



Psychological factors and pain catastrophizing in men with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS): a meta-analysis

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Background: Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) is a chronic disease with a variety of psychosocial and somatic symptoms. CP/CPPS has substantial health care costs with unclear etiology, which may be caused by psychosocial factors. Moreover, previous studies suggested that cognitive processes played a crucial role in the perception of somatic pain. Therefore, the aim of this meta-analysis was to analyze the psychosocial characteristics in men with CP/CPPS, especially the symptom of pain catastrophizing.

Methods: Relevant publications were searched in different databases including PubMed, MEDLINE, EMBASE, Google Scholar and the Cochran Library using the search terms of “Chronic prostatitis”, “Chronic pelvic pain syndrome”, “Psychosocial” and “Catastrophizing”. The prevalence of psychological factors and pain catastrophizing in men with CP/CPPS were extracted and calculated.

Results: Ten studies inclusive of 1,308 patients were included. Analysis of NIH-CPSI scores showed that the severity of CP/CPPS was 23.20 (95% CI: 21.13–25.28). The severity of pain catastrophizing was 13.81 (95% CI: 9.83–17.79) estimated by coping strategies questionnaire (CSQ), while the severity of pain catastrophizing was 24.83 (95% CI: 9.19–40.47) estimated by pain catastrophizing scale (PCS). The prevalence of psychosocial symptom was 0.43 (95% CI: 0.32–0.55), while the prevalence of pain catastrophizing was 0.26 (95% CI: 0.21–0.31).

Conclusions: The psychological factors and pain catastrophizing in men with CP/CPPS was serious. Furthermore, the prevalence of psychosocial symptom and pain catastrophizing was high. There might be a link between pain catastrophizing and somatic symptoms in CPPS. Thus, further prospective studies are needed to evaluate the importance of psychosocial factors in symptom severity of CP/CPPS.

Keywords: Chronic prostatitis (CP); chronic pelvic pain syndrome (CPPS); psychosocial; catastrophizing; meta-analysis

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Introduction

Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) is a chronic disease characterized by a number of symptoms (1). The most common symptom of CP/CPPS is pain, which may be persistent or occur in numerous locations (2). Moreover, psychosocial factors or psychiatric comorbidities are frequent among patients with CP/CPPS, which has severe impact on the quality of life (QoL) for male patients (3). Due to the heterogeneity and multifactorial etiology of CP/CPPS, single treatment was less effective than multimodal therapy approaches, especially for male patients with numerous psychosocial variables (4). Psychosocial factors, such as pain catastrophizing, were associated with the difficulty in the management of CP/CPPS symptoms and the poorer QoL (5).

The symptoms of CP/CPPS are mostly evaluated by the method of the National Institutes of Health-Chronic Prostatitis Symptom Index (NIH-CPSI) with limitation of not assessing psychological factors, which are very common in CP/CPPS patients (6). UPOINT was developed by Shoskes *et al.*, which contained the clinical domain of psychosocial dysfunction (7). Previous study showed that men with CP/CPPS suffered from a high burden of psychosocial symptoms, had poor adjustment, which led to greater pain, more disability and diminished mental QoL (8). In addition, greater pain catastrophizing was correlated with higher UPOINT scores, higher pain scores, worse urinary function and worse QoL in CP/CPPS patients (9). Pain catastrophizing (ruminative, magnifying, helpless about pain) was considered to play a crucial role in chronic pain and might be associated with the chronic pelvic pain of CP/CPPS patients (10).

The severity of psychological factors has been reported to be associated with individual stress perception or subjective stress interpretation of CP/CPPS patients (11). For CP/CPPS patients, individual coping strategies and cognitive assessment about the contents or frequency of the causative factors, played a vital role in the occurrence and progression of stress (12). Abnormal coping strategies and cognitive assessment might cause stress or psychological factors, even physical diseases of CP/CPPS patients (13). Moreover, psychotherapeutic management might be a useful tool for the clinical treatment of CP/CPPS patients who were refractory to drug therapy or physiotherapy (14).

Despite some studies of the relationships between psychological factors (such as depression and pain catastrophizing) and the development, prolongation of

the symptoms in CP/CPPS patients (3), there is lack of knowledge about the severity of psychological factors and the prevalence of pain catastrophizing in patients. And the deeper understanding of the association between the psychological mechanisms and the heterogeneity of symptoms, was crucial for the improved therapies for CP/CPPS patients.

This meta-analysis will summarize and synthesize the severity and the prevalence of psychological factors and pain catastrophizing in CP/CPPS patients, to further understand the role of psychosocial factors and pain catastrophizing in the development and maintenance of CP/CPPS. Moreover, all these results will contribute to the development of the effective approaches to improve the pain symptom, urinary function, QoL, psychological factors and psychiatric comorbidities in CP/CPPS patients.

Methods

Prior to the literature search, participants, interventions, comparisons, outcomes, and study design (PICOS) items were defined: P: patients were diagnosed with CP/CPPS by the NIH classification or patients met the traditional definition of CP prostatodynia/nonbacterial prostatitis. I: not applicable. C: the psychological factors and pain catastrophizing of patients. O: the severity or the prevalence of psychological factors and pain catastrophizing of patients. S: cross-sectional studies.

The review was developed according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

Search strategy

We searched relevant publications that investigated the severity or prevalence of psychological factors and pain catastrophizing in CP/CPPS patients. Studies that investigated the severity or prevalence of psychological factors and pain catastrophizing in CP/CPPS patients were selected through a standard search in the PubMed, Medline, Google Scholar, the Cochrane library and Embase until October 2018. We performed the search by the following keywords or expressions: “Chronic prostatitis”, “Chronic pelvic pain syndrome”, “Psychosocial” and “Catastrophizing”. All possible combinations of keywords were used as search terms to identify all possible candidates. And the final searching strategies were as follow: (Chronic

prostatitis [MeSH] OR Chronic pelvic pain syndrome [MeSH]) AND (Psychosocial [MeSH] OR Catastrophizing [MeSH]). Article types were restricted to cross-sectional english studies.

The abstract of all potentially relevant studies was screened and then full articles were also reviewed if the abstract were indistinct. In addition, the reference lists of relevant articles were retrieved. ALL articles that investigated the severity or the prevalence of psychological factors and pain catastrophizing CP/CPPS patients were restricted in our meta-analysis.

Inclusion criteria

The included articles should meet the following inclusion criteria: (I) patients were diagnosed with CP/CPPS by the NIH classification or patients met the traditional definition of CP prostatodynia/nonbacterial prostatitis; (II) studies that investigated the severity or the prevalence of psychological factors and pain catastrophizing of patients; (III) sufficient data of the severity of psychological factors or the prevalence of pain catastrophizing could be extracted; (IV) the severity of disease and psychological factors were assessed by National Institutes of Health Chronic Prostatitis Symptom Index (NIH-CPSI), Coping Strategies Questionnaire (CSQ) or Pain Catastrophizing Scale (PCS).

Exclusion criteria

We excluded studies that (I) were case reports; (II) included patients with other prostatitis syndromes; (III) involved patients diagnosed with other disorders of the urogenital system; (IV) had insufficient data about the psychological factors.

Data extraction and quality assessment

The demographic of all included articles was extracted, including first author, year of publication, sample size, age of patients, evaluation tools and symptom duration. In addition, outcome data of psychological factors were also were extracted from the studies, including (I) the scores of NIH-CPSI (the severity of CP/CPPS), (II) CSP (the severity of pain catastrophizing), (III) the percentage of psychosocial factors, (IV) the percentage of pain catastrophizing.

The quality was assessed by two authors (Xinfei Huang and Jianhuai Chen) with the method of Agency for Health care Research and Quality (AHRQ). AHRQ recommends 11 items and the Crombie's items contains 7 items for assessing the quality of cross-sectional/ prevalence study. Differences in assessment were solved through a discussion with another author (Yun Chen).

Statistical analysis

The mean and standard deviation of the scores of NIH-CPSI, CSQ and PCS were derived, as well as the prevalence of psychosocial factors and pain catastrophizing. The results of meta-analysis, including the scores of NIH-CPSI, CSQ, PCS and the prevalence of psychosocial problem and pain catastrophizing, were presented with standardized mean differences (SMD), which were identified by 95% CI. Heterogeneity was assessed with χ^2 and I^2 statistic (15). The pooled effect was calculated by the random effect model if there was statistically significant heterogeneity (P was less than 0.1 or I^2 was greater than 50%); otherwise, the fixed-effect model was conducted. The probability of publication bias was assessed by Egger's (16) and Begg-Mazumdar (17) test. $P < 0.05$ was considered statistically significant.

Results

Literature search results

A total of 103 relevant articles were identified by literature search. Then 84 records were removed after screening the titles and abstract of each study. And 3 studies were removed as they did not provide the data of the severity or percentage of pain catastrophizing. Six articles were removed owing to the lack of information about the psychological factors. Finally, 10 articles satisfied the inclusion criteria were included in our meta-analysis. The flowchart of the selection process was presented in *Figure 1*.

Characteristics of included trials

We included 10 studies that explored the severity or prevalence of psychological factors or pain catastrophizing, which included male 1,308 patients with CP/CPPS. Three studies were included for reporting the prevalence of pain catastrophizing. Five studies evaluated the prevalence of psychological factors and 7 articles reported the severity

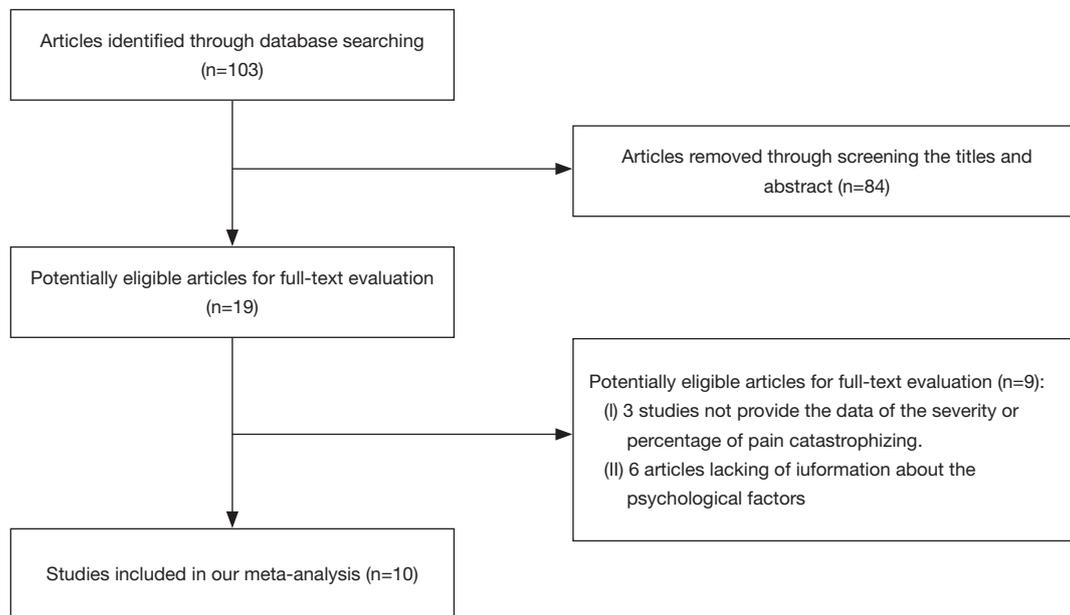


Figure 1 Flow diagram of selection of eligible studies.

of pain catastrophizing. Detailed characteristics of all the included studies were summarized in *Table 1*.

Meta-analysis

Severity of CP/CPPS

Nine studies reported the scores of NIH-CPSI of CP/CPPS patients. The pooled estimation for the severity of disease among men patients with CP/CPPS was 23.20 (95% CI: 21.13–25.28) by the random effect model (*Figure 2*). In addition, significant heterogeneity was observed ($I^2=96\%$; $P<0.01$). No significant was found about the publication bias assessed by Egger's ($P>0.05$) and Begg-Mazumdar test ($P>0.05$).

Severity of pain catastrophizing

Seven studies collected the scores of CSQ or PCS to assess the severity of pain catastrophizing. The results demonstrated that the pooled estimation was 13.81 (Random-effects model; 95% CI: 9.83–17.79; *Figure 3*) estimated by CSQ and 24.83 (Random-effects model; 95% CI: 9.19–40.47; *Figure 4*) estimated by PCS for the severity of pain catastrophizing in patients with CP/CPPS with significant heterogeneity ($I^2=91\%$, $P<0.01$; $I^2=100\%$, $P<0.01$). No evidences of publication bias were found by

Egger's ($P>0.05$) and Begg-Mazumdar test ($P>0.05$).

Prevalence of psychological factors

With the random effect model, the pooled SMD for the prevalence of psychological factors in 5 studies was 0.43 (95% CI: 0.32–0.55; *Figure 5*). There was significant heterogeneity among these studies ($I^2=88\%$; $P<0.01$). Egger's ($P>0.05$) and Begg-Mazumdar test ($P>0.05$) did not reveal evidences of publication bias.

Prevalence of pain catastrophizing

Three studies reported the data about the prevalence of pain catastrophizing. As shown in *Figure 6*, pooled estimation for the prevalence of pain catastrophizing in men patients with CP/CPPS was 0.26 (Fixed-effects model; 95% CI: 0.21–0.31) with significant heterogeneity ($I^2=0\%$; $P=0.74$). Evidences of publication bias were not observed Egger's ($P>0.05$) and Begg-Mazumdar test ($P>0.05$).

Discussion

This is the first meta-analysis that explored the psychosocial characteristics in men patients with CP/CPPS, including the severity and prevalence of psychological factors and pain catastrophizing. The results demonstrated that

Table 1 Characteristics of the included trials

Author	Year	Sample size	Age (years)	Evaluation tools	Symptom duration	NIH-CPSI	Catastrophizing scores	Percentage of psychosocial ^a	Percentage of catastrophizing (criterion)
Hedelin H (18)	2012	61	46±11	NIH-CPSI, CSQ, UPOINT	11±11 years	22.8±7.7	15.30±9.10 (CSQ)	NA	17 (28%) (CSQ ≥20)
Samplaski MK (19)	2012	220 ^b	44.6±13.4	NIH-CPSI, UPOINT	57.05±87.49 months	25.02±6.49	NA	83 (33.7%) ^c	25 (25%) ^d (NA)
Hedelin HH (20)	2009	50	46 [26–71]	NIH-CPSI, CSQ, UPOINT	7 years (6 months – 35 years) ^e	23±7	16.09±9.5 (CSQ)	18 (36%)	15 (30%) (CSQ ≥21)
Polackwich AS (21)	2015	82	41.6±13.2	NIH-CPSI, UPOINT	24 [3–240] months	26.8±6.3	NA	39 (47.60%)	NA
Shoskes DA (7)	2010	100	46 [18–71]	NIH-CPSI, UPOINT	24 [3–380] months	25.2±6.1	NA	37 (37%)	NA
Zhang YD (22)	2016	192	31.3 [18–57]	NIH-CPSI, PCS, UPOINT	20.5 [3–165] months	20.5±6.9	11.10±10.70 (PCS)	115 (59.90%)	NA
Davis SNP (23)	2013	171	44.2±14.0 [18–82]	NIH-CPSI, PCS, UPOINT	56.7±24 months	24.1±7.24	23.30±12.40 (PCS)	NA	NA
Krsmanovic A (2)	2014	175	46.83±10.86	NIH-CPSI, PCS	At least 3 of the last 6 months	16.47±8.67	16.30±9.52 (PCS)	NA	NA
Naliboff BD (24)	2017	176	47.7±15.5	NIH-CPSI, PCS, CSQ	8.1±10.9 years	NA	50.0±9.10 (PCS), 10.4±8.5 (CSQ)	NA	NA
Klotz SGR (25)	2018	81	48.33±15.28	NIH-CPSI, PCS	6.13±8.69 years	24.97±7.47	23.44±12.93 (PCS)	NA	NA

^a, according to UPOINT; ^b, 120 patients were characterized by UPOINT and 100 patients were characterized by its subdomain; ^c, among the all the patients [220]; ^d, among the 100 patients characterized by the subdomain of UPOINT; ^e, 20% had a history of less than 1 year. NIH-CPSI, National Institutes of Health Chronic Prostatitis Symptom Index; CSQ, Coping Strategies Questionnaire; PCS, Pain Catastrophizing Scale.

CP/CPPS patients suffered from high prevalence of psychosocial factors or psychiatric comorbidities, while pain catastrophizing was significant in the patients with psychological factors. All these findings were consistent with other researches, which showed that psychological factors, especially pain catastrophizing, might significantly affect the urological and nonurological conditions, including pain and QoL of patients, as well as the treatment (26,27).

There was a complex interaction between psychopathologic and somatic symptoms (26). Previous study showed that high psychosocial burden was found in CP/CPPS patients (27). Meanwhile, painful point of CP/CPPS was related with the self-reported psychosocial factors (28). Moreover, high rates

of psychopathologic factors or symptoms might lead to lower QoL (2). The results of our meta-analysis indicated that both high prevalence of psychosocial problem and pain catastrophizing was found in CP/CPPS patients. The serious mental disorders, especially depression anxiety and stress, and high prevalence of pain catastrophizing, might influence the severity of disease, the symptoms, treatment and prognosis of men suffering from CP/CPPS (29,30).

Previous study demonstrated that abnormal cognition could lead to pain-related disability, while catastrophizing, including rumination magnification and helplessness, made a significant contribution to the inability to disengage from negative pain ruminations (3). Pain was the most common

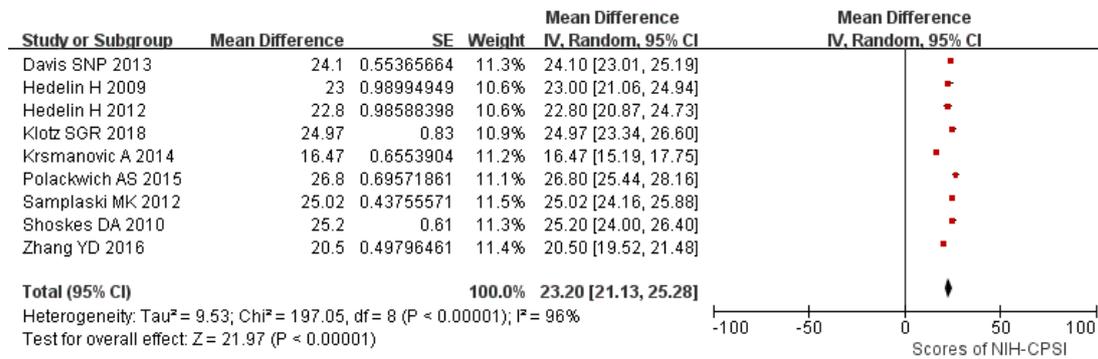


Figure 2 Overall severity of the disease among men patients with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS).

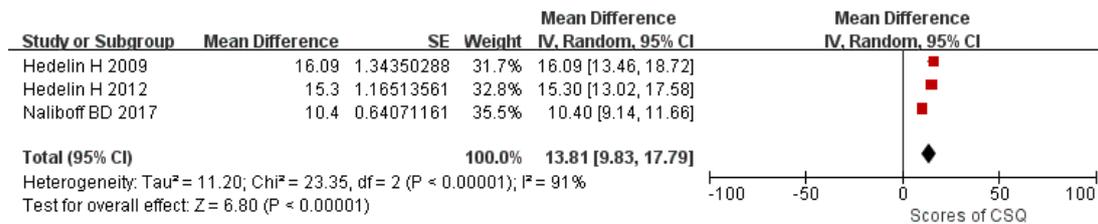


Figure 3 Overall severity of pain catastrophizing estimated by coping strategies questionnaire (CSQ) among men patients with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS).

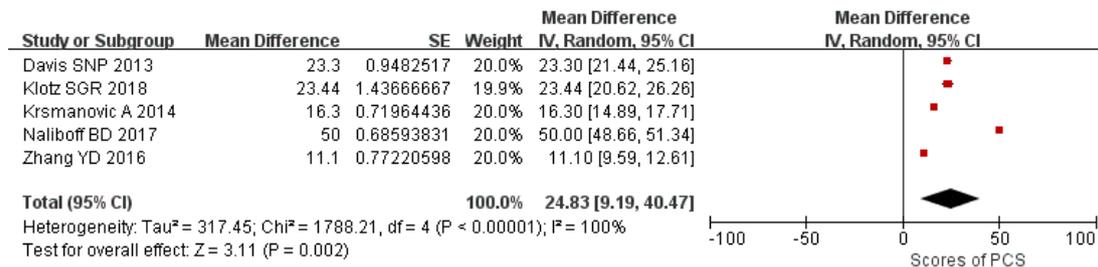


Figure 4 Overall severity of pain catastrophizing estimated by pain catastrophizing scale (PCS) among men patients with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS).

symptom in CP/CPPS patients, which was associated with the poor QoL of patients (10). Moreover, catastrophizing was robustly associated with the self-reported pain (31). Higher level of pain catastrophizing was found in CP/CPPS patients in the previous study (12). Our results also revealed high prevalence of pain catastrophizing in CP/CPPS patients. Pain-coping strategy was found to be associated with the outcome of CP/CPPS patients and it could be a predictor for the pain and other symptoms of patients (13).

It was important to note that reductions in psychosocial

problem and pain catastrophizing might be associated with improvement in the urinary function, pain symptom, QoL in CP/CPPS patients (3). Less pain, depressive symptoms and better physical QoL could be predicted by the normal cognition and coping strategy (32,33). Cognitive factors play a vital role in patient adjustment, including helplessness catastrophizing and pain catastrophizing (34,35). Therefore, biopsychosocial treatment model including psychotherapeutic management should be developed for men patients with CP/CPPS who are refractory to drug

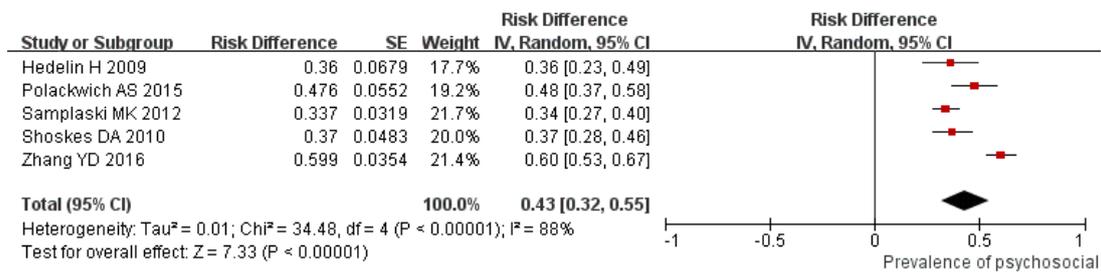


Figure 5 Overall prevalence of psychological factors among men patients with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS).

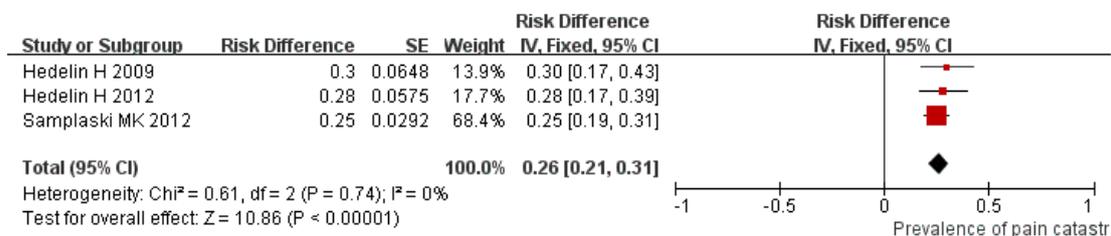


Figure 6 Overall prevalence of pain catastrophizing among men patients with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS).

therapy and physiotherapy.

However, some limitations of this meta-analysis should be addressed. First, the number of included studies is insufficient, and some studies have a relatively small sample size. Second, there were differences among participants and methods, including differences in durations. In addition, we were unable to analyze the association between the severity of CP/CPPS and psychosocial symptoms.

Conclusions

This meta-analysis showed that men patients with CPPS in this study suffered from a high burden of psychosocial symptoms, especially pain catastrophizing. More researches about the psychosocial symptoms in CP/CPPS were needed to explore the relationships between the psychosocial problem including abnormal cognition, coping strategy and urinary function, pain, QoL of CP/CPPS patients, and to develop multimodal management for patients suffering from a high burden of psychopathologic and somatic symptoms.

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Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/tau.2020.01.25>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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