Received: 23 August 2023 | Revised: 24 August 2023 | Accepted: 25 August 2023

DOI: 10.1111/jsr.14041

REVIEW ARTICLE

Cognitive behavioural therapy for insomnia in inpatient psychiatric care: a systematic review

Carlotta L Schneider[1] | Elisabeth Hertenstein[1,2] | Christoph Nissen[2,3]

[1]University Hospital of Psychiatry and Psychotherapy, University of Bern, Bern, Switzerland

[2]Department of Psychiatry, Faculty of Medicine, University of Geneva, Geneva, Switzerland

[3]Division of Psychiatric Specialties, Department of Psychiatry, Geneva University Hospitals (HUG), Geneva, Switzerland

Correspondence
Christoph Nissen, Department of Psychiatry, Geneva University Hospitals (HUG), 1201 Geneva, Switzerland.
Email: christoph.nissen@hcuge.ch

Funding information
University of Geneva

Summary

Insomnia is highly prevalent among patients with psychiatric disorders. According to current guidelines, cognitive behavioural therapy for insomnia (CBT-I) represents the first-line treatment for chronic insomnia, also for patients with psychiatric comorbidity. While recent studies have demonstrated that CBT-I not only improves insomnia but also other health outcomes in patients with psychiatric disorders and comorbid insomnia in *outpatient* settings, the level of implementation and treatment potential of CBT-I in *inpatient* psychiatry is less clear. The objective of this systematic review is to present and discuss studies that have adapted CBT-I for inpatient psychiatric care. PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PsycINFO, were searched until June 2023. A total of 10 studies were identified, with the majority being non-randomised trials without comparison groups and small sample sizes. With preliminary character, studies report feasibility and potential efficacy in inpatient settings. Together, this review identifies a paucity of studies on CBT-I or derivates in inpatient psychiatry. Despite challenging in this setting, studies adapting CBT-I to the needs of severely ill patients and hospital settings might have the potential to improve mental health care.

KEYWORDS
CBT-I, inpatient, insomnia, psychiatry

1 | INTRODUCTION

Sleep and psychiatric disorders are interrelated. Work over the past decades demonstrates that insomnia occurs across diagnostic entities (transdiagnostically) and is not merely a symptom that emerges and remits with the mental disorder. Instead, insomnia can precede, co-occur with, and persist after remission of a mental disorder episode and represents a risk factor for unfavourable outcome at each of these stages (Hertenstein et al., 2019; Riemann et al., 2017).

Importantly, cognitive behavioural therapy for insomnia (CBT-I), the first-line treatment according to current guidelines (Riemann et al., 2017) can not only improve insomnia but also symptoms of the mental disorder (Hertenstein et al., 2019). The link between insomnia and mental health outcomes, as well as the potential of insomnia treatment to improve mental health, has led to a reconsideration of insomnia. This has resulted in a transition from a symptom-level understanding to a diagnosis-level approach in recent revisions of diagnostic systems (comorbidity principle) (American Psychiatric Association, 2013; ICD-10, 1993).

To date, many studies have demonstrated the efficacy of CBT-I within various *outpatient* settings in psychiatry, summarised in meta-analyses (Hertenstein et al., 2022) and guidelines (Riemann et al., 2017). However, the level of implementation and treatment potential of CBT-I in *inpatient* psychiatry is less clear.

The specific aim of this work is to provide a systematic review summarising and evaluating all types of studies that implemented CBT-I or adaptations within *inpatient* settings in psychiatry. This is of particular interest for two reasons. First, the inpatient setting offers the opportunity to reach patients with severe and complex disorders, often excluded from outpatient trials. Second, inpatient care paves the way for further outpatient treatment, also impacting treatment expectation of patients. Particularly, successful implementation of CBT-I or adaptations in inpatient settings might have the potential to counteract the overprescription of hypnotics that is connected to the risk of tolerance and dependency.

2 | METHODS

The present work was performed in accordance with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Hutton et al., 2015). The protocol for the systematic review was pre-registered in the International Prospective Register of Systematic Reviews (PROSPERO) database (identifier: CRD42023391394).

2.1 | Search strategy

The literature search was performed using the databases PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PsycINFO. The primary search was conducted without limits for publication date until June 15, 2023. The following term was searched for in the abstract or title: (behavioural AND therapy OR treatment) AND (insomnia) AND (mental OR psychiatric) AND (inpatient).

2.2 | Study selection

Eligible for the present work were all types of studies written in English, German or French that investigated CBT-I or derivatives within the acute inpatient setting of a psychiatric hospital. More specifically, the following inclusion criteria were applied:

P = participants: participants aged ≥18 years at baseline, admitted to an acute inpatient setting of a psychiatric hospital with a mental disorder and insomnia.
I = intervention: CBT-I or derivate.
C = comparator: no restriction.
O = Outcome: effect on insomnia and mental disorder.
T = type: any type of trial.

The first author (CLS) performed the literature search and screened all titles and abstracts. Two authors (CLS and EH) screened full texts of potentially eligible studies against inclusion criteria. Doubts were discussed together with the last author (CN) and resolved through decision by consensus.

2.3 | Data extraction

The following variables were manually extracted by the first author (CLS) from all included studies: title, author, year, study type, information on the population, the definition/assessment of insomnia, CBT-I components tested, outcome, follow-up, quality assessment and main findings.

3 | RESULTS

3.1 | Study selection

A total of 403 abstracts were identified through our literature search. The search flow is presented in Figure 1. A total of 344 abstracts were screened after removing duplicates and 13 potentially eligible full texts remained and were assessed for eligibility. Finally, 10 studies met our inclusion criteria and were included in this systematic review.

3.2 | Study characteristics

A total of 10 of the included studies were reviewed (Table 1). The included studies comprise one case study (Morin et al., 1990), non-randomised pre–post-test studies without control group (Biancosino et al., 2006; Crönlein et al., 2014; Haynes et al., 2011; Laguna-Parras et al., 2013; Schneider et al., 2020; Tan et al., 1987), one non-randomised study with control group (de Niet et al., 2010), one propensity score-matched outcome study (Hsu et al., 2015), and only one randomised controlled trial (RCT; Sheaves et al., 2018).

3.3 | Patient characteristics

All research groups tested their intervention within an inpatient setting. The majority of studies applied their intervention transdiagnostically, not limiting their sample to patients with a specific diagnosis (Biancosino et al., 2006; de Niet et al., 2010; Haynes et al., 2011; Laguna-Parras et al., 2013; Schneider et al., 2020; Sheaves et al., 2018; Tan et al., 1987). Two groups limited the intervention to patients diagnosed with affective mental disorders (Hsu et al., 2015; Morin et al., 1990). Reasoning behind a focus on patients diagnosed with an affective disorder was not further specified and listed as a limitation (Hsu et al., 2015). Crönlein et al. (2014) tested their programme on a psychiatric ward in a sample of patients diagnosed with primary insomnia without major comorbidity.

3.4 | Time points

The majority of the investigations presented more than two assessment time-points including follow-up assessments. Tan et al. (1987)

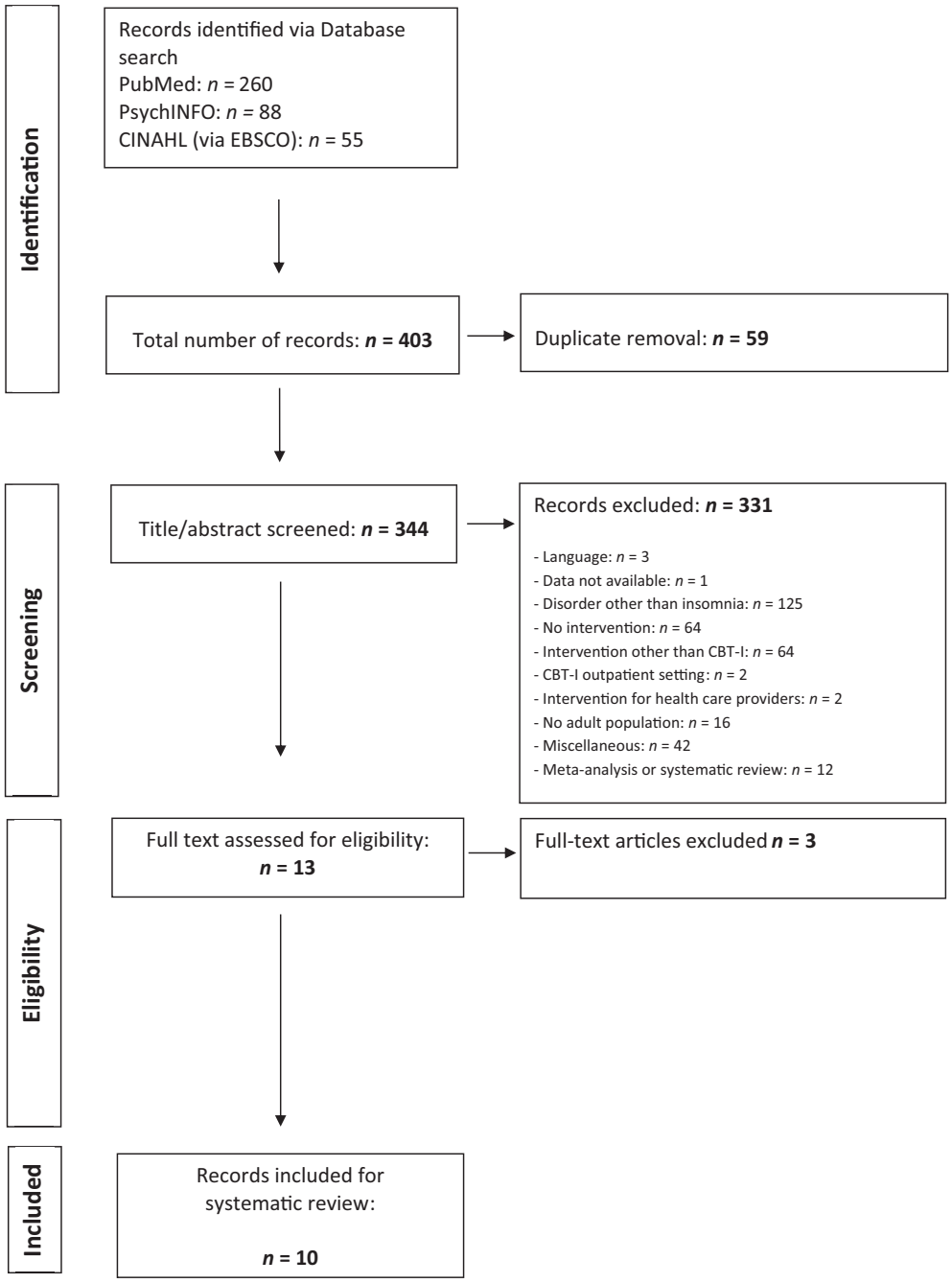

FIGURE 1 Flow of the study search. CBT-I, cognitive behavioural therapy for insomnia.

assessed at admission, discharge and 6-month follow-up. Morin et al. (1990) at admission and 4-month follow-up. Biancosino et al. (2006) tested at baseline 2 weeks prior to the start of intervention, 1 day prior, 15 days and 3 months after the last session. Crönlein et al. (2014) tested at baseline and 6-month follow-up. Hsu et al. (2015) tested 1 week prior to the start, upon completion of the 6-week intervention, and 1-month follow-up. Sheaves et al. (2018) tested before the start, and at 2, 4 and 12 weeks after the start of the intervention. Four studies assessed pre- and post-intervention or at discharge without longer follow-up assessment (de Niet et al., 2010; Haynes et al., 2011; Laguna-Parras et al., 2013; Schneider et al., 2020).

3.5 | Treatment components

All studies applied at least one of the treatment components of CBT-I. Three studies included all CBT-I components, namely (a) education about CBT-I, (b) managing stress and restructuring cognitions that interfere with sleep, (c) psychoeducation about sleep and sleep hygiene, (d) stimulus control treatment and sleep restriction treatment, and (e) relaxation training (Crönlein et al., 2014; Hsu et al., 2015; Sheaves et al., 2018). Two used classical modules of CBT-I including monitored and regularised sleep schedules but did not include sleep restriction therapy (Haynes et al., 2011; Tan et al., 1987). Biancosino et al. (2006) applied stimulus control and

TABLE 1 Details of the 10 included studies.

Reference	Title	Research group/ affiliation	Type of trial	Setting	Randomisation	Allocation	Blinding	Comparators	Sample size (*n*) control group treatment start	Sample size (*n*) control group treatment evaluation	Sample size (*n*) intervention group treatment start	Sample size (*n*) intervention group treatment evaluation	Participants age, years, mean (range)
Tan et al. (1987)	Inpatient multidimensional management of treatment-resistant insomnia	Soldatos/ Hershey, Penn State, USA	Pilot study	Inpatient psychiatric unit	N/A	N/A	N/A	N/A ('Given that previous outpatient therapeutic measures had failed, patients served as their own controls')	N/A	N/A	20	16	55.1 (18–71)
Morin et al. (1990)	Sleep restriction for the inpatient treatment of insomnia	Morin/Richmond, Virginia, USA	Case Report	Inpatient psychiatric unit	N/A	N/A	N/A	N/A	N/A	N/A	1	1	49
Biancosino et al. (2006)	Efficacy of a short-term psychoeducational intervention for persistent non-organic insomnia in severely mentally ill patients: A pilot study	Grassi/Ferrara, Italy	Pilot study	Residential psychiatric unit	N/A	N/A	N/A	N/A	N/A	N/A	36	36	47.4 (SD 12.6; 21–69)
de Niet et al. (2010)	Can mental healthcare nurses improve sleep quality for inpatients?	Hutschemaekers/ Radboud University Nijmegen, Netherlands	Pilot study	Inpatient psychiatric unit	N/A	Not specified	N/A	Yes (different comparable wards)	Total of 72 patients started across three comparable wards (the third ward testing MAR, excluded for this review)	14	Total of 72 patients started across three comparable wards (the third ward testing MAR, excluded for this review)	29	(18–60)
Haynes et al. (2011)	Examination of insomnia and insomnia treatment in psychiatric inpatients	Bootzin/Tucson Arizona, USA	Pre–post-test study/ retrospective chart review	26-bed psychiatric ward	N/A	N/A	N/A	N/A	N/A	N/A	76	19	51.6 (SD 12.3)
Laguna-Parras et al. (2013)	Effectiveness of the 'sleep enhancement' nursing intervention in hospitalised mental health patients.	Nogales-Vargas-Machuca/ Jaen, Spain	Quasi-experimental pre–post-test study without control group	Mental health inpatient unit	N/A	N/A	OSQ administered at admission by blinded researchers	N/A	N/A	N/A	544	291	44.5 (SD 16.1; 19–82)
Crönlein et al. (2014)	Fourteen-day inpatient cognitive-behavioural therapy for insomnia: a logical and useful extension of the stepped-care approach for the treatment of insomnia	Crönlein/ Regensburg, Germany	Pilot study	Inpatient setting	N/A	N/A	N/A	N/A	N/A	N/A	162	131	53.6 (SD 12.2)

TABLE 1 (Continued)

Reference	Title	Research group/ affiliation	Type of trial	Setting	Randomisation	Allocation	Blinding	Comparators	Sample size (*n*) control group treatment start	Sample size (*n*) control group treatment evaluation	Sample size (*n*) intervention group treatment start	Sample size (*n*) intervention group treatment evaluation	Participants age, years, mean (range)
Hsu et al. (2015)	Effects of cognitive behavioural therapy in patients with depressive disorder and comorbid insomnia: a propensity score-matched outcome study	Chung/ Taipei, Taiwan	Propensity score-matched outcome study	Psychiatric teaching hospital	Propensity score matching is a statistical matching technique by accounting for the covariates that predict receiving the treatment	Receiving CBT-I vs not	Not specified	Yes	15	11	18	13	Median age reported: 52.4
Sheaves et al. (2018)	Stabilising sleep for patients admitted at acute crisis to a psychiatric hospital (OWLS): an assessor-blind pilot randomised controlled trial	Espie and Freeman/ Oxford, UK	Assessor-blind parallel-group pilot RCT	Male only acute psychiatric inpatient ward	Randomisation using a web-based randomisation system	STAC + SC vs. SC alone	Research assessors were blind to treatment allocation	SC alone	20	18	20	16	40
Schneider et al. (2020)	Become your own SLEEPexpert: design, implementation, and preliminary evaluation of a pragmatic behavioural treatment program for insomnia in inpatient psychiatric care	Nissen/Bern, Switzerland	Clinical implementation and evaluation	Inpatient psychiatric unit	N/A	N/A	N/A	N/A	N/A	N/A	21	15	41.7 (SD 12.6; 19–59)

Participants sex, % female	How was insomnia diagnosed—ICD-10, DSM, ISI	Duration of insomnia, years, mean (range)	Comorbid diagnosis	How were comorbidities diagnosed	CBT-I component	Intensity of intervention	Intervention conducted by	Measure time points	Main outcome and further instruments used to measure sleep	Main outcome comorbidity	Effect of intervention on main outcome insomnia	Effect size of intervention on main outcome insomnia	Remarks
60	Quality of sleep index (4 items)	13.3 (1–48)	19/20 patients received 'other' Axis I diagnoses. All 20 patients received other Axis II diagnoses and five patients had Axis III diagnoses as well	Physical and neurological assessment, psychiatric evaluation (DSM-III) Psychological test battery (MMPI)	Behaviour therapy, consisting of systematic progressive deep-muscle relaxation training, stimulus control measures, and biofeedback training, as well as regularisation of sleep schedules, was provided to 14 patients	Not specified	Not specified	Admission, discharge, 6 months follow-up	Quality of sleep index	Quality of life index	Significant improvement of quality of sleep index from admission to discharge and 6-month follow-up	Not reported	Treated with a multidimensional approach directed primarily at the associated mental disorder

(Continues)

TABLE 1 (Continued)

Participants sex, % female	How was insomnia diagnosed—ICD-10, DSM, ISI	Duration of insomnia, years, mean (range)	Comorbid diagnosis	How were comorbidities diagnosed	CBT-I component	Intensity of intervention	Intervention conducted by	Measure time points	Main outcome and further instruments used to measure sleep	Main outcome comorbidity	Effect of intervention on main outcome insomnia	Effect size of intervention on main outcome insomnia	Remarks
100	Clinical evaluation	10	Major depression, diabetes, unspecified liver problems (causing chronic pain)	Clinical evaluation	Behavioural bedtime restriction	12 days	Nursing team	Admission, daily sleep diary, 4-month follow-up	Sleep diary, hourly rounds noting sleep or wake by nursing team	BDI, Profile of Mood States	A simple procedure consisting of curtailing the amount of time in bed was effective for treating severe insomnia secondary to pain and depression	Not reported	
64	ICD-10	6.7 (SD 4.9)	18 patients had a diagnosis of affective disorders, 15 patients were affected by psychotic disorders and 3 had a diagnosis of personality disorder	Not specified	Psychoeducation (stimulus control, sleep hygiene and sleep restriction procedure)	Two session (60 min each) psychoeducational intervention (group setting)	Unclear 'conductor'	T0 (2 weeks before starting psychoeducational intervention), T1 (the day prior to the intervention), T2 (15 days after the last session of intervention) and T3 (3 months after end of intervention)	SWAI, NSOS, DSS	Not reported	Efficacy of a short-term intervention on improving self-reported specific sleep parameters of the persistent non-organic insomnia	Not reported	During insomnia treatment, patients received no other psychological treatment
66	Brief assessment of insomnia and decision tree, RCSQ	Not specified	Psychotic, mood, or anxiety disorders	Not specified	Stimulus control and psychoeducation	Stimulus control instructions by nurses day and night time, set of sleep hygiene instructions and 'sleep facts'; nurses had the option of providing their patient with a pamphlet 'things you can do yourself if you can't sleep'	Nursing team	RCSQ weekly (period of 2 weeks)	Sleep quality and RCSQ total score	Not reported	Stimulus control does not change sleep quality	Sleep quality $d = 0.39$ (−0.26, 1.03; $p = 0.22$); RCSQ total score $d = -0.02$ (−0.66,0.62; $p = 0.95$)	No defined intervention for patients
5	ISI	Not specified	Schizophrenia or schizoaffective disorder ($n = 10$, 53%), depression ($n = 6$, 32%), alcohol or substance dependence ($n = 5$, 26%), PTSD ($n = 3$, 16%), psychotic	Not specified	Treatment protocol was based on a structured manual for the behavioural treatment of insomnia; (1) sleep hygiene (2) stimulus control (3) relaxation techniques (4)	1 h insomnia therapy group weekly in a 4 week rotation	First author, psychologist	T1 (on average 4 days after admission), T2 (7 or 14 days after T1)	ISI	Not reported	Behavioural treatment reduces insomnia severity	Not reported	

TABLE 1 (Continued)

Participants sex, % female	How was insomnia diagnosed—ICD-10, DSM, ISI	Duration of insomnia, years, mean (range)	Comorbid diagnosis	How were comorbidities diagnosed	CBT-I component	Intensity of intervention	Intervention conducted by	Measure time points	Main outcome and further instruments used to measure sleep	Main outcome comorbidity	Effect of intervention on main outcome insomnia	Effect size of intervention on main outcome insomnia	Remarks
			disorder not otherwise specified ($n = 3$, 16%), other anxiety disorders ($n = 2$, 11%), bipolar disorder ($n = 1$, 5%)		challenging negative cognition								
54	Diagnosis of disturbed sleep pattern (NANDA International 2005) in the nursing admission assessment record	Not specified	Psychotic disorders (44%), followed by bipolar disorders (21%), depressive conditions (21%), and personality (10%) and behaviour (2.4%) disorders	According to ICD-10	'Sleep enhancement' nursing intervention including sleep monitoring and sleep hygiene rules	Not specified	Nursing team	Admission and discharge	OSQ score and Nursing outcome classification sleep scores	Not specified	The 'sleep enhancement' nursing intervention was effective for patients admitted to a mental health inpatient unit with disturbed sleep pattern, regardless of the drugs administered during their hospital stay	Not reported	Convenience sampling was used, estimating the sample size according to the number of annual admissions to the unit in the 2 previous years (∼500 patients) and the percentage of patients with disturbed sleep pattern (∼75%). A sample size of 289 was established to achieve 5% precision in the estimation of a proportion by means of a bilateral normal asymptotic 95% CI
84	Before treatment, the patients were interviewed and examined by a sleep expert regarding the following inclusion criteria: (1) diagnostic criteria of primary insomnia for ≥1 year according to the International Classification of Sleep Disorders 2;	≥1	Not specified	Not specified	Fixed schedule of bedtimes and classical modules of CBT-I such as stimulus control, psychoeducational elements, and relaxation therapy	14 days. Patients were closely surveyed and coached in the daily implementation of these elements throughout their hospital stay and they were regularly seen by a psychiatrist and a sleep expert	Psychiatrists and sleep experts	Baseline and 6-month follow-up	PSQI, RIS	BDI	Despite the significant improvements in PSQI and RIS, the mean level of insomnia was still moderate to severe	Not reported	Exclusion criteria was severe psychiatric disorders

(Continues)

TABLE 1 (Continued)

Participants sex, % female	How was insomnia diagnosed—ICD-10, DSM, ISI	Duration of insomnia, years, mean (range)	Comorbid diagnosis	How were comorbidities diagnosed	CBT-I component	Intensity of intervention	Intervention conducted by	Measure time points	Main outcome and further instruments used to measure sleep	Main outcome comorbidity	Effect of intervention on main outcome insomnia	Effect size of intervention on main outcome insomnia	Remarks
	(2) evidence of conditioned sleep difficulty and/or heightened arousal in bed, and (3) previous participation in an outpatient CBT-I without success or inability to participate in standard outpatient CBT-I because of disease severity or inability to reduce hypnotics.												
60.6	Diagnosed by a physician according to a structured clinical interview for the criteria of the DSM, Fourth Edition, Text Revision (DSM-IV-TR)	Median onset of disease was 6 years	Diagnosis for treatment starter: major depressive disorder, single episode ($n = 12$, 36.3%), recurrent episode ($n = 9$, 27.3%), or neurotic depression ($n = 12$, 36.3%)	Diagnosed by a physician according to a Structured Clinical Interview for the criteria of the DSM-4	(a) education about CBT-I, (b) managing stress and restructuring cognitions that interfere with sleep, (c) psychoeducation about sleep and sleep hygiene, (d) stimulus control treatment and sleep restriction treatment, (e) relaxation training	90 min group setting CBT-I weekly for 6 weeks	The therapist for the CBT-I intervention was trained by one senior nurse who received the CBT-I training in America	Pre-test, 1 week prior to start of CBT-I, post-test after completion of 6-week CBT-I, 1-month follow-up	PSQI, DBAS, PSAS, Sleep Hygiene Practice Scale	HAM-D	Overall sleep quality of depressed patients who received CBT-I was significantly improved	Not reported	Inclusion criteria included antidepressant medication, such as an SSRI or SNRI, which had been prescribed by a physician; patients who had delirium, psychotic disorders, dementia, eating disorder, obsessive-compulsive disorder, alcohol addiction, or substance abuse disorder were excluded from the study
0 (all male)	Clinical interview by psychiatrist; ISI ≥8	Not specified	Schizophrenia spectrum and other psychotic disorders (45%), affective disorders (55%) in both groups	Clinical interview by psychiatrist	The CBT-I treatment techniques was taken from three main sources. Session 1 included psychoeducation, assessment, and goal setting. The focus of subsequent sessions was chosen based on	STAC was provided in one-to-one sessions with each patient. Treatment took place on the ward, in a local clinic room, or the local community while using ward leave. STAC was delivered over a 2-week therapy	Clinical psychologist	0,2, 4 and 12 weeks	ISI	WEMWBS	At week 0, all patients' ISI scores indicated clinically significant insomnia symptoms (ISI ≥8). By Week 2, eight participants in the STAC group	STAC led to large effect size (ES) reductions in insomnia at week 2 (adjusted mean difference −4.6, 95% CI −7.7 to −1.4, ES −0.9)	

TABLE 1 (Continued)

Participants sex, % female	How was insomnia diagnosed—ICD-10, DSM, ISI	Duration of insomnia, years, mean (range)	Comorbid diagnosis	How were comorbidities diagnosed	CBT-I component	Intensity of intervention	Intervention conducted by	Measure time points	Main outcome and further instruments used to measure sleep	Main outcome comorbidity	Effect of intervention on main outcome insomnia	Effect size of intervention on main outcome insomnia	Remarks
					the key maintenance factors identified in session 1. Treatment techniques included: setting a consistent sleep window, stimulus control, boosting circadian zeitgebers (light/dark, meals and timing of activity), wind-down (including relaxation) and rise routines, strategies to manage night-time worry and voices, and sleep hygiene. The final session was always relapse management, including planning sleep strategies for use upon discharge	window. Five sessions were defined as a minimum dose (to include both formulation and completion of at least one active therapy technique). The frequency and duration of sessions were flexible depending on the patient preference and clinical presentation. The mean (SD) number of treatment sessions was 8.6 (1.5) and the mean (SD) duration of sessions was 44.8 (15.6) min					reported no clinically significant insomnia symptoms (40%) compared with four in the SC alone group (20%)		
60	Clinical judgement, ISI	16.2 (SD 16.9; 0.5–50)	According to ICD-10 criteria: 9F1, 2F2, 10F3, 2F4, 3F5, 1F6, 1F9 (transdiagnostic)	Clinical judgement	Education about sleep based sleep pressure and circadian rhythm; focus on bedtime restriction	One 'kick' off session; group setting lead by psychologist; daily sleep diary and brief daily contact with nursing team	Entire healthcare team (physician, psychologists, and nursing team)	Intervention start and discharge (mean [SD] 17.9 [6.7] days)	ISI, PSQI	BSI-18	Sleep-related improvement in ISI, PSQI, increase in TST, SE	ISI (Panel A, 18.3 ± 4.6 vs. 11.4 ± 4.4, $t(14) = 4.5$, $p < 0.001$, $d = 1.2$) and PSQI scores (Panel B, 12.9 ± 3.8 vs. 10.3 ± 3.3, $t(14) = 2.4$, $p = 0.031$, $d = 0.6$)	Minimal exclusion criteria for severely ill patients

Abbreviations: Axis I, II and III diagnosis, mental health and substance use disorders, personality disorders and mental retardation, general medical conditions respectively; BSI, brief symptom inventory; CBT-I, cognitive behavioural therapy for insomnia; CI, confidence interval; DBAS, dysfunctional beliefs and attitudes about sleep; DSM, American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders; DSS, Daytime Sleepiness Scale; ESS, Epworth Sleepiness Scale; ICD-10, 10th edition of the International Classification of Diseases; ISI, Insomnia Severity Index; MAR, music-assisted relaxation; N/A, not available; NANDA, North American Nursing Diagnosis Association; NSOS, Nocturnal Sleep Onset Scale; OSQ, Oviedo Sleep Questionnaire; PSAS, Pre-Sleep Arousal Scale; PSQI, Pittsburgh Sleep Quality Index; RCSQ, Richards Campbell Sleep Questionnaire; RCT, randomised controlled trail; RIS, Regensburg Insomnia Scale; SC, standard care; SC, stimulus control; SD, standard deviation; SE, sleep efficiency; SNRI, serotonin–noradrenaline reuptake inhibitor; SSRI, selective serotonin reuptake inhibitor; STAC, sleep treatment at acute crisis; SWAI, sleep–wake activity inventory; TST, total sleep time; WEMWBS, Warwick–Edinburgh Mental Wellbeing Scale.

sleep restriction procedures but no relaxation techniques. Two studies focused only on bedtime restriction based on the underlying mechanisms of sleep, namely sleep pressure and circadian rhythm (Morin et al., 1990; Schneider et al., 2020), and two studies used nursing interventions including sleep monitoring and communicating sleep hygiene rules (de Niet et al., 2010; Laguna-Parras et al., 2013). Two research groups explored components not included in classical CBT-I, namely activity monitoring devices and enhanced light exposure (Sheaves et al., 2018) and biofeedback training (Tan et al., 1987).

3.6 | Feasibility

The included studies propose feasibility of their programmes. Two studies report no drop-out during therapy (Biancosino et al., 2006; Morin et al., 1990). Most other studies report drop-out rates of 20–30% from the first to last assessment. Two studies included 50% of their study sample for analysis (de Niet et al., 2010; Laguna-Parras et al., 2013). The most prominent reason for attrition was related to the nature of an admission ward, where discharge during the assessment period was frequent. Six studies delivered their adapted programme in group settings (Table 1).

3.7 | Effects of intervention

All but one study (de Niet et al., 2010) reported a decrease in insomnia severity or improvement of self-reported sleep-specific parameters. Crönlein et al. (2014) reported that despite significant improvements on two scales, the overall mean level of insomnia in their sample was still moderate to severe. Some studies suggested an associated reduction in symptoms of other health parameters (Crönlein et al., 2014; Hsu et al., 2015; Morin et al., 1990; Schneider et al., 2020; Sheaves et al., 2018; Tan et al., 1987). It is of note that the majority of these findings are preliminary, and control conditions are needed to demonstrate efficacy of the interventions.

3.8 | Quality of studies

Standard assessments of quality such as Risk Of Bias In Non-randomised Studies of Interventions (ROBINS-I; Sterne et al., 2016) or Consolidated Standards of Reporting Trials (CONSORT) 2010 statement: extension to randomised pilot and feasibility trials (Eldridge et al., 2016) were not suitable and do not allow for systematic comparison of quality due to the heterogeneity of the identified investigations. Overall, the quality of the presented studies can be classified as low due to their preliminary character.

As a comparison, the effects of pharmacological interventions for acute and long-term management of insomnia disorder were investigated in studies including 44,089 patients (De Crescenzo et al., 2022). To date, RCTs looking at the effect of CBT-I in patients with mental disorders and comorbid insomnia include 1083 patients (Hertenstein et al., 2022) and only 40 of these patients have been investigated within an inpatient setting (Sheaves et al., 2018).

4 | DISCUSSION

Our systematic review of CBT-I or derivates in inpatient psychiatric care identified 10 studies with few patients and preliminary character. Several explanations for the observed paucity of studies need to be discussed.

First, the low number of studies might be explained by low relevance of the topic. However, insomnia in inpatient psychiatry appears to represent a substantial health problem. More specifically, an estimate of 2.5–3 million people are treated in inpatient psychiatry in 1 year in the European Union (EU)—estimated based on an average of 73 psychiatric hospital beds/100,000 inhabitants (European Health Information Gateway, 2021) and an average length of stay in the hospital of 39.4 days (Dimitri et al., 2018). Robust data on the prevalence of insomnia in inpatient psychiatry are, to our knowledge, not available. However, a comparison with outpatient data (in line with own unpublished data in inpatients) indicates that most patients with psychiatric disorders, across diagnostic entities, have insomnia symptoms (up to 80%). Often the sleep difficulties are closely tied to the mental disorder and start and end with an episode, without sleep-specific treatment. However, ~30% of patients (in outpatient settings) fulfil criteria for comorbid insomnia disorder on a diagnosis level, defined by sleep continuity problems and related daytime symptoms over at least 3 months with temporal independence from the psychiatric disorder (that is insomnia precedes or persists the episode of a psychiatric disorder). Importantly, recent work demonstrates that CBT-I for insomnia comorbid to a psychiatric disorder does not only improve sleep, but also symptoms of the psychiatric disorder (Hertenstein et al., 2022). However, these data are limited to outpatient settings. Together, insomnia in inpatient psychiatry appears to represent a significant health problem and CBT-I or components might contribute to improving sleep and other health outcomes.

Second, even if there is a significant problem, the low number of studies on CBT-I or derivates might be explained by sufficient (effective and well-tolerated) other treatment options for insomnia. Here it should be stated that insomnia in inpatient psychiatry is very often addressed with medication. In fact, most patients with insomnia receive hypnotic medication (Delaney, 2020; Hossny et al., 2019). Approved and widely used medication include benzodiazepines and benzodiazepine receptor agonists, related to the risk of the development of tolerance and dependency. Other frequently prescribed compounds include sedative antidepressants and antipsychotics (off-label use). While all these medications might be well indicated for specific patients and situations, overmedication is frequent (Waters et al., 2012). Of note, a stay in a hospital represents a critical period forming patients' expectations and treatment behaviour, and might be a starting point for long-term use, tolerance, and dependency.

Together, the current clinical practice is not sufficiently in line with guideline recommendations stating that CBT-I, not medication, represents the first-line treatment option for insomnia, also for patients with psychiatric comorbidity (Riemann et al., 2017).

Third, the paucity of studies on CBT-I or derivates in inpatient psychiatry might be explained by challenges of implementation. Indeed, a variety of clinical situations on the patient (e.g., intoxication or agitation) or hospital side (e.g., personnel resources and hospital routines) can render CBT interventions impossible. However, our own investigations, based on interviews with severely ill patients and healthcare teams in acute inpatient psychiatry, demonstrate a great interest of patients and healthcare team members for non-pharmacological, behavioural interventions and feasibility (Schneider et al., 2020). This is complemented by other studies, showing that at least components of CBT-I are feasible in complex inpatient settings with acceptance of the programme by patients (Biancosino et al., 2006; Haynes et al., 2011; Laguna-Parras et al., 2013; Sheaves et al., 2018; Tan et al., 1987). Moreover, the selected studies show that CBT-I was implemented using existing resources of the team on the ward (de Niet et al., 2010; Laguna-Parras et al., 2013; Morin et al., 1990), but sleep-specific training of the healthcare team was needed (de Niet et al., 2010; Hsu et al., 2015; Laguna-Parras et al., 2013).

Together, further investigating and implementing CBT-I or components in inpatient psychiatry might have the potential to improve mental health care. In the following, we summarise and discuss ideas for future developments. The available studies along with recent developments of the classification systems (fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* [DSM-5] and the 11th revision of the International Classification of Diseases [ICD-11]) suggest that, as inclusion criterion, patients with chronic insomnia (≥3 months) comorbid to a psychiatric disorder (diagnostic criterion: at least partial temporal independence, that is insomnia precedes or persists) should be offered CBT-I or adaptations. The Insomnia Severity Index (ISI) can be used as a screening instrument, with values ≥7 indicative of relevant insomnia (Morin et al., 2011). Importantly, other sleep disorders, most notably sleep apnea syndrome (polygraphic screening or sleep laboratory assessment for complex situations), but also other sleep or circadian disorders should be carefully diagnosed and adequately treated. We propose minimal exclusion criteria for participation in behavioural treatment programmes, such as severe cognitive deficits, acute intoxication, acute withdrawal, or an inability to communicate. Of note, our position, shared with most other studies, is that no diagnosis per se represents an exclusion criterion for participation, but rather individual constraints, to not systematically prevent some patient groups from behavioural programmes.

The review of studies indicates that treatment programmes need to be adapted and simplified according to the needs of severely ill patients and the inpatient setting. Our own programme ('Become your own SLEEPexpert') centres on the two major components of sleep–wake regulation, a homeostatic and a circadian process, with restriction of time in bed (increasing sleep pressure) and circadian adaptation of the sleep window. The focus on restriction of time in bed is supported by studies identifying restriction of time in bed as the single most effective treatment component of CBT-I (Kyle et al., 2014). Moreover, the focus on behaviour (compared to cognitive interventions) is easier to implement as a treatment strategy. Standard recommendations suggest times in bed of at least 5 h. Particular attention is needed for patients with bipolar disorder due to a potential shift into mania related to short sleep. Several studies highlight that coordinated activities of the entire team, including all professional groups (medical doctors, psychologists, nursing team) supporting behavioural therapy, are essential (Hossny et al., 2019; Novak et al., 2020; Paterson et al., 2021). For instance, it might compromise treatment effects when some team members centre on prolonged periods of wakefulness in the evening to increase sleep pressure and the responsible physician prescribes highly sedating drugs. In a hospital setting, a group format appears preferential (Biancosino et al., 2006; Crönlein et al., 2014; Haynes et al., 2011; Hsu et al., 2015; Schneider et al., 2020; Tan et al., 1987), coordinated with individual team contacts. Particular attention should be given to regular assessments and potential reduction and discontinuation of sedative medication.

In addition to patient and healthcare team factors, numerous structural and organisational aspects in psychiatric hospitals are challenging for the implementation of CBT-I or components. For instance, dinner is frequently offered early (e.g., 6:00 p.m.), along with limited opportunities for activities in the evening. Structured activities in the evening would support patients in selecting later times in bed, as a critical component of sufficient sleep pressure. Generally, the atmosphere on acute psychiatric wards can be adverse for sleep, with restless to aggressive patients, unfavourable light conditions, various sources of noise and other factors. Moreover, personnel resources are often limited in the later evening and at night with a tendency to distribute sedative medication to promote a quite atmosphere on the ward. Clinic routines limit adaptations of sleep windows to individual circadian preferences. Not all these aspects, but at least some, can be addressed on clinical wards, including for instance improved activities in the evening for patients, defined rest and activity areas on a ward with adapted light conditions, and others (Novak et al., 2020).

In summary, the present work identifies a paucity of studies on CBT-I or derivates in inpatient psychiatry and suggests that adaptations of CBT-I should be further investigated and might have the potential to contribute to improved mental health care.

AUTHOR CONTRIBUTIONS

Christoph Nissen: Writing – original draft; methodology; writing – review and editing; supervision; conceptualization; investigation; validation. **Carlotta L Schneider:** Writing – original draft; writing – review and editing; project administration; formal analysis; conceptualization; methodology; data curation; visualization; investigation. **Elisabeth Hertenstein:** Methodology; supervision; conceptualization; writing – review and editing; investigation.

ACKNOWLEDGEMENT

Open access funding provided by University of Geneva.

FUNDING STATEMENT

The current work was supported by in house funding.

CONFLICT OF INTEREST STATEMENT

CN has worked on advisory boards of Idorsia, Lundbeck and Janssen. The other authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Christoph Nissen https://orcid.org/0000-0001-9809-0275

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5R)*. American Psychiatric Association Publishing. https://doi.org/10.1176/appi.books.9780890425596

Biancosino, B., Rocchi, D., Donà, S., Kotrotsiou, V., Marmai, L., & Grassi, L. (2006). Efficacy of a short-term psychoeducational intervention for persistent non-organic insomnia in severely mentally ill patients. A pilot study. *European Psychiatry*, *21*(7), 460–462. https://doi.org/10.1016/j.eurpsy.2005.03.005

Crönlein, T., Langguth, B., Geisler, P., Wetter, T. C., & Eichhammer, P. (2014). Fourteen-day inpatient cognitive-Behavioural therapy for insomnia: A logical and useful extension of the stepped-care approach for the treatment of insomnia. *Psychotherapy and Psychosomatics*, *83*(4), 255–256. https://doi.org/10.1159/000360706

De Crescenzo, F., D'Alò, G. L., Ostinelli, E. G., Ciabattini, M., Di Franco, V., Watanabe, N., Kurtulmus, A., Tomlinson, A., Mitrova, Z., Foti, F., Del Giovane, C., Quested, D. J., Cowen, P. J., Barbui, C., Amato, L., Efthimiou, O., & Cipriani, A. (2022). Comparative effects of pharmacological interventions for the acute and long-term management of insomnia disorder in adults: A systematic review and network meta-analysis. *Lancet*, *400*(10347), 170–184. https://doi.org/10.1016/S0140-6736(22)00878-9

de Niet, G., Tiemens, B., & Hutschemaekers, G. (2010). Can mental health-care nurses improve sleep quality for inpatients? *British Journal of Nursing (Mark Allen Publishing).*, *19*(17), 1100–1105.

Delaney, K. R. (2020). Let's talk about benzodiazepine use: Inpatient psychiatric nurses initiating the conversation. *Journal of Psychosocial Nursing and Mental Health Services*, *58*(1), 33–38. https://doi.org/10.3928/02793695-20191218-07

Dimitri, G., Giacco, D., Bauer, M., Jane, V., Greenberg, L., Lasalvia, A., et al. (2018). Predictors of length of stay in psychiatric inpatient units: Does their effect vary across countries ? *European Psychiatry*, *48*, 6–12. https://doi.org/10.1016/j.eurpsy.2017.11.001

Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., Lancaster, G. A., & PAFS consensus group. (2016). CONSORT 2010 statement: Extension to randomised pilot and feasibility trials. *BMJ*, *355*, i5239. https://doi.org/10.1136/bmj.i5239

European Health Information Gateway. (2021). *Psychiatric Hospital Beds Per 100 000*. WHO Regional Office for Europe https://gateway.euro.who.int/en/indicators/hfa_488-5070-psychiatric-hospital-beds-per-100-000

Haynes, P. S., Kersh, B., & Bootzin, R. R. (2011). Examination of insomnia and insomnia treatment in psychiatric inpatients. *International Journal of Mental Health Nursing*, *20*(2), 130–136.

Hertenstein, E., Feige, B., Gmeiner, T., Kienzler, C., Spiegelhalder, K., Johann, A., Jansson-Fröjmark, M., Palagini, L., Rücker, G., Riemann, D., & Baglioni, C. (2019). Insomnia as a predictor of mental disorders: A systematic review and meta-analysis. *Sleep Medicine Reviews.*, *43*, 96–105.

Hertenstein, E., Trinca, E., Wunderlin, M., Schneider, C. L., Züst, M. A., Fehér, K. D., Su, T., Straten, A. V., Berger, T., Baglioni, C., Johann, A., Spiegelhalder, K., Riemann, D., Feige, B., & Nissen, C. (2022). Cognitive behavioral therapy for insomnia in patients with mental disorders and comorbid insomnia: A systematic review and meta-analysis. *Sleep Medicine Reviews*, *62*, 101597. https://doi.org/10.1016/j.smrv.2022.101597

Hossny, E., Brainch, N., Weinberg, S., Bodic, M., & Jacob, T. (2019). "my patient Can't sleep": Resident-led curriculum development for insomnia management. *Academic Psychiatry*, *43*(6), 595–599. https://doi.org/10.1007/s40596-019-01087-x

Hsu, H. M., Chou, K. R., Lin, K. C., Chen, K. Y., Su, S. F., & Chung, M. H. (2015). Effects of cognitive behavioral therapy in patients with depressive disorder and comorbid insomnia: A propensity score-matched outcome study. *Behaviour Research and Therapy*, *73*, 143–150.

Hutton, B., Salanti, G., Caldwell, D. M., Chaimani, A., Schmid, C. H., Cameron, C., Ioannidis, J. P. A., Straus, S., Thorlund, K., Jansen, J. P., Mulrow, C., Catalá-López, F., Gøtzsche, P. C., Dickersin, K., Boutron, I., Altman, D. G., & Moher, D. (2015). The PRISMA extension statement for reporting of systematic reviews incorporating network meta-analyses of health care interventions: Checklist and explanations. *Annals of Internal Medicine*, *162*(11), 777–784. https://doi.org/10.7326/M14-2385

ICD-10. (1993). *The ICD-10 classification of mental and Behavioural disorders: Diagnostic criteria for research*. World Health Organization.

Kyle, S. D., Miller, C. B., Rogers, Z., Siriwardena, A. N., Macmahon, K. M., & Espie, C. A. (2014). Sleep restriction therapy for insomnia is associated with reduced objective total sleep time, increased daytime somnolence, and objectively impaired vigilance: Implications for the clinical management of insomnia disorder. *Sleep*, *37*(2), 229–237. https://doi.org/10.5665/sleep.3386

Laguna-Parras, J. M., Jerez-Rojas, M. R., García-Fernández, F. P., Carrasco-Rodríguez, M. D., & Nogales-Vargas-Machuca, I. (2013). Effectiveness of the 'sleep enhancement' nursing intervention in hospitalized mental health patients. *Journal of Advanced Nursing.*, *69*(6), 1279–1288.

Morin, C. M., Belleville, G., Bélanger, L., & Ivers, H. (2011). The insomnia severity index: Psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep*, *34*(5), 601–608. https://doi.org/10.1093/sleep/34.5.601

Morin, C. M., Kowatch, R. A., & O'Shanick, G. (1990). Sleep restriction for the inpatient treatment of insomnia. *Sleep*, *13*(2), 183–186.

Novak, C., Packer, E., Paterson, A., Roshi, A., Locke, R., Keown, P., Watson, S., & Anderson, K. N. (2020). Feasibility and utility of enhanced sleep management on in-patient psychiatry wards. *BJPsych Bulletin*, *44*(6), 255–260. https://doi.org/10.1192/bjb.2020.30

Paterson, A., Khundakar, M., Young, A., Ling, J., Chakraborty, S., Rathbone, A. P., Watson, S., Donaldson, T., & Anderson, K. N. (2021). The smarter sleep educational interventions: An initiative to reduce hypnotic prescribing in in-patient psychiatric care. *BJPsych Bulletin*, *46*(4), 1–9. https://doi.org/10.1192/bjb.2021.41

Riemann, D., Baglioni, C., Bassetti, C., Bjorvatn, B., Dolenc Groselj, L., Ellis, J. G., Espie, C. A., Garcia-Borreguero, D., Gjerstad, M., Gonçalves, M., Hertenstein, E., Jansson-Fröjmark, M., Jennum, P. J., Leger, D., Nissen, C., Parrino, L., Paunio, T., Pevernagie, D., Verbraecken, J., … Spiegelhalder, K. (2017). European guideline for the

diagnosis and treatment of insomnia. *Journal of Sleep Research*., *26*(6), 675–700. https://doi.org/10.1111/jsr.12594

Schneider, C. L., Hertenstein, E., Fehér, K., Maier, J. G., Cantisani, A., Moggi, F., Berger, T., & Nissen, C. (2020). Become your own SLEEPexpert: Design, implementation, and preliminary evaluation of a pragmatic behavioral treatment program for insomnia in inpatient psychiatric care. *Sleep Advances*, *1*(1), zpaa005. https://doi.org/10.1093/sleepadvances/zpaa005

Sheaves, F. D., Isham, L., McInerney, J., Nickless, A., Yu, L.-M., et al. (2018). Stabilising sleep for patients admitted at acute crisis to a psychiatric hospital (OWLS): An assessor-blind pilot randomised controlled trial. *Psychological Medicine*, *48*(10), 1694–1704.

Sterne, J. A. C., Hernán, M. A., Reeves, B. C., Savović, J., Berkman, N. D., Viswanathan, M., Henry, D., Altman, D. G., Ansari, M. T., Boutron, I., Carpenter, J. R., Chan, A. W., Churchill, R., Deeks, J. J., Hróbjartsson, A., Kirkham, J., Jüni, P., Loke, Y. K., Pigott, T. D., … Higgins, J. P. T. (2016). ROBINS-I: A tool for assessing risk of bias in non-randomized studies of interventions. *BMJ*, *355*, i4919. https://doi.org/10.1136/bmj.i4919

Tan, T. L., Kales, J. D., Kales, A., Martin, E. D., Mann, L. D., & Soldatos, C. R. (1987). Inpatient multidimensional management of treatment-resistant insomnia. *Psychosomatics*, *28*(5), 266–272. https://doi.org/10.1016/s0033-3182(87)72535-3

Waters, F., Faulkner, D., Naik, N., & Rock, D. (2012). Effects of polypharmacy on sleep in psychiatric inpatients. *Schizophrenia Research*, *139*(1–3), 225–228. https://doi.org/10.1016/j.schres.2012.05.013

How to cite this article: Schneider, C. L., Hertenstein, E., & Nissen, C. (2023). Cognitive behavioural therapy for insomnia in inpatient psychiatric care: a systematic review. *Journal of Sleep Research*, e14041. https://doi.org/10.1111/jsr.14041