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Assessment of Prostate Cancer Patients' Understanding of the IPSS Questionnaire

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Short Running Title: Misunderstanding of IPSS Questions

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Data Sharing Statement:

Research data are stored in an institutional repository and may be shared upon request to the corresponding author.

Abstract

Background and Purpose: The International Prostate Symptom Score (IPSS) is a widely used tool for evaluating patient-reported lower urinary tract symptoms (LUTS). In this study, we assessed prostate cancer patient understanding of IPSS questions.

Materials and Methods: Consecutive prostate cancer patients (n=144) self-completed an online IPSS questionnaire within one week prior to their visit at our radiation oncology clinic. At the visit, a nurse reviewed each IPSS question to ensure the patient understood it and then verified the patient answer with him. Pre-verified scores and nurse-verified scores were recorded and analyzed for discrepancies.

Results: Complete concordance between pre-verified and nurse-verified responses to individual IPSS questions existed for 70 men (49%). In terms of overall IPSS score, 61 men (42%) had a lower/improved IPSS after nurse verification and 9 men (6%) had a higher/worsened IPSS. Prior

to verification, patients overstated their symptoms of frequency, intermittency, and incomplete emptying. As a result of the nurse verification, four out of seven patients with IPSS in the severe range (20-35) were recategorized to the moderate range (8-19). Sixteen percent of patients whose pre-verified IPSS were in the moderate range were recategorized after nurse verification to the mild range (0-7). For 10% of patients, their eligibility for treatment options changed after nurse verification.

Conclusion: Patients not infrequently misunderstand the IPSS questionnaire, leading them to respond in ways that do not accurately reflect their symptoms. Clinicians should verify patient understanding of the IPSS questions particularly when using the score to determine eligibility for treatments.

Key Words: International Prostate Symptom Score, IPSS, Prostate Cancer, Radiation, Patient-reported, Verification

Introduction:

Urologic oncology clinicians often need to evaluate the degree of lower urinary tract symptoms (LUTS) in patients to select appropriate cancer treatment options, evaluate patients for clinical trial eligibility, and assess patient outcomes. For radiation oncologists in particular, optimizing

urinary symptoms before and after cancer treatment requires accurate assessment and classification of symptom severity.

The International Prostate Symptom Score (IPSS) is widely used to assess LUTS, and it is often obtained both at baseline and at follow-up evaluations. IPSS, an adaptation of the American Urological Association (AUA) Symptom Index, was validated nearly 30 years ago for the assessment of men with benign prostatic hypertrophy (BPH) [1]. It has been used in many randomized clinical trials of therapies for LUTS [2,3] and is recommended by the World Health Organization (WHO) [4].

Although the IPSS is a validated quality of life assessment tool, our clinical experience suggests that many patients lack a clear understanding of the IPSS questions. For example, when asked about the sensation of incomplete bladder emptying, patients often misinterpret this to be a question about urinary frequency. Such misunderstandings can lead to inaccurate scores which This is of particular importance for prostate cancer treatment selection because high IPSS is a relative contraindication for certain radiation treatments. To quantify the magnitude of this problem, we systematically investigated the accuracy of the IPSS, prospectively collecting patient responses to the questionnaire before and after a nurse explained the questions to the patients, and analyzed the differences.

Patients and Methods

The IPSS questionnaire (Supplementary Table 1) consists of seven questions that evaluate the following: 1) sensation of incomplete emptying, 2) frequency of urinating at intervals of ≤ 2 hours, 3) intermittency of the urinary stream, 4) difficulty postponing urination characterized as urinary urgency, 5) weakness push or strain to and 7) need to awaken at night to urinate (nocturia). The overall IPSS ranges from 0 to 35, with a higher score indicating greater LUTS.

At our institution, we request prostate cancer patients to complete the IPSS questionnaire prior to each radiation oncology clinic consultation and follow-up visit. The patient electronically completes the form by logging into an online platform, generally within a week prior to the visit. For the purposes of this study, we analyzed IPSS obtained from consecutive radiation oncology clinic patients during the period from September 2020 through April 2021. To eliminate the issue of language preference, we limited our analysis to patients who indicated English as their primary language. Patients were included in the study regardless of whether they received radiation or the type of radiotherapy intervention delivered. The responses entered electronically by the patient served as the pre-verified score.

A total of 3 radiation oncology office nurses working at two of our outpatient clinics were trained for this project. The training consisted of instructing the nurses to speak out each his answer was accurate. In restating the questions to the patients, the nurses were asked to emphasize those parts of the questionnaire that in clinical practice are frequently

misunderstood, in particular what is meant by a sensation of incomplete emptying (vs a frequent need to return to the toilet), and to explain more explicitly that the first 6 questions are looking for a frequency of a particular symptom, rather than a symptom severity.

The nurses recorded the verified scores for use in this study analysis. For patients seen at multiple clinic visits during the study duration, only one nurse-verified IPSS (the first one obtained during the above dates) was included in the analysis. A patient's response was considered concordant or discordant based on whether there was agreement or disagreement between the pre-verified response and the subsequent nurse-verified response.

At our institution, the IPSS is utilized as part of our treatment guidelines for determining patient eligibility for various radiotherapeutic interventions. For example, an IPSS less than 18 is preferred for brachytherapy, whereas an IPSS less than 20 is preferred for stereotactic body radiation therapy (SBRT). Patients with an IPSS of 15 or higher are also often recommended to consider a medication for their urinary symptoms (usually either anticholinergic or alpha-blocker) to improve their function prior to initiating SBRT [5]. To illustrate the potential effect that misunderstanding the IPSS questions could have on clinical care, we also analyzed how the change from the pre-verified overall score to the nurse-verified score would change the eligibility for treatment per these departmental guidelines, regardless of whether the patient was actually being considered for that intervention.

We compared the pre-verified IPSS with the nurse-verified IPSS for each patient, looking for the prevalence of discrepant responses to individual questions as well as for discrepancies in the overall score. We analyzed the data to identify factors that might be associated with discordant

IPSS responses. The Wilcoxon rank-sum test was used for continuous variables: age at questionnaire completion and PSA prior to survey completion. The Pearson's Chi-squared test was used for categorical variables: Gleason Grade Group, tumor stage, nodal stage, metastasis stage, treatment type, and history of hormonal therapy. All analyses were conducted using the statistical software package R 4.1.0.

This study was performed with Institutional Review Board approval.

Results

Nurses verified responses of 144 consecutive prostate cancer patients who completed the IPSS questionnaire between September 8, 2020 and April 13, 2021. One third of these patients were assessed prior to having received any treatment for their prostate cancer. Forty percent had received definitive radiotherapy, while 27% had undergone prior radical prostatectomy; most of the latter had also already undergone salvage radiation. Just over half of the patients (54%) had received some form of hormonal therapy.

Table 1 presents the characteristics for our participants stratified by whether all pre-verified responses were in complete concordance with their corresponding nurse-verified responses. Seventy-four patients (n=51%; 95% CI 43%-60%) had pre-verified responses with at least one discrepancy compared with nurse-verified responses. For 31 patients a discrepancy of at least a 3-points was noted. As shown in Table 2, nurse-verified responses were more likely to be lower (i.e., reflecting fewer symptoms) than pre-verified responses. Because pre-verified responses from patients without a given symptom (i.e.,

score of 0) were expected to have greater concordance with nurse-verified responses, we also analyzed the responses of only those patients reporting presence of that symptom (i.e., score of at least 1). This analysis confirmed the trend for scores based on nurse-verified responses being lower or improved than those based on pre-verified responses.

The prevalence of discordance was highest for incomplete emptying (24%), intermittency (20%), urgency (19%), and frequency (19%), whereas we observed lower discordance rates for weak stream (16%), nocturia (15%), and straining (8%). There was evidence that patients pre-verified reporting gave higher/worse responses compared to nurse-verified reporting for frequency ($p=0.009$), intermittency ($p=0.004$), weak stream ($p=0.017$), incomplete emptying ($p=0.002$), and nocturia ($p=0.021$). For incomplete emptying, nurse-verified responses were lower for 25 men, 16 of whom had a response reduced to zero. For frequency, responses were lower for 22 men, with 12 response reduced to zero. For intermittency, responses were lower for 23 men, with 20 response reduced to zero. The question about urgency had the highest proportion of nurse-verified responses being higher or worsened than pre-verified responses (7.6%), while the question about straining had the lowest such proportion (1.4%). In terms of overall IPSS, 42% of patients had a lower or improved score after nurse verification, while only 6.2% of patients had a higher or worsened score.

Overall IPSS scores are frequently grouped into the severity categories (U mild IPSS 0-7), (U moderate IPSS 8-19), (U severe IPSS 20-35). Table 3 summarizes the effect of nurse verification on the severity grouping. Among pre-verified IPSS in the mild category, nurse verification did not lead to any change in severity grouping. However, for pre-verified IPSS

corresponding to the moderate (n=50) or severe categories (n=7), the probability of regrouping increased, always in the direction of lower severity.

Figure 1 presents a scatterplot of nurse-verified IPSS against pre-verified IPSS and displays whether the change in score would have resulted in a change in eligibility for treatments per departmental guidelines. Among our cohort, fifteen of the patients (10%; 95% CI, 6%-17%) would have had a change in their eligibility status for treatment options. Nine patients would have been considered ineligible for brachytherapy based on their pre-verified IPSS, but would have been eligible based on their nurse-verified IPSS. Similarly, four patients would have been converted from being ineligible to being eligible for SBRT based on their nurse-verified IPSS. We observed the converse – eligible patients rendered ineligible after nurse verification – less frequently; one patient for brachytherapy and zero patients for SBRT. There were five men whose pre-verified IPSS would have met the threshold to consider urinary modifying medications, but would not have met this threshold after nurse verification; the converse was true for just two patients.

Discussion

As a widely used quality of life (QOL) questionnaire in urologic oncology, the IPSS plays a key role in prostate cancer research and patient management. IPSS has been psychometrically validated and shown to correlate with urinary QOL. It classically has been used in the initial assessment of patients with BPH/LUTS and to follow the change in urinary function after treatment of these conditions. Its use has been extended in the radiation oncology community

as a screening tool to help select treatment options depending on the degree of BPH/LUTS, and as a way of following toxicity post-treatment. However, the IPSS is almost 30 years old and has not been modified in the light of contemporary understanding of patient communication

The findings of this study show that many patients do not understand the IPSS questions.

Scores based on such misunderstanding can potentially lead to suboptimal management of urologic symptoms and can cause patients to be ineligible for certain cancer therapies or clinical trials. Approximately half of the patients surveyed changed in their IPSS overall score after the nurses explained the questions to them. Of those whose scores changed after nurse verification, the vast majority had a decrease in the reported severity of symptoms. These discrepancies appeared to result largely from patients misunderstanding the intent of the questions and thus overstating the severity of their symptoms. This is particularly evident from the large percentage of men who changed their scores to zero after hearing explanations of the questions regarding incomplete emptying, frequency, and intermittency. The prior literature has consistently found that clinicians underreport symptoms compared to direct patient-reported outcomes [6,7]. This raises the possibility that our findings might be explained by clinician underreporting. However, there are several lines of evidence against such an effect. First, prior studies compared patient-reported symptom ratings with those reported independently by clinicians, whereas we analyzed only self-reported symptoms, evaluating the impact of having a trained clinician explain the questions to the patients and verifying their understanding. This means that two major mechanisms for underreporting – the clinician not asking the patient about a symptom or not listening carefully to his response – do not apply. Second, differences between original and nurse-verified scores varied by symptom. Critically,

the nurses were able to articulate the reasons for that variation in clear terms centering on patient understanding. For instance, the symptom with the highest discordance was incomplete emptying, and it is noted in clinical practice that patients often misunderstood that to be a question about frequency (e.g., "How often do you have to urinate?" vs. "How often do you have to urinate at night?").

We conclude that the cause of the discordance is related to patient misunderstanding of questions rather than clinician underreporting.

One of the findings of this study is that the probability of discordance between the pre-verified score and the nurse-verified score was significantly higher for those reporting severe symptoms than for those reporting mild symptoms. We hypothesize that this may be because, in our experience, some patients misunderstand the rating scale to be a *subjective* assessment of severity of each symptom, rather than an *objective* question about the frequency of that symptom. It may be that such a misunderstanding has a greater impact on the degree of discordance as the symptoms worsen. This would be true if the rate of increase in subjective urinary bother caused by a given symptom is of greater magnitude than the rate of increase in the frequency of that symptom. For patients with milder symptoms, this misunderstanding may not result in much change in the score with verification, because less overall severity of a given symptom likely also correlates with lower frequency of that symptom. On the other hand, patients with subjectively more bother may be more likely to inadvertently overreport the frequency of the symptom if they misunderstand the question to be about frequency rather than severity. However, this hypothesis does not really explain why so many self-reported scores were reduced to zero, which suggests a more specific misunderstanding of the individual questions regarding incomplete emptying, frequency, and intermittency.

How should the results of this study change clinical practice? We are certainly not advocating for the routine administration of the IPSS questionnaire by nurses, as this would undermine the validity of the score, which is designed to be self-administered. However, our study underscores the necessity for clinicians to closely review the responses with any patient with an unfavorable IPSS, especially when the initial score would deem a patient ineligible for certain treatment options. . While we acknowledge that a small numerical change in individual IPSS scores (ie 1 or 2 points) may not be clinically significant, we did note that for 31 patients a discrepancy of at least a 3-points was noted. We believe that our findings do illustrate the potential for patient misunderstandings to impact on treatment selection, especially when relying on threshold IPSS values to guide clinical recommendations.

A limitation of our study is that the interviews were done by different nurses. When self-reported outcome measures are acquired by interviewers, inter-interviewer reproducibility is critical [8]. It is possible that individual nurses taking part in this study may have inadvertently introduced some variability in terms of how they explained the questions to the patients. However, we feel this is unlikely to have affected the results of our study because our nurses were trained to base their explanations on the standard printed IPSS format and to merely -recorded answers.

In conclusion, IPSS values are inflated in some patients due to their misunderstanding of specific questions. Clinicians should never disqualify a patient from receiving prostate cancer treatments due to a high IPSS without reviewing the IPSS questionnaire with the patient. While the IPSS is useful in screening patients for needing urinary modifiers, the questionnaire results

should be similarly verified before making such adjustments to clinical care. Further research should examine the impact of our findings on evaluation of benign disease.

Figure Captions

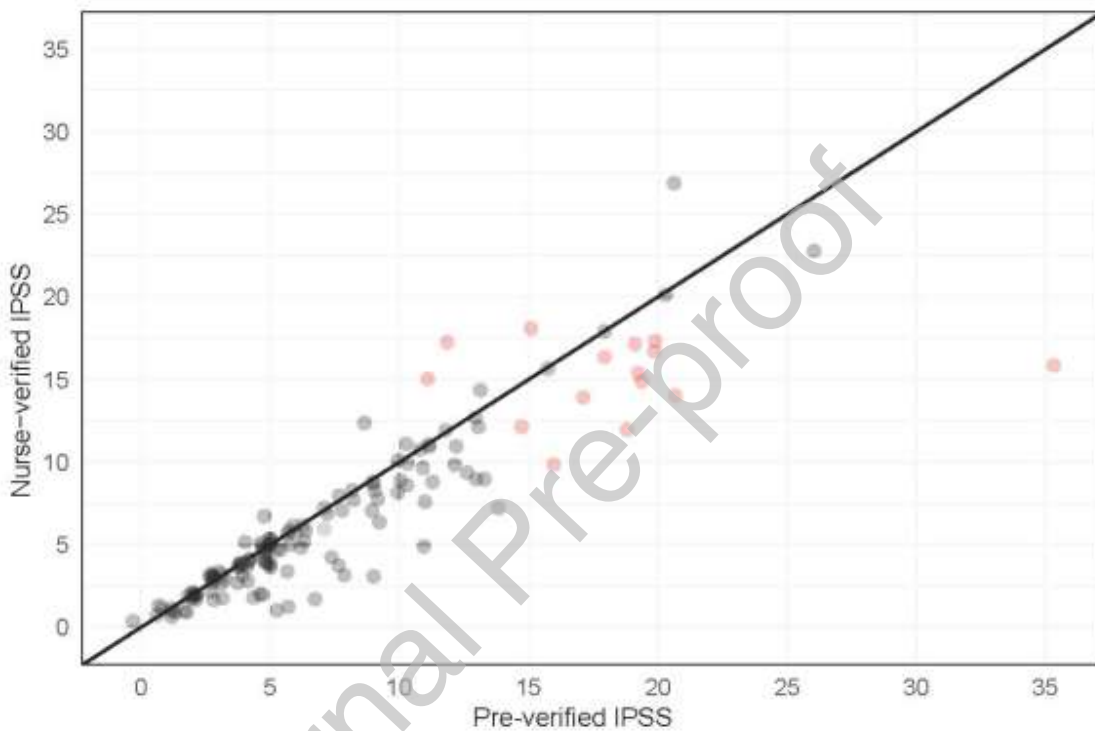


Figure 1: Scatter plot of overall International Prostate Symptom Score (IPSS) score initially self-reported by patient versus nurse-verified. The red dots correspond to patients whose eligibility for treatment options would have changed after nurse verification. Scores were given some

Table 1. Patient and disease characteristics stratified by whether all pre-verification responses were concordant with all corresponding nurse-verified responses.

| Characteristic | Concordant N = 70 | Discordant N = 74 | p-value ² |
|---------------------------------|----------------------|----------------------|----------------------|
| Age at Patient response to IPSS | 68 (63, 74) | 69 (64, 73) | 0.9 |

| | | | |
|------------------------------|-------------------|--------------------|------|
| Gleason Grade Group | | | 0.6 |
| 1 | 1 (1.4%) | 2 (2.7%) | |
| 2 | 24 (34%) | 33 (45%) | |
| 3 | 23 (33%) | 17 (23%) | |
| 4 | 9 (13%) | 7 (9.5%) | |
| 5 | 13 (19%) | 15 (20%) | |
| PSA (pre-treatment) | | | |
| Intact prostate (N=105) | 7.06 (5.03, 9.16) | 7.66 (5.61, 13.50) | 0.2 |
| Post-op (pre-salvage) (N=39) | 0.22 (0.13, 0.52) | 0.21 (0.15, 0.32) | >0.9 |
| T stage | | | 0.6 |
| T1 | 27 (39%) | 35 (47%) | |
| T2 | 18 (26%) | 19 (26%) | |
| T3 | 22 (31%) | 19 (26%) | |
| T4 | 1 (1.4%) | 1 (1.4%) | |
| TX | 2 (2.9%) | 0 (0%) | |
| N Stage | 10 (14%) | 6 (8.1%) | 0.2 |
| M stage | 1 (1.4%) | 1 (1.4%) | >0.9 |
| Treatment Type | | | 0.3 |
| No RP or RT | 20 (29%) | 27 (36%) | |
| RT-only | 26 (37%) | 32 (43%) | |
| RP-only | 6 (8.6%) | 5 (6.8%) | |
| RP + RT | 18 (26%) | 10 (14%) | |
| History of ADT | 40 (57%) | 38 (51%) | 0.5 |

Results are presented as median (quartiles) and frequency (%).

Abbreviations:

IPSS=International Prostate Symptoms Score; PSA= Prostate Specific Antigen level in nanograms per milliliter; RP=Radical prostatectomy; RT=Radiation therapy; ADT=Androgen Deprivation Therapy.

Table 2. Direction of change of nurse-verified response compared with pre-verification response for individual questions and for overall IPSS.

| | | |
|--|----------------|--|
| | N = 144 | Among patients with individual symptom score > 0 |
|--|----------------|--|

| | | |
|---------------------|-----------------|----------|
| Incomplete Emptying | | N=65 |
| Improved | 25 (17%) | 25 (38%) |
| Worsened | 10 (6.9%) | 6 (9.2%) |
| Frequency | | N=120 |
| Improved | 22 (15%) | 22 (18%) |
| Worsened | 5 (3.5%) | 5 (4.2%) |
| Intermittency | | N=59 |
| Improved | 23 (16%) | 23 (39%) |
| Worsened | 6 (4.2%) | 4 (6.8%) |
| Urgency | | N=82 |
| Improved | 17 (12%) | 17 (21%) |
| Worsened | 11 (7.6%) | 7 (8.5%) |
| Weak stream | | N=73 |
| Improved | 17 (12%) | 17 (23%) |
| Worsened | 5 (3.5%) | 4 (5.5%) |
| Straining | | N=35 |
| Same | 133 (92%) | 24 (69%) |
| Improved | 9 (6.2%) | 9 (26%) |
| Worsened | 2 (1.4%) | 2 (5.7%) |
| Nocturia | | N=129 |
| Improved | 15 (10%) | 15 (12%) |
| Worsened | 6 (4.2%) | 6 (4.7%) |
| Overall IPSS | | |
| Same | 74 (51%) | -- |
| Improved | 61 (42%) | -- |
| Worsened | 9 (6.2%) | -- |

Results are presented as frequency (%). u V
to the respective questions.

Abbreviations:

IPSS=International Prostate Symptoms Score

Table 3. Severity grouping based on pre-verification responses versus nurse-verified responses.

| | Pre-verification Responses | | |
|---------------------------------|-----------------------------------|---------------------------------|-------------------------------|
| | Mild (IPSS 0-7), N = 87 | Moderate (IPSS 8-19), N = 50 | Severe (IPSS 20-35), N = 7 |
| Nurse-Verified Responses | | | |
| Mild (IPSS 0-7) | 87 (100%) | 8 (16%) | 0 (0%) |
| Moderate (IPSS 8-19) | 0 (0%) | 42 (84%) | 4 (57%) |
| Severe (IPSS 20-35) | 0 (0%) | 0 (0%) | 3 (43%) |

Abbreviations:

IPSS=International Prostate Symptoms Score

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