ORIGINAL ARTICLE

The Beck Depression Inventory (BDI-II) and a single screening question as screening tools for depressive disorder in Dutch advanced cancer patients

**Franca Warmenhoven · Eric van Rijswijk ·
Yvonne Engels · Cornelis Kan · Judith Prins ·
Chris van Weel · Kris Vissers**

Abstract

Purpose Depression is highly prevalent in advanced cancer patients, but the diagnosis of depressive disorder in patients with advanced cancer is difficult. Screening instruments could facilitate diagnosing depressive disorder in patients with advanced cancer. The aim of this study was to determine the validity of the Beck Depression Inventory (BDI-II) and a single screening question as screening tools for depressive disorder in advanced cancer patients.

Methods Patients with advanced metastatic disease, visiting the outpatient palliative care department, were asked to fill out a self-questionnaire containing the Beck Depression Inventory (BDI-II) and a single screening question "Are you feeling depressed?" The mood section of the PRIME-MD was used as a gold standard.

Results Sixty-one patients with advanced metastatic disease were eligible to be included in the study. Complete data were obtained from 46 patients. The area under the curve of the receiver operating characteristics analysis of the BDI-II was 0.82. The optimal cut-off point of the BDI-II was 16 with a sensitivity of 90% and a specificity of 69%. The single screening question showed a sensitivity of 50% and a specificity of 94%.

Conclusions The BDI-II seems an adequate screening tool for a depressive disorder in advanced cancer patients. The sensitivity of a single screening question is poor.

Keywords Depression · Advanced cancer · Validation · Screening tool · BDI-II

F. Warmenhoven (✉) · Y. Engels · K. Vissers
Department of Anesthesiology, Pain and Palliative Medicine,
Radboud University Nijmegen Medical Centre,
Huispost 630, P.O. Box 9101, 6500 HB, Nijmegen,
The Netherlands
e-mail: f.warmenhoven@anes.umcn.nl

E. van Rijswijk · C. van Weel
Department of Primary and Community Care,
Radboud University Nijmegen Medical Centre,
Nijmegen, The Netherlands

C. Kan
Department of Psychiatry,
Radboud University Nijmegen Medical Centre,
Nijmegen, The Netherlands

J. Prins
Department of Medical Psychology,
Radboud University Nijmegen Medical Centre,
Nijmegen, The Netherlands

Introduction

Depression seems highly prevalent in patients with advanced cancer. In different studies, a large variation of prevalence of depression in advanced cancer (4% to 58%) is reported [1]. This large variation in prevalence can be explained by the use of different research samples with different risk factors like cancer type, age, sex, history of depression, alcohol abuses, and by the use of different assessment tools [2–4]. In some patients with advanced cancer, a depressive disorder as defined in the DSM-IV can be diagnosed, whereas others experience symptoms of depression and low mood but do not meet the diagnostic criteria of the DSM-IV. Both situations are associated with a lower quality of life and consequently cause a burden for the patient and his caregivers [5, 6].

In patients with advanced cancer, several factors can influence the diagnostic process of depression. Firstly,

specific physical signs and symptoms presented in a patient with advanced cancer, such as weight loss or fatigue, can originate from advanced cancer or from depression [7]. Physical symptoms and depressive symptoms may partly share a common pathway of distress [8], which makes it difficult to distinguish between cause and effect: physical symptoms may increase a depressed feeling on the one hand and on the other hand a depressed feeling may result in more physical complaints [9, 10]. Secondly, it may be difficult to distinguish grief from depression in patients with advanced cancer [11]. Thirdly, for both patient and physician emotional issues are difficult to address in this phase of life. Only a minority (17%) of advanced cancer patients explicitly express their emotional distress to their physician and physicians themselves do not often address emotional problems in conversations with advanced cancer patients, possibly because they do not feel well trained in communication with palliative care patients [12, 13, 17].

The recognition of depression is not optimal for oncologists [14, 15] and other physicians as well [16] because of the reasons mentioned. If patients with advanced cancer who are suffering from a depressive disorder are not identified, they will not be able to benefit from the pharmacological and psychological treatments that are considered beneficial [16, 18, 19].

Screening instruments could facilitate recognizing depressive disorder in this population [20]. Systematic screening for symptoms like depression fits into the principles of advanced care planning that is promoted in patients with advanced cancer or in need of palliative care [21]. The ideal screening instrument combines a high sensitivity with a high specificity. When using a cut score in a screening instrument, the optimal cut score for a specific patient group can be determined with a receiver operating characteristics analysis. The usefulness of a screening tool depends on the positive and negative predictive value considering the main aim of the screening. When screening for depression in patients in a palliative trajectory, given the vulnerability of these patients and the consequences of depression for their health status and quality of life, a high negative predictive value seems most important. False positive cases can be ruled out in further diagnostic assessment.

Recently, screening for depression with one or two simple questions was suggested to be highly specific [22], although different studies report different findings on psychometric values of short screening methods [23]. A short screening method is appealing because the costs would be considerably lower than other methods for diagnosing depressive disorder; it is time efficient and many people can be screened for depression in a quick and simple way.

The Beck Depression inventory (BDI-II) is one of the most widely used screening tools for depression and it may provide a useful method for screening for depression in palliative care [24–26]. This inventory is a self-report questionnaire that was originally developed to rate the severity of depressive symptoms [27]. The BDI-II has shown good psychometric qualities as a screening tool for depression. However, the BDI-II contains several items on somatic symptoms of depression (for example, questions about loss of energy, fatigue, and loss of appetite), which may lead to an overestimation of positive cases in a patient group with somatic illness. The BDI-II has been validated in many samples including cancer patients [28].

The aim of the present study was to assess the validity of the BDI-II and a single screening question as screening tools for depression in Dutch-speaking patients with advanced cancer. The hypothesis was that both the BDI-II and the single screening question are adequate screening tools for depressive disorders in Dutch advanced cancer patients.

Methods

Ethical approval and informed consent

The study received approval of the medical ethical committee of the Radboud University Nijmegen Medical Centre. After obtaining informed consent, patients were asked to fill out a self-report questionnaire. Patients who were unable to read and understand the Dutch language were excluded from participating in this study.

Sample and design

From December 2003 until March 2007, all consecutive patients with advanced, non-curable stages of metastatic cancer referred to a new outpatient palliative care department at the Radboud University Nijmegen Medical Centre were asked to participate in the study by their treating physician. Patients considered by their physician to be too ill to participate were not asked.

Questionnaires and data collection

Patients were asked to provide demographic information. The BDI-II and a single screening question "Are you feeling depressed?" were used to screen for depression. The BDI-II is a 21-item self-report questionnaire with four response options for each item. Items of the BDI-II relate to different symptoms of depression such as sadness, hopelessness, self-blame, guilt, fatigue, and loss of appetite. On each item, patients are asked to choose the statement that best describes their attitude towards the item. Scores of the BDI-II can vary from 0 to 63 and are often classified as

follows: 0–13 no depression, 14–19 mild depression, 20–28 moderate depression, and 29–63 severe depression [29].

Patients were asked to fill out the questionnaire during their visit at the outpatient department or at home. The mood section of the PRIME-MD [30] was administered as a gold standard for the clinical diagnosis of a depressive disorder by the physician, who was blind to the results of the questionnaire. The PRIME-MD is a structured interview based on the DSM-IV classification for depressive disorder and has been validated in oncology patients [31]. The PRIME-MD provides standardized questions that focus directly on key diagnostic symptoms and a depressive disorder was diagnosed when patients fulfilled the DSM-IV criteria. The time required to complete the PRIME-MD mood section is approximately 10 min.

Statistical analysis

Statistical analysis was performed with SPSS 16.0. Means, sensitivity, specificity, and positive and negative predictive value were computed. A receiver operating characteristics (ROC) analysis was performed to determine the optimal cut score for the BDI-II as a screen for depression in this population.

Results

From December 2003 until March 2007, 61 patients (29 men, 32 women) were eligible to be included in the study. The inclusion period of this study has been relatively long because the outpatient department for palliative care patients was a new facility in the hospital and, consequently, referral numbers were low. Patients suffered from a variety of advanced cancers (23% colon carcinoma, 16%

breast cancer, 8% head and neck cancer, 8% lung cancer, 45% some other malignancy). Of the 61 eligible patients, 20 patients (33%) deceased within 6 months. Seven eligible patients refused to participate in the study.

Among the 54 patients who enrolled in the study, administration of the PRIME-MD was not completed in eight patients (Fig. 1). Therefore, complete data were obtained of 46 patients (26 women, 20 men, mean age 60 years, median age 58 years). The mean BDI-II score of the 46 patients who participated in the study was 14.7 (SD 9.9).

Ten out of 46 patients (22%) were diagnosed with a major depressive disorder using the PRIME-MD. The area under the curve (AUC) of the ROC analysis of the BDI-II was 0.82 (Fig. 2). Using the traditional cut score of 14, the BDI-II demonstrated 90% sensitivity and 64% specificity. The positive and negative predictive values were 45% and 97%, respectively. However, using a higher cut score of 16 retained high sensitivity (90%) while increasing specificity to 69%. The positive and negative predictive values were 55% and 96%, respectively. The single screening question demonstrated 50% sensitivity and 94% specificity. The positive and negative predictive values of the single screening question were 71% and 87%, respectively (Table 1).

Discussion

This study shows that the BDI-II is an adequate screening tool to detect depressive disorder in patients with advanced cancer. Using a cut-off point of 16, it has good sensitivity (90%) and acceptable specificity (69%). The single screening question performed unsatisfactory, demonstrating only 50% sensitivity and 94% specificity. Given the consequences of not recognizing a depression
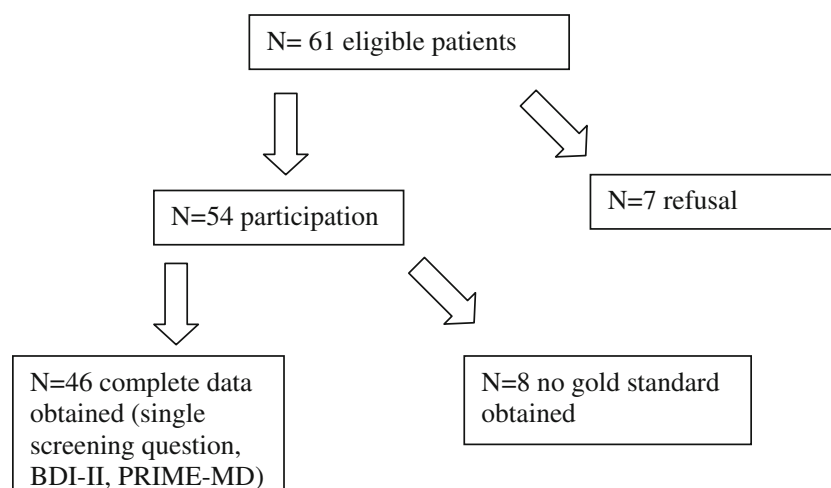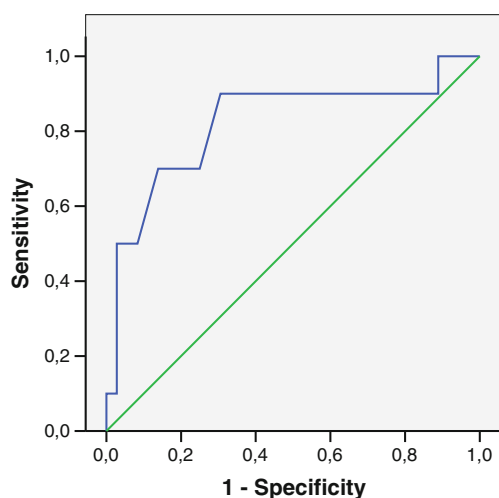

Fig. 1 Inclusion of patients

Fig. 2 Receiving operating characteristic beck depression inventory (BDI-II)

in this vulnerable patient group and the possibility to rule out depression in further diagnostic assessment in patients who screen positive for depression, a high sensitivity and high negative predictive value of screening tools are important and a lower specificity and positive predictive value are accepted.

The results of this study differ somewhat from previous findings on psychometric properties of the Beck Depression Inventory in a cancer patient sample. Katz et al. found that with a cut score of 16 the BDI had a sensitivity of 73% and specificity of 100% in a sample of 60 ambulatory patients with a malignancy of the head and neck region and identified the optimum cut score at 13 with a sensitivity of 92% and a specificity of 90% [32]. In the present study, the participants originated from a heterogeneous group of patients with advanced cancer, whereas Katz et al. used a more homogeneous group of ambulatory head and neck cancer patients. Furthermore, Katz et al. used a different instrument, the Schedule for Affective Disorders and Schizophrenia, as a gold standard.

A possible shortcoming of the BDI-II as a screening tool in advanced cancer patients is that the number of identified cases could be overestimated because of the somatic items of the questionnaire. The specificity of the BDI-II in advanced cancer patients might be increased by excluding

the somatic items (e.g., weight loss, loss of appetite, etc.). The Beck Depression Inventory Short Form (BDI-SF), consisting of seven items tapping exclusively affective symptoms, might be more appropriate for this population. Love et al. performed a study in 227 women with metastatic breast disease in which the BDI-SF had a specificity of 63% and a positive predictive value of 0.52 [33]. This needs further study to determine the psychometric properties in a more heterogeneous patient group.

The sensitivity of the single screening question in this study appeared 50%, which is almost similar to the reported sensitivity of 55% in an earlier study in 74 palliative care patients [34]. Other previous studies, however, report a much higher sensitivity of a single screening question in palliative care patients (72–100%) [23, 35]. The low sensitivity of the single screening question in this study may point to difficulties regarding the meaning of the question. The word depression knows different translations and different interpretations in the Dutch language. The exact words that have been used might have influenced the results [36].

This study has some limitations. Firstly, the relatively small sample size was recruited from the recently started outpatient department for palliative care. Small sample size is not unusual in palliative care, in which recruitment is difficult and dropout rates are high due to deterioration of health status and death. Secondly, the selection of participants in this study was performed by the treating physician. The number of patients that the physicians considered too ill to participate was not recorded. In general, though, the participation of patients in research is high, when their "personal" treating physician invites them for participation, but it might introduce selection bias if the physician leaves out highly distressed patients. Given the relatively high scores on the BDI-II in this sample, severe bias seems unlikely. Thirdly, we used the PRIME-MD as a gold standard. The PRIME-MD and other psychiatric interviews are not validated for *advanced* cancer patients specifically. However, they have been validated in cancer patients [31].

This study offers a contribution to the diagnosis and screening of depressive disorder in advanced cancer patients. The Beck Depression Inventory offers a method for brief and sensitive detection of depressive disorder in this specific group of patients. If used systematically in

Table 1 Psychometric properties of single screening question and BDI-II

	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)
Single screening question	50	69	71	87
BDI-II (cut score 14)	90	64	45	97
BDI-II (cut score 16)	90	69	55	96

all advanced cancer patients, this screening tool may increase and improve physician's evaluations of not only somatic, but also psychological complaints of their patients.

To our knowledge, this is the first validation study of the Dutch Beck Depression Inventory and of a single screening question to screen for depression in a heterogeneous group of advanced cancer patients. Secondly, it gives a prevalence of depression in advanced cancer patients, based on a clinical diagnosis with the PRIME-MD, contrary to prevalence numbers acquired by questionnaires. In clinical practice, the screening tool can serve to alert physicians to the possibility of depressive disorder and hence give attention to the mental health status of palliative care patients, if necessary followed by further diagnostic assessment and appropriate treatment.

Conclusions

The BDI-II seems to be an adequate screening tool for depressive disorders in Dutch advanced cancer patients when using a cut score of 16. The single screening question is less adequate to detect depression in palliative care patients, considering the low sensitivity.

Diagnosing depression in patients with advanced cancer remains a challenge. Using a valid screening tool can facilitate the process of diagnosing depression in this specific group of patients.

Conflict of interest The authors declare no conflict of interest relating to this manuscript. The authors have full control of the primary data and the data can be reviewed on request.

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