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How sleep in patients with serious mental illness is recorded and treated, and its impact on service engagement

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ABSTRACT

Background: Sleep and mental health share a bidirectional relationship whereby problems in one exacerbate the other. Accordingly, sleep problems are frequent and severe in serious mental illness (SMI) populations, exacerbating SMI symptoms. This study examined the documentation and treatment of sleep problems within anonymised clinical records of SMI patients, and their association with attendance rates and number of appointments scheduled.

Methods: Patient records between 01.09.2021 and 31.08.2022 were identified and relevant records (n = 229) extracted from an NHS Trust database. Content analysis was used to assess documentation and treatment of sleep problems and Chi-square tests were used to assess demographic differences. Mann-Whitney U tests were used to compare attendance rates and number of appointments scheduled between patients with/without sleep problems.

Results: Most (n = 170; 84 %) patients with sleep problems had no or minimal assessment of the sleep problem within their records. Patients were primarily offered no (n = 115; 57 %) or non-recommended (n = 69; 34 %) sleep treatment. More outpatients were offered no sleep treatment (n = 89; 64 %) than inpatients (n = 26; 41 %) (p = .002) whilst more inpatients were offered non-recommended sleep treatments (n = 33; 52 %) than outpatients (n = 36; 26 %) (p < .001). No significant associations were found between sleep and attendance or appointments scheduled.

Conclusions: There is a lack of routine clinical attention to sleep assessment and treatment in SMI groups. Where sleep is addressed, treatment often conflicts with guidelines. Improved sleep assessment and treatment could significantly enhance current SMI patient care.

1. Introduction

There is extensive literature demonstrating that sleep problems increase susceptibility to mental health disorders and reduce functioning ([1]; Simon et al., 2020). Presence of sleep disorder(s) is associated with mental health symptom severity [2] so it follows that sleep problems are notably common in serious mental illness (SMI) [1,3–6]. SMI is understood here as comprising psychotic disorders, bipolar disorder, major depression and anxiety disorders, and eating disorders or personality disorders where the degree of functional impairment is severe. In SMI, sleep problems are known to be associated with a higher number of suicide attempts, compromised cognitive and socio-occupational functioning, lower quality of life, and higher rates of mood episode relapse [7–13]. The need for an evidence-based approach to assessment and treatment of sleep problems in SMI is therefore critical.

Current clinical guidance highlights the importance of treating insomnia within mental health services. The National Institute for Health and Care Excellence [NICE] [14] recommends that chronic (> three months) insomnia be addressed via sleep hygiene and Cognitive Behavioral Therapy for Insomnia (CBT-I) as a first-line treatment. Updated DSM-5 guidelines [15] marked an important shift in the classification of insomnia, recommending that chronic insomnia be thought of as an independent disorder (and so worthy of treatment in its own right), irrespective of comorbid mental health or sleep disorders 16,17.

Individuals with co-existing sleep and mental health disorders do not fit neatly into established diagnostic categories and, consequently, may

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not receive appropriate treatment through conventional, single-disorder approaches [18]. However, growing evidence supports the positive impact of targeting sleep disorders independently from co-existing mental health problems, with a large effect indicated for improvement in sleep and a small effect supported for subsequent improvements in mental health [19]. Evidence suggests that CBT-I can alleviate a broad spectrum of associated psychiatric symptoms [19], such as anxiety [20], depression [21], and psychosis [22]. Sleep therefore represents a transdiagnostic mechanism by which mental health problems may be alleviated [23,24].

Given its impact on mental health and functioning, it follows that sleep is an important topic to include in mental health assessment, and yet there is limited research into how sleep is assessed across mental health services. Growing evidence demonstrates sleep problems are recognised as highly prevalent and disruptive in primary and secondary community mental health settings, but that treating sleep was rare and remained primarily pharmacological, despite demand for non-pharmacological sleep interventions and wish to refer/be referred [5, 25–27]. Reasons for this included lack of standardised processes of assessing sleep within services, lack of knowledge and training amongst staff, and beliefs that sleep treatment is too demanding in SMI populations. It is clear that assessment and treatment of sleep in mental health services requires more attention.

An underexplored but plausible impact of poor sleep is reduced propensity to attend healthcare appointments. Poor sleep has been shown to increase workplace absenteeism [28] and could hypothetically affect propensity to attend outpatient appointments. Attendance is known to be a problem in NHS mental health services generally. According to the NHS Benchmarking Network [29] report regarding all outpatient departments across 2018/19, patients did not attend (DNA'd) 8 % of appointments, and the average cost of each DNA was £153, so missed appointments incur high costs for services. Non-attendance is also associated with worse mental health outcomes and increased future service use [30]. The two most reported reasons for DNAs are patients forgetting their appointments and administrative errors [31], however there could be numerous other factors at play including greater deprivation [32], mental health severity, and/or sleep problems (e.g., via increased likelihood of forgetfulness). There is a clear gap in the research surrounding the relationship between sleep problems and appointment attendance rates.

A second plausible impact of poor sleep is longer-term requirement of support from healthcare services. Sleep deprivation reduces memory consolidation and neural plasticity 33,34 and inadequate memory of treatment is linked to low adherence and poor outcomes 35–38. McDonald et al. [3] indeed found sleep disturbance to be associated with poor prognosis in SMI treatment, especially in conjunction with mood instability, whilst de Beurs [39] suggests the more complex the mental health problem, the longer treatment is required.

In conclusion, current evidence suggests that improved sleep may lead to improved treatment outcomes, which could be especially impactful for SMI populations. Clinicians and patients have previously reported inadequate assessment and treatment of sleep, however, the evidence surrounding these issues is limited. The extent to which sleep affects attendance rates or requirement of appointments within secondary community mental health settings is also still unclear. Given that evidence-based sleep treatments are available, exploring these issues in further detail could highlight the need and the means for better assessment of sleep problems and integration of sleep-specific treatments for SMI patients.

The primary research question of this study is *'How are sleep problems in SMI patients recorded in clinical documentation?'*. The second research question is *'How are sleep problems in SMI patients treated in routine practice?'*. Additional exploratory research questions are: 1) *'Does SMI patients' sleep affect their attendance rates?'* and 2) *'Are SMI patients with sleep problems scheduled more appointments than SMI patients with good sleep?'*.

2. Method

2.1. Design

This study employs a cross-sectional design of secondary data analysis utilising the Cambridgeshire and Peterborough NHS Foundation Trust Research Database (CPFTRD) which uses the Clinical Records Anonymisation and Text Extraction (CRATE) software system [40] to search health records from 'SystmOne', the Trust's electronic healthcare record system. CRATE collects and anonymises routine medical data from Cambridgeshire and Peterborough NHS Foundation Trust (CPFT) patients for use in research. Free-text notes and correspondence were unavailable via CRATE, so this study focused on content within SystmOne's routine questionnaires such as Risk Assessments and Care Plans (for all sources, see Appendix A). As of October 2020, the data within CPFTRD was derived from approximately 260,000 people who received care from CPFT Cambridgeshire and Peterborough NHS Foundation Trust [41], reflective of a total population of approximately [42] 894, 300 people Cambridgeshire and Peterborough Insight, 2024. All data was retrieved from documentation uploaded between 01.09.21 and 31.08.22.

2.2. Participants

The study focused on working age adults with SMI. All patients under CPFT's community mental health teams (CMHTs) and early intervention in psychosis teams (EIPs) were included, the rationale being that patients treated under these services fit the criteria for SMI. Between 01.09.21 and 31.08.22, there were 1744 patients under the care of the CMHTs and EIPs collectively.

2.3. Case selection and data extraction

A protocol for case selection and data extraction was developed for the purpose of this study. Patient records were selected via Structured Query Language (SQL) [43] (code-based searches) and keyword searches within selected patients' records, according to specific inclusion/exclusion criteria (outlined below) (see Appendix A for SQL searches).

The first search captured occurrences of the keywords 'sleep', 'insomnia', 'waking', 'nightmare', 'apn', 'hypersomnia', 'restless leg', 'circadian', 'somnolence', and 'narcolepsy' from all available records of patients under the care of secondary community mental health services between 01.09.21 and 31.08.22. After removal of duplicates, this generated 664 individual patient records (see Appendix A for more details of case selection process and sources of information).

Next, a second search was performed within each retained patient record to ascertain relevance. Patient records were either included and assigned to a group ('Poor sleep' or 'Good sleep') or excluded, according to the following criteria.

- If *explicit* mention that patient is currently experiencing sleep problems, and there is no evidence of it improving within time period, assign to 'Poor Sleep' (PS) group ($n = 203$)
- If *explicit* mention of sleep being optimal (or equivalent description) within time period, assign to 'Good Sleep' (GS) group ($n = 68$)
- If mentions of sleep are inconsistent or irrelevant (e.g., 'sleeping rough', 'sleeping at friend's house'), exclude ($n = 393$)

The 203 PS records could be used to answer the primary and secondary research questions (which required no attendance data). Following a third SQL search to generate attendance data (records were included if they had minimum 50 % attendance outcomes available), 93 patient records (67 PS and 26 GS) had sufficient attendance data available to answer the exploratory questions. A total of 229 individual patient records were therefore utilised for the purposes of this study (see

Table 1
Descriptive features of patients with PS.

	Poor Sleep (n = 203)
Gender	
Female	121 (60 %)
Male	82 (40 %)
Ethnicity	
White British	120 (59 %)
Other ethnicity[a]	57 (28 %)
Unspecified	26 (13 %)
Employment status	
Long term sick or disabled, receiving benefits	65 (32 %)
Employed	37 (18 %)
Unemployed	23 (11 %)
Other/Unspecified	78 (38 %)
Mental health diagnosis	
Schizophrenia/Psychosis	42 (21 %)
Bipolar disorder	26 (13 %)
Schizoaffective disorder	12 (6 %)
Depression	10 (5 %)
Personality disorder	6 (3 %)
Anxiety	4 (2 %)
Comorbid disorders	33 (16 %)
Other[b]/Unspecified	71 (35 %)
Inpatient for part of time period of interest	
Yes	62 (31 %)
No	141 (69 %)

[a] 'Other ethnicity' includes Asian, Baltic Estonian/Latvian/Lithuanian, Kashmiri, Indian, Irish, 'Other White background', Pakistani, Turkish, White and Black African, White and Black Caribbean.

[b] 'Other' mental health diagnosis includes PTSD, Adjustment disorder, Dissociative disorder, Mental and behavioural disorders due to multiple drug use and/or use of other psychoactive substances, Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and/or psychotropic drugs, not elsewhere classified (some of which are comorbid with each other and/or schizophrenia/psychosis).

Table 1).

Final searches were performed for all included patient records to retrieve demographic details for each patient. Demographic details included age, ethnicity, gender,[1] employment status, diagnosis, and inpatient status. Patient age on 01.03.22 was calculated from all dates of birth for use in reporting, as this is the mid-point of the time period of interest. All 203 patients assigned to PS group were understood to have had 'chronic insomnia' as defined by ICD-11 [44] and all mentions of 'recommended treatment' below are based on NICE (2022) guidelines pertaining to chronic insomnia.

Next, electronic keyword searches were performed across all available notes of the PS patient records. The keyword searches included: 'sleep', 'somn', 'waking', 'nightmare', 'apn', 'restless leg', 'circadian', 'narcolepsy', 'hour', 'zopiclone', 'zolpidem', 'melatonin', 'group', 'CBT', and 'sleep hygiene'.

2.4. Content analyses

A quantitative content analysis was conducted to answer the primary research question, *'How are sleep problems in SMI patients recorded?'*. All occurrences of the terms 'sleep', 'nightmare', 'somn', 'apn', 'restless, 'circadian', 'narcolepsy', 'wak', and 'hour' were explored in context to ascertain *how* sleep was described. Identified patterns included descriptions of 1) causes (e.g., *'experiences nightmares'* or *'feels too much energy/anxiety/pain to sleep'*), 2) perceived effect (e.g., *'fatigue during day'*, *'memory loss'*, or *'exacerbates mental health symptoms'*), 3) sleep pattern, 4) average hours of daily sleep, and 5) specific sleep disorder (e.g., *insomnia, obstructive sleep apnoea, circadian rhythm disorder*).

Descriptions of sleep problems were then categorised as follows.

- 'None' = singular indication of sleep problem with no description (e.g., *'poor sleep'*, *'sleeps badly'*)
- 'Minimal' = cause OR perceived effect OR sleep pattern OR average hours of daily sleep OR specific sleep disorder described
- 'Adequate' = 1) cause AND sleep pattern AND average hours of daily sleep described OR 2) specific sleep disorder described
- 'Good' = cause AND perceived effect AND sleep pattern AND average hours of daily sleep described

A quantitative content analysis was also conducted to answer the secondary research question, *'How are sleep problems treated?'*. Methods by which sleep was treated were coded by authors AS and SR in accordance with the key shown in Fig. 1. A Cohen's kappa score of >.8 was achieved, indicating 'almost perfect' agreement [45].

2.5. Statistical analyses

SPSS version 29.0.1.0 [46] was used to analyse the data. Participant sample numbers were based on maximum number available after data extraction was complete.

In follow up to the primary research question content analysis, chi-square tests of independence were conducted to examine whether there was a significant difference in how sleep was described ('none', 'minimal', or 'adequate') based on gender, ethnicity, or inpatient status.

In follow up to the secondary research question content analysis, chi-square tests of independence were conducted to examine whether there was a significant difference in how sleep was treated ('recommended treatment offered', 'non-recommended treatment offered', or 'no treatment offered') based on gender, ethnicity, or inpatient status.

To answer the exploratory research question, *'Does SMI patients' sleep affect their attendance rates?'*, a Mann-Whitney *U* test (since the assumption of normal distribution was not met) was conducted to examine whether there was a significant difference in the percentage of appointments attended or DNA'd/cancelled between groups (GS and PS).

To answer the exploratory research question, *'Are SMI patients with sleep problems scheduled more appointments than SMI patients with good sleep?'*, a Mann-Whitney *U* test (since the assumption of normal distribution was not met) was conducted to evaluate whether number of appointments scheduled significantly differed by sleep status (GS and PS).

2.6. Ethics

All patients who had information about them recorded electronically at CPFT since 2005, have contributed to the CPFTRD database (with identifying information removed) unless they specifically requested to opt-out. The CPFTRD board granted ethical approval for this study in November 2022. CPFTRD is approved for secondary data analysis use for research by NHS ethics (reference: 22/EE/0264).

3. Results

The 203 PS patient records were used to answer both the primary and secondary research questions. Mean age was 40 (*SD* 13.35). The 62 patients who were inpatients for part of the time period of interest (01.09.21–31.08.22) spent an average of 42 % (2–100 %) of their total time under services during that period at an inpatient setting. Further descriptive features are provided in Table 1.

[1] A patient's 'gender' is understood throughout this paper as denoting their socially constructed identity and a non-binary variable. However, at the time the data was gathered, SystmOne provided only four options for recording a patient's gender: 'male', 'female', 'indeterminate', or 'unspecified/unknown'. The study was not therefore able to distinguish between identified gender and the gender patients were assigned at birth (if there were any cases where these differed).

Y = Recommended treatment offered	NR = Non-recommended treatment offered	N = No treatment offered / self-treated
Y.1 = sleep hygiene advice*	NR.1*** = non-recommended medication offered for sleep	N.1 = no treatment offered
Y.2 = CBT-I**	NR.2**** = recommended sleep medication not adjacent to CBT-I	N.2 = self-treated (including over-counter medication)
Y.3 = short-term recommended sleep medication adjacent to CBT-I	NR.3***** = only limited aspects of sleep hygiene advice offered	N.3 = treatment by non-MH team (e.g., resolved by GP)
Y.4 = specialist support (e.g., continuous positive airway pressure therapy)		N.4 = using recreational substances to self-treat

*Y.1 'Sleep hygiene advice' is understood as any confirmation of sleep hygiene having been discussed/offered to that patient; **Y.2 CBT-I includes a sleep group offered on Mulberry Wards as this was based on CBT-I; ***NR.1 non-recommended medication is assumed if there is no mention of medication name; ****NR.2: for the purposes of this study, recommended medications include: Melatonin, Zopiclone, Zolpidem (NICE-recommended), and Promethazine (included based on the rationale that it is a histaminergic sedative rather than a Benzodiazepine, so arguably reasonable to prescribe to patients with previous substance dependency or where there are concerns about interaction with other medications, both common risks in SMI populations); *****NR.3: includes allusions to sleep hygiene being discussed in the future, but no evidence that it was

Fig. 1. Coding key for descriptions of methods by which sleep was treated
*Y.1 'Sleep hygiene advice' is understood as any confirmation of sleep hygiene having been discussed/offered to that patient; **Y.2 CBT-I includes a sleep group offered on Mulberry Wards as this was based on CBT-I; ***NR.1 non-recommended medication is assumed if there is no mention of medication name; ****NR.2: for the purposes of this study, recommended medications include: Melatonin, Zopiclone, Zolpidem (NICE-recommended), and Promethazine (included based on the rationale that it is a histaminergic sedative rather than a Benzodiazepine, so arguably reasonable to prescribe to patients with previous substance dependency or where there are concerns about interaction with other medications, both common risks in SMI populations); *****NR.3: includes allusions to sleep hygiene being discussed in the future, but no evidence that it was.

3.1. Primary research question

Regarding descriptions of sleep problems, *causes* were described in 56 (28 %) records, *perceived effect* was described in 53 (26 %) records, *sleep pattern* was described in 56 (28 %) records, *average hours of daily sleep* was described in 39 (19 %) records, and *specific sleep disorders* were named in 27 (13 %) records (insomnia = 19, obstructive sleep apnoea = 6, restless legs syndrome = 1, hypersomnia = 1).

Out of the 203 PS patient records, 74 (37 %) contained no descriptions, 96 (47 %) contained 'minimal' descriptions, 31 (15 %) contained 'adequate' descriptions, and two (1 %) contained 'good' descriptions of sleep problems.

There was no significant association between sleep description ('none', 'minimal', or 'adequate') and ethnicity (X^2 (2, N = 175) = 1.89, p = .389), gender (X^2 (2, N = 201) = 2.09, p = .352), or inpatient status (X^2 (2, N = 201) = 3.3, p = .192). 'Good' descriptions were not included in analyses as they comprised only two data points.

3.2. Secondary research question

Regarding treatment of sleep problems, 115 (57 %) patient records contained no mention of sleep treatment being offered by their mental health team (although three of these did access sleep treatment via their GP), 69 (34 %) patients were offered non-recommended treatments at best, and 19 (9 %) patients were offered recommended treatments.

Amongst the 69 patients offered non-recommended treatments, 52 (75 %) were offered a recommended sleep medication (not adjacent to CBT-I). Fifteen (22 %) were offered one or more *non-recommended* medications for sleep disorders, including Temazepam (n = 3), Olanzapine (n = 4), Quetiapine (n = 2), Clonazepam (n = 1), Diazepam (n = 1), Mirtazapine (n = 1), or unspecified (n = 3). Fourteen (20 %) were offered limited aspects of sleep hygiene.

Of the 19 patients offered recommended treatments, four were offered CBT-I. Of these four patients, two were offered group-based CBT-I adjacent to a recommended sleep medication, one was offered individual CBT-I via a sleep study adjacent to a recommended sleep medication, and one was referred to a sleep clinic with no medication. Fourteen of the patients offered recommended treatments were offered sleep hygiene without CBT-I. The one remaining patient received specialist support in the form of continuous positive airway pressure therapy for obstructive sleep apnoea.

There was no significant association between sleep treatment ('no treatment', 'non-recommended', or 'recommended') and ethnicity (X^2 (2, N = 177) = 4.62, p = .099) or gender (X^2 (2, N = 203) = .45, p = .799).

There was a statistically significant difference in sleep treatment offered based on inpatient status, with a medium effect size (X^2 (2, N = 203) = 12.97, p = .002, V = .25). Post-hoc comparisons using a Bonferroni adjusted significance level of .008, indicated significant differences in the type of treatment offered based on inpatient status. Significantly more outpatients were offered no treatment (n = 89; 64 %) compared to inpatients (n = 26; 41 %) (p = .002). Significantly more inpatients were offered non-recommended treatments (n = 33; 52 %) than outpatients (n = 36; 26 %) (p < .001). There was no significant difference between inpatients (n = 5; 8 %) and outpatients (n = 14; 10 %) in recommended treatments offered (p = .608).

3.3. Exploratory research questions

The 91 patient records which included a confirmed sleep status *and* sufficient attendance data were used to answer both the exploratory research questions. Mean age was 41 (*SD* 13.22) in the PS group and 32 (*SD* 13.08) in the GS group. The 16 PS patients who were inpatients for part of the time period of interest (01.09.21–31.08.22) spent an average of 41 % (2–99 %) of their total time under services during that period at an inpatient setting. For the six GS patients, the average was 27 % (8–67 %). Further descriptive features are provided in Table 2.

Table 2
Descriptive features of patients included in the PS and GS groups.

	Both groups (n = 91)	PS group (n = 65)	GS group (n = 26)
Gender			
Female	65 (71 %)	49 (75 %)	16 (62 %)
Male	26 (29 %)	16 (25 %)	10 (38 %)
Ethnicity			
White British	51 (56 %)	38 (59 %)	13 (50 %)
Other ethnicity[a]	27 (30 %)	15 (23 %)	12 (46 %)
Unspecified	13 (14 %)	12 (18 %)	1 (4 %)
Employment status			
Long term sick or disabled, receiving benefits	29 (32 %)	22 (34 %)	7 (27 %)
Employed	19 (21 %)	12 (19 %)	7 (27 %)
Unemployed	11 (12 %)	8 (12 %)	3 (12 %)
Other/unspecified	32 (35 %)	23 (35 %)	9 (34 %)
Mental health diagnosis			
Schizophrenia/psychosis	11 (12 %)	4 (6 %)	7 (27 %)
Other/comorbid disorder(s)[b]	37 (41 %)	31 (48 %)	6 (23 %)
Unspecified	43 (47 %)	30 (46 %)	13 (50 %)
Inpatient for part of time period of interest			
Yes	22 (24 %)	16 (25 %)	6 (23 %)
No	69 (76 %)	49 (75 %)	20 (77 %)

[a] 'Other ethnicity' includes Asian, Baltic Estonian/Latvian/Lithuanian, Kashmiri, Indian, Irish, 'Other White background', Pakistani, Turkish, White and Black African, White and Black Caribbean.

[b] 'Other/comorbid disorder(s)' includes Bipolar disorder, Schizoaffective disorder, Anxiety, Depression, Personality disorder, PTSD, Adjustment disorder, Cyclothymia, Dissociative disorder, Mental and behavioural disorders due to multiple drug use and/or use of other psychoactive substances, Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and/or psychotropic drugs, not elsewhere classified (some of which are co-morbid with each other and/or schizophrenia/psychosis).

3.3.1. *'Does SMI patients' sleep affect their attendance rates?'*

Patients in the PS group and the GS group both attended an average of 87 % of appointments in the time period of interest. There was no significant between-groups difference in rate of appointments attended (z = −.734, p = .463).

3.3.2. *'Are SMI patients with sleep problems scheduled more appointments than SMI patients with good sleep?'*

The PS group were scheduled an average of 18 appointments (*SD* 14.2) in the time period of interest, whilst the GS group were scheduled an average of 17 appointments (*SD* 12.27). There was no significant between-groups difference in number of appointments scheduled (z = −.040, p = .968).

4. Discussion

This study used routine clinical records to establish the current practices for assessment and treatment of sleep problems in patients under secondary community mental health services. The ways in which clinicians described sleep problems and their impact suggests that there is awareness amongst clinicians of the relevance of sleep to patients' mental health. Despite this, we found that sleep problems were described inconsistently, and in the majority of cases, either not treated at all or treated in ways that conflicted with guidelines. This supports findings from previous clinician and patient surveys [5,25–27] that routine assessment and treatment of sleep problems is severely lacking in secondary community mental health settings, despite a well-established bidirectional relationship between sleep and mental health.

NICE guidelines were used as the basis for treatment expectations, namely sleep hygiene advice and CBT-I as a first-line treatment, with *temporary* (preferably less than one week) medication (melatonin, zopiclone, zolpidem, or promethazine) offered adjacent to CBT-I if required. It is overwhelmingly evident that these guidelines were rarely followed. This tendency is thought to be due to lack of knowledge, training and resources regarding sleep assessment and treatment and/or beliefs that sleep treatment is too demanding in SMI populations [26,27,47]. It is also possible that few clinicians are aware of NICE guidelines for insomnia, and whose responsibility it is to treat it. This shortfall in clinicians' appropriate treatment of sleep problems is an unfortunate reality since CBT-I has been shown to be a cost-effective approach for individuals with mental health problems (although the literature on cost-effectiveness of CBT-I in SMI specifically is sparce), and could reduce long-term service costs and patient morbidity in the longer term [48–50].

Sleep hygiene was provided more frequently than CBT-I in our sample, however, there was little evidence that it was tailored to individuals, and no follow-up descriptions of how effective it was. For SMI populations, merely providing advice with no follow up is likely insufficient without support to implement it [51]. The majority of patients were offered no or non-recommended treatments (primarily pharmacological). Over-the-counter treatments for sleep are expressly advised *against* by NICE (2022), yet one patient was actively advised to seek them, whilst two others were noted to be seeking them of their own accord with no advice to the contrary. One defence for lacking assessment and treatment of sleep problems (aside from lack of training) is that the ICD-11's [52] ambiguous definition of insomnia could prevent sleep problems being recognised and targeted in their own right. However, it is clear from this study that many clinicians do recognise and *attempt* to treat sleep problems. Patient care may therefore improve hugely from services making treatment guidance clearer.

It is interesting to note the disparity between expected sleep disorder prevalence rates compared to rates recorded. For example, only 203 (12 %) out of a total of 1744 patients under the care of CMHT and EIP

services between 01.09.21 and 31.08.22 were identified as having a sleep problem even though sleep problems are known to be highly prevalent (26%–80 %) in SMI populations [3,5,6]. As well as insomnia, prevalence rates of lesser-known sleep disorders like circadian rhythm disorder 53,54, hypersomnia 55,56, restless legs syndrome [57], and obstructive sleep apnoea 58,59 are all elevated in SMI populations compared to the general population, and yet there were very few mentions of these specific disorders. This suggests that these disorders may be under-identified and subsequently undertreated, which poses further risks for patients' health and wellbeing (e.g., some medications commonly prescribed for SMI treatment can aggravate the symptoms of obstructive sleep apnoea).

Across the sample of patients identified as having sleep problems (n = 203), there were more female patients (60 %) than males. It is possible this reflects lower likelihood for men to voluntarily access psychological therapies [60], and/or higher prevalence of insomnia in women [61]. At least 59 % of patients were White British and at least 28 % were of other ethnicity (unfortunately, there was too much variance across too small a sample to sub-categorise ethnicity further), with 13 % unclear. An average of 85 % of the population across Huntingdonshire, Fenland, Peterborough, Cambridge, East Cambridgeshire, and South Cambridgeshire are White 62, suggesting non-White British ethnicity populations may be over-represented in this study's SMI patient sample.

Gender and ethnicity did not significantly impact how sleep was treated, but inpatient status did. 'Inpatients' were more likely to be offered non-recommended treatments than outpatients, whilst outpatients were more likely to be offered no sleep treatment than inpatients. It is possible that having been an inpatient at some point denotes increased severity of mental health and/or sleep symptoms and that such patients are therefore more likely to be offered (pharmacological) sleep treatment. Differences could also be explained by systemic factors. For example, patients' sleep is observed 24/7 on inpatient wards and medication can be easily prescribed and accessed. On inpatient wards, sleep problems are often treated with antipsychotic medication which has sedative effects, but this is not an appropriate long-term solution [25,63]. Further research is warranted regarding sleep treatment decisions on inpatient wards, especially since it is established that sleep can be successfully treated via appropriate means in these settings and that this improvement continues post-discharge [64]. This being said, it is important to note that in the current study, 'inpatients' spent an average of only 42 % (ranging from 2 to 100 %) of the one-year time period of interest at an inpatient setting, therefore it is possible that treatments were offered prior or subsequent to inpatient admission, so we cannot reliably state that setting caused the treatment differences.

This study had an exploratory aim of elaborating on the association between sleep and appointment attendance rate. There was no difference detected in attendance rates or number of appointments offered between those identified as having sleep problems and those without. This may reflect low recording of attendance and therefore insufficient power for this analysis.

4.1. Study advantages and limitations

An advantage of this research approach was that it provided a non-invasive way to analyse a range of data since it was extracted from real-world patient records. The data is highly relevant due its capture of recent clinical practices, and any results are therefore directly linked to clinical implications. Although other studies have investigated appropriateness of sleep assessment and treatment in SMI, they have predominantly relied on recruitment of patients/clinicians who opted into the research process and whose responses may have been biased (e.g., clinicians with more interest in sleep being more likely to take part). While other investigation methods have differed from the present study, it is notable that the findings (in relation to sleep being rarely formally assessed or treated) are consistent, lending further robustness to our conclusions.

The advantage of utilising this real-world clinical data presented an intrinsic limitation, namely that data was entirely reliant on historic recording by clinicians and data availability in CPFTRD. It had been expected that this would be a limiting factor, especially since it was already established that sleep is not routinely assessed. However, even mandatory data records such as attendance outcomes were sparsely recorded, which further limited the extent to which some questions could be answered. The primary limitation to this study, however, was that records available for scrutinising were limited to 'questionnaires' (e.g., risk assessments, care plans, safeguarding referral forms, etc.) or SystmOne-generated outcome measures (e.g., HONOS) (for all sources, see Appendix A). Free text clinical notes and correspondence records were inaccessible, though it is likely such records would have included relevant details. This may have limited the findings.

4.2. Future directions

To build on these findings, incorporating routine assessment of sleep into clinical practice within SMI (or indeed any) mental health services could be piloted via feasibility studies. One suggestion is adoption of a standardised outcome measure such as the Insomnia Severity Index (ISI), Sleep Condition Indicator (SCI), or Pittsburgh Sleep Quality Index (PSQI), to be routinely completed upon acceptance of referral. A second suggestion is integration of specific sleep questions that capture 1) cause (s) of sleep problem, 2) perceived effect of sleep problem, 3) sleep pattern, 4) average hours of daily sleep, 5) presence of specific sleep disorder, into services' routinely completed questionnaires (such as Risk Assessments or Care Plans). It is particularly important that appropriate staff training (e.g., to improve identification of and differentiation between sleep problems) is integrated alongside either/both of these suggestions, as this has been shown to increase healthcare staff's confidence in both assessing and treating sleep problems [26]. Important information about sleep could then be readily available, easily accessible, and routinely updated for every patient, streamlining the pathway for appropriate sleep treatment.

5. Conclusion

In conclusion, this study echoes previous work illustrating a lack of routine clinical attention to sleep assessment and treatment in SMI populations, and supports that where sleep is addressed, this most often takes the form of non-recommended forms of treatment. This highlights the need for both improved consistency in sleep assessment and appropriate treatment that aligns with clinical guidelines.

CRediT authorship contribution statement

Aviva Stafford: Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation. **Sheri Oduola:** Writing – review & editing, Supervision. **Sarah Reeve:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Health and Social Care.

Appendix A

A.1 Case selection process

Table 1
Case selection process

Terms searched	Records retrieved*	Assigned sleep status	Sufficient attendance data
Sleep	650	269 (199 PS, 68 GS)	91 (65 PS, 26 GS)
Insomnia	2	1 (PS)	–
Waking	7	2 (PS)	1 (PS)
Nightmare	5	1 (PS)	1 (PS)
Apn	0	0	–
Hypersomnia	0	0	–
Restless leg	0	0	–
Circadian	0	0	–
Somnolence	0	0	–
Narcolepsy	0	0	–
Total records extracted	664	273 (203 PS, 68 GS)	93 (67 PS, 26 GS)
Total records utilised (all PS + GS with sufficient attendance data)	**229**		

GS = Good sleep; PS = Poor sleep.
*excludes records that were duplicated in 'sleep' search.

A.2 S[1] sources from which patient data was retrieved

CPFT Risk Assessment.
CPFT Care Plan - Main.
CPFT Care Plan - Crisis Plan - Adults & OPMH.
CPFT Care Plan - Crisis Plan.
CPFT Adults & OPMH FRS Telephone Triage.
CPFT Care Plan - Main - Adults & OPMH.
CPFT Lifestyle Assessment and Support B2.
CPFT AMHP Report Form SOC323 Part [QQQQQQ].
CPFT. Honos Adult (MHCT).
CPFT AMHP Report Form SOC323 Part 2a.
CPFT FRS Frequent Caller Triage.
CPFT Care Plan - Safe Plan.
CPFT Occupational Therapy ADL Assessment.
CPFT Occupational Self Assessment ([~~~~~~])
CPFT CAARMS.
CPFT [ZZZZZZ] Plan - Crisis Plan - Adults & OPMH.
CPFT Care [ZZZZZZ] - Safe [ZZZZZZ].
CPFT Frequent Caller Agreed Plan.
CPFT Care [QQQQQQ] - Crisis [QQQQQQ] - Adults & OPMH.
CPFT CAADA/DASH Risk Assessment.
CPFT Clozapine Side Effects.
CPFT MHA - Section 136 RAVE Assessment.
CPFT Occupational Therapy Report.
CPFT Care [QQQQQQ] - Main - Adults & OPMH.
CPFT [ZZZZZZ] Plan - Main - Adults & OPMH.
CPFT Honos Adult (MHCT).

A.3 SQL searches

SQL search 1 (to identify relevant records)

```
SELECT TOP 25000 *  FROM s1.[dbo].[s1_freetext]
WHERE (TeamName like '%cameo%' or TeamName like '%locality%')
AND  [FreeText] LIKE '%sleep%'
AND EventDate BETWEEN '2021-09-01' AND '2022-08-31'
ORDER BY EventDate, rid
```

(repeat, swapping 'sleep' for each term below individually):

```
AND [FreeText] LIKE '%insomnia%'
AND [FreeText] LIKE '%waking%'
AND [FreeText] LIKE '%nightmare%'
AND [FreeText] LIKE '%apn%'
AND [FreeText] LIKE '%circadian%'
AND [FreeText] LIKE '%restless leg%'
AND [FreeText] LIKE '%hypersomnia%'
AND [FreeText] LIKE '%somnolence%'
AND [FreeText] LIKE '%narcolepsy%'
```

SQL search 2 (to bring up all notes for individual patient record)

```
SELECT TOP 3000 * FROM s1.[dbo].[s1_freetext]
WHERE rid in ('insert rid here')
AND EventDate BETWEEN '2021-09-01' AND '2022-08-31'
ORDER BY EventDate
```

SQL search 3 (to identify attendance records)

```
SELECT ae.rid,
Cast (ae.dateevent AS DATE) event_date,
contactmethoddescription,
costcentredesc,
eventdetailsdescription,
eventdetailsmethoddescription,
 [role],
teamname,
organisationname,
appointmentstatusdescription,
app.attendedordna
FROM   [S1].[dbo].[s1_activityevent] AS AE
       LEFT OUTER JOIN [S1].[dbo].[s1_appointments] AS app
ON AE.rid = app.rid
AND Cast (ae.dateevent AS DATE) = Cast (appointmentdate AS DATE)
WHERE  ae.rid in ('insert rid here') AND
   CAST (DateEvent AS DATE) BETWEEN '2021-09-01' AND '2022-08-31'
AND ( eventdetailsdescription NOT IN ('Administration', 'Clinical Administration',
'Data Migration', 'Administration Clinical', 'Administration Clinical', 'Patient
record' ) )
AND ( contactmethoddescription NOT IN ('Administration', 'Clinical Administration',
'Data Migration', 'Add things here' ) )
AND (CostCentreDesc LIKE '%CAMEO%' OR
       CostCentreDesc LIKE '%PALT%' OR
       CostCentreDesc LIKE '%HALT%' OR
       CostCentreDesc LIKE '%CALT%' OR
       CostCentredesc LIKE 'FALT%')
ORDER  BY -- ae.rid,
costcentredesc desc,
dateeventdatetime
```

SQL search 4 (to identify age, ethnicity, employment status, gender)

```
SELECT dem.rid, pat.dob, dem.Ethnicity, dem.EmploymentMHSDSStatusDescription,
dem.Gender, dem.IMD_Rank
FROM s1.dbo.s1_patient AS PAT
INNER JOIN s1.dbo.S1_Demographics dem
ON pat.rid = dem.rid
WHERE pat.rid IN ('insert rid here')
ORDER BY dem.rid
```

SQL search 5 (to individual diagnosis)

```
SELECT rid, code, Description, DateDiagnosis
FROM s1.dbo.S1_Diagnosis dia
WHERE rid IN
('0aa233aaf84e164b7f3df2297a5d61e8')
ORDER BY rid, DateDiagnosis, code
```

Additional SQL search (to identify n of patients under CMHTs and EIPs between 01.09.21-31.08.22)

```
SELECT DISTINCT rid  FROM s1.[dbo].[s1_freetext]
WHERE (TeamName like '%cameo%' or TeamName like '%locality%')
AND EventDate BETWEEN '2021-09-21' AND '2022-08-31'
```

Example of full SystmOne 'Risk

A.4 'Risk Assessment' questionnaire template

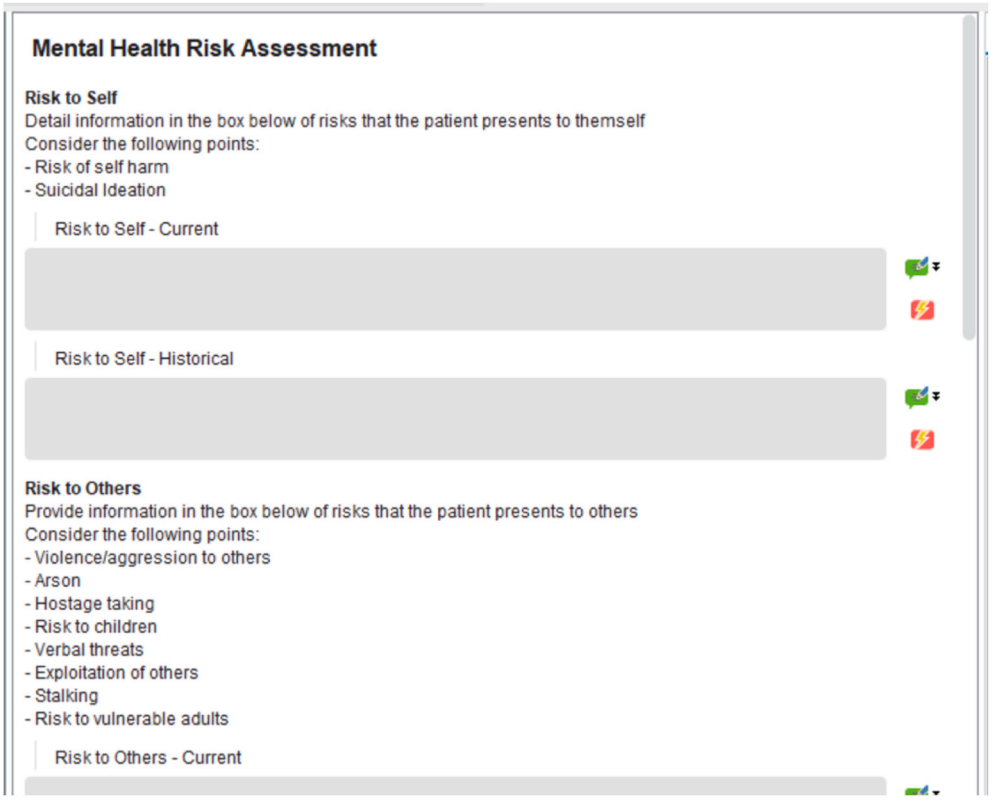

Fig. 1. Risk Assessment part 1

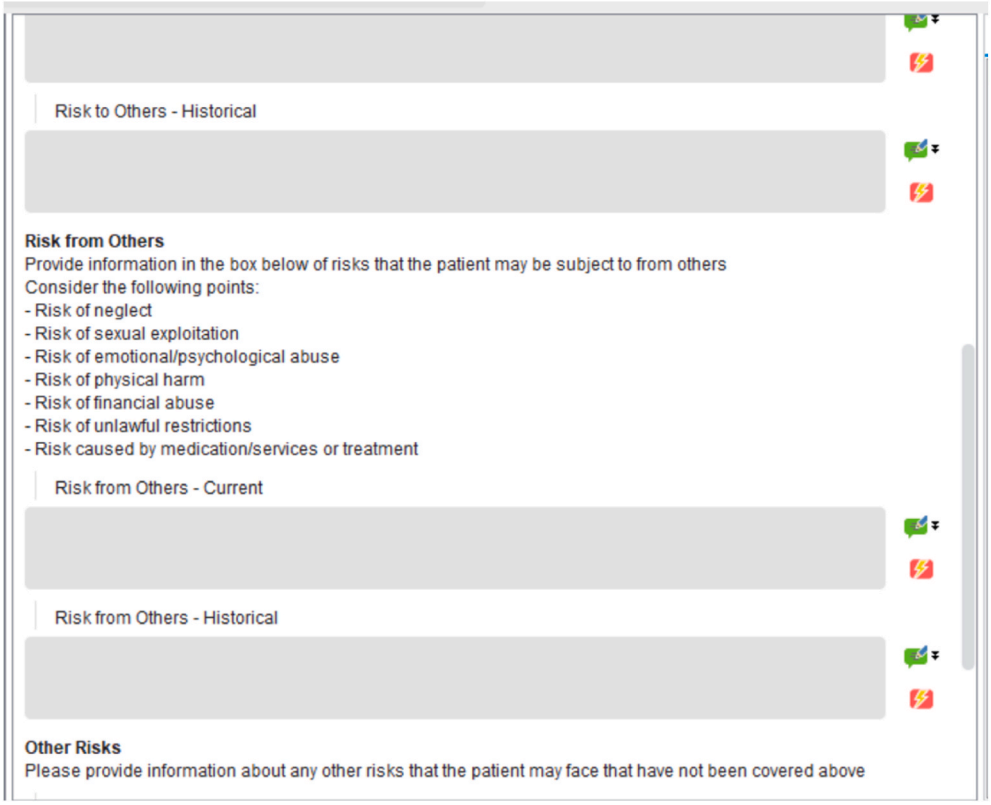

Fig. 2. Risk Assessment part 2

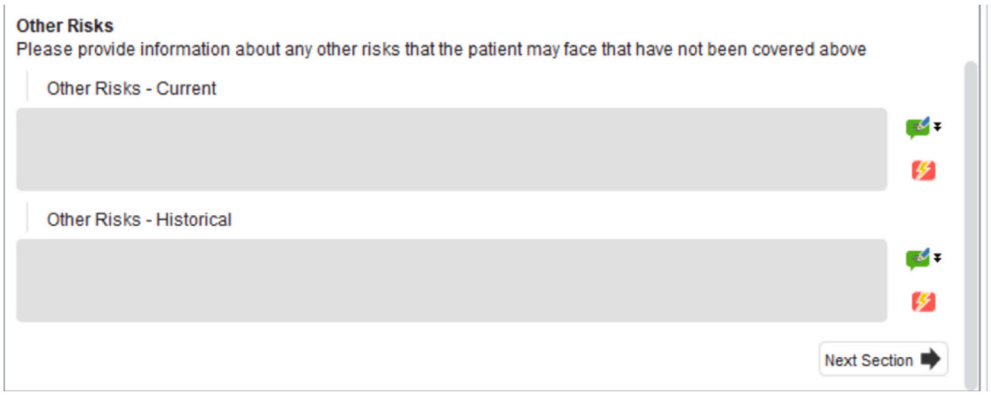

Fig. 3. Risk Assessment part 3

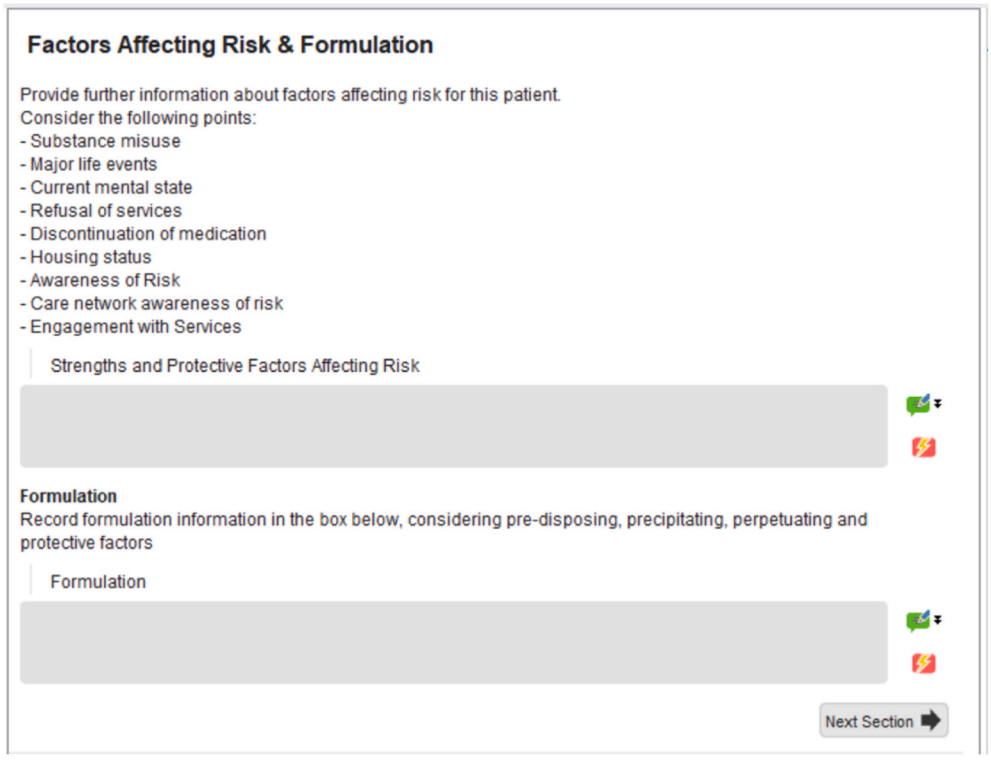

Fig. 4. Risk Assessment part 4

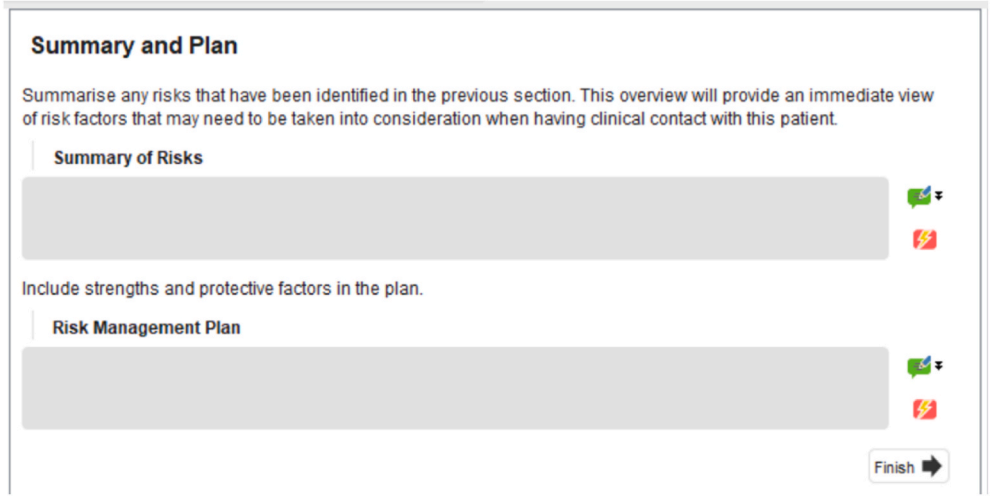

Fig. 5. Risk Assessment part 5

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