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Health-related quality of life in patients with interstitial cystitis/bladder pain syndrome and frequently associated comorbidities

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Abstract
Purpose To estimate the association of chronic non-urologic conditions [i.e., fibromyalgia (FM), chronic fatigue syndrome (CFS), and irritable bowel syndrome (IBS)] with health-related quality of life (HRQOL) in patients with interstitial cystitis/bladder pain syndrome (IC/BPS).
Methods A total of 276 women with established diagnoses of IC/BPS completed a telephone interview which included demographics, self-reported medical conditions, the SF-36 health survey, and the interstitial cystitis symptom index (ICSI). Multivariate linear regression analysis was used to identify correlates of SF-36 physical and mental component summary scores.
Results Mean patient age was 45.1 (SD 15.9) years, and 83 % of the subjects were white. Mean values for the SF-36 Physical Component Score (PCS) and Mental Component Score (MCS) means were 39 (SD 14) and 45 (SD 12), respectively, indicating significant HRQOL reductions. Mean ICSI score was 11.27 (SD = 4.86). FM and IBS were significantly associated with worse SF-36 scores: −8 points on the PCS ($p < 0.001$) and −6 points on the MCS ($p < 0.001$). CFS and the presence of other pelvic conditions (overactive bladder, vulvodynia, endometriosis) were not significantly associated with SF-36 PCS and MCS scores.
Conclusions In patients with IC/BPS, the presence of FM, CFS, and IBS has a significant association with HRQOL, equivalent in impact to the bladder symptoms themselves. These results emphasize the importance of a multidisciplinary approach to treating patients with IC/BPS and other conditions.

Keywords Fibromyalgia · Chronic fatigue syndrome · Irritable bowel syndrome · Quality of life

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Introduction

Interstitial cystitis/bladder pain syndrome (IC/BPS) is characterized by chronic bladder pain, urinary urgency, and frequency. IC/BPS symptoms are widespread, affecting 3.3–7.9 million women over the age of 18 in the United States [1]. Patients with IC/BPS consistently report dramatic reductions in health-related quality of life (HRQOL) [2, 3] and are frequently diagnosed with non-urologic pain fibromyalgia (FM), chronic fatigue syndrome (CFS), and irritable bowel syndrome (IBS) [4–6]. It is likely that these non-urologic conditions are partly responsible for the observed decrease in HRQOL associated with IC/BPS. However, the specific contribution of these non-urologic conditions to overall HRQOL has not been specifically examined.

Methods

Clinical cohort

Details of this clinical cohort have been previously published [7]. Eight urologists and 16 gynecologists with

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expertise in managing IC/BPS referred female patients with this condition to the investigative team. A total of 276 patients (89 % response rate) were recruited, including 194 with IC/BPS alone and 82 with IC/BPS plus another pelvic condition [overactive bladder (OAB), endometriosis, or vulvodynia]. Presence of IC/BPS, OAB, endometriosis, and vulvodynia was based on the physician diagnosis from the participating urologists and gynecologists. The distinction of whether the patient had IC/BPS alone or IC/BPS with another pelvic condition was made in order to be able to differentiate the effect that IC/BPS had on HRQOL separate from the effect of these other pain conditions. The presence of other conditions was based on subject self-report. The following exclusionary criteria were applied to this clinical cohort: the presence of bladder cancer, urethral diverticulum, spinal cord injury, stroke, Parkinson's disease, multiple sclerosis, spina bifida, cyclophosphamide treatment, radiation treatment to the pelvic area, tuberculosis cystitis, ovarian cancer, vaginal cancer, genital herpes, and pregnancy.

Each study participant completed a 90-min computer-assisted telephone interview with a trained interviewer from the RAND Telephone Survey Center. Respondents provided information on demographic factors, current symptoms, and medical history, including self-reported history of FM, CFS, and IBS. Current IC/BPS symptoms were assessed with the Interstitial Cystitis Symptom Index (ICSI) [9]. The ICSI ranges from 0 to 20 with higher numbers indicating more negative symptom effect.

HRQOL was measured using the Medical Outcomes Study 36-item Short Form Health Survey, version 2 (SF-36) [8]. The SF-36 contains 8 subdomains that yield physician component scores (PCS) and mental component scores (MCS). General health perceptions and energy/fatigue subdomains are included in both component scores. In addition to these two subdomains, the PCS consists of physical functioning, role limitations due to physical health functioning, and bodily pain, and the MCS consists of emotional well-being, role limitations due to personal or emotional problems, and social functioning. An additional advantage of the SF-36 is that it has a record of use in studies of patients with IC/BPS [9]. The PCS and MCS each are scored on a T-score metric so that the mean is 50 and the standard deviation is 10 in the US general population (higher scores represent better HRQOL).

Statistical analysis

Descriptive statistics were calculated for age, race/ethnicity, and comorbid condition as well as ICSI Symptom and Problem indices and the SF-36 PCS and MCS scores. All SF-36 T-score means and ranges were adjusted for age.

Multivariate linear regression models predicted SF-36 T scores from patient type ("IC/BPS only" or "IC/BPS plus another pelvic condition"), race (white or non-Hispanic white), age (in decades), associated condition (FM, CFS, IBS), and ICSI score. The reference category was defined as white women with "IC/BPS only." Analyses were conducted using SAS 9.2.

Results

A total of 276 subjects completed the study, of whom 70 % had IC/BPS only and 30 % had IC/BPS plus another pelvic condition (overactive bladder, endometriosis, or vulvodynia). The majority of the subjects were white (83 %). A total of 20 % had FM, 14 % had CFS, and 46 % had IBS, as shown in Table 1.

SF-36 PCS and MCS means were 39 (SD = 14) and 45 (SD = 12), respectively, as shown in Table 2. The mean ICSI score was 11.27 (SD = 4.86).

The multivariate linear regression models show that the presence of another pelvic condition (overactive bladder, endometriosis, or vulvodynia) did not have a significant association with any individual component scores, including PCS and MCS scores ($\beta = -0.72$, $p = 0.646$ and $\beta = 2.29$, $p = 0.137$, respectively), as shown in Table 2. Similarly, race/ethnicity was not significantly associated with these scores ($\beta = 1.32$, $p = 0.478$ and $\beta = -0.63$, $p = 0.727$, respectively). SF-36 PCS scores were significantly higher for older women ($\beta = 2.46$ per decade, $p < 0.0001$). The presence of FM and/or IBS were related to worse SF-36 PCS scores ($\beta = -7.55$, $p < 0.001$ and $\beta = -5.51$, $p < 0.001$, respectively). A moderate ICSI score of 11–15 corresponded to an SF-36 PCS score 4 points lower ($p = 0.016$) lower than the reference category

Table 1 Subject demographics and characteristics

Subject characteristics	Percent (*n*)
Mean age (SD)	45.1 (15.9)
Physician diagnosis (%)	
IC/BPS only	70 (194)
IC/BPS and OAB, endometriosis, or vulvodynia	30 (82)
Race/ethnicity (%)	
Non-Hispanic white	83 (229)
Non-Hispanic black	5 (15)
Hispanic	4 (10)
Other	8 (22)
Non-urologic conditions (%)	
Fibromyalgia	20 (55)
Chronic fatigue syndrome	14 (39)
Irritable bowel syndrome	46 (128)

Table 2 Multivariable linear regression model showing changes in SF-36 subscale scores

	Physical functioning	Role limitations due to physical health functioning	Bodily pain	General health perceptions	Emotional well-being	Role limitations due to personal or emotional problems	Social functioning	Energy fatigue	SF-36 PCS	SF-36 MCS
Mean score (SD)	45 (16)	39 (14)	38 (13)	40 (14)	45 (12)	45 (13)	38 (12)	42 (12)	39 (14)	45 (12)
Patient type										
IC/BPS only	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
IC/BPS plus OAB, endometriosis, or vulvodynia	−1.3	−0.0	1.1	0.5	1.1	1.9	2.5	0.3	−0.7	2.3
Race/ethnicity										
White**	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Other	−5.3*	−0.7	1.6	0.1	−0.5	−2.9	−1.0	−0.2	−1.3	−0.6
Age (per decade)	1.1*	2.2*	2.3*	3.3*	0.7	1.1*	1.5*	1.7*	2.5*	0.8
Non-pelvic conditions										
Fibromyalgia	−6.3*	−5.1*	−6.4	−8.4*	−2.2	−4.1	−2.5	−7.9*	−7.6*	−2.5
CFS	−4.5	−5.8*	−2.5	−2.8	−3.5	−4.6	−8.0*	−1.9	−3.8	−4.3
IBS	−5.4*	−4.5*	−3.5*	−6.2*	−4.1*	−1.2	0.4	−4.0*	−5.5*	−1.1
ICSI score										
0–10	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
11–15	−4.4*	−2.7	−4.1*	−1.5	−0.7	−2.3	−1.0	−3.7*	−4.0*	−0.7
16–20	−12.4*	−8.4*	−9.5*	−5.7*	−6.0*	−7.2*	−5.5*	−8.0*	−10.1*	−4.5*

* $p < 0.05$

** Non-Hispanic white

of ICSI < 11, while a more severe ICSI score of 16–20 was associated with an SF-36 PCS score 10 points lower than those with ICSI < 11 ($p < 0.0001$). Likewise, a severe ICSI score of 16–20 was associated with a 4 points lower SF-36 MCS score than for those with ICSI < 11 ($p = 0.015$). Additional scores for the individual components of the SF-36 can be found in Table 2.

Discussion

Patients with IC/BPS had lower HRQOL than those without the condition, as demonstrated by their SF-36 MCS and PCS mean scores. The mean SF-36 PCS score was 39 (SD 14) and the mean SF-36 MCS score was 45 (SD 12). This means that half of those with IC/BPS fall within the 2nd and 44th percentile of PCS for the general population and that 45 % of those with IC/BPS are below the 10th percentile of PCS in the general population, Of note, the subscale mean scores for bodily pain (38, SD 13) and social functioning (38, SD 12) showed the largest differences from population norms.

Other studies have also found significantly lower quality of life with IC/BPS; however, the magnitude of the findings differ with different study populations. The Nurses' Health Study I and II defined patients as having IC/BPS if they had a cystoscopic diagnosis of the disease. Based on data from this study, women with interstitial cystitis had significantly lower quality of life scores (SF-36) than women without interstitial cystitis in the following subdomains: role limitations due to physical health functioning ($\beta = -13.1$, $p < 0.001$), bodily pain ($\beta = -9.8$, $p < 0.001$), energy/fatigue ($\beta = -7.7$, $p < 0.001$), and social functioning ($\beta = -7.2$, $p < 0.001$) [10]. Our study, which defined patients with IC/BPS based on expert diagnosis, had lower HRQOL scores, as measured by the SF-36. This difference can be attributed to our broader, and currently more accepted, inclusionary criteria.

Another study used potentially more symptomatic patients who were enrolled in a clinical trial for intravesical pentosan polysulfate. This study defined IC/BPS by the NIDDK criteria for IC and a score of at least 5 on the ICSI. Using the SF-36, they found that patients with IC had a mean PCS score of 37.7 (compared to 56.6 in patients

without IC) and a mean MCS score of 39.4 (compared to 52.3 in patients without IC) [3].

Tripp et al. looked at quality of life in patients with interstitial cystitis using the SF-12 and the ICSI and ICPI. This study recruited patients from expert centers who had a diagnosis of IC/BPS, similarly to recruitment in our study. Using the SF-12, they found that patients with IC/BPS had a mean PCS score of 34.6 ± 7.8 and a mean MCS score of 43.1 ± 13.4 [11]. These findings most closely correlate with those in our study.

Thirty percent of patients with IC/BPS in our study were also diagnosed with other pelvic conditions, including OAB, endometriosis and vulvodynia. Surprisingly, however, the presence of these conditions was not associated with an additionally lower HRQOL. The presence of a second pelvic condition in addition to IC/BPS does not have a unique additional association with HRQOL.

In addition to having IC/BPS, our study showed that the presence of non-pelvic conditions (FM, CFS, IBS) has a significant detrimental impact on measures of HRQOL. Among patients with IC/BPS, a higher ICSI score (greater symptom effect) was related to worse SF-36 PCS and MCS scores. Of note, a minimally important difference of 1.2 points in the ICSI has been shown to correlate with meaningful changes in patient-reported global response assessment [12].

Patients with FM had an 8 points lower SF-36 PCS score ($p < 0.001$), patients with CFS had a 4 points lower SF-36 MCS score ($p = 0.057$), while patients with IBS had a 6 points lower SF-36 PCS score ($p < 0.001$). These findings suggest that regional (as in IBS) or systemic (as in FM and CFS) symptoms are distinct from the bladder and may in fact prove to add to the negative impact on HRQOL. Therefore, clinicians who only treat bladder symptoms, and do not also attempt to identify the presence of non-bladder symptoms, will be unable to achieve a meaningful impact on HRQOL.

This study should be interpreted with certain limitations in mind. One limitation is that this study relies on the self-reported presence of other medical conditions. While these patients were referred by physicians with a confirmed diagnosis of IC/PBS, patients self-reported diagnoses of FM, CFS, and IBS. Additionally, since the patients were referred by a heterogeneous group of physicians, it is likely that they underwent different diagnostic tests and inclusion criteria, meaning that they were not a group chosen by rigid inclusion/exclusion criteria that would be required for a clinical trial. Additionally, it is possible that some additional patients had these syndromes but were not diagnosed, potentially lowering the reported presence of these comorbidities in the study sample. However, it is notable that the rate of these conditions in our study is consistent with others reported in the literature [5, 6, 13]. A further limitation of this study is that we did not obtain information about medications. Furthermore, any impact of medications on HRQOL cannot be assessed in this study.

Collectively, our data suggest that non-bladder conditions have a substantial association with decreased HRQOL in many patients with IC/BPS. This suggests that effective treatment of bladder symptoms alone in these patients may have a limited impact on overall patient satisfaction and functioning due to the effect of the other comorbid conditions. Improvement in delivery of care to these patients would potentially improve their quality of life.

Conclusions

In patients with IC/BPS, the presence of FM, CFS, and IBS has a significant negative association with HRQOL, equivalent in impact to the bladder symptoms themselves. These results emphasize the importance of a multidisciplinary approach to treating patients with IC/BPS.

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