Women in pain : the course and diagnostics of chronic pelvic pain

Weijenborg, P.T.M.

Women in
PAIN

Adapted from J Sex Med 2009, Aug 12
[Epub ahead of print]

Sexual functioning in women with chronic pelvic pain: the role of anxiety and depression

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Moniek ter Kuile, Philomeen Weijenborg and Philip Spinhoven.

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ABSTRACT

Introduction: Chronic Pelvic Pain (CPP) in women is a long-lasting and often disabling condition. It seems reasonable to expect that as a result of the pain, extreme fatigue and/or depressive mood, women with CPP may report a variety of sexual problems.
Aim: The present study investigated differences in the report of sexual problems in women with Chronic Pelvic Pain (CPP) compared to healthy controls, and whether the association of CPP with sexual problems was moderated or mediated by somatic and psychological factors as manifested in women suffering from CPP.
Method: 154 women with CPP and 58 age-matched controls completed self-report measures for sexual functioning, pain, physical impairment, anxiety, depression, sexual and physical abuse.
Main Outcome Measure: Golombok Rust Inventory of Sexual Satisfaction (GRISS).
Results: Women with CPP reported higher levels of vaginistic complaints, sexual avoidance, nonsensuality and sexual dissatisfaction than healthy controls. Sexual problems were associated with anxiety, depression and sexual abuse history but not with somatic factors as pain and physical impairment. Anxiety as well as depression, irrespective of the report of sexual abuse experiences, mediated the effect of CPP on sexual problems. Sexual abuse was a general predictor of sexual problems in both women with CPP and controls.
Conclusions: Anxiety and depression constitute important factors in the evaluation of sexual problems in women with CPP.

Introduction

Chronic pelvic pain (CPP) in women is described as a continuous or intermittent pain, in the lower abdominal area or pelvis for at least six months, not exclusively associated with the menstrual cycle (dysmenorrhoea) and/or sexual intercourse (deep dyspareunia) [Williams 2004]. Chronic pelvic pain is a long-lasting and often disabling condition [Mathias 1996]. Problems with sexual functioning resulting from chronic pelvic pain have to be addressed and assessed by the health care professional. It seems reasonable to expect that as a result of the pain, extreme fatigue and/or depressive mood, women may report a variety of sexual problems ranging from decreased pleasure and frequency of intercourse, deficient lubrication during sexual contact, superficial or deep dyspareunia and/or problems in reaching orgasm to a total aversion towards sexual intimacy.

Reports in the literature about the coincidental prevalence of sexual problems with CPP are scarce. In community based studies in the UK [Zondervan 2001], New Zealand [Grace 2004] and Australia [Pitts 2008] a substantially larger proportion of the women with CPP reported dyspareunia (varying between 29% and 42%) than women without CPP (varying between 11% and 14%). Only a few studies have investigated sexual problems within clinical populations [Collett 1998; Verit 2006; Florido 2008]. In line with the results of the community based studies, patients with CPP reported more sexual problems such as dyspareunia, problems with desire or arousal and lubrication than women without CPP [Collett 1998; Verit 2006; Florido 2008]. Collett and colleagues also found that patients with CPP reported more sexual problems than women with any other type of chronic pain problem.

The available studies suggest that women with CPP report more frequently a history of sexual abuse [Roelofs 2007] and show higher levels of anxiety and depression [McGowan 1998] compared to controls. Moreover, there are indications that a history of sexual abuse [Leonard 2002] as well as higher levels of anxiety and depression [Angst 1998] are both related with sexual problems. Therefore the possible differences in sexual functioning between women with CPP and controls as found may be mediated and moderated by these factors. In line with this supposition, Randolph and Reddy [Randolph 2006] found that in a non-clinical sample of 63 women with CPP, sexual problems were positively related to a history of sexual abuse and depression. The effect of sexual abuse on sexual functioning was dependent on the extent of depressive symptoms. Therefore, differences in sexual functioning between women with CPP and controls might be mediated by pain characteristics (somatic and psychological factors) and moderated by patient characteristics such as a history of sexual abuse.

The purpose of the current study was to investigate (a) differences in sexual problems between women with CPP and healthy controls and (b) moderators/mediators of sexual problems in women with CPP. It was hypothesized that compared to healthy controls, women with CPP would report more sexual problems and that the association of CPP with sexual problems would be moderated by sexual abuse and mediated by depression and anxiety.

Methods

Participants

Between 2001 and 2008, all consecutive women who visited a CPP-team of the gynaecological out-patient clinic of a university hospital were included in the study. If after gynaecological examination, ultrasound investigation and/or laparoscopy, no diagnosis or somatic explanation for their pelvic pain is found or if the complaint persists despite adequate treatment of the initial diagnosis, women are typically referred to and examined by the CPP team. Before consultation by the team women are asked to complete baseline questionnaires (see further). The control group was recruited by advertisement in local newspapers. Women were included if they did not suffer from pelvic pain, or reported a maximum of 3 days a month's pain related to the menses. Control women completed the questionnaires at the hospital and were compensated with €15 and travel expenses. Furthermore, to be included in the current study all women had to be over 18 years of age and had to have been in a hetero sexual relationship. Approval for this study was obtained from the Institutional Review Board of the hospital.

Measures

Primary outcome measure

Golombok Rust Inventory of Sexual Satisfaction (GRISS) [Van Lankveld 1999; Ter Kuile 1999]. The GRISS contains 28 items covering seven frequently occurring sexual complaints of heterosexual persons with a steady partner: anorgasmia, vaginismus/ dyspareunia, (in)frequency of sexual contact, sexual non-communication, dissatisfaction, nonsensuality, and avoidance of sex. In addition, it provides a total score of the person's dissatisfaction with sexual functioning within the relationship. A higher score indicates more sexual problems/dissatisfaction. The GRISS has been validated within the Dutch population and the psychometric properties are good [Van Lankveld 1999; Ter Kuile 1999]. The internal consistency of participants' data in our sample was found to be satisfactory ($.70 < \alpha < .82$ for the subscales and $\alpha = .93$ for the GRISS total-score)

Possible mediators and moderators

Current pain intensity was assessed using the Visual Analogue Scale (VAS) of the McGill Pain Questionnaire [Melzack 1975; Vanderiet 1987]. The Dutch version has good psychometric properties [Vanderiet 1987].

Physical impairment was measured using the Medical Outcome Study (MOS) 36-Item Short-Form Health Survey (SF-36) [Ware 1992; VanderZee 1996; Essink-Bot 1997; Aaronson 1998]. The psychometric properties of this questionnaire have been found to be adequate [Ware 1992; VanderZee 1996; Essink-Bot 1997; Aaronson 1998]. Aggregation of the 8 domains (physical functioning, social functioning, role limitations caused by physical health problems, role limitations caused by emotional problems, emotional well-being or mental health, vitality, bodily pain and general health perception) yields 2 measures: the Physical Component Summary (PCS) and the Mental Component

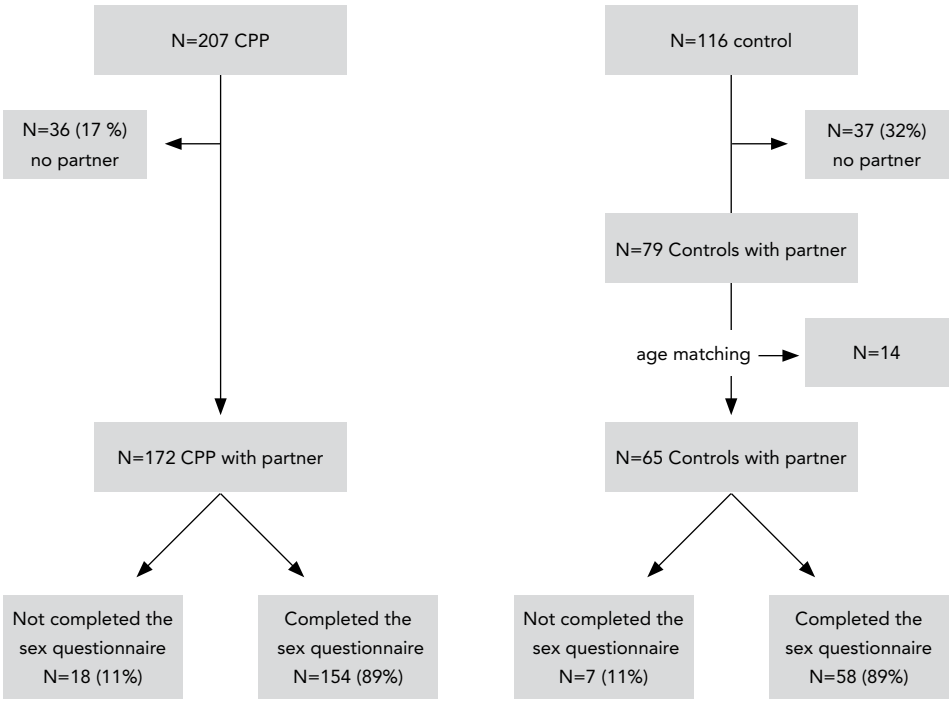
Summary (MCS) score, assessing physical and mental health respectively [Ware 1992]. In a norm-based scoring each scale has the same average (50) and the same standard deviation (10). Anytime a scale score is below 50, health status is below average.
The correlations between the MCS-score and both HADS subscales (r = -.70) and the HADS total score (r = -.75), were negative and statistically significant with a large effect size. Therefore for this study only the PCS-score was used. The internal consistency of participants' data in our sample was found to be satisfactory (α = .88 for the items with a high loading on the PCS score).
The presence of anxiety and depressive states was assessed using the Hospital Anxiety and Depression Scale (HADS) [Zigmond 1983; Spinhoven 1997]. It consists of two 7-item scales: one for anxiety and one for depression (score range of 0-21). Higher scores represent higher levels of symptoms of anxiety or/and depression The questionnaire is validated for the Dutch language and has good psychometric properties [Spinhoven 1997]. The internal consistency of participants' data in our sample was found to be satisfactory (α = .83 for the anxiety subscale and α = .85 for the depression subscale).
To assess *the prevalence of sexual as well as physical abuse* during childhood and later years the 7-item Sexual and Physical Abuse Questionnaire (SPAQ) questionnaire was used [Kooiman 2002]. Sexual abuse is restricted to sexual abuse with actual physical contact and physical abuse is confined to intentional violence resulting in some kind of physical injury as for example bruises. The criterion validity was found to be satisfactory [Kooiman 2002].

Statistical analyses

Descriptive statistics were calculated for all variables. Prior to analysis, all dependent variables were examined to determine whether they were normally distributed. The following subscales were transformed to better approximate normal distributions: GRISS vaginismus/ dyspareunia, GRISS dissatisfaction, GRISS nonsensuality, and GRISS avoidance of sex, GRISS total-score and the SF-36 PCS. These transformations resulted in a quasi-normal distribution with adequate skewness ($< |1|$).
In order to investigate whether compared to normal controls, women with CPP differed on biographic, somatic and psychological CPP characteristics, and sexual functioning univariate statistics were conducted.
The univariate association of sexual functioning with somatic and psychological CPP characteristics was assessed with correlation coefficients. If appropriate, variables which were significantly correlated with sexual functioning were subsequently entered stepwise in a hierarchical multiple regression model, statistically controlling for biographic variables.
In the present study mediation occurs if (1) CPP significantly affects the mediator (somatic and psychological CPP characteristics), (2) CPP significantly affects sexual functioning in the absence of the mediator, (3) the mediator has a significant and unique effect on sexual functioning, and (4) the effect of CPP on sexual functioning shrinks upon the addition of the mediator into the model [Baron 1986]. To formally evaluate whether putative mediators (partly) mediated the relationship of CPP and sexual functioning, the standard error of the mediated effect was bootstrapped [Mackinnon 2002]. The macro for SPSS-14

developed by Preacher and Hayes [Preacher 2008] was used to generate estimates for the indirect effects in multiple mediator models.
To test whether patient characteristics (i.e., sexual abuse) were non-specific predictors or moderators, multiple regression analyses were computed for sexual functioning. In the present study moderation occurs if a patient characteristic does interact significantly with CPP and sexual functioning. Thus, if there is a significant 'CPP X patient characteristic' interaction effect, the patient characteristic is a moderator. If the interaction term is not statistically significant but the patient characteristic predicts sexual functioning, than this factor is a non-specific predictor [Kraemer 2002].

Figure 1 *Selection of women with Chronic Pelvic Pain (CPP) and controls*



Results

Two hundred and seven women with CPP completed all questionnaires. One hundred and seventy two women of the 207 (83%) reported that they had a heterosexual relationship. Hundred and fifty four women of the 172 (89%) potential women with CPP completed the sex related questions. Seventy nine out of the 116 (84%) women in the control group reported to have a heterosexual relationship. To match the women in the control group with the women with CPP on age, 14 (18%) women were excluded in the control group, resulting in a mean age of 38.3 years old (SD = 10.3) in the CPP group and 39.2 years (SD = 10.0) in the control group. Especially, a larger proportion of women in the control group were found to be in the older age group (between 55 and 70) compared with women in the corresponding CPP group. No differences were observed between the percentage of women with CPP (N = 18; 11%) and controls (N = 7; 11%) who did not complete the sex related questions (see Figure 1).

Table 1 *Demographic and clinical variables of 154 women with Chronic Pelvic Pain at their initial visit to a Chronic Pelvic Pain (CPP) team and 58 controls*

	CPP N (%)	Controls N (%)	χ^2	*p*
Living with partner (yes)	134 (87)	46 (79)	1.95	0.16
Children (yes)	102 (66)	41 (71)	0.38	0.54
Level of education low[a] (yes)	45 (29)	5 (9)	9.92	0.01
Paid employment (yes)	91 (60)	38 (66)	0.49	0.48
Disability insurance benefit (yes)	46 (31)	1 (2)	20.03	0.01
Sexual abuse history (yes)	53 (35)	20 (35)	0.01	0.93
Physical abuse history (yes)	38 (26)	13 (22)	0.29	0.59
Characteristics of the CPP group				
Duration complaint (years) M (SD)	6.2 (6.2)			
Diagnoses N (%)				
Endometriosis (yes)	12 (8)			
Adhesions (yes)	34 (22)			
Endometriosis + Adhesions (yes)	10 (7)			
Ovarian cysts (yes)	8 (5)			
Other diagnosis (yes)	10 (7)			
None (yes)	80 (52)			
Operations for the CPP (yes)	132 (85)			
Total number of operations for CPP M (SD)	2.4 (1.9)			

N = Number; M = Mean; SD = Standard Deviation.

[a] level of education: low: primary school, special education, lower secondary education (vocational and general); high: upper secondary vocational education, higher professional education, pre-university, university.

The CPP group consisted of a sample of chronic pain patients with a mean duration of the pain problem of more than six years (range: 0.5 - 35 years). A variety of diagnoses like endometriosis, adhesions, cysts, were thought to be associated with the pelvic pain complaint. In addition, for 52% of the women no somatic abnormality had been identified (Table 1). More than 85% of the women had had a surgery for the pain problem before attending the CPP-team.

Differences in biographic, somatic and psychological characteristics between women with CPP and controls

A significantly higher percentage of women with CPP had a lower level of education and achieved disability insurance benefits compared with the women in the control group (Table 1). Moreover, women with CPP reported significantly more pain, depression and anxiety symptoms and were physically more impaired than women in the control group (Table 2).

Differences in sexual functioning between women with CPP and controls

As can been seen in Table 2, in comparison with controls, women with CPP reported significantly more sexual avoidance behaviour, nonsensuality and complaints of vaginismus. The total GRISS score was significantly higher in women with CPP than controls indicating that women with CPP were more dissatisfied with their sexual relationship than healthy controls.

Table 2 *Pain and adjustment to pain and sexual functioning of 154 women with Chronic Pelvic Pain at their initial visit to a Chronic Pelvic Pain (CPP)-team and 58 controls*

	CPP Mean (SD)	Controls Mean (SD)	*t*-value	*p*	*d*
CPP characteristics					
Pain severity	50.10 (24.02)	2.13 (5.35)	22.70	0.01	2.33
Physical impairment	37.20 (8.51)	54.54 (7.50)	- 11.16	0.01	2.11
Anxiety	6.73 (3.91)	3.77 (3.01)	5.83	0.01	0.81
Depression	6.05 (4.24)	2.26 (2.24)	8.32	0.01	1.00
Sexual functioning					
Infrequency	6.25 (2.33)	5.84 (1.88)	1.31	0.23	0.19
Non-communication	4.94 (1.89)	5.05 (1.59)	0.39	0.69	0.06
Dissatisfaction	7.95 (3.50)	7.64 (3.19)	0.44	0.66	0.09
Avoidance	7.28 (3.62)	5.78 (2.28)	2.86	0.01	0.46
Nonsensuality	6.88 (3.29)	5.83 (2.23)	2.31	0.02	0.35
Vaginismus	7.21 (3.55)	5.44 (2.54)	4.27	0.01	0.54
Anorgasmia	9.80 (4.17)	8.93 (2.97)	1.68	0.10	0.23
Sexual dissatisfaction	60.51 (19.10)	53.38 (12.98)	2.66	0.01	0.41

.2 < *d* <.5 = small; .5 < *d* < .8 = medium and *d* >.8 = large effect size [Cohen 1988]

Univariate predictors of sexual functioning

In the combined group of women with CPP and control women (N=212), the association between GRISS scores for sexual functioning (sexual avoidance, nonsensuality, vaginismus and sexual dissatisfaction) with the putative moderators (demographic and group characteristics) was assessed with point-biserial or Pearson correlation coefficients if appropriate. Of the biographic variables (i.e., age, living with a partner, parity, level of education, employment status and abuse) a history of sexual abuse was significantly correlated with the four GRISS-scales scores for sexual functioning, with women with a history of sexual abuse reporting more sexual problems. Furthermore the subscale for vaginistic complaints was significantly related with age and having children, indicating that nulliparous women and those who were younger in age reported more vaginistic complaints.
Of the putative mediating variables, pain severity, anxiety and depression were significantly and positively correlated with all the four GRISS scales for sexual functioning. Women with higher levels of pain, depression and anxiety reported more sexual problems. Furthermore, physical impairment was significantly and negatively correlated with vaginistic complaints indicating that more physically impaired women reported more vaginistic complaints (Table 3).

Table 3 *Correlation of sexual functioning with putative moderators and mediators in the total group of 212 women*

	GRISS Vaginismus	GRISS Avoidance	GRISS Nonsensuality	GRISS- total score Sexual dissatisfaction
Possible Moderators				
Age	-.16*	.02	.08	.07
Living with partner	.07	.09	.07	.03
Children	-.17*	.04	.07	.00
Level of education	.10	.02	.01	.01
Paid employment	.04	.07	.08	.01
Disability insurance benefit	.09	.03	.07	.08
Sexual abuse history	.22**	.22**	.24**	.22**
Physical abuse history	.02	.00	.02	.04
Possible Mediators: CPP characteristics				
Pain severity	.20**	.18*	.17*	.18*
Physical impairment	.18**	.10	.11	.13
Anxiety	.34**	.42**	.42**	.48**
Depression	.32**	.43**	.42**	.46**
CPP characteristics for the CPP group only (N=154)				
Duration of the complaint	.15	.05	.01	.08
Diagnosis	.02	.12	.02	.03
Operations for the CPP	.02	.10	.02	.07

*p <.05 and **p = <.01 GRISS=Golombok Rust Inventory of Sexual Satisfaction; CPP=Chronic Pelvic Pain.

Multivariate predictors of sexual functioning

On the basis of the results of these univariate analyses, those variables which were significantly correlated with sexual functioning were entered stepwise in separate hierarchical multiple linear regression models. The putative moderators/non-specific predictor (i.e., age and sexual abuse) were entered into the equation in the first step, and the putative mediators (i.e., pain, anxiety and depression) in the second step (p-value in = .05/p-value out = .1). The GRISS subscales for vaginismus, sexual avoidance and sexual nonsensuality and the GRISS total score for sexual dissatisfaction were used as dependent variables (Table 4). Because, it could be possible that the association between the dependent variables (sexual functioning) and putative mediators differs between women with CPP and controls, variables representing the interaction of CPP with the putative mediators were entered in the third step if appropriate (p-value in = .05).

For the dependent variable vaginismus, besides age and sexual abuse, anxiety and pain were entered in the equation, and explained an additional proportion of 12.0% of the variance in vaginistic complaints. Because of the high association of anxiety with depression ($r = .72$, $p < .01$), depression did not make an additional and independent contribution in vaginismus over and above anxiety. Together, age, sexual abuse, anxiety and pain did explain 17.5 % of the variance in vaginismus. None of the interaction terms were entered in the analysis (Table 4).

For the dependent variable sexual dissatisfaction (GRISS total score), besides sexual abuse, both anxiety and depression were entered in the equation, explaining an additional proportion of 21.5 % of the variance in sexual dissatisfaction. Together sexual abuse, anxiety and depression explained 26.3% of the variance in sexual dissatisfaction. Pain and none of the interaction terms were entered in the analysis (p-value in > .05). As can be seen in table 4, the multiple regression analyses with the GRISS subscales for sexual avoidance or nonsensuality as dependent measures showed a very comparable pattern as the total GRISS score. As none of the interaction terms between CPP X putative mediators were entered in one of the regression analyses, we can conclude that the relationship between the putative mediators and sexual functioning in women with CPP and controls does follow a comparable pattern.

Mediators of the association of CPP with sexual functioning

In order to test whether anxiety mediates the association of CPP with vaginismus, vaginismus was regressed upon anxiety and CPP (as pain was one of the main characteristics that was used in this study to differentiate between women with CPP and healthy controls, it was decided not to include pain severity as a putative mediator in the mediation analysis for vaginismus). In the mediation analysis age and a history of sexual abuse were entered as control variables. With these four variables (age, abuse, anxiety, and CPP) being included together in the regression equation, the relationship between vaginismus and CPP decreased in strength, from $\beta = .25$, $t = 3.87$, $p < .001$, to $\beta = .18$, $t = 2.60$, $p = .01$. Bootstrapping the indirect effects of anxiety on vaginismus using 5.000 bootstrap samples, anxiety proved to be a significant mediator of CPP in vaginismus, while controlling for age and sexual abuse.

In order to formally test whether anxiety and depression mediated the association of CPP with sexual dissatisfaction, sexual dissatisfaction was regressed on CPP and the two putative mediators, while controlling for sexual abuse in all equations. In the first step, sexual dissatisfaction was regressed upon presence of CPP, and showed that CPP significantly predicted sexual dissatisfaction, $\beta = .16$, $t = 2.39$, $p = .018$. In the second step, sexual dissatisfaction was regressed on CPP together with both putative mediators. With these four variables (abuse, CPP, anxiety and depression) being included together in the regression equation, the relationship between CPP and sexual dissatisfaction decreased in strength and was no longer significant, $\beta = .03$, $t = 0.48$, $p = .631$. Bootstrapping the indirect combined effect of anxiety and depression on the association of CPP with sexual dissatisfaction, both depression and anxiety proved to be significant and independent mediators of the relationship between CPP and sexual dissatisfaction, while controlling for sexual abuse. Similar results were found regarding sexual avoidance and nonsensuality as de-

Table 4 *Regression analyses predicting Vaginismus, Sexual Avoidance, Nonsensuality and Sexual dissatisfaction (N=212)*

Predictor	β	***t*-value**	***p* -value**
		Vaginismus	
(Constant)		9.45	0.01
Age	.14	2.04	0.04
Sexual Abuse	.13	1.90	0.06
Anxiety	.25	3.54	0.01
Pain	.17	2.43	0.02
		Sexual avoidance	
(Constant)		35.49	0.01
Sexual Abuse	.16	2.51	0.01
Anxiety	.25	2.67	0.01
Depression	.20	2.18	0.03
		Nonsensuality	
(Constant)		49.70	0.01
Sexual Abuse	.18	2.74	0.01
Anxiety	.25	2.70	0.01
Depression	.19	2.06	0.04
		Sexual Dissatisfaction (GRISS total score)	
(Constant)		114.35	0.01
Sexual Abuse	.16	2.58	0.01
Anxiety	.31	3.47	0.01
Depression	.20	2.19	0.03

Total model (Vaginismus) $R^2 = .175$, (F (4,182) = 9.66, $p < .01$); Total model (Sexual avoidance) $R^2 = .223$, (F (3,192) = 18.41, $p < .01$); Total model (Nonsensuality) $R^2 = .224$, (F (3,192) = 18.45, $p < .01$); Total model (Sexual Dissatisfaction) $R^2 = .263$ (F (3,201) = 29.96, $p < .01$).
GRISS = Golombok Rust Inventory of Sexual Satisfaction.

pendent variables. Both the CPP-sexual avoidance and CPP-nonsensuality relationships were totally mediated by anxiety and depression, while controlling for sexual abuse.These results suggest that the differences in sexual dissatisfaction, sexual avoidance and sexual nonsensuality between women with CPP and healthy controls were totally mediated by anxiety and depression. In addition, the difference found in vaginistic complaints between women with CPP and healthy controls was partly mediated by anxiety.

Moderators of the association of CPP with sexual functioning

Sexual abuse was the only patient characteristic that predicted sexual functioning, even after controlling for depression and anxiety (see Table 4). To assess whether sexual abuse was a moderator or a non-specific predictor of the association of sexual functioning with CPP, an interaction variable of sexual abuse X CPP was computed. In the first step of the multiple regression analyses CPP and abuse were entered. In the second step the interaction term of sexual abuse X CPP was entered if appropriate ($p < .05$). The four GRISS (sub)scales were used as dependent variables. The interaction between sexual abuse X CPP term did not account for a significant proportion in sexual functioning above the main effects of sexual abuse and CPP for each of the dependent variables for sexual functioning. These results indicate that the relationship between sexual abuse and sexual functioning in women with CPP and controls does follow a comparable pattern and that abuse is a non-specific predictor of sexual functioning in women.

Discussion

The study reported here examined (a) differences in sexual functioning between women with CPP and healthy controls and (b) moderators and mediators of sexual functioning in a clinical sample of women with CPP. As expected, women with CPP reported significantly more vaginistic complaints, sexual avoidance, nonsensuality and sexual dissatisfaction than age-matched controls. Moreover women with CPP reported significantly more pain, depression and anxiety and were physically more impaired than women in the control group. There were no group differences in reported history of sexual abuse. Finally the mediation analyses indicated that anxiety and depression were associated with sexual problems in all women but, given the fact that women with CPP have higher levels of anxiety and depression than controls, they also reported more sexual problems. Furthermore, sexual abuse was found to be a non-specific predictor of sexual functioning in all women.

In line with other studies we found that women with CPP reported more sexual complaints, such as vaginismus and dyspareunia [Collett 1998; Zondervan 2001; Grace 2004; Verit 2006; Florido 2008; Pitts 2008], but no differences were reported for orgasm problems or frequency of sexual contact [Grace 2004; Randolph 2006; Florido 2008; Pitts 2008]. Contrary to our hypothesis, we observed a striking resemblance in women with CPP and without CPP regarding the percentage of women that reported a history of sexu-

al abuse (35% in both samples). This percentage found in the current study is comparable with the percentages of 28% - 34% found in other samples of women with and without somatic or psychological complaints, using the same self-report measure [Kooiman 2002; Van Lankveld 2006; Weijenborg 2008; Brauer 2009]. These percentages are also comparable with the percentage of sexual abuse of 34% found in a large population study in the Netherlands, using a structured interview [Draijer 1990].

Of the putative mediating variables (i.e., pain, physical impairment, anxiety, and depression), pain, anxiety and depression were significantly and positively correlated with sexual functioning, with women with higher levels of pain, depression and anxiety reporting more sexual problems. In men with prostatitis/ CPP [Smith 2007; Aubin 2008] or other chronic non-cancer pain samples [Kraaimaat 1996; Tan 1998; Monga 1998; Kwan 2005], it is also found that sexual problems are associated with psychological factors as depression. After controlling for psychological variables (depression and anxiety), the direct association between pain and sexual functioning was no longer significant. These results indicate that the level of pain has an indirect effect on sexual functioning. Some studies [Kraaimaat 1996; Skevington 2001; Kwan 2005; Verit 2006] found a significant effect of pain intensity on sexual functioning while others did not observe such a relationship [Monga 1998; Randolph 2006]. Furthermore, in the group of women with CPP alone no association was found of duration of the pain problem, the amount of operations and specific somatic diagnosis with sexual complaints. So we can conclude that sexual functioning in women with CPP is more strongly associated with psychological pain characteristics (depression and anxiety) and to a lesser degree with somatic pain characteristics such as pain severity and physical impairment.

Our mediation analyses suggest that anxiety and depression are associated with sexual problems in all women but given that women with CPP have more anxiety and depression than do controls then this poses an extra burden on their sexual function. These results are comparable with the findings of Randolph and Reddy [Randolph 2006], who found in a non-clinical sample of women with CPP that depression mediated the effect of relationship factors on sexual behaviour and sexual relationship satisfaction. Furthermore, we found that in women with CPP as well as controls, sexual abuse was associated with worse sexual functioning, independent of somatic and psychological factors. So sexual abuse can be considered as a non-specific predictor for sexual functioning in women in general and not a specific predictor for women with CPP [Leonard 2002].

The findings of our study, however, have to be interpreted with caution, because the correlational nature of the findings regarding CPP, sexual functioning and anxiety/ depression precludes conclusions concerning the causality of relationships between these variables. Controlled (experimental or intervention) studies are required to elucidate the mediating role of anxiety and depression in the relationship of CPP with sexual functioning.

Some limitations of this study deserve mentioning. First, by using the GRISS to assess sexual problems, we can have underestimated the report of sexual problems. Although it is a well known and validated measure, it does not have specific questions regarding deep or superficial dyspareunia which is probably the most important complaint during sexual contact for women with CPP. The Vaginismus subscale does have items regarding discomfort with penetration, including pain, but does not differentiate between discomfort, pain and the location of the pain. Second, because the control group consisted of women who responded to an advertisement in a local newspaper we are not sure if this control group is a representative group of women of the Dutch population without pelvic pain. However, their response on the questionnaires for physical impairment, anxiety and depression were comparable with the norms of the control groups for the specific measures we used. Furthermore, it is not clear if the study findings can be generalized to other chronic pain problems in women, such as vulvodynia or to bladder pain syndrome/interstitial cystitis. Further studies are requested on women with other chronic pain problems.

The results of this study show that sexual abuse, anxiety and depression are associated with sexual problems in all women but given that women with CPP have more anxiety and depression than controls, this poses an extra burden on their sexual function which should be carefully assessed and treated.