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Original Research Article

Medical and Psychosocial Correlates of Insomnia Symptoms in Adult Survivors of Pediatric Brain Tumors

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Abstract

Objective Children diagnosed with brain tumors are at risk for insomnia. We evaluated insomnia symptoms, medical and psychosocial correlates, and medical documentation of sleep-related issues in a neuro-oncology clinic. **Methods** 98 adult survivors of pediatric brain tumors provided data about sleep, psychological distress, and health-related quality of life. Medical records were reviewed for treatment-related information and for documentation of sleep-related issues. **Results** 26% of the sample reported insomnia symptoms as evidenced by poor sleep efficiency. Insomnia symptoms were associated with a migraine headache history, but not with other medical or psychosocial outcomes. Approximately one in three medical providers did not document discussing sleep during the survivorship visit. **Conclusions** A sizeable number of pediatric brain tumor survivors experience insomnia symptoms. The survivorship visit is an ideal opportunity for providers to conduct a sleep evaluation for this at-risk population and to provide referrals for evidence-based insomnia treatment.

Key words: childhood cancer; insomnia; pediatric brain tumor; sleep efficiency; survivorship.

Introduction

As survival rates for children diagnosed with brain tumors have improved, oncology teams have sought to better understand the medical and psychosocial late effects of tumor-directed therapy (Turner, Rey-Casserly, Liptak, & Chordas, 2009). In addition to the emotional and environmental disruptions that can affect sleep in any child with a serious medical disorder, evidence suggests that pediatric brain tumor survivors are at particular risk for sleep dysfunction because the direct and/or indirect damage to the developing brain caused by neurosurgery, chemotherapy, and cranial radiation can injure sleep centers in the brain, disrupting normal sleep function (Hinds et al., 2007; Rosen, Bendel, Neglia, Moertel, & Mahowald, 2003; Rosen & Brand, 2011; Vallance et al., 2010; Van Someren et al., 2004; Wilne et al., 2007). In particular, insomnia symptoms have been associated with a medical issue commonly seen in brain tumor survivors: migraine headaches (DeAngelis, 2001; Kelman & Rains, 2005; Taylor, 2014). The relationship between poor sleep and headaches is noteworthy because it is likely to be bidirectional in nature, with one exacerbating the other (Alstadhaug, Salvesen, & Bekkelund, 2007; Rains, 2008). Although childhood brain tumors are relatively rare, they account for up to 90% of children consecutively referred to a sleep center for an evaluation (Rosen, Shor, & Geller, 2008).

Prior literature examining sleep disorders in pediatric brain tumor patients have generally focused on

excessive daytime sleepiness and sleep disordered breathing (Mandrell et al., 2012; Manley et al., 2012; Rosen & Brand, 2011; Van Someren et al., 2004), especially in patients who experience these problems near the time of their treatment. Despite evidence that many pediatric brain tumor survivors suffer from insomnia (Rosen & Brand, 2011), even years after treatment, there is limited knowledge about prevalence and correlates of insomnia in this population of cancer survivors (Kaleyias, Manley, & Kothare, 2012). Researchers have consistently demonstrated the negative health consequences of untreated insomnia (Campos, Hassan, Riechelmann, & Del Giglio, 2011; Liu & Zhou, 2002; van Litsenburg et al., 2011). There is increasing interest to examine insomnia in cancer survivors (Mulrooney et al., 2008; Savard & Morin, 2001; Zhou & Recklitis, 2014) known to be vulnerable to medical and psychological late effects of cancer treatment (Ellenberg et al., 2009; Gurney et al., 2003; Zeltzer et al., 2009).

Insomnia disorder is defined by "dissatisfaction with sleep quantity or quality" that causes "clinically significant distress or impairment in ... functioning" (American Psychiatric Association, 2013) and has been associated with medical and psychosocial characteristics in cancer populations (Savard, Simard, Blanchet, Ivers, & Morin, 2001). These sleep disturbances occur despite adequate opportunity for sleep, and manifest as difficulty with sleep initiation and/or maintenance. Clinicians who treat insomnia disorder commonly use sleep efficiency (the ratio of total time asleep compared with total time in bed) as their intervention metric, with 85% being the desired treatment target (Perlis, Jungquist, Smith, & Posner, 2008; Spielman, Saskin, & Thorpy, 1987). Recent evidence has suggested that sleep efficiency is an independent predictor of outcomes in cancer survivors (Palesh et al., 2014).

As insomnia occurs across a range of severity, it is critical in a medical setting to clearly demarcate which cases warrant clinical attention. To target cancer survivors reporting clinically significant insomnia symptoms, we have previously used 85% sleep efficiency to identify patients at risk for insomnia disorder (Zhou & Recklitis, 2014). Using this criterion we set out to describe and evaluate cases of clinically significant insomnia symptoms in a locally followed cohort of adult survivors of pediatric brain tumors. The goals for our study were to (1) describe the prevalence of clinically significant insomnia symptoms in this population; (2) identify relationships between medical, physical, and psychosocial patient characteristics with the presence/absence of clinically significant insomnia symptoms; and (3) evaluate the frequency with which sleep issues were documented during a neuro-oncology survivorship medical visit.

Methods

Participants

Participants in these analyses were drawn from a larger study, Project REACH (Research Evaluating After Cancer Health), a longitudinal cohort of cancer survivors within a single cancer center (Bober et al., 2013). All participants in Project REACH were diagnosed with cancer ≥2 years ago, at least 1 year posttreatment, and were able to complete study forms independently in English. Enrolled participants completed annual self-report surveys of health outcomes, either in person or through the mail. The study was approved by the cancer center's institutional review board.

We examined the subset of Project REACH participants aged ≥18 years, who had been diagnosed with a pediatric brain tumor, and were being followed in a pediatric neuro-oncology survivorship clinic. Of 200 pediatric brain tumor survivors enrolled in Project REACH, 158 were eligible (>18 years). During the study period, 112 of these survivors returned to the neuro-oncology clinic for a follow-up survivorship visit and were asked to complete the study measures reported on here. Of these 112 survivors, 108 completed a study packet. However, 10 did not provide complete sleep data and were excluded from study analyses, resulting in our final sample of 98 survivors. Of these 98 study participants who completed questionnaires, 87 completed them on the same day as their neuro-oncology survivorship visit, and 11 subsequently returned the measures via mail following their survivorship visit.

The 98 participants (53 males and 45 females) evaluated in the current study were an average of 23.3 years old (range = 18.0–43.4 years) (Table I). The majority were unmarried (96.9%), had less than a college education (67.3%), and had a household income <$100,000 (70.2%). The primary tumor diagnoses for this sample were astrocytoma (57.1%), medulloblastoma (22.4%), and ependymoma (12.2%). Survivors were an average of 13.3 years postdiagnosis (range = 3.5–29.9 years) and had received a variety of cancer treatments, including surgery (94.9%), chemotherapy (44.9%), radiation therapy (63.3%), including radiation therapy involving the hypothalamus (58.2%).

Measures

Demographic and Cancer-Treatment Variables

Study participants were asked to provide demographic information, including their age, gender, marital status, highest level of education completed, and household income. Electronic medical records were reviewed for all participants to collect their cancer diagnosis, cancer treatment history, history of migraine headaches, and history of seizures.

Pittsburgh Sleep Quality Index

Participants completed the Pittsburgh Sleep Quality Index (PSQI), a commonly used 19-item self-report

Table I. Demographic, and Health-Related Descriptive Information Categorized by Presence of Insomnia Symptoms

Variable	No.	No insomnia symptoms *n* (% or *SD*)	Insomnia symptoms *n* (% or *SD*)	*p*	Odds ratio
Age (years)	98	23.2 (3.9)	23.6 (6.0)	0.69	0.98
Gender	98			0.1	
Male	53	43 (58.9%)	10 (40.0%)		Ref
Female	45	30 (41.1%)	15 (60.0%)		2.15
Marital status	98			0.75	
Married/living as married	3	2 (2.7%)	1 (4.0%)		1.48
Single (never married)	95	71 (97.2%)	24 (96.0%)		Ref
Education	98			0.57	
<College graduate	66	48 (65.8%)	18 (72.0%)		Ref
≥College graduate	32	25 (34.2%)	7 (28.0%)		0.75
Household income	84			0.69	
<$50,000	29	22 (34.9%)	7 (33.3%)		Ref
$50,000–99,999	30	21 (33.3%)	9 (42.9%)		1.27
>$100,000	25	20 (31.7%)	5 (23.8%)		0.74
Physical health				0.51	
Primary diagnosis	98				
Astrocytoma	56	39 (53.4%)	17 (68.0%)		Ref
Medulloblastoma	22	19 (26.0%)	3 (12.0%)		0.75
Ependymoma	12	9 (12.3%)	3 (12.0%)		1
Other	8	6 (8.2%)	2 (8.0%)		1.21
Time since diagnosis (years)	98	13.1 (5.6)	13.8 (5.6)	0.61	
Recurrence	98			0.37	
Yes	13	11 (17.7%)	2 (8.0%)		0.49
No	85	62 (84.9%)	23 (92.0%)		Ref
Chemotherapy	98			0.57	
Yes	44	34 (46.6%)	10 (40.0%)		0.77
No	54	39 (53.4%)	15 (60.0%)		Ref
Radiation therapy (CNS)	98			0.38	
Yes	62	48 (65.8%)	14 (56.0%)		0.66
No	36	25 (34.2%)	11 (44.0%)		Ref
Radiation therapy (hypothalamus)	98			0.17	
Yes	57	45 (61.6%)	12 (48.0%)		0.57
No	41	28 (38.4%)	13 (52.0%)		Ref
Surgery	98			0.77	
Yes	93	69 (94.5%)	24 (96.0%)		1.39
No	5	4 (5.5%)	1 (4.0%)		Ref
Diagnosed with seizures (ever)	89			0.31	
Yes	13	8 (12.3%)	5 (20.8%)		1.22
No	76	57 (87.7%)	19 (79.2%)		Ref
Diagnosed with migraines (ever)	89			**0.02**	
Yes	49	31 (47.7%)	18 (75.0%)		**3.29**
No	40	34 (52.3%)	6 (25.0%)		Ref
Mental health					
BSI-18 depression (T-score)	92	49.1 (9.5)	49.0 (9.6)	0.99	1
BSI-18 anxiety (T-score)	92	46.3 (9.3)	49.3 (9.7)	0.19	0.97
Quality of life					
SF-12 mental health (summary score)	89	50.9 (8.8)	50.9 (12.5)	0.97	1
SF-12 physical health (summary score)	89	50.9 (8.1)	50.1 (10.2)	0.72	1.01

Note. Statistical significance at $p < .05$ and odds ratios that differ significantly from 1.0 are shown in bold.

measure of sleep quality and disturbances over the past month. On the PSQI, participants self-reported bedtime, wake time, total hours of actual sleep, and information about sleep onset, sleep maintenance, use of sleep medications, and breathing dysfunction (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). To examine difficulty with sleep onset, difficulty with sleep maintenance, use of sleep medication, daytime somnolence, and difficulty breathing during the night, we dichotomized participant responses to ≥1×/week or <1×/week in our statistical analyses to determine whether the sleep-related issue was a relatively common occurrence and to highlight the distinction between participants with and without the symptom. To provide a clinically meaningful measure of insomnia symptoms, the participants' sleep efficiency was calculated by dividing their self-reported total number of hours of sleep by total time in bed, calculated by subtracting their reported bed time from their wake time. The PSQI has been used previously in populations

of adult survivors of childhood cancers (Mulrooney et al., 2008; Zhou & Recklitis, 2014). The PSQI had acceptable internal consistency in our sample (Cronbach's $\alpha = .72$).

Short Form-12

We used the Short Form-12 (SF-12) to evaluate health-related quality of life (Ware, Kosinski, & Keller, 1996). The SF-12 is a 12-item measure that provides both a physical and mental health summary score, and has demonstrated reliability and validity (Ware et al., 1996). The SF-12 has been widely used in the cancer literature, including in adolescent and young adult cancer survivors (Bober et al., 2013; Mulrooney et al., 2008; Zhou & Recklitis, 2014). The SF-12 demonstrated acceptable internal consistency (Cronbach's $\alpha = .65$).

Brief Symptom Inventory-18

To evaluate psychological distress, the Brief Symptom Inventory-18 (BSI-18) was administered (Derogatis, 2001). The BSI-18 is an 18-item measure that has been used in studies of adolescent and young adult cancer populations (Hudson et al., 2003), including those that have examined sleep-related issues (Nolan et al., 2013). The Anxiety and Depression scales of the BSI-18 were used here. The BSI-18 had good internal consistency in our sample (Cronbach's $\alpha = .88$).

Neuro-Oncology Medical Visit Note Review

Eighty-seven participants met with their medical providers for a neuro-oncology survivorship visit on the same day as completion of their study questionnaires. For this subset, the electronic medical record for this visit was reviewed for the presence of the keywords "sleep" or "insomnia" using an electronic text search function. Subsequently, study staff manually reviewed the electronic medical records to ensure that the electronic search did not miss documentation of sleep in the note. The 11 participants who did not have survivorship visits on the same day they completed study measures did not have their records reviewed.

Statistical Analyses

We calculated descriptive statistics to describe the sample's demographic, medical, and mental health characteristics. A participant was characterized as experiencing insomnia if his/her sleep efficiency was <85% in keeping with standard practice for evaluating insomnia in behavioral interventions (Spielman et al., 1987). Participants with and without insomnia were compared across sleep-related variables, including total sleep time, difficulty with sleep onset (≥1×/week), difficulty with sleep maintenance (≥1×/week), use of sleep medication (≥1×/week), daytime somnolence (≥1×/week), and difficulty breathing during the night (≥1×/week) using chi-square and Fisher's exact tests. The relationships of insomnia to demographic, medical, and psychosocial variables were evaluated using logistic regression analyses. In these analyses, both radiation therapy and radiation therapy that included the hypothalamus were evaluated separately as binary variables (exposure/no exposure). In addition, the participants were also classified by dose of hypothalamic radiation as follows: no exposure ($n = 41$), <2,400 cGy ($n = 7$), 2,400–3,600 cGy ($n = 17$), and >3,600 cGy ($n = 33$). These different doses of hypothalamic radiations were also examined for an association with insomnia using logistic regression. Finally, we reported the rates of documentation of sleep in the medical notes of patients who completed questionnaires on the same day as their survivorship visit. Participants with missing data for a specific variable were excluded in a list-wise fashion from that particular analysis.

Results

Sleep Characteristics

Overall, participants reported sleeping an average of 7.7 h per night (range = 3.0–11.2 h; $SD = 1.4$ h), and sleep efficiency was an average of 89.3% (range = 50.0–100.0%; $SD = 10.6\%$). Of the 98 survivors in the current study, 25 (25.5% of the sample) reported a sleep efficiency <85% and were classified as having insomnia symptoms. The mean sleep efficiency of survivors with symptoms of insomnia was 74.8% ($SD = 8.2\%$), whereas survivors without insomnia symptoms had a reported mean sleep efficiency of 94.2% ($SD = 5.5\%$).

The participants with insomnia symptoms reported significantly less total sleep time (7.0 hr vs. 8.0 hr; $p < .01$), and were more likely to report having difficulty with sleep onset at least once per week (40.0% vs. 19.2%; $p = .04$; Table II). However, compared with survivors without symptoms of insomnia, survivors with insomnia symptoms did not report significantly more night or early-morning awakenings, daytime somnolence, or taking a sleep medication at least once per week ($ps > .20$). Participants with insomnia symptoms also reported significantly worse overall sleep quality on the PSQI ($p < .001$; Table II).

Correlates of Insomnia Symptoms

To examine which variables may be associated with insomnia symptoms in this sample, the 25 participants with insomnia symptoms were compared with the 73 participants without symptoms of insomnia on a variety of demographic, cancer-related, and health variables using univariate logistic regression (Table I). More females reported insomnia symptoms than males (33.3% vs. 18.9%), but this difference did not

Table II. Sleep-Related Variable Information by Presence of Insomnia Symptoms

Variable	No.	No insomnia symptoms *n* (% or *SD*)	Insomnia symptoms *n* (% or *SD*)	Statistical significance	Odds ratio
Total sleep time (hours)	98	8.0 (1.5)	7.0 (1.0)	**<0.01**	**0.65**
Sleep medication (≥1×/week)	97			0.24	
Yes	16	10 (13.9%)	6 (24.0%)		0.51
No	81	62 (86.1%)	19 (76.0%)		Ref
Daytime somnolence (≥1×/week)	96			0.5	
Yes	7	6 (8.3%)	1 (4.2%)		2.09
No	89	66 (91.6%)	19 (95.8%)		Ref
Pittsburgh sleep quality index	98				
Total score	98	4.0 (2.4)	6.7 (3.3)	**<0.001**	**0.71**
Item #5 a (cannot get to sleep within 30 min)				**0.04**	
<1×/week	74	59 (80.8%)	15 (60.0%)		Ref
≥1×/week	24	14 (19.2%)	10 (40.0%)		**0.36**
Item #5b (wake up in the middle of the night or early morning)				0.5	
<1×/week	68	52 (71.2%)	16 (64.0%)		Ref
≥1×/week	30	21 (28.8%)	9 (34.0%)		0.71
Item #5d (cannot breathe comfortably)					
<1×/week	93	70 (95.9%)	23 (92.0%)	0.45	Ref
≥1×/week	5	3 (4.1%)	2 (8.0%)		0.49

Note. Statistical significance at $p < .05$ and odds ratios that differ significantly from 1.0 are shown in bold.

reach statistical significance ($p = .10$). No other demographic variables were related with insomnia symptoms. No cancer-related variable, including cancer diagnosis, time since diagnosis, cancer recurrence, or type of treatment received (chemotherapy, radiation therapy to the central nervous system, radiation therapy involving the hypothalamus, or surgery), were significantly related with insomnia symptoms ($ps > .05$). Analyses indicated that hypothalamic radiation dosage (categorized as none, <2,400 cGy, 2,400–3,600 cGy, and >3,600 cGy) was not related to insomnia symptoms (data not shown; $p = .26$). Though having a seizure history was not associated with symptoms of insomnia, having been diagnosed with migraine headaches was significantly associated with insomnia ($p = .02$, odds ratio = 3.29). Survivors with insomnia symptoms were similar to those without insomnia symptoms across the measures of depressive symptoms and anxiety symptoms, and did not differ on the mental and physical quality of life scales ($ps > .35$) (Table I).

Medical Documentation of Sleep

Of the 98 study participants, 87 (88.8%) completed their study questionnaires the same day they met with their neuro-oncology medical provider for a survivorship visit, and 23 of these survivors were classified as having symptoms of insomnia (Figure 1). Of these 23 survivors with insomnia symptoms, 16 (69.6%) had documentation of their sleep-related issues in their medical record, which was similar to the proportion of patients without insomnia symptoms whose notes contained documentation of sleep-related issues (62.5%; $p = .53$). The sleep efficiency for participants who saw a medical provider on the same day they completed study questionnaires (mean = 88.8%) was not significantly different than those who did not see a medical provider on the same day (mean = 90.4%; $p = .46$).

Discussion

Cancer treatments that directly target a developing brain place children diagnosed with a brain tumor at significant risk for disrupted sleep. Compared with other sleep disruptions, insomnia has been a relatively understudied sleep disorder within pediatric brain tumor survivors, despite evidence to suggest that it is a common clinical disorder for this population (Rosen & Brand, 2011). In the current study, we used a clinically meaningful threshold (sleep efficiency of 85%) to (1) identify rates of insomnia symptoms; (2) examine medical, physical, and psychosocial correlates of insomnia symptoms; and (3) to describe the proportion of survivors who discussed insomnia with their oncology providers.

Approximately one of every four pediatric brain tumor survivors in our sample reported sleep efficiency <85%, poor enough to warrant clinical insomnia intervention. These survivors with poor sleep efficiency also reported poorer overall sleep quality, which exceeded an established cutoff indicating poor sleep quality (Buysse et al., 1989). The rate of insomnia symptoms is higher than reported in prior literature, which has examined survivors of pediatric brain tumors (Mandrell et al., 2012; Manley et al., 2012; Mulrooney et al., 2008; Rosen & Brand, 2011), but comparable with rates seen in other childhood cancer

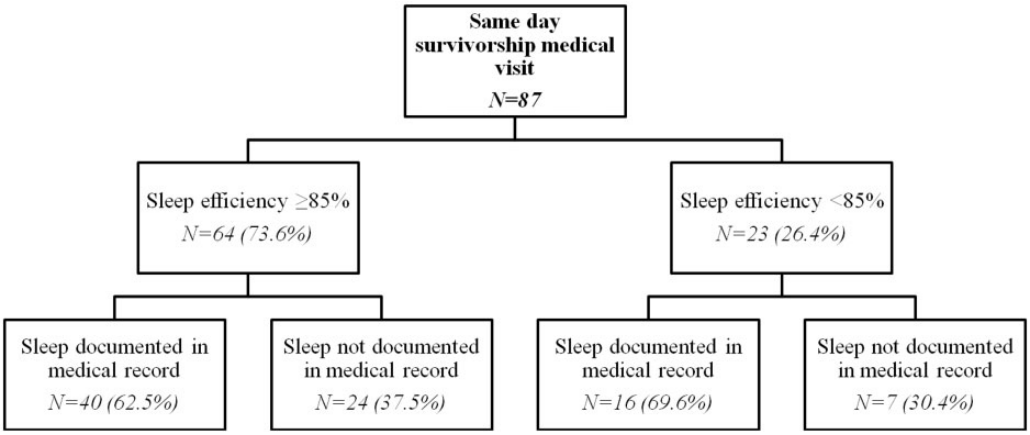

Figure 1. Medical record documentation of sleep in participants with a survivorship visit on the same day as study questionnaire completion.

survivor populations (Zhou & Recklitis, 2014) and in the general population (Ohayon & Reynolds, 2009). We hypothesize this to be the result of two factors: first, we used sleep efficiency criteria to identify symptoms of insomnia, rather than a sleep quality scale. Despite poor sleep efficiency and significantly fewer hours of total sleep, chronic insomnia sufferers may not endorse the impact of sleep disruption on sleep quality, as they may be accustomed to the sequelae of their poor sleep. Second, previous studies tended to evaluate younger patients shortly after diagnosis and treatment. Our findings may reflect the possibility that insomnia symptoms can emerge as a late-effect years after treatment has ended. Specifically, challenges with sleep onset are noted as 40.0% of those with insomnia symptoms reported difficulty with getting to sleep within 30 min at least once per week, consistent with prior literature (Nolan et al., 2013). We acknowledge that the impact of common sleep disorders in brain tumor survivors on sleep efficiency and quality (notably obstructive sleep apnea) were not part of our analyses. However, we did not see a statistically significant difference between rates of difficulty breathing during sleep when comparing those with and without insomnia symptoms on a single-item query (Table II).

We were unable to identify a relationship between insomnia symptoms with cancer-specific variables, including tumor diagnosis, recurrence, and cancer treatment type. This may be surprising, but is consistent with a previous report from the Childhood Cancer Survivor Study, which included adult survivors of a variety of childhood cancers, including pediatric brain tumors (Mulrooney et al., 2008). In a separate study examining adult survivors of pediatric brain tumors, a relationship was noted between hypothalamic radiation and sleep-onset problems, but not difficulty with sleep maintenance or overall sleep quality (Nolan et al., 2013). However, our findings did not provide evidence that radiation therapy involving the hypothalamus was associated with symptoms of insomnia. It is acknowledged that sample sizes for some of the treatment variables (e.g., diagnosis) may have impacted the lack of significant findings.

Our results do indicate that symptoms of insomnia are associated with migraine headaches. In our sample, survivors with insomnia symptoms were 3.3 times more likely to report having been diagnosed with migraine headaches. This suggests that oncology providers should be aware of the increased likelihood of insomnia in their brain tumor patients who report a history of migraine headaches. Given how frequently migraine headaches are reported by patients who have been treated for a brain tumor, this is certainly a correlate that should be further explored from both a clinical and research perspective. Because of the bidirectional nature of the relationship between sleep with migraine headaches, addressing both poor sleep and migraine headaches simultaneously will be important in improving sleep and reducing migraine frequency and intensity (Alstadhaug et al., 2007; Rains, 2008).

Both the National Sleep Foundation and National Cancer Institute recommend that patients discuss sleep problems with their medical providers (National Cancer Institute, 2013; National Sleep Foundation, 2015). However, in our sample, approximately one in three pediatric brain tumor survivors did not have sleep-related issues documented in the medical note of a neuro-oncology survivorship visit designed to address late effects of cancer treatment. While sleep efficiency is a meaningful clinical metric for insomnia symptoms because it is sensitive to core elements of insomnia disorder (i.e., difficulty with sleep onset and/or maintenance), it is not sufficient for a DSM-V diagnosis. Thus, it is imperative that the survivorship medical visit is viewed as an opportunity for a thorough assessment of sleep-related disturbances in these at-risk patients (Howell et al., 2013), as insomnia remains "under-recognized and undertreated" in cancer

populations (Dahiya, Ahluwalia, & Walia, 2013). It is promising to see that discussions about sleep are occurring in this sample more frequently than in primary care or other cancer survivorship settings (Johnson, 1999; Morin et al., 2011; Zhou & Recklitis, 2014).

Our findings highlight insomnia symptoms as a potential late effect of cancer treatment affecting a significant percentage of long-term survivors of pediatric brain tumors, many years after completion of cancer therapy. Though our results did not show insomnia symptoms to be associated with specific cancer treatments, it was associated with migraine headaches, suggesting that migraine headache history should alert providers to potential sleep disruption. Future research efforts in this at-risk population should examine larger survivor populations, and include the use of objective measures of sleep function (e.g., actigraphy). Further, it will be critical to study the natural development of insomnia symptoms (Savard, Ivers, Villa, Caplette-Gingras, & Morin, 2011) immediately following a brain tumor diagnosis so that we may better understand the extent to which the development of insomnia symptoms are directly related to cancer and its treatment. Clinically, oncology providers and cancer survivorship programs caring for survivors of pediatric brain tumors should evaluate their current screening practices for sleep disorders, and their resources for providing patient education and treatment referrals for this significant medical issue. Further, it is critical that long-term pediatric brain tumor survivors who suffer from insomnia symptoms be made aware that proven treatment options exist for both pediatric and adult populations (Garland et al., 2014; Taylor & Roane, 2010). Behavioral sleep medicine experts, including psychologists, nurses, and physicians, can play an important role in delivering evidence-based therapy for these patients who are very much in need of relief from their insomnia symptoms (Morgenthaler et al., 2006).

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