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Sleep hygiene in patients with early-stage breast cancer: a short report

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BACKGROUND: A previously conducted study reported that insomnia rates among oncology patients in Ireland are twice that of the general population, and that a breast cancer diagnosis was an independent predictor for clinical insomnia disorder. The aim of this study is to explore this interaction further in a larger cohort of breast cancer patients.
METHODS: We evaluated sleep disturbance and sleep hygiene practices among adult breast cancer patients via questionnaires. Sociodemographic data, clinical characteristics, sleep history and attitudes towards sleep assessments were collected and analysed.
RESULTS: The comprehensive 40-item questionnaire was completed by 315 patients. Of this cohort, 56% reported a change in their sleeping patterns since their cancer diagnosis, with over 55% of the study population having sub-threshold or clinical insomnia disorder. Although 64.2% of patients believed that questions regarding sleep should be part of breast cancer assessment, only 32% recalled being asked about sleep by a healthcare worker. Moreover, only 27.1% of respondents felt their sleeping difficulties were adequately dealt with since their diagnosis.
CONCLUSION: In summary, sleep disturbance is prevalent among breast cancer patients. Despite a majority of breast cancer patients recognising the importance of sleep assessment, a significant gap remains in healthcare providers addressing these concerns effectively.

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INTRODUCTION

Sleep disorders are frequently reported among cancer patients, both during treatment, in the post-treatment phase, and subsequently in palliative care settings [1–4]. Reduced sleep duration and poor sleep quality is associated with an increased risk of cancer recurrence and decreased cancer survival [5–8]. In contrast to the general population sleep disturbance is greater in younger rather than older patients [9]. Sleep disturbance experienced by both patients and their partners are associated with increased levels of fear of cancer recurrence [10]. Additionally, there is a well-established relationship between cancer related fatigue and sleep deficiency, underscoring the importance of addressing sleep issues in this population [11, 12].

A recent evaluation of sleep patterns in an Irish oncology population demonstrated an insomnia rate twice that of the general population [13]. In that study univariate analysis demonstrated that age under 65, a breast cancer diagnosis, current chemotherapy receipt and alcohol consumption, and a previous history of anxiety were predictors of insomnia syndrome [13]. Despite the significant symptomatic burden of sleep disturbances, these issues are often unrecognised and are inadequately addressed in clinical practice, particularly when compared to other symptoms such as pain and fatigue [14–16]. The National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines in Oncology advocate for specialised sleep assessment, acknowledging the increasing prevalence of related issues among cancer patients [17]. Nevertheless, a 2020 study revealed that only 34% of Irish oncology patients recalled undergoing assessment for sleep disturbance as part of their treatment [13]. As a breast cancer diagnosis was identified as an independent predictor of clinical insomnia disorder within the Irish oncology population [13], we aimed to explore this interaction further by quantifying the prevalence of sleep disturbance within a specific Irish cohort of breast cancer patients. Additionally, we aimed to examine patient's opinions on sleep hygiene and evaluate sleep hygiene practices within this population.

This was a cross-sectional questionnaire-based study conducted between September 2023 and March 2024 in adult patients diagnosed with breast cancer at Cork University Hospital/University College Cork Cancer Centre. A comprehensive 40-item composite questionnaire was formulated from a previously established questionnaire supplemented by additional questions devised by the authors [13].

The survey was circulated to patients attending the Outpatient Department. Institutional ethical board approval was obtained (Clinical Research Ethics Committee of the Cork Teaching Hospitals, ECM 01/2025/PUB), and all participants provided informed consent. Patients' behaviours, attitudes and perceptions regarding sleep hygiene and assessment were examined. Clinical characteristics, sociodemographic and lifestyle data, were

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Table 1. Patient demographics.

Number	315	Number	315
Gender (%)		Currently working (%)	
Female	315 (100)	Yes	122 (38.7)
		No	187 (59.4)
Age groups (%)		Unknown	6 (1.9)
25–34	3 (1)		
35–44	25 (7.9)	Smoking status (%)	
45–54	88 (27.9)	Current	22 (7.0)
55–64	106 (33.7)	Ex	131 (41.6)
65–74	71 (22.5)	Never	162 (51.4)
75+	22 (7.0)		
		Alcohol (%)	
Ethnicity (%)		Yes	222 (70.5)
White/Caucasian.	307 (97.5)	No	86 (27.3)
Black/African American	2 (0.6)	Unanswered	7 (2.2)
Asian/Other	6 (1.9)		
		Caffeine (%)	
Marital status (%)		Yes	274 (87.0)
Single	43 (13.7)	No	34 (10.8)
Divorced/separated	30 (9.5)	Unanswered	7 (2.2)
Married/Living			
with partner	225 (71.4)	Performance status (%)	
Widowed	17 (5.4)	0–1	285 (90.5)
		2–3	19 (6.1)
Children at home(%)		Unknown	11 (3.4)
Yes	155 (49.2)		
No	158 (50.2)	Hospitalisation in the last month (%)	
Unknown	2 (0.6)	Yes	23 (7.3)
		No	289 (91.7)
		Unknown	3 (1.0)

recorded. Sleep disturbance was assessed using the Insomnia Severity Index (ISI) as a baseline [18]. The ISI was selected as it is a validated instrument for identifying cases of insomnia within a population [18–20]. Data analysis was conducted using IBM SPSS V26. Descriptive statistics were employed to summarise the demographic and clinical characteristics of the participants. Pearsons's and Spearman's rank correlations were used to determine the association of clinical, lifestyle and demographic factors with ISI scores. Statistical significance was assumed by a p-value < 0.05.

A total of 315 questionnaires were completed, with baseline demographics summarise in Table 1 and clinical characteristics summarised in Table 2.

Among all patients, 56.8% ($n = 179$) reported a change in their sleeping patterns since their cancer diagnosis, with 72.4% ($n = 228$) stating they had not experienced sleep difficulties prior to diagnosis. An analysis of ISI scores revealed that 4.8% ($n = 14$) of this population exhibited severe clinical insomnia, 18.2% ($n = 53$) demonstrated moderate clinical insomnia, 33.2% ($n = 97$) experienced subthreshold clinical insomnia, and 43.8% ($n = 128$) reported no clinically significant insomnia, as shown in Fig. 1. Only one-third of the patients expressed satisfaction with their current sleep patterns (33.3%, $n = 105$), while more than half indicated that their sleeping patterns caused them at least some degree of distress (54.3%, $n = 171$).

High caffeine intake, alcohol consumption, low levels of physical activity, and the use of electronic devices before bed are all recognised as potentially modifiable factors that adversely affect sleep [13]. At the time of the study, 87% ($n = 274$) of participants reported caffeine consumption, 70.5% ($n = 222$) reported alcohol consumption, and 96.2% ($n = 303$) reported they used electronic devices before bed. Just under a quarter of our patients ($n = 78$, 24.8%) indicated that they believed alcohol consumption could affect sleep and sleeping patterns.

In our cohort, 62.5% ($n = 197$) of patients believed that sleep assessment should be a component of cancer treatment; however, only 23.8% ($n = 75$) felt that their sleeping difficulties had been adequately addressed since diagnosis. Under one-third of the study population recalled being asked about their sleep by a healthcare worker. Only 12% ($n = 8$) of patients with moderate or severe insomnia felt that their sleeping difficulties had been sufficiently addressed since diagnosis.

The findings of our study both align with and diverge from those reported by Harrold and colleagues [13], who investigated sleep disturbance across a broader oncology population in Ireland. In Harrold's study, 44% of patients met criteria for clinical insomnia (moderate or severe), while our breast cancer-specific cohort demonstrated a higher overall prevalence when including both subthreshold and clinical insomnia.

Consistent with Harrold's findings and multiple other studies [4, 13], we observed a statistically significant association between age and insomnia severity, with patients under 65 reporting higher ISI scores ($p < 0.001$; $V = 0.288$). However, unlike Harrold's study, which also identified alcohol consumption as a predictor of

Table 2. Patient's clinical characteristics.

Number	315	Number	315
Stage of breast cancer(%)		Currently taking steroids (%)	
Stage 1	57 (18.1)	Yes	29 (9.2)
Stage 2	93 (29.5)	No	271 (86.0)
Stage 3	46 (14.6)	Unanswered	15 (4.8)
Stage 4	36 (11.4)		
Unknown	83(26.4)		
Given advice on what time of day to take steroids(%)			
First diagnosed with breast cancer (%)		Yes	20 (6.3)
<6 months	48 (15.2)	No	6 (1.9)
6 months – 1 year	51 (16.2)	Unsure	3 (1.0)
1 year – 3 years	79 (25.1)	Not currently taking steroids	286 (90.8)
3 years – 5 years	44 (14.0)		
5 years+	90 (28.6)	Currently taking sleeping tablets (%)	
Unanswered	3 (1.0)	Yes	40 (12.7)
		No	266 (84.4)
Surgery for breast cancer (%)		Unanswered	9 (2.8)
Yes	294 (93.3)		
No	18 (5.7)	Currently taking relaxants/anxiolytics (%)	
Unsure	3 (1.0)	Yes	43 (13.7)
		No	262 (83.2)
Chemotherapy (%)		Unanswered	10 (3.1)
Currently receiving	57 (18.1)		
Planned	4 (1.3)	Currently taking hormonal treatment (%)	
Never/not planned	94 (29.8)	Yes	184 (58.4)
Received in the past	143 (45.4)	No	113 (35.9)
Unanswered	17 (5.4)	Unsure/unanswered	18 (5.7)
Type of hormonal treatment (%)			
Time since chemotherapy(%)		Tablets	167 (90.8)
< 1 year	24 (7.6)	Injections	38 (20.7)
1–3 years	38 (12.1)	Other/unsure	10 (5.4)
3–5 years	22 (7.0)	Total	184 (100)
5 years+	60 (19.0)		
Not applicable	171 (54.3)	Name of hormonal treatment[a]	
		Anastrozole	47 (25.5)
Radiotherapy(%)		Anastrozole + Zoladex	4 (2.2)
Currently receiving	3 (1.0)	Exemestane	14 (7.6)
Planned	31 (9.8)	Exemestane + Zoladex	4 (2.2)
Never/Not planned	26 (8.3)	Faslodex	4 (2.2)
Received in the past	241 (76.5)	Letrozole	14 (7.6)
Unanswered	14 (4.4)	Letrozole + Zoladex	6 (3.3)
		Tamoxifen	32 (17.4)
Time since radiotherapy		Tamoxifen + Zoladex	2 (1.1)
< 1 year	54 (17.2)	Zoladex	5 (2.7)
1–3 years	63 (20.0)	Other	52 (28.2)
3–5 years	40 (12.7)	Total	184 (100)
5 years+	81 (25.7)		
Not applicable	77 (24.4)		

[a]Patient may have received more than one type of hormonal therapy.

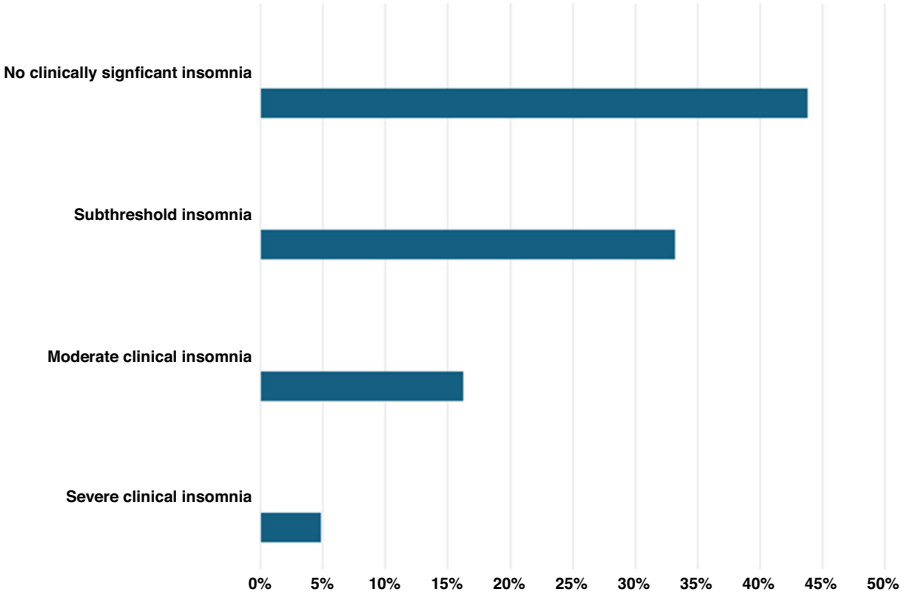

Fig. 1 Insomnia severity index scores.

insomnia, we found no statistically significant associations between insomnia and any other clinical, lifestyle or demographic variable as presented in Table 3. In the present study 46% of patients had received chemotherapy and only 24 of 315 patients were within a year of chemotherapy receipt. In contrast, 245 of 294 patients in the study of Harrold et al. were receiving active chemotherapy. As previously reported in patients receiving chemotherapy for breast cancer sleep quality predictors improve with duration of time from chemotherapy treatment [21], which may explain the differences observed.

Our results both resonate with, and differ from those of Mercadante et al. [3]; who studied patients in palliative care settings over a 6 month period of whom 10% had breast cancer and 3.8% had prostate cancer. Over 60% of all patients had sleep disturbance, with hormone therapy and use of opioids and steroids being positively associated with sleep disturbance. Considering that the vast majority of our patients had early stage cancer with good performance state (ECOG 0-1; 90.5%), our results may not capture palliative-phase sleep burdens. This supports the view that sleep disturbance in cancer is multi-factorial and may evolve and changes as the diseases progresses.

The fact that our patient population was largely composed of individuals no longer receiving active treatment may help explain the higher prevalence of chronic, rather than acute, sleep disturbances. Previous studies have linked treatment-related toxicity – particularly during chemotherapy- with significant sleep disturbance [9, 22]. In our population, only 7.6% of our patient had completed chemotherapy within the past year. This may account for the lower frequency of treatment-related sleep complaints. These contrasting findings likely reflect post-treatment survivorship sleep challenges, rather than acute treatment-related insomnia. Our findings point to persistent sleep issues in the survivorship phase. These insights highlight the need for tailored sleep management strategies across different phases of the cancer care continuum.

Our findings demonstrate that there is a high prevalence of sleep disorders among this population, with more than half of the participants reporting changes in their sleep patterns since their cancer diagnosis despite over two-thirds lacking any prior history of sleep-related issues. This high level of prevalence aligns with findings from existing literature in similar populations [13]. There were high levels of consumption of caffeine and alcohol in our population, modifiable risk factors known to negatively affect sleep hygiene. One-fifth of patients reported using alcohol as a sleeping aid, yet only one-quarter recognised the potential impact of alcohol on sleep. This gap in patient awareness of sleep hygiene mirrors findings from previous studies [14, 23] and further highlights the need for patient education, and the importance of the provision of sleep hygiene education information to this population in the clinical setting.

The strengths of this study include a substantial data collection window, its large sample size, as well as a broad selection criterion, with no exclusion of particular demographic characteristics, current disease activity, or co-morbidities. This generated a study sample more representative of the 'real-world'. Limitations include the use of a self-reported point prevalence questionnaire without objective measures of sleep disturbance and insomnia such as wearable devices [24–26]. Additional limitations include a lack of ethnic diversity [27].

In conclusion, there is a high level of sleep disturbance among breast cancer patients; despite a majority of breast cancer patients recognising the importance of sleep assessment, a significant gap remains in healthcare providers' addressing these concerns effectively. This study underscores the urgent need for integrated sleep assessment into oncology care [28]. Further steps include exploring healthcare provider attitudes and knowledge of sleep disturbance and sleep assessment in oncology care. Recommendations for sleep assessment and sleep hygiene education should be integrated into oncology patient care plans and survivorship guidelines to ensure consistent and proactive management of this issue.

The significant burden of sleep disturbance and clinical insomnia in oncology cohorts is further reflected in contemporaneous nationally conducted research; The Menopause after cancer (MAC) [29] and Sleepio after cancer (SAC) [30] studies have both examined large cohorts of women cancer patients with clinical insomnia disorder. Whilst identification and recognition of sleep disturbance amongst cancer patients remains a challenge, the provision of treatment to those diagnosed with clinical insomnia disorder also poses a problem, with limited access to cognitive behavioural therapy for insomnia being available. Various studies including both the MAC and SAC studies examined the efficacy of digital cognitive behavioural therapy for insomnia (dCBT-I), which

Table 3. Analysis of patient factors associated with insomnia.

	n	*p*	V	$\bar{x}$ +/− σ
Age				
<65	222	<0.001	0.228	10.32 +/− 6.96
>65	93			6.49 +/− 5.99
Stage of cancer				
Stage 1	53	0.810	0.083	10.38 +/− 5.95
Stage 2	87			9.29 +/− 6.98
Stage 3	44			9.64 +/− 7.58
Stage 4	33			9.30 +/− 7.13
Chemotherapy				
Currently receiving	55	0.885	0.030	9.56 +/− 7.65
Not currently receiving	222			9.12 +/− 6.77
Radiotherapy				
Received in the past	223	0.116	0.132	9.39 +/− 6.95
Never received/not planned	24			7.3 3 +/− 5.29
Hormonal treatment				
Currently receiving	176	0.711	0.050	9.63 + /− 6.87
Not currently receiving	101			8.44 + /− 6.95
Diagnosis				
<6 months since diagnosis	45	0.616	0.058	10.42 +/− 7.27
>6months since diagnosis	244			8.97 + /− 6.85
Alcohol				
Yes	206	0.142	0.117	9.99 +/− 7.02
No	80			7.50 +/− 6.40
Caffeine				
Yes	252	0.887	0.029	9.32 +/− 6.90
No	34			9.09 +/− 7.22
Latest time for caffeine				
Before 12 pm	54	0.142	0.125	9.28 +/− 6.51
After 12 pm	194			9.24 +/− 6.99

could address current limitations in treatment access [29–31]. Incorporating these digital interventions into clinical pathways and survivorship guidelines may help tailor care to specific patient group by addressing individual risk profiles and the multifactorial nature of sleep disturbance. Such personalised approaches enable more targeted care and have the potential to improve treatment outcomes across diverse oncology populations.

DATA AVAILABILITY

Data from the study available on reasonable request from corresponding author.

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AUTHOR CONTRIBUTIONS

Contributions Study design: EV, SOR Data Collection: EV Data Analysis: EV, CSW, TT, SOR Manuscript writing EV, CSW, TT, SOR Final draft approval: EV, CSW, TT, SOR.

COMPETING INTERESTS

Seamus O'Reilly is Deputy Editor of the journal BJC Reports but did not have a role in the peer review assessment of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

All methods were performed in accordance with the relevant guidelines and regulations. Approval was obtained from a Cork Teaching Hospitals Clinical Research Ethics Committee ECM 01/2025/PUB. Informed consent was obtained from all participants.

ADDITIONAL INFORMATION

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