Prevalence of Insomnia in an Oncology Patient Population: An Irish Tertiary Referral Center Experience

Emily C. Harrold, MD¹; Ahmad F. Idris, MD²; Niamh M. Keegan, MD³; Lynda Corrigan, MD²; Min Yuen Teo, MD³; Martin O'Donnell, MD⁴; Sean Tee Lim, MD⁴; Eimear Duff, MD⁴; Dearbhaile M. O'Donnell, MD²; M. John Kennedy, MD²; Sue Sukor, MD²; Cliona Grant, MD²; David G. Gallagher, MD²; Sonya Collier, DClinPsych⁵; Tara Kingston, MD, MRCPsych, MSc⁵; Ann Marie O'Dwyer, MD⁵; and Sinead Cuffe, MD²

ABSTRACT

Background: The NCCN Guidelines for Survivorship recommend dedicated sleep assessment. Reported insomnia prevalence in the general Irish population is 6% to 15%. Reported insomnia prevalence internationally among new/recently diagnosed patients with cancer varies from 30.9% to 54.3%. Insomnia prevalence has not been previously quantified in an Irish oncology cohort. **Methods:** A 40-item questionnaire was prospectively administered to ambulatory patients with cancer aged ≥ 18 years. Prespecified criteria to define insomnia syndrome combined those of the *International Classification of Sleep Disorders*, version 1, and the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV). The Hospital Anxiety and Depression Scale-Depression/Anxiety (HADS-D/A) was used to screen for potential confounding variables. **Results:** The response rate to the questionnaire was 87% (294/337). The predominant respondent age group was 55 to 64 years (26%; 77/294), 70.7% were female (208/294), and the most common cancer subtypes were breast (37.4%), colorectal (12.9%), and lung (12.2%). A total of 62% (183/294) of patients reported sleep disturbance after diagnosis, 63% (115/183) reported moderate/severe distress related to this disturbance, and 37% (61/183) reported a significant impact on physical function. Although 33% (98/294) met insomnia syndrome criteria, only 34% (33/98) of these patients had a preexisting history of sleep disturbance. Female sex, age < 65 years, cancer subtype, alcohol consumption, and HADS-D/A ≥ 11 were associated with statistically significant higher odds ratios (OR) of insomnia syndrome. Multivariate analysis identified breast cancer (OR, 3.17; $P = .01$), age < 65 years (OR, 1.8; $P = .03$), and alcohol consumption (OR, 2.3; $P = .005$) as independent predictors of insomnia syndrome. **Conclusions:** Insomnia syndrome prevalence in this cohort is comparable to that reported previously and supports dedicated sleep assessment. This study identifies potentially modifiable risk factors for insomnia and demonstrates additional utility of the HADS score in identifying patients at risk.

J Natl Compr Canc Netw 2020;18(12):1623–1630
doi: 10.6004/jnccn.2020.7611

¹Department of Medical Oncology, Mater Misericordiae University Hospital, Dublin, Ireland; ²Department of Medical Oncology, St. James's Hospital, Dublin, Ireland; ³Department of Medical Oncology, Memorial Sloan Kettering Cancer Center, New York, New York; ⁴Trinity College Medical School, Dublin, Ireland; and ⁵Department of Psychological Oncology Medicine, St. James's University Hospital, Dublin, Ireland.

See JNCCN.org for supplemental online content.

Background

The WHO estimates that by 2020, 15.5 million people will experience cancer and global cancer deaths will increase from 7.1 million in 2002 to 11.5 million in 2030.¹ Both insomnia and depression often develop as associated psychologic comorbidities and can become chronic issues even in the event of remission. Insomnia is more common among patients with cancer than among the general population² and those with nonmalignant medical conditions.^{3,4} Insomnia is a significant independent predictor of reduced patient functioning when function 3 months prior to diagnosis is compared with function 8 weeks postdiagnosis,⁵ regardless of cancer site or stage. Quantification of insomnia syndrome is important from a morbidity and quality-of-life perspective, but also because of potential interaction with mortality.⁶ Among the general population, emerging epidemiologic data suggest higher rates of all-cause mortality for individuals with shortened duration of sleep.^{7–11} Insomnia is equally associated with higher mortality rates among cardiology patients^{12,13} and poorer prognosis among patients with chronic diseases.¹⁴ In addition, increased standardized incidence rates of liver and lung cancer have been noted among patients with newly diagnosed sleep disorders.¹⁵

Although sleep disturbance is commonly reported among patients with cancer,¹⁶ data regarding exact prevalence of insomnia syndrome distinct from sleep disturbance are more limited. One of the challenges in interpreting the literature is poor differentiation between symptoms of insomnia and insomnia syndrome. A variety of screening tools have been used across heterogeneous patient groups¹⁷ (supplemental Appendix 1 and eTable 1; available with this article at JNCCN.org), and often long-term follow-up data are not available.

See page 1738 for related commentary.

Reported insomnia prevalence among patients newly diagnosed with or recently treated for cancer varies from 30.9% to 54.3%.^{18–22} Similarly high rates of insomnia symptoms, 23% to 44%,^{23–27} have been identified up to 5 years after initiation of adjuvant therapy for cancer, and insomnia continues to remain a significant issue among long-term survivors (>5 years),^{28,29} illustrating the chronicity of this sleep disturbance. Sleep disturbance has been reported in nearly 50% of patients with advanced cancer³⁰ and is associated with increased pain, depression, anxiety, and a worse sense of well-being.³¹ At a practical level, patients may be reluctant to report their symptoms due to the belief that sleep disturbance is a natural consequence of their diagnosis, and medical staff may be reluctant to pose relevant questions due to lack of expertise in managing these symptoms. Despite this, 25% to 50% of all psychotropic prescriptions written for patients who have cancer are for hypnotics.^{32,33}

To our knowledge, insomnia prevalence has not previously been quantified in an Irish oncology cohort. The NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) for Survivorship³⁴ recommend dedicated sleep assessment, reflecting acknowledgment of the increased insomnia prevalence among patients with cancer, and its association with increased symptom distress scores. The Irish Sleep Apnoea Trust reports that insomnia affects 6% to 15% of the general Irish population; a multinational European study in the general population that included Ireland reported a rate of 7% of severe insomnia, with higher rates among women than men.³⁵

Methods

We conducted a prospective nonblinded questionnaire-based study over a 6-month period from June to December 2014 at a single tertiary-level Irish hospital, in collaboration with the psycho-oncology service to ensure that any significant mental health issues identified through study participation were dealt with in a sensitive and expeditious manner.

Institutional ethical board approval was obtained and a 40-item questionnaire (supplemental eAppendix 1) was prospectively administered to ambulatory patients with cancer attending either the oncology day ward or the outpatient clinic. Inclusion criteria were confirmed cancer diagnosis, age ≥ 18 years, ability to read and complete a questionnaire, and capacity to provide informed consent. All eligible patients were invited to participate. After providing consent, participants completed a self-report questionnaire encompassing demographic and clinical data, patient-reported functional status,^{36,37} and the Hospital Anxiety and Depression Scale (HADS).³⁸ Inpatients were excluded from this study. The primary study endpoint was assessment of the

prevalence of insomnia syndrome among the ambulatory patient cohort. Secondary endpoints included investigation of predisposing, precipitating, and perpetuating factors for insomnia syndrome.

Data Reduction

Our prespecified criteria for insomnia syndrome combines those of the *International Classification of Sleep Disorders*, version 1,³⁹ and the *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition; DSM-IV)⁴⁰ and were described by Savard and Morin¹⁷ in their comprehensive review of insomnia among patients with cancer. The 4 criteria used were (1) difficulty initiating sleep or difficulty maintaining sleep, (2) sleep disturbance occurring ≥ 3 nights per week, (3) sleep disturbance causing significant impairment of daytime functioning or severe distress, and (4) sleep disturbance present ≥ 1 month. Patients who met all 4 criteria were coded as having insomnia syndrome. Impact on daytime functioning and distress was self-reported and not objectively assessed. Those who met some but not all 4 criteria were coded as having insomnia symptoms.

Assessments

The 40-item questionnaire (supplemental eAppendix 1) was designed to incorporate the sleep-related components of the Hamilton Depression Rating Scale,⁴¹ quantify duration and nature of sleep disturbance, evaluate sleep hygiene in the context of well-described precipitating and perpetuating factors for sleep disturbance,¹⁷ and evaluate patients' experiences of inquiries regarding sleep disturbance and preferences for intervention.

The Patient-Reported Functional Status (PRFS) is a patient-completed measure of performance status that represents the activities/function domain of the Patient-Generated Subjective Global Assessment (PG-SGA) measure.^{37,42} It is based on the ECOG scale but is expressed in lay terms.^{36,43} In contrast to the ECOG scale, it is a 5-point scale in which 0 is "normal with no limitations," 1 is "not my normal self, but able to be up and about with fairly normal activities," 2 is "not feeling up to most things, but in bed or chair less than half the day," 3 is "able to do little activity and spend most of the day in bed or chair," and 4 is "pretty much bedridden, rarely out of bed."

HADS³⁸ was used to screen for depression (HADS-D) and anxiety (HADS-A) as potential confounding variables. This measure is frequently used among patients with cancer because it is characterized by an absence of somatic symptoms that may be attributable to either medical or psychiatric conditions. HADS is a 14-item questionnaire and each item has a Likert response scale. Final scores are cumulative, with higher scores suggestive of a case. The cutoff value used for cases was a score of ≥ 11 , consistent with the original authors'

description of the scale and with an indication of moderate severity of either anxiety or depression. We are aware that lower values have been suggested in some more recent literature.⁴⁴ We used this scale to assess for anxiety and depression as 2 separate variables, as proposed by its original authors, rather than a combined score, which has been proposed elsewhere.⁴⁴ The validity of separating the 2 subscales in patients with cancer was confirmed in 568 patients by Moorey et al⁴⁵; use of HADS to detect anxiety and depressive states separately in a 2-factor model has also been found to be invariant across sex or disease phase among patients with cancer.⁴⁶

Data Analysis

All patients who accepted and at least partially completed the questionnaire were included for the purpose of data analysis. To explore clinical and demographic factors potentially associated with insomnia syndrome, we first performed univariate logistical regression analysis on factors such as sex, age, alcohol consumption, HADS-D and HADS-A scores, cancer subtypes, smoking status, caffeine and corticosteroid use, and surgery. All variables that had a *P* value of $<.05$ were then entered into a multivariate logistical regression model to identify potential independent predictors of insomnia syndrome.

Results

Demographic and Clinical Characteristics

Of the 337 patients invited to participate, 87% consented to study inclusion ($n=294$); 12 declined without explanation, 15 were too unwell to participate, 8 declined due to lack of appropriate reading aids, 4 declined due to language difficulties, and 4 declined due to time constraints.

Table 1 lists the baseline demographics, cancer subtype, and treatment modalities received by our patient cohort. The predominant respondent age group was 55 to 64 years ($n=77$; 26%), and 70.7% ($n=208$) of respondents were female. Consistent with an ambulatory patient cohort, 81.3% ($n=239$) of patients had a self-reported performance status³⁶ of 0 to 1. Breast, colorectal, and lung were the most common cancer subtypes represented. Most respondents ($n=245$; 83.3%) were receiving active chemotherapy, slightly more than one-half (56.6%) had undergone oncologic surgery, and 17% ($n=50$) had been hospitalized in the month prior to completion of our questionnaire.

Insomnia Syndrome

A total of 62% ($n=183$) of patients reported sleep disturbance after their diagnosis; of these, 37% ($n=67$) reported a

significant impact on physical function and 63% ($n=115$) reported moderate to severe distress relating to this disturbance. Concerningly, 19% ($n=34$) indicated that their sleep disturbance had impacted their ability to tolerate further treatment and 24% ($n=44$) felt it had impacted their cognition.

Among the entire cohort, 33% ($n=98$) of patients met all 4 prespecified criteria for insomnia syndrome (ie, they reported difficulty initiating sleep or difficulty maintaining sleep, sleep disturbance occurring ≥ 3 nights per week, sleep disturbance causing significant impairment of daytime functioning or severe distress, and sleep disturbance present ≥ 1 month). Only 34% ($n=33$) of patients who met insomnia syndrome criteria had any preexisting history of sleep disturbance. Of the patients who did not meet insomnia syndrome criteria, 45% ($n=89$) had ≥ 1 of the 4 critical diagnostic symptoms: 69 had 1 symptom, 19 had 2 symptoms, and 1 patient had 3 symptoms.

Among the entire cohort, 6% ($n=18$) of patients had a HADS score of ≥ 11 , with 10 of these patients having both HADS-D and HADS-A ≥ 11 . The patients with a HADS score of ≥ 11 were contacted individually regarding potential referral to psycho-oncology based on patient preference, in addition to further clinical assessment; 3 were already attending psycho-oncology, 3 requested referral, and 12 patients declined referral. Patients' treating physicians were informed of high HADS-D/A scores so that these patients' psychologic status could be more closely monitored with additional opportunities for referral if required.

By univariate analysis, female sex, age <65 years, cancer subtype, alcohol consumption, and HADS-D/A score ≥ 11 were associated with statistically significant higher odds ratios of insomnia syndrome (Table 2). Multivariate analysis demonstrated 3 independent predictors of insomnia syndrome: breast cancer (odds ratio [OR], 3.17; $P=.01$), age <65 years (OR, 1.8; $P=.03$), and alcohol consumption (OR, 2.3; $P=.005$) (Table 3).

Sleep Hygiene

Alcohol consumption, low level of physical activity, high caffeine intake, and electronic stimulus prior to going to bed are all recognized as factors that impact sleep negatively.⁴⁷

At the time of study, 67.4% ($n=198$) of patients reported alcohol consumption; 36 patients did not complete further questions regarding regularity of alcohol consumption. Of those who did respond to more detailed questions regarding alcohol consumption, 76% ($n=196$) reported alcohol consumption no more than once per week and 24% ($n=62$) more than once per week. Overall, 12% ($n=34$) of all respondents had used alcohol on occasion as a sleep aid and 45% ($n=132$) of patients were

Table 1. Patient Demographic and Clinical Characteristics

Characteristic	n (%)
Sex	
Male	86 (29.3)
Female	208 (70.7)
Age, y	
<65	183 (62.2)
≥65	111 (37.8)
Ethnicity	
White/Caucasian	284 (96.6)
Black/African American	3 (1.0)
Asian/Other	7 (2.4)
Children at home	
Yes	121 (41.2)
No	172 (58.5)
Unanswered	1 (0.3)
Currently working	
Yes	64 (21.8)
No	230 (78.2)
Smoking status	
Current	28 (9.5)
Former	141 (48.0)
Never	125 (42.5)
Alcohol consumption	
Yes	198 (67.4)
No	95 (32.3)
Unanswered	1 (0.2)
Performance status	
0–1	239 (81.3)
2–3	55 (18.7)

unaware that alcohol consumption could impact sleep. Notably, among the 98 patients with insomnia syndrome, 80% (n=79) reported alcohol consumption at the time of study participation.

A total of 81.3% (n=239) of the entire study population self-reported a performance status of 0 to 1, and consequently it is unsurprising that more than one-half (54%; n=159) of the patients reported physical activity lasting at least 30 minutes more than once per week. A minority of patients in the entire study population engaged in meditation (7%; n=22), yoga (6%; n=19), mindfulness (5%; n=14), Pilates (2%; n=5), and acupuncture (1%; n=3).

Of the 98 patients with insomnia syndrome, 98% (n=79) drank caffeine in some form every day, and significantly more than one-half reported drinking

Table 1. Patient Demographic and Clinical Characteristics (cont.)

Characteristic	n (%)
Cancer subtype	
Breast	110 (37.4)
Colorectal	38 (12.9)
Lung	36 (12.2)
Gynecologic	33 (11.2)
Gastric/Hepatobiliary	10 (3.4)
Esophageal	11 (3.7)
Genitourinary	6 (2.0)
Head and neck	14 (4.8)
Other	18 (6.1)
Chemotherapy	
Currently receiving	245 (83.3)
Previously received	33 (11.3)
Planned	13 (4.4)
Never/Not planned	3 (1.0)
Radiotherapy	
Currently receiving	9 (3.0)
Previously received	112 (38.0)
Planned	156 (53.1)
Never/Not planned	93 (31.6)
Surgery	
Yes	166 (56.5)
No	127 (43.2)
Unanswered	1 (0.3)
Hospitalization in the last month	
Yes	50 (17.0)
No	242 (82.3)
Unanswered	2 (0.7)

caffeine-containing beverages after 6:00 PM; 9.8% (n=10) reported drinking caffeine after 10:00 PM.

In terms of electronic stimuli, in the hour before bed, 85% (n=84) of patients with insomnia syndrome watched television and 89% (n=87) reported either television or computer use.

Previous Inquiry and Preferences for Intervention

Among all respondents, 62% (n=182) thought that cancer management should incorporate sleep assessment, but only 34% (n=100) recalled having such an assessment. Of the patients who recalled previous inquiries about sleep disturbance, 27% had been asked by their oncologist, which was comparable to the 27% who reported similar inquiries from their general practitioner. Other patients reported being questioned by the oncology nurse (18%), palliative care team (15%), and palliative care nurses (5%).

Table 2. Univariate Analysis

	Patients, N	Odds Ratio (95% CI)	P Value
Female sex	208	1.9 (1.1–3.4)	.022
Age <65 y	183	2.5 (1.5–4.4)	.001
Alcohol consumption	198	2.2 (1.3–1.0)	.004
HADS-D ≥11	18	3.6 (1.3–10.8)	.011
HADS-A ≥11	32	2.6 (1.3–5.5)	.009
Breast cancer vs other	110	3.2 (1.4–8.2)	.005
Caffeine	270	1.2 (0.5–3.4)	.615
Steroids	193	1.1 (0.6–1.9)	.887
Smoker vs nonsmoker	28 vs 125	1.8 (0.7–4.4)	.184
Smoker vs ex-smoker	28 vs 141	1.3 (0.5–3.0)	.600
Surgery	166	1.6 (1.0–2.7)	.055
Recent hospitalization	50	0.9 (0.4–1.6)	.667
Previous chemotherapy vs current	33 vs 245	1.3 (0.6–2.7)	.455
Never treated with chemotherapy vs current	16 vs 245	3.5 (1.0–13.8)	.044
Previous radiotherapy vs current	112 vs 9	1.75 (0.4–12.1)	.480
Never treated with radiotherapy vs current	156 vs 9	2.2 (0.5–15.3)	.297
Previous history of anxiety	68	1.8 (1.0–3.1)	.044
Previous history of depression	40	1.9 (1.0–3.8)	.066

Abbreviations: HADS-A, Hospital Anxiety and Depression Scale-Anxiety; HADS-D, Hospital Anxiety and Depression Scale-Depression.

Regarding preferred intervention, respondents were asked to indicate on a Likert scale their degree of comfort with a variety of interventions; a score of 10 indicated that patients would be extremely comfortable with the relevant intervention, whereas a score of 1 implied indifference. Written information (mean score, 5.96; 95% CI, 5.52–6.41), mindfulness therapy (mean score, 4.87; 95% CI, 4.43–5.32), and a once-off lecture on sleep management (mean score, 4.82; 95% CI, 4.38–5.26) were favored over pharmacologic intervention (ie, sleeping tablets) (mean score, 4.58; 95% CI, 4.16–5.00). Respondents allocated a mean score of 3.92 (95% CI, 3.52–4.32) to an individual session with a psychiatrist/psychologist and a mean score of 4.12 (95% CI, 3.71–4.52) to cognitive behavioral therapy (CBT). A series of lectures or group workshops on sleep management were the least popular, with mean scores of 3.57 (95% CI, 3.20–3.95) and 3.54 (95% CI, 3.16–3.92), respectively. This pattern of patient preference is further corroborated by evaluating the frequency distribution of the scores allocated to each of the interventions (supplemental eTable 2).

Discussion

Insomnia is a significant problem for patients with cancer at all stages of their treatment trajectory, with an impact on multiple functional domains and a deleterious effect on overall quality of life.⁴⁸ Improving sleep outcomes is significantly related to improvements in quality

of life and reduced daytime fatigue.⁴⁹ Data also suggest an association between rest/activity cycles and both response to treatment and overall survival.⁶

Insomnia incidence in this Irish cohort of patients with cancer was more than twice that of the general population. It was comparable to findings reported elsewhere and would justify dedicated sleep assessment.^{2–4} One-third of our patient cohort met criteria for insomnia syndrome and most had no preexisting history of sleep disorder, suggesting causality with both their diagnosis and treatment. Similar to the findings of Palesh et al⁵⁰ among 826 patients attending oncology private practice groups in the United States, younger age and female sex represent significant risk factors for insomnia syndrome in our Irish cohort. Both these factors and cancer subtype are obviously nonmodifiable but should lower the threshold of clinical vigilance to screen for significant sleep disorders. Two-thirds of patients in our study drank alcohol no more than once per week;

Table 3. Multivariate Analysis

	Odds Ratio (95% CI)	P Value
Breast cancer	3.17 (1.2–9.0)	.01
Alcohol consumption	2.3 (1.3–4.4)	.005
Age <65 y	1.8 (1.1–3.4)	.03

concerningly, >10% of these patients had occasionally used alcohol as a sleep aid and nearly half were unaware it could impact sleep patterns detrimentally. Alcohol consumption is a modifiable risk factor that independently predicts insomnia syndrome in our patient cohort.

Insomnia is often described as existing within a symptom cluster with close association to anxiety, depression, and fatigue.^{51–54} Preexisting psychologic morbidity is also a consideration, particularly among patients with breast cancer.^{55,56} In our cohort, HAD score of ≥ 11 increased the OR of insomnia syndrome, demonstrating additional utility of this scale. It also allowed us to identify and expeditiously refer these patients to our psycho-oncology colleagues.

One limitation of our study was that although our questionnaire integrated components of previously validated scales, the questionnaire itself has not been externally validated. Equally, our study used a point prevalence self-reported questionnaire without objective measures of sleep disturbance and insomnia. Polysomnography is considered the gold standard for measurement, but it is cumbersome for patients who have cancer, and consequently is used in few studies.^{54,57} Our study also relied on self-report of impact of sleep disturbance on both physical and cognitive function.

Pharmacologic intervention in the form of hypnotics is the most commonly prescribed intervention for insomnia⁵⁸ yet more specific data in terms of efficacy among patients with cancer is required.⁵⁹ In our cohort, patient preference was for nonpharmacologic interventions ranging from written information, to mindfulness therapy, to once-off lectures and CBT. In noncancer groups, CBT for insomnia (CBT-I) consisting of 4 key components—sleep restriction, stimulus control, cognitive restructuring, and relaxation training—is the most effective and durable treatment for insomnia. It has also been validated among patients with cancer in several randomized trials.^{49,60–63}

In the current setting of restricted resources, alternative strategies to individual CBT-I need to be evaluated. Group therapy as compared with individual CBT has been shown to be effective in patients without cancer both as an early intervention and for chronic insomnia.^{64,65} Equally, computer-based interventions,⁶⁶ telephone-based consultations,⁶⁷ and self-help strategies⁶⁸ have all demonstrated efficacy in noncancer populations. Data in patients with cancer are more limited but remain encouraging and potentially more immediately applicable. Ritterband et al⁶⁹ investigated the feasibility of an internet-based CBT tool, and reported that the intervention group had greater improvements in insomnia severity, sleep efficiency, sleep onset latency, and sleep quality compared with the control group. Savard et al⁷⁰ demonstrated the feasibility of a self-help program for

treating insomnia comorbid with cancer, with statistically and clinically meaningful improvements in numerous sleep variables and overall quality of life. The investigators subsequently conducted a 3-arm randomized controlled trial comparing video-based CBT versus professionally delivered CBT versus no treatment in 242 patients with breast cancer.⁷¹ Although face-to-face delivery was associated with superior remission rates and improvements in overall insomnia severity, both CBT groups reported clinically meaningful improvements in sleep variables compared with the control group. Less resource-intensive models of CBT-I delivery represent an important option, particularly in centers without dedicated psycho-oncology services, and require further exploration.

Sleep hygiene is considered ineffective as monotherapy, but does promote behaviors that facilitate sleep in an attempt to limit those that contribute to insomnia.⁶¹ In the trial by Dirksen and Epstein,⁶¹ the control group received sleep education and information on sleep hygiene. Even addressing sleep disturbances at this low level of complexity seemed to produce meaningful improvements in sleep patterns. Our cohort demonstrated lack of awareness regarding sleep hygiene and exhibited behaviors that have the potential to perpetuate sleep disturbance and ultimately promote the development of insomnia. They also reported willingness to receive written information regarding this topic, which represents a relatively low-cost opportunity for intervention in the absence of dedicated CBT-I programs that remain the gold standard.

Conclusions

It is essential that the long-term goal of research on sleep disturbances in patients with cancer focuses on treatment approaches that will improve quality of life both during treatment and after completion.⁴⁸ Of particular importance were our findings that the study patients reported being amenable to questioning regarding their sleep patterns, and that most thought that cancer care should incorporate dedicated sleep assessment. Based on results of this study, we are developing a patient education leaflet on sleep management for distribution in all major Irish oncology centers that will incorporate and reinforce our findings.

Submitted October 14, 2019; accepted for publication June 26, 2020.

Author contributions: Study concept and design: Harrold, Idris, Keegan, Collier, Kingston, O'Dwyer, Cuffe. Patient psycho-oncology support during the study: Collier, Kingston, O'Dwyer. Data collection: Harrold, Idris, Keegan, Corrigan, M. O'Donnell, Lim, Duffy, Cuffe. Data analysis and interpretation: Harrold, Idris, Keegan, Corrigan, Teo, Cuffe. Manuscript preparation: All authors. Critical review: Harrold, Idris, Keegan, Teo, D.M. O'Donnell, Kennedy, Sukor, Grant, Gallagher, Collier, Kingston, O'Dwyer, Cuffe.

Previous presentation: This study was presented as a poster at ESMO 2016 Congress; October 7–11, 2016; Copenhagen, Denmark (Ann Oncol 2016; 27[Suppl]:Abstract 4209), and as an oral presentation at the 2016 Irish Society of Medical Oncology Meeting; January 30; Dublin, Ireland.

Disclosures: The authors have disclosed that they have not received any financial consideration from any person or organization to support the preparation, analysis, results, or discussion of this article.

Disclaimer: All procedures performed in this study were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration. All participants signed informed consent prior to their inclusion in this study.

Correspondence: Emily C. Harrold, MD, Department of Medical Oncology, Mater Misericordiae University Hospital, Eccles Street, Dublin 7, Ireland. Email: emilyharrold@mater.ie

References

- Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006;3:e442.
- Beszterczey A, Lipowski ZJ. Insomnia in cancer patients. *Can Med Assoc J* 1977;116:355.
- Johns MW, Egan P, Gay TJA, et al. Sleep habits and symptoms in male medical and surgical patients. *BMJ* 1970;2:509–512.
- Anderson KO, Getto CJ, Mendoza TR, et al. Fatigue and sleep disturbance in patients with cancer, patients with clinical depression, and community-dwelling adults. *J Pain Symptom Manage* 2003;25:307–318.
- Given B, Given C, Azzouz F, et al. Physical functioning of elderly cancer patients prior to diagnosis and following initial treatment. *Nurs Res* 2001; 50:222–232.
- Mormont MC, Waterhouse J, Bleuzen P, et al. Marked 24-h rest/activity rhythms are associated with better quality of life, better response, and longer survival in patients with metastatic colorectal cancer and good performance status. *Clin Cancer Res* 2000;6:3038–3045.
- Vgontzas AN, Liao D, Pejovic S, et al. Insomnia with short sleep duration and mortality: the Penn State cohort. *Sleep* 2010;33:1159–1164.
- Ferrie JE, Shipley MJ, Cappuccio FP, et al. A prospective study of change in sleep duration: associations with mortality in the Whitehall II cohort. *Sleep* 2007;30:1659–1666.
- Gallicchio L, Kalesan B. Sleep duration and mortality: a systematic review and meta-analysis. *J Sleep Res* 2009;18:148–158.
- Heslop P, Smith GD, Metcalfe C, et al. Sleep duration and mortality: the effect of short or long sleep duration on cardiovascular and all-cause mortality in working men and women. *Sleep Med* 2002;3:305–314.
- Cappuccio FP, D'Elia L, Strazzullo P, et al. Sleep duration and all-cause mortality: a systematic review and meta-analysis of prospective studies. *Sleep* 2010;33:585–592.
- Condén E, Rosenblad A. Insomnia predicts long-term all-cause mortality after acute myocardial infarction: a prospective cohort study. *Int J Cardiol* 2016;215:217–222.
- Choi JW, Song JS, Lee YJ, et al. Increased mortality in relation to insomnia and obstructive sleep apnea in Korean patients studied with nocturnal polysomnography. *J Clin Sleep Med* 2017;13:49–56.
- Carroll JE, Seeman TE, Olmstead R, et al. Improved sleep quality in older adults with insomnia reduces biomarkers of disease risk: pilot results from a randomized controlled comparative efficacy trial. *Psychoneuroendocrinology* 2015;55:184–192.
- Hu LY, Chen PM, Hu YW, et al. The risk of cancer among patients with sleep disturbance: a nationwide retrospective study in Taiwan. *Ann Epidemiol* 2013;23:757–761.
- Roscoe JA, Kaufman ME, Matteson-Rusby SE, et al. Cancer-related fatigue and sleep disorders. *Oncologist* 2007;12(Suppl 1):35–42.
- Savard J, Morin CM. Insomnia in the context of cancer: a review of a neglected problem. *J Clin Oncol* 2001;19:895–908.
- Degner LF, Sloan JA. Symptom distress in newly diagnosed ambulatory cancer patients and as a predictor of survival in lung cancer. *J Pain Symptom Manage* 1995;10:423–431.
- Ginsburg ML, Quirt C, Ginsburg AD, et al. Psychiatric illness and psychosocial concerns of patients with newly diagnosed lung cancer. *CMAJ* 1995;152:701–708.
- Krech RL, Walsh D. Symptoms of pancreatic cancer. *J Pain Symptom Manage* 1991;6:360–367.
- Kurtz ME, Kurtz JC, Given CW, et al. Loss of physical functioning among patients with cancer: a longitudinal view. *Cancer Pract* 1993;1:275–281.
- Malone M, Harris AL, Luscombe DK. Assessment of the impact of cancer on work, recreation, home management and sleep using a general health status measure. *J R Soc Med* 1994;87:386–389.
- Couzi RJ, Helzlsouer KJ, Fetting JH. Prevalence of menopausal symptoms among women with a history of breast cancer and attitudes toward estrogen replacement therapy. *J Clin Oncol* 1995;13:2737–2744.
- Engstrom CA, Strohl RA, Rose L, et al. Sleep alterations in cancer patients. *Cancer Nurs* 1999;22:143–148.
- Harrison LB, Zelefsky MJ, Pfister DG, et al. Detailed quality of life assessment in patients treated with primary radiotherapy for squamous cell cancer of the base of the tongue. *Head Neck* 1997;19: 169–175.
- Lindley C, Vasa S, Sawyer WT, et al. Quality of life and preferences for treatment following systemic adjuvant therapy for early-stage breast cancer. *J Clin Oncol* 1998;16:1380–1387.
- Sarna L, Brecht ML. Dimensions of symptom distress in women with advanced lung cancer: a factor analysis. *Heart Lung* 1997;26:23–30.
- Arndt V, Koch-Gallenkamp L, Jansen L, et al. Quality of life in long-term and very long-term cancer survivors versus population controls in Germany. *Acta Oncol* 2017;56:190–197.
- Gooneratne NS, Dean GE, Rogers AE, et al. Sleep and quality of life in long-term lung cancer survivors. *Lung Cancer* 2007;58:403–410.
- Gibbins J, McCoubrie R, Kendrick AH, et al. Sleep-wake disturbances in patients with advanced cancer and their family carers. *J Pain Symptom Manage* 2009;38:860–870.
- Delgado-Guay M, Yennurajalingam S, Parsons H, et al. Association between self-reported sleep disturbance and other symptoms in patients with advanced cancer. *J Pain Symptom Manage* 2011;41:819–827.
- Derogatis LR, Feldstein M, Morrow G, et al. A survey of psychotropic drug prescriptions in an oncology population. *Cancer* 1979;44:1919–1929.
- Stiefel FC, Kornblith AB, Holland JC. Changes in the prescription patterns of psychotropic drugs for cancer patients during a 10-year period. *Cancer* 1990;65:1048–1053.
- Sanft T, Denlinger CS, Armenian S, et al. NCCN Guidelines Insights: Survivorship, Version 2.2019. *J Natl Compr Canc Netw* 2019;17:784–794. To view the most recent version of these guidelines, visit NCCN.org
- Chevalier H, Los F, Boichut D, et al. Evaluation of severe insomnia in the general population: results of a European multinational survey. *J Psychopharmacol* 1999;13(4 Suppl 1):S21–24.
- Popovic G, Harhara T, Pope A, et al. Patient-reported functional status in outpatients with advanced cancer: correlation with physician-reported scores and survival. *J Pain Symptom Manage* 2018;55:1500–1508.
- Pt-Global. PG-SGA. Accessed August 1, 2019. Available at: http://pt-global.org/?page_id=13
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361–370.
- American Sleep Disorders Association. The International Classification of Sleep Disorders. Diagnostic and Coding Manual. Rochester, MN: American Sleep Disorders Association; 1997.
- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 4th ed. Washington, DC: American Psychiatric Association; 1994.
- Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psychiatry* 1960;23:56–62.
- Bauer J, Capra S, Ferguson M. Use of the scored Patient-Generated Subjective Global Assessment (PG-SGA) as a nutrition assessment tool in patients with cancer. *Eur J Clin Nutr* 2002;56:779–785.
- Martin L, Watanabe S, Fainsinger R, et al. Prognostic factors in patients with advanced cancer: use of the patient-generated subjective global assessment in survival prediction. *J Clin Oncol* 2010;28:4376–4383.
- Singer S, Kuhnt S, Götze H, et al. Hospital anxiety and depression scale cutoff scores for cancer patients in acute care. *Br J Cancer* 2009;100: 908–912.
- Moorey S, Greer S, Watson M, et al. The factor structure and factor stability of the hospital anxiety and depression scale in patients with cancer. *Br J Psychiatry* 1991;158:255–259.
- Annunziata MA, Muzzatti B, Altòè G. Defining Hospital Anxiety and Depression Scale (HADS) structure by confirmatory factor analysis: a

- contribution to validation for oncological settings. *Ann Oncol* 2011;22:2330–2333.
47. Stepanski EJ, Wyatt JK. Use of sleep hygiene in the treatment of insomnia. *Sleep Med Rev* 2003;7:215–225.
 48. Lis CG, Gupta D, Grutsch JF. The relationship between insomnia and patient satisfaction with quality of life in cancer. *Support Care Cancer* 2008;16:261–266.
 49. Espie CA, Fleming L, Cassidy J, et al. Randomized controlled clinical effectiveness trial of cognitive behavior therapy compared with treatment as usual for persistent insomnia in patients with cancer. *J Clin Oncol* 2008;26:4651–4658.
 50. Palesh OG, Roscoe JA, Mustian KM, et al. Prevalence, demographics, and psychological associations of sleep disruption in patients with cancer: University of Rochester Cancer Center-Community Clinical Oncology Program. *J Clin Oncol* 2010;28:292–298.
 51. Liu L, Fiorentino L, Natarajan L, et al. Pre-treatment symptom cluster in breast cancer patients is associated with worse sleep, fatigue and depression during chemotherapy. *Psychooncology* 2009;18:187–194.
 52. Fleming L, Randell K, Harvey CJ, et al. Does cognitive behaviour therapy for insomnia reduce clinical levels of fatigue, anxiety and depression in cancer patients? *Psychooncology* 2014;23:679–684.
 53. Kim E, Jahan T, Aouizerat BE, et al. Changes in symptom clusters in patients undergoing radiation therapy. *Support Care Cancer* 2009;17:1383–1391.
 54. Fiorentino L, Rissling M, Liu L, et al. The symptom cluster of sleep, fatigue and depressive symptoms in breast cancer patients: severity of the problem and treatment options. *Drug Discov Today Dis Models* 2011;8:167–173.
 55. Cimprich B. Pretreatment symptom distress in women newly diagnosed with breast cancer. *Cancer Nurs* 1999;22:185–194.
 56. Ancoli-Israel S, Liu L, Marler MR, et al. Fatigue, sleep, and circadian rhythms prior to chemotherapy for breast cancer. *Support Care Cancer* 2006;14:201–209.
 57. Silberfarb PM, Hauri PJ, Oxman TE, et al. Assessment of sleep in patients with lung cancer and breast cancer. *J Clin Oncol* 1993;11:997–1004.
 58. Davidson JR, MacLean AW, Brundage MD, et al. Sleep disturbance in cancer patients. *Soc Sci Med* 2002;54:1309–1321.
 59. Berger AM, Parker KP, Young-McCaughan S, et al. Sleep/Wake disturbances in people with cancer and their caregivers: state of the science. *Oncol Nurs Forum* 2005;32:E98–126.
 60. Savard J, Simard S, Ivers H, et al. Randomized study on the efficacy of cognitive-behavioral therapy for insomnia secondary to breast cancer, part I: sleep and psychological effects. *J Clin Oncol* 2005;23:6083–6096.
 61. Dirksen SR, Epstein DR. Efficacy of an insomnia intervention on fatigue, mood and quality of life in breast cancer survivors. *J Adv Nurs* 2008;61:664–675.
 62. Berger AM, Kuhn BR, Farr LA, et al. One-year outcomes of a behavioral therapy intervention trial on sleep quality and cancer-related fatigue. *J Clin Oncol* 2009;27:6033–6040.
 63. Fiorentino L, McQuaid JR, Liu L, et al. Individual cognitive behavioral therapy for insomnia in breast cancer survivors: a randomized controlled crossover pilot study. *Nat Sci Sleep* 2010;2:1–8.
 64. Jansson M, Linton SJ. Cognitive-behavioral group therapy as an early intervention for insomnia: a randomized controlled trial. *J Occup Rehabil* 2005;15:177–190.
 65. Verbeek IH, Konings GM, Aldenkamp AP, et al. Cognitive behavioral treatment in clinically referred chronic insomniacs: group versus individual treatment. *Behav Sleep Med* 2006;4:135–151.
 66. Vincent N, Lewycky S. Logging on for better sleep: RCT of the effectiveness of online treatment for insomnia. *Sleep* 2009;32:807–815.
 67. Bastien CH, Morin CM, Ouellet MC, et al. Cognitive-behavioral therapy for insomnia: comparison of individual therapy, group therapy, and telephone consultations. *J Consult Clin Psychol* 2004;72:653–659.
 68. Mimeault V, Morin CM. Self-help treatment for insomnia: bibliotherapy with and without professional guidance. *J Consult Clin Psychol* 1999;67:511–519.
 69. Ritterband LM, Bailey ET, Thorndike FP, et al. Initial evaluation of an Internet intervention to improve the sleep of cancer survivors with insomnia. *Psychooncology* 2012;21:695–705.
 70. Savard J, Villa J, Simard S, et al. Feasibility of a self-help treatment for insomnia comorbid with cancer. *Psychooncology* 2011;20:1013–1019.
 71. Savard J, Ivers H, Savard MH, et al. Is a video-based cognitive behavioral therapy for insomnia as efficacious as a professionally administered treatment in breast cancer? Results of a randomized controlled trial. *Sleep (Basel)* 2014;37:1305–1314.

See JNCCN.org for supplemental online content.

Supplemental online content for:

Prevalence of Insomnia in an Oncology Patient Population: An Irish Tertiary Referral Center Experience

Emily C. Harrold, MD; Ahmad F. Idris, MD; Niamh M. Keegan, MD; Lynda Corrigan, MD; Min Yuen Teo, MD; Martin O'Donnell, MD; Sean Tee Lim, MD; Eimear Duff, MD; Dearbhaile M. O'Donnell, MD; M. John Kennedy, MD; Sue Sukor, MD; Cliona Grant, MD; David G. Gallagher, MD; Sonya Collier, DClinPsych; Tara Kingston, MD, MRCPsych, MSc; Ann Marie O'Dwyer, MD; and Sinead Cuffe, MD

J Natl Compr Canc Netw 2020;18(12):1623–1630

eTable 1: Heterogeneity of Assessment Tools

eTable 2: Frequency Distribution of Response to Patient Preference for Intervention

eAppendix 1: Patient Questionnaire

eTable 1. Heterogeneity of Assessment Tools

Reference	n	Cancer Site/Stage	Assessment Method
Beszterczey & Lipowski, ¹ 1977	47	Mixed	18-item questionnaire
Brandberg et al, ² 1995	144	Melanoma/Stage II	6-item questionnaire
Chen et al, ³ 2008	115	Lung cancer, on chemotherapy	Pittsburgh Sleep Quality Index, EORTC QLQ-C30
Couzi et al, ⁴ 1995	190	Postmenopausal breast/in situ or invasive locoregional	66-item questionnaire
Davidson et al, ⁵ 2002	982	Mixed/All stages	42-item questionnaire
Degner & Sloan, ⁶ 1995	434	Mixed/All stages	Symptom Distress Scale (13 symptoms)
Engstrom et al, ⁷ 1999	150	Breast, lung/all stages	82-item questionnaire
Ginsburg et al, ⁸ 1995	52	Lung/All stages	Diagnostic interview schedule
Harrison et al, ⁹ 1997	29	Tongue/All stages	3 items of the Memorial Symptoms Assessment Scale
Kaye et al, ¹⁰ 1983	30	Mixed/Inoperable, included patients with cancer and cardiac patients	38-item questionnaire
Krech & Walsh, ¹¹ 1991	39	Pancreas/Unresectable	Standardized institutional clinical assessment tool
Kurtz et al, ¹² 1993	279	Mixed	1 item of McCorkle Symptom Distress Scale-modified
Lis et al, ¹³ 2008	954	Mixed	EORTC QLQ-C30
Lindley et al, ¹⁴ 1998	86	Breast/Stage I and II	1 item of McCorkle Symptom Distress Scale-modified
Malone et al, ¹⁵ 1994	212	Mixed	United Kingdom Sickness Impact Profile
Owen et al, ¹⁶ 1999	15	Mixed	Pittsburgh Sleep Quality Index
Palesh et al, ¹⁷ 2010	823	Mixed/All stages	Hamilton Depression Inventory
Portenoy et al, ¹⁸ 1994	243	Mixed/All stages	3 items of Memorial Symptoms Assessment Scale
Sarna ¹⁹ 1993	69	Lung/All stages	1 item of Symptom Distress Scale-modified
Savard et al, ²⁰ 2001	300	Breast cancer	33-item questionnaire
Le Guen et al, ²¹ 2007	29	Lung, newly diagnosed	Pittsburgh Sleep Quality Index
Savard et al, ²² 2011	962	Newly diagnosed nonmetastatic awaiting surgery	Insomnia diagnostic interview

Abbreviations: EORTC QLQ-C30, EORTC Quality of Life Questionnaire Core 30.

References

- Beszterczey A, Lipowski ZJ. Insomnia in cancer patients. *Can Med Assoc J* 1977;116:355.
- Brandberg Y, Mansson-Brahme E, Ringborg U, et al. Psychological reactions in patients with malignant melanoma. *Eur J Cancer* 1995;31:157–162.
- Chen ML, Yu CT, Yang CH. Sleep disturbances and quality of life in lung cancer patients undergoing chemotherapy. *Lung Cancer* 2008;62:391–400.
- Couzi RJ, Helzlsouer KJ, Fetting JH. Prevalence of menopausal symptoms among women with a history of breast cancer and attitudes toward estrogen replacement therapy. *J Clin Oncol* 1995;13:2737–2744.
- Davidson JR, MacLean AW, Brundage MD, et al. Sleep disturbance in cancer patients. *Soc Sci Med* 2002;54:1309–1321.
- Degner LF, Sloan JA. Symptom distress in newly diagnosed ambulatory cancer patients and as a predictor of survival in lung cancer. *J Pain Symptom Manage* 1995;10:423–431.
- Engstrom CA, Strohl RA, Rose L, et al. Sleep alterations in cancer patients. *Cancer Nurs* 1999;22:143–148.
- Ginsburg ML, Quirt C, Ginsburg AD, et al. Psychiatric illness and psychosocial concerns of patients with newly diagnosed lung cancer. *CMAJ* 1995;152:701–708.
- Harrison LB, Zelefsky MJ, Pfister DG, et al. Detailed quality of life assessment in patients treated with primary radiotherapy for squamous cell cancer of the base of the tongue. *Head Neck* 1997;19:169–175.
- Kaye J, Kaye K, Madow L. Sleep patterns in patients with cancer and patients with cardiac disease. *J Psychol* 1983;114:107–113.
- Krech RL, Walsh D. Symptoms of pancreatic cancer. *J Pain Symptom Manage* 1991;6:360–367.
- Kurtz ME, Kurtz JC, Given CW, et al. Loss of physical functioning among patients with cancer: a longitudinal view. *Cancer Pract* 1993;1:275–281.
- Lis CG, Gupta D, Grutsch JF. The relationship between insomnia and patient satisfaction with quality of life in cancer. *Support Care Cancer* 2008;16:261–266.
- Lindley C, Vasa S, Sawyer WT, et al. Quality of life and preferences for treatment following systemic adjuvant therapy for early-stage breast cancer. *J Clin Oncol* 1998;16:1380–1387.

15. Malone M, Harris AL, Luscombe DK. Assessment of the impact of cancer on work, recreation, home management and sleep using a general health status measure. *J R Soc Med* 1994;87:386–389.

16. Owen DC, Parker KP, McGuire DB. Comparison of subjective sleep quality in patients with cancer and healthy subjects. *Oncol Nurs Forum* 1999;26:1649–1651.

17. Palesh OG, Roscoe JA, Mustian KM, et al. Prevalence, demographics, and psychological associations of sleep disruption in patients with cancer: University of Rochester Cancer Center-Community Clinical Oncology Program. *J Clin Oncol* 2010;28:292–298.

18. Portenoy RK, Thaler HT, Kornblith AB, et al. Symptom prevalence, characteristics and distress in a cancer population. *Qual Life Res* 1994;3:183–189.

19. Sama L. Correlates of symptom distress in women with lung cancer. *Cancer Pract* 1993;1:21–28.

20. Savard J, Simard S, Blanchet J, et al. Prevalence, clinical characteristics, and risk factors for insomnia in the context of breast cancer. *Sleep* 2001;24:583–590.

21. Le Guen Y, Gagnadoux F, Hureaux J, et al. Sleep disturbances and impaired daytime functioning in outpatients with newly diagnosed lung cancer. *Lung Cancer* 2007;58:139–143.

22. Savard J, Ivers H, Villa J, et al. Natural course of insomnia comorbid with cancer: an 18-month longitudinal study. *J Clin Oncol* 2011;29:3580–3586.

eTable 2. Frequency Distribution of Response to Patient Preference for Intervention								
Score	Sleeping Tablets (n)	Written Information (n)	Once-Off Sleep Management Lecture (n)	Series of Sleep Management Lectures (n)	Group Workshops on Sleep Management (n)	Individual Session With Psychiatrist/Psychologist (n)	Cognitive Behavioral Therapy (n)	Mindfulness Therapy (n)
1–2	120	78	114	148	141	135	125	104
3–4	32	23	19	29	36	26	34	33
5–6	34	31	37	36	38	44	35	32
7–8	30	35	29	21	23	24	21	25
9–10	63	101	71	36	32	41	45	75

eAppendix 1: Patient Questionnaire

PATIENT QUESTIONNAIRE	
<p>Thank you for taking the time to fill out this questionnaire. It should take no more than 10-15 minutes of your time and any questions you would prefer not to answer can be omitted. You will be asked a number of questions about yourself, your general health, and your sleeping patterns, the answers to which will all be anonymized. The majority of questions will have a series of options and you are asked to mark the one that most applies to you. Others will have a scale and you are asked to pick the number on the scale that most applies to you.</p>	
1. Age (y):	18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65-74 ☐ ≥75 ☐
2. Sex:	Male ☐ Female ☐
3. Ethnicity:	White/Caucasian ☐ Black/African American ☐ Asian ☐ Other ☐
4. Marital status:	Single ☐ Divorced/Separated ☐ Married/Living with partner ☐ Widowed ☐
5. Children at home:	Yes ☐ No ☐ If yes, please indicate ages: _____
6. Highest level of education gained:	Primary school ☐ Secondary school ☐ University degree ☐ College degree/technical qualification ☐ Postgraduate Qualification (Masters/PhD) ☐
7. Occupation:	_____ Currently working: Yes ☐ No ☐
8. Please check the statement that best applies to you:	Smoker ☐ Cigar ☐ Cigarette ☐ Rolling tobacco ☐ Please indicate quantity per day: _____ Ex-smoker ☐ How long ago did you stop smoking? _____ Never smoker ☐
9. Do you drink alcohol?	Yes ☐ No ☐ If yes: More than once per week ☐ Once per week ☐ Once per month ☐ Less frequently ☐ In one week please indicate number of: Glasses of wine: _____ (standard glass is 100 mL) Pints of beer: _____ (standard pint 568 mL) Glasses of spirits _____ (pub measure of spirits is 25 mL)

(continued)

eAppendix 1: Patient Questionnaire (cont.)

10. Do you drink caffeine? Yes ☐ No ☐

If yes, please indicate amount consumed per day: (assume 1 cup= 250 ml)

Tea: <1 cups ☐ <2 cups ☐ 2-4 cups ☐ >4 cups per day ☐

Coffee: <1 cups ☐ <2 cups ☐ 2-4 cups ☐ >4 cups per day ☐

Carbonated beverages: <1 cups ☐ 1-2 drinks ☐ 2-4 drinks ☐ >4 drinks per day ☐

What is the latest time in the day you would drink caffeine:

Before 12 PM ☐

12 PM to 6 PM ☐

6 PM to 8 PM ☐

8 PM to 10 PM ☐

After 10 PM ☐

11. Which statement best describes your current level of activity:

Normal with no limitations ☐

Not my normal self, but able to be up and about with fairly normal activities ☐

Not feeling up to most thing, but in bed or chair less than half the day ☐

Able to do little activity and spend most of the day in bed or chair ☐

Totally confined to bed or chair ☐

12. Which statement best describes the amount of physical activity you do in a week (eg, walking, swimming, running, working in the garden, shopping)

30 minutes at least once per week ☐

30 minutes 1-3 times per week ☐

30 minutes more than 3 times per week ☐

13. From the list below please mark any of the devices you would use in the last hour before bed:

Television ☐

Computer/Internet ☐

iPod ☐

Radio ☐

Wii/PlayStation/Xbox ☐

Other ☐

14. Do you participate in any of the following activities (please check all that apply)

Yoga ☐

Meditation ☐

Pilates ☐

Acupuncture ☐

Mindfulness ☐

Other ☐

MEDICAL HISTORY:

15. What type of cancer do you have?

Breast ☐

Ovarian/Cervix ☐

Uterine (womb) ☐

Prostate ☐

Colorectal (bowel/rectum) ☐

Lung ☐

Lymphoma ☐

Melanoma ☐

Head and neck ☐

Other not listed: _____

(continued)

eAppendix 1: Patient Questionnaire (cont.)

16. Have you had surgery for cancer: Yes ☐
 No ☐
 Type of cancer surgery: _____

17. Have you been hospitalized in the last month? Yes ☐ No ☐
 If yes, for how long? _____

18. Please indicate the statement that best applies to you regarding chemotherapy/targeted therapy:
 Currently receiving ☐
 Planned ☐
 Never/Not planned ☐
 Received in the past ☐ How long ago _____

19. Please indicate the statement that best applies to you regarding Radiotherapy?
 Currently receiving ☐
 Planned ☐
 Never/Not planned ☐
 Received in the past ☐ How long ago _____

20. Do you currently attend/ or have you ever attended any of the following services?
 Please check all that apply to you:
 Palliative care ☐
 Psych-oncology ☐
 Psychiatry ☐
 Support group ☐

22. Prior to your cancer diagnosis did you ever have a history of anxiety?
 Yes ☐ No ☐ **If yes**, who managed your symptoms:
 General practitioner ☐
 Psychiatrist ☐
 Psychologist/Counselor ☐
 Did not seek medical advice ☐

23. Prior to your cancer diagnosis did you ever have a history of depression?
 Yes ☐ No ☐ **If yes** who managed your symptoms:
 General practitioner ☐
 Psychiatrist ☐
 Psychologist/Counselor ☐
 Did not seek medical advice ☐

24. Please indicate ALL current medications:
 a) Steroids, eg, dexamethasone, prednisolone: Yes ☐ No ☐ Unsure ☐
If yes: Do you only take around the days of chemotherapy? Yes ☐ No ☐ Unsure ☐
 Do you take for reasons other than chemotherapy? Yes ☐ No ☐ Unsure ☐
 What time of day do you take your last steroid: _____
If yes:
 Has anyone ever given you advice about the best time of day to take your steroids?
 Yes ☐ No ☐ Unsure ☐

b) Sleeping tablets: Yes ☐ No ☐ Unsure ☐
Name of tablet: _____
If yes: Every night ☐
 More than or equal to 3 nights per week ☐
 Less than 3 nights per week ☐

(continued)

eAppendix 1: Patient Questionnaire (cont.)

c) Relaxants, antianxiety pills, eg, Valium, Xanax, Ativan: Yes ☐ No ☐ Unsure ☐

Name of tablet: _____

If yes: Every night ☐

More than or equal to 3 nights per week ☐

Less than 3 nights per week ☐

d) Hormone treatments: Yes ☐ No ☐ Unsure ☐

Name of treatment _____

If yes: Tablets ☐

 Injections ☐

 Patches ☐

e) Nonsteroidal anti-inflammatories, eg, Neurofen, Difene, ibuprofen: Yes ☐ No ☐ Unsure ☐

f) Morphine-type painkillers, eg, OxyContin, OxyNorm, Oramorph, Palladone MST
Yes ☐ No ☐ Unsure ☐

g) Herbal remedies: Yes ☐ No ☐ Unsure ☐

h) Nicotine patch: Yes ☐ No ☐ Unsure ☐

i) Diuretics (water pill), eg, furosemide (Lasix), Frumil Yes ☐ No ☐ Unsure ☐

If yes, what time of day do you take your last dose: _____

SLEEPING HISTORY:

25. Prior to your cancer diagnosis did you ever have a history of difficulties sleeping/insomnia?
Yes ☐ No ☐ **If yes** who managed your symptoms:

General practitioner ☐

Psychiatrist ☐

Psychologist/Counselor ☐

Did not seek medical advice ☐

26. Has your sleeping pattern changed since you were diagnosed with cancer?
Yes ☐ No ☐ Unsure ☐

If yes, please tick any of the following that apply:

Sleeping more than usual ☐

Sleeping less than usual ☐

Difficulty getting to sleep ☐

Multiple awakenings at night ☐

Experiencing less restful sleep ☐

Waking early and being unable to sleep despite wanting to ☐

27. Over the past month have you ever taken a nap during the day?

Yes, every day ☐

Yes, most days ☐

Yes, occasionally ☐

Hardly ever ☐

Never ☐

28. On an average night does it take you longer than 30 minutes to get to sleep? Yes ☐ No ☐

29. On an average night would you wake up for more than 30 minutes at night? Yes ☐ No ☐

30. On an average night would you spend more than 50% of time in bed asleep? Yes ☐ No ☐

(continued)

eAppendix 1: Patient Questionnaire (cont.)

31. Is your sleep disturbed: Less than 3 nights per week ☐
 More than 3 nights per week ☐
 Every night ☐
 Not disturbed ☐

32. How long has your sleep been disturbed for: Less than 1 month ☐
 More than one month but less than 6 months ☐
 Greater than 6 months ☐
 Sleep not disturbed ☐

33. What interferes with your sleep:

	Not at All	A Little	Quite a Bit	Very Much
Pain	1	2	3	4
Nausea	1	2	3	4
Vomitting	1	2	3	4
Shortness of breath	1	2	3	4
Anxiety	1	2	3	4
Depression	1	2	3	4
Financial worries	1	2	3	4
Noise/Environment	1	2	3	4
Need to pass urine	1	2	3	4
Night sweats/hot flashes	1	2	3	4
Cancer diagnosis/medical worries	1	2	3	4

If you can think of any other factor that regularly interferes with your sleep, please specify

34. Do you think any of the following can affect your sleeping pattern?

Steroids: Yes ☐ No ☐ Unsure ☐
 Caffeine: Yes ☐ No ☐ Unsure ☐
 Alcohol: Yes ☐ No ☐ Unsure ☐

35. Do you ever use alcohol before going to bed to help you sleep?

Yes, every day: ☐
 Yes, most days: ☐
 Yes, occasionally: ☐
 Hardly ever: ☐
 Never: ☐

36. Indicate on a scale of 1 to 10 how much your sleep disturbance distresses you.

No distress 1 2 3 4 5 6 7 8 9 10 High level of distress

37. Do you feel your sleeping pattern influences any of the following:

	Not at All	A Little	Quite a Bit	Very Much
Physical function during the day	1	2	3	4
Cognition (memory)	1	2	3	4
Mental function during day/ability to perform complicated tasks	1	2	3	4
Ability to tolerate treatment	1	2	3	4
Emotions	1	2	3	4

(continued)

eAppendix 1: Patient Questionnaire (cont.)

38. As part of your medical treatment, do you think you should be asked about your sleeping patterns?

Yes ☐ No ☐ Unsure ☐

39. Have you ever been asked about your sleep by a health professional?

Yes ☐ No ☐ Unsure ☐

If yes, by whom: Medical oncologist

☐

Radiation oncologist

☐

Palliative care

☐

Psychological oncology service

☐

Nurse: Palliative care nurse

☐

Oncology nurse

☐

General practitioner

☐

40. If insomnia became a problem for you, on a scale of 1 to 10 would you feel being referred for the following:

Consideration of sleeping tablets: 1 2 3 4 5 6 7 8 9 10

Written advice on sleep management: 1 2 3 4 5 6 7 8 9 10

Once time lecture on sleep management: 1 2 3 4 5 6 7 8 9 10

Series of lectures on management of sleep: 1 2 3 4 5 6 7 8 9 10

Group workshop led by psychologist and attended by up to 8 other patients: 1 2 3 4 5 6 7 8 9 10

One-to-one sessions with psychiatrist/psychologist: 1 2 3 4 5 6 7 8 9 10

Cognitive behavioural therapy(treatment dealing with different thoughts and the behaviors behind them): 1 2 3 4 5 6 7 8 9 10

Mindfulness therapy: 1 2 3 4 5 6 7 8 9 10

HOSPITAL ANXIETY AND DEPRESSION SCALE

As per the original permission agreement with GL Assessment this scale cannot be reproduced in a publication or journal article resulting from the study for which permission was sought.

HADS copyright @ R.P. Snaith and A.S. Zigmond 1983, 1992, 1994

Record form items originally published in Acta Psychiatrica Scandinavica 67, 361-70, copyright @ Munksgaard

International Publishers Ltd, Copenhagen, 1983.

The edition used first published in 1994 by Nelson Publishing Company Ltd(now GL Assessment Ltd)

389 Chiswick High Road, London W4 4AL.

GL Assessment is part of the Granada Learning Group.

(continued)

eAppendix 1: Patient Questionnaire (cont.)**HOSPITAL ANXIETY AND DEPRESSION SCALE**

As per the original permission agreement with GL Assessment, this scale cannot be reproduced in a publication or journal article resulting from the study for which permission was sought.

HADS copyright @ R.P. Snaith and A.S. Zigmond 1983, 1992, 1994

Record form items originally published in Acta Psychiatrica Scandinavica 67, 361-70, copyright @ Munksgaard International Publishers Ltd, Copenhagen, 1983.

The edition used first published in 1994 by Nelson Publishing Company Ltd(now GL Assessment Ltd)

389 Chiswick High Road, London W4 4AL.

GL Assessment is part of the Granada Learning Group.

Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361–370.