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## Rescoring the NIH Chronic Prostatitis Symptom Index (NIH-CPSI): Nothing New

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### Abstract

The NIH-Chronic Prostatitis Symptom Index (NIH-CPSI) is a commonly used 13-item questionnaire for the assessment of symptom severity in men with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS). For each item, score ranges are 0–1 (6 items), 0–3 (2 items), 0–5 (3 items), 0–6 (1 item), and 0–10 (1 item). This scoring system is straightforward, but items with wider score ranges are *de facto* weighted more, which could adversely affect the performance characteristics of the questionnaire. We rescored the NIH-CPSI so that equal weights were assigned to each item, and compared the performance of the standard and rescored questionnaires using the original validation dataset. Both the original and revised versions of the scoring algorithm discriminated similarly among groups of men with chronic prostatitis (n=151), benign prostatic hyperplasia (n=149), and controls (n=134). Internal consistency of the questionnaire was slightly better with the revised scoring, but values with the standard scoring were sufficiently high (Cronbach's alpha = 0.80). We conclude that although the rescored NIH-CPSI provides better face validity than the standard scoring algorithm, it requires additional calculation efforts and yields only marginal improvements in performance.

### Keywords

chronic pelvic pain syndrome; questionnaire; psychometrics

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## Introduction

The NIH-Chronic Prostatitis Symptom Index (NIH-CPSI) (Appendix) is a 13-item index developed to assess symptoms and quality of life in men with chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS)<sup>1</sup>. It has demonstrated good reliability, validity, and responsiveness to change, and it has been used as the primary outcome variable in multiple large-scale studies of CP/CPPS treatments<sup>1–4</sup>. It has also been translated into multiple languages for international use<sup>5–11</sup>.

The NIH-CPSI has a total score range from 0 to 43, and it includes three subscales addressing pain (score range 0–21), urinary symptoms (score range 0–10), and quality of life (QOL) (score range 0–12). The pain subscale consists of six items which are each scored from 0 to 1, one item which is scored from 0 to 5, and one item which is scored from 0 to 10. The urinary subscale consists of two items, each of which is scored from 0 to 3. The QOL subscale includes two items that are scored from 0 to 3, and one item that is scored from 0 to 6. Because item scores are summed to calculate a total, items with higher potential scores are weighted more; hence, those items contribute more to the NIH-CPSI total score. When developing a questionnaire, it is more common to scale each item in the questionnaire similarly, especially when there is no obvious advantage to weighting certain items more than others<sup>12</sup>. We examined whether rescoring the NIH-CPSI according to these principles would result in improved performance of the index.

## Methods

The standard NIH-CPSI scoring algorithm was altered so that each of the 13 items was weighted equally. The response of each item was standardized onto a 0–100 scale, with higher scores representing greater symptom severity. For example, Q3 of the index (How often have you had pain or discomfort ... over the past week?) has response values 0-Never, 1-Rarely, 2-Sometimes, 3-Often, 4-Usually, and 5-Always. These scores were converted to 0, 20, 40, 60, 80, and 100, respectively. The Total Score and the subscales were then calculated by taking the mean of the standardized scores for the items that made up the scale. If items were missing, the subscale and Total Score were still calculated by taking the mean of the standardized values of the non-missing items, provided less than 20% of the items in the scale were missing; otherwise, the score for that scale was set to missing. Testing of the revised algorithm was performed using the data from the original validation cohort of 434 subjects (151 CP/CPPS, 149 benign prostatic hyperplasia (BPH), and 134 controls). The accrual and clinical characteristics of this cohort have been previously described<sup>1</sup>. Generalized estimating equations (GEE) models were used to assess discriminatory power between the study groups, and Cronbach's alpha was used to assess for internal consistency.

## Results

The results are presented in the Table. Both the standard scoring and the revised scoring algorithms discriminated similarly among the 3 clinical groups (all  $p < 0.001$ ). Cronbach's alpha scores for the total score and subscales were the same or slightly better with the

revised scoring, indicating slightly better internal consistency. However, internal consistency was still sufficiently high ( $\alpha = 0.80$ ) using the standard scoring.

## Discussion

Since its development in 1999, the NIH-CPSI has become the primary tool for evaluation of CP/CPPS symptom severity and treatment response. The adoption of this uniform outcome measure has greatly aided understanding of treatment responses and natural history of this disorder. However, as with any newly developed questionnaire, refinements may improve its performance.

Our revised scoring system for the NIH-CPSI clearly discriminated between men with CP/CPPS, men with BPH and controls. Furthermore, the internal consistency was excellent, indicating that items within each subscale correlated well with each other. This revised scoring system may be preferable to the standard scoring system from a psychometric standpoint, as there is no obvious clinical rationale for weighting items in the NIH-CPSI differently, as is done with the standard scoring.

However, there are a number of reasons to reject the revised scoring system. First, the standard scoring algorithm—a simple sum—is easy to calculate, while the revised system requires more complicated calculations that are difficult to do by hand. Second, the standard scoring system and the revised scoring system discriminated equally well among the 3 clinical groups of subjects. Third, although the internal consistency was slightly better with the revised scoring, values for the standard scoring were still more than acceptable. Finally, adoption of a new scoring system may require considerable education of the urologic community, given the widespread adoption of the NIH-CPSI with the standard scoring.

Several limitations need to be taken into account when interpreting these results. The three groups in the validation cohort (CP/CPPS, BPH, and controls) exhibit symptoms that are quite dissimilar. Therefore, it is not surprising that both scoring systems are able to discriminate between them. It is possible that testing in groups that are more similar (CP/CPPS vs male interstitial cystitis or new onset vs chronic CP/CPPS) might reveal that one scoring system is more discriminative than the other. In addition, the analysis was performed on a single validation cohort comprising predominantly white men from tertiary care facilities. It is possible that the performance characteristics would be different in other populations.

## Conclusions

Although the rescored NIH-CPSI provides better psychometric face validity than the standard scoring algorithm, it requires additional calculation efforts and yields only marginal improvements in performance. These results support continued use of the standard scoring for the NIH-CPSI.

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Discriminatory power and internal consistency of standard scoring and revised scoring for the NIH-CPSI

	Total Score			Pain Subscale			Urinary Subscale			QOL Subscale		
	CP	BPH	Controls	CP	BPH	Controls	CP	BPH	Controls	CP	BPH	Controls
<b>Standard scoring</b>												
Mean	19.7	6.9	1.9	8.7	1.3	0.3	4.1	3.6	1.0	6.7	2.2	0.6
s.d.	10.6	5.9	3.0	5.9	2.7	1.3	3.1	2.5	1.3	3.6	2.6	1.5
Range	0-43	0-34	0-20	0-21	0-13	0-8	0-10	0-10	0-8	0-12	0-12	0-8
Cronbach's alpha	0.89			0.79			0.80			0.83		
<b>Revised scoring</b>												
Mean	46.2	13.8	3.2	43.6	7.3	1.2	41.3	35.7	10.2	52.9	16.1	3.6
s.d.	26.4	14.2	6.5	29.9	15.0	6.2	31.4	24.9	13.3	30.4	21.2	9.9
Range	0-100	0-77	0-57	0-100	0-78	0-60	0-100	0-100	0-80	0-100	0-100	0-61
Cronbach's alpha	0.93			0.89			0.80			0.91		