular-weight-heparin 70 have been used to treat vulvodynia. Botulinum toxin type A prevents the release of acetylcholine at the neuromuscular junction resulting in muscle paralysis and has been used in the prevention of migraine headaches. Botulinum toxin type A is injected into trigger points (painful areas on the vulvar vestibule) and/or into hypertonic pelvic floor muscles. [37] A dose of 50 units of botulinum toxin type A was shown to reduce mean pain scores (VAS 0–10 cm) from 6.6 to 0.2, though the difference was not significantly greater than that observed with placebo. However, the 100-unit dose appeared to be less effective than the 50-unit dose. These findings highlight the need to replicate the efficacy of the 50-unit dose in a larger randomized controlled trial. [37] Low-molecular-weight heparin reduces pain by increasing blood flow to the vulvar stroma, reducing the release of nerve growth factor from mast cells, and decreasing inflammation. Coagulation monitoring is not necessary with low-molecular-weight heparin, but women should be taught self-monitoring for bleeding and bruising. [38]

- **Psychological interventions - cognitive behavioral therapy**

CBT is used as a non-pharmacologic option for the management of provoked vulvodynia; however, there is no clear consensus on its effectiveness in patients with vulvodynia.[39]

- **Surgical interventions- cold knife vestibulectomy**

It is unknown why vestibulectomy reduces vulvar pain and dyspareunia. There was found significant reduction in vulvar pain and dyspareunia. [40][41] Vestibulectomy is not widely used because of limited patient acceptability. Because of its invasive nature, vestibulectomy should be considered a treatment of last resort.

## 4. Conclusions

Vulvodynia remains a diagnostic and clinical challenge for medical professionals. Despite increasing awareness, it is still considered underdiagnosed. There is not enough data on its prevalence in the Polish population. Many different specialists may need to be involved in the therapeutic process. The most important part of treatment is effective pain management, as pain is the main factor contributing to the deterioration of sexual function and quality of life in women with vulvodynia. Both non-invasive and more invasive methods are available to patients. A thorough clinical examination and accurate diagnosis are also essential, along with raising awareness among healthcare professionals about the complex and chronic nature of the condition. A multimodal approach is recommended, including not only medical treatment, but also psychological therapy, physiotherapy, and, in some cases, surgery. Nevertheless, women can benefit from new treatment methods, as these offer them multiple options.

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