

ORIGINAL ARTICLE

Sleep beliefs and attitudes and the association with insomnia among psychiatric outpatients

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Abstract

Background: While it has been demonstrated that dysfunctional sleep beliefs can contribute to sleep disturbances, less is known about it in psychiatric patients and the role these beliefs play in influencing sleep.

Aims: To examine maladaptive sleep cognition among psychiatric patients and to assess its association with insomnia.

Method: Participants were outpatients ($n = 400$) recruited from a tertiary psychiatric hospital. The Dysfunctional Beliefs and Attitudes about Sleep (DBAS-16) scale was administered to examine sleep-related cognitions in different domains. Clinical insomnia was assessed using the Insomnia Severity Index. Factors associated with DBAS were explored using linear regression and the association between DBAS scores and insomnia was tested using logistic regression.

Results: Among psychiatric patients, factors associated with the DBAS domains were ethnicity, educational attainment, psychiatric comorbidity, and consumption of sleep medication. Higher dysfunctional sleep beliefs were associated with insomnia. The association was particularly prominent in the mood disorder diagnostic group.

Conclusions: Dysfunctional sleep beliefs were associated with insomnia among psychiatric patients. Addressing these maladaptive cognitions is critical in alleviating sleep problems in psychiatric patients.

Keywords

Sleep cognition, sleep beliefs, DBAS, psychiatric patients

History

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Introduction

Insomnia is highly prevalent among patients with psychiatric disorders and is a symptom of major depressive disorder, dysthymia, generalized anxiety disorder, and posttraumatic stress disorder (American Psychiatric Association, 2000). It is one of the early warning signs of a number of psychiatric disorders and a potential precipitant of relapse in an array of psychopathologies and thus it deserves more in-depth analyses among psychiatric patients.

Many studies have revealed the importance of dysfunctional sleep beliefs in the maintenance of insomnia (Fins et al., 1996; Morin et al., 1993; Van Egeren et al., 1983). These studies found that those with insomnia (a) are less realistic than good sleepers about the amount of sleep they require, (b) strongly support statements regarding the negative

consequences of insomnia, and (c) have a higher likelihood of attributing poor sleep to external, stable causes. Cognitive models also suggest that individuals with insomnia tend to be overly worried about their sleep and about the daytime consequences of not getting enough sleep (Harvey, 2002). This triggers anxiety and attentional processes that cause the individual to selectively focus on and monitor internal and external sleep-related threat cues, and develop dysfunctional sleep beliefs. Furthermore, negative cognitive and behavioural processes in the form of worry and rumination are present in a range of psychiatric conditions such as psychotic disorder, depression, and generalized anxiety disorder (Harvey, 2004). Thus, maladaptive sleep beliefs, as a manifestation of excessive worries about sleep, are likely to be present across a range of psychiatric conditions.

The Dysfunctional Beliefs and Attitudes about Sleep (DBAS) scale is the most widely used validated measure to assess sleep-disruptive cognitions (Morin et al., 2007). There is a substantial amount of literature supporting the effect of dysfunctional sleep cognitions on sleep quality (Carney et al., 2007, 2010; Edinger et al., 2000; Tang et al., 2012; Yang et al., 2011). However, most research generated from the DBAS is on community or clinical samples of insomnia with exclusion criteria that eliminate patients with psychiatric

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conditions. There has been little research on subjective sleep experiences and beliefs among patients with various psychiatric disorders. To the best of our knowledge, a study by Huthwaite et al. (2014) was the only study that explored subjective sleep experiences among patients with a range of psychiatric disorders and looked into dysfunctional sleep beliefs. Therefore to address the gaps in sleep literature, this study aimed to gain insights into dysfunctional sleep beliefs among psychiatric patients by exploring sociodemographic and clinical factors which are associated with dysfunctional sleep beliefs, and examining the associations between these beliefs and insomnia among psychiatric patients. Further analysis was conducted to explore potential differences in the associations between sleep beliefs and insomnia across diagnostic groups.

Methods

Participants and procedures

Participants for this research study were outpatients seeking treatment at the Institute of Mental Health, a tertiary psychiatric hospital in Singapore. A total of 400 participants primarily diagnosed with either mood disorder ($n = 180$; major depression and bipolar disorder), anxiety disorder ($n = 100$; obsessive compulsive disorder, generalized anxiety disorder, panic disorder, and posttraumatic stress disorder), or schizophrenia spectrum disorder ($n = 120$) were recruited for the study. The inclusion criteria consist of participants being diagnosed with any of the psychiatric disorders mentioned above and being able to complete a questionnaire in English. Participants provided written informed consent for their research participation and completed the questionnaire assessing their sleep quality, attitudes and beliefs regarding sleep, and sociodemographic information. Clinical profiles of the participants were obtained through their electronic medical records. Participants received an inconvenience fee after completion of the questionnaire. The study was approved by the institutional ethics committee (i.e. National Healthcare Group Domain Specific Review Board, Singapore).

Measures

The abbreviated version of the DBAS-16 scale was administered to examine sleep-related cognitions (Morin et al., 2007). It assesses attitudes and beliefs regarding sleep in four different domains: perceived *consequences* of insomnia, *worry and helplessness* about sleep, *sleep expectations*, and *sleep medications*. The *consequences* domain explores exaggerated perceived outcomes of sleep disturbance (e.g. ‘‘Without an adequate night’s sleep, I can hardly function the next day’’). *Worry and helplessness* domain addresses beliefs pertaining to concerns about poor sleep and the lack of ability to change the situation (e.g. ‘‘I am worried that I may lose control over my ability to sleep’’). *Expectations* domain highlights unrealistic sleep expectations (e.g. ‘‘I need 8 hours of sleep to feel refreshed and function well during the day’’), and the *medication* domain examines the perceived efficacy and preference for use of sleep medication as a solution to poor sleep (e.g. ‘‘Medication is probably the only solution to sleeplessness’’). Participants read each of the 16 statements

and rated their level of agreement on a scale of 1 (*strongly disagree*) to 10 (*strongly agree*). No cut-off score was used to determine the dysfunctionality of sleep because it is not simply the presence of cognitions measured on the scale that defines dysfunction, or vice versa. Rather, it is the strength and flexibility at which participants endorse these beliefs that reflect their levels of maladaptation. A higher DBAS total score indicates stronger endorsement and higher levels of maladaptive sleep cognitions. An exploratory factor analysis (EFA) using principal axis factoring was conducted to examine the factor structure of the DBAS-16 instrument on a random half of the sample ($n = 200$). The Kaiser–Meyer–Olkin measure of sampling adequacy was 0.87 and Bartlett’s test of sphericity was significant, $\chi^2(120) = 1194.6, p < 0.001$, thus suggesting that the data is suitable for factor models. The initial eigenvalues from the EFA results suggested a four-factor structure which was similar to the one proposed by Morin et al. (2007), but with some differences in factor loadings. The EFA results suggested that 1 item (Item 13; see Morin et al., 2007) should be removed as it did not load onto any of the factors based on a factor loading cut-off of 0.40. There were cross-loadings on 3 of the items (Items 5, 8, and 11 cross-loaded on Factor 1 and Factor 2) and they were retained in the factor with the higher loading for subsequent analysis. A confirmatory factor analysis (CFA) was then conducted using the factor structure and items loadings as suggested by the results from the EFA. The CFA was run using SPSS AMOS version 21.0 (Chicago) (Arbuckle, 2012) on the remaining half of the sample ($n = 200$). A comparative fit index of 0.901 was obtained. The factors were labelled as with the original scale: perceived *consequences* of insomnia (Items 7, 8, 9, 12, 14, and 16), *worry and helplessness* about sleep (Items 3, 4, 5, 10 and 11), *sleep expectations* (Items 1 and 2), and *sleep medications* (Items 6 and 15). Domain scores were calculated by taking the means of the items in each domain, and total DBAS score was obtained from the mean of the 15 items. Internal consistency of the items was tested using Cronbach’s alpha and the following values were obtained for this study sample: DBAS total $\alpha = 0.90$ (15 items), *consequences* $\alpha = 0.87$ (6 items), *worry and helplessness* $\alpha = 0.80$ (5 items), *expectations* $\alpha = 0.68$ (2 items), and *medications* $\alpha = 0.63$ (2 items).

The Insomnia Severity Index (ISI) is a brief screening instrument to assess the severity of insomnia (Bastien et al., 2001). There are 7 items in the scale that examine insomnia symptoms, degree of satisfaction with sleep, visibility of impairment due to insomnia, distress and daytime interference on a scale of 0–4. A total score is obtained by summing across the 7 items, with higher scores indicating greater insomnia severity. Scoring between 0–7 is interpreted as having no clinically significant insomnia, 8–14 as subthreshold insomnia, 15–21 as clinical insomnia with moderate severity, and 22–28 as severe clinical insomnia. A cut-off score of 15 is used in this study to identify participants with clinical insomnia.

Sociodemographic information including age, gender, ethnicity, educational attainment, and employment status was collected. Clinical characteristics of the participants such as the presence of psychiatric comorbidity (co-occurrence of two or more psychiatric diagnoses), comorbidity with chronic physical conditions, duration of mental illness, and use of

sleep medication were obtained from medical records. For the purpose of this study, medications for sleep problems included diazepam, lorazepam, alprazolam (xanax), zolpidem tartrate, zopiclone, and hydroxyzine (atarax). All instruments in this study were administered in English.

Statistical analysis

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 23 (Armonk, NY). Descriptive statistics was used to describe the sample characteristics by assessing the frequencies of sociodemographic and clinical variables. To explore factors associated with sleep beliefs, linear regression was run using DBAS total score as outcome variable and sociodemographic and clinical variables as independent variables in the regression model. Variables included in the analysis were age group, gender, ethnicity, educational attainment, employment status, diagnosis, duration of illness, presence of psychiatric comorbidity, presence of chronic physical condition, and use of sleep medication. Next, to examine the association between sleep beliefs and insomnia in psychiatric patients, participants were grouped into two categories using the ISI cut-off score: individuals scoring 15 and above were defined as those with insomnia. Multivariable logistic regression was used to examine the independent association between sleep beliefs and insomnia. In the unadjusted regression model, insomnia status was treated as a binary outcome variable, and DBAS domain and total scores were added as independent variables. Subsequent regression models controlled for potential confounders by including sociodemographic variables (i.e. age group, gender, ethnicity, educational attainment, and employment status in Model 1), and sociodemographic and clinical variables (i.e. diagnosis, duration of illness, presence of psychiatric comorbidity, presence of chronic physical condition, and use of sleep medication in Model 2) concurrently. For DBAS domains which were significantly associated with insomnia, subgroup analyses of psychiatric diagnostic groups (mood disorders, anxiety disorders, and schizophrenia spectrum disorders) were additionally conducted using multivariable logistic regression to examine the independent effects of sleep cognitions on insomnia outcomes. All statistically significant results are reported at p value ≤ 0.05 .

Results

Sample characteristics

Table 1 shows the profile of the sample recruited for this study. Majority of the participants were within the age group of 21–39 years old (55.0%), male (52.5%), and of Chinese ethnicity (37.8%). Most of the participants had attained post-secondary to pre-university level of education (41.0%) and were employed (54.8%). A large majority of the participants had been diagnosed with their primary psychiatric condition for more than 5 years (65.8%).

The following mean scores (SD) for sleep cognitions were obtained in this study sample: *consequences* 6.04 (2.27), *worry and helplessness* 6.51 (2.35), *expectations* 7.24 (2.35), *medications* 5.31 (2.80), and DBAS total 6.26 (1.90).

Scores from the ISI revealed that 137 participants did not have insomnia (34.3%), 121 had subthreshold insomnia (30.3%), 100 had clinical insomnia of moderate severity (25.0%), and 42 had severe clinical insomnia (10.5%). Using the ISI cut-off score, 142 participants (35.5%) were found to have clinical insomnia in this study.

Factors associated with dysfunctional sleep beliefs

Sociodemographic and clinical factors associated with dysfunctional sleep beliefs are presented in Table 2. Participants of Indian and other ethnicities had lower maladaptive sleep cognitions as compared to those of Chinese ethnicity ($\beta = -0.460$, $p = 0.036$). Having primary ($\beta = 0.901$, $p = 0.048$) educational attainment as compared to tertiary educational attainment was associated with higher DBAS total score. Psychiatric comorbidity ($\beta = 0.569$, $p = 0.004$) and the use of sleep medication ($\beta = 0.493$, $p = 0.014$) were associated with higher DBAS total scores.

Association between sleep beliefs and insomnia

At the univariate level, individuals with insomnia had significantly higher DBAS total scores and *consequence*, *worry and helplessness*, and *medication* domain scores (unadjusted model in Table 3, $p < 0.001$). The associations remained significant after controlling for sociodemographic and clinical variables (Model 1 and Model 2). Results from the logistic regression showed that every unit increase in DBAS scores was significantly associated with greater odds of having insomnia (OR = 1.161–1.599, $p < 0.01$; Model 2).

Subgroup analysis of associations by diagnostic groups

The association between sleep-related cognitions and insomnia were tested again within each diagnostic group and the results are presented in Table 4. Among participants with mood disorders, those with higher *consequences* domain score (OR = 1.456, $p < 0.001$), higher *worry and helplessness* domain score (OR = 1.707, $p < 0.001$), higher *medications* domain score (OR = 1.211, $p = 0.007$), and higher DBAS total score (OR = 1.647, $p < 0.001$) had greater odds of having insomnia. Similar findings were observed in the schizophrenia diagnostic group, with the exception of *medications* score not being significantly associated with insomnia. Among participants with anxiety disorders, neither the domain scores nor the total DBAS score were significantly associated with insomnia.

Discussion

This study was conducted to explore factors associated with sleep-related cognitions among psychiatric patients and to assess the association of these cognitions with insomnia.

Factors associated with sleep beliefs

Several sociodemographic and clinical factors were found to be associated with maladaptive sleep cognitions including ethnicity, educational attainment, the use of sleep medication, and the presence of psychiatric comorbidity. Psychiatric patients with lower educational attainment were found to have

Table 1. Sociodemographic and clinical characteristics of sample ($n = 400$).

	<i>n</i>	%
Age group		
21–39	220	55.0
40–65	180	45.0
Gender		
Male	210	52.5
Female	190	47.5
Ethnicity		
Malay	105	26.3
Indian and Others	144	36.0
Chinese	151	37.8
Educational attainment		
Primary or below	28	7.0
Secondary	154	38.5
Post-secondary to pre-university	164	41.0
Tertiary and above	54	13.5
Employment status		
Employed	219	54.8
Economically inactive	28	7.0
Unemployed	152	38.0
Diagnosis		
Schizophrenia spectrum disorder	120	30.0
Mood disorder	180	45.0
Anxiety disorder	100	25.0
Duration of illness		
<2 years	61	15.3
2–5 years	76	19.0
>5 years	263	65.8
Any psychiatric comorbidity		
Yes	188	46.8
No	212	53.3
Any other chronic medical condition		
Yes	236	59.0
No	164	41.0
Sleep medication		
Yes	140	35.0
No	260	65.0

higher DBAS score than those with higher educational attainment. For instance, our findings showed that individuals with primary educational attainment obtained a higher DBAS total score than those with tertiary educational attainment by a score of 0.901. The higher scores indicate greater rigidity in sleep cognitions that could have contributed to poorer sleep outcomes. Given past studies' findings that higher educational attainment is consistently associated with better sleep and this effect of education is relatively robust (Friedman et al., 2007; Grandner et al., 2010; Hale, 2005), the association found in the present study could be possibly explained by the increased literacy levels accompanying higher education levels, allowing more knowledge to be acquired regarding sleep-promoting habits and rational sleep beliefs. Higher education may also indicate greater ability and empowerment to dispel less warranted concerns about sleeplessness.

Patients with comorbid psychiatric diagnoses endorsed stronger maladaptive sleep beliefs than those without a comorbid psychiatric condition. Having comorbid psychiatric condition could be associated with more behavioural symptoms, which may in turn cause patients to be more concerned about sleep disturbances that accompany these symptoms. For example, among individuals with anxiety disorders, it was reported that having a comorbid condition was associated with greater symptom severity (Kaufman & Charney, 2000; Mennin et al., 2000). Thus, higher levels of anxiety and worry

could affect individual's perception of one's control over sleep and the consequences of poor sleep, leading to stronger endorsement of dysfunctional sleep beliefs.

Being on sleep medication was associated with higher dysfunctional sleep beliefs among psychiatric patients. A similar finding was reported by Huthwaite et al. (2014) where psychiatric patients taking hypnotic had significantly higher *expectations* domain score than those not on medication. With patients taking sleep medication having a higher DBAS total score, they had greater worries about sleep disturbances and their consequences, and were more likely to strongly endorse items such as "Medication is probably the only solution to sleeplessness" and "[...] I am better off taking a sleeping pill rather than having a poor night's sleep" than those who were not on sleep medication. Thus, it can be largely inferred that those patients on sleep medication in this study had stronger beliefs of the efficacy of drugs to promote sleep. Strong endorsement of these items also suggests an overly rigid belief in the use of sleep medication as the sole solution to improve sleep quality. It is thus important to monitor this group of patients and to teach them alternative solutions to manage their sleep disturbances.

Association between sleep beliefs and insomnia

Consistent with past literature and cognitive models (Carney et al., 2010; Edinger et al., 2000; Harvey, 2002; Jansson-Frojmark & Linton, 2008; Jansson & Linton, 2007; Morin et al., 1993), this study provides evidence of the role maladaptive cognitions may play in insomnia. Findings from this study expand on those of previous studies conducted on non-clinical samples and showed that maladaptive sleep cognitions also contribute to poor sleep among psychiatric outpatients. It reveals that even when clinical characteristics such as psychiatric diagnosis, duration of illness, and comorbidities were controlled for, higher levels of dysfunctional sleep cognitions were significantly associated with insomnia among psychiatric patients in general. This result highlights the possible contributory effect of maladaptive sleep cognitions on insomnia, above and beyond the impact of psychiatric symptoms on insomnia. This finding adds to the limited existing sleep literature analyzing study sample with various psychiatric conditions and clinical profiles, by providing evidence of the role maladaptive cognition plays in sleep disturbances across these clinical groups.

While it may be concluded that insomnia is influenced by sleep-related cognitions in a general psychiatric population, interesting findings emerged when subgroup analyses of diagnostic groups were conducted. Overall, findings from this study suggest that dysfunctional sleep beliefs were associated with insomnia most considerably among patients with mood disorders and schizophrenia spectrum disorders, and not among patients with anxiety disorders. Given that chronic worry is a central feature of anxiety disorders and sleep disturbance is listed as a diagnostic criteria in these disorders (American Psychiatric Association, 2000), we might expect these individuals to be excessively worried about potential sleep dysfunction. However, neither the domain scores nor the total scores were associated with insomnia among patients with anxiety disorders. It is difficult to account for such

Table 2. Adjusted β estimates of sociodemographic and clinical variables associated with DBAS total scores ($n = 400$).

	<i>B</i>	95% CI ^a	<i>p</i>
Age group			
21–39	0.263	[–0.155, 0.681]	0.217
40–65	Ref.		
Gender			
Male	0.071	[–0.155, 0.681]	0.709
Female	Ref.		
Ethnicity			
Malay	–0.462	[–0.939, 0.015]	0.058
Indian and Others	–0.460	[–0.891, –0.030]	0.036
Chinese	Ref.		
Educational attainment			
Primary or below	0.901	[0.007, 1.795]	0.048
Secondary	0.505	[–0.094, 1.103]	0.098
Post-secondary to pre-university	0.180	[–0.406, 0.767]	0.546
Tertiary and above	Ref.		
Employment status			
Employed	0.107	[–0.293, 0.506]	0.599
Economically inactive	–0.172	[–0.940, 0.597]	0.661
Unemployed	Ref.		
Diagnosis			
Schizophrenia spectrum disorder	0.111	[–0.419, 0.641]	0.680
Mood disorder	0.455	[–0.013, 0.924]	0.057
Anxiety disorder	Ref.		
Duration of illness			
<2 years	Ref.		
2–5 years	–0.089	[–0.730, 0.553]	0.786
>5 years	–0.250	[–0.808, 0.307]	0.378
Any psychiatric comorbidity			
Yes	0.569	[0.188, 0.950]	0.004
No	Ref.		
Any other chronic medical condition			
Yes	–0.211	[–0.593, 0.171]	0.278
No	Ref.		
Sleep medication			
Yes	0.493	[0.098, 0.887]	0.014
No	Ref.		

^aThe confidence interval (CI) indicates the interval which one can be 95% confident that the true β lies in that interval.

Table 3. Unadjusted and adjusted odds ratios (OR) representing results of the logistic regression to examine the associations between insomnia and DBAS scores ($n = 400$).

	Consequences		Worry and helplessness		Expectations		Medications		DBAS total	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Unadjusted model	1.419**	[1.274, 1.581]	1.564**	[1.383, 1.768]	1.039	[0.951, 1.135]	1.194**	[1.105, 1.290]	1.595**	[1.393, 1.826]
Model 1 ^a	1.433**	[1.280, 1.605]	1.601**	[1.407, 1.821]	1.042	[0.950, 1.143]	1.209**	[1.115, 1.311]	1.627**	[1.411, 1.876]
Model 2 ^b	1.429**	[1.262, 1.619]	1.587**	[1.381, 1.824]	1.072	[0.966, 1.189]	1.161*	[1.062, 1.270]	1.599**	[1.372, 1.863]

CI = confidence interval. The confidence interval indicates the interval which one can be 95% confident that the true OR lies in that interval. Statistically significant results are in bold; * $p < 0.01$. ** $p < 0.001$.

^aAdjusted for sociodemographic variables (i.e. age group, gender, ethnicity, educational attainment, and employment status).

^bAdjusted for sociodemographic variables and clinical variables (i.e. diagnosis, duration of illness, presence of psychiatric comorbidity, presence of chronic physical condition, and use of sleep medication).

differences in the associations between insomnia and sleep beliefs across diagnostic groups. It is plausible that insomnia in patients with anxiety disorder was influenced more by sociodemographic or clinical factors such as aspects of their psychiatric condition, rather than by maladaptive sleep cognitions. Future studies may seek to use qualitative methods to further explore the specific content of sleep beliefs in order to further understand how it contributes to insomnia across different diagnostic groups.

This study found that a significant proportion of psychiatric patients (35.5%) met criteria for ISI defined clinical insomnia. It is necessary to address these concerns given the critical role sleep disturbances plays on the trajectory of mental illness. Cognitive behavioural therapy for insomnia (CBT-I) includes a component to target maladaptive cognitions associated with poor sleep. Several studies have shown that a reduction in scores of maladaptive sleep beliefs predicted better treatment outcomes following CBT-I, which

Table 4. Adjusted odd ratios representing the association between insomnia and sleep beliefs within each diagnostic group.

	Mood disorders (n = 180)			Schizophrenia spectrum disorders (n = 120)			Anxiety disorders (n = 100)		
	OR	p	95% CI	OR	p	95% CI	OR	p	95% CI
Consequences	1.456	<0.001	[1.198, 1.769]	1.721	<0.001	[1.269, 2.334]	1.201	0.217	[0.898, 1.605]
Worry and helplessness	1.707	<0.001	[1.361, 2.140]	1.765	<0.001	[1.305, 2.387]	1.342	0.091	[0.954, 1.887]
Medications	1.211	0.007	[1.055, 1.390]	1.093	0.411	[0.884, 1.351]	1.032	0.770	[0.833, 1.279]
DBAS total	1.647	<0.001	[1.305, 2.080]	1.960	0.001	[1.341, 2.864]	1.243	0.248	[0.859, 1.798]

Multivariable logistic regression with DBAS scores as independent variables and insomnia status as outcome variable, controlling for sociodemographic and clinical variables. Statistically significant results are in bold.

included the alleviation of insomnia symptoms and the maintenance of more long-term sleep improvements among psychiatric patients (Dolan et al., 2010). Findings from this study suggest that such treatments could be modified to better target patients with lower education, psychiatric comorbidity or those who were on sleep medication across the three diagnostic groups studied, given these groups' higher endorsement of dysfunctional sleep beliefs. In particular, for patients on sleep medication, it may be necessary to place greater emphasis on addressing rigid beliefs regarding the perceived effectiveness of hypnotic drugs in improving sleep quality. In fact, a randomized control trial found that long-term sleep outcomes were optimized when hypnotic medication was subsequently withdrawn from a combinatory therapy of CBT and medication in patients with chronic insomnia (Morin et al., 2009).

The interpretation of our results should be done in the light of the following limitations. The cross-sectional nature of this study design poses constraints in establishing a causal relationship between dysfunctional sleep beliefs and insomnia. According to Harvey (2002), maladaptive sleep beliefs may lead to actual sleep deficit, and predispose patients to poor sleep. However, it is also plausible that in psychiatric patients, insomnia as a psychiatric symptom may trigger anxiety that cascades into dysfunctional sleep-related cognitions. In addition, as this study sample consisted of only outpatients, the generalizability of our findings might be limited when it comes to inpatient psychiatric patients, who may suffer from more severe conditions. Antipsychotic drugs and antidepressants which were prescribed to treat the participants were not assessed in this study and may have an impact on the patient's sleep outcomes. Notwithstanding the aforementioned limitations, the strengths of the present study lie in the relatively large study sample comprising psychiatric patients with various mental illnesses. This allowed a comparison of sleep-related cognitions across patient types and an examination of the differences that may exist between them. The validity of our findings is enhanced with the establishment of clinical diagnoses of psychiatric and physical conditions from medical records, instead of self-reported measures commonly utilized by other studies.

In conclusion, the present study explored patient profiles across diagnostic categories and identified several socio-economic and clinical factors that were associated with maladaptive sleep beliefs: ethnicity, educational attainment, psychiatric comorbidity, and consumption of sleep medication. It was also found that these dysfunctional sleep beliefs were associated with insomnia in psychiatric patients. The

findings of this study highlight the need to place greater emphasis on countering dysfunctional sleep beliefs for patients of various clinical profiles to address their sleep concerns.

Declaration of interest

All authors did not receive financial support for this work and have no conflict of interest to declare.

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