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A new index of priority symptoms in advanced ovarian cancer

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Abstract

Objective—This study sought to develop and examine preliminary validity of the NCCN-FACT Ovarian Symptom Index-18 (NFOSI-18), a new ovarian cancer-specific symptom index comprised of symptoms rated as highest priority by both oncology clinical experts and women with advanced ovarian cancer.

Methods—Fifty-one women with advanced ovarian cancer rated the importance of 30 symptoms associated with advanced ovarian cancer. Ten gynecologic oncologists then rated symptoms according to whether they were predominantly disease- or treatment-related. Patient priorities were then reconciled with previously-published clinician priorities for symptom measurement in ovarian cancer. This produced the NFOSI-18. Participants also completed measures of quality of life and performance status to examine preliminary validity of the NFOSI-18.

Results—An 18-item symptom index for advanced ovarian cancer was developed, including three subscales: disease-related symptoms, treatment-related symptoms, and general function/well-being. Lower NFOSI-18 scores indicate greater high-priority symptom burden. Preliminary reliability suggests good internal consistency ($\alpha=0.80$). The NFOSI-18 and its subscales were significantly positively associated with quality of life validity criteria. Scores on the NFOSI-18 differed significantly by performance status, with poor performance status associated with lower NFOSI-18 scores.

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Conflict of interest statement

Support for the study was provided by grants from the following pharmaceutical companies: Amgen, AstraZeneca, Bayer, Bristol-Myers Squibb, Centocor, Cell Therapeutics, Inc., Genentech, GlaxoSmithKline, Eli Lilly and Company, Merck & Co., Novartis, Ortho Biotech, Pfizer, Sanofi-Aventis and Takeda Pharmaceuticals. The contents represent original work. No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit upon the author(s) or upon any organization with which the author(s) is/are associated.

Conclusions—The NFOSI-18 shows preliminary evidence for reliability and validity as a brief assessment of the most important symptoms associated with treatment for advanced ovarian cancer.

Keywords

Quality of life; Symptom Index; Ovarian Cancer

Introduction

Ovarian cancer is the second most-common and the most deadly gynecologic malignancy in the United States [1]. Only 19% of ovarian cancer cases are diagnosed at an early stage [1], most likely due to the absence of detectable symptoms in early stages and the lack of effective screening measures. As such, approximately three-fourths of women with ovarian cancer present with Stage III or IV advanced disease [2].

Given the limited curative treatment options available to women with advanced stage ovarian cancer, patient-reported quality of life (QOL) is an important clinical and research endpoint. Decrements in QOL among women with advanced ovarian cancer may be influenced by physical symptoms, including pain, neuropathy, alopecia, nausea and vomiting, anemia, and fatigue [3]; emotional symptoms, including anxiety, anger, guilt, and depression, [4]; and sexual concerns [5].

Symptom management, the preservation of functionality, and the maintenance/improvement of QOL constitute important aims of clinical trials in advanced ovarian cancer. The palliative success of treatments can be evaluated by their ability to adequately manage and/or improve ovarian cancer-specific symptoms, highlighting the need for psychometrically sound QOL assessment. Clinical researchers and oncology professionals remain hesitant about the use of multidimensional QOL instruments in clinical practice and research [6]. The Food and Drug Administration (FDA) has addressed concerns about the measurement of QOL as a treatment outcome through the regulation of claims of drug effectiveness in improving QOL [7]. The FDA Oncologic Drug Advisory Committee Quality of Life Subcommittee has stated that pharmaceutical company claims of improved QOL must be specific to the QOL domain that was measured and has recommended that the assessment of specific symptoms is an appropriate starting point for improved measurement of QOL domains [8]. In response to these needs, recent research has sought to improve the clinical utility of QOL measurement specific to ovarian cancer symptoms, from the development of an ovarian cancer-specific QOL measure derived from patient and provider interviews [10] to the development of a subscale of advanced ovarian cancer-specific symptoms rated as high priority by oncology physician and nurse experts [11]. Such measures are more likely to be sensitive to the effects of cancer treatment modalities [9] and may be better able to assess intervention efficacy in terms of disease-specific symptom amelioration and QOL. Input from oncology physician and nurse experts helps to identify those symptoms that are high-priority due to the potential to be ameliorated by chemotherapy, thus serving as criteria in assessing response to treatment [11]. However, patient ratings of symptom importance may be discrepant from those of oncology professionals [12–16], particularly when considering

symptoms of a more psychological nature [16], and therefore the multi-step process of advanced ovarian cancer-specific symptom measurement also requires input from patients.

The purpose of the present study was to create a new ovarian cancer symptom index reflecting the symptoms rated as highest priority by both clinical experts and women with advanced ovarian cancer [17]. The present study also sought to examine the preliminary reliability and validity of the new symptom index for advanced ovarian cancer.

Methods

Design

The development of a clinically-meaningful, advanced ovarian cancer-specific symptom index involved multiple steps prior to the design and implementation of the present study. First, input about symptoms and concerns specific to ovarian cancer was collected through semi-structured patient and provider interviews, resulting in the development of the Functional Assessment of Cancer Therapy–Ovarian (FACT-O), an ovarian cancer-specific QOL measure [10]. Next, Cella and colleagues [11] surveyed oncology physician and nurse experts at 17 National Comprehensive Cancer Network (NCCN) member institutions about symptom priorities in ovarian cancer using items from the FACT-O. Physicians and nurses rated the five most important symptoms to address in treating patients with advanced ovarian cancer to yield a subscale of eight oncology clinician-rated high priority symptoms including the following items: fatigue, vomiting, pain, nausea, stomach swelling, worry condition will get worse, content with present QOL, and stomach cramping.

The present study was part of a larger cross-sectional study (Principal Investigator: DC) which sought to develop symptom indexes for 11 different types of advanced cancer. A detailed description of the methods has been published elsewhere [17]. Fifty-one women with advanced ovarian cancer (stage III or IV) with a prior history of chemotherapy for at least two cycles (1 month for non-cyclical chemotherapy) were recruited from a subset of NCCN member institutions (NorthShore University HealthSystem,¹ Moffitt Cancer Center, Fred Hutchinson Cancer Research Center, Duke University Medical Center, and Dana Farber Cancer Institute) and four private, non-profit social service organization members of the Cancer Health Alliance of Metropolitan Chicago (CHAMC). Participants' responses were evaluated alongside the results of previously administered surveys of oncology professionals at NCCN member institutions [11] for purposes of constructing a symptom index reflecting expert and patient consensus of the most important disease-specific symptoms and concerns. Ten expert oncology clinicians were then surveyed in an effort to differentiate whether priority symptoms were predominantly disease- or treatment-related.

Participants

Inclusion criteria included diagnosis of Stage III or IV ovarian cancer, prior experience with chemotherapy for at least 2 cycles (1 month for non-cyclical chemotherapy), no other primary malignancy diagnosed and/or treated within previous 5 years except non-melanoma

¹At the time of this study, this institution was affiliated with the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

skin cancer, able to understand and provide signed informed consent, sufficient cognitive ability to complete questionnaires without assistance, fluency (reading and speaking) in English, and at least 18 years of age. Participant eligibility was determined by personnel at each participating NCCN member institution and by staff at the CHAMC, under the supervision of the study. All women provided informed consent in accordance with institutional IRB and HIPAA guidelines prior to participation and completed self-report questionnaires at one time point. Participating patients were remunerated \$50 for their participation.

Gynecologic oncologists were recruited from NCCN institutions, and were eligible to participate if they could attest to at least 3 years' experience treating at least 100 patients with advanced ovarian cancer. All gynecologic oncologists provided informed consent in accordance with institutional IRB and HIPAA guidelines prior to participation and were remunerated \$100 for their participation.

Measures

Patients' sociodemographic and clinical information were obtained from either patient self-report (CHAMC sites) or physician report (NCCN sites).

A subset consisting of the second half of the sample of patients ($N=28$) completed the Participant-Generated Symptom List prior to the Symptom Checklist, based on our prior experience with similar qualitative research suggesting that this subset sample size would ensure saturation of possible new concepts.. The Participant-Generated Symptom List qualitatively measured patient-generated symptoms perceived as most important to monitor when assessing the value of drug treatment for advanced ovarian cancer. The patient-generated symptom lists were generated via interviews. Participants were asked to rate the perceived importance of each symptom they generated, using a scale from 0 ("not important") to 10 ("extremely important").

The Symptom Checklist assessed patient-perceived ovarian cancer symptom importance. Participants selected the ten symptoms with the greatest perceived importance when assessing the value of drug treatment for advanced ovarian cancer from a list of 30 symptoms associated with ovarian cancer that were derived from the Functional Assessment of Cancer Therapy-Ovarian (FACT-O) [10]. From the list of 10 symptoms selected as most important by participants, they then indicated the five symptoms they considered to be the very most important symptoms/concerns to monitor when assessing the value of drug treatment for advanced ovarian cancer. Four versions of the checklist were administered to control for potential response bias due to item order.

The NCCN/FACT Advanced Ovarian Cancer Physician Symptom/Concern Survey [11] captured the degree to which oncology experts believed 33 different ovarian cancer-related symptoms were disease- or treatment-related. Physicians used a five-point scale, ranging from "Exclusively disease-related" to "Exclusively treatment-related," to indicate the degree to which they perceive the symptom is disease- or treatment-related.

The FACT-O [10] assessed patient-reported general quality of life related to cancer, as well as specific symptoms and concerns related to ovarian cancer. The 27 items assessing general quality of life related to cancer comprise the Functional Assessment of Cancer Therapy-General (FACT-G) [18], which is a well-established multidimensional QOL instrument that contains four general subscales: Physical Well-Being (PWB), Social/family Well-Being (SWB), Emotional Well-Being (EWB), and Functional Well-Being (FWB). The 12 items assessing symptoms and concerns specific to ovarian cancer were derived from a survey of physician and nurse experts at 17 NCCN member institutions that provided detailed information on the priority symptoms endorsed by oncology experts for 9 tumor sites, including ovarian cancer [11]. Higher scores on the FACT-O indicate greater QOL.

The Eastern Cooperative Oncology Group Performance Status (ECOG) [19] assessed performance status. Participants classified themselves into one of the following categories: (0) fully ambulatory without symptoms, (1) fully ambulatory with some symptoms, (2) requiring less than 50% of awake time to rest, (3) requiring more than 50% of awake time to rest, and (4) bedridden.

Data analysis

Frequency distributions were evaluated for all items appearing in the ovarian cancer symptom index. To determine item inclusion, the probability of chance endorsement as one of the top five symptoms was calculated by dividing five (the allowable number of “very most important symptoms”) by 30 (the total number of items in the ovarian cancer-specific checklist) and multiplying this number by 51 (number of participants). Items that met this a priori cut-off were included in the index. Items that were endorsed at significantly greater rates than others were more closely reviewed to determine whether an additional symptom from that same domain area also warranted inclusion. Items from the FACIT measurement system were used, when available, for ease of use, validity and translation capabilities.

Write-in items were also reviewed for existence of new concepts that had not previously appeared on the checklists. If greater than 10% of patients in a disease category reported a particular new symptom/concern that was not judged to be treatment-related (by the Principal Investigator), or greater than 20% of patients if the new symptom/concern was judged to be primarily treatment-related, it was considered for item inclusion.

Frequency distributions were evaluated for gynecologic oncologist symptom attribution ratings. If more than 50% of physicians indicated that a symptom was exclusively/predominantly treatment-related, the item was categorized in the Treatment Side-Effects (TSE) subscale. Items predominantly related to disease or function/well being were categorized in the Disease-Related Symptoms (DRS) or General Function and Well-being (F/WB) subscales accordingly.

Given that 2 of the 18 items selected for the new index were new and not previously included as items in the FACT-O nor added to this study based on previous clinician reports, they were not administered to participants in the present study. These two items were treated as missing and scores on the NCCN-FACT Ovarian Symptom Index-18 (NFOSI-18) were prorated according to standard FACIT scoring protocol [20]. Cronbach’s alpha assessed the

internal consistency reliability of each subscale and total scale of the NFOSI-18. Convergent validity was assessed by examining Spearman correlations among the NFOSI-18 total scale and subscales and the FACT-O (total scale and subscales), with scores recalculated to remove overlapping items that would artificially inflate the correlation. Criterion validity was assessed with a one-way analysis of variance (ANOVA) examining the relationship between performance status classification and NFOSI-18 subscales.

Results

Participant characteristics

A total of 51 women (M age=62.1 years, SD=10.6) with advanced ovarian cancer participated in the study. Table 1 lists the sociodemographic characteristics of women in the study. Participants were predominately White (94.1%), highly educated (76.5% more than high school), and not presently working outside of the home (76.5%).

Patient ratings of symptom importance

Of the 30 pre-selected items presented on the Symptom Checklist, 10 items were endorsed as important with a probability greater than chance. Table 2 displays the frequency of items endorsed by patients as being “Very Important” to monitor when assessing the value of drug treatment for advanced ovarian cancer. Of the 10 items endorsed by patients at a probability greater than chance, five items overlapped with items endorsed as important by oncology physician and nurse experts at a probability greater than chance in the Cella et al. [11] study. Table 3 displays those symptoms endorsed as important by patients in the present study and by oncology physician and nurse experts in the Cella et al. [11] study. Participants ($N=28$) who completed the Participant-Generated Symptom List generated symptoms/concerns related to advanced ovarian cancer prior to completing the Symptom Checklist. Table 4 lists the most common participant-generated symptoms and their importance.

Reliability and validity of NFOSI-18

Appropriate FACIT items were identified for the majority of priority symptoms, including those that were patient-generated. Gynecologic oncologist ratings were used to classify the 18 items into the TSE, DRS, and F/WB subscales. The 18-item NFOSI-18 is presented in Table 5. The internal consistency reliability for the full NFOSI-18 was good (16 items with data, $\alpha=0.80$). The DRS ($\alpha=0.63$), TSE ($\alpha=0.55$), and F/WB ($\alpha=0.64$) subscales demonstrated less adequate internal consistency reliability. The NFOSI-18 demonstrated a strong correlation with the ovarian cancer-specific subscale of the FACT-O ($r=0.62$, $p<0.0001$). The ovarian cancer-specific subscale of the FACT-O was also moderately to strongly correlated with the NFOSI-18 DRS subscale ($r=0.51$, $p<0.0001$), the NFOSI-18 TSE subscale ($r=0.46$, $p<0.001$), and the NFOSI-18 F/WB subscale ($r=0.58$, $p<0.0001$). The ANOVAs revealed that participants' scores on the NFOSI-18 scores differed significantly by performance status² (all $p<0.01$) such that participants with worse performance status reported lower NFOSI-18 scores.

²Given the small proportion of participants that categorized themselves as ECOG performance status 3, participants who categorized themselves as ECOG performance status 2 and 3 were collapsed into one category.

Discussion

Since patient-reported concerns like QOL and symptoms are critical outcomes in the treatment of advanced ovarian cancer, the NFOSI-18 fills an important gap in our toolbox of reliable and valid measures to support assessment of interventions in gynecological oncology. In this study, we demonstrated the clinical utility of the NFOSI-18, a new symptom index that reflects the symptoms rated as highest priority by both clinical oncology experts and women with advanced ovarian cancer [17]. As such, it comprises items reflecting symptoms that have been identified by oncology physician and nurse experts as amenable to chemotherapy and worthy as criteria in assessing response to treatment, as well as those symptoms identified as high-priority by patients.

Differences between oncology physician and nurse expert ratings of priority symptoms and patients' ratings of priority symptoms highlight the need for an advanced ovarian cancer-specific symptom index that incorporates symptoms rated as high priority by patients, and symptoms rated as high priority by clinical oncology experts. The NFOSI-18 is the first symptom index developed through rigorous multi-step quantitative and qualitative methodology to assess advanced ovarian cancer symptoms perceived as high priority by clinical oncology experts and patients. In this study, the full NFOSI-18 demonstrated good internal consistency and was associated with validity criteria, such as performance status and ovarian cancer-specific QOL, in the expected direction. Although NFOSI-18 scores cannot be directly calculated from the FACT-O questionnaire because of the inclusion of three items not originally part of the FACT-O ("I feel fatigued," "I am bothered by constipation," and "I am bothered by skin problems"), researchers who wish to calculate comparable scores using FACT-O data may prorate the scores upward to make them comparable to the 18-item NFOSI-18. Prorated scores can be calculated according to the following formula: $18 \times [(\text{sum of NFOSI item responses}) / (\text{number of NFOSI items completed})]$ as long as >50% of the 18 items are completed [20].

Consistent with past research [20,21], fatigue was the most frequently-endorsed high-priority symptom by women with ovarian cancer. This is not unexpected, given the high rate of fatigue experienced by individuals with cancer [22], and women with ovarian cancer [23]. Among older individuals with cancer, fatigue may represent a barrier to functional independence, activities of daily living, and instrumental activities of daily living [24].

The list of patient-rated high-priority symptoms in the present study contained a number of physical symptoms, including constipation, nausea, pain, being able to get around by oneself, and feeling ill. Although both patients in the present study and oncology physician and nurse experts in the Cella et al. [11] study identified nausea and pain as high-priority symptoms, there was a lack of concordance with respect to the importance ratings of other physical symptoms. This highlights variability in perceived physical symptom importance between patients and oncology clinicians, which reaffirms the need for a measurement tool comprised of both patient-rated and oncology clinician-rated important symptoms. Additionally, although neuro-toxicity was a priority noted by patients, it did not meet a priori cut-off for inclusion on the NFOSI-18. In cases where researchers or clinicians desire a comparison of neurotoxicity, either the 11-item FACT/GOG (Gynecologic Oncology

Group) Neurotoxicity (Ntx) subscale [25] or the 4-item FACT/GOG (Gynecologic Oncology Group) Neurotoxicity (Ntx) subscale [26] should be added to the NFOSI, depending upon the level of detail sought by the investigator(s).

Participants in the present study also identified several psychosocial symptoms as high-priority, including worry that condition would worsen, contentment with QOL, ability to sleep well, and ability to enjoy life. These findings are interesting in light of Houck et al.'s [23] findings that having a sense of hope, an enhanced appreciation for day to day life, and a strong support system positively impacted QOL, whereas fear of the disease negatively impacted QOL among women with advanced ovarian cancer. Oncology physician and nurse experts in the Cella et al. [11] study did not share the patients' perceived importance of being able to enjoy life or being able to sleep well. This suggests that patients may hold higher expectations related to aspects of positive psychosocial well-being than oncology clinicians, which may have implications for psychosocial symptom management and psychosocial referrals. Given that all of the psychosocial symptoms fell within the DRS and F/WB subscales, this may also reflect oncology clinicians' focus on treatment-related symptoms when considering the most important symptoms in advanced ovarian cancer. Indeed, all items in the TSE subscale reflected physical symptoms. The symptoms included across the NFOSI-18 subscales suggest the importance of psychosocial care in addition to anti-cancer treatment in order to optimally address QOL.

Despite substantial research suggesting that women with ovarian cancer are commonly affected by sexual dysfunction [27,28], sexual dysfunction did not emerge as a patient-rated high-priority symptom in the present study. Participants did not endorse the "Interest in sex" item on the Symptom Checklist as high-priority at a rate high enough to meet our a priori cut off for inclusion, nor did any of the subset of patients completing the Participant-Generated Symptom List report any sexual functioning symptoms. This may reflect the possibility that the item "interest in sex" does not capture the full range of possible sexual functioning concerns that might be considered higher priority by women with advanced ovarian cancer (e.g., sexual discomfort); however, one might expect that the Participant-Generated Symptom List may have captured high-priority sexual concerns not addressed in the Symptom Checklist, which was not the case. This finding does not suggest that women with advanced ovarian cancer do not have concerns about sexual functioning; however, it is possible that in the context of other symptoms, concerns about sexual functioning may not be considered among the highest priority symptoms by women with advanced ovarian cancer.

Implications

The examination of clinically meaningful patient outcomes in cancer has advanced from a focus on more traditional end-points, such as tumor response and survival, to include a greater emphasis on QOL outcomes. The measurement of QOL has also followed an evolutionary process, from more general measures of health-related QOL to more disease- and symptom-specific measures of QOL. Throughout this process, the assessment of the relative importance of disease-specific symptoms has become essential. The results of this study extend previous findings through the development and preliminary validation of the

NFOSI-18, a measure of the ovarian cancer symptoms rated as highest priority by both clinical experts and women with advanced ovarian cancer. The measurement of ovarian cancer-specific symptoms perceived as important by patients and oncology clinician experts provides a more comprehensive perspective on QOL in advanced ovarian cancer and provides a foundation for the development of more accurate and clinically meaningful measurement of advanced ovarian cancer-specific QOL. Improved assessment and monitoring of high-priority symptoms may lead to improved symptom-specific medical and psychosocial interventions, improved patient satisfaction with treatment, and improved health policy.

This new index provides the clinical researcher and clinical provider with a new option for assessing patient response to treatment. As it is highly-redundant with the FACT-O, one might wonder when to choose one option over the other. The NFOSI-18 is about half the length of the FACT-O, requiring about 4–5 minutes of patient time (compared to 8–10 minutes for the FACT-O). It is very focused on symptoms and selects only the most important concerns associated with treating advanced disease. Therefore, it is a sensible choice in clinical trials or in clinical practice when the purpose is to obtain an estimate of primarily physical symptom experience and impact associated with advanced disease. On the other hand, the FACT-O would be a better choice if one wished to characterize the multidimensional experience of ovarian cancer patients at any stage, ranging from physical to functional, emotional and social well-being. In addition, there are many more studies reporting FACT-O scores and data. However, with time and experience using the NFOSI-18, interpretation of results will be further enhanced.

Limitations

The results of the present study should be considered in light of several limitations. First, the study had a relatively small sample size, although it is comparable to previously published research examining quality of life in advanced ovarian cancer patients (e.g., [25]). Second, the cross-sectional design limits ability to examine test–retest reliability or responsiveness to change over time. Future longitudinal research with larger sample sizes is needed to address the validity of the NFOSI-18. Third, the predominantly White, highly educated sample in this study limits the generalizability of the findings. The generalizability of the findings is further restricted to women with advanced ovarian cancer. The results of this study should also be considered in light of the rapidly changing face of oncologic treatment, which raises the possibility that the symptoms endorsed as most important, most notably treatment side effects, may change over time. Despite these limitations, the present study remains the first to report on the initial psychometric properties of the NFOSI-18. The findings demonstrate good internal consistency reliability and validity for the total NFOSI-18, suggesting that it may serve as a valuable brief assessment of high-priority advanced ovarian cancer-specific symptoms and quality of life in both research and clinical practice.

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Table 1Sociodemographic characteristics of participants ($N=51$).

	Mean	SD
Age, years	62.1	10.6
	<i>N</i>	%
Race/Ethnicity		
White	48	94.1
African-American	3	5.9
Non Hispanic	49	96.1
Hispanic	2	3.9
Highest Education %		
Some high school or less	2	3.9
High school graduate/GED	10	19.6
Vocational/some college	15	29.4
College degree	13	25.5
Professional/graduate degree	11	21.6
Current occupational status		
Homemaker	4	7.8
Unemployed	2	3.9
Retired	24	47.1
On disability	7	13.7
On leave of absence	2	3.9
Full-time employed	9	17.6
Part-time employed	3	5.9
ECOG performance status		
0	11	21.6
1	21	41.2
2	16	31.4
3	3	5.0

Table 2Rankings of top 5 symptoms/concerns^a by patients.

Symptom/concern	Overall rank	% Endorsed top 5
Lack of energy (fatigue)	1	61
Able to sleep well	2	37
Able to enjoy life	3	25
Content with current QOL	4	24
Able to get around by myself	5	22
Constipation	5	22
Nausea	5	22
Pain	8	20
Worry that condition will get worse	8	20
Feeling ill	10	18

^aIncludes only those items endorsed at a probability greater than chance.

Table 3

Comparison of patient and oncology clinician symptom rankings.

Symptom/concern	Patient	Oncology clinician
	Overall rank	Overall rank ^a
Lack of energy (fatigue)	1	1
Being able to sleep well	2	–
Being able to enjoy life	3	–
Being content with current QOL	4	7
Being able to get around by myself	5	–
Constipation	5	–
Nausea	5	4
Pain	8	3
Worry that condition will get worse	8	5
Feeling ill	10	–
Vomiting	–	2
Stomach swelling	–	5
Stomach cramps	–	8

^aBased on data from Cella et al. [11].

Table 4

Participant-generated symptoms and their perceived importance.

Symptom/concern	Rank	% of Responses (N)	Mean importance rating (0–10)	Symptom currently in checklist
Fatigue	1	43 (12)	7.7	Yes
Nausea	2	39 (11)	8.6	Yes
Pain	3	36 (10)	6.5	Yes
Constipation	4	21 (6)	8.0	Yes
Hair loss	4	21 (6)	7.2	No
Neuropathy	6	18 (5)	10.0	No
Patient–doctor communication	6	18 (5)	9.2	No
Diarrhea	8	14 (4)	8.8	No
Effects of chemotherapy	8	14 (4)	9.3	No

Note. N=28.

Table 5

NFOSI-18 items and subscales.

Subscale	Item	Included in FACT-O?
DRS	I have a lack of energy	Yes
	I have pain	Yes
	I feel ill	Yes
	I have cramps in my stomach area	Yes
	I feel fatigued	No
	I am bothered by constipation	No ^a
	I have swelling in my stomach area	Yes
	I have control of my bowels	Yes
	I worry that my condition will get worse	Yes
	I am sleeping well	Yes
TSE	I have nausea	Yes
	I am bothered by hair loss	Yes
	I am bothered by side effects of treatment	Yes
	I have been vomiting	Yes
	I am bothered by skin problems	No
F/WB	I am able to get around by myself	Yes
	I am able to enjoy life	Yes
	I am content with the quality of my life right now	Yes

^aThis item is not on the FACT-O but data was collected for the present study based on oncology clinician write in responses from Cella et al. [11].