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**Brief Report**

# Death Anxiety in Patients With Metastatic Non-Small Cell Lung Cancer With and Without Brain Metastases



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**Abstract**

**Context.** Death anxiety is common in patients with metastatic cancer, but its relationship to brain metastases and cognitive decline is unknown. Early identification of death anxiety and its determinants allows proactive interventions to be offered to those in need.

**Objectives.** To identify psychological, physical, and disease-related (including brain metastases and cognitive impairment) factors associated with death anxiety in metastatic non-small cell lung cancer (mNSCLC) patients.

**Methods.** A cross-sectional pilot study with mNSCLC outpatients completing standardized neuropsychological tests and validated questionnaires measuring death anxiety, cognitive concerns, illness intrusiveness, depression, demoralization, self-esteem, and common cancer symptoms. We constructed a composite for objective cognitive function (mean neuropsychological tests z-scores).

**Results.** Study measures were completed by 78 patients (50% females; median age 62 years [range 37–82]). Median time since mNSCLC diagnosis was 11 months (range 0–89); 53% had brain metastases. At least moderate death anxiety was reported by 43% ( $n = 33$ ). Objective cognitive impairment was present in 41% ( $n = 32$ ) and perceived cognitive impairment in 27% ( $n = 21$ ). Death anxiety, objective, and perceived cognitive impairment did not significantly differ between patients with and without brain metastases. In univariate analysis, death anxiety was associated with demoralization, depression, self-esteem, illness intrusiveness, common physical cancer symptoms, and perceived cognitive impairment. In multivariate analysis, demoralization ( $P < 0.001$ ) and illness intrusiveness ( $P = 0.001$ ) were associated with death anxiety.

**Conclusion.** Death anxiety and brain metastases are common in patients with mNSCLC but not necessarily linked. The association of death anxiety with both demoralization and illness intrusiveness highlights the importance of integrated psychological and symptom management. Further research is needed on the psychological impact of brain metastases. *J Pain Symptom Manage* 2020;60:422–429. *Crown Copyright* © 2020 *Published by Elsevier Inc. on behalf of American Academy of Hospice and Palliative Medicine. All rights reserved.*

**Key Words**

*Palliative care, neuro-oncology, neuropsychological, psychological distress, death anxiety*

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## Key Message

This study showed that death anxiety, cognitive decline, and brain metastases are common in patients with metastatic non-small cell lung cancer but not necessarily linked. The study findings highlight the need for the integration of psychological and physical symptom-focused management. Further research is warranted to obtain insight into the psychological impact of non-small cell lung cancer brain metastases.

## Introduction

Distress about dying and death (death anxiety) is common in patients with metastatic cancer.<sup>1,2</sup> Terror management theory suggests that death anxiety is a fundamental human fear that is amplified by mortality salience (awareness that one's death is inevitable).<sup>3</sup> The diagnosis and progression of metastatic cancer inevitably heightens mortality salience and may trigger death anxiety.<sup>4</sup> Research conducted in patients with metastatic cancer has shown that death anxiety is associated with demoralization, lower self-esteem, depression, and physical symptoms commonly experienced by patients with cancer, such as pain, shortness of breath, and lack of energy.<sup>5–8</sup>

Demoralization is characterized by feelings of hopelessness and helplessness, loss of sense of meaning and purpose in life, and diminished self-esteem.<sup>9</sup> A recent study indicates that demoralization may be linked to death anxiety because it reflects a loss of resilience, with the breakdown of psychological mechanisms that protect individuals from death anxiety.<sup>6</sup> Self-esteem (a person's self-worth<sup>10</sup>) has been shown to protect against core human fears<sup>5</sup> and, therefore, may protect individuals with metastatic cancer from death anxiety in the face of multiple losses associated with the disease.<sup>11,12</sup> In patients with metastatic cancer, increased symptom burden may heighten mortality salience and its related fears.<sup>7,8</sup> Illness intrusiveness, which refers to the illness-induced disruption of lifestyles, activities, relationships, and interests,<sup>13,14</sup> may heighten death anxiety by limiting resilience resources (e.g., social relationships and participating in meaningful activities) and increasing mortality salience.

For patients with metastatic non-small cell lung cancer (mNSCLC), the treatment landscape has changed remarkably in recent years, with the introduction of targeted therapies and immunotherapies.<sup>15,16</sup> However, despite the overall improved survival, most patients with mNSCLC still die of their disease. Moreover, additional disease-related factors may contribute to death anxiety in these patients. mNSCLC is the most common cancer to metastasize to the brain,<sup>17</sup> and brain metastases are associated with worse prognosis and increased morbidity. The development of brain metastases may

trigger death anxiety and fears related to the perceived loss of control, impaired cognition, and changes in personality.<sup>18,19</sup> The shortened life expectancy and adverse neurological sequelae associated with brain metastases may increase death anxiety. Cognitive decline is common in both central nervous system and non-central nervous system cancers, but the development of brain metastases and their treatment increase the risk for such decline.<sup>20–25</sup> Cognitive decline can significantly impede daily functioning and may be a signal of disease progression to patients, heightening their death anxiety.<sup>26</sup>

Patients with brain metastases and cognitive decline are often excluded from clinical trials, and it has not been examined whether death anxiety is associated with brain metastases and/or cognitive decline. Improving insight into other relevant contributors to death anxiety could inform preventive and therapeutic interventions directed to reduce death anxiety and existential distress in patients with mNSCLC. The specific aim of this pilot study was to identify, from a range of psychological, physical, and disease-related factors (including brain metastases and cognitive decline), the most important contributing factors to death anxiety in patients with mNSCLC.

## Methods

### Study Population

Between October 2018 and June 2019, outpatients were recruited at the Princess Margaret Cancer Centre, a comprehensive cancer center in Toronto, Canada. Inclusion criteria were aged 18 years and older, mNSCLC diagnosis, and fluency in English. Exclusion criteria were the presence of primary brain tumors or psychiatric or neurological conditions that could impact consent or completing study measures. The latter was determined by the physician and nurse managing the clinic.

### Study Measures

Demographic characteristics were obtained during a structured interview. Disease and treatment-related variables were obtained via chart review, including date of mNSCLC diagnosis; disease characteristics (epidermal growth factor receptor [EGFR] mutational status and the presence and number of brain metastases); localized and systemic treatments received; and the presence of disease progression (defined as radiological progression or clinical deterioration within one month before the study visit).

### Self-Report Questionnaires

The Death and Dying Distress Scale<sup>2</sup> is a validated questionnaire assessing death anxiety in patients

with advanced cancer.<sup>27</sup> The 15-item scale includes items about distress related to the dying process, running out of time, and the impact of one's death on loved ones. The items are scored on a six-point Likert scale (0—not distressed to 5—extreme distress). Moderate death anxiety is defined by Death and Dying Distress Scale scores between 25 and 46, and severe death anxiety is defined as scores  $\geq 47$ .<sup>28</sup>

The Demoralization Scale<sup>29</sup> was used to measure demoralization. This 24-item validated measure assesses loss of meaning and purpose, dysphoria, disheartenment, helplessness, and sense of failure, and items are scored on a five-point Likert scale. Questionnaire scores of  $\geq 30$  represent at least moderate demoralization.<sup>29,30</sup>

The Patient Health Questionnaire-9<sup>31</sup> was used to assess depressive symptoms. Based on the *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition) diagnostic criteria for depression, the Patient Health Questionnaire-9 has nine items, which are scored on a four-point Likert scale. Scores  $\geq 10$  represent at least moderate depression.

The Rosenberg Self-Esteem Scale<sup>32</sup> is a validated measure that assesses an individual's global level of self-esteem, by measuring both positive and negative feelings about the self. The 10 items on this scale are each scored on a four-point Likert scale. Higher scores reflect greater self-esteem.

The Illness Intrusiveness Rating Scale<sup>33</sup> was used to measure illness-induced disruption of valued activities and interests, including work, recreation, and social relationships.<sup>13</sup> The 13 items on this validated measure are scored on a seven-point Likert scale. Higher scores reflect greater illness intrusiveness.

The Memorial Symptom Assessment Scale—Short Form<sup>34</sup> measures the severity and frequency of 28 common physical symptoms in patients with cancer. The items are scored on a five-point Likert scale, with higher scores referring to a greater number or severity of symptoms.<sup>34</sup>

The Functional Assessment of Cancer Therapy—Cognitive Function, Version 3 (Fact-Cog)<sup>35,36</sup> is a widely used validated measure that is used to assess perceived cognitive function.<sup>37</sup> The Fact-Cog consists of 37 statements related to cognitive functioning, and respondents rate frequency of occurrence in the past week on a five-point Likert scale (0—never/not at all to 4—several times a day/very much). The perceived cognitive impairment subscale of the Fact-Cog (Fact-Cog PCI) was used in this study, with higher scores indicating less perceived cognitive impairment. Based on normative data from a healthy adult population (provided by Costa et al.<sup>38</sup>), we transformed the Fact-Cog PCI scores to *z*-scores (mean 0; SD 1). Perceived cognitive impairment was defined as a Fact-Cog PCI score  $\geq 1.5$  SD below the normative mean.

### Neuropsychological Tests

The neuropsychological test battery was based on the International Cognition and Cancer Task Force guidelines<sup>39</sup> and administered by research staff (A. C. E. and G. S.) trained and supervised by a clinical neuropsychologist (K. E.).

The Hopkins Verbal Learning Test—Revised<sup>40,41</sup> (HVLTR) measures verbal learning and memory, including total recall (TR; number of words recalled after repeated learning trials), delayed recall (DR; number of words recalled after a time delay), and recognition (number of words correctly recognized).

Trail Making Test-A (TMTA)<sup>42,43</sup> measures processing speed and visual attention, and Trail Making Test-B (TMTB) measures mental flexibility and executive function. Scores are based on the time required to complete each part.

Controlled Oral Word Association<sup>44,45</sup> is a verbal fluency test; the score is based on the number of words generated in response to a phonemic cue within a designated time frame.

Neuropsychological test scores were converted to *z*-scores based on published normative data that accounted for age, gender, and/or education.<sup>40,43,45</sup> Patients were considered cognitively impaired if they scored at least 1.5 SD below the normative mean on two and/or more tests or at least 2 SD below the mean on a single test.<sup>39</sup> A cognitive composite (COG-comp) was constructed by averaging the neuropsychological test *z*-scores (HVLTR-TR, HVLTR-DR, TMTA, TMTB, and Controlled Oral Word Association).

### Statistical Analysis

Statistical analyses were performed using SPSS, Version 23.0 (IBM SPSS Statistics, Armonk, NY). Descriptive statistics were calculated for continuous variables, and frequencies were used for categorical variables. When a patient skipped an item but completed at least half of the questionnaire items, scores were prorated (i.e., we multiplied the sum of the individual item scores by the total number of scale items and subsequently, divided by the number of items answered by the participant).<sup>46</sup> The number of months since mNSCLC diagnosis was converted into a binary variable using a median split (Table 1).

Independent *t*-tests or Mann-Whitney *U* tests, depending on data distribution, were performed to compare levels of death anxiety, objective, and perceived cognitive impairment in patients with and without brain metastases.

To identify factors related to the levels of death anxiety, linear univariate regression analyses included demographic (age, gender, and smoking history), disease (time since mNSCLC diagnosis, the presence and number of brain metastases, and the presence

of disease progression), psychological (demoralization, depression, self-esteem, perceived cognitive impairment, and illness intrusiveness), and common physical cancer symptoms, as well as objective cognitive impairment. Subsequently, all factors univariately associated with death anxiety with a  $P$ -value  $\leq 0.05$  were included in the backward linear multivariate analysis. Before conducting the regression analysis, assumptions were tested, for example normally distributed residuals.

## Results

About 238 patients were approached, of whom 81 (34%) provided written informed consent. Reasons for nonparticipation were lack of interest ( $n = 124$ ), high symptom burden ( $n = 8$ ), and the study being too time consuming ( $n = 25$ ). Of the consented patients, two patients withdrew (one because of clinical deterioration and one because of the time required for the study visit) and one patient was lost to follow-up. In total, 11 questionnaire scores and 1 COG-comp were missing, and 11 questionnaire scores were prorated (Table 2).

### Demographic and Clinical Characteristics

See Table 1 for demographic and clinical characteristics. Median age was 62 years (range 37–82), and 39 (50%) were females. Median time since

mNSCLC diagnosis was 11 months (range 0–89). About 41 patients (53%) had brain metastases; of those 20 (49%) were females, 14 (34%) had an EGFR mutation, and 23 (56%) had received cranial irradiation.

### Psychological Disturbance

At least moderate death anxiety was reported by 33 patients (43%), including 15 with severe death anxiety. The median reported level of death anxiety was 22 (range 0–69) (Table 2). Depression and demoralization were reported by 19 (25%) and 25 (33%) patients, respectively. The median self-esteem score was 21 (range 6–30; interquartile range 8), which is comparable to reported levels in a cohort of U.S. adults<sup>47</sup> ( $n = 503$ ; mean 23.0; SD 5.8). The levels of illness intrusiveness (median 37.0; interquartile range 27) were comparable to previously reported levels in patients with lung cancer<sup>33</sup> (mean 41.1; SD 16.8). Of the 33 patients who reported at least moderate death anxiety, 15 (45%) were females, 13 (49%) reported depression, and 22 (67%) demoralization.

### Brain Metastases

About 18 of 41 (44%) patients with brain metastases reported at least moderate death anxiety, and 15 of 37 (41%) patients were without brain metastases. In this pilot cohort, severity of death anxiety did not significantly differ in patients with and without brain metastases (median 24 [range 0–69] vs. median 17 [range 0–69]; Mann-Whitney  $U$  test = 676;  $P = 0.51$ ).

### Physical Symptoms

The most common physical symptoms were lack of energy ( $n = 69$ ; 88%), shortness of breath ( $n = 55$ ; 71%), and difficulty sleeping ( $n = 52$ ; 67%).

### Cognitive Impairment

About 32 (41%) patients met the criteria for objective cognitive impairment. Although the mean COG-comp was within normal limits (mean  $-0.40$ ; SD .91), the range was wide (range  $-3.1$  to 1.6). The cognitive domains most often affected were verbal learning (HVTL-R-TR,  $n = 22$ ; 28%), memory (HVTL-R-DR,  $n = 19$ ; 24%), and executive function (TMTB,  $n = 16$ ; 21%). Objective cognitive impairment was evident in 19 of 41 (46%) patients with brain metastases and in 13 of 37 (35%) patients without brain metastases. Moreover, of the 23 patients who received cranial irradiation 13 patients (57%) had objective cognitive impairment (10 stereotactic radiosurgery [SRS], two whole-brain radiation therapy [WBRT] as well as one SRS and WBRT). The COG-comp did not significantly differ in patients with and without brain metastases (mean  $-0.56$  [SD .88] vs. mean  $-0.26$  [SD .93];  $t = -1.44$ ;  $P = 0.15$ ).

Table 1  
Clinical and Disease Characteristics

Variable	N = 78 (%)
Median age (range) <sup>a</sup>	62 (37–82)
Female	39 (50)
Married or common-in-law	61 (78)
Ethnicity	
Caucasian	51 (65)
Asian	23 (30)
Other	4 (5)
Education; yrs; median (range)	15 (4–25)
Native English-speaking <sup>b</sup>	67 (89)
Smoking history	54 (69)
Median time since mNSCLC diagnosis; months (range)	11 (0–89)
EGFR-mutated	25 (32)
Active systemic treatment	61 (78)
Disease progression <sup>a</sup>	26 (33)
Number of brain metastases	
0	37 (47)
1–3	20 (26)
$\geq 4$	21 (27)
Cranial radiotherapy <sup>c</sup>	
SRS	16 (21)
WBRT	10 (13)

mNSCLC = metastatic non-small cell lung cancer; EGFR = epidermal growth factor receptor; SRS = stereotactic radiosurgery; WBRT = whole-brain radiation therapy.

<sup>a</sup>At time of study visit.

<sup>b</sup>Including patients who had studied for four or more years in English.

<sup>c</sup>Patients could have received both SRS and WBRT.

Table 2  
Descriptive Statistics for the Psychological Variables, Common Physical Cancer Symptoms, and Cognitive Function

Variable	Median (Range)	N (%) Impaired	Missing/Prorated
Psychological variables (measure and test cutoff)			
Death anxiety (DADDS $\geq 25$ )	23 (0–69)	33 (43)	1/1
Demoralization (DS $\geq 30$ )	18 (0–84)	25 (33)	2/5
Depression (PHQ-9 $\geq 10$ )	6 (0–26)	19 (25)	1/1
Self-Esteem (RSE)	21 (6–30)	—	1/1
Illness intrusiveness (IIRS)	37 (13–71)	—	2/1
Common physical cancer symptoms (MSAS)	18 (0–62)	—	2/0
Cognitive function			
Objective cognitive composite (COG-comp; mean z-score)	–0.40 (–3.17 to 1.6)	—	1/0
Objective cognitive impairment <sup>a</sup>	—	32 (41)	1/0
Perceived cognitive impairment (Fact-Cog PCI) <sup>b</sup>	63 (27–80)	21 (27)	1/1

DADDS = Death and Dying Distress Scale; DS = Demoralization Scale; PHQ-9 = Patient Health Questionnaire-9; RSE = Rosenberg Self-Esteem Scale; IIRS = Illness Intrusiveness Rating Scale; MSAS = Memorial Symptom Assessment Scale; COG-comp = cognitive composite.

<sup>a</sup>Objective cognitive impairment: at least 1.5 SD below the normative mean on two and/or more neuropsychological tests or at least 2 SD below the mean on one test.

<sup>b</sup>Perceived cognitive impairment: FACT-Cog PCI scores of  $>1.5$  SD below the normative mean.

About 21 patients (27%) reported perceived cognitive impairment. Eleven of 41 (27%) patients with brain metastases reported perceived cognitive impairment, and 10 of 37 (27%) patients without brain metastases reported perceived cognitive impairment. Severity of perceived cognitive impairment did not significantly differ in patients with and without brain metastases (median 64 [range 36–80] vs. median 58 [range 27–80]; Mann-Whitney  $U$  test = 645;  $P = 0.33$ ).

#### Factors Associated With Death Anxiety

Death anxiety was univariately associated with demoralization, depression, self-esteem, illness intrusiveness, common physical cancer symptoms, and perceived cognitive impairment (Table 3), which were subsequently entered in the multivariate analysis. In the linear multivariate regression analysis, only greater demoralization ( $P < 0.001$ ) and increased illness intrusiveness ( $P = 0.001$ ) were significantly related to greater death anxiety (Table 3), explaining 64% of the variance. Interrelationships between death anxiety, demoralization, depression, self-esteem, illness intrusiveness, common physical cancer symptoms, perceived cognitive impairment, and objective cognitive impairment are presented in the Appendix Table 1.

#### Discussion

This pilot study demonstrated that death anxiety is common in patients with mNSCLC but not necessarily linked to brain metastases or objective cognitive impairment. Death anxiety was found to be associated with demoralization and illness intrusiveness. Illness

intrusiveness refers to the degree to which disease and/or treatment interfere with one's lifestyle, activities, relationships, and interests.<sup>13</sup> It has been conceptualized as an intervening variable that links the burden of the disease and treatments with subjective well-being and emotional distress. Individuals with greater illness intrusiveness tend to participate less in valued activities and perceive less personal control.<sup>14</sup> The association between death anxiety and

Table 3  
Linear Regression Analyses With the Reported Levels of Death Anxiety

Variable	Univariate		Multivariate	
	$\beta$	$P$	$\beta$	$P$
Age	–0.21	0.33		
Gender	–2.6	0.56		
Smoking	5.5	0.25		
$\leq 11$ months vs. $>11$ months since mNSCLC diagnosis	–7.6	0.08		
Disease progression	5.1	0.27		
Brain metastases	3.4	0.43		
Number of brain metastases		0.37		
0 vs. 1–3	7.3			
0 vs. $\geq 4$	–0.11			
Objective cognitive impairment (COG-comp; z-score)	2.7	0.27		
Perceived cognitive impairment	–5.70	0.001	<sup>a</sup>	<sup>a</sup>
Demoralization	0.89	$<0.001$	0.73	$<0.001$
Depression	2.0	$<0.001$	<sup>a</sup>	<sup>a</sup>
Self-esteem	–2.1	$<0.001$	<sup>a</sup>	<sup>a</sup>
Physical symptoms	0.77	$<0.001$	<sup>a</sup>	<sup>a</sup>
Illness intrusiveness	0.70	$<0.001$	0.31	0.001

mNSCLC = metastatic non-small cell lung cancer; COG-comp = cognitive composite.

<sup>a</sup>Were included in the linear multivariate analysis but removed during backward selection.

illness intrusiveness highlights the need for interventions that support life engagement while also facing and preparing for death; a capacity referred to as double awareness.<sup>48</sup>

According to terror management theory, the psychological factors that shield individuals from death anxiety are a sense of meaning in life, self-esteem, and attachment security.<sup>3,5,49</sup> Attachment security refers to confidence in the availability of support and the capacity to make use of it.<sup>49</sup> We did not find a relationship between death anxiety and self-esteem, although this relationship has been previously reported.<sup>7,12</sup> The burden of metastatic disease, fear of disease progression, and disease-related dependency may all contribute to demoralization, which has been found to trigger death anxiety.<sup>6</sup> Demoralization could arise directly through the loss of meaning and purpose in life and indirectly through its effect on self-esteem. A larger and longitudinal study using structural equation modeling is needed to confirm the mediating effect of demoralization on death anxiety.

The levels of death anxiety and objective or perceived cognitive impairment in the present study were comparable in patients with and without brain metastases, and cognitive impairment was not associated with death anxiety. It is possible that cognitive impairment and/or the presence of brain metastases do not contribute to death anxiety beyond the overriding impact of metastatic cancer. However, this question warrants further study in larger samples because of the heterogeneity of this study population. With the discovery of targetable mutations (e.g., EGFR) and increased implementation of SRS, the recognition of the heterogeneity in the disease course of NSCLC with and without brain metastases has grown.<sup>50</sup> The focal treatment of brain metastases with SRS and WBRT may be prevented or delayed in patients with targetable mutations, whereas brain metastases that are multiple and without targetable mutations may still require WBRT.<sup>51</sup> These treatment modalities have different side effects<sup>20</sup> and may have different psychological and neuropsychological consequences. The timing of the onset of brain metastases and their association with neurological symptoms may also influence the psychological impact of brain metastases.<sup>52</sup> It is increasingly evident in this current treatment era of mNSCLC that multiple factors must be taken into account to understand the psychological impact of brain metastases.

The high prevalence of death anxiety in patients with mNSCLC demonstrated in this study supports the need for greater attention to this symptom. Early identification of distress associated with death anxiety and its determinants could allow proactive

interventions to be introduced to alleviate and prevent such distress.<sup>1,53,54</sup> In that regard, in a large randomized controlled trial with patients with metastatic cancer, death anxiety was shown to be responsive to a brief psychotherapeutic intervention (Managing Cancer and Living Meaningfully [CALM]).<sup>1</sup> Such an intervention may also alleviate demoralization and enhance engagement in meaningful activities to foster resilience and combat the intrusive effects of the disease on quality of life.

Some patients with mNSCLC may experience positive life evaluation and personal growth after the cancer diagnosis and confrontation with the shortened life expectancy.<sup>55</sup> This may include increased appreciation of life, growth in their perception of themselves, and relationships with others.<sup>56</sup> These possible positive outcomes should be taken into consideration when developing an intervention for distress about death and dying.

Our study is limited by its relatively small study population and cross-sectional design. The participation rate of 34% was reasonable for a study of this kind, but selection bias in recruitment and heterogeneity in disease and treatment-related factors may have limited the ability to detect differences between those with and without brain metastases and/or cognitive decline. Furthermore, because death anxiety and cognitive decline may fluctuate across the disease trajectory, longitudinal studies are needed to understand their inter-relationship over time. The performance status of participants in this study was relatively well preserved, and the cross-sectional design may not have captured the increase in death anxiety that may occur with disease progression and greater proximity to death. Moreover, our study did not include patients with severe cognitive impairment, as the ability to provide informed consent and understand the study measures were inclusion criteria for the study. It is possible that patients with severe cognitive impairment have less insight into the imminence of the end of life and thus report less death anxiety.

## Conclusions

Death anxiety, brain metastases, and cognitive impairment are common in patients with mNSCLC but not necessarily linked. Death anxiety in this population is associated with demoralization and illness intrusiveness highlighting the need for integrated interventions that address physical and psychological well-being.<sup>54</sup> Further research is also needed on the psychological impact of brain metastases and the determinants of death anxiety in patients with advanced disease.

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## Appendix

Appendix Table 1

**Bivariate Spearman Correlations Between Death Anxiety, Demoralization, Depression, Self-Esteem, Illness Intrusiveness, Common Physical Cancer Symptoms, PCI, and Objective Cognitive Impairment (COG-Comp)**

Variable	Death Anxiety		Demoralization		Depression		Self-Esteem		Illness Intrusiveness		Common Cancer Symptoms		PCI	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
Death anxiety	—	—												
Demoralization	0.75	<0.001	—	—										
Depression	0.47	<0.001	0.57	<0.001	—	—								
Self-esteem	-0.52	<0.001	-0.70	<0.001	-0.59	<0.001	—	—						
Illness intrusiveness	0.61	<0.001	0.50	<0.001	0.45	<0.001	-0.41	<0.001	—	—				
Common cancer symptoms	0.39	<0.001	0.41	<0.001	0.64	<0.001	-0.50	<0.001	0.47	<0.001	—	—		
PCI	-0.37	0.001	-0.38	0.001	-0.53	<0.001	0.56	<0.001	-0.41	<0.001	-0.60	<0.001	—	—
Objective cognitive impairment	0.17	0.13	0.07	0.54	-0.05	0.67	0.09	0.44	0.10	0.38	-0.03	0.82	0.04	0.71

PCI = perceived cognitive impairment; COG-comp = cognitive composite.