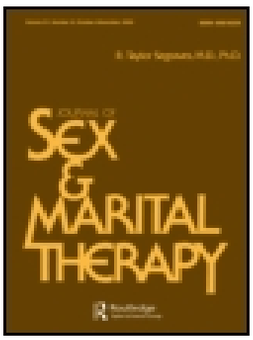

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Pain intensity and sexual functioning in men with genital pain: the mediation role of sexually-related thoughts

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Abstract

The comorbidity between male genital pain and sexual dysfunction is highly prevalent. Previous studies have indicated that men with genital pain share some cognitive characteristics with men experiencing other sexual dysfunctions. However, there is little information on the role of these cognitive factors in understanding the relationship between pain intensity and sexual functioning. This study aims to test if negative sexually-related thoughts mediate the relationship between pain intensity and sexual functioning in men with genital pain. A total of 50 men with self-reported genital pain completed an online survey assessing pain intensity, thoughts during sexual activity and sexual functioning. Results showed a significant effect of negative sexually-related thoughts on sexual functioning, β = -.71, $t(50)$ = -4.2, $p < .001$. Additionally, the Sobel test found a partial mediation effect (z = 2.23, p = .025) and a medium-large indirect effect size was observed (ab_{cs} = .474). Findings suggest that negative sexually-related thoughts play an important role in explaining the impact of pain intensity on sexual functioning. Overall, the study emphasizes the relevance of cognitions in predicting sexual function/dysfunction in men with genital pain, and suggests the use of cognitive techniques in the treatment of this clinical condition.

Keywords

male genital pain; automatic thoughts; cognitions, sexual functioning; sexual dysfunction

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Male Genital Pain is defined by the presence of recurrent or persistent pain related to sexual activity for a period of at least six months in adult men at least 18 years old (Engeler et

al., 2014; Luzzi, 2003; Luzzi & Law, 2006). It is often attributed to Chronic Pelvic Pain (CPP), which is characterized by symptoms of prostate pain (PPS) and/or lower urinary tract, bowel and pelvic floor dysfunction, in association with negative cognitive, behavioural, emotional and sexual consequences (Engeler et al., 2014). Although genital pain is often comorbid with other sexual dysfunctions, there is little evidence regarding the role of common factors in explaining the development and maintenance of sexual and pain problems for men (Davis, Binik, & Carrier, 2009; Davis, Binik, Amsel, & Carrier, 2013; Nickel & Shoskes, 2010; Pereira, Oliveira, & Nobre, 2016a, 2016b). Studies have suggested that negative thoughts during sexual activity are strongly associated with worse sexual functioning (Nobre, 2010; Nobre & Pinto-Gouveia, 2003a, 2007, 2008), however it is unclear how these negative thoughts may contribute to explain the relationship between pain intensity and sexual functioning in men with genital pain (Nickel, Mullins, & Tripp, 2008). Therefore, this is a pilot study that focuses on investigating how negative sexually-related thoughts may explain the variability of sexual functioning and testing its mediating role in the relationship between pain intensity and sexual functioning in men with genital pain.

Male genital pain is a common but often understudied clinical complaint (Collins, Stafford, O'Leary, & Barry, 1999; Davis et al., 2009; Luzzi, 2003; Pavone-Macaluso, 2006). In the 5th Edition of the Diagnostic and Statistical Manual of Mental Disorders, the new diagnosis for genital pain – the "Genito-Pelvic Pain/Penetration Disorder"- applies exclusively to women (American Psychiatric Association, 2013). In fact, the diagnosis of male dyspareunia has rarely been applied, as evaluation and treatment were frequently focused in addressing organic causes, which may have contributed to the disqualification of the DSM diagnosis (Sungur & Gündüz,

2014). However, a significant number of men show pain symptoms without any identified organic cause and/or experience ongoing genital pain after medical treatment (Davis et al., 2009; Konkle & Clemens, 2011; Luzzi, 2003). Inadequate assessment of pelvic floor tenderness may have prevented these men from receiving specific and phenotypically directed treatment (Magri et al., 2010; Shoskes et al., 2009). Nevertheless, the current absence of a DSM diagnosis may lead to neglect or undervaluation of clinical cases, and does not benefit the research for better treatment approaches (Sungur & Gündüz, 2014).

Focusing on PPS, the classification of the different syndromes remains controversial, but the most commonly adopted system was proposed by the National Institutes of Health in the US and separates bacterial prostatitis (acute and chronic) from non-bacterial Chronic Prostatitis/Chronic Pelvic Pain Syndrome (CP/CPPS; Davis et al., 2009; Luzzi, 2003; Magri, Marras, Restelli, Wagenlehner, & Perletti, 2015). CP/CPPS is one of the most enigmatic conditions, for which there is no proven infection or inflammation that can explain the pain (often located at the perineal area) (Davis et al., 2009; Egan & Krieger, 1997; Engeler et al., 2014; Pavone-Macaluso, 2006; Pontari & Ruggieri, 2004). Several studies revealed a prevalence of CP/CPPS between 2% to 15% in community samples, however, in health contexts it accounts for 8% to 12% of the clinical population (Collins et al., 1999; Davis et al., 2009; Luzzi, 2003; Pavone-Macaluso, 2006). CP/CPPS is common among men of all ages, but prevalence is particularly higher in men between 35 and 45 years of age (Luzzi & Law, 2006).

CP/CPPS's etiology remains unclear, and hypotheses such as infection, autoimmunity, and neuromuscular factors were tested (Luzzi, 2003). Although there is empiric evidence for each of the research paradigms, studies are often inconclusive and do not cover most cases

(Alexander et al., 1998; Anderson, Wise, Sawyer, & Chan, 2005; Batstone et al, 2002, Hellstrom et al., 1987; Wise & Anderson, 2012; Zermann, Ishigooka, Doggweiler, & Schmidt, 1999). More recent etiologic models have been tested to better understand genital pain, namely CPPS (Nickel & Shoskes, 2010; Pontari, 2013; Shoskes & Nickel, 2013). These models support a biopsychosocial perspective of pain and suggest that men exposed to potential risk factors, including infectious, genetic, anatomical, neuromuscular, endocrine, immune (including autoimmune), and psychological mechanisms (e.g. depression or pain catastrophizing– an exaggerated negative "mental set" activated when experiencing pain) may develop a self-perpetuating cycle of acute, and then chronic, pain (Gatchel & Maddrey, 2004; Gatchel et al., 2007; Nickel & Shoskes, 2010; Pontari & Ruggieri, 2004; Pontari, 2013; Shoskes, Nickel, Rackley, & Pontari, 2009; Sullivan, Bishop & Pivik, 1995; Sullivan, Stanish, Waite, Sullivan & Tripp, 1998). Using a set of self-report and clinical assessment tools, these models relate to the development of the UPOINT system, currently validated worldwide to assess 6 domains: urologic, psychosocial, organic, (degree of) infection, neurologic, and (muscular) tenderness (Magri et al., 2010; Shoskes et al., 2009; Zhao, Zhang, He & Zeng, 2013).

Given its characteristics, genital pain has a profound impact on sexual functioning (Davis et al., 2009; Ku, Kim, & Paick, 2005). Erectile dysfunction emerges as the most studied co-occurring sexual dysfunction for men with genital pain, and its prevalence ranges between 0.6% and 48.3% (Collins et al., 1999; Lee et al., 2007). A recent meta-analysis indicated that patients with CP/CPPS have an increased risk of suffering from Erectile Dysfunction (Chen, Zhou, Qiu, Wang, & Dai, 2015). This comorbidity may be explained by physiological changes in penile hemodynamic function impeding normal erectile function or

causing pain, such as an increase in autonomic vascular tone or abnormally elevated pelvic floor muscle tone (Cohen, Gonzalez, & Goldstein, 2016). Also, Premature Ejaculation is frequently associated with pain, as prevalence ranges between 26.2% and 77.3% (Davis et al., 2013; Gonen, Kalkan, Cenker, & Ozkardes, 2005; Liang et al., 2004). Moreover, Lee and Lee (2015) reported an increased odds ratio for Premature Ejaculation in men with more severe pain symptoms. Premature Ejaculation may be associated to the altered sensation or muscle spasticity caused by inflammation or infection, impairing the ejaculatory reflex (Cohen, Gonzalez, & Goldstein, 2016). There is also evidence for the presence of both of these sexual dysfunctions in men with genital pain, with prevalence rates ranging from 7.7% to 15.3% (Gonen et al., 2005).

Nevertheless, the literature has also documented the contribution of psychological dimensions in precipitating or perpetuating genital pain (Magistro et al., 2016; Riegel et al., 2014). Regarding sexual functioning, the impact of cognitions during sexual activity is well studied among men and women, but less is known about its role on genital pain, namely in men (Nobre, 2010; Nobre & Pinto-Gouveia, 2003a, 2003b, 2007, 2008). Studies have indicated that men with Erectile Dysfunction report significantly more negative thoughts during sexual activity compared to men without sexual dysfunctions (Nobre & Pinto-Gouveia, 2003a, 2007). Regarding male genital pain, a cross-sectional study with 134 participants showed that men experiencing genital pain and other sexual dysfunctions reported significantly more “failure anticipation thoughts” in comparison to sexually healthy men (Pereira et al., 2016a). Another study found that “erection concern thoughts” were significantly associated with higher pain intensity in men with genital pain, above and beyond the effects of pain catastrophizing (Pereira

et al., 2016b). Although very preliminary in nature, these studies suggest that the presence of negative sexually-related thoughts is a common experience for men with genital pain and men with other sexual dysfunctions. Nevertheless, this evidence does not specify the nature of the relationship between pain intensity, negative sexually-related cognitions and sexual functioning in men with genital pain.

In sum, men with genital pain seem to share characteristics with men with other sexual dysfunctions, not only because they often report sexual dysfunctions but because they also report specific negative sexually-related cognitions that may make them vulnerable to the development of sexual dysfunction and pain. Therefore, this pilot study aims to clarify the relationship between pain intensity and sexual functioning in men with genital pain, as well as analysing the contribution of negative sexually-related thoughts in mediating that relationship. We hypothesize that the higher the pain intensity in men with genital pain, the lower their sexual functioning will be, with negative sexually-related cognitions accounting for most of this association.

Methods

Participants

This study was conducted with a sample of 50 men with self-reported genital pain. All participants were heterosexual men aged 18 years or older. Table 1 presents the main sociodemographic characteristics of the sample.

Insert Table 1

Measures

Descriptive Variables. Information related to the participants and their genital pain was assessed through an adapted version of the General Introductory Questionnaire for Sexual Pain for men (Oliveira, Nobre & Vilarinho, 2011). This is a self-report measure that addresses a set of variables, including sociodemographic dimensions, medical dimensions, and pain-related dimensions. Regarding sociodemographic variables, it measures age, education level, occupation, mean annual income, geographical location, marital status, duration and type of relationship, sexual orientation, ethnicity, and religion. In regard to medical factors, the questionnaire addresses the participant's perception of their own health condition, current and past diseases, medication, past surgeries and medical procedures, and medical family history. In terms of genital pain and chronic pain there are open and closed questions, as well as Likert scales, to assess location, frequency, intensity, durability and symptom evolution, discomfort levels, life interference, diagnosis and sought treatment. Finally, there are questions referring to other symptoms, mainly urinary tract infections and Haematospermia.

NIH Chronic Prostatitis Symptom Index (CPSI).

NIH Chronic Prostatitis Symptom Index (CPSI) is a measure commonly used to assess CP/CPPS (Litwin et al., 1999; Litwin, 2002). It includes different types of questions such as "yes" or "no" questions (e.g. "In the last week, have you experienced: Pain or burning during urination?") and Likert scale questions (e.g. "Which number best describes your average pain or discomfort on the days that you had it, over the last week?", from 0 – no pain, to 10 – pain as bad as you can imagine). The 9 items of the CPSI are scored across 3 domains of pain (0 to 21), urinary symptoms (0 to 10), and quality of life impact (0 to 12). Higher scores indicate worse outcomes in all domains. The measure showed good internal consistency (α = .86 to .91) and

high test-retest reliability (r = .83 to .93; Litwin et al., 1999; Litwin, 2002). These questions were adapted to Portuguese, and psychometric validation is currently underway. In the current study, the measure showed good internal consistency (α = .70).

Short Form – McGill Pain Questionnaire (SF-MPQ).

The SF-MPQ measures pain intensity, as well as its sensory and affective characteristics (Azevedo et al., 2007; Melzack, 1987). The first question is a set of 15 items describing pain, measured in a five-point Likert scale (0 – none; 4 – severe). The following question uses a visual analogue scale that assesses pain intensity, from 0 (no pain) to 100 (the worst pain possible). The last question corresponds to the Present Pain Intensity (PPI), measured through a 6-point Likert scale (0 – without pain; 5 – unbearable). Higher global values reveal higher pain intensity (minimum = 0; maximum = 50) (Melzack, 1987). This measure revealed good internal consistency (α = .78 for the affective dimension; α = .76 for the sensory dimension), as well as good discriminant validity (Azevedo et al., 2007). In this study, the scale had good internal consistency (α = .91), with adequate α values for the sensory dimension (α = .84) and the affective dimension (α = .80).

Sexual Modes Questionnaire (SMQ) – Male Version.

The male version of the SMQ is a 30-item self-report questionnaire that measures thoughts, emotions and sexual response during sexual activity (Nobre & Pinto-Gouveia, 2003a). Since the study's focus is on thoughts, only the automatic thoughts subscale (ATS) was applied. ATS items represent thoughts or images during sexual activity that may or may not be related to erotic stimuli. Factorial analysis has indicated five dimensions, explaining 54.7% of total variance: failure anticipation thoughts (e.g. "I'm condemned to failure"), erection concern

thoughts (e.g. "Why isn't this working?"), age and body related thoughts (e.g. "I'm getting old"), negative thoughts toward sex (e.g. "This is disgusting"), and lack of erotic thoughts (e.g. "These movements and positions are fabulous"). Participants answered based on a five-point Likert scale (1 – never; 5 – always). Higher values correspond to more frequent negative sexually-related thoughts (minimum = 27; maximum = 135). Psychometric studies showed that, for the global measure, there was good internal consistency (α = .88) and moderate test-retest correlation (*r* = .65) between two consecutive administrations with a 4-week interval (Nobre & Pinto-Gouveia, 2003a). For each factor, α values were adequate, varying between .69 and .83 (Nobre & Pinto-Gouveia, 2003a). This measure also showed good discriminant validity between a sexually healthy sample and a clinical sample (Nobre & Pinto-Gouveia, 2003a). In the current study, the ATS subscale showed adequate internal consistency both as a whole (α = .92) and for each dimension (α values between .65 and .92).

International Index of Erectile Function (IIEF) – Portuguese Version.

The Portuguese version of the IIEF is a 15-item questionnaire which evaluates five dimensions of male sexual functioning: sexual desire, erectile function, orgasmic function, sexual satisfaction, and overall satisfaction (Quinta-Gomes & Nobre, 2012; Rosen et al., 1997). This measure allows for computation of specific indexes for each dimension, as well as a score for overall sexual function (minimum = 5; maximum = 75). Regarding psychometric characteristics, studies have demonstrated its discriminant validity between a sexually healthy sample and a clinical sample, as well as its reliability with α ≥ .73 and test-retest correlations between administrations at baseline and in the fourth week, for each factor, between .64 and .84 (Rosen et al., 1997). The Portuguese version showed adequate psychometric qualities, regarding

internal consistency (α values between .72 and .86), discriminant validity between a sexually healthy sample and a clinical sample (*p* values always < .05), and test-retest reliability (moderate to high correlations) (Quinta-Gomes & Nobre, 2012). Participants were asked to answer according to their situation in the previous four weeks. In the current study, globally, this scale showed good internal consistency (α = .91), and, for each factor, α values were adequate (α values between .62 and .92).

Procedures

Participants completed an online survey about sexual functioning, thoughts during sexual activity, and pain intensity, as well as demographic and medical data. This study was part of a larger survey that collected data regarding different cognitive and emotional variables. The online survey was advertised on several social networks, Portuguese blogs dedicated to sexuality and pain, and through electronic mailing lists and flyers. Snowball or referral sampling methods were also applied in disseminating the survey (Goodman, 1961). The survey was previously administered to volunteers in order to test the adequacy and clarity of the language. Participants received the link and a full explanation of the purpose of the study. To participate, volunteers had to be 18 years of age or older. After giving their informed consent, the participants completed the survey, which took approximately 25 minutes. Also, no incentives or monetary compensation was given to participants. The sample was collected between January and November 2014. In order to guarantee the privacy and anonymity of the participants, they were not asked any personal data that could identify them. The database was stored on a server from the University xxx blind, and no IP address was registered. The study was approved by the University's ethics committee.

Statistical analysis

A hundred and fifty-one men with self-reported genital pain initially took the survey. However, 101 participants did not complete the introductory questionnaire (plus the CPSI), and at least one of the questionnaires of the survey (SMQ, IIEF and SF-MPQ) and were excluded from the analysis (67% of total sample). Moreover, accounting for the impact they have on sexual functioning, we have not included participants who reported, at least, one of these diseases: Diabetes, Hypertension, Chronic fatigue syndrome, Chronic pain, Fibromyalgia (Davis et al., 2009; Luzzi, 2006). A final sample of 50 men with self-reported genital pain was included in this study (33% of total sample). Missing values were not treated (questionnaires with missing values were not analysed). Power analysis was investigated for a significant level of .05 ($\alpha = .05$) and the sample size turned out to be large enough to find moderate effect sizes ($N = 50$; $\eta = .15$; $\pi = .76$).

Descriptive characteristics of the sample were analysed with percentages, means, and standard deviations. Table 2 shows the descriptive data of all the study variables. Moreover, the variables show significant and moderate correlations among them, except for the near to moderate association between pain intensity and sexual functioning ($r = -.386$, $N = 50$, $p < .000$) (see Table 3).

Insert Table 2

Insert Table 3

Mediation analysis was conducted through linear regression equations (Baron & Kenny, 1986; MacKinnon, Fairchild, & Fritz, 2007). As previously mentioned, giving that relevant diseases were excluded, information on medical factors was not included as a co-variate.

Sexually-related thoughts (SMQ – ATS subscale) were considered the mediator, with pain intensity (total of SF-MPQ) being the independent variable (IV) and sexual functioning (total of IIEF) the dependent variable (DV). A Sobel test was used to assess the significance of the mediation effect. The Sobel test determines whether the reduction in the effect of the independent variable, after including the mediator in the model, is a significant reduction and, therefore, whether the mediation effect is statistically significant (Baron & Kenny, 1986). The completely standardized indirect effect was computed as a measure of the effect size of the mediation (Preacher & Kelley, 2011).

Results

Sample characteristics

Twenty-two percent of the participants rated the genital pain as being always or almost always present (4 or 5 in a Likert scale ranging between 1 – never and 5 – always), while 78% reported experiencing the pain less frequently (2 or 3 in the same 5-point Likert scale). Specifically, 52% of them reported feeling pain or discomfort during or after ejaculation, and 57.1% indicated pain or a burning sensation while urinating. Concerning pain location, most men reported higher frequency at the tip of the penis (75.5%), and 36% of men reported multiple locations of pain (e.g. testicles, pubic area, and perineum).

Concerning pain characteristics, for the majority of the sample (85%) symptoms occur with sexual intercourse, and 34.8% also report the occurrence of pain with sexual activity even without penetration. Furthermore, 16.7% of them described their symptoms as intermittent and 11.8% described them as being constant. Sixty-eight percent of men reported moderate to high

levels of pain intensity (i.e. more than 5 points in a scale ranging between 1 – no pain – and 10 – worst pain ever). Eighty-eight percent of men with genital pain reported moderate to high levels of discomfort related to pain, and 36% reported moderate to high levels of interference in daily life. On average, pain had been present for 5 years, whereas for the majority (56.6%) there was no change of symptoms over time. Moreover, CPSI scores were low for all domains (Table 4). Overall, these results are representative of the variability of the sample.

The mediation analysis

In Step 1, the regression of the IV on the mediator was significant, $\beta = .60$, $t(50) = 4.49$, $p < .001$. Step 2 showed that the regression of the IV on the DV was also significant, $\beta = -.39$, $t(50) = -2.6$, $p = .014$. Step 3 showed a significant mediation effect on the DV, $\beta = -.71$, $t(50) = -4.2$, $p < .001$. Also, the IV was no longer a significant predictor of the DV, $\beta = .06$, $t(50) = .37$, $p = .711$ after the inclusion of the mediator. Additionally, the Sobel test found a partial mediation effect ($z = 2.23$, $p = .025$) (see Table 5). According to *r* Cohen parameters, the completely standardized indirect effect determined a medium-large effect size of the mediation ($ab_{cs} = .474$). Finally, accounting for the negative correlations in the second and third equations ($\beta = -.39$, $t(50) = -2.6$, $p = .014$; $\beta = -.71$, $t(50) = -4.2$, $p < .001$), the model suggested that the relationship between higher pain intensity and lower sexual functioning was mediated by the increase of negative sexual thoughts. The mediation model is shown in Figure 1.

Insert Table 5

Insert Figure 1

Discussion

This was a pilot study that aimed to explore the role of sexual cognitions in explaining the relationship between sexual functioning and pain intensity in men suffering from genital pain. This study showed that negative sexually-related thoughts mediated the relationship between sexual functioning and pain intensity in men with genital pain. These findings are consistent with our hypothesis, suggesting that the relationship between higher pain intensity and lower sexual functioning in men with genital pain could be explained by the activation of negative sexual cognitions (Pontari & Ruggieri, 2004; Pontari 2013).

The significance of the mediation effect, assessed through the Sobel test, showed that this was a partial mediation, as the *z* score was different from 0 (Baron & Kenny, 1986). This points out that, among others, cognitions during sexual activity may be one of the factors mediating the impact of pain intensity on sexual functioning (Carvalho & Nobre, 2011; Nobre & Pinto-Gouveia, 2007, 2008). As previously stated, this domain expresses cognitions related to worries about sexual performance (e.g., "I must achieve an erection," "I must be able to have intercourse") (Nobre & Pinto-Gouveia, 2003a). According to a cognitive-behavioral framework of sexual dysfunction, negative sexually-related thoughts derive from dysfunctional sexual beliefs, which are sexual myths and erroneous ideas socially and culturally conveyed (e.g. "A real man has sexual intercourse very often"; "Penis erection is essential for a woman's sexual satisfaction") (Nobre, 2003b). Dysfunctional sexual beliefs may act as risk factors for the development of sexual dysfunctions, and negative sexual cognitions could help perpetuate the symptoms, as they point out the activation of the cognitive sexual schema of incompetence or failure (Butler, Fennell, Hackmann, 2010; Nobre, 2010; Nobre & Pinto-Gouveia, 2007).

Thereby, negative sexual thoughts may promote an appraisal of the genital pain as a threat or concern (i.e. due to the negative association between sex and pain and/or failure) and work as a mechanism of cognitive distraction from the erotic stimuli, which hinders sexual functioning (Janssen, Everaerd, Spiering, & Janssen, 2000; Magri et al., 2010; Vlaeyen & Linton, 2000).

Individual variability in psychophysiological processes may also help explain how negative sexual thoughts influence the sexual functioning of men with genital pain (Janssen, Everaerd, Spiering, & Janssen, 2000). According to the Dual-Control Model, sexual arousal and associated behaviors depend heavily on the balance between sexual excitation and sexual inhibition, relevant to an adaptive sexual response (through mechanisms of activation or suppression) in the face of an erotic stimulus (Janssen & Bancroft, 2006). Thus, negative sexual thoughts could be related to a predominantly nonsexual processing of sexual stimuli, a process dependent on attentional processes (i.e., cognitive distraction), but initiated at an unconscious or "automatic" cognitive level in response to psychological threats or performance-related worries, which leads to a maladaptive activation of the sexual inhibition system (Janssen & Bancroft, 2006)

According to a biopsychosocial perspective, pain is an idiosyncratic experience created from the interplay between physiological, psychological and social factors (Gatchel & Maddrey, 2004; Gatchel et al., 2007). As mentioned in the introduction, recent etiologic models of male genital pain have proposed that physiological (e.g. genetic, neurologic, immune factors), psychological (e.g. depression and pain catastrophizing) and even social dimensions (e.g. relationships and social support) interact in the development of pain (Nickel & Shoskes, 2010; Pontari & Ruggieri, 2004; Pontari, 2013). Previous research has emphasized the role of negative

emotions (e.g. anxiety or depression) and pain catastrophizing in decreasing sexual arousal and desire, which ultimately leads to avoidance and helplessness towards sexual activity and perpetuates the cycle of genital pain and sexual dysfunction (Carvalho & Nobre, 2011; Ku, Kim & Paick, 2015). Even though negative emotions were not measured in this study, it is reasonable to assume that the mechanisms working both on sexual dysfunctionality and genital pain may also relate to anxiety or depression for the study participants (Ku, Kim & Paick, 2015). Nevertheless, these findings emphasize how negative thoughts during sexual activity contribute to the comorbidity between genital pain and sexual dysfunction in men (Davis et al., 2013; Nickel & Shoskes, 2010). Moreover, these results are consistent with the findings from a previous study that showed that negative sexually-related thoughts contributed to the increase in pain intensity above and beyond pain catastrophizing (Pereira et al., 2016b). Thus, thoughts and worries about sexual performance may contribute specifically to perpetuating the decreased sexual functioning and increased pain intensity.

Findings should be interpreted with caution due to some limitations of the study. This is a cross-sectional study, which prevents the establishment of causal relationships. The small and non-probabilistic sample compromises the significance and generalization of these results. Our sample was also reduced by the fact that a large proportion of respondents was excluded for not completing the introductory questionnaire, which could be explained by the length of this sub-section. Moreover, the fact that the inclusion criteria for men with genital pain were mainly based on self-reported information compromises the assignment of a thorough clinical diagnosis, as it neglects the possible influence of medical factors on pain intensity. Also, due to constraints in assessing clinical settings, this was an online study, which may have also limited the

participation of men who do not have access to the internet and those who may not feel as capable of using this tool. Finally, in the study, we found alphas between 0.6 and 0.7 for the ATS subscale factors with a low number of items (e.g. "Lack of erotic thoughts" with 4 items; "Negative thoughts towards sex" with 5 items). Nevertheless, we decided to keep these dimensions in because low alphas might be related to our small sample and not only to measurement issues (Bonett, 2002; Cronbach, 1951).

In the future, studies with larger samples, a stricter clinical evaluation, and the inclusion of other variables (e.g. relational variables, sexual beliefs) are necessary to better understand how much of a role these dimensions play in predicting pain intensity. Furthermore, there is much need for the development of longitudinal studies that may test the nature and course of genital pain and further the development of more efficient intervention protocols.

In sum, this study addresses an understudied but important clinical complaint with great impact on the quality of life, which is male genital pain (Davis et al., 2009; Luzzi, 2003; Luzzi & Law, 2006; Pavone-Macaluso, 2006). It contributes to the recognition of this condition as a sexual health issue and the right to a satisfying sex life for these patients. Specifically, this study highlights the role of negative thoughts during sexual activity for the comorbidity between genital pain and sexual dysfunction in men (Davis et al., 2013; Nickel & Shoskes, 2010). According to Cognitive Behavioral Therapy theory, the present findings have important clinical implications by shedding light onto the cognitive processing of sexual stimuli, besides the influence of other physiological or social dimensions (Binik, 2010; Granot & Lavee, 2002). This contribution may help patients understand how negative sexually-related thoughts interact with their emotions and influence their sexual response (Ku, Kim & Paick, 2015). Insight over these

processes may benefit the development of more adaptive strategies, based on cognitive techniques, for the management of pain and sexual dysfunction, above and beyond the use of other therapeutic modalities (Nickel et al., 2008, 2013). Finally, the study reinforces the inclusion of sexual functioning in a multidimensional etiology of genital pain (e.g. inclusion of sexual therapy in the UPOINT system), towards a multidisciplinary assessment and treatment that effectively addresses the contribution of cognitive factors in perpetuating the suffering of men experiencing sexual dysfunction and genital pain (Davis et al., 2013; Nickel & Shoskes, 2010).

Conflict of interest

The authors declare that they have no conflict of interest.

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</BIBL>

Figure 1.</number><ti>Mediation model of linear regression between Pain intensity, Sexually-related thoughts and Sexual functioning in a sample of men with genital pain (N = 50)

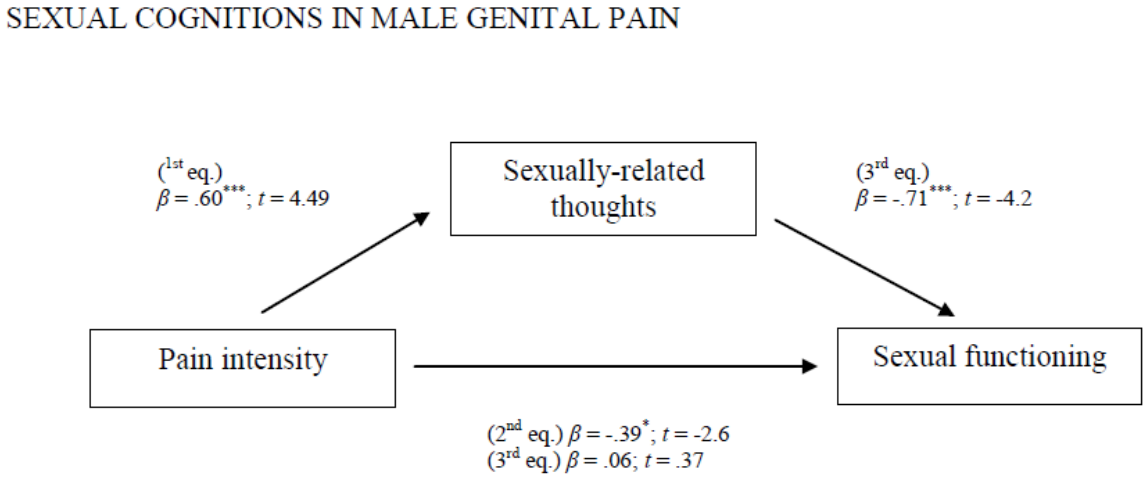

Table 1. *Sociodemographic characteristics of the sample (N = 50)*

Age	
M	31.88
Range	18--66

SD			13.41

	M	SD	Min. – Max.

	N	*%*
Marital Status		
Married/CL	16	33
Single	33	66
Widowed	-	-
Divorced	1	2
Educational level		
0-4 years	1	2.2
5--6 years	-	-
7--9 years	2	4.4
10--12 years	15	33.3
13--15 years	14	31.1
+ 15 years	13	28.9

Notes. M = mean. *SD* = standard deviation. *CL* = Living in common law

Table 2. *Descriptive data of Pain intensity, Sexually-related thoughts and Sexual functioning (N = 50)*

Pain intensity[1]	10.69	9.72	0 – 50
Sexually-related thoughts[2]	63.18	10.17	31 – 75
Sexual functioning[3]	54.3	17.94	34 – 119

Note. M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum

	Pain intensity	**Sexually-related thoughts**	**Sexual functioning**
Pain intensity	-		
Sexually-related thoughts	.599**	-	
Sexual functioning	-.390***	-.681***	-

Table 3. *Correlations (r Pearson) between Pain intensity, Sexually-related thoughts and Sexual functioning in a sample of men with genital pain (N = 50)*

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

Table 4. *CPSI domain scores in men with genital pain (N = 50)*

	Mean	**SD**	**Min.**	**Max.**
Pain (0-21)	6.46	1.88	4	9

[1] Total of affective and sensorial subscales of SF-MPQ
[2] SMQ (ATS subscale)
[3] Total of IIEF

	Sexually-related thoughts (1st equation)		**Sexual functioning (2nd equation)**		**Sexual functioning (3rd equation)**	
	β	*t*	*β*	*t*	*β*	*t*
Urinary Symptoms (0-10)	1.51		1.62		0	6
Quality of life impact (0-12)	3.52		2.03		0	8

Table 5. *Linear Regression analysis of Mediation between Pain intensity, Sexually-related thoughts and Sexual functioning in a sample of men with genital pain (N = 50)*

Sexually-related thoughts	-	-	-	-	-.71***	-4.2	*Notes*
Pain intensity	.60***	4.49	-.39*	-2.6	.06	.37	. *p < .05, ** p < .01, *** p < .001

Figure 1. Mediation model of linear regression between Pain intensity, Sexually-related thoughts and Sexual functioning in a sample of men with genital pain (N = 50)