Feasibility of supported online guided self-help for insomnia for young people attending child and adolescent mental health services

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Abstract

Background: Sleep disturbance in adolescents is common with up to one third reporting significant symptoms of insomnia. Research with adults has demonstrated that online cognitive behavioural therapy for insomnia (CBTi) can improve both sleep and mental health. However, research with adolescents is lacking and we know little about whether CBTi would have similar effects with this younger population.

Objective: This study aims to assess the feasibility of adding supported online CBT for insomnia to the usual care of young people aged 14-17 years attending specialist child and adolescent mental health services.

Methods: This is an open trial where we will recruit young people (n=50) aged 14-17 attending specialist child and adolescent mental health services (CAMHS) with symptoms of insomnia. In addition to their usual care, young people will be provided with Sleepio, a 6 session, online CBTi self-help programme for insomnia. Sleepio teaches a range of techniques including sleep hygiene, relaxation training, stimulus control, sleep restriction and cognitive techniques which participants will be helped to apply through brief weekly telephone support calls. Questionnaires and interviews will be completed at baseline and post-intervention (8 weeks) and will assess sleep, symptoms of depression and anxiety and acceptability of Sleepio and telephone support.

Results: Recruitment started in May 2018 and will continue until the end of September 2018.

Conclusions: This study will provide preliminary evidence about whether supported online CBTi is acceptable to young people with mental health problems and the post-intervention effects on sleep and symptoms of anxiety and depression. This information will determine whether a randomised trial to determine the effectiveness of Sleepio should be undertaken.
Introduction

Insomnia

Poor sleep during adolescence is common with insomnia, defined as chronic dissatisfaction with sleep quantity and/or quality, being the most prevalent sleep disorder [1,2]. One third of adolescents report insomnia symptoms and up to a quarter will fulfill the diagnostic criteria for insomnia depending on the definition and method of assessment [3,4]. Insomnia symptoms are persistent [2] and are associated with significant mental health problems including depression, anxiety, substance abuse and suicidal ideation [3,5,6,7].

Association between insomnia and mental health

Research examining the nature of the association between adolescent sleep disturbance and mental health is limited and the findings are not consistent [8]. There is evidence of a bidirectional relationship where symptoms of insomnia during adolescence both predict and are predicted by depression and depressive symptoms [9,10,11]. However, overall, there is more evidence to suggest that insomnia symptoms precede the development of anxiety and depression in adolescence more than the reverse [8,12-14]. This suggests that the provision of interventions that directly address insomnia could reduce the risk of developing mental health problems or reduce current symptomatology [12].

Cognitive behavioural therapy for insomnia (CBTi)

With adults, there is well established evidence that treating insomnia can improve mental health including depression [15], anxiety [16] and psychotic experiences [17] Interventions are based on cognitive behavioural therapy for insomnia (CBTi) and typically include a range of techniques including stimulus control, relaxation training, sleep restriction, sleep hygiene and cognitive techniques to manage worries and intrusive thoughts [18]. Insomnia interventions can be delivered
via the internet with systematic reviews concluding that internet CBTi is effective and improves both sleep and mental health [19,20].

**CBTi for adolescents**

With adolescents, research examining the effect of CBTi on sleep and mental health is promising but very limited [21,18]. An open uncontrolled pilot study assessing a 5 week CBTi intervention for depressed adolescents with insomnia found post intervention improvements in sleep and mood [22]. Similarly, augmenting depression treatment with CBTi in a randomised controlled trial involving 40 adolescents aged 12-20 years of age resulted in positive effects on sleep and depression [23]. In a community study, Bruin et al. [24], found that CBTi delivered either face to face or over the internet to 12-19 year olds with insomnia were similarly effective and resulted in comparable improvements in sleep and psychopathology (anxiety and depression) compared to a waiting list control group. The authors concluded that improvements in psychopathology were attributable to a reduction of insomnia and recommend that further research is undertaken within clinical settings.

**Aims of the study**

The aim of this study is to assess the feasibility of adding supported online CBT for insomnia for young people aged 14-17 years attending specialist child and adolescent mental health services (CAMHS).

**Methods**

**Study Design**

This is a pre-post uncontrolled mixed-methods feasibility study. The study was funded by the Wiltshire Child Mental Health Commissioning group and ethical approval was obtained by the South West - Central Bristol Research Ethics Committee (17/SW/0178).

**Setting**
The study will be undertaken in child and adolescent mental health services (CAMHS) within the Oxford Health NHS Foundation Trust. The Trust serves a wide geographical area that includes Bath and North East Somerset, Swindon and Wiltshire.

**Participants**

Young people will be eligible to participate if they are: aged 14 to 17 years old; attending CAMHS with symptoms of insomnia (i.e. time asleep/time in bed ≤ 85%) as either a primary issue or as a co-morbidity; motivated to try and improve their sleep; interested in using Sleepio.

Motivation is assessed by rating each of 3 questions on a 10-point Likert scale, 0 (strongly disagree) through to 10 (strongly agree). The questions relate to problem severity (“At present, sleep is a big problem for me”), desire to change (“I want to change my sleep”) and self-efficacy (“I feel I can change my sleep”). For inclusion, each item must be rated ≥ 5.

Young people will be ineligible to participate if: they are presenting with active suicidal ideation; they have been diagnosed with psychosis; there are current safeguarding concerns (i.e. the young person has suffered abuse within the last 6 months or is the subject of a safeguarding investigation); they have a significant developmental disorder (e.g. autism) which prevents them from understanding the online materials.

As this is a feasibility study, any face-to-face intervention or medication that the young person is receiving through CAMHS will not be interrupted. This trial will therefore run alongside any treatment as usual.

**Recruitment and Consent**

Clinical staff working in CAMHS teams across Bath and North East Somerset, Swindon and Wiltshire will identify eligible young people. Interested young people and their carers will be provided with a project information sheet and their details will be passed to the research team. A research assistant will contact the young person to discuss the project, obtain written consent and complete baseline
measures. For those under the age of 16, parental consent will also be required. Meetings will either take place at the individual’s home, at the University of Bath, via telephone or at a community venue, depending on their preference.

**Intervention**

Sleepio is an established, fully automated, web-based, self-administered sleep intervention that has been evaluated with adults [25,17,26]. The intervention is based on CBT for insomnia and incorporates cognitive (e.g. paradoxical intention, cognitive restructuring, mindfulness, positive imagery, putting the day to rest), behavioural (e.g. sleep restriction, stimulus control and relaxation) and educational components (e.g. sleep hygiene, psychoeducation). The programme is highly interactive and content is presented via an animated virtual therapist (The Prof) in six weekly sessions that all end with a quiz. Participants complete daily sleep diaries throughout the intervention, which are used by the programme algorithmically to provide automated “personalized” help.

There are four different components of Sleepio: sleep diary, case file, library and community. There is also a Sleepio app that can be used to augment the web version. The app allows the user to fill in their sleep diary, view their daily schedule and access relaxation audio files.

**Sleep Diary**

Users are required to complete a daily sleep diary that feeds into the underlying algorithms that tailor the Sleepio programme content to the individual.

**Case File**

At the very beginning of the programme, users are asked to define the goals that they want to achieve with Sleepio. This progress is tracked throughout and can be viewed in the individual’s case file. Here, they can also view their to-do list and daily schedule that the Prof helps them to compile.
throughout the course. The case file also contains tools such as a recommended reading list, a thought checker and a day planner and users can download worksheets and audio files.

Library

The library contains articles about sleep which augment the Sleepio sessions.

Community

There is a community section within Sleepio where users can post comments and interact with each other. As this section is not moderated and is intended for adults, young people will be instructed not to access this area of the website.

Brief telephone support

Although Sleepio is a self-administered programme, maintaining engagement and programme compliance may be particularly challenging for adolescents [18]. As Sleepio has not previously been used with this age group we will augment the programmes with brief (15 minute), weekly support telephone calls from a trained Sleepio Assistant. The purpose of support calls are to maintain motivation and engagement and we will follow a similar process to that used by Luik et al [26]. Session content will be discussed, and the young person will be helped to reflect on how techniques can be applied to their situation.

Study Procedures

The study procedures are summarised in Figure 1.

Insert Figure 1 here

Once eligible young people have provided consent and completed baseline measures, they will be emailed an individual access code for Sleepio. A Sleepio Assistant will contact the young person to discuss the goals that they wish to achieve at the end of Sleepio and agree times for future support calls. Sessions are released each week. The Sleepio Assistants will monitor progress through the
Sleepio dashboard which summarises when the young person has accessed each session. Reminder emails and telephone calls will be sent if young people are not engaging with their session. When the six sessions have been completed, a member of the research team will arrange to meet with the young person and conduct the post-use assessment.

**Outcome Measures**

The following standardised assessments will be completed pre (baseline) and post Sleepio completion (8 -10 weeks).

**Mental health**

Anxiety: Revised Child Anxiety and Depression Scale (RCADS) [27]. RCADS is a 47-item questionnaire assessing DSM-IV criteria for social phobia, separation anxiety, obsessive compulsive disorder, panic disorder, generalised anxiety disorder and major depressive disorder. Each item is rated on a 4-point Likert scale of frequency ranging from never (0) to always (3) and items are then summed to produce sub-scale and total anxiety scores. There are age and gender related norms for identifying clinically significant scores (total score ≥64-80).

Depression: The Mood and Feelings Questionnaire (MFQ) [28]. The MFQ consists of 33 items each rated as either “true” (scores 2), “sometimes true” (scores 1) or “not true” (scores 0). The MFQ has high criterion validity and correlates well with other measures of depression. A total score of 27 and above is associated with major depression, 20 with mild depression and 16 with no mood disorder [28-30].

Sleep.

Insomnia Severity Index (ISI): A seven item self-report measure assessing symptoms of insomnia over a two-week period on a 5-point scale. The ISI assesses severity of sleep onset, sleep maintenance, and early morning awakening problems; sleep dissatisfaction; interference of sleep difficulties with
daytime functioning; whether sleep problems are noticed by others; and distress caused by sleep difficulties [31].

Sleep Condition Indicator (SCI). An eight item self-report measure assessing sleep and impact on daytime functioning over the previous month on a 4-point scale. The SCI is an internally consistent (α = .86) measure with a clinical cut-off 17 correctly identifying 89 % of those with probable DSM-5 insomnia disorder [25,32].

Experience of Sleepio

At the post-use assessment, a semi-structured interview will be undertaken with young people to gather detailed feedback on their experience of Sleepio. These questions will explore young people’s perceived accessibility of, and satisfaction with, Sleepio, as well as any perceived changes in their sleep or mental health. They will also be asked their opinions on specific elements of Sleepio and on their weekly telephone support calls.

Usage

The number of Sleepio sessions completed by each individual will be recorded from the Sleepio dashboard.

Sample Size

Formal power calculations were not deemed necessary due to this being an initial feasibility study. Recruiting 50 young people should provide sufficient information to determine whether Sleepio is perceived as acceptable and results in improved sleep and mental health in young people [33].

Statistical Analysis

We will present descriptive statistics summarising the cohort in terms of age, gender, sleep, anxiety and depressive symptomology. Descriptive statistics will also be used to summarise engagement with Sleepio in terms of number of sessions completed versus the number of those who dropped out.
T-test analyses of mean scores will be conducted on the total scores for the pre-and post measures of sleep (ISI, SCI), and on the total and subscale scores for the pre-and post measures of mood (RCADS, MFQ). This will allow exploration of any changes in sleep or psychological functioning following Sleepio use.

Post-use semi-structured interviews will be analysed to determine the acceptability of Sleepio with young people. The interviews will be audio recorded and transcribed. A predefined framework will be derived from the interview schedule and adapted following participant responses for analysis.

**Results**

The study is currently open to recruitment and is planned to close at the end of October 2018.

**Discussion**

This study aims to determine the feasibility of adding supported online CBT for insomnia for young people aged 14-17 years attending specialist child and adolescent mental health services (CAMHS).

Our study is addressing an important problem and will provide preliminary evidence about whether supported online CBTi is acceptable to young people with mental health problems and the post-intervention effects on sleep and symptoms of anxiety and depression. If found to have a positive effect on mental health, this low intensity intervention delivered with minimal therapist support could readily increase the limited capacity of traditional child and adolescent mental health services.

**Limitations**

Whilst this is a feasibility study limitations in the study design need to be acknowledged. Firstly, we are relying on self-report measures of sleep and are not using objective actigraphy measures. Retrospective self-report may be prone to inaccuracies but whilst wearable devices are able to prospectively monitor and track sleep, they are not always reliable or accurate [34]. Subjective reports do provide useful information which we will supplement with prospectively completed sleep diaries completed as young people progress through Sleepio [8].
Secondly, this is an open trial and we do not have any control or comparison groups. This will not allow comparative insights into whether any improvements are due to the Sleepio intervention, the young person's on-going mental health intervention, or the passing of time. At this stage our primary aim is to determine the acceptability and feasibility of using Sleepio with young adolescents - not in determining efficacy. The inclusion of comparison group(s) to control for these variables will be considered in a subsequent trial.

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Contributions

PS is the grant holder and principal investigator for the project. PS conceptualized the study design and drafted the manuscript. MD and AC are providing telephone support and BC is the researcher undertaking pre- and post-assessments. All authors read, contributed to, and approved the final manuscript.

Conflicts of Interest

None declared.

References


Figure 1. Sleepio study procedure.

**Identification:** Clinical staff in Child and Adolescent Mental Health Teams.

**Eligibility Criteria:** Aged 14-17, attending CAMHS, poor sleep, motivated to try improve it.

**Sleep diary:** Completed daily.

**Sleepio sessions:** Accessed weekly.

**Sleepio outcomes:** Completed RCADS, MFQ, SCI, ISI and semi-structured interview assessing acceptability of Sleepio.

1. Aged under 16: Assent from young person and signed parent consent.
2. Aged over 16: Young person signed consent.

Recruitment
CAMHS: Child and Adolescent Mental Health Services; RCADS: Revised Child Anxiety and Depression Scale; MFQ: Mood and Feelings Questionnaire; ISI: Insomnia Severity Index; SCI: Sleep Condition Indicator.