

REVIEW

Basic methods for the assessment of the health related quality of life in uro-oncological patients

Roman SOSNOWSKI^{1*}, Marta KULPA², Mariola KOSOWICZ², Fabrizio PRESICCE³,
Francesco PORPIGLIA⁴, Andrea TUBARO³, Cosimo De NUNZIO³, Tomasz DEMKOW¹

¹Department of Uro-oncology, M. Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland; ²Department of Psycho-oncology, M. Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland; ³Department of Urology, Sant'Andrea Hospital, "Sapienza" University of Rome, Rome, Italy; ⁴Division of Urology, Department of Oncology, University of Turin, Turin, Italy

*Corresponding author: Roman Sosnowski, Department of Uro-oncology, M. Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland. E-mail: roman.sosnowski@gmail.com

ABSTRACT

BACKGROUND: The evaluation of patients' expectations and quality of life in uro-oncology is considered an important outcome of treatment efficacy and satisfaction.

Aim of this systematic review was to evaluate the most frequently adopted tools in uro-oncology to assess Health Related Quality of Life (HRQoL).

EVIDENCE ACQUISITION: A systematic literature search until October 2015 was performed on MEDLINE, Cochrane Library, PubMed combining the following terms: "quality of life," "health related quality of life," "kidney cancer," "bladder cancer," "prostate cancer." Additional references were obtained from the reference list of full-text manuscripts. Data were synthesized using meta-analytic methods conformed to the PRISMA statement.

EVIDENCE SYNTHESIS: HRQoL is a fundamental step in evaluating treatment outcome in patients with urological cancers. HRQoL is mostly measured through several questionnaires, which are generally categorized in generic questionnaires, exploring the patient's well-being en bloc; specific questionnaires, assessing each single domain of health status; and uro-oncological specific questionnaires, mainly characterized by a modular approach. Although different questionnaires have been proposed and validated, the standard method to be adopted in urology is far from the solution and further studies should investigate the strength and weakness of the different questionnaires.

CONCLUSIONS: HRQoL questionnaires should become a standard method to evaluate medical/surgical outcomes in uro-oncology. Their implementation may significantly improve patients' satisfaction and help physicians in the decision-making process and possibly reduce health care costs.

(Cite this article as: Sosnowski R, Kulpa M, Kosowicz M, Presicce F, Porpiglia F, Tubaro A, *et al.* Basic methods for the assessment of the health related quality of life in uro-oncological patients. *Minerva Urol Nefrol* 2017;69:_____. DOI: 10.23736/S0393-2249.16.02726-0)

Key words: Quality of Life - Urinary bladder neoplasms - Prostatic neoplasms - Kidney neoplasms.

Introduction

Overall survival (OS) and cancer specific survival (CSS) are generally considered the standard parameters to evaluate the outcomes in uro-oncology. However, in recent years there is a growing interest in the assessment of Health Related Quality of Life

(HRQoL) in cancer patients in order to correctly measure treatment efficacy and satisfaction.¹ Although several HRQoL have been developed and validated, differences in the research methods, on patients' characteristics did not allow the development and implementation of a standard HRQoL tool.² The need to extensively investigate the different domains

of quality of life in cancer patients should be also balanced with the possible difficulties in filling out complex questionnaires in relation to the severe conditions of the patients in this population compilation

Aim of this systematic review was to evaluate the most frequently adopted HRQoL questionnaires in uro-oncology.

Evidence acquisition

A MEDLINE, Cochrane Library, and National Center for Biotechnology Information (NCBI) PubMed search for relevant articles published from January 1975 until January 2016 was performed by combining the following terms: “quality of life,” “health related quality of life,” “kidney cancer,” “bladder cancer,” “prostate cancer.” Only articles published in the English language and with an available full text were selected. In addition, sources in the reference sections of the identified publications were added to the list. Each article and abstract was reviewed for its appropriateness and relevance with the topic of this review. Two reviewers independently screened all abstracts and full-text articles. Disagreement was resolved by discussion, and where no agreement was reached, a third independent part acted as an arbiter (Figure 1).

Evidence synthesis

Basic principles concerning research tools

Health related quality of life can be studied using various techniques. Qualitative, multi-factorial research allows not only the ability to assess precisely the well-being of the patient but also to evaluate it qualitatively; however, this takes up relatively too much time and is labor-intensive. Another QoL evaluation method is the use of questionnaires as a tool. This last method allows the quantitative evaluation of the result and enables comparisons of various patient groups.

An important element influencing the choice of research tools in the assessment of HRQoL is the fact that the use of a given research tool

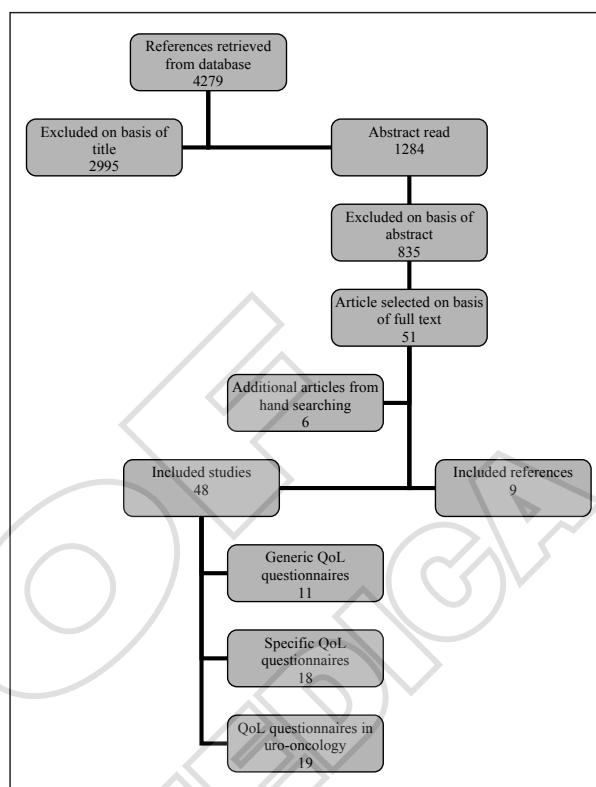


Figure 1.—Flow diagram of the search results.

should not take too long, should be adapted to the intellectual level of the respondent, should be clear and should allow the responder to provide clear answers. As an example, it is not feasible to expect pertinent answers to a hundred questions in the questionnaire since many of the responses will be inadequate.³ Therefore, many studies on QoL use specific instruments (disease-specific) for a given situation. The main advantage of these instruments is that most of the questions contained therein relate to the phenomena, which are highly likely to occur in a given patient and thus have a greater chance of detecting changes. Their main disadvantage is that one cannot compare the results obtained using different instruments or in various populations nor does it allow a general evaluation of the quality of life which requires separate research. Instruments to measure HRQoL in uro-oncological patients are often divided into generic and cancer specific instruments. This last group is further divided into two groups: domain-specific, *i.e.* the analysis of the specific, functional domains of the pa-

tient and disease-specific, *i.e.* the analysis of factors originating from the disease as such.^{3, 4}

Generic questionnaires are used to test a population over a wide range and are applied to patients with various health problems and are not restricted solely to those concerning one specific organ or system. They have the advantage of allowing comparisons to be made of the quality of life for different groups of patients. These concern four areas of research: functional, physical, mental/emotional and social. Their disadvantage is their low sensitivity with respect to changes caused by treatment within a given group of patients.⁵

Questionnaires specific to a given disease, as opposed to generic instruments, are specially designed to evaluate those aspects of health that are affected by a specific disease. These instruments are usually more sensitive, that is, sensitive to small, but important, changes in health, in comparison with general instruments.⁶ Since they focus on selected aspects of HRQoL instruments, specific to a disease, they cannot be used to compare the effects of two different diseases on the quality of life; sometimes, these instruments are so specific that they render it impossible to compare two populations of patients with the same disease, for example there are tools specifically addressed for children and adults.⁷

Quality adjusted life years

One of the important measures of HRQoL is Quality Adjusted Life Years (QALYs). This term was introduced in 1977 by Weinstein and Stason.⁸ The basis for the assumptions of the researchers was the fact that for a man, the number of years lived in good health is more valuable than the same number of years lived in mediocre or poor health. QALY calculations are based on the number of years gained by medical intervention (coefficient 1) and the quality of life in the years so obtained (coefficient 2). The final score is achieved by multiplying both factors. The first variable is the number of years for which the patient's life will be extended through the procedure; the second variable is the subjective feeling of

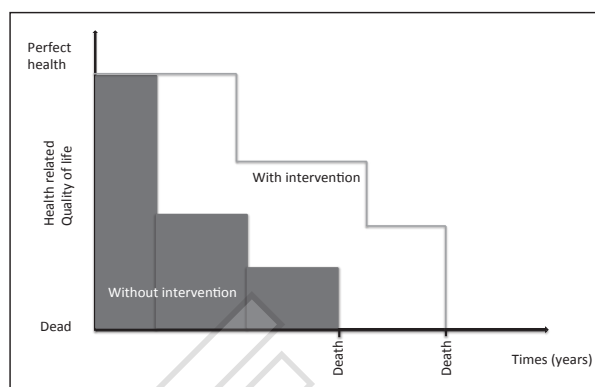


Figure 2.—Graphic presentation of QALY profit in groups of patients with and without therapeutic intervention.

satisfaction with life on a scale from 0 (death) to 1 (full health). QALY takes into account, in a consistent manner, the health, psycho-social and sociological status of the person tested and is obtained by asking the patient for how many years of life in full health would he exchange 10 years of life in his or her present state of health.⁹ Figure 2 presents the measure of QALY profit in the patients' situation with — and without — therapeutic intervention. QALY combines morbidity and mortality into a single weighted measure. Thus, QALY gives an idea of how many extra months or years of life of a reasonable quality a person might gain as a result of a treatment. QALY scale is particularly adopted in assessing the value for money of an intervention. QALY is an important and increasingly used economic measure of the relative impact of healthcare interventions and can be measured for all diseases. QALYs were largely adopted in uro-oncological studies, in several contexts. In particular recently Heilbrun *et al.* included QALY in their cost-analysis of effectiveness between immediate treatment, percutaneous biopsy and active surveillance for the diagnosis of the small solid renal mass¹⁰. In prostate cancer scenario, QALY measurements were assessed to evaluate the clinical benefit of PSA screening and for decision making between curative treatment and active surveillance in low risk patients.¹¹⁻¹³ Notwithstanding QALYs suffer from some limitations. They lack of sensitivity when comparing the efficacy of two competing but similar treatments and in the manage-

ment of less severe health problems.¹⁴ In particular chronic diseases, where quality of life is a major issue and survival less of an issue, are problematic to accommodate in the QALY context, and there is a tendency to resort to the use of disease-specific measures of quality of life. Similarly, preventive measures, where the impact on health outcomes may not occur for many years, may be difficult to quantify using QALYs because the importance attached to each of the health dimensions is highly dependent on age, life context and life responsibilities.

Further criticisms have surrounded the inadequate weight attached to emotional and mental health problems, and the lack of consideration of the impact of health problems on the quality of life of carers and other family members.¹⁴

Generic questionnaires

Form 36 Health Survey Questionnaire (SF-36) is one of the most commonly used generic questionnaires⁵ developed by Ware and co-author in 1992.¹⁵ In uro-oncology, over one hundred published studies have been carried out using the SF-36, demonstrating its abilities as a global QoL Measure. Completing SF-36 takes a patient less than 10 minutes and its utility, reproducibility and ability to demonstrate changes due to effective treatment have frequently been re-confirmed. Major limitations of SF-36 consist in a low response rate in elderly populations (more than 65 years) and a lack to assess sleep domain. In addition to other generic questionnaires, the Sickness Im-

pact Profile (SIP)¹⁶ and the Nottingham Health Profile (NHP)¹⁷ are also worth mentioning. Recently, however, these tests have been used less frequently.⁵ Table I presents a summary of generic questionnaires.¹⁵⁻²⁰

Specific questionnaires

The term HRQoL refers predominantly to individual states in the patient's life: the functional, physical, mental or social status and the overall quality of life. Specific research tools have been developed for individual areas although some of these may cover several conditions in the patient tested.

The functional status expresses mobility and the ability to do for oneself; it is a measure of adaptation to the symptoms. Somatic/physical condition is tested within a range of the performance of basic physiological functions and the physical symptoms associated with the disease and therapeutic interactions. This area reflects the quality of symptom control. The main symptom in this area, in determining the quality of life, is pain. Mental status is defined as the degree of acceptance of the disease and adaptation to the new living conditions dictated by the disease. A measure of this condition is emotional status, that is, the quantity and quality of emotions, estimated as the presence, or absence, of negative feelings of anxiety, depression, anger or the presence of positive feelings of joy, contentment and hope.²¹ The social area includes the type and quality of contacts, the extent of social support, social functioning, functioning in roles, relationships in the family and the material-

TABLE I.—*Summary of generic QoL questionnaires.*

Questionnaire	Number of questions	Domains and characteristics evaluated	Full name of the questionnaire	Validation article (s)
SF-36, -12	36, -12	physical functioning, role-physical functioning, role-emotional functioning, vitality, mental health, social functioning, bodily pain, general health	The Short Form (36) Health Survey	Mc. Horney ¹⁸ Mc. Horney ²⁰ Ware ¹⁵
SIP	136	physical, mental, social (6 subscales: somatic autonomy, mobility control, mobility range, social behaviour, emotional stability score, psychological autonomy / communication)	Sickness Impact Profile	Gilson ¹⁶ Bergner ¹⁹
NHP	38	physical mobility, social isolation, emotional reactions, pain, sleep, energy	Nottingham Health Profile	Hunt ¹⁷

household situation. The overall quality of life is determined as a summary of assessments of the above areas. This assessment does not always reflect the results obtained in the areas mentioned above. Examples of tools for auditing the overall quality of life are the Functional Assessment of Cancer Therapy — General (FACT-G) the QLQ-C30 and its abbreviated version, the QLQ-C15-PAL, which is specially prepared for evaluating the quality of life in patients in palliative care. Table II presents a summary of specific QoL questionnaires.²²⁻³⁶

Questionnaires used in uro-oncology patients

There is a characteristic aspect of cancer-specific QoL questionnaires, which distinguishes them from all other chronic disease QoL questionnaires. We can call it the “modular approach”. The modular approach in HRQoL assessment combines the administration of a cancer-specific instrument appropriate for use in any type of cancer (the “core” questionnaire) with a specific instrument (the “module” questionnaire), which assesses, in great detail, issues of relevance to specific cancer-patient subgroups (*e.g.* bladder cancer or prostate cancer), not adequately covered by the core questionnaire. The use of a module

increases specificity. Combined use of a core measure and module is advantageous because the module offers increased sensitivity to disease and treatment effects while the core measure enables results to be compared across the full range of cancer clinical contexts.³⁷

Among the many “core” questionnaires used to assess HRQoL in uro-oncology patients, the QLQ-C30 and the FACT-G are predominant.^{4, 5, 38}

EORTC QLQ-C30 was developed by experts of the Quality of Life Research Group at the European Organisation for Research and the Treatment of Cancer, EORTC.³⁹ The EORTC QLQ-C30 consists of a questionnaire of 30 questions, grouped into 5 scales and reflecting the functioning of the patient in physical, emotional, cognitive, and social and life-role levels. The questions feature three scales of symptoms (fatigue, pain and nausea with vomiting) in a global health assessment of quality of life and a certain number of questions which fall into any of the three scales to assess the intensity of additional symptoms (shortness of breath, sleep disturbance, constipation and diarrhea), as well as the patient’s own assessment of the impact of disease on his or her financial situation. Questions about the overall quality of life and health give a score

TABLE II.—*Summary of specific QoL questionnaires.*

Questionnaire	Numbers of questions / scores	Status / condition	Full name of the instrument	Validation article (s)
Karnofsky Index	Scores 0-100	Functional	Karnofsky Index	Karnofsky ²²
ECOG	Scores 0-5	Functional	Eastern Co-operative Oncology Group; Zubroda Scale; Zubroda-ECOG-WHO Scale	Oken ²³
GHO	28	Somatic	General Health Questionnaire	Goldberg ²⁴
VAS	Visual scale	Somatic	Visual Analogue Scale	Aitken ²⁵
McGill Pain Questionnaire	20	Somatic	Mc. Gill Pain Questionnaire	Melzack ²⁶
RSCL	38	Somatic	Rotterdam Symptom Checklist	De Haes ²⁷
STAS	34	Somatic	Support Team Assessment Schedule	Higginson ²⁸
MFI	20	Somatic	Multi-dimensional Fatigue Inventory	Smets ²⁹
HADS	7	Mental	Hospital Anxiety and Depression Scale	Zigmond ³⁰
STAI	40	Mental	State Trait Anxiety Index	Spielberg ³¹
BDI	21	Mental	Beck Depression Inventory questionnaire	Beck ³²
MAC	14	Mental	Mental Adjustment to Cancer	Watson ³³
QLQ-C15-PAL	EORTC QLQ C-30 + 15-items	Palliative care	European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative	Groenvold ³⁴
FACIT-Pal	FACIT-G + 19-items	Palliative care	Functional Assessment of Chronic Illness Therapy – Palliative Care	Cella ³⁵
QLI	5	Palliative care	Spitzer’s Quality of Life Index	Spitzer ³⁶

ranging from 1 to 7, number 1 indicating a very poor state of health and quality of life and 7 indicating “excellent”. Other questions have a four-point response range from 1 to 4 (never, sometimes, often, and very often). The higher the total score, the higher the quality of life of the patient. The EORTC group has created many specific questionnaires besides the QLQ C-30, all dedicated to specific types of cancer, for example, the QLQ PR25 for testing the quality of life of patients with prostate cancer.

Another questionnaire often used in HRQoL studies on uro-oncology patients is the FACT-G (Functional Assessment of Cancer Therapy - General). This is derived from the FACT group of questionnaires (Functional Assessment of Cancer Therapy).³⁵ The FACT-G questionnaire, consists of 27 questions grouped into four main domains, or subscales, defining the quality of life as physical condition, social/family life, emotional state and functioning in daily life. Each of these questions is assessed on a five-point scale from 0 - being the lowest quality of life - to 4, the highest quality of life. The higher scores in each of the scales indicate the higher quality of life of the patient. In addition to the basic FACT-G questionnaire, supplementary questions or modules for each organ or system issues are used, such as prostate cancer and bladder cancer.

To ease the usability of the FACT-G, new methods for computer acquisition, scoring, and display of data will be available. These implementations will likely alleviate patient burden, expedite data collection and scoring, and further guide the clinician or researcher in meaningful interpretation.

Equivalent foreign language versions of the FACT-G questionnaires are currently available in more than 50 different languages (for some scales), permitting cross-cultural comparisons of populations from different backgrounds. On the other hand, the QLQ C-30 has been translated and validated into 81 languages and has been used in more than 3,000 studies worldwide. It has been supplemented by disease-specific modules for several cancers. The average time required to complete the questionnaire was approximately 11 minutes,

and most patients required no assistance. In addition QLQ C-30 showed optimal validity to detect alterations induced by oncological treatments: statistically significant changes, in the expected direction, in physical and role functioning, global quality of life, fatigue, and nausea and vomiting were 13 differences between EORTC QLQ C-30 and FACT-G for measuring health-related quality of life in cancer clinical research.³⁷ They have reported that psychometric evidence does not recommend one questionnaire over the other in general. However, important differences between the social domains, scale structure and tone that inform choice have been found. Firstly important differences concern the manner in which “social HRQoL” is theorized and measured in the QLQ C-30 *versus* FACT-G. QLQ C-30 evaluates impacts on social activities and family life while FACT-G focuses on social support and relationships. Furthermore the QLQ C-30 overall score is generated by averaging responses to just two questions (global health and quality of life), while the FACT-G consists in the summation of all 27 items. Classical test theory expects that scales included a greater number of items should be more reliable and therefore more sensitive and responsive. On the other hand, the multiplicity of issues and symptoms subsumed within each FACT-G scale increases the potential for sensitivity and responsiveness to be reduced because of differential effects among items. Lastly the QLQ-C30 and FACT-G differ in their respective ‘look and feel’. With the exclusion of its emotional scale, the QLQ-C30 limits its questions to relatively ‘objective’ aspects of functioning, whereas the FACT-G encourages respondents to reflect on their thoughts and feelings throughout.³⁷

The Expanded Prostate Cancer Index Composite (EPIC) is other example of comprehensive instrument for evaluation patient function and bother after different type of prostate cancer treatment.⁴⁰ The original UCLA-PCI questioner⁴¹ was augmented with specific items addressing irritative and obstructive voiding symptoms, hematuria and symptoms intimately related to androgen deprivation therapy. The

shortened version of this tool was developed – EPIC-26⁴² and EPIC for Clinical Practice with 16 items.⁴³ In the recently performed systemic comparison of instruments assessing QLQ in prostate cancer patients, authors conclude that EPIC had the best rate according to EMPRO standard criteria.^{44, 45}

In order to obtain the highest possible level of precision of QoL analysis in patients with specific uro-oncological diseases, numerous authors and groups of researchers have developed dedicated instruments. Many of these tools have not been validated and have been used only once. Table III presents some selected, validated and relatively frequently used research tools for cancer patients with ailments of kidney, bladder and prostate.^{35, 39, 46-68}

In a recent systematic review of the most used questionnaires in men with prostate cancer carried out recently, the author chose several, from among 20 different questionnaires, for a specific purpose.³⁸ The SF-12 questionnaires, as a generic instrument, should be recommended for screening populations in line with positive ratings for criterion validity, construct validity, reproducibility, and interpretability. The CARES-SF and the FACT-G questionnaires can be recommended as cancer-specific HRQoL instruments, as they both received positive ratings for content validity, internal consistency, construct validity, and reproducibility. Additionally, the CARES-SF is more extensive and also has a marital and sexual domain. The UCLA-PCI and the FACT-P are recommended for the specific evaluation of prostate cancer patients. When detailed information is needed regarding bowel, sexual, and urinary function, the UCLA-PCI may provide more insight.

The systemic review of the literature done by MacLennan, showed that there are no dedicated methods for the evaluation of the quality of life in patients with cancer of the kidneys and hence there are no clear guidelines presenting appropriate research tools.⁶⁹ Only Liu and co-authors mentioned structured review studies on HRQoL in various types of cancer, specifically cancer of the kidney, claiming that continued development and a refinement of

instruments, especially for kidney cancer, are urgently needed.⁷⁰ In studies evaluating various surgical techniques and various scopes of kidney operations, questionnaires SF-36 and EORTC QLQ C-30 were used as generic instruments^{69, 71-73} while for the evaluation of therapy, in the generalized stadium of cancer disease, questionnaires EORTC QLQ C-30 and FACT-G⁷⁴⁻⁷⁶ were used. As a disease-specific questionnaire, FKSI and RCC-SI^{67, 68} were most often used.

Measuring HRQOL in bladder cancer has its unique difficulties. All of the currently available bladder cancer-specific instruments contain items evaluating the urinary domain, but the items mostly address general, urinary problems.⁷⁷ Different cancers also come with different sets of potential side effects and impacts on body image. Hence it is difficult to develop a universal, disease-specific instrument, which can be applied to all patients with bladder cancer. Systematic reviews and meta-analysis of the literature on health related quality of life after radical cystectomy showed that most often, SF-36 and SIP were used as generic instruments for the evaluation of QoL while for evaluation relating to the QoL in cancer, FACT-G, EORTC QLQ C-30 were most often used.⁷⁷⁻⁷⁹ The most frequently used instruments specific for bladder cancer were BCI, FACT-BL and EORTC QLQ BLM-30.⁴⁶ Attention should be drawn to the fact that there is a very limited selection of highly specialized instruments dedicated to selected situations in bladder cancer. The recently developed instrument — IONB-PRO — dedicated to patients with bladder cancer who underwent cystectomy with the ileal orthotopic neo-bladder⁵⁴ is worthy of note. The authors of one of the recently performed systemic reviews concluded that *“although progress has been made in evaluating HRQOL in post-cystectomy bladder cancer patients, there is still a need for well-designed, prospective studies”*.⁷⁷

To assess levels of self-esteem, which are indirectly associated with the assessment of the quality of life, the Self-Esteem questionnaire (SES) — developed by Morison Rosen-

TABLE III.—*Summary of HRQOL questionnaires for uro-oncology patients.*

Questionnaire	Numbers of questions	Subscales
FACT-G	27	Physical, social / family, emotional functional
EORTC QLQ C-30	30	Physical, role, cognitive, emotional, social; three symptom scales (fatigue, pain and nausea / vomiting); a global health and quality of life scale
EORTC-BLM30	30	Urinary and bowel symptoms, sexual function, urostomy issues, catheter problems, and body image
EORTC-BLS24	24	Urinary and bowel symptoms, sexual function, urostomy issues, catheter problems, and body image
FACT-BI	27+13	Urinary, bowel and sexual symptoms
FACT-BI-Cys (FACT-VCI)	27+17	Urinary, bowel And sexual symptoms
IONB-PRO	43	Symptoms, neo-bladder self-management emotional, activities of daily living, social and emotional issues, leap fatigue
BCI	36	Bowel, sexual and urinary function, bother
FACT-P	27+12	Bowel function and bother, sexual function and bother, urinary incontinence and irritative – obstructive, hormonal function and bother
EORTC QLQ PR25	30+25	Bowel symptom, sexual activity and functioning, urinary symptom and incontinence, The side-effects of hormonal treatment (androgen deprivation)
PORPUS	10	Sexual, urinary, bowel and utility
EPIC	50	Urinary continence / irritation, bowel, sexual, and hormonal treatment (androgen deprivation) function as well as related bother.
PC-QoL	52	Urinary, bowel, sexual, function as well as related and role of activity limitation bother, anxiety over disease course/effectiveness of treatment
PCSI	29	Urinary, bowel, sexual, function as well as related symptom distress, cancer worry
UCLA-PCI	20	Bowel function and bother, sexual function and bother, urinary function and bother)
FKSI-10,-15	10, -15	Pain, fatigue, pulmonary symptoms, bowel/bladder symptoms, nutritional health, psychological functioning, treatment side effects
RCC-SI	30	Pain, fatigue, pulmonary symptoms, bowel / bladder symptoms, nutritional health, psychological functioning, treatment side effects

berg in 1965 — is applied. The questionnaire is also called the Rosenberg Self-Assessment Scale.⁸⁰ The scale consists of 10 statements regarding conscious attitudes to the inner self, both positive and negative, regarding the emotions associated with cognitive opinions about oneself. The results shown on the SES scale can indirectly supplement a diagnosis of depression, a narcissistic personality, certain qualities of temperament, locus of control, optimism, social skills or shyness.

The surgical treatment of men, during

which damage to the external genitalia takes place, can significantly alter the quality of life. Among others, perception of the masculinity of a given patient has a significant influence on the scale of this deterioration. Men, recognizing traditional patterns and views on masculinity would draw a lot of satisfaction from their sexual sphere of life, which significantly affects their mental well-being. A 94-question, CMNI questionnaire (the Masculine Norms Conformity Inventory) evaluating a patient's identification with the standards of masculin-

Full name of the instrument	Validation article(s)	Type of questionnaire	Disease
Functional Assessment of Cancer Therapy – General	Cella ³⁵	Core	General cancer
European Organisation for Research and Treatment of Cancer Quality of Life Core Questionnaire	Aaronson ³⁹	Core	General cancer
European Organisation for Research and Treatment of Cancer Quality of Life Core Questionnaire-Bladder Cancer Muscle Invasive	Erber ⁴⁶ Songi ⁴⁷ Gacci ⁴⁸	Modular	Muscle-invasive bladder cancer
European Organisation for Research and Treatment of Cancer Quality of Life Core Questionnaire-Bladder Cancer Muscle Invasive	Blazeby ⁴⁹	Modular	Non muscle-invasive bladder cancer
Functional Assessment of Cancer Therapy-Bladder Cancer	Cella ³⁵ Mansson ⁵⁰ Ali ⁵¹ Kikuchi ⁵²	Modular	Bladder cancer
Functional Assessment of Cancer Therapy -Bladder Cancer - Cystectomy (FACT-Vanderbilt Cystectomy Index)	Cookson ⁵³ Songi ⁴⁷ Gacci ⁴⁸	Modular	Bladder cancer – after cystectomy and various urinary diversions
Ileal Orthotopic Neo-bladder Patient-Reported Outcomes	Siracusano ⁵⁴	Specific	Bladder cancer – patient with ileal Orthotopic Neo-bladder
Bladder Cancer Index	Gilbert ⁵⁵ Gilbert ⁵⁶	Specific	Bladder cancer – after local therapy
Functional assessment of cancer Therapy-Prostate	Esper ⁵⁷ Esper ⁵⁸	Modular	Prostate cancer
European Organisation for Research and Treatment of Cancer Quality of Life Core Questionnaire- Prostate	van Andel ⁵⁹ O' Leary ⁶⁰	Modular	Prostate cancer
Patient-oriented Prostate Utility Scale	Krahn ⁶¹ Ritvo ⁶²	Specific	Prostate cancer
Expanded Prostate Index Composite	Wei ⁴⁰	Specific	Prostate cancer – after radical prostatectomy or radiotherapy
Prostate Cancer Quality of Life Instrument	Hollenbeck ⁶³ Giesler ⁶⁴	Specific	Clinically localised prostate cancer
Prostate Cancer Symptom Indices	Clark ⁶⁵	Specific	Prostate cancer – after radical prostatectomy or external beam radiotherapy
University of California -Los Angeles - Prostate Cancer Index	Litwin ⁴¹	Specific	Prostate cancer – after radical prostatectomy or external beam radiotherapy
Functional Assessment of Cancer Therapy-Kidney Symptom Index	Cella ⁶⁷	Modular	Kidney cancer
Renal Cell Carcinoma Symptom Index	Harding ⁶⁶ Rao ⁶⁸	Specific	Kidney cancer

ity applicable, was developed by Mahalik and co-authors in 2003.⁸¹ In 2008, Burns and co-authors developed a shortened, 22-question version of CMNI reflecting all 11 domains of the original questionnaire.⁸²

Conclusions

Management of cancer patients has extensively improved in the decades, particularly treatment efficacy and improved overall survival must be associated to a corresponding

improvement on patients' quality of life. So far the evaluation of quality of life is mandatory in cancer patients and the need of a standardized method is a priority in uro-oncology. Generic/specific and uro-oncological questionnaires have been proposed and validated with controversial results. Unfortunately most of them are not routinely used in clinical practice and we are far to define the standard questionnaire to be used in different settings and populations. Well-designed comparative studies and consensus conferences are expected to regulate

the use of these instruments and to clarify their use in different area.

Furthermore, taking into account the implications of the health related quality of life issues on the current and future managements of cancer patients, we support that validated health-related quality of life questionnaires should be use in clinical trials as well as in clinical practice to better evaluate and investigate the safety and efficacy of new treatment modalities. Their implementation may also significantly improve patients' satisfaction and help physicians in the decision-making process and possibly reduce health care costs through the improvement of patients' mental and physical distress.

References

- Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. *Ann Intern Med* 1993;118:622-9.
- Bullinger M. Assessing health related quality of life in medicine. An overview over concepts, methods and applications in international research. *Restor Neurol Neurosci* 2002;20:93-101.
- Guyatt GH, Ferrans CE, Halyard MY, Revicki DA, Symonds TL, Varricchio CG, *et al.* Exploration of the value of health-related quality-of-life information from clinical research and into clinical practice. *Mayo Clin Proc* 2007;82:1229-39.
- Heldwein FL, Sanchez-Salas RE, Sanchez-Salas R, Teloken PE, Teloken C, Castillo O, *et al.* Health and quality of life in urology: issues in general urology and urological oncology. *Arch Esp Urol* 2009;62:519-30.
- Garratt A, Schmidt L, Mackintosh A, Fitzpatrick R. Quality of life measurement: bibliographic study of patient assessed health outcome measures. *BMJ* 2002;324:1417.
- Wiebe S, Guyatt G, Weaver B, Matijevic S, Sidwell C. Comparative responsiveness of generic and specific quality-of-life instruments. *J Clin Epidemiol* 2003;56:52-60.
- Bryant D, Schunemann H, Brozek J, Jaeschke R, Guyatt G. [Patient reported outcomes: general principles of development and interpretability]. *Pol Arch Med Wewn* 2007;117:5-11.
- Weinstein MC, Stason WB. Foundations of cost-effectiveness analysis for health and medical practices. *N Engl J Med* 1977;296:716-21.
- Robberstad B. QALYs vs DALYs vs LYs gained: What are the differences, and what difference do they make for health care priority setting? *Norsk Epidemiologi* 2005;15:183-91.
- Heilbrun ME, Yu J, Smith KJ, Dechet CB, Zagoria RJ, Roberts MS. The cost-effectiveness of immediate treatment, percutaneous biopsy and active surveillance for the diagnosis of the small solid renal mass: evidence from a Markov model. *J Urol* 2012;187:39-43.
- Heijnsdijk EA, De Carvalho TM, Auvinen A, Zappa M, Nelen V, Kwiatkowski M, *et al.* Cost-effectiveness of prostate cancer screening: a simulation study based on ERSPC data. *J Natl Cancer Inst* 2015;107:366.
- Heijnsdijk EA, Wever EM, Auvinen A, Hugosson J, Ciatto S, Nelen V, *et al.* Quality-of-life effects of prostate-specific antigen screening. *N Engl J Med* 2012;367:595-605.
- Liu D, Lehmann HP, Frick KD, Carter HB. Active surveillance versus surgery for low risk prostate cancer: a clinical decision analysis. *J Urol* 2012;187:1241-6.
- Phillips C, Thompson G. What is a QALY?: Hayward Medical Communications; 2001.
- Ware JE, Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992;30:473-83.
- Gilson BS, Gilson JS, Bergner M, Bobbit RA, Kressel S, Pollard WE, *et al.* The sickness impact profile. Development of an outcome measure of health care. *Am J Public Health* 1975;65:1304-10.
- Hunt SM, Mckenna SP, Mcewen J, Williams J, Papp E. The Nottingham Health Profile: subjective health status and medical consultations. *Soc Sci Med A* 1981;15:221-9.
- Mchorney CA, Ware JE, Jr., Raczek AE. The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. *Med Care* 1993;31:247-63.
- Bergner M, Bobbitt RA, Carter WB, Gilson BS. The Sickness Impact Profile: development and final revision of a health status measure. *Med Care* 1981;19:787-805.
- Mchorney CA, Ware JE, Jr., Lu JF, Sherbourne CD. The MOS 36-item Short-Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Med Care* 1994;32:40-66.
- Julian LJ. Measures of anxiety: State-Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), and Hospital Anxiety and Depression Scale-Anxiety (HADS-A). *Arthritis Care Res (Hoboken)* 2011;63 Suppl 11:S467-72.
- Karofsky DA, Burchenal JH. Present status of clinical cancer chemotherapy. *Am J Med* 1950;8:767-88.
- Oken MM, Creech RH, Tormey DC, Horton J, Davis TE, Mcfadden ET, *et al.* Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am J Clin Oncol* 1982;5:649-55.
- Goldberg DP, Hillier VF. A scaled version of the General Health Questionnaire. *Psychol Med* 1979;9:139-45.
- Aitken RC. Measurement of feelings using visual analogue scales. *Proc R Soc Med* 1969;62:989-93.
- Melzack R. The McGill Pain Questionnaire: major properties and scoring methods. *Pain* 1975;1:277-99.
- De Haes JC, Van Knippenberg FC, Neijt JP. Measuring psychological and physical distress in cancer patients: structure and application of the Rotterdam Symptom Checklist. *Br J Cancer* 1990;62:1034-8.
- Higginson IJ, Mccarthy M. Validity of the support team assessment schedule: do staffs' ratings reflect those made by patients or their families? *Palliat Med* 1993;7:219-28.
- Smets EM, Garssen B, Bonke B, De Haes JC. The Multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. *J Psychosom Res* 1995;39:315-25.
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361-70.
- Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. Manual for the State-Trait Anxiety Inventory: Consulting Psychologists Press; 1983.
- Beck AT. A systematic investigation of depression. *Compr Psychiatry* 1961;2:163-70.
- Watson M, Greer S, Young J, Inayat Q, Burgess C, Robertson B. Development of a questionnaire measure of adjustment to cancer: the MAC scale. *Psychol Med* 1988;18:203-9.
- Groenvold M, Petersen MA, Aaronson NK, Arraras JI, Blazeby JM, Bottomley A, *et al.* The development of the EORTC QLQ-C15-PAL: a shortened question-

- naire for cancer patients in palliative care. *Eur J Cancer* 2006;42:55-64.
35. Cella DF, Tulsky DS, Gray G, Sarafian B, Linn E, Bonomi A, *et al.* The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *J Clin Oncol* 1993;11:570-9.
 36. Spitzer WO, Dobson AJ, Hall J, Chesterman E, Levi J, Shepherd R, *et al.* Measuring the quality of life of cancer patients: a concise QL-index for use by physicians. *J Chronic Dis* 1981;34:585-97.
 37. Luckett T, King MT, Butow PN, Oguchi M, Rankin N, Price MA, *et al.* Choosing between the EORTC QLQ-C30 and FACT-G for measuring health-related quality of life in cancer clinical research: issues, evidence and recommendations. *Ann Oncol* 2011;22:2179-90.
 38. Hamoen EH, De Rooij M, Witjes JA, Barentsz JO, Rovers MM. Measuring health-related quality of life in men with prostate cancer: A systematic review of the most used questionnaires and their validity. *Urol Oncol* 2015;33:69 e19-28.
 39. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, *et al.* The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst* 1993;85:365-76.
 40. Wei JT, Dunn RL, Litwin MS, Sandler HM, Sanda MG. Development and validation of the expanded prostate cancer index composite (EPIC) for comprehensive assessment of health-related quality of life in men with prostate cancer. *Urology* 2000;56:899-905.
 41. Litwin MS, Hays RD, Fink A, Ganz PA, Leake B, Brook RH. The UCLA Prostate Cancer Index: development, reliability, and validity of a health-related quality of life measure. *Med Care* 1998;36:1002-12.
 42. Szymanski KM, Wei JT, Dunn RL, Sanda MG. Development and validation of an abbreviated version of the expanded prostate cancer index composite instrument for measuring health-related quality of life among prostate cancer survivors. *Urology* 2010;76:1245-50.
 43. Chang P, Szymanski KM, Dunn RL, Chipman JJ, Litwin MS, Nguyen PL, *et al.* Expanded prostate cancer index composite for clinical practice: development and validation of a practical health related quality of life instrument for use in the routine clinical care of patients with prostate cancer. *J Urol* 2011;186:865-72.
 44. Schmidt S, Garin O, Pardo Y, Valderas JM, Alonso J, Rebollo P, *et al.* Assessing quality of life in patients with prostate cancer: a systematic and standardized comparison of available instruments. *Qual Life Res* 2014;23:2169-81.
 45. Valderas JM, Ferrer M, Mendivil J, Garin O, Rajmil L, Herdman M, *et al.* Development of EMPRO: a tool for the standardized assessment of patient-reported outcome measures. *Value Health* 2008;11:700-8.
 46. Erber B, Schrader M, Miller K, Schostak M, Baumunk D, Lingnau A, *et al.* Morbidity and Quality of Life in Bladder Cancer Patients following Cystectomy and Urinary Diversion: A Single-Institution Comparison of Ileal Conduit versus Orthotopic Neobladder. *ISRN Urol* 2012;2012:342796.
 47. Sogni F, Brausi M, Frea B, Martinengo C, Faggiano F, Tizzani A, *et al.* Morbidity and quality of life in elderly patients receiving ileal conduit or orthotopic neobladder after radical cystectomy for invasive bladder cancer. *Urology* 2008;71:919-23.
 48. Gacci M, Saleh O, Cai T, Gore JL, D'elia C, Minervini A, *et al.* Quality of life in women undergoing urinary diversion for bladder cancer: results of a multicenter study among long-term disease-free survivors. *Health Qual Life Outcomes* 2013;11:43.
 49. Blazeyby JM, Hall E, Aaronson NK, Lloyd L, Waters R, Kelly JD, *et al.* Validation and reliability testing of the EORTC QLQ-NMIBC24 questionnaire module to assess patient-reported outcomes in non-muscle-invasive bladder cancer. *Eur Urol* 2014;66:1148-56.
 50. Mansson A, Davidsson T, Hunt S, Mansson W. The quality of life in men after radical cystectomy with a continent cutaneous diversion or orthotopic bladder substitution: is there a difference? *BJU Int* 2002;90:386-90.
 51. Ali AS, Hayes MC, Birch B, Dudderidge T, Somani BK. Health related quality of life (HRQoL) after cystectomy: comparison between orthotopic neobladder and ileal conduit diversion. *Eur J Surg Oncol* 2015;41:295-9.
 52. Kikuchi E, Horiguchi Y, Nakashima J, Ohigashi T, Oya M, Nakagawa K, *et al.* Assessment of long-term quality of life using the FACT-BL questionnaire in patients with an ileal conduit, continent reservoir, or orthotopic neobladder. *Jpn J Clin Oncol* 2006;36:712-6.
 53. Cookson MS, Dutta SC, Chang SS, Clark T, Smith JA, Jr., Wells N. Health related quality of life in patients treated with radical cystectomy and urinary diversion for urothelial carcinoma of the bladder: development and validation of a new disease specific questionnaire. *J Urol* 2003;170:1926-30.
 54. Siracusano S, Niero M, Lonardi C, Cerruto MA, Ciciliato S, Toffoli L, *et al.* Development of a questionnaire specifically for patients with Ileal Orthotopic Neobladder (IONB). *Health Qual Life Outcomes* 2014;12:135.
 55. Gilbert SM, Dunn RL, Hollenbeck BK, Montie JE, Lee CT, Wood DP, *et al.* Development and validation of the Bladder Cancer Index: a comprehensive, disease specific measure of health related quality of life in patients with localized bladder cancer. *J Urol* 2010;183:1764-9.
 56. Gilbert SM, Wood DP, Dunn RL, Weizer AZ, Lee CT, Montie JE, *et al.* Measuring health-related quality of life outcomes in bladder cancer patients using the Bladder Cancer Index (BCI). *Cancer* 2007;109:1756-62.
 57. Esper P, Mo F, Chodak G, Sinner M, Cella D, Pienta KJ. Measuring quality of life in men with prostate cancer using the functional assessment of cancer therapy-prostate instrument. *Urology* 1997;50:920-8.
 58. Esper P, Hampton JN, Smith DC, Pienta KJ. Quality-of-life evaluation in patients receiving treatment for advanced prostate cancer. *Oncol Nurs Forum* 1999;26:107-12.
 59. Van Andel G, Bottomley A, Fossa SD, Efficace F, Coens C, Guerif S, *et al.* An international field study of the EORTC QLQ-PR25: a questionnaire for assessing the health-related quality of life of patients with prostate cancer. *Eur J Cancer* 2008;44:2418-24.
 60. O'leary E, Drummond FJ, Gavin A, Kinnear H, Sharp L. Psychometric evaluation of the EORTC QLQ-PR25 questionnaire in assessing health-related quality of life in prostate cancer survivors: a curate's egg. *Qual Life Res* 2015;24:2219-30.
 61. Krahn M, Ritvo P, Irvine J, Tomlinson G, Bezjak A, Trachtenberg J, *et al.* Construction of the Patient-Oriented Prostate Utility Scale (PORPUS): a multiattribute health state classification system for prostate cancer. *J Clin Epidemiol* 2000;53:920-30.
 62. Ritvo P, Irvine J, Naglie G, Tomlinson G, Bezjak A, Matthew A, *et al.* Reliability and validity of the PORPUS, a combined psychometric and utility-based quality-of-life instrument for prostate cancer. *J Clin Epidemiol* 2005;58:466-74.
 63. Hollenbeck BK, Dunn RL, Wei JT, Montie JE, Sanda MG. Determinants of long-term sexual health outcome after radical prostatectomy measured by a validated instrument. *J Urol* 2003;169:1453-7.
 64. Giesler RB, Miles BJ, Cowen ME, Kattan MW. Assessing quality of life in men with clinically localized pros-

- tate cancer: development of a new instrument for use in multiple settings. *Qual Life Res* 2000;9:645-65.
65. Clark JA, Talcott JA. Symptom indexes to assess outcomes of treatment for early prostate cancer. *Med Care* 2001;39:1118-30.
 66. Harding G, Cella D, Robinson D, Jr., Mahadevia PJ, Clark J, Revicki DA. Symptom burden among patients with renal cell carcinoma (RCC): content for a symptom index. *Health Qual Life Outcomes* 2007;5:34.
 67. Cella D, Yount S, Du H, Dhanda R, Gondek K, Langefeld K, *et al.* Development and validation of the Functional Assessment of Cancer Therapy-Kidney Symptom Index (FKSI). *J Support Oncol* 2006;4:191-9.
 68. Rao D, Butt Z, Rosenbloom S, Robinson D, Jr., Von Roenn J, Kuzel TM, *et al.* A Comparison of the Renal Cell Carcinoma-Symptom Index (RCC-SI) and the Functional Assessment of Cancer Therapy-Kidney Symptom Index (FKSI). *J Pain Symptom Manage* 2009;38:291-8.
 69. MacLennan S, Imamura M, Lapitan MC, Omar MI, Lam TB, Hilvano-Cabungcal AM, *et al.* Systematic review of perioperative and quality-of-life outcomes following surgical management of localised renal cancer. *Eur Urol* 2012;62:1097-117.
 70. Liu J, Mittendorf T, Von Der Schulenburg JM. A structured review and guide through studies on health-related quality of life in kidney cancer, hepatocellular carcinoma, and leukemia. *Cancer Invest* 2010;28:312-22.
 71. Gratzke C, Seitz M, Bayrle F, Schlenker B, Bastian PJ, Haseke N, *et al.* Quality of life and perioperative outcomes after retroperitoneoscopic radical nephrectomy (RN), open RN and nephron-sparing surgery in patients with renal cell carcinoma. *BJU Int* 2009;104:470-5.
 72. Polascik TJ, Pound CR, Meng MV, Partin AW, Marshall FF. Partial nephrectomy: technique, complications and pathological findings. *J Urol* 1995;154:1312-8.
 73. Shinohara N, Harabayashi T, Sato S, Hioka T, Tsuchiya K, Koyanagi T. Impact of nephron-sparing surgery on quality of life in patients with localized renal cell carcinoma. *Eur Urol* 2001;39:114-9.
 74. Heinzer H, Mir TS, Huland E, Huland H. Subjective and objective prospective, long-term analysis of quality of life during inhaled interleukin-2 immunotherapy. *J Clin Oncol* 1999;17:3612-20.
 75. Motzer RJ, Hutson TE, Tomczak P, Michaelson MD, Bukowski RM, Rixe O, *et al.* Sunitinib versus interferon alfa in metastatic renal-cell carcinoma. *N Engl J Med* 2007;356:115-24.
 76. Cella D, Li JZ, Cappelleri JC, Bushmakina A, Charbonneau C, Kim ST, *et al.* Quality of life in patients with metastatic renal cell carcinoma treated with sunitinib or interferon alfa: results from a phase III randomized trial. *J Clin Oncol* 2008;26:3763-9.
 77. Shih C, Porter MP. Health-related quality of life after cystectomy and urinary diversion for bladder cancer. *Adv Urol* 2011;2011:715892.
 78. Cerruto MA, D'elia C, Siracusano S, Gedeshi X, Mariotto A, Iafrate M, *et al.* Systematic review and meta-analysis of non RCT's on health related quality of life after radical cystectomy using validated questionnaires: Better results with orthotopic neobladder versus ileal conduit. *Eur J Surg Oncol* 2016;42:343-60.
 79. Lee RK, Abol-Enein H, Artibani W, Bochner B, Dalbagni G, Daneshmand S, *et al.* Urinary diversion after radical cystectomy for bladder cancer: options, patient selection, and outcomes. *BJU Int* 2014;113:11-23.
 80. Rosenberg M. Society and adolescent self-image. New York: Princeton University Press; 1965.
 81. Mahalik JR, Locke BD, Ludlow LH, Diemer M, Scott RPJ, Gottfried M. Development of the Conformity to Masculine Norms Inventory. *Psychology of Men and Masculinity*, 2003;4:3-25.
 82. Burns SM, Mahalik JR. Sexual functioning as a moderator of the relationship between masculinity and men's adjustment following treatment for prostate cancer. *Am J Mens Health* 2008;2:6-16.

Conflicts of interest.—The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Article first published online: September 28, 2016.