

Article

Sexual Functioning in Women with Central Sensitization Syndromes: The Role of Pain and Post-Traumatic Stress

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ABSTRACT

Background/aim: Individuals with central sensitization syndromes (CSS) experience marked impairment across multiple areas of life, including sexuality; however, empirical evidence regarding their relationship with trauma remains limited. **Method:** An online survey was conducted in a general population sample ($n = 1,238$). Sexual functioning, trauma and its sequelae, and various health-related, psychological, and relationship variables were assessed, comparing women with CSS ($n = 179$), women with other medical conditions ($n = 137$), and healthy women ($n = 508$). **Results:** The CSS group exhibited more severe general and post-traumatic symptoms, as well as poorer sexual functioning (marked by lower desire and satisfaction, and greater pain) than the other groups. In addition, women with CSS and sexual dysfunction reported more pain, poorer sleep quality and depression, and poorer adjustment with their partners than those with CSS but without sexual dysfunction. In the CSS group, sensory-affective pain mediated the impact of post-traumatic stress symptoms on sexual functioning. **Conclusions:** The findings indicate complex interrelations between trauma, pain, and sexuality, highlighting the importance of addressing sexual health in the comprehensive care of women with CSS.

Funcionamiento Sexual en Mujeres con Síndromes de Sensibilización Central: El Papel del Dolor y el Estrés Post-Traumático

RESUMEN

Antecedentes/objetivo: Las personas con síndromes de sensibilización central (CSS) presentan un marcado deterioro en múltiples ámbitos de vida, incluida la sexualidad, aunque la evidencia empírica sobre su relación con el trauma es limitada. **Método:** Se realizó una encuesta online en población general ($n = 1.238$), y se examinó el funcionamiento sexual, el trauma y sus secuelas, y diversas variables de salud, estado psicológico y pareja, comparando mujeres con CSS ($n = 179$) con mujeres con otras condiciones médicas ($n = 137$) y mujeres sanas ($n = 508$). **Resultados:** El grupo de CSS presentó sintomatología general y post-traumática más severa, así como peor funcionamiento sexual (caracterizado por menor deseo y satisfacción, y mayor dolor) que los otros grupos. Además, las mujeres con CSS y disfunción sexual presentaron más dolor, afectación de la calidad del sueño y depresión, y peor ajuste con sus parejas que aquellas con CSS pero sin disfunción sexual. En el grupo de CSS el dolor sensorial-afectivo medió el impacto de los síntomas de estrés post-traumático sobre el funcionamiento sexual. **Conclusiones:** Los hallazgos indican relaciones complejas entre trauma, dolor y sexualidad, subrayando la importancia de abordar la salud sexual en el tratamiento integral de las mujeres con CSS.

Palabras clave:

Sensibilización central
Dolor
Trauma
Sexualidad
Mujeres

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Introduction

Pain is a complex experience that can have a marked impact on a person's life. According to the International Association for the Study of Pain (IASP), pain is defined as 'an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage' (Raja et al., 2020), and chronic pain as 'pain that persists or recurs for more than 3 months' (Treede et al., 2019). The chronification of pain involves a higher risk of developing psychological disorders, such as depression or anxiety (Dueñas et al., 2025), and significantly affects interpersonal relationships (Borthwick et al., 2024), which together lead to a decline in overall well-being.

Chronic pain is a major public health issue. In Europe, the percentage of people who suffer from it is 21.45% (Rometsch et al., 2025), and in Spain, it reaches 25.9% (Dueñas et al., 2025). Chronic pain involves considerable direct and indirect costs for society. In Spain, annual expenses can reach €4,928.70 per patient (Sarria-Santamera et al., 2022), and its effects on employment are notable: 31.6% of individuals take sick leave and 13.5% lose their jobs (De Sola et al., 2016).

The pathogenesis of chronic pain is complex and multifactorial. A biopsychosocial model provides the most comprehensive understanding of this clinical condition, as it highlights the dynamic interactions between biological, psychological, and social factors in both its onset and persistence (Kovačević et al., 2024). Currently, various chronic pain conditions are grouped under the heading of central sensitization syndromes (CSS), based on the assumption that they stem from the phenomenon of central sensitization (CS) (Nijs et al., 2021; Yunus, 2007). According to the IASP, CS is characterized by an 'increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input' (Boyd et al., 2021). Alterations in nociceptive neurons, impaired descending inhibitory pathways, and hyperreactivity in pain processing regions result in pain hypersensitivity, manifested as hyperalgesia and allodynia (Woolf, 2011). Clinical conditions identified as CSS (e.g., fibromyalgia -FM-, chronic fatigue syndrome, irritable bowel syndrome), in addition to pain, share other characteristics such as sleep problems, fatigue, and sensitivity to certain stimuli (Yunus, 2007). FM is often considered a prototype example of CSS.

Current research suggests the existence of synergistic relationships between trauma, pain, and CS. Adverse experiences can alter the functioning of the hypothalamus-pituitary-adrenal axis (the body's primary stress response system), contributing to CS. Several systematic reviews report that people with chronic pain have experienced more traumas, especially during childhood, than healthy people (Karimov-Zwienenberg et al., 2024; Nicolson et al., 2023; Uvelli et al., 2024). These experiences may increase the risk of chronic pain, with up to 75% of individuals with chronic pain reporting early life adversity, and adult women exposed to violence are twice as likely to develop chronic pain (Nicolson et al., 2023; Uvelli et al., 2024). Individuals with CSS frequently exhibit symptoms of post-traumatic stress disorder (PTSD), and in some cases, may meet diagnostic criteria for PTSD (Altungy et al., 2026; Gardoki-Souto et al., 2022; Miró et al., 2025). It has been reported that up to 37% of women with FM may suffer from PTSD, which increases pain sensitivity, lowers pressure

tolerance, and exacerbates their already compromised functioning (Karimov-Zwienenberg et al., 2024; Lahat-Birka et al., 2024; Miró et al., 2020).

One area that is particularly affected in people with CS pain is sexuality, which may also be associated with traumatic experiences. The physical symptoms that are often present in these CS conditions (e.g., low tolerance to sensory stimuli such as touch and pressure) are antagonistic to pleasure and can lead to avoidance of sexual intimacy with a partner. Generally, people with chronic pain experience anorgasmia or decreased sexual desire (Santos-Iglesias et al., 2024), poorer lubrication, and increased pain (Flegge et al., 2023). This has been observed in patients with FM, in whom sexual dysfunction is present in up to 79.6%, affecting satisfaction, arousal, and desire (Deggerone et al., 2024; Erdem & Ustabasoglu, 2023; Mollà-Casanova et al., 2023). In addition, pain causes sexual relations to become uncomfortable encounters (Grande-Gascón et al., 2021; Monteiro et al., 2021) that tend to be avoided (sometimes accompanied by feelings of guilt), generating conflict within the couple's relationship that contributes to sexual dysfunction (Granero-Molina et al., 2023; Macedo et al., 2015). Recently, Nimbi et al. (2024) compared several conditions of chronic pain, identifying increased genital pain, more frequent interruptions during sexual activity, and greater sexual difficulties, especially in cases of vulvodynia, FM, and comorbidity (involving FM, vulvodynia and chronic migraine). However, little is known about how experiences of adversity, pain and sexuality interact to intensify the clinical presentation.

The purpose of this study was to examine sexual functioning in women with CSS, compared to women with other medical conditions (OMC) and healthy controls, to analyze the associations between sexual difficulties and PTSD symptoms, and to determine whether physical, emotional, or relational factors mediate the impact of PTSD symptoms on sexual functioning. The hypotheses established are: (1) women with CSS will exhibit greater sexual dysfunction than the comparison groups; (2) the severity of sexual dysfunction in the CSS group will be associated with more pronounced emotional sequelae of trauma; and (3) pain, emotional distress, and quality of the couple's relationship will mediate the relationship between PTSD symptoms and sexual functioning in the CSS group.

Method

Participants

A cross-sectional study was conducted with incidental sampling in the Spanish population. Eligibility criteria for participation included being female, at least 18 years of age, and possessing sufficient reading comprehension and proficiency in the use of digital technologies. Data were initially collected from 1,506 participants. After a thorough data-quality review, several cases were excluded due to unmet inclusion criteria, high levels of missing data, incomplete questionnaires, or inconsistent response patterns. As a result, a pool of 1,238 eligible women aged 18 to 72 years was obtained. Three groups were then established: women with CSS ($n = 179$), women with OMC ($n = 137$), and healthy women ($n = 508$). The remaining 414 individuals who presented heterogeneous physical and psychological conditions were excluded from the study. The rate of excluded participants in this study (17.8%) is consistent with prior methodological research on online surveys, where removal rates of

up to 31.95% have been reported following the application of data-quality criteria (Arevalo et al., 2022).

The Central Sensitization Inventory (Cuesta-Vargas et al., 2016) was used to identify CSS. The CSS group consisted of participants with FM, chronic fatigue syndrome, irritable bowel syndrome, tension headaches/migraines, temporomandibular joint disorder, and/or multiple chemical sensitivity. The OMC group included participants with other conditions not classified as CSS (e.g., cardiac, respiratory, endocrine, dermatological). The healthy group included participants who did not have any medical conditions (neither CSS-related nor other types).

Significant differences were found in age, marital status, and education level across groups. Participants in the CSS ($M = 38.37$, $SD = 13.97$) and OMC ($M = 37.16$, $SD = 15.23$) groups were older than those in the healthy group ($M = 27.46$, $SD = 11.73$), $F(2, 821) = 63.68$, $p < .001$. Most participants were single (CSS: 42.5%, OMC: 43.1%, healthy: 72.6%), $\chi^2(10, N = 824) = 103.17$, $p < .001$, and had university-level education (CSS: 62.6%, OMC: 66.4%, healthy: 68.7%), $\chi^2(10, N = 824) = 25.78$, $p < .010$.

Measure Instruments

Pain

McGill Pain Questionnaire, short version (MPQ-SV; Melzack, 1987, adaptation by Lázaro et al., 2001). Explores sensory and affective aspects of pain through 15 pain descriptions rated on a Likert scale from 0 (*none*) to 3 (*severe*), as well as pain intensity over the last 7 days and at the time of assessment. On the sensory-affective scale, higher scores indicate greater pain. In this sample, the Cronbach's alpha (α) of the sensory-affective scale was .89.

Sleep Quality

Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989, adaptation by Royuela-Rico & Macías-Fernández, 1997). Assesses sleep quality through 19 items that cover subjective quality, latency, duration, habitual efficiency, disturbances, use of hypnotic medication, and daytime dysfunction. The first four items have a time-based response, while the rest have response options ranging from 0 (*never in the last month*) to 3 (*three or more times a week*). On the total scale, higher scores reflect greater disturbance, and a score > 5 indicates poor sleep quality. In this sample, PSQI presented $\alpha = .81$.

Emotional Distress

Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983, adaptation by Caro & Ibáñez, 1992). Evaluates anxiety and depression symptoms in non-psychiatric hospital settings using 14 items (grouped into separate scales for each condition) rated on a Likert scale from 0 to 3 with item-specific response options. On each subscale, higher scores indicate greater anxiety/depression. Scores ≥ 11 indicate a clinical concern. In this sample, anxiety and depression scales showed $\alpha = .83$ and $\alpha = .81$, respectively.

Perceived Stress

Perceived Stress Scale (PSS; Cohen et al., 1983, adaptation by Remor, 2006). Examines the extent to which situations in life are

perceived as stressful through 14 items, with Likert-type responses varying from 0 (*never*) to 4 (*very often*). On this scale, higher scores indicate a greater perception of stress. In this sample, PSS had $\alpha = .88$.

Trauma and PTSD

Questionnaire on Traumatic Events and PTSD Symptoms (developed by the authors of this study). It is based on the description of PTSD according to the DSM-5 (American Psychiatric Association, 2013) and other well-validated instruments (e.g., Global Assessment of Post-Traumatic Stress; Crespo et al., 2017). A comprehensive list of items was generated and underwent several phases of selection and refinement by three independent expert evaluators, resulting in a consensus-based formulation of the items. This instrument consists of two sections. The first includes a list of 15 types of traumatic events to which the person responds according to the options: "I have not experienced it", "I had a direct experience with this event", "I directly witnessed this event happening to another person(s)", and "I have knowledge that this event happened to a close family member or friend". Next, the person must briefly explain the traumatic event that most affected them and answer a series of questions about when the event occurred, their age, how long ago it happened, and its frequency. The second part includes 28 items with 4 response options quantified between 0 (*not at all*) and 3 (*a lot*) that explore PTSD symptoms. The items are grouped into subscales reflecting the main manifestations of PTSD: intrusive symptoms, avoidance symptoms, cognitive/mood symptoms, and alertness/reactivity symptoms. In this sample, subscales showed $\alpha = .84-.90$.

Couple Relationship

Dyadic Adjustment Scale, short version (EAD-13; Spanier, 1976, adaptation by Santos-Iglesias et al., 2009). Assesses the quality of the couple relationship using 13 items, each rated on Likert scales ranging from 0–5 or 0–4, with item-specific response options. The items are grouped into three subscales: satisfaction, consensus, and cohesion. On these subscales, higher scores indicate a better fit between couples. In this sample, subscales had $\alpha = .55-.80$.

Sexual Functioning

Female Sexual Functioning Index (FSFI; Rosen et al., 2000, adaptation by Vallejo-Medina et al., 2018). Explores different aspects of sexual functioning through 19 items grouped into six subscales: desire, excitement, lubrication, orgasm, satisfaction, and pain. Items are rated using Likert scales ranging from 0–5 or 1–5, with item-specific response options. On the total scale, lower scores reflect greater impairment, and a score ≤ 27 indicates sexual dysfunction (Wiegel & Meston, 2005). In this sample, subscales demonstrated $\alpha = .81-.97$.

Procedure

Participants completed an anonymous online survey lasting approximately thirty minutes, conducted on the LimeSurvey platform and distributed via the institutional email of the University of Granada, social media, and community settings.

The first section of the survey collected information on the participants' socio-demographic characteristics, physical and psychological health, sexual and reproductive health, relationships, and sexuality. The second section included the instruments previously mentioned.

The study was conducted in accordance with the ethical standards of the Helsinki Declaration, and was approved by the Ethics Committee of the University of Granada. Informed consent was obtained from all participants.

Data Analysis

Data were analyzed with SPSS (version 28.01.0; IBM Corp, 2021) and JASP (version 0.17.2.1; JASP Team, 2023). Values of $p < .050$ and 95% confidence intervals were considered. The established subgroups ($n = 179$ in CSS; $n = 137$ in OMC; and $n = 508$ in healthy subjects) exceeded the minimum sample size required ($n = 128$), assuming an anticipated effect size of 0.5, a desired statistical power of .80, and a significance level of .050.

Basic descriptive statistics (M , SD , and %) were presented. The association between socio-demographic and clinical characteristics between groups was estimated with χ^2 test. An ANCOVA controlling for age (covariate) was run used for quantitative variables. Post-hoc tests were performed with Bonferroni's adjustment. As groups had different sizes (great size/small size > 1.5), the assumption of homogeneity of variance was violated. The violation of this assumption may have effects in the observed significance in mean comparisons. As for this, the Mayorga et al. (2020) rules were followed to validate the acceptance of the alternative hypothesis: the observed F was greater than the theoretical one ($df(1, N-k/k)$); the observed effect size was $\geq$ small magnitude ($d \geq 0.20$); and the ratio between type II (acceptance of false null hypothesis) and type I (rejection of true null hypothesis) error was ≥ 1 ($\beta/\alpha \geq 1$). These three criteria were met when heterogeneity of variance was observed.

Age was included as a covariate given its potential influence on pain perception and modulation (Sun et al., 2025). Effect size was calculated using η^2 , with interpretation based on Cohen's (1988) guidelines: small (.01–.039), medium (.06–.11), and large ($> .14$).

In the CSS group, participants with sexual dysfunction ($n = 33$) were compared with those without sexual dysfunction ($n = 146$) in clinical measures using Student's t -test for independent samples. Effect size was calculated using Cohen's d , following Cohen's (1988) guidelines: small (0.2–0.4), medium (0.5–0.7), and large (> 0.8).

In the CSS group, the relationship between clinical measures was examined using Pearson's correlation coefficient. Correlations were interpreted according to Cohen's (1988) guidelines: low (.10–.29), medium (.30–.49), and high ($> .50$). Mediation models were analysed to determine the role of pain, emotional distress, and couple's relationship quality in the association between PTSD symptoms and sexual functioning in the CSS group. Direct effects, indirect effects (specific and total), and total effects were estimated (Preacher & Hayes, 2008). To test the significance of the effects, delta method standard errors, bias-corrected percentile bootstrap confidence intervals, and the ML estimator were used.

Results

General and Reproductive Health, and Intimate Relationships

Current health perception differed significantly across groups, $\chi^2(6, N = 824) = 137.75, p < .001$, with acceptable health most frequent in the CSS group (43%) and good health predominating in the OMC (48.9%) and healthy (54.5%) groups. Reproductive health also varied by group: most participants had neither undergone menopause (CSS: 65.4%, OMC: 63.5%, healthy: 89.6%) nor been pregnant (CSS: 55.3%, OMC: 61.3%, healthy: 82.1%), with both variables showing significant group effects, χ^2 s (4 and 2, $N = 824$) = 77.53 and 58.93, $ps < .001$, respectively. Pregnancy related problems were less frequent overall but differed significantly across groups (CSS: 40%, OMC: 34%, healthy: 22%), $\chi^2(2, N = 224) = 6.67, p < .050$.

Most participants in the CSS (67%) and OMC (70.1%) groups had a couple, unlike the healthy group, where the majority (50.8%) did not, $\chi^2(2, N = 824) = 29.34, p < .001$. No group differences were observed in sexual orientation (80.7%–83.2% heterosexual; $p = .735$) or relationship type (96.6%–99.2% exclusive; $p = .540$). Sexual intercourse frequency also differed by group, $\chi^2(12, N = 466) = 36.48, p < .001$, with one intercourse per week reported by 28.3% of CSS, 30.2% of OMC, and 42.8% of healthy participants, whereas self-stimulation frequency did not differ across groups (27.7%–34.6% a few times per month; $p = .087$).

Characteristics of Traumatic Events

Trauma exposure and trauma types differed significantly across groups (see Table 1). The CSS group (86%) exhibited greater exposure to traumatic experiences than the OMC (70.1%) and healthy (55.7%) groups. Psychological harassment or abuse within family or couple relationships was most common in CSS (54.7%), whereas the sudden, accidental, or violent death of a loved one was most frequent in the OMC (40.9%) and healthy (28.5%) groups. Adulthood was most frequently reported as the stage of impactful trauma in CSS (50%) and OMC (47.9%), while adolescence predominated in the healthy group (44.9%). Single-occurrence events were more common in the OMC (64.6%) and healthy (57.2%) groups than in CSS (44.2%).

ANCOVA (controlling age) revealed significant group differences in the number of traumatic experiences, $F(2, 820) = 26.29, p < .001$, with the CSS group reporting the highest exposure ($M = 4.51$; $SE = 0.24$), followed by OMC ($M = 3.05$; $SE = 0.27$) and healthy ($M = 2.38$; $SE = 0.14$). No significant effect of the covariate age was observed, $F(1, 820) = 0.39, p = .531$.

Clinical Characteristics, Emotional Sequelae of Trauma, and Intimate Relationships

Separate ANCOVAs (controlling age) revealed significant group differences in sensory-affective pain, sleep quality, anxiety, depression, and perceived stress, $F_s(2, 820) = 26.21$ – 65.43 , $ps < .001$, with the CSS group showing the greatest impairment (see Table 2). Poor sleep (PSQI > 5) was reported by 74.3% of CSS participants, compared with 47.4% in the OMC and 43.1% in the healthy group. Clinical levels of anxiety and depression (HADS-A/D ≥ 11) were also more prevalent in the CSS group

Table 1
Characteristics of Trauma in the Study Groups

Characteristics	CSS (<i>n</i> = 179)	OMC (<i>n</i> = 137)	Healthy (<i>n</i> = 508)	χ^2
Trauma exposure (%)	86.0	70.1	55.7	55.37***
Vital stage of trauma (%)				28.50***
Childhood	26.6	28.1	23.7	
Adolescence	23.4	24.0	44.9	
Adulthood	50.0	47.9	31.4	
Frequency of the trauma (%)				23.63***
A single occasion	44.2	64.6	57.2	
Several occasions	18.8	16.7	24.4	
Repeatedly	37.0	18.8	18.4	
Type of trauma (%)				
Natural disasters	26.3	22.6	18.3	5.43
Transport accidents	44.7	32.8	26.2	21.27***
Other accidents	30.7	21.2	20.5	8.15*
Rape/sexual abuse/assault by an acquaintance/ family member	33.0	24.1	14.6	29.42***
Rape/sexual abuse/assault by a stranger	23.5	10.9	10.6	19.60***
Bullying/psychological abuse at work/academic centre	47.5	23.4	22.6	42.27***
Psychological harassment/abuse within the family/couple relationship	54.7	36.5	22.4	65.38***
Physical abuse within the family/couple relationship	33.5	19.7	14.4	31.02***
Physical violence in the community	18.4	19.0	10.6	10.66**
Sudden/accidental/ violent death of a loved one	45.8	40.9	28.5	20.60***
Difficult diagnosis/ treatment, or traumatic medical event	50.3	27.7	21.3	54.60***
Combat/exposure to war zone	2.2	2.9	2.0	0.46
Terrorist acts/torture/ kidnapping	2.8	3.6	2.0	1.41
Imprisonment/detention	10.1	7.3	7.3	1.47
Being repeatedly/extremely subjected to repulsive situations	5.0	2.9	2.8	2.22
Other event	26.3	13.1	12.0	21.33***

Note. CSS = Central Sensitization Syndromes; OMC = Other Medical Conditions. The percentages for each type of trauma reflect direct or indirect experience of trauma; * $p < .050$; ** $p < .010$; *** $p < .001$.

Table 2
Clinical Characteristics and Emotional Sequelae of Trauma in the Study Groups

Scale	CSS (<i>n</i> = 179) <i>M</i> (<i>SE</i>)	OMC (<i>n</i> = 137) <i>M</i> (<i>SE</i>)	Healthy (<i>n</i> = 508) <i>M</i> (<i>SE</i>)	<i>F</i> (2, 820) ^a	η^2
Sensory-affective pain	8.98 (0.45)	3.41 (0.51)	2.88 (0.27)	65.43*** (a, b)	.138
Sleep quality	9.13 (0.27)	6.17 (0.31)	5.65 (0.16)	58.05*** (a, b)	.124
Anxiety	9.86 (0.29)	6.78 (0.33)	6.66 (0.17)	43.92*** (a, b)	.097
Depression	7.39 (0.31)	4.51 (0.35)	4.63 (0.18)	30.53*** (a, b)	.069
Perceived stress	30.02 (0.70)	24.13 (0.79)	24.30 (0.41)	26.21*** (a, b)	.060
Intrusive symptoms-PTSD	5.88 (0.31)	4.40 (0.39)	3.66 (0.23)	15.42*** (a, b)	.055
Avoidance symptoms-PTSD	2.36 (0.14)	1.76 (0.18)	1.64 (0.10)	7.65*** (a, b)	.028
Cognitive/mood symptoms-PTSD	8.25 (0.42)	5.07 (0.53)	4.42 (0.31)	26.07*** (a, b)	.090
Alertness/reactivity symptoms-PTSD	7.11 (0.33)	4.25 (0.42)	3.46 (0.25)	37.15*** (a, b)	.123
PTSD symptoms-total	23.61 (1.06)	15.49 (1.33)	13.20 (0.79)	30.29*** (a, b)	.103

Note. ^a $df(2, 529)$ in PTSD measures; CSS = Central Sensitization Syndromes; OMC = Other Medical Conditions; PTSD = Post-traumatic Stress Disorder; *M* = estimated marginal mean; *SE* = standard error; a = CSS vs. OMC; b = CSS vs. healthy; c = OMC vs. healthy; *** $p < .001$

(40.8% and 30.2%) than in OMC (18.2% and 7.3%) and healthy (19.5% and 8.7%) groups. The covariate age had significant effects across all variables, $F_s(1, 820) = 6.49\text{--}26.23$, $ps < .050$. Significant group differences were also identified in PTSD

symptoms, $F_s(2, 529) = 7.65\text{--}37.15$, $ps < .001$, with the CSS group exhibiting more severe post-traumatic manifestations than the other groups. No significant effects of the covariate age were observed, $F_s(1, 529) = .04\text{--}1.66$, $ps > .050$.

Further ANCOVAs (controlling age) revealed group differences in couple's relationship consensus, $F(2, 462) = 4.06, p < .050$, but neither cohesion ($p = .369$) nor satisfaction ($p = .197$). The CSS group reported lower consensus compared to the OMC and healthy groups (see Table 3). The covariate age had significant effects on satisfaction, $F(1, 462) = 34.07, p < .001$, and consensus, $F(1, 462) = 18.74, p < .001$, but not on cohesion, $F(1, 462) = .30, p = .578$. Sexual functioning also varied across groups in desire, satisfaction, pain, and total score, $F_s(2, 820) = 3.49\text{--}6.47, p_s < .050$, with no differences in excitement, lubrication, or orgasm ($p_s > .050$). The CSS group reported lower desire and satisfaction, and more pain, than the other groups. Based on the FSFI cut-off (≤ 27), sexual dysfunction was present in 18.4% of CSS, 15.3% of OMC, and 15.6% of healthy participants. The covariate age had significant effects only on sexual desire, $F(1, 820) = 50.22, p < .001$, but not on the remaining variables, $F_s(1, 820) = .09\text{--}2.98, p_s > .050$.

Women with CSS and sexual dysfunction ($n = 33$) showed significantly higher levels of sensory-affective pain and depression and poorer sleep quality than those without sexual dysfunction

($n = 146$), $t_s(177) = 2.24\text{--}2.43, p_s < .050$. They also reported lower satisfaction, consensus, and cohesion in their relationships, $t_s(118) = -3.00$ and $-1.89, p_s < .050$. No significant differences were found in PTSD symptoms ($p = .184$) (see Table 4).

Relationship Between Sexual Functioning and Several Variables in CSS Group

Sexual functioning-total showed significant correlations with sensory-affective pain, sleep quality, anxiety, depression, perceived stress, relationship satisfaction, consensus, and cohesion, and various PTSD symptoms (see Table 5). Lubrication showed a similar correlational pattern and was the most prominent sexual dimension. PTSD symptoms-total also correlated significantly with sensory-affective pain, sleep quality, anxiety, depression, and perceived stress, $r_s = .37\text{--}.58, p_s < .010$, and negatively with relationship satisfaction, consensus, and cohesion, $r_s = -.42$ and $-.30$, respectively, $p_s < .010$. Cognitive/mood and alertness/reactivity symptoms showed a similar correlational pattern and were the most prominent post-traumatic features.

Table 3
Sexual Functioning and Couple Relationships in the Study Groups

Scale	CSS ($n = 179$) $M (SE)$	OMC ($n = 137$) $M (SE)$	Healthy ($n = 508$) $M (SE)$	$F(2, 820)^+$	η^2
Desire	5.86 (0.16)	6.42 (0.18)	6.35 (0.09)	3.62* (b)	.009
Excitement	12.75 (0.50)	14.28 (0.57)	13.69 (0.30)	2.23	.005
Lubrication	13.38 (0.54)	14.47 (0.61)	14.06 (0.32)	0.99	.002
Orgasm	9.49 (0.40)	10.12 (0.46)	9.89 (0.24)	0.60	.001
Satisfaction	9.09 (0.31)	10.49 (0.34)	10.28 (0.18)	6.47** (a, b)	.016
Pain	7.51 (0.48)	9.40 (0.54)	9.41 (0.28)	6.02** (a, b)	.014
Sexual functioning-total	58.10 (2.05)	65.20 (2.31)	63.71 (1.21)	3.49*	.008
Satisfaction-couple	18.51 (0.32)	19.15 (0.35)	19.21 (0.22)	1.63	.007
Consensus-couple	18.27 (0.38)	19.69 (0.41)	19.43 (0.26)	4.06* (a, b)	.017
Cohesion-couple	8.82 (0.29)	9.31 (0.32)	9.31 (0.20)	0.99	.004

Note. ⁺ $df(2, 462)$ in couple relationship measures; CSS = Central Sensitization Syndromes; OMC = Other Medical Conditions; M = estimated marginal mean; SE = standard error; a = CSS vs. OMC; b = CSS vs. healthy; c = OMC vs. healthy; * $p < .050$; ** $p < .010$

Table 4
Comparison of CSS Subgroups With and Without Sexual Dysfunction

	CSS with sexual dysfunction ($n = 33$) $M (SD)$	CSS without sexual dysfunction ($n = 146$) $M (SD)$	$t(df)$	d
Sensory-affective pain	12.67 (13.20)	8.51 (8.57)	2.24(177)*	0.43
Sleep quality	11.15 (5.30)	8.95 (4.56)	2.43(177)**	0.46
Anxiety	10.61 (4.85)	9.41 (4.25)	1.42(177)	0.27
Depression	9.30 (5.25)	7.20 (4.67)	2.28(177)*	0.43
Perceived stress	30.91 (10.78)	28.75 (9.27)	1.16(177)	0.22
Satisfaction-couple	15.39 (6.26)	18.56 (3.53)	-3.00(118)**	-0.76
Consensus-couple	15.00 (5.93)	18.40 (4.31)	-2.90(118)**	-0.74
Cohesion-couple	7.39 (4.07)	9.04 (3.29)	-1.89(118)*	-0.48
PTSD symptoms-total	25.69 (14.79)	22.93 (14.08)	0.90(152)	0.19

Note. CSS = Central Sensitization Syndromes; PTSD = Post-traumatic Stress Disorder; * $p < .05$, ** $p < .01$.

Table 5
Correlations Between Clinical Variables and Sexual Functioning in the CSS Group

	D	E	L	O	S	P	Total
Sensory-affective pain	-.21*	-.23*	-.24*	-.21*	-.15	-.23*	-.26*†
Sleep quality	-.24*	-.24*	-.24*	-.17	-.25*	-.16	-.25*
Anxiety	-.21*	-.18	-.23*	-.19	-.20*	-.18	-.23*
Depression	-.35*	-.26*	-.29*	-.25*	-.18	-.16	-.29*†
Perceived stress	-.21*	-.18	-.26*	-.22*	-.21*	-.18	-.25*
Satisfaction-couple	.10	.27*	.33*	.25*	.48*	.27*	.34*†
Consensus-couple	.13	.24*	.33*	.29*	.39*	.18	.31*
Cohesion-couple	.04	.14	.31*	.15	.34*	.23*	.25*
Intrusive symptoms-PTSD	-.02	-.03	-.11	-.05	-.13	-.06	-.09
Avoidance symptoms-PTSD	-.01	-.03	-.07	-.02	-.09	.00	-.04
Cognitive/mood symptoms-PTSD	-.23*	-.17	-.25*	-.20	-.22*	-.19	-.25*
Alertness/reactivity symptoms-PTSD	-.18	-.19	-.26*	-.18	-.21*	-.15	-.24*
PTSD symptoms-total	-.16	-.15	-.23*	-.16	-.21	-.14	-.21*

Note. CSS = Central Sensitization Syndromes; PTSD = Post-traumatic Stress Disorder. D = desire; E = excitement; L = lubrication; O = orgasm; S = satisfaction; P = pain; Total = sexual functioning-total.

†Variables selected for mediation analysis; * $p < .010$.

Mediators Between PTSD Symptoms and Sexual Functioning in CSS Group

Based on the correlational pattern and the effect size, the mediating roles of sensory-affective pain, depression, and satisfaction in the couple relationship, in the association between PTSD symptoms (cognitive/mood and alertness/reactivity) and sexual functioning-total were examined. The direct effect of cognitive/mood symptoms on sexual functioning was not significant ($Z = -0.37, p = .706$). However, the total indirect effect was significant ($Z = -3.12, p < .010$), with sensory-affective pain showing a significant specific indirect effect ($Z = -2.59, p < .010$). In contrast, the specific indirect effects of satisfaction ($Z = -1.84, p = .066$) and depression ($Z = -0.85, p = .393$) were not significant. The total effect, which includes both direct and indirect effects, was significant ($Z = -3.17, p < .010$). Equivalent results were obtained when alertness/reactivity symptoms were considered as the independent variable, indicating that PTSD symptoms significantly impact sexual functioning through sensory-affective pain.

Discussion

This study examines the sexual functioning of women with CSS in comparison to those with OMC and healthy controls. Moreover, it identifies distinct patterns in sexuality and suggests a potential link between pain, PTSD symptoms, and sexual dysfunction in the CSS group. As the first study to explore sexuality in women with CSS relative to other conditions, it offers preliminary but clinically relevant findings.

The findings revealed that the CSS group experienced more lifetime traumas ($M = 4.51$) than the OMC ($M = 3.05$) and healthy controls ($M = 2.38$), with trauma prevalence in CSS ranging from 2.2% to 54.7% depending on trauma type. Half of the women with CSS reported experiencing their most severe trauma during adulthood, and the other half during childhood or adolescence. These traumatic events occurred only once in 44.2% of cases, while

55.8% experienced them on several occasions or repeatedly. These results align with recent research on the prevalence of adverse life experiences in individuals with chronic pain. For instance, more than 70% of women with FM reported having experienced trauma (Miró et al., 2020), and 84% had done so during childhood or adolescence, prior to the onset of FM (Gardoki-Souto et al., 2022).

The most frequent traumas in the CSS group were related to psychological abuse in family or couple relationships, which is consistent with previous evidence indicating that interpersonal traumas (within a meaningful relationship) are commonly reported by individuals with chronic pain (Combas et al., 2022; Craner et al., 2022). Such traumas are often associated with deeper emotional harm, primarily due to the disruption of trust in close human relationships.

As expected, the CSS group showed a clinical profile marked by more severe sensory-affective pain, poor sleep quality, anxiety, depression, and perceived stress. In addition, in terms of the emotional sequelae of trauma, the findings indicated that the CSS group exhibited more intense symptoms of intrusion and avoidance, as well as greater cognitive/mood disturbances and alterations in alertness/reactivity, compared to the other groups. Similar trends were reported in previous studies (Gardoki-Souto et al., 2022; Manuel et al., 2023; Miró et al., 2020, 2025). For example, Miró et al. (2025) found that individuals with CSS scored higher on PTSD symptom measures than those with OMC and healthy controls, with 28.5% meeting the diagnostic criteria for PTSD, and the CSS group with PTSD showing greater clinical impairment.

With regard to sexuality, the CSS group also showed poorer sexual functioning than the OMC and healthy groups, with desire, satisfaction, and pain being particularly affected. Additionally, 18.4% of women with CSS presented sexual dysfunction according to the FSFI. Findings confirm hypothesis 1. The data, although of smaller magnitude, are consistent with previous literature. Individuals with FM have been found to exhibit poorer overall sexual functioning and problems with arousal, lubrication, orgasm, satisfaction, pain, and desire, with up to 85.2% experiencing some

form of sexual dysfunction (Erdem & Ustabaşoğlu, 2023; Mollà-Casanova et al., 2023). In chronic pain populations, 73.9% reported some form of dysfunction, 64.8% reported low interest in sexual activities (Flegge et al., 2023), and 44.8% expressed concerns about their sexual functioning (Santos-Iglesias et al., 2024). Variations in reported sexual dysfunction may stem from differing definitions, assessment tools, sample populations, and sociocultural contexts, complicating cross-study comparisons.

Despite the interference of pain, individuals with CSS may continue to seek pleasurable sensations in their erogenous zones, with data from this study showing monthly self-stimulation and weekly sexual intercourse, consistent with previous studies (Santos-Iglesias et al., 2024). Furthermore, individuals with chronic vulvar pain can still experience pleasurable sensations, which may help alleviate discomfort (Mautz et al., 2023), and women with FM who maintain regular sexual activity report better mood outcomes (Karpuz, 2024).

Participants with CSS who also had sexual dysfunction had higher levels of sensory-affective pain and depression and poorer sleep quality compared to those with CSS but without sexual dysfunction. Pain, sexual dysfunction, and depression often occur together, possibly with interactive effects. Several studies have found that people with chronic pain and sexual dysfunction are more likely to have depressive and anxiety symptoms (Flegge et al., 2023), and that FM patients who had comorbid depression had worse sexual functioning than those without depression (Erdem & Ustabaşoğlu, 2023). Note that depressive symptoms, in turn, show a moderate mediating effect on suicide risk (Antuña-Cambor et al., 2025; Diaz et al., 2025), in addition to other factors such as mobility limitations (Torres et al., 2024).

Couple relationships also appear to be partially affected. Individuals in the CSS group reported lower levels of consensus but similar levels of satisfaction and cohesion compared to other groups. However, within the CSS subgroup experiencing sexual dysfunction, significantly lower levels were observed across all dimensions of couple adjustment compared to those without sexual dysfunction. These results may reflect the relational complexity associated with chronic conditions. Despite the challenges posed by CSS, individuals may still experience high relationship satisfaction, likely due to the emotional support and care provided by their partners. But when the sexual sphere is altered, it is often accompanied by deeper affective and trust-related fractures, which in turn lead to a weakening of the relational bond. Note that couple relationships in this context are shaped by factors beyond pain and sex itself, such as self-esteem, communication patterns, and caregiving roles, highlighting the need for further research.

In the CSS group, significant associations were identified between sexual functioning and several clinical variables (pain, sleep, emotional distress, couple relationship), as well as PTSD symptoms (cognitive/mood and alertness/reactivity). Lubrication showed the strongest pattern of associations. Findings confirm hypothesis 2. In a similar vein, previous evidence shows that women with chronic pain and poor lubrication report higher pain levels (Flegge et al., 2023), while better sexual functioning is associated with reduced symptoms and emotional distress (Santos-Iglesias et al., 2024). To date, no studies have examined the relationship between trauma and sexuality in CSS, which prevents direct comparisons with our findings.

The mediation analysis revealed that, in the CSS group, PTSD symptoms had a significant impact on sexual functioning through the experience of pain, while depression and couple's relationship quality did not play a relevant role as mediators. Findings partially confirm hypothesis 3. The sensory-affective dimensions of pain appear to be crucial in understanding how trauma and its aftermath affect the sexuality of women with CSS, although further research is needed to determine which specific dimension of sexual functioning is most compromised. It could be valuable to examine these relationships in other contexts, such as the penitentiary setting (e.g., Young et al., 2025).

This study has several limitations. Due to the online distribution of the survey, direct access to individuals with CSS through healthcare settings was not possible. This may have introduced self-selection and coverage biases, as well as potential recall bias and differences in question interpretation. The high rate of sample attrition may have implications for the external validity of the findings. The sample included only women, limiting generalizability to other genders. While key CSS conditions were addressed, other related disorders were not explored. The questionnaire used to assess trauma and PTSD symptoms has not yet undergone external validation. Cohesion scale (couple relationship) showed low internal consistency. Additional variables pertinent to sexuality and victimization in intimate relationships, such as sexual double standards and sexual cognitions (Álvarez-Muelas et al., 2023; Martínez-Gómez et al., 2021; Sierra et al., 2026), were not taken into account. Finally, the cross-sectional design restricts conclusions about mediating processes and precludes the establishment of causal relationships. Future research should explore these aspects in greater depth.

This research reveals that women with CSS often experience poorer sexual functioning and more severe PTSD symptoms. Those with sexual dysfunction report greater sensory-affective pain, more depression, poorer sleep and difficulties in the couple relationship. Also, pain mediates PTSD's impact on sexuality. Given the complexity of CSS, it is crucial to address all aspects of patient well-being. Emotional Awareness and Expression Therapy (Maroti et al., 2025) has emerged as a promising treatment for CSS with comorbid psychosocial trauma, although its impact on sexual functioning remains unknown. Integrating emotional processing and sexual health strategies into multidisciplinary care may help tailor treatments and improve outcomes for individuals with chronic pain.

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