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'CBT-I in Cancer: We Know It Works, so Why Are We Waiting?'

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Abstract Insomnia is one of the most frequently reported and debilitating difficulties associated with cancer. Recent decades have seen a move from pharmacological interventions for insomnia, to non-pharmacological, cognitive behavioural therapies (CBT-I). Numerous clinical trials have established the effectiveness of CBT-I in the general population and more recently, in those with insomnia associated with cancer. However, despite these promising outcomes, the availability of such therapies remains limited across cancer services. Recent years have seen developments to widen access to CBT-I, including the use of internet-based resources. Such developments may offer a useful means of overcoming the availability and access issues of CBT-I for those with insomnia associated with cancer.

Keywords Cancer · Sleep · Insomnia · Cognitive behaviour therapy · Intervention · Psychological

Introduction

Despite its pervasiveness and chronicity, insomnia in cancer care is under-reported by patients, overlooked by clinicians and as a consequence, poorly managed. This is partly due to the belief that insomnia is a transient response to cancer diagnosis and treatment, which will self-resolve. However, insomnia which remains untreated has consequences for psychological and physical wellbeing. Diminished quality of life, impaired mood, heightened pain and increased fatigue are all common responses to persistent insomnia disorder, and many of those living with cancer experience unremitting insomnia which impacts upon daytime functioning. Evidence demonstrates that cognitive behaviour therapy (CBT) should be the first-line intervention for insomnia disorder and patients have expressed their acceptance of this treatment approach. However, despite this evidence, CBT is not routinely available to cancer populations, perhaps due to uncertainty around when and how it could most usefully be made available.

This article is part of the Topical Collection on *Insomnia—Behavioral Therapy*

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Cancer and Insomnia Prevalence

According to the World Health Organization, cancer is among the leading causes of morbidity and mortality worldwide. Approximately 14 million new cases were recorded in 2012 and this figure is expected to rise by around 70 % over the next two decades [1]. In particular, breast cancer incidence has increased from a rate of 103/100,000 in 1975 to 126/100,000 in 2007 and there is an increased incidence of colorectal cancer in developed countries [2]. Both breast and colorectal cancers have been linked to circadian disruption [3], and their epidemiology correlates with regions where circadian disruption, through night-shift working, for example, is most prevalent [4]. Although tentative, this evidence may suggest a circadian disruption-based model for cancer, particularly breast and colorectal cancers, which should be further explored.

Fortunately, due to screening programmes, earlier disease detection and improving treatment regimes, cancer survival

rates are also increasing. Recent estimates indicate that around half of those diagnosed with cancer are expected to survive for at least 10 years and in the UK alone, cancer survival rates have doubled in the last 40 years [5] However, these improvements in rates of survivorship are not without cost. Evidence shows that many cancer survivors experience a significant symptom burden [3], particularly at the end of active treatment when treatment side effects often fail to remit [4].

One of the most commonly reported side effects of cancer diagnosis/treatment is insomnia, which refers to difficulty initiating or maintaining sleep at least three nights per week for at least 3 months, accompanied by impaired daytime functioning [5]. Epidemiological data from cancer populations report that 25–69 % report difficulty sleeping, with 18–29 % reporting sleep disturbance that meets diagnostic criteria for insomnia disorder [6–8]. However, despite increasing awareness of the pervasiveness of insomnia within cancer groups, scientific reports of insomnia prevalence remain variable and wide ranging. This is partly due to the utilisation of different insomnia definitions, measurements and timing of assessments [9]. However, recent amendments to the diagnostic criteria for insomnia disorder [9] and the publication of clinical screening tools based upon these new criteria [10] should result in improvements to the consistency of prevalence estimates in future studies.

Evolution of Insomnia in Cancer

Although insomnia is a prevalent problem for cancer patients, little information is available about its long-term course and limited studies have focused on insomnia as a persistent disorder in oncology groups. However, scientific understanding of the evolution of insomnia has been applied in the context of cancer, and etiological factors including insomnia predisposition, precipitation and perpetuation have been proposed [11]. One recent report on the natural history of insomnia in cancer patients reported data on incidence, persistence, remission and relapse of insomnia over the 18-month period following diagnosis in a group of patients with mixed cancer types [8, 12]. The study revealed high rates of insomnia at baseline (59 %), including 28 % with insomnia disorder. Insomnia became less prevalent over the 18-month assessment period but did remain pervasive at the end of the study (36 %). Approximately 15 % of patients experienced a first incidence of insomnia during the study and around 20 % experienced relapse. Patients categorised as having an insomnia disorder were much less likely to experience remission than those who had insomnia symptoms. Those meeting criteria for insomnia disorder at baseline retained that sleep status for the duration of the study, highlighting its persistence over time. This study provides a useful analysis of the evolution of insomnia disorder during the cancer diagnosis/treatment/rehabilitation phases and indicates the point(s) at which cancer patients may be most vulnerable to developing a persistent complaint of poor sleep.

The elevated prevalence of insomnia amongst cancer patients is partly explained by heightened psychological distress following diagnosis [13]. However, the side effects from active cancer treatment are also known to contribute to the deterioration of good sleep [13–15]. A large-scale prospective study of cancer patients undergoing chemotherapy found that 39.8 % reported moderate or severe insomnia symptoms after their initial chemotherapy session. Furthermore, two-thirds of patients reported that insomnia symptoms persisted throughout their subsequent cycles of chemotherapy [6]. In particular, sleep maintenance problems are the most frequently reported sleep complaint during active treatment, with 63.3 % of patients experiencing fragmented sleep patterns [16].

Once established, insomnia often becomes a chronic, unremitting complaint. RCT data from a cancer survivor population reported a median insomnia duration of greater than 2 years [17]. Similarly, a cross-sectional survey of 982 cancer patients found that 31 % reported insomnia, of which 75 % had a chronic disorder (i.e. lasting 6 months or more). Therefore, it seems that insomnia often takes a chronic course in many cancer patients [18]. This pattern of persistence may be explained by individual responses to sleep disturbance that influence its maintenance over time (e.g. maladaptive sleep behaviour, faulty beliefs). These individual responses are potentially more commonly observed in cancer populations than in the general population, due to their focus on restoration and recovery. In order to cope with the physical demands of active treatment (i.e. surgery, chemotherapy, radiotherapy), cancer patients may be required to rest more than usual during the day. Qualitative reports from cancer survivor populations indicate that they implement earlier bedtimes, later rising times and increased daytime napping during their cancer treatment [19]. These maladaptive sleep habits encourage the development of an irregular sleep-wake pattern, which may ultimately lead to de-synchronisation of the sleep-wake cycle and contribute to the development of a chronic insomnia disorder [11]. Therefore, disease-specific factors (such as psychological distress, active cancer treatment) may contribute to the precipitation of insomnia, whilst poor sleep behaviours arising as a result of attempts to combat these disease-specific factors may contribute to its maintenance.

Consequences of Insomnia in Cancer

Insomnia disorder is not only prevalent and persistent but is consequential for both psychological and physical wellbeing. Research indicates that good sleep quality, characterised by consistent and distinguishable sleep/wake patterns, reduces depressive symptomatology, enhances quality of life and improves physical outcomes [20–22]. However, due to the high

prevalence of insomnia following diagnosis, cancer patients are especially vulnerable to the negative impact of sleep disruption. Also, insomnia often occurs alongside other symptoms like fatigue, anxiety and low mood [15, 23–25], causing further impairment to quality of life. Liu et al. found that breast cancer patients who reported multiple symptoms (symptom clusters) prior to the onset of active treatment experienced poorer sleep, more fatigue and reduced mood during cancer treatment [23]. Therefore, one symptom may contribute to the maintenance and exacerbation of the others [26].

Associations between commonly occurring symptoms have also been explored in the general population. For example, epidemiological data indicates that insomnia contributes to the development of depressive disorder [24] and individuals with cancer and insomnia experience reduced functioning, increased pain and more fatigue than those without insomnia [27, 28]. Sharma et al. reported that almost one-third of cancer patients described sleep problems reaching clinical levels, which were strongly related to symptoms of psychological distress [25]. Therefore, given the increasing number of cancer survivors who are likely to have comorbid symptoms (including insomnia), there is a considerable burden on healthcare providers to understand and implement symptom management strategies to cope with these increasing demands.

Cognitive Behaviour Therapy for Insomnia (CBT-I) in Cancer

The consequences of insomnia can be severe enough to warrant medical intervention, with 25 % of cancer patients regularly taking sleeping tablets. However, this long-term pharmacotherapy is undesirable to patients [29]. There is considerable evidence that intervening at the psychosocial level, using cognitive behavioural therapy, is effective for insomnia associated with cancer [17, 30–34, 35•, 36, 37] and is a treatment approach that patients prefer [19].

Cognitive behavioural therapy for insomnia (CBT-I) is a multicomponent intervention that was developed to target the specific cognitive, physiological and behavioural aspects that characterise the insomnia disorder. Essentially, CBT-I comprises five potential elements, including stimulus control, sleep restriction, sleep hygiene, cognitive restructuring and relaxation training. Evidence demonstrates that CBT-I can be successfully administered using a range of delivery methods, including groups [38, 39], telephone [40], online [41, 42] and self-help manuals [43]. Importantly, the effectiveness of CBT-I has been demonstrated for insomnia that occurs alongside complex psychiatric and medical conditions as well as for insomnia without those comorbidities.

To date, nine controlled trials of CBT-I in cancer patients have been conducted (summarised in Table 1) [17, 30, 32–34, 35•, 36, 37, 44, 45•, 46]. One of the largest of these trials, using face-to-face CBT-I, was conducted by Espie et al. (2008) [17]. This study recruited 150 cancer patients (mixed tumour sites) to either a group delivered, nurse led CBT-I intervention or to a treatment as usual (TAU) condition. Significant improvements in subjectively reported sleep onset latency, wake time after sleep onset and sleep efficiency were noted in the CBT-I group, with large between-group effect sizes of −0.86, −0.97, and 1.09, respectively. These results represented a reduction of approximately 1 h in sleep onset latency and time spent awake during the night. There was no change in the TAU group and results were sustained at 6-month follow-up assessment. Alongside these improvements in sleep outcomes, improvements to quality of life, mood and levels of cancer-related fatigue were also reported in the CBT-I condition [26].

Recent Advances in CBT-I Delivery

Although numerous studies have identified CBT-I as an effective and well-tolerated therapy for insomnia associated with cancer, this therapeutic approach is not always widely available to patients. Limited availability of therapists with sufficient expertise, and geographical distance from treatment centres can prove to be barriers. This is something that is not limited to those with cancer: treatment for sleep disorders in general is often piece-meal across services [47]. However, a concomitant physical illness can bring with it further difficulties in accessing treatment. The diagnosis of cancer can bring significant financial burdens, meaning that the cost of additional travel to treatment centres may be prohibitive [48]. Furthermore, the physical effects of both the illness and its treatment may preclude others from seeking additional treatment.

The issues of availability and access have been explored widely in the general literature for psychological therapies, with increasing attempts, over recent decades, to train non-psychologists to deliver psychological therapies. In particular, attention has been paid to developing the skills of nursing members of the multi-disciplinary health team [49]. A similar process has taken place within the general insomnia literature, with a substantial focus on widening access to CBT for insomnia through dissemination of treatment programmes to a larger group of health professionals, such as community nursing staff [50]. Such efforts provide a wider pool of therapists, thereby increasing the availability of the therapy and potentially reducing the cost of delivery. A further step in this process has been the use of guided self-help materials (often utilising the Internet) as a means of delivering psychological therapies. Positive outcomes for these have been found in the general literature for psychological disorders, as well as in studies specific to insomnia [41, 51, 52•]. The availability of

Table 1 Summary of trials of CBT for insomnia in patients with cancer

Author	Year	*N*	Tumour site	CBT format	Study design	Primary outcome measures	Method of assessment	Main outcomes
Savard et al [30, 37]	2005	57	Breast	8 group sessions	RCT: wait-list control	SOL, WASO, TST, SE	Sleep diaries, PSG	Significant improvement in subjective sleep and mood variables; reduction in medication use; trends toward improvement in objective sleep
Epstein and Dirksen [36]	2007	72	Breast	6 group sessions	RCT: multi-component CBT-I vs single component	SOL, WASO, TST, SE	Sleep diaries, actigraphy	Significant improvements in sleep variables, both objectively and subjectively
Espie et al [17]	2008	150	Mixed	5 group sessions	RCT: CBT-I vs TAU	SOL, WASO, TST, SE	Sleep diaries, actigraphy	Significant improvements in subjective sleep variables and quality of life; outcomes for objective measures weaker
Berger et al [32, 33]	2009	219	Breast	6 individual sessions (mean)	RCT: BT (incorporated CBT-I) vs lifestyle advice and attention	SOL, WASO, TST, SE	Sleep diaries, actigraphy	Significant improvements in both subjective and objective sleep variables; no differences in fatigue between groups
Fiorentino et al [34]	2010	14	Breast	6 individual sessions	RCT: cross-over	SOL, WASO, TST, SE	Sleep diaries, actigraphy	Significant improvements in both subjective and objective sleep variables
Ritterband et al [35•]	2012	28	Mixed	6 individual sessions delivered online	RCT: wait-list control	SOL, WASO, TST, SE, NWAK	Sleep diaries	Significant improvements in subjective sleep variables
Matthews et al [44]	2014	56	Breast	6 individual sessions	RCT: CBT-I vs BPT	SOL, WASO, TST, SE, NWAK	Sleep diaries	Significant improvements in subjective sleep variables; no differences in fatigue, mood or quality of life
Savard et al [45•]	2014	260	Breast	6 individual sessions	RCT: face-to-face CBT-I vs video CBT-I vs TAU	SOL, WASO, TST, SE	Sleep diaries, actigraphy	Significant improvements in subjective measures of sleep variables, but not objective measures; effects greater in the face-to-face group than video CBT-I
Garland et al [46]	2014	111	Mixed	8 group sessions	RCT: MBSR vs CBT-I	SOL, WASO, TST, SE	Sleep diaries, actigraphy	Greater improvement in subjective sleep variables for CBT-I vs MBSR following treatment, but no statistical difference at 3-month follow-up from treatment completion, although CBT-I still showed greater magnitude of effects; interventions equally effective in improving mood and stress

BPT behavioural placebo treatment, *BT* behaviour therapy, *CBT-I* cognitive behaviour therapy for insomnia, *MBSR* mindfulness-based stress reduction, *NWAK* number of night-time awakenings, *RCT* randomised controlled trial, *SE* sleep efficiency, *SOL* sleep onset latency, *TAU* treatment as usual, *TST* total sleep time, *WASO* wake time after sleep onset

differing treatment delivery methods allows the opportunity for a stepped-care model within services, thereby increasing access and reducing costs [47].

Similar trends in the delivery of CBT for insomnia associated with cancer have emerged in recent years, with studies exploring options for providing psychological treatment to individuals with cancer and sleep disorders. The composition of these interventions typically involves a series of treatment sessions, with material that covers the same areas as would be provided in face-to-face treatment. The difference in these cases is that treatment is delivered at distance, either through video-recorded sessions [47] or through online sessions [32]. In Savard et al.'s (2014) study, the opportunity for telephone contact with a therapist was available but somewhat surprisingly only a limited number (8 %) of participants chose to do this. This study established that video-based self-help materials can have significant benefits in resolving symptoms of insomnia associated with cancer [45•], albeit that outcomes for remission rates and relapse rates (for insomnia) were poorer in the video-based treatment group than a comparison face-to-face group. Ritterberg et al. (2012) also found evidence of efficacy in the use of their internet-based therapy, to an extent that matched those found in studies of face-to-face delivered therapy with cancer survivors [32]. Although it is acknowledged that aspects of direct treatment (in particular, the therapeutic relationship) may be difficult to recreate in distance methods, the accessibility and cost benefits of such models should not be discounted. Indeed, for many individuals, the only viable treatment option would be through distance methods. Clearly, the counterbalance to this will be individuals' access to the necessary technology, such as Internet connections, and the ease of use of programmes. Nonetheless, work to overcome these barriers and explore this additional treatment modality is likely to be a focus of research in future years.

Conclusion

A clear focus on informing the implementation of CBT for insomnia as part of general psychological care within oncology settings should be a research priority. In current clinical practice, the only help available for the troubling, chronic problem of insomnia has often been the attempted short-term fix of hypnotic medication, which most cancer patients find particularly undesirable [19]. However, CBT for insomnia is an evidence-based solution that is not only safe and effective but also has the potential to make long-term improvements to health and wellbeing in cancer populations.

CBT is an effective and enduring treatment for chronic insomnia disorder, but so far the evidence for CBT has not changed practice. Uncertainty remains about how CBT for insomnia could be integrated into existing oncology care settings, specifically with regard to when it would be most useful for the patient. However, it is suggested that the most substantive barrier to integration of CBT for insomnia into practice is availability. Therapist availability, geographical distance and financial resource implications may limit patient access to treatment.

Recent years have seen the development of several models of treatment delivery for CBT for insomnia. This provides the potential for a stepped-care model, something that may be the key to increasing integration of insomnia treatment within wider cancer services. Moving forward, the research focus must be to improve the management of severe and intrusive sleep disturbance that is common in cancer by determining the methods by which it would be most suitable to provide CBT intervention to these patients.

Compliance with Ethics Guidelines

Conflict of Interest Leanne Fleming and Kenneth MacMahon declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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