

The Value of Fatigue Severity to Rule Out Depression in Older Adult Patients With Cancer

Laura Deckx, PhD, Marjan van den Akker, PhD, Denise Vergeer, MD, Doris van Abbema, RN, MSc, Franchette van den Berkmortel, MD, PhD, Loes Linsen, PhD, Eric T. de Jonge, MD, PhD, Bert Houben, MD, Mieke van Driel, MD, PhD, FRACGP, and Frank Buntinx, MD, PhD

The prevalence of depression among patients with cancer is high. Results from a comprehensive meta-analysis estimated the prevalence of depression, as defined by the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV), to be 21% among patients with cancer (Mitchell et al., 2011). Particularly in older adult patients with cancer, depression is identified as an important concern and is more prevalent compared to younger patients with cancer and older adults (aged 70 years or older) without a history of cancer (Mohile et al., 2011; Nelson et al., 2009). Because the number of older adult patients with cancer is rising, the psychosocial consequences of cancer and its treatment, such as depression, will become an important problem that requires attention (Stanton, 2012).

Depression has a negative impact on quality of life, cognitive functioning, and survival (Ensinck et al., 2002). A study confirmed that, after adjustment for major clinical predictors of mortality, patients with cancer and depressive symptoms had a two-fold risk for all-cause mortality compared to patients with cancer without depressive symptoms (Mols, Husson, Roukema, & van de Poll-Franse, 2013). Therefore, the accurate identification and treatment of depression is an essential public health issue.

However, identification of depression in older adult patients with cancer is challenging, and depression is often unrecognized and untreated (Nelson, Cho, Berk, Holland, & Roth, 2010; Warmenhoven, van Weel, Vissers, & Prins, 2013; Weinberger, Bruce, Roth, Breitbart, & Nelson, 2011; Weinberger, Roth, & Nelson, 2009). Several reasons account for the under-recognition of depression. First, older adult patients less commonly disclose affective symptoms, such as sadness, and instead tend to present with trouble concentrating, fatigue, and lack of initiative (Nelson et al., 2010). Second, patients and healthcare providers often assume that depressive symptoms are normal symptoms of

Purpose/Objectives: To evaluate whether fatigue severity can serve as a cue to investigate the presence of depression in older adult patients with cancer.

Design: Cross-sectional observational cohort study.

Setting: Seven hospitals and general practices in Belgium and the Netherlands.

Sample: 205 older adult patients with cancer and 436 older adults without cancer (aged 70 years or older).

Methods: The diagnostic accuracy of fatigue as a proxy for depression was evaluated using sensitivity, specificity, and predictive values.

Main Research Variables: Fatigue was measured with a visual analog scale, and depression was measured with the 15-item Geriatric Depression Scale.

Findings: Fifty-six percent of the population experienced fatigue, and 13% were depressed. For fatigue as a cue for depression, sensitivity was 82%, specificity was 47%, positive predictive value was 18%, and negative predictive value was 95%.

Conclusions: The data confirm that fatigue is a valuable cue to investigate the presence of depression because 82% of depressed participants were correctly identified by fatigue. The assessment of fatigue severity is intuitive, quick, straightforward, and usually already implemented.

Implications for Nursing: Identification of depression is difficult in older adult patients with cancer. Instead of experiencing affective symptoms of depression, older adult patients are more likely to disclose somatic symptoms, such as fatigue, which often overlap with cancer-related symptoms. Nurses should be aware of this problem and should be alert for the possibility of depression in older adult patients presenting with fatigue.

Key Words: cancer in older adults; aging; depression; fatigue; screening

ONF, 42(4), E302–E309. doi: 10.1188/15.ONFE302-E309

aging (Nelson et al., 2010). Third, the overlap between diagnostic criteria of depression and cancer-related symptoms and treatment side effects may account for

the under-recognition of depression in patients with cancer (Nelson et al., 2010). When confronted with a diagnosis of cancer, feelings of sadness, distress, and grief are normal, and there is only reason for concern when these feelings last for a long time or limit daily functioning (Warmenhoven et al., 2013).

In this context, Weinberger et al. (2009, 2011) showed that older adult patients are less likely to endorse the two gateway symptoms of depression—depressed mood and loss of interest—and emphasized the importance of evaluating additional symptoms of depression. Fatigue is an additional symptom that may prove to be a useful cue to further investigate the presence of depression.

Fatigue is a common symptom in older adult patients with cancer (Rao & Cohen, 2004), and numerous studies have shown that fatigue and depression are related and occur concurrently (Fox & Lyon, 2006; Hofman, Ryan, Figueroa-Moseley, Jean-Pierre, & Morrow, 2007; Rhondali et al., 2012). A cross-sectional study in breast cancer survivors showed that fatigue was a significant predictor of depression (Galiano-Castillo et al., 2014). For this reason, the National Comprehensive Cancer Network (NCCN) has recommended that “the possibility of depression should be carefully considered in patients with cancer who report fatigue” (Lawrence, Kupelnick, Miller, Devine, & Lau, 2004, p. 47). Fatigue might serve as a cue for nurses and physicians to investigate the presence of depression; however, the added value of this strategy has not been evaluated empirically. Therefore, the aim of this study was to assess whether self-reported severity of fatigue can be used as a cue to identify patients who might benefit from further assessment of depression. This strategy has the advantage of being quick and straightforward and is already standard practice for oncology nurses. In addition, oncology nurses are often aware of the wide scope of emotions and feelings, including fatigue, patients with cancer go through. Results of this study will enhance nurses’ awareness of the difficulties associated with identifying depression in older adult patients with cancer and provide them with a tool to enhance identification of patients at risk.

This strategy was evaluated in a population of older adult patients with cancer and in an older primary care population without a history of cancer because several of the reasons that account for under-recognition of depression in older adult patients with cancer could also apply to older adults in general.

Methods

Study Design and Participants

The data for this cross-sectional study were collected as part of KLIMOP (Dutch acronym for “Kanker bij Limburgse en Vlaams-Brabantse Ouderen Project”), a

project focusing on older adult patients with cancer from the provinces of Limburg, Belgium and the Netherlands, and Flemish-Brabant, Belgium (Deckx et al., 2011). KLIMOP is an ongoing observational cohort study of older adult patients with cancer and a primary care population of older adults without a history of cancer (excluding non-melanoma of the skin). All participants are aged 70 years or older. The focus of this study is the long-term well-being of older adult patients with cancer.

The included patients with cancer were patients with a new and first diagnosis of breast, prostate, lung, or colorectal cancer (stages I–III). They were recruited through seven hospitals in Belgium and the Netherlands within three months after a cancer diagnosis.

Older adults without cancer were recruited through general practices in the same regions as the patients with cancer. General practitioners asked all consecutive eligible patients (aged 70 years or older with no history of cancer) to participate until 20 patients per general practitioner agreed to participate.

Exclusion criteria for patients with cancer and people without a history of cancer were the inability to speak Dutch, a formal diagnosis of dementia, and an estimated life expectancy of less than six months. For this study, cross-sectional analyses using baseline data of all patients included in the study from June 2010 to December 2013 are presented. Because this study is part of an ongoing longitudinal study, some patients’ medical information (e.g., cancer stage, date when cancer treatment was started) is not yet available because data from medical records are only extracted one year after inclusion to ensure complete data regarding cancer treatment and to avoid duplication.

The study protocol was approved by the ethical review boards at KU Leuven and UZ Leuven, both in Belgium, and the Maastricht University Medical Centre in the Netherlands. The study is conducted in compliance with Good Clinical Practice guidelines, the principles of the Declaration of Helsinki, version October 2008, and the Belgian and Dutch laws regarding human participants and personal data protection. All patients signed informed consent.

Data Collection

Methods of data collection and management were identical in both groups. Data were collected through personal interviews or self-administered questionnaires and included sociodemographic information, medical information, and a measure for fatigue severity and depression. The baseline interview of patients with cancer took place at the hospital, scheduled together with other appointments. The baseline interview of older adults without cancer took place during home visits.

A visual analog scale (VAS) was used to assess fatigue severity. Patients were asked, “On a scale of

0–10, how would you rate your fatigue during the past 24 hours?” Fatigue was used as a continuous scale, referred to as fatigue severity, and a cutoff of 4 or greater was used to define increased fatigue (referred to as “fatigue” in this article), which is also the most

commonly used cutoff in the literature (Bower et al., 2014; Lawrence et al., 2004).

Depression was measured with the 15-item Geriatric Depression Scale (GDS-15), which was designed to screen for depression in an older adult population by reducing the focus on somatic symptoms of depression because older adults may show similar symptoms for other reasons (Yesavage et al., 1982). The GDS-15 is a well-validated screening instrument for depression in an older adult population (Nelson et al., 2010) and is commonly used in older adult patients with cancer (Wildiers et al., 2014). The total sum score ranges from 0–15. A score of 5 or greater was used as cutoff for depression, for which sensitivity and specificity against a standard clinical interview have been shown to be 91% and 72%, respectively. The GDS-15 has a high level of internal consistency (Cronbach alpha = 0.8) (D’Ath, Katona, Mullan, Evans, & Katona, 1994). In the current study, Cronbach alpha was 0.74 for the total population, 0.74 in patients with cancer, and 0.74 in participants without cancer.

Table 1. Baseline Characteristics of Participants

Characteristic	Patients With Cancer (n = 205)		People Without Cancer (n = 436)		p	Total (N = 641)	
	\bar{X}	SD	\bar{X}	SD		\bar{X}	SD
Age (years)	76.45	4.88	78.1	5.59	0.00	77.57	5.42
Fatigue score ^a	4	2.56	4.04	2.41	0.91	4.02	2.45
Characteristic	n	%	n	%	p	n	%
Gender					0.17		
Male	68	33	169	39	–	237	37
Female	137	67	267	61	–	404	63
Ethnicity					0.07		
Caucasian	205	100	429	98	–	634	99
Other	–	–	7	2	–	7	1
Marital status					0.09		
Single	13	6	14	3	–	27	4
Married or living together	123	60	271	62	–	394	61
Widowed	58	28	139	32	–	197	31
Divorced	9	4	7	2	–	16	2
Other	2	1	5	1	–	7	1
Cancer type							
Breast	111	54	–	–	–	–	–
Colorectal	61	30	–	–	–	–	–
Prostate	11	5	–	–	–	–	–
Lung	22	11	–	–	–	–	–
Cancer stage							
I	24	12	–	–	–	–	–
II	66	32	–	–	–	–	–
III	32	16	–	–	–	–	–
Not available	83	40	–	–	–	–	–
Fatigue score^a							
0	29	14	42	10	–	71	11
1	14	7	24	6	–	38	6
2	19	9	65	15	–	84	13
3	24	12	62	14	–	86	13
4	20	10	39	9	–	59	9
5	37	18	78	18	–	115	18
6	30	15	52	12	–	82	13
7	14	7	44	10	–	58	9
8	12	6	21	5	–	33	5
9	4	2	3	1	–	7	1
10	2	1	6	1	–	8	1
Depression					0.43		
No	176	86	384	88	–	560	87
Yes	29	14	52	12	–	81	13

^a Fatigue was measured with a visual analog scale (range = 0–10 with higher scores indicating greater fatigue). Depression was measured with the 15-item Geriatric Depression Scale (range = 0–15 with higher scores indicating greater depression, cutoff score of 5 or greater).

Note. Differences were between older adult patients with cancer and older adults without cancer. All tests were based on chi-square analyses. For age and fatigue, the Wilcoxon-Mann-Whitney test was used.

Note. Because of rounding, percentages may not total 100.

Analysis

Sociodemographic and clinical characteristics of the study population are presented as the mean and standard deviation for continuous variables and as numbers and proportions for categorical variables. Comparisons between older adult patients with cancer and older adults without cancer were performed using the Wilcoxon-Mann-Whitney test for continuous data and the chi-square test for categorical data. A p value of less than 0.05 was considered to be statistically significant throughout all analyses.

Missing values of patients with five or fewer missing items on the GDS-15 were imputed if it did not influence the classification with respect to depression. Patients with more than five items missing on the GDS-15, a change of classification, or any missing values for fatigue were excluded from the analysis.

To assess whether fatigue and the severity of fatigue can be used as a cue to identify patients who might benefit from further assessment of depression,

fatigue was operationalized as a screening tool. The diagnostic accuracy was evaluated using sensitivity, specificity, predictive values, and area under the receiver operating curve (AUC) with a 95% confidence interval (CI). Sensitivity is the proportion of depressed people that are correctly identified by presence of fatigue, and specificity is the proportion of people who are not depressed who are correctly identified by absence of fatigue (Altman & Bland, 1994a). The positive predictive value is the proportion of patients who are fatigued and depressed, and the negative predictive value is the proportion of patients who are not fatigued and not depressed (Altman & Bland, 1994b). To the authors' knowledge, there are no firm reference values for acceptable sensitivity, specificity, or predictive values because the acceptable value depends on the test and underlying disease, whether or not the test is invasive, and to what extent false positive or false negative results are acceptable. In this context, the most important characteristic of fatigue as a screening tool for depression is the ability to exclude the presence of depression with a high sensitivity because false negative test results will lead to false assurance. The AUC is a summary measure that gives a global assessment of the diagnostic accuracy of fatigue (Altman & Bland, 1994c). The magnitude of the AUC indicates whether a test is useful to discriminate between individuals who are at high or low risk of disease. The maximum value for the AUC is 1, which indicates a perfect test that is 100% sensitive and 100% specific. An AUC value of 0.5 indicates no discriminative value; the test is no better than tossing a coin.

As a sensitivity analysis, analyses were repeated with a score of 3 or greater as cutoff for increased fatigue. Statistical analyses were performed using the STATA statistical software package, version 11.

Results

Of the 683 patients in KLIMOP, data from 641 patients were included for analysis in this report. Twenty-two patients were excluded because of missing values for depression, 8 were excluded for fatigue, and 12 were excluded for both. Characteristics of the population are presented in Table 1. Older adult patients with cancer were younger than older adults without cancer ($p < 0.001$). The mean age was 76 years for older adult patients with cancer ($SD = 4.88$) and 78 years for older adults without cancer ($SD = 5.59$). Mean fatigue severity was not different between patients with cancer and people without cancer ($p = 0.91$). The prevalence of fatigue was 58% for patients with cancer and 56% for people without cancer ($p = 0.58$). Depression was present in 14% of patients with cancer and in 12% of people without cancer ($p = 0.43$).

Figure 1 shows the indicators of diagnostic accuracy of fatigue severity as a screening tool for depression

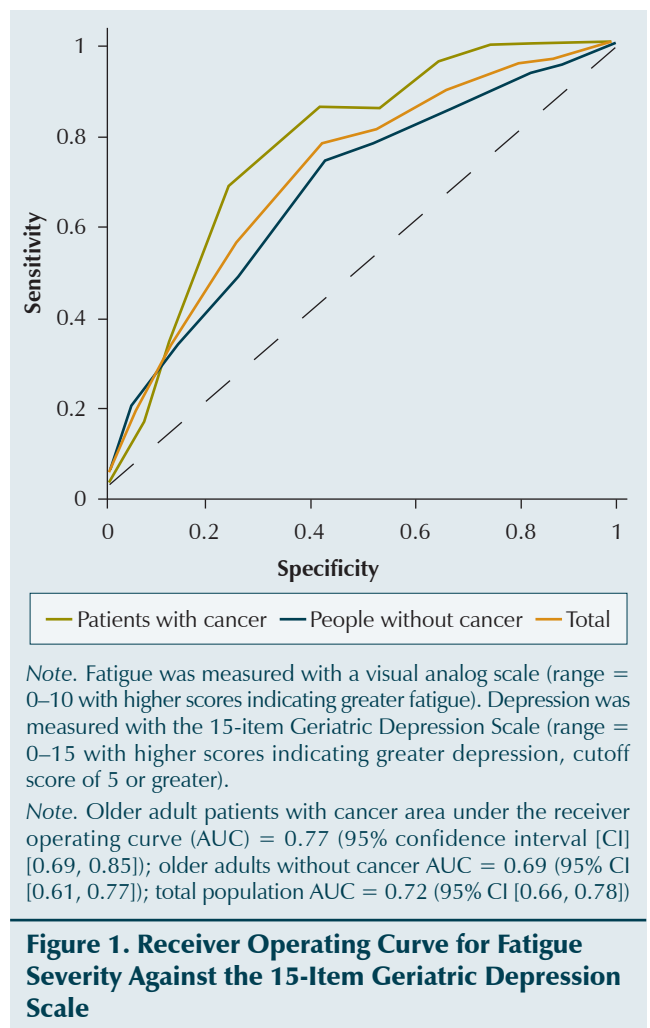


Figure 1. Receiver Operating Curve for Fatigue Severity Against the 15-Item Geriatric Depression Scale

in the total population, in older adult patients with cancer, and in older adults without cancer. Details of the diagnostic accuracy are presented in Table 2, and a two-by-two table is presented (see Table 3). For the continuum of fatigue severity scores, the AUC was moderate (AUC = 0.72, 95% CI [0.66, 0.78] for the total population; AUC = 0.77, 95% CI [0.69, 0.85] for older adult patients with cancer; AUC = 0.69, 95% CI [0.61, 0.77] for older adults without cancer).

For fatigue (cutoff of 4 or greater), sensitivity was 82% (95% CI [71, 89]) and specificity was 47% (95% CI [43, 51]) in the total population. Therefore, 82% of people with depression were correctly identified by presence of fatigue, and 47% of people without depression were correctly identified by absence of fatigue. Positive predictive value was 18% (95% CI [14, 23]), and negative predictive value was 95% (95% CI [91, 97]). Therefore, only 18% of people with fatigue were depressed, and 95% of people without fatigue were not depressed.

For older adult patients with cancer, sensitivity was 86% (95% CI [68, 96]), specificity was 47% (95% CI [39, 54]), positive predictive value was 21% (95% CI [14, 29]),

and negative predictive value was 95% (95% CI [89, 99]). In older adults without cancer, sensitivity was 79% (95% CI [65, 89]), specificity was 47% (95% CI [42, 53]), positive predictive value was 17% (95% CI [12, 22]), and negative predictive value was 94% (95% CI [90, 97]). Sensitivity, specificity, and predictive values were not significantly different for older adult patients with cancer compared to older adults without cancer.

When a score of 3 or greater was used as cutoff to define increased fatigue, sensitivity was 90% (95% CI [82, 96]) and specificity was 33% (95% CI [29, 37]) in the total population. In older adult patients with cancer, sensitivity was 97% (95% CI [82, 99]) and specificity was 35% (95% CI [28, 42]). In older adults without cancer, sensitivity was 87% (95% CI [74, 94]) and specificity was 32% (95% CI [28, 37]). Sensitivity and specificity were not significantly different for older adult patients with cancer compared to older adults without cancer.

Discussion

Depression is common in patients with cancer and has a negative impact on recovery, quality of life, and survival. However, the identification of depression in older adult patients with cancer is challenging and, therefore, often not recognized. Because fatigue is a common symptom in patients with cancer and often occurs concurrently with depression, oncology practice guidelines recommend considering the possibility of depression in patients with cancer who report fatigue (Lawrence et al., 2004).

The authors' data provide scientific support for this recommendation; 82% of depressed participants were correctly identified by their experience of fatigue, and using fatigue would halve the efforts to identify patients who might benefit from further assessment of depression because 56% of the population was fatigued. In addition, the assessment of fatigue severity is intuitive, quick, and straightforward. In the oncol-

ogy setting, it is common practice for nurses to inquire about someone's fatigue severity. This study shows that nurses can use the presence of fatigue as a cue to further investigate the presence of depression in older adult patients with cancer. However, healthcare providers should keep in mind that only one of five patients with fatigue was depressed, and 18% of patients with depression would be missed if only patients presenting with fatigue were assessed for depression.

Missing patients who might benefit from further assessment of depression could be avoided by increasing the sensitivity. If a score of 3 or greater was used as cutoff to define increased fatigue, sensitivity would be 90% in the total population, 97% in older adult patients with cancer, and 87% in older adults without cancer. However, only 30% of the population in the current study reported a level of fatigue that was lower than 3. Therefore, using a score of 3 or greater as cutoff would only partly optimize further testing for depression because the majority of older adults report this level of fatigue. In addition, a score of 4 or greater is broadly accepted as cutoff for moderate fatigue (Bower et al., 2014; Lawrence et al., 2004).

Mitchell (2010) recommended that "no short screening tools should be relied on in isolation" (p. 492). This view also corresponds with recommendations from a study on symptom clusters in patients with cancer, which stated that it is important to assess a cluster of symptoms rather than focussing on a single one (So et al., 2009). Therefore, fatigue severity cannot replace proper clinical assessment of depression, but it offers a useful trigger for increased alertness and additional testing for depression in older adult patients with cancer.

In the context of symptom clusters, the co-occurrence of fatigue and depression is often discussed together with pain or anxiety (Fox & Lyon, 2006; So et al., 2009). The exact mechanism behind these symptom clusters is not well understood. Symptoms may be secondary to the physical and psychological stress associated with

Table 2. Diagnostic Accuracy for Fatigue Against the 15-Item Geriatric Depression Scale

Group	N	Se	95% CI	Sp	95% CI	PPV	95% CI	NPV	95% CI	AUC	95% CI
Total	641	82	[71, 89]	47	[43, 51]	18	[14, 23]	95	[91, 97]	0.64	[0.6, 0.69]
Patients with cancer	205	86	[68, 96]	47	[39, 54]	21	[14, 29]	95	[89, 99]	0.66	[0.59, 0.74]
People without cancer	436	79	[65, 89]	47	[42, 53]	17	[12, 22]	94	[90, 97]	0.63	[0.57, 0.69]

AUC—area under the receiver operating curve; CI—confidence interval; NPV—negative predictive value; PPV—positive predictive value; Se—sensitivity; Sp—specificity

Note. Fatigue was measured with a visual analog scale (range = 0–10 with higher scores indicating greater fatigue). Depression was measured with the 15-item Geriatric Depression Scale (range = 0–15 with higher scores indicating greater depression, cutoff score of 5 or greater).

Table 3. Two-by-Two Table for Fatigue Against the 15-Item Geriatric Depression Scale

Variable	Total (N = 641)		Patients With Cancer (n = 205)		People Without Cancer (n = 436)	
	Depressed	Not Depressed	Depressed	Not Depressed	Depressed	Not Depressed
Fatigued	66	296	25	94	41	202
Not fatigued	15	264	4	82	11	182

Note. Fatigue was measured with a visual analog scale (range = 0–10 with higher scores indicating greater fatigue). Depression was measured with the 15-item Geriatric Depression Scale (range = 0–15 with higher scores indicating greater depression, cutoff score of 5 or greater).

cancer and its treatment (Gosain & Miller, 2013), or one symptom in particular may lead to a downward spiral of negative health consequences, which might trigger other symptoms. Underlying comorbidity might play an important role as well (Bower et al., 2014). For example, prescription drugs and the underlying disease may contribute to the occurrence of fatigue (Giacalone et al., 2013; Gosain & Miller, 2013). A meta-analysis confirmed that presence of comorbidity was significantly associated with the occurrence and severity of fatigue in patients with cancer (Wright, Hammer, & D'Eramo Melkus, 2014). However, it was beyond the scope of the current article to investigate the influence of comorbidity or the reciprocal influence of one symptom on another.

The most important strength of the current study is that, to the authors' knowledge, this is the first study to empirically assess the added value of fatigue severity as a cue to identify patients who might benefit from further assessment of depression. In addition, older adult patients with cancer and participants from a general older adult population were included, and the identification of depression was shown to be challenging in both groups. This increases the generalizability of the results and shows that the diagnostic accuracy of fatigue severity is similar in both groups. Another strength of this study is that the authors do not recommend implementing yet another screening instrument, but instead recommend the use of information that is already available as a trigger for increased attention or additional testing for depression. This is particularly relevant for hospitals where geriatric screening (and, therefore, relevant instruments for older adult patients) is not yet implemented in the oncology ward. Although, in some departments, the patient may already be routinely screened for depression by the Distress Thermometer or a depression scale, these may not be as suitable in older adult patients with cancer. Regarding the DSM-IV, it has been proposed that those criteria may not be as suitable for the identification of depression in patients with cancer and, particularly, older adult patients with cancer (Trask, 2004).

Limitations

Like any study, this one was not without limitations. No information was available on the formal diagnosis of depression according to the gold standard of a clinical interview following DSM-IV criteria; instead, the authors relied on the GDS-15. However, the GDS-15 is a well-validated screening instrument for depression in a general older adult population, as well as in a population of older adult patients with cancer (Nelson et al., 2010). Sensitivity and specificity of the GDS-15 (cutoff of 5 or greater) against a standard clinical interview have been shown to be 91% and 72%, respectively (D'Ath et al., 1994). The use of the DSM-IV criteria in patients with cancer, as well as older adult patients in general, has been criticized because the symptoms of depression are often similar to those of the physical illness or its treatment (Trask, 2004). Several approaches have been suggested to overcome this problem, ranging from including all symptoms of depression to only considering symptoms of depression if they are clearly not the result of the physical illness (Guan, Sulaiman, Zainal, Boks, & De Wit, 2013). None of these approaches has gained widespread support, and their usefulness in clinical practice is limited. However, the GDS-15 was specifically designed to reduce the focus on somatic symptoms of depression.

A second limitation is that, to the authors' knowledge, no gold standard for the assessment of fatigue is available, and a wide variety of scales to measure fatigue exists (Jean-Pierre et al., 2007). Multidimensional scales have been commonly used in research because they provide information on the effect of fatigue on several domains of physical, socioemotional, and cognitive functioning (Jean-Pierre et al., 2007). However, because they are time-consuming and burdensome for the patient, multidimensional scales are not suitable for daily clinical practice (Ahlberg, Ekman, Gaston-Johansson, & Mock, 2003). Therefore, the authors opted for a unidimensional VAS for measuring fatigue, which has several advantages. It is quick and easy to use, has been recommended by the NCCN practice guidelines (Lawrence et al., 2004), has been designed specifically for use

Knowledge Translation

Identification of depression is difficult in older adult patients with cancer because they are more likely to disclose somatic symptoms that can overlap with cancer-related symptoms.

Results of this study showed that the presence of fatigue can be an indicator of depression in older adult patients with cancer.

Assessing for fatigue has the advantage of being quick and straightforward, and it is already standard practice for many oncology nurses.

with patients with cancer (Jean-Pierre et al., 2007), and is suitable for use in healthy individuals (Glaus, 1993).

Implications for Nursing and Conclusions

Nurses play an important role in the detection and referral of psychosocial problems, such as depression. Therefore, nurses may need additional assistance because the identification of depression in older adult patients with cancer is particularly challenging. In this respect, the authors hope that oncology nurses are aware that some screening tools for depression may not be as suitable for use in patients with cancer, particularly older adult patients with cancer, given the overlap with cancer-related symptoms and the tendency to disclose more somatic symptoms instead of affective symptoms. In addition, in older adult patients with cancer, the identification of depression may be further complicated by common comorbidities, such as cognitive decline. Results of this study showed that presence of fatigue is an important cue to further investigate the presence of depression in older adult patients with cancer. This strategy can be used by oncology nurses. It has the advantage of being quick, straightforward, and standard practice. However, healthcare providers should keep in mind that only one out of five patients with fatigue was depressed and that

some patients with depression would be missed if only patients presenting with fatigue were assessed for depression. Therefore, it is necessary that oncology nurses thoroughly assess whether depression could be present and not solely rely on the symptom of fatigue.

The current study supports the recommendation that healthcare providers should consider the possibility of depression in patients reporting fatigue. This applies to older adult patients with cancer, as well as older adults without cancer.

The authors gratefully acknowledge the participating patients, physicians, and nurses; the University Biobank Limburg in Belgium and Biobank Nutrium Maastricht University Medical Centre in the Netherlands for storing the biologic material obtained for this study; and Tine De Burghgraeve, PhD, Liesbeth Daniels, MD, and Carine Van Den Broeke, PhD, for their excellent support and advice.

Laura Deckx, PhD, is a research fellow in the Department of General Practice at KU Leuven in Belgium and a postdoctoral research fellow in the Discipline of General Practice at the University of Queensland in Australia; Marjan van den Akker, PhD, is an associate professor in the Department of General Practice at KU Leuven and in the Department of Family Medicine at Maastricht University in the Netherlands; Denise Vergeer, MD, is a general practitioner trainee at VU University Medical Center in Amsterdam, the Netherlands; Doris van Abbema, RN, MSc, is a doctoral student in the Department of Medical Oncology at Maastricht University Medical Centre in the Netherlands; Franchette van den Berkmortel, MD, PhD, is a medical oncologist in the Department of Internal Medicine at Atrium Medical Centre Parkstad in Heerlen, the Netherlands; Loes Linsen, PhD, is a manager at University Biobank Limburg and Clinical Laboratory of Experimental Hematology at Jessa Hospital in Hasselt, Belgium; Eric T. de Jonge, MD, PhD, is a senior specialist in the Department of Gynecology at Ziekenhuis Oost-Limburg in Genk, Belgium; Bert Houben, MD, is a colorectal surgeon in the Department of Abdominal and Oncological Surgery at Jessa Hospital; Mieke van Driel, MD, PhD, FRACGP, is a professor in the School of Medicine at the University of Queensland in Brisbane, Australia; and Frank Buntinx, MD, PhD, is a professor in the Department of General Practice KU Leuven and in the Department of Family Medicine at Maastricht University. This study was supported, in part, by de Vlaamse Liga tegen Kanker [Flemish League Against Cancer] (No. 10482) and the European Union/Interreg IV Grensregio Vlaanderen–Nederland (No. IVA-VLANED-3.46). Deckx can be reached at laura.deckx@med.kuleuven.be, with copy to editor at ONFEditor@ons.org. (Submitted July 2014. Accepted for publication February 17, 2015.)

References

- Ahlberg, K., Ekman, T., Gaston-Johansson, F., & Mock, V. (2003). Assessment and management of cancer-related fatigue in adults. *Lancet*, *362*, 640–650. doi:10.1016/S0140-6736(03)14186-4
- Altman, D.G., & Bland, J.M. (1994a). Diagnostic tests. 1: Sensitivity and specificity. *BMJ*, *308*, 1552.
- Altman, D.G., & Bland, J.M. (1994b). Diagnostic tests 2: Predictive values. *BMJ*, *309*, 102.
- Altman, D.G., & Bland, J.M. (1994c). Diagnostic tests 3: Receiver operating characteristic plots. *BMJ*, *309*, 188.
- Bower, J.E., Bak, K., Berger, A., Breitbart, W., Escalante, C.P., Ganz, P.A., . . . Jacobsen, P.B. (2014). Screening, assessment, and management of fatigue in adult survivors of cancer: An American Society of Clinical Oncology clinical practice guideline adaptation. *Journal of Clinical Oncology*, *32*, 1840–1850. doi:10.1200/JCO.2013.53.4495
- D'Ath, P., Katona, P., Mullan, E., Evans, S., & Katona, C. (1994). Screening, detection and management of depression in elderly primary care attenders. I: The acceptability and performance of the 15 item Geriatric Depression Scale (GDS15) and the development of short versions. *Family Practice*, *11*, 260–266.
- Deckx, L., van Abbema, D., Nelissen, K., Daniels, L., Stinissen, P., Bultens, P., . . . van den Akker, M. (2011). Study protocol of KLIMOP: A cohort study on the wellbeing of older cancer patients in Belgium and the Netherlands. *BMC Public Health*, *11*, 825.
- Ensinnck, K.T., Schuurman, A.G., van den Akker, M., Metsemakers, J.F., Kester, A.D., Knottnerus, J.A., & Buntinx, F. (2002). Is there

- an increased risk of dying after depression? *American Journal of Epidemiology*, 156, 1043–1048.
- Fox, S.W., & Lyon, D.E. (2006). Symptom clusters and quality of life in survivors of lung cancer. *Oncology Nursing Forum*, 33, 931–936. doi:10.1188/06.ONF.931-936
- Galiano-Castillo, N., Ariza-García, A., Cantarero-Villanueva, I., Fernández-Lao, C., Díaz-Rodríguez, L., & Arroyo-Morales, M. (2014). Depressed mood in breast cancer survivors: Associations with physical activity, cancer-related fatigue, quality of life, and fitness level. *European Journal of Oncology Nursing*, 18, 206–210.
- Giacalone, A., Quitadamo, D., Zanet, E., Berretta, M., Spina, M., & Tirelli, U. (2013). Cancer-related fatigue in the elderly. *Supportive Care in Cancer*, 21, 2899–2911. doi:10.1007/s00520-013-1897-1
- Glaus, A. (1993). Assessment of fatigue in cancer and non-cancer patients and in healthy individuals. *Supportive Care in Cancer*, 1, 305–315.
- Gosain, R., & Miller, K. (2013). Symptoms and symptom management in long-term cancer survivors. *Cancer Journal*, 19, 405–409. doi:10.1097/01.PPO.0000434391.11187.c3
- Guan, N.C., Sulaiman, A.H., Zainal, N.Z., Boks, M.P., & De Wit, N.J. (2013). Diagnostic criteria for major depressive disorder in cancer patients: A review. *International Journal of Psychiatry in Medicine*, 45, 73–82.
- Hofman, M., Ryan, J.L., Figueroa-Moseley, C.D., Jean-Pierre, P., & Morrow, G.R. (2007). Cancer-related fatigue: The scale of the problem. *Oncologist*, 12(Suppl. 1), 4–10. doi:10.1634/theoncologist.12-S1-4
- Jean-Pierre, P., Figueroa-Moseley, C.D., Kohli, S., Fiscella, K., Palesh, O.G., & Morrow, G.R. (2007). Assessment of cancer-related fatigue: Implications for clinical diagnosis and treatment. *Oncologist*, 12(Suppl. 1), 11–21. doi:10.1634/theoncologist.12-S1-11
- Lawrence, D.P., Kupelnick, B., Miller, K., Devine, D., & Lau, J. (2004). Evidence report on the occurrence, assessment, and treatment of fatigue in cancer patients. *Journal of the National Cancer Institute. Monographs*, 32, 40–50. doi:10.1093/jncimonographs/lgh027
- Mitchell, A.J. (2010). Short screening tools for cancer-related distress: A review and diagnostic validity meta-analysis. *Journal of the National Comprehensive Cancer Network*, 8, 487–494.
- Mitchell, A.J., Chan, M., Bhatti, H., Halton, M., Grassi, L., Johansen, C., & Meader, N. (2011). Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: A meta-analysis of 94 interview-based studies. *Lancet. Oncology*, 12, 160–174. doi:10.1016/S1470-2045(11)70002-X
- Mohile, S.G., Fan, L., Reeve, E., Jean-Pierre, P., Mustian, K., Peppone, L., . . . Dale, W. (2011). Association of cancer with geriatric syndromes in older Medicare beneficiaries. *Journal of Clinical Oncology*, 29, 1458–1464. doi:10.1200/JCO.2010.31.6695
- Mols, F., Husson, O., Roukema, J.A., & van de Poll-Franse, L.V. (2013). Depressive symptoms are a risk factor for all-cause mortality: Results from a prospective population-based study among 3,080 cancer survivors from the PROFILES registry. *Journal of Cancer Survivorship*, 7, 484–492. doi:10.1007/s11764-013-0286-6
- Nelson, C.J., Cho, C., Berk, A.R., Holland, J., & Roth, A.J. (2010). Are gold standard depression measures appropriate for use in geriatric cancer patients? A systematic evaluation of self-report depression instruments used with geriatric, cancer, and geriatric cancer samples. *Journal of Clinical Oncology*, 28, 348–356.
- Nelson, C.J., Weinberger, M.I., Balk, E., Holland, J., Breitbart, W., & Roth, A.J. (2009). The chronology of distress, anxiety, and depression in older prostate cancer patients. *Oncologist*, 14, 891–899. doi:10.1634/theoncologist.2009-0059
- Rao, A., & Cohen, H.J. (2004). Symptom management in the elderly cancer patient: Fatigue, pain, and depression. *Journal of the National Cancer Institute. Monographs*, 32, 150–157. doi:10.1093/jncimonographs/lgh031
- Rhondali, W., Perceau, E., Berthiller, J., Saltel, P., Trillet-Lenoir, V., Tredan, O., . . . Filbet, M. (2012). Frequency of depression among oncology outpatients and association with other symptoms. *Supportive Care in Cancer*, 20, 2795–2802. doi:10.1007/s00520-012-1401-3
- So, W.K., Marsh, G., Ling, W.M., Leung, F.Y., Lo, J.C., Yeung, M., & Li, G.K. (2009). The symptom cluster of fatigue, pain, anxiety, and depression and the effect on the quality of life of women receiving treatment for breast cancer: A multicenter study [Online exclusive]. *Oncology Nursing Forum*, 36, E205–E214. doi:10.1188/09.ONF.E205-E214
- Stanton, A.L. (2012). What happens now? Psychosocial care for cancer survivors after medical treatment completion. *Journal of Clinical Oncology*, 30, 1215–1220. doi:10.1200/JCO.2011.39.7406
- Trask, P.C. (2004). Assessment of depression in cancer patients. *Journal of the National Cancer Institute. Monographs*, 32, 80–92. doi:10.1093/jncimonographs/lgh013
- Warmenhoven, F., van Weel, C., Vissers, K., & Prins, J. (2013). Screening instruments for depression in advanced cancer patients: What do we actually measure? *Pain Practice*, 13, 467–475. doi:10.1111/papr.12012
- Weinberger, M.I., Bruce, M.L., Roth, A.J., Breitbart, W., & Nelson, C.J. (2011). Depression and barriers to mental health care in older cancer patients. *International Journal of Geriatric Psychiatry*, 26, 21–26. doi:10.1002/gps.2497
- Weinberger, M.I., Roth, A.J., & Nelson, C.J. (2009). Untangling the complexities of depression diagnosis in older cancer patients. *Oncologist*, 14, 60–66. doi:10.1634/theoncologist.2008-0147
- Wildiers, H., Heeren, P., Puts, M., Topinkova, E., Janssen-Heijnen, M.L., Extermann, M., . . . Hurria, A. (2014). International Society of Geriatric Oncology consensus on geriatric assessment in older patients with cancer. *Journal of Clinical Oncology*, 32, 2595–2603. doi:10.1200/JCO.2013.54.8347
- Wright, F., Hammer, M.J., & D'Eramo Melkus, G. (2014). Associations between multiple chronic conditions and cancer-related fatigue: An integrative review. *Oncology Nursing Forum*, 41, 399–410. doi:10.1188/14.ONF.41-04AP
- Yesavage, J.A., Brink, T.L., Rose, T.L., Lum, O., Huang, V., Adey, M., & Leirer, V.O. (1982). Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research*, 17, 37–49.