Psychosocial variables affect the quality of life of men diagnosed with chronic prostatitis/chronic pelvic pain syndrome

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OBJECTIVE

To examine interactions between demographic, pain, urinary, psychological and environmental predictors of quality of life (QOL) in men with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS).

PATIENTS AND METHODS

In all, 253 men previously enrolled in the National Institutes of Health Chronic Prostatitis Cohort study in North American tertiary-care clinical centres (six in the USA and one in Canada) self-reported with validated instruments, including the QOL subscales of the Short Form-12 (physical, SF12-PCS; and mental, SF12-MCS), demographics, urinary symptoms, depression, current pain, pain coping, 'catastrophising' (catastrophic thinking about pain), pain control, social support and solicitous responses from a partner. Data were collected through a one-time survey. Covariates determined to be significant were entered into a multivariable regression model predicting SF12-PCS and SF12-MCS.

RESULTS

Adjusting for covariates, regression models showed that poorer SF12-PCS scores were predicted by worse urinary function ($P < 0.001$) and increased use of pain-contingent resting as a coping strategy ($P = 0.026$). Further, poorer SF12-MCS scores were predicted by greater pain catastrophizing ($P = 0.002$) and lower perceptions of social support ($P < 0.001$). In separate follow-up analyses, helplessness was the significant catastrophizing subscale ($P < 0.001$), while support from family and friends were the significant social support subscales ($P = 0.002$ and <0.001).

CONCLUSIONS

These data suggest that specific coping and environmental factors (i.e. catastrophizing, pain-contingent resting, social support) are significant in understanding how patients with CP/CPPS adjust. These data can be used to develop specific cognitive-behavioural programmes for men with CP/CPPS who are refractory to standard medical therapy.

KEYWORDS

chronic prostatitis, chronic pelvic pain syndrome, quality of life, psychosocial

INTRODUCTION

Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) is a clinical syndrome characterized by pain in the perineum, pelvis, suprapubic area or the external genitalia, with variable degrees of voiding or ejaculatory disturbances. It is well recognized that CP/CPPS is a major healthcare burden, in terms of symptom and diagnostic prevalence (2–9% and up to 16%, respectively) as well as significant socio-economic costs. Traditional medical treatment is not effective for many patients with CP/CPPS [1].

Quality of life (QOL) describes how well people function in life, as well as their discernment of well-being. Most men with CP/CPPS report significant impairment in QOL [2–4]. Increased pain, the primary symptom in CP/CPPS, is associated with worse QOL (both mental and physical) and greater overall symptom

presentation [5,6]. Tripp *et al.* [7] recently showed that specific cognitive variables (i.e. catastrophic thinking about pain or 'catastrophizing') and behavioural pain-coping strategies (e.g. resting) show strong predictive relations with CP/CPPS physical symptoms like pain or perceived disability. Outcome variables, other than pain, must be evaluated and followed during the initial assessment and subsequent treatment. Understanding the psychosocial variables that effect QOL in CP/CPPS might be a key step in ameliorating symptoms in patients who are not 'cured' with a traditional biomedical strategy. Before any outcome can be used in a clinical treatment programme the evidence required to develop such a strategy must be provided. Using a bio-psychosocial framework in a one-time patient survey in a large group with CP/CPPS, we examined the predictive associations of cognitive factors (i.e. catastrophizing, control over pain, behavioural pain-coping strategies, e.g. using rest for pain coping), environmental factors (i.e. social support, solicitous responses from significant others), pain, depression and urinary symptoms with CP/CPPS QOL.

PATIENTS AND METHODS

Men diagnosed with CP/CPPS were recruited from an existing database of 488 men previously enrolled in the National Institutes of Health (NIH) Chronic Prostatitis Cohort (CPC) Study. A complete description of the cohort (488 men) was previously published [8] and the current sample was previously examined for CP/CPPS pain experience [7], but not QOL.

A one-time battery of questionnaires was administered to assess the following constructs: QOL, urinary symptoms, depressive symptoms, pain severity, catastrophic thinking about pain, perceived control over pain, pain-contingent resting as a pain coping measure, perceived level of social support, and solicitous responses to pain from a significant other.

Health-related QOL was assessed using the Medical Outcomes Study Short Form 12 (SF12) (copyright Medical Outcomes Trust and John E. Ware, Jr.). Using 12 items, two SF12 subscales can be computed; the physical component summary (SF12-PCS) and the mental component summary (SF12-MCS). The mean is set at 50 (range 0–100; higher scores indicating better QOL) for both the SF12-MCS and SF12-PCS scores in the general population. Pain severity was assessed using the Short-Form McGill Pain Questionnaire (SF-MPQ) [9]. The SF-MPQ assesses both sensory and affective qualities of pain, and an overall pain intensity value. Urinary symptoms were assessed using the urinary subscale of the NIH Chronic Prostatitis Symptom Index (CPSI) [10]. Depressive symptoms were assessed using the Center for Epidemiological Studies Depression Scale (CES-D) [11], which measures 20 depressive symptoms within the last week, with an emphasis on mood and with scores of 0–48. Catastrophic thinking about pain was assessed using the Pain Catastrophizing Scale [12], a 13-item instrument that assesses three components of catastrophizing: rumination, magnification and helplessness. Perceived control over pain was assessed by using the 10-item control scale of the Survey of Pain Attitudes (SOPA-C) [13]. Pain-contingent resting as a pain coping measure was assessed using the seven-item resting subscale of the Chronic Pain Coping Inventory (CPCI-R) [14]. This subscale scale assesses the extent to which patients use rest as a means of coping with pain. Perceived social support was assessed by using the 12-item Multidimensional Scale of Perceived Social Support (MSPPS) [15]. This measure is assessed in three subscales that examine perceived support from family, friends and a significant other, as well as an overall rating of perceived support.

This study was approved by the institutional review board of each collaborating clinical centre. Of the 488 previously diagnosed research participants contacted, 253 provided consent to be contacted for this study. Study materials were forwarded, including a consent form, demographic information sheet, and assessment measures. The package took ≈35 min to complete and was returned in a postage-paid envelope to the appropriate research centres.

Several statistical tests were used to examine potential bias and to account for missing data, as outlined in detail in Appendix 2 [16,17]. Multivariable regression modelling of QOL subscales was used to examine the strength of associations with the independent variables, with parameter estimates for the simultaneous effects (in 253 men). Recognizing that a multiplicity of statistical tests, when considered within a formal hypothesis-testing framework, can lead to inflated overall error rates, a more conservative critical value of $P < 0.01$ was used to indicate significance.

TABLE 1 The mean (SD) values for the various instruments (253 men)

Measure	Mean (SD)
SF12-PCS	47.43 (10.02)
SF12-MCS	45.70 (11.38)
SF-MPQ	7.96 (7.83)
Urinary	3.74 (2.60)
CES-D	13.92 (9.94)
SOPA-C	18.03 (8.24)
CPCI-R	1.80 (1.72)
MSPSS	58.82 (18.69)
CAT	16.52 (10.51)

RESULTS

The sample of 253 men reported a mean (SD) age of 45 (11.3) years; over half the men reported an education level of high school equivalent, 36% reported some college/university, and 10% reported less than high school. Most men (81%) were employed and were living with a partner (70%). The ethnicity of the sample was primarily white (88%) with 5% African-Americans, 3% Hispanic/Latino, 2% Asian and 1% American Indian. The annual income for this sample was reported as >US$ 50 000 for 62% of the men.

The mean (SD) for all measures are summarized in Table 1, and Table 2 shows correlations between study variables. Poorer physical functioning was associated with elevated urinary status, pain, depression, catastrophizing, and pain-contingent resting behaviours. Higher SF12-PCS scores, or better physical functioning, were associated with greater perceived control over pain. Poorer mental functioning QOL was associated with greater pain, depression, catastrophizing and pain-contingent resting. Higher SF12-MCS, or better mental functioning, was associated with greater perceived social support. Other correlations for urinary status, pain, depression, catastrophizing, social support and solicitous responses from a significant other are presented in Table 2.

Regression models examining for physical and mental QOL functioning are shown in Table 3.

TABLE 2 Correlations of dependent and independent variables in CP/CPPS

	Urinary	SF-MPQ	CES-D	CAT	MSPSS	SOPA-C	CPCI-R
SF12-PCS	−0.38†	−0.38†	−0.34†	−0.28†	0.11	0.19†	−0.53†
SF12-MCS	−0.07	−0.35†	−0.81†	−0.46†	0.52†	0.11	−0.32†
Urinary scale		0.31†	0.11	0.14*	0.06	−0.18*	0.22†
SF-MPQ			0.47†	0.50†	−0.24†	−0.18*	0.42†
CES-D				0.52†	−0.49†	−0.17†	0.38†
CAT					−0.32†	−0.28†	0.39†
MSPSS						0.09	−0.12*
SOPA-C							−0.01

*P < 0.05; †P < 0.01.

TABLE 3 Predictive models in CP/CPPS for QOL (SF12-PCS and SF12-MCS)

Regression model	Estimate (SEM)	t	P
SF12-PCS			
Intercept	52.61		
SF-MPQ	−0.20 (0.09)	−2.29	0.023
Urinary	−0.83 (0.22)	−3.81	<0.001
CES-D	−0.09 (0.07)	−1.23	0.222
MSPSS	0.01 (0.03)	0.32	0.750
CAT	0.09 (0.06)	1.38	0.170
CPCI-R	−2.39 (0.37)	−6.52	<0.001
SOPA-C	0.16 (0.07)	2.25	0.026
SF12-MCS			
Intercept	38.09		
SF-MPQ	−0.20 (0.10)	−2.08	0.039
Urinary	0.04 (0.25)	0.17	0.866
SOPA-C	−0.01 (0.08)	−0.11	0.909
CPCI-R	−0.75 (0.41)	−1.81	0.072
MSPSS	0.24 (0.03)	7.08	<0.001
CAT	−0.22 (0.07)	−3.12	0.002
Social support			
Intercept	27.73		
MSPSS-SO	0.17 (0.11)	1.61	0.109
MSPSS-FA	0.37 (0.12)	3.22	0.002
MSPSS-FR	0.40 (0.11)	3.77	<0.001
Catastrophizing			
Intercept	52.82		
CAT-R	−0.31 (0.28)	−1.10	0.274
CAT-M	−0.03 (0.36)	−0.07	0.942
CAT-H	−0.80 (0.23)	−3.57	<0.001

Respectively, age and education were not correlated with SF12-MCS ($r = 0.04$ and 0.10) but were with the SF12-PCS ($r = -0.14$ and 0.17). Urinary status and depressive symptoms both correlated with SF12-PCS ($r = -0.38$ and −0.34) and were thus included in the SF12-PCS regression model. However, urinary status was not correlated with SF12-MCS scores ($r = -0.07$) and was thus omitted from the analysis. Also, depressive symptoms were so highly correlated with SF12-MCS ($r = -0.81$) that they were considered a redundant measure and excluded from that regression. In both QOL regression models, pain was a covariate, to hold constant the possible inflation of QOL scores.

For predicting QOL physical functioning, results show that greater pain and more severe urinary status were significant predictors of poorer QOL. Further, decreased perceptions of pain control and increased pain-contingent resting were significant predictors of poorer QOL physical functioning. Of these variables, pain-contingent resting was the most robust predictor of poorer functioning. Importantly, all regression models in this study simultaneously examined predictive influences of all variables entered, so that a variable showing the most robust association can be considered to have the strongest prediction effect even when the effect of the other variables is statistically controlled. As detailed in Table 3, for every 1-point increase in pain-contingent resting, there was a corresponding model-adjusted decrease in QOL physical functioning score (SF12-PCS) of 2.39 points ($P < 0.001$).

For QOL mental functioning, pain, social support and catastrophizing were the only three predictors of the independent variables. Social support was identified as the most robust predictor of poorer QOL mental functioning. In this regression model, every 1-point increase in perceived social support is associated with a model-adjusted increase in QOL mental functioning score (SF12-MCS) of 0.24 points ($P < 0.001$). Every 1-point decrease in catastrophizing was associated with a model-adjusted increase of 0.22 points ($P = 0.002$).

Follow-up regression analyses examined the unique contributions of social support and catastrophizing subscales to predicting QOL mental functioning. The family and friends social-support subscales were predictors of QOL mental functioning ($P = 0.002$ and <0.001). For catastrophizing, the 'helplessness' subscale was the only predictor ($P < 0.001$).

DISCUSSION

These analyses highlight several novel predictors of QOL in patients with CP/CPPS. Although previous data showed urinary scores and pain to be associated with poorer QOL in patients with CP/CPPS in primary-care and urology clinics [4,6], the present results are the first to examine other cognitive and environmental factors that might influence QOL in men with CP/CPPS.

The endorsement of rest as a pain-coping strategy that is robustly associated with poorer physical functioning is of particular interest. Few men with CP/CPPS (9%) reported using rest as a helpful coping strategy in a previous study [18], with a clear majority (42%) reporting their symptoms worsening

when sitting or in other sedentary behaviour. The association between pain-contingent resting (referring to the extent to which patients use rest as a means of coping with pain) and poorer QOL physical function in the present study corroborates these findings. Reports on pain and disability suggest that using rest to attempt to ameliorate pain can lead to physical de-conditioning, which might translate into decreased mobility and greater pain [18].

For QOL mental functioning, although pain has been shown to predict worse QOL [4,6] in the present study both social support and catastrophizing had stronger associations. Social support includes perceived support from family, friends and a significant other, or an overall rating of perceived support, while catastrophizing consists of rumination ('I can't stop thinking about how much it hurts'), magnification ('I worry that something serious may happen'), and helplessness ('There is nothing I can do to reduce the intensity of the pain'). The family and friends social support and catastrophizing helplessness subscales were the most important predictors of mental QOL.

The strengths of this study include its use of many men representative of patients with clinical CP/CPPS nationwide, but all such surveys have several limitations. We might not have addressed important psychosocial factors or variables, the patients were enrolled from tertiary academic prostatitis centres and might not reflect the 'average' patient with CP/CPPS, and the use of a correlational cross-sectional design is limited in determining any conclusions of causality. A reasonable percentage of patients with CP/CPPS (52%) responded to the survey, but there is a potential bias, as those who responded were slightly different in several aspects from those who did not. They were slightly more symptomatic, reported a mildly better QOL, a longer delay from diagnosis, were older and had other small differences, as outlined in Appendix 2. The strength of the study analyses was that we carefully examined and acknowledged this potential bias, and further determined the influence of missing data (as in all surveys, not all patients completed every question; details outlined in Appendix 2).

CP/CPPS is regarded as a clinical chronic pain condition and pain is not only thought to be the primary symptom, but also a central feature in QOL [6]. Our clinical therapeutic focus has been to ameliorate pain, a goal eluding us in many cases. The current results suggest that pain is not the best predictor of QOL, and that pain coping, catastrophizing and social support might be appropriate targets of intervention. Cognitive-behavioural self-management interventions designed to educate the patient about coping with distress, understanding the thinking associated with greater pain, and practising new methods of coping (i.e. both emotionally and behaviourally), are effective for various other chronic health conditions [19,20]. CP/CPPS does not mimic the psychosocial and interpersonal concerns often found in chronic low back pain or general nonmalignant pain conditions, and therefore it cannot be assumed that a programme developed for the latter pain would be successful in patients with CP/CPPS. Only by examining the specific variables associated with QOL in CP/CPPS will it be possible to develop a specific, empirically guided, but evidence-based, pain management intervention for these men.

In conclusion, the present study suggests that specific coping and environmental factors (i.e. catastrophizing, pain-contingent resting, social support) are significant in understanding how patients with CP/CPPS adjust, and their QOL. These results could be used to develop specific cognitive-behavioural programmes for men with CP/CPPS who are refractory to standard medical therapy.

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CONFLICT OF INTEREST

None declared.

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Abbreviations: **CP/CPPS**, chronic prostatitis/chronic pelvic pain syndrome; **QOL**, quality of life; **NIH**, National Institutes of Health; **CPC**, Chronic Prostatitis Cohort; **CPSI**, Chronic Prostatitis Symptom Index; **SF12(-PCS)(-MCS)**, Medical Outcomes Study Short Form 12 (physical component summary) (mental component summary); **SF-MPQ**, McGill Pain Questionnaire short-form; **CES-D**, Center for Epidemiological Studies-Depression scale; **CAT(-R)(-M)(-H)**, Pain Catastrophizing Scale (rumination) (magnification) (helplessness); **SOPA-C**, Survey of Pain Attitudes Control subscale; **CPCI-R**, Chronic Pain Coping Inventory Resting scale; **MSPPS (-SO) (-FA) (-FR)**, Multidimensional Scale of Perceived Social Support (significant other) (family) (friends); **MPI-SR**, Multidimensional Pain Inventory's Solicitous Responses subscale.

APPENDIX 1

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APPENDIX 2

DETAILS OF STATISTICAL TESTS TO EVALUATE BIAS AND MISSING DATA

To evaluate the potential selection bias in this sample, the 253 survey responders were compared with 235 nonresponders for CP/CPPS symptoms, QOL and demographic characteristics. On average, the responders tended to score 1.6 points lower on the NIH-CPSI total score and 0.6 points lower on SF12-PCS, indicating less severe CP/CPPS symptoms ($P = 0.022$ and 0.026, respectively), better SF12-MCS ($P = 0.009$) and 1.6 years longer from diagnosis ($P = 0.045$). Also the responders were 4 years older ($P < 0.001$), more were whites ($P = 0.048$), more educated ($P = 0.023$), higher income ($P < 0.001$) and more were living with spouse/partner ($P = 0.047$) than nonresponders.

About a third (85) of the original replies were screened as not completed amongst the 253, due to some missing scale items (required for totalling subscale values). To evaluate the randomness of missing items, the demographics, including age, race, ethnicity, education, living status, smoking and drinking status and employment, were compared between those providing completed scale items for all data (168) and those who had provided data with missing values (85). Standard *t*-tests were used to evaluate differences for all continuous variables and chi-squared tests were used for the categorical variables. There was no statistically significant difference between the groups in age, race, ethnicity, education, smoking and drinking status and employment. However, those completing the surveys were more likely to be living with spouse or partner ($P < 0.001$).

Ordinary least squares regressions was used to analyse patients with complete data. For sensitivity analysis purposes, missing values for all variables in the regression models were then imputed to examine the total sample of 253. Because of the arbitrary missing pattern within the total sample, multiple imputations (MI) were applied using the Markov Chain Monte Carlo algorithm, assuming missing at random and multivariate normality of the data [16]. To increase the accuracy of the imputed values on the variables of interest, the factors associated with those variables or with the probability of being missing were also adjusted in the imputation model as predictors [17]. The initial values of the imputation were obtained with the expectation-maximization algorithm. Any imputed value was within the potential range of the corresponding scale. In all, 10 replicate data sets were generated and analysed; the 10 sets of results were then combined for the inference. The MI was implemented using the MI procedure and the MIANALYSE procedure in SAS 9.1 (SAS, 2003).

Multivariable regression models were fitted for the SF12-PCS and SF12-MCS, both for the

limited sample of 168 patients with complete data and the entire data set with imputed data (MI). The MI models were compared and provided replication of output using the list-wise data procedure. The regression MI models (253 men) provided a set of analyses similar to those for the list-wise reduced sample of 168. It was decided on the basis of these analyses that comparisons would proceed with the MI sample of 253 respondents for a better representation of the men with CP/CPPS surveyed.