ELSEVIER

MEASURING QUALITY OF LIFE IN MEN WITH PROSTATE CANCER USING THE FUNCTIONAL ASSESSMENT OF CANCER THERAPY-PROSTATE INSTRUMENT

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ABSTRACT

Objectives. As the incidence of prostate cancer in the United States exceeds 330,000 in 1997, increasingly more men are faced with treatment choices for which there is no clear approach. At every stage of disease, these treatment choices may involve clinically equivalent modalities that differ in side effects and impact upon quality of life (QOL). Comprehensive, yet efficient, questionnaires are needed to measure QOL in patients with prostate cancer.

Methods. Developed as a disease-specific adjunct to the Functional Assessment of Cancer Therapy (FACT) measurement system, a 12-item prostate cancer subscale (PCS) was developed and tested in three independent samples: a subscale development sample (n = 43), validity sample 1 (n = 34), and validity sample 2 (n = 96). The 12 items ask about symptoms and problems specific to prostate cancer. These questions are added to the general (FACT-G) instrument, thereby comprising a 47-item questionnaire.

Results. Internal consistency of the PCS ranged from 0.65 to 0.69, with coefficients for FACT-G subscales and aggregated scores ranging from 0.61 to 0.90. Concurrent validity was confirmed by the ability to discriminate patients by disease stage, performance status, and baseline prostate-specific antigen (PSA) level. Sensitivity to change in performance status and PSA score over a 2-month period suggested that some subscales of the FACT-Prostate (P) (including the PCS) are sensitive to meaningful clinical change.

Conclusions. Our findings support use of the FACT-P as a meaningful component of QOL evaluation in men undergoing therapy for prostate cancer. UROLOGY **50:** 920–928, 1997.

Prostate cancer incidence is estimated to reach 334,000 new cases in the United States in 1997, twice that of lung cancer in men. More than 41,800 deaths are anticipated as a result of this cancer, making it the second leading cause of cancer death in men.[1] Although many men are being diagnosed at early stages of the disease, 42% of newly diagnosed men have disease that is beyond local control at the time of diagnosis.

Regardless of the stage of disease at the time of diagnosis, the decision for treatment has the potential to significantly affect the quality of life (QOL) in men with prostate cancer. Recently, the healthcare community has recognized the importance of using QOL measurement as an essential component of a treatment modality's efficacy.[2] The need for this type of evaluation in the treatment of patients with prostate cancer is clearly shown by the variation in treatment options that are provided to patients at various stages of this disease.

In localized disease, radical prostatectomy and radiation therapy at the time of diagnosis have been found to demonstrate similar survival curves.[3] They are frequently presented as equivalent treatment options to these patients. Both treatment modalities, however, are accompanied by a potential risk for significant side effects related to the areas of sexual function, potency, and continence. Although studies have examined treatment efficacy between these options, specific instruments designed to compare these options in relation to their interval and overall side effects and impact on QOL have not been readily available.

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Patients who have disease that has advanced beyond local control are no longer curable. The treatment becomes palliative and the goals for care primarily include extending survival time and improving the QOL. Treatment and its associated side effects and toxicities substantiate the necessity for balancing quantity with quality of life. Response to therapy in patients with hormone refractory prostate cancer has historically been difficult to measure because the majority of patients treated do not have measurable disease at the time of treatment.[4] The use of additional therapies is appropriate only when symptoms can be relieved and quality of survival can be maintained or improved.[5] In a study by Herr *et al.*[6] comparing QOL of patients with metastatic prostate cancer with and without hormonal therapy, therapy did not improve psychosocial QOL; in fact, the nontherapy group was found to have better physical and sexual functioning. Several European trials have also identified an inability of prostate cancer therapy to decrease pretreatment morbidities.[7,8] Because therapy is of questionable efficacy in extending life and is known to have some morbidity, QOL evaluation is imperative when evaluating results of clinical trials in this disease population. Indeed, reports of QOL in both early[9] and advanced[10,11] disease are becoming more common.

Depending on the stage of their disease, patients with prostate cancer may be experiencing alterations in their nutrition, elimination, pain management, and sexual function. The need for an instrument that would capture multidimensional aspects of QOL and yet be "user friendly" to a very diverse socioeconomic population was deemed critical to the evaluation of therapies in patients with prostate cancer. The Functional Assessment of Cancer Therapy-General (FACT-G) is a 34-item generic QOL measurement tool that was developed by Cella *et al.*[12] The instrument measures four cornerstone dimensions of QOL: physical well-being, social/family well-being, emotional well-being, and functional well-being; and includes a brief (2 item) assessment of relationship with the doctor. The FACT-G has well-established validity and reliability,[12,13] a sixth-grade reading level, and has been administered to thousands of cancer patients since 1989.[9,12,13] Since its initial development, several disease-specific subscales of the FACT have been developed to supplement the FACT-G, including subscales for brain tumors,[14] breast cancer,[15,16] lung cancer,[15–17] colon cancer,[15,16] human immunodeficiency virus (HIV) infection,[18–20] ovarian cancer, cervical cancer, bladder cancer, and head and neck cancer.[21,22] This study was undertaken to develop and test a disease-specific subscale for prostate cancer in order to add it to the FACT-G to form the FACT-P. Some of these results have been presented in abstract form[23,24]; however, this is the first full report on the use of the FACT-P in patients with prostate cancer.

MATERIAL AND METHODS

Development of the Prostate Cancer Subscale

In the fall of 1992, multiple clinical trials were being conducted at the Meyer L. Prentis Comprehensive Cancer Center (MLPCCC, Detroit, Mich) in men with metastatic prostate cancer. The FACT (general version) was believed to be a comprehensive QOL instrument with the exception of prostate-specific questions. Collaboration with Cella *et al.*[12] resulted in the development of the prostate cancer subscale (PCS). The PCS included issues related to sexuality, bowel/bladder function, and pain. Items to be included were developed with input from 8 patients with prostate cancer and 8 oncology professionals with expertise in the care and treatment of prostate cancer patients. The healthcare providers included medical oncologists, surgical oncologists, radiation oncologists, and advanced practice nurses, all with 2 or more years of experience treating men with prostate cancer.

The first draft of the FACT-P was administered to a prostate cancer self-help group consisting of 25 individuals with prostate cancer at various stages. This first draft included the FACT-G plus 10 questions specific to prostate cancer concerns. Analysis of both written and verbal evaluations of the FACT-P identified a need to more specifically address issues such as sexuality. An additional 10 patients who had undergone radical prostatectomy completed the initial draft with similar comments. The FACT-P was revised at that time to address these areas of concern. The revised FACT-P was administered to another prostate cancer self-help group (18 men) and no further need for revision was identified at that time. Version 2 of the FACT-P, with 12 prostate-specific items, was used thereafter. This 12-item PCS was combined with the 33-item FACT-G (version 2) to form the 46-item FACT-P. Subsequent to the time when the data for this report were gathered, 1 question has been added to the FACT-G, making it 34 questions. The 47-item FACT-P (version 3) is the one currently in general use. It differs from the FACT-P used in this report only by the subsequently added item (No. 25), and by some minor rewording for clarity. The "prostate specific" questions are those included under the "additional concerns" subscale of the FACT-P (Fig. 1). The scoring and item content of the subscales have remained constant through all three versions. The FACT-P (version 3) is self-administered and requires approximately 8 to 10 minutes to complete. It requires a sixth-grade reading level and is now available in eight languages. All of the data reported here were collected using the English form.

Meyer L. Prentis Comprehensive Cancer Center/ University of Michigan Sample

By combining records from the two self-help groups used for input regarding item content, a total of 43 questionnaires were available for initial data analysis. A limited amount of complete demographic data was available for this group, but in general, the group primarily included men without hormone refractory disease. Since 1992, the FACT-P has been part of an ongoing clinical trial at the MLPCCC and the University of Michigan. Initial eligibility requirements included patients with histologically verified prostate cancer at any stage of the disease. Patients were excluded from participation if they had known evidence of brain metastasis, delirium, psychosis, or severe depression. They had to be English speakers, and had to be enrolling in a concurrent clinical trial utilizing a treatment modality for their prostate cancer. The study involved com-

FACT-P (Version 3)

Below is a list of statements that other people with your illness have said are important. By circling one number per line, please indicate how true each statement has been for you during the past 7 days.

PHYSICAL WELL-BEING	not at all	a little bit	some-what	quite a bit	very much
1. I have a lack of energy	0	1	2	3	4
2. I have nausea	0	1	2	3	4
3. Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
4. I have pain	0	1	2	3	4
5. I am bothered by side effects of treatment	0	1	2	3	4
6. I feel sick	0	1	2	3	4
7. I am forced to spend time in bed	0	1	2	3	4

8. Looking at the above 7 questions, how much would you say your **PHYSICAL WELL-BEING** affects your quality of life? (circle one number)

0 1 2 3 4 5 6 7 8 9 10

Not at all **Very much so**

SOCIAL/FAMILY WELL-BEING	not at all	a little bit	some-what	quite a bit	very much
9. I feel distant from my friends	0	1	2	3	4
10. I get emotional support from my family	0	1	2	3	4
11. I get support from my friends and neighbors	0	1	2	3	4
12. My family has accepted my illness	0	1	2	3	4
13. Family communication about my illness is poor	0	1	2	3	4
14. I feel close to my partner (or the person who is my main support)	0	1	2	3	4
15. Have you been sexually active during the past year? No___ Yes ____ If yes: I am satisfied with my sex life	0	1	2	3	4

16. Looking at the above 7 questions, how much would you say your **SOCIAL/FAMILY WELL-BEING** affects your quality of life? (circle one number)

0 1 2 3 4 5 6 7 8 9 10

Not at all **Very much so**

RELATIONSHIP WITH DOCTOR	not at all	a little bit	some-what	quite a bit	very much
17. I have confidence in my doctor(s)	0	1	2	3	4
18. My doctor is available to answer my questions	0	1	2	3	4

19. Looking at the above 2 questions, how much would you say your **RELATIONSHIP WITH THE DOCTOR** affects your quality of life? (circle one number)

0 1 2 3 4 5 6 7 8 9 10

Not at all **Very much so**

EMOTIONAL WELL-BEING	not at all	a little bit	some-what	quite a bit	very much
20. I feel sad	0	1	2	3	4
21. I am proud of how I'm coping with my illness	0	1	2	3	4
22. I am losing hope in the fight against my illness	0	1	2	3	4
23. I feel nervous	0	1	2	3	4
24. I worry about dying	0	1	2	3	4
25. I worry that my condition will get worse	0	1	2	3	4

26. Looking at the above 6 questions, how much would you say your **EMOTIONAL WELL-BEING** affects your quality of life? (circle one number)

0 1 2 3 4 5 6 7 8 9 10

Not at all **Very much so**

FUNCTIONAL WELL-BEING	not at all	a little bit	some-what	quite a bit	very much
27. I am able to work (include work in home)	0	1	2	3	4
28. My work (include work in home) is fulfilling	0	1	2	3	4
29. I am able to enjoy life	0	1	2	3	4
30. I have accepted my illness	0	1	2	3	4
31. I am sleeping well	0	1	2	3	4
32. I am enjoying the things I usually do for fun	0	1	2	3	4
33. I am content with the quality of my life right now	0	1	2	3	4

34. Looking at the above 7 questions, how much would you say your **FUNCTIONAL WELL-BEING** affects your quality of life? (circle one number)

0 1 2 3 4 5 6 7 8 9 10

Not at all **Very much so**

ADDITIONAL CONCERNS	not at all	a little bit	some-what	quite a bit	very much
35. I am losing weight	0	1	2	3	4
36. I have a good appetite	0	1	2	3	4
37. I have aches and pains that bother me	0	1	2	3	4
38. I have certain areas of my body where I experience significant pain	0	1	2	3	4
39. My pain keeps me from doing things I want to do	0	1	2	3	4
40. I am satisfied with my present comfort level	0	1	2	3	4
41. I am able to feel like a man	0	1	2	3	4
42. I have trouble moving my bowels	0	1	2	3	4
43. I have difficulty urinating	0	1	2	3	4
44. I urinate more frequently than usual	0	1	2	3	4
45. My problems with urinating limit my activities	0	1	2	3	4
46. I am able to have and keep an erection	0	1	2	3	4

47. Looking at the above 12 questions, how much would you say these **ADDITIONAL CONCERNS** affect your quality of life? (circle one number)

0 1 2 3 4 5 6 7 8 9 10

Not at all **Very much so**

FIGURE 1. *FACT-P (version 3).*

pletion of a baseline questionnaire followed by repeat administrations at 1 and 2 months. Institutional review board approval was obtained. Written consent to participate was also obtained prior to survey administration according to institutional guidelines.

By the spring of 1995, data for 34 of the patients enrolled in the study had been collected. Each of these patients had advanced hormone refractory prostate cancer and had been enrolled on an investigational study using two oral agents in treatment of their progressive disease. Three FACT-P measurements were included in the analysis for each patient based on data availability (baseline, 1 month, and 2 month). These FACT-P measurements were analyzed in conjunction with information on the participant's performance status, weight, prostate-specific antigen (PSA), and alkaline phosphatase levels at each measurement. Patients whose PSA drops consistently during therapy are typically considered to be responding well to treatment and can be expected to have an improved QOL. Collection of serial PSA and FACT-P data afforded us the opportunity to see if these two measurements covaried as expected.

University of Chicago Sample

During the period between the fall of 1994 and the spring of 1995, the FACT-P was administered to patients seen at the Prostate and Urology Center of the Louis A. Weiss Memorial Hospital, affiliated with the University of Chicago. Patients seeking a second opinion regarding their prostate cancer between 8/8/94 and 3/31/95 were invited to participate. The purpose of this study was to gather information on the degree of emotional, psychological, and social stress for patients with prostate cancer in order to determine needs for support and counseling.

Patients who agreed to participate were asked to complete a short battery of questionnaires on their initial visit to the Prostate and Urology Center. After giving informed consent, participants were asked to self-administer a battery of three questionnaires, including the FACT-P. Among the patients for whom there is information regarding the time at which they completed the questionnaires, most (67.3%) patients completed the battery before seeing the urologist in consultation.

A total of 101 prostate cancer patients were approached and 96 of these patients participated in this study. Of the 96 men who participated in the study, 86 were seeking a second opinion for their disease. An additional 10 patients who were managing their disease conservatively also completed the same battery of questionnaires.

Of the 86 men seeking second opinions, 17 (20%) had evidence of metastasis or reoccurrence. Another 67 (78%) of the second-opinion patients had clinically localized disease (with a mean follow-up time between diagnosis and study participation of 0.3 years). Of the 6 men with local disease who had already received treatment, 2 were status post radical prostatectomy and the remaining 4 had received hormone treatments. The 2 remaining patients had presented with prostate problems, without yet having gotten a positive biopsy result. Demographic data for all 3 sample groups are summarized in Table I.

RESULTS

FACT-P Scores and Internal Consistency

Scoring for the FACT scales was accomplished using a scoring guide that identifies those items that must be reversed prior to being added to obtain subscale scores. Adjustments are made in scoring to account for any missing items. Questions 8,

TABLE I. *Patient demographics*

	Scale Development Sample	University of Michigan Validity Sample 1 (n = 34)	University of Chicago Validity Sample 2 (n = 96)
Age			
Mean	65	67	66
Standard deviation		8.6	8.7
Range	49–80	47–83	44–87
Race			
White	35 (81%)	23 (79.4%)	
African-American	5 (11%)	7 (20.6%)	
Other	3 (8%)		
Years since Dx			
Mean	4.0	4.4	1.0
Range	1–14	1–14	0–12

KEY: Dx = diagnosis.

TABLE II. *FACT-P subscales: descriptive statistics on all three samples

	University of Michigan Data		
	Scale Development Sample (n = 43) Mean (SD)	Validity Sample 1 (n = 34) Mean (SD)	University of Chicago Data Validity Sample 2 (n = 96) Mean (SD)
PWB (7 items)	25.5 (3.6)	21.2 (5.3)	26.2 (2.8)
FWB (7 items)	22.4 (4.3)	16.5 (6.6)	21.6 (5.2)
SWB (7 items)	20.8 (5.0)	22.1 (4.9)	23.5 (4.3)
EWB (5 items)	16.3 (3.0)	14.6 (4.2)	15.5 (4.2)
Relationship with doctor (2 items)	6.4 (1.9)	7.6 (0.8)	6.5 (1.6)
FACT-G total score (28 items)	91.5 (13.5)	82.1 (14.1)	93.6 (11.7)
PCS (12 items)	34.4 (6.7)†	27.6 (6.8)	36.9 (6.6)
TOI (26 items) (PWB + FWB + PCS)	82.3 (13.1)†	65.2 (16.4)	84.6 (11.7)
FACT-P total score (40 items)	126.1 (18.8)†	109.8 (19.1)	130.5 (16.3)

KEY: EWB = emotional well-being; FWB = functional well-being; PCS = prostate cancer subscale; PWB = physical well-being; SD = standard deviation; SWB = social well-being.

** The scale development sample included 43 patients from a mixed-stage self-help group. Validity sample 1 contained 34 patients with advanced hormone refractory prostate cancer. Validity sample 2 contained 86 patients who were seeking a second opinion about their disease, 7 under a watchful waiting protocol, and 3 receiving vitamin A derivative treatment.*

† Means and SD of PCS and FACT-P total were computed based on prorated scores for those patients (n = 24) who completed the initial 10-item PCS.

16, 19, 26, 34, and 47 are global QOL questions currently being tested by one of the authors (D.C). These are not used at this time in scoring the general FACT or the FACT-P. Means, standard deviations, and Cronbach's alpha coefficients of FACT-P and its subscales are reported for all three samples in Tables II and III. Differences across study samples were not tested for significance, as they represent convenience samples that would make interpretation of differences difficult. It is interesting, however, that validity sample 1 consists of patients with advanced disease, whereas patients in validity sample 2 were predominantly men with localized disease.

Internal consistency assesses the degree to which items in a given scale are measuring the same underlying dimension. In other cancer types, the FACT-G subscales have demonstrated acceptable to very good coefficients of internal consistency ("undimensionality"), but this has not yet been reported in patients with prostate cancer, nor has the internal consistency of the PCS been evaluated. If the PCS items are to be added together to create a summary index of value, some minimal coefficient (eg, alpha above 0.60) is necessary to ensure that there is no excessive error in the summary score. Coefficient alpha is an established method to measure internal consistency.[25] Table III reports internal consistency of the FACT-P subscales in all three samples. Customary ranges were identified for acceptable (0.60 to 0.69), good (0.70 to 0.79), and high (0.80 to 1.0) levels. Internal consistency estimates for FACT-G and FACT-P totals were both high (FACT-G: alpha range 0.85 to 0.87; FACT-P total: alpha range to 0.87 to 0.89). For all three samples, the FACT-G subscale alpha coefficients were in the acceptable to good range (alpha = 0.61 to 0.84). Except for the emotional well-being subscale in the scale development sample, the social well-being and relationship with doctor

TABLE III. *FACT-P internal consistency on all three samples* (Cronbach's Alpha)*

	University of Michigan Data		University of Chicago Data Validity Sample 2 (n = 96)
	Scale Development Sample (n = 43)	Validity Sample 1 (n = 34)	
PWB (7 items)	0.83	0.77	0.64
FWB (7 items)	0.81	0.82	0.83
SWB (7 items)	0.72	0.69	0.71
EWB (5 items)	0.62	0.74	0.75
Relationship with doctor (2 items)	0.84	0.61	0.84
FACT-G total score (28 items)	0.87	0.85	0.87
PCS (12 items)	†	0.65	0.69
TOI (26 items) (PWB + FWB + PCS)	†	0.90	0.85
FACT-P total score (40 items)	†	0.87	0.89

KEY: Abbreviations as in Table II.
** The scale development sample included 43 patients from a mixed-stage self-help group. Validity sample 1 contained 34 patients with advanced hormone refractory prostate cancer. Validity sample 2 contained 86 patients who were seeking a second opinion about their disease, 7 under a watchful waiting protocol, and 3 receiving vitamin A derivative treatment.*
† Alpha was not computed since most of the patients completed only the 10-item initial version of the PCS.

TABLE IV. *FACT-P scores by disease stage, combined validity samples (n = 130)*

Subscale	Physical (7 items)	Social (7 items)	Relationship with Doctor (2 items)	Emotional (5 items)	Functional (7 items)	FACT-G (28 items)	PCS (12 items)	TOI (26 items)	FACT-P Total (40 items)
1. Early T0/T1	26.9*	24.3	6.7	15.8	22.1*	96.0*	37.9*	86.9*	133.9*
(n = 41)	(1.8)	(4.3)	(1.4)	(4.0)	(4.4)	(10.3)	(5.5)	(8.7)	(14.3)
2. Local T2	26.0*	23.2	6.2*	15.7	21.6*	92.2*	37.8*	85.0*	129.9*
(n = 38)	(3.0)	(3.7)	(1.9)	(4.0)	(6.0)	(12.0)	(6.7)	(12.5)	(15.7)
3. T3 or T4	21.5*	22.1	7.4*	14.0	16.4*	81.8*	28.1*	65.9*	109.8*
(n = 51)	(5.2)	(4.8)	(0.91)	(4.7)	(6.2)	(13.8)	(6.7)	(15.9)	(18.6)
Post hoc comparisons (Tukey)	3 < 2 3 < 1		3 < 2		3 < 2 3 < 1	3 < 2 3 < 1	3 < 2 3 < 1	3 < 2 3 < 1	3 < 2 3 < 1

KEY: Abbreviations as in Table II.
Numbers are mean (SD).
** P <0.05.*

subscales in validity sample 1, and the physical well-being subscale in validity sample 2, all other FACT-G subscales produced coefficients above 0.70. The 12-item prostate cancer subscale also showed acceptable coefficients (alpha = 0.65 for validity sample 1; alpha = 0.69 for validity sample 2). Cronbach's alpha (coefficient) value was evaluated using the SPSS RELIABILITY procedure, which permits interactive reduction of items in order to maximize internal consistency. Item reduction did not provide meaningful increases in the derived alpha and therefore the subscale has remained at 12 items.

Combined Validity Samples

Because the 34 patients in validity sample 1 were patients with hormone refractory prostate cancer, and the 96 patients in validity sample 2 were mostly early stage patients, it would be useful to combine the two samples in order to determine the relationship of FACT-P scores and disease stages. Results showed that patients at different disease stages had significantly different physical, functional, and PCS scores and FACT-G, FACT-P total scores. Scheffé's post hoc comparisons confirmed that patients with earlier disease reported significantly higher scores than patients with later stage disease on physical well-being, functional well-being, PCS, and the total summary scores such as FACT-G total, FACT-P total, and trial outcome index (TOI), which is the sum of physical well-being, functional well-being, and PCS (see Table IV).

Sensitivity to Change in Performance Status Rating

Because they were assessed at three points in time, patients in validity sample 1 were separated into three groups: performance status rating (PSR) improved; PSR unchanged; PSR worsened. Performance status ratings were done by the investigators using a standard Zubrod scoring method. One-way analyses of covariance (ANCOVAs) were conducted with time 3 FACT-P subscale scores as the dependent variables, time 1 FACT-P scores as

the covariates, and the PSR change groups as the independent variables. Results showed that after adjusting for the FACT-P scores at time 1, patients with improved PSR and unchanged PSR had higher physical well-being, functional well-being, PCS, TOI, and FACT-P total scores at time 3, when compared to patients with worsened PSR. Differences in social well-being, emotional well-being, and relationship with doctor subscales, as well as differences in the FACT-G, were not statistically significant.

Sensitivity to Change in PSA

Again using validity sample 1, the sensitivity of the FACT-P to change in PSA from baseline to time 3 was tested using independent *t* tests. To avoid inclusion of cases with variable clinical courses over the 2 months of study, only those patients whose PSA scores changed in a consistent direction from time 1 through time 2 and then to time 3 were selected for the analyses. Patients were separated in two groups (PSA dropping and PSA rising). FACT-P score changes from time 1 to time 3 were used as the dependent variables. Compared to the 7 patients with rising PSA levels, the 8 patients with dropping PSA had higher (better) PCS, FACT-G, TOI, and FACT-P total scores at time 3 than at time 1. The differences were significant ($P < 0.05$). The functional well-being and physical well-being subscales had the same trend as the FACT-G total and PCS, but they are not statistically significant. The differences between the two patient groups on social well-being, relationship with doctor, and emotional well-being subscales were not statistically significant.

COMMENT

QOL measurement in prostate cancer therapy has become an essential component of clinical trial evaluation and, perhaps, should be integrated into comprehensive cancer care. In many instances, the goal of therapy in prostate cancer is one of palliation as opposed to cure. This necessitates an obligation to assess the impact these treatments have on QOL and use this knowledge in the overall evaluation of efficacy. Although the primary intent of this project was to establish the basic reliability and validity of the PCS of the FACT measurement system, we also hoped to demonstrate the sensitivity to change of this instrument by incorporating it into a clinical trial using a repeated measures design.

The FACT-P was simple to administer and score. In our experience, the patients completing it had no difficulty in understanding or responding to the survey questions. Patients seemed to be genuinely pleased that an interest in their QOL was a component of their overall care. Furthermore, the data captured by the FACT-P in all three samples appear to show acceptable to very good psychometric characteristics (reliability, validity), and appear to have clinical relevance. The internal consistency coefficients for the FACT-G subscales and the PCS are all beyond the acceptable level required for making group comparisons when evaluating changes in scores over time. It is not recommended that individual case definition or classification be attempted with any subscale scores, although the FACT-G and FACT-P total scores appear to have adequate internal consistency to attempt this in future studies.

A unique aspect of this study was the ability in validity sample 1 to compare FACT-P scores to PSA level, both at baseline and over time. Because the subscales comprising the TOI are more physical in nature than the others, these TOI subscales would be expected to correlate with a disease marker such as PSA level. Baseline data correlation coefficients indicated that the TOI may, as has been suggested,[17] be the most focused and sensitive indicator of the physical aspects of QOL. The magnitude of the correlation between the TOI and baseline PSA (−0.43, or 18% shared variance) was substantially higher than the average of its three components (−0.25, or 6% shared variance). Indeed, it was the only significant correlation in this study, given the small sample size of validity sample 1. In addition, the TOI and PCS (but not the physical well-being and functional well-being subscales) were sensitive to PSA changes over time in patients who either consistently improved or consistently declined (Table V). Patients who experience a therapeutic response to therapy would be expected to have higher QOL scores, whereas those individuals who are not responding to therapy are expected to experience diminishing QOL. In the first 2 months of treatment, this is most likely to occur in the physical dimensions of QOL, most specifically, prostate cancer symptoms. Given the specific purpose of measuring a physical change, use of the TOI reduces error relative to the FACT-G or FACT-P total scores, and at the same time it combines and thereby strengthens the covarying subscales that relate to the physical aspects of QOL. This practice should not be intended to imply that measurement of social and emotional well-being is unimportant; in fact, their inclusion is essential to ensure that the full spectrum of QOL is captured by the evaluation. Improvement in the TOI, if matched by an equal or greater decline in social or emotional functioning, would remove the treatment's value.

In addition to the sensitivity of the TOI, the PCS, and the FACT-G and FACT-P total scores to changes in PSA, there was also documented sensi-

TABLE V. *FACT-P sensitivity to change in PSR and PSA, validity sample 1 (n = 34)***

	Physical (7 items)	Social (7 items)	Relationship with Doctor (2 items)	Emotional (5 items)	Functional (7 items)	FACT-G (28 items)	PCS (12 items)	TOI (26 items)	FACT-P Total (40 items)
PSR improved	21.4†	21.8	8.0	15.8	16.2‡	83.2	30.4†	68.0‡	113.6†
(n = 5)	(4.6)	(4.1)	(0.0)	(3.3)	(5.2)	(14.8)	(3.2)	(12.1)	(17.0)
PSR unchanged	20.3†	21.8	7.3	15.0	16.9‡	80.7	31.3†	68.5‡	112.1†
(n = 15)	(4.8)	(2.6)	(1.0)	(3.8)	(5.7)	(14.5)	(5.7)	(12.3)	(18.1)
PSR worsened	14.7†	21.0	8.0	15.6	9.3‡	70.0	24.0†	48.7‡	94.0†
(n = 8)	(4.6)	(4.7)	(0.0)	(4.2)	(2.0)	(8.8)	(4.6)	(7.5)	(11.7)
PSA dropping	2.0	−0.5	−0.1	1.9	2.6§	3.7†	5.3†	9.9†	9.0†
(n = 8)	(3.5)	(2.2)	(0.4)	(2.7)	(5.4)	(4.8)	(5.8)	(11.3)	(10.6)
PSA rising	−4.2	0.9	−0.0	0.3	−2.3§	−5.1†	−2.9†	−5.7†	−8.0†
(n = 7)	(9.9)	(6.4)	(1.0)	(4.6)	(3.9)	(9.4)	(7.8)	(15.7)	(16.2)

KEY: PSR = performance status rating; all other abbreviations as in Table II.
Numbers are mean (SD).
Time 3 (2 month) scores are reported. Statistical results are based on one-way analysis of covariance (ANCOVA) with PSR group (improved, unchanged, worsened) as the independent variable. Time 3 FACT-P scores were entered as the dependent measures, and time 1 scores as covariates. FACT-P change scores are reported. Statistical results are based on independent t tests comparing change scores of patients with consistently dropping PSA (n = 8) to scores of patients with consistently rising PSA (n = 7) over a 2-month period.
** Thirty-four patients with advanced hormone refractory prostate cancer (6 patients had missing PSR data at one or both of the two time points). Only those 15 patients whose PSA increased or decreased consistently from time 1 to time 2 and then to time 3 were selected for this analysis.*
† *P <0.05.*
‡ *P <0.01.*
§ *Marginal, P <0.10.*

tivity to change in PSR in validity sample 1. As Table V indicates, The FACT-P total score, the physical well-being, functional well-being, and PCS scores and, of course, the TOI, were sensitive to changes in performance status ranging over a 2-month period. Again, these subscales covering the physical dimensions of QOL are, as expected, more sensitive to changes in patient activity level. Similarly, these more physical subscales are more sensitive to the distinctions between patients with early versus late stage disease (Table IV). In particular, patients with advanced stage disease scored consistently lower than patients with earlier stage disease, reflecting the symptomatic nature of the disease and, perhaps, some psychological difference associated with having the illness at different stages. It is likely that the psychological component of the different scores is modest, if present at all, in the physical well-being, functional well-being, and PCS scores, because differences between advanced stage patients and the others in emotional well-being scores are small (1.7 to 1.8) and nonsignificant.

In a study by Litwin *et al.*,[9] the FACT-G (without the PCS) was administered to 528 men: 214 with clinically localized prostate cancer, 273 age-matched controls, and 41 with metastatic disease. The 41 metastatic cases were discarded from their analysis, to allow a comparison of QOL questionnaires in localized prostate cancer versus no disease. They found that the FACT-G subscales did not distinguish localized disease from healthy controls. PCS items could not be evaluated in that study because the questionnaires were mailed before the items became available (Litwin MS, personal communication). It is noteworthy that the mean subscale scores of our early stage patients are very similar to those of the Litwin *et al.*[9] study. We included patients with advanced disease in our analysis and did indeed find sensitivity to group differences in many subscales, as described above. Therefore, it appears that whereas the FACT-G (but not necessarily the PCS items) may not differentiate between patients with localized disease and healthy controls, per Litwin *et al.*,[9] it can indeed differentiate between prostate cancer patients across disease stage, performance status, and even PSA level. It also has the added indication of sensitivity to change, unlike the items tested by Litwin *et al.*[9] Therefore, the FACT-P can be used with confidence of sensitivity in clinical trials and clinical practice settings in which the identified patients are men with prostate cancer.

The relatively small sample sizes and inconsistency of measurements across samples are recognized limitations of this study. Nevertheless, given that this is the first full report on the performance of this widely used questionnaire, we believed it was better to combine data sets from different sites that offered complementary information and provided the greatest amount of psychometric data. Further studies administering the FACT-P to prostate cancer patients with various stages of the disease will help establish its validity across a spectrum of patients, from those waiting watchfully with early disease through patients considering second- or third-line hormonal treatment for metastatic disease. At

present, the FACT-P is being used in many clinical trials across the United States and Canada. As more data are obtained and analyzed, we hope to more clearly demonstrate the effectiveness of the FACT-P in evaluating sensitivity to change during the course of therapy. At this point, results with small numbers of patients whose clinical status (PSA, PSR) improves or declines over 2 months' time are indeed promising.

CONCLUSIONS

As therapeutically equivalent options become more prevalent across different stages of disease, more information that is specifically relevant to men with prostate cancer, such as pain, urinary and sexual function, and self-image, will be helpful, and at times crucial, in determining the choice of one treatment over another. This position has been advocated by Tannock and coworkers,[26–28] who have used palliative end-point data analyses at times preferentially over survival or disease-free survival. The FACT-P prostate-specific subscale scores were found to be significantly correlated (but not redundant) with the general FACT scores. This adds strength to the rationale for using the FACT-P with this group of patients. Our findings to date provide support for use of the FACT-P in the evaluation of QOL in men with prostate cancer. It is available for use and, indeed, is currently in use, in clinical trials and clinical practice evaluation. Ongoing translation and validation efforts have produced semantically and linguistically equivalent translations from its original English into Spanish, French, German, Italian, Dutch, Swedish, and Norwegian.

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