

### **Abstract**

Disturbed sleep is a common symptom of depression in adolescents, but this symptom is not often targeted in psychological therapies for depression. Although the causal relationship between sleep and depression is unclear, there is increasing evidence that in adults, Cognitive Behavioural Therapy for Insomnia (CBT-I) improves sleep problems and reduces symptoms of depression; however, there has been little investigation of using this approach with adolescents. This article describes the adaptation of brief CBT-I for adolescents with depression. A single case study is reported to illustrate the use of the 'Sleeping Better' Programme. Adaptations for adolescents include increased emphasis on engagement of the young person and the inclusion of parents in treatment. The treatment programme was acceptable to the adolescent and parent, and treatment outcome, as indicated by sleep diaries and standardised measures of depression and anxiety, was positive. Further evaluation of the 'Sleeping Better' programme is needed to establish if it is an effective low-intensity intervention for sleep problems in adolescents who have depression or anxiety.

**Keywords:** depression; insomnia; adolescence; cognitive-behavioural therapy; CBT-I

The period of adolescence is associated with a marked increase in the onset of Major Depressive Disorder (MDD; Merikangas, Nakamura, & Kessler, 2009). Up to 20% of adolescents report having had a depressive episode before they are 18 years old (Thapar, Collishaw, Pine, & Thapar, 2012) and internationally 2.6% of young people meet diagnostic criteria for a depressive disorder at any specified time (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). Adolescent depression has been associated with a range of adverse outcomes including educational underachievement (Verboom, Sijtsema, Verhulst, Penninx, & Ormel, 2014), reduced interpersonal functioning (O'Shea, Spence, & Donovan, 2014) and a 30-fold increased risk of suicidal behaviour and completed suicide (Birmaher et al., 1996).

Sleep disturbances are a symptom of MDD (APA, 2013; WHO, 1992) and are very frequently reported by depressed adolescents (Goodyer et al., 2017; Orchard, Pass, Marshall, & Reynolds, 2017). Young people with depression most often report problems with insomnia (Liu et al., 2007) – this includes a difficulty going to sleep (initial insomnia), maintaining sleep (middle insomnia), or premature awakening (terminal insomnia). Sleep disturbances can exacerbate other depressive symptoms (Spielman & Anderson, 1999), and substantially increase the risk of suicidal behaviour and self-harm amongst depressed adolescents (McCall et al., 2010; Singareddy et al., 2013).

Mental health professionals have traditionally conceptualised sleep disturbances as secondary to MDD, however accumulating evidence now challenges this view (Blom, Jernelöv, Rück, Lindefors, & Kaldo, 2017). In a meta-analysis of 23 studies, Lovato and Gradisar (2014) found that time awake in bed at night, particularly sleep onset latency (i.e. time taken to fall asleep) and poor sleep efficiency (time spent asleep as a proportion of time spent in bed), consistently predicted current and future episodes of depression. This insight into the longitudinal relationship between sleep disturbances and psychopathology implies

that adolescent sleep disturbances alone, or in the context of depression, might be a viable target for treatment (Gregory & Sadeh, 2012).

This is important because evidence-based treatments for common mental health problems are often insufficient to alleviate sleep disturbances in young people. For example, Kennard et al. (2006) investigated the remission rates, treatment response and residual symptoms of adolescents with MDD who were randomised to receive a 12-week treatment consisting of either: fluoxetine, cognitive behavioural therapy (CBT), a combination thereof, or clinical management with pill placebo. After treatment in all arms, 50% of adolescents who met criteria for remission, and 74% of adolescents who responded to treatment but failed to remit, continued to experience residual symptoms, most commonly sleep disturbances. Similarly in an online CBT treatment for anxiety disorders, Donovan, Spence and March (2017) found that treatment resulted in no significant improvement in adolescents' sleep problems, although there were overall reductions in anxiety (Spence et al., 2011; Spence, Holmes, March, & Lipp, 2006).

These data suggest that it may be important to target sleep problems experienced by young people with anxiety and depression (Peterman et al., 2016). Cognitive Behavioural Therapy for Insomnia (CBT-I) is considered the first line treatment for insomnia in adults irrespective of other comorbidities (Qaseem, Kansagara, Forcica, Cooke, & Denberg, 2016)(Qaseem, Kansagara, Forcica, Cooke, & Denberg, 2016)(Qaseem et al., 2016; Riemann et al., 2017). CBT-I is usually offered as a 6- to 8-session multicomponent intervention that aims to address maladaptive cognitions and behaviours which maintain an individuals' sleep disturbance (Blake, Sheeber, Youssef, Raniti, & Allen, 2017). Typical treatment components include sleep restriction, stimulus control (strengthening the association between bed and sleep), sleep hygiene and cognitive techniques (Palermo et al., 2016). CBT-I is effective for adults with primary insomnia when delivered in individual, group and online modalities

(Koffel, Koffel, & Gehrman, 2015; Trauer, Qian, Doyle, Rajaratnam, & Cunnington, 2015) and for adults with primary psychological or physical conditions and comorbid insomnia (van Straten et al., 2017; Wu, Appleman, Salazar, & Ong, 2015). Ellis, Cushing and Germain (2015) have developed a brief, one session, CBT-I intervention for adults with acute insomnia. This reduced insomnia severity and improved rates of insomnia remission compared to a waitlist condition (Boullin, Ellwood, & Ellis, 2016; Ellis et al., 2015; Randall, Nowakowski, & Ellis, 2018).

There are key developmental differences between adults and adolescents which highlight the need for adolescent-specific sleep treatments (Clarke & Harvey, 2012); adolescents experience changes to their circadian rhythm (i.e. delayed sleep onset), the onset of puberty, inflexible school schedules, and limited autonomy (given that they are usually subject to parental influence). However, there is limited research on the efficacy of CBT-I with adolescents (Jansson-Fröjmark & Norell-Clarke, 2016). Blake et al. (2017) reviewed the efficacy of CBT-I in adolescents with a self-reported or diagnosed sleep disorder who were aged 10-19 years. Eligible studies ( $N = 9$ ) included randomised controlled trials and uncontrolled feasibility trials, and treatments were required to include both behavioural and cognitive components. CBT-I resulted in statistically significant improvements in subjective and objective sleep outcomes, including sleep onset latency and sleep efficiency at post-treatment and at follow-up. Three studies assessed co-morbid depression symptoms and reported large pre- to post-treatment effect sizes, which were maintained at follow-up. Two studies assessed co-morbid anxiety symptoms and reported a small pre- to post-treatment effect size. To date, only one study has examined the efficacy of CBT-I on sleep and mental health symptoms for adolescents diagnosed with insomnia and a depressive disorder. Clarke et al. (2015) conducted a pilot randomised trial comparing conventional CBT for depression supplemented with CBT-I, and conventional CBT for depression supplemented with sleep

hygiene. CBT plus CBT-I resulted in significant benefits on total sleep time, insomnia severity and depression recovery at 12- and 26-week follow-ups, with medium and large effect sizes.

The available research therefore suggests that CBT-I may be effective for young people with depression and sleep problems. Brief interventions warrant particular attention because access to specialist mental health services for young people is limited (Stallard, Udwin, Goddard, & Hibbert, 2007). It is important to assess if any new treatments are acceptable to young people and their parents especially because adolescents are the least likely group to seek help for mental health and related difficulties (Rickwood, Deane, & Wilson, 2007). Parents of adolescents are often “gate-keepers” to adolescents accessing mental health treatment (Reardon et al., 2017, p.624) but often parents and adolescents hold differing perspectives of mental health services (Coyne et al., 2015).

### **The ‘Sleeping Better’ Programme (Orchard, Pass, & Reynolds, 2017)**

‘Sleeping Better’ is a brief, behavioural sleep intervention for insomnia in adolescents with common mental health problems. ‘Sleeping Better’ retains key elements of brief CBT-I (see Ellis et al., 2015) and incorporates a number of adaptations to reflect the specific developmental stage of adolescents aged 11-18 (see Table 1). The intervention includes a brief treatment planning session, where the sleep diary is explained and routine outcome measures are collected (see below), followed by four treatment sessions over six weeks. Session 1 is 60 minutes and the 3 remaining sessions 30 minutes (a total of 2.5hrs of therapist contact time).

[Insert Table 1]

The components of ‘Sleeping Better’ include sleep- and psycho-education, sleep hygiene, stimulus-control, and sleep restriction. To identify the role of sleep disturbance in depression, a simple maintenance formulation is used to highlight the young person’s current experience of depression and the impact of poor sleep (see Figure 1). Psychoeducation about insomnia and the ‘Sleeping Better’ rationale is provided to adolescents and their parents before and throughout therapy. Families are informed that the programme will focus on improving sleep efficiency by increasing the young person’s ‘drive’ to sleep and by reducing any behaviours that interfere with sleep. Sleep efficiency (and subsequent sleep quality) is prioritised initially followed by a focus on improving sleep quantity.

Treatment is delivered with the support of a workbook for adolescents, which is used simultaneously as a clinician manual. The content of treatment is transparent and easy to follow (i.e. the clinician and the young person work through the adolescent workbook together). A complementary clinician guide is used to support them to deliver ‘Sleeping Better’.

[Insert Figure 1]

## **Case Illustration**

### **Client Background and Characteristics**

#### ***Case background***

‘Sophia’ (a pseudonym) was a 16-year-old girl who lived at home with her parents and younger sibling. Her symptoms of depression emerged around four months earlier, whilst she was receiving treatment for panic disorder. At the end of treatment for panic disorder Sophia was re-assessed using a structured diagnostic interview (K-SADS) and was diagnosed

with depression. Her symptoms were depressed mood, anhedonia, suicidal ideation, initial insomnia, fatigue, decreased concentration and indecision.

Sophia was experiencing passive suicidal ideation (thoughts about not wanting the life she had, with occasional thoughts that she would be better off dead). She had been self-harming for the previous few months, using razor blades to cut her arms every other day, typically late at night in her bedroom before she went to sleep. Sophia recognised that this was not a helpful strategy to manage her low mood and wanted to stop self-harming. During the assessment, the clinician developed a safety plan with Sophia and her mother.

Sophia and her mother were offered the 'Sleeping Better' programme and were keen to give it a try. To provide the therapist with a detailed breakdown of Sophia's sleep, and to personalise treatment, Sophia completed a sleep diary (see below) for one week before her first 'Sleeping Better' treatment session. This showed that it was taking Sophia on average, two and a half hours to fall asleep each night, and that she was sleeping an average of less than six hours per night. Sophia did not report waking during the night or waking too early in the morning.

During the first treatment session, it was also established that Sophia slept in a bedroom on her own, and regularly watched television or used her mobile phone whilst in bed at night. Sophia's caffeine use was also recorded, and it was noted that Sophia was primarily drinking tea on a daily basis, particularly during the afternoons.

### ***Case selection***

This case was chosen to illustrate a relatively straightforward application of the 'Sleeping Better' approach with a young person and was selected from a pilot evaluation of 'Sleeping Better' for adolescents with depression. The client had received routine treatment (CBT) for anxiety. However, as her anxiety symptoms reduced, her depression-related difficulties became more apparent and it was noted that she was experiencing severe

insomnia. ‘Sleeping Better’ was therefore offered as an additional treatment. Sophia and her mother provided verbal and written consent to disseminate their ‘Sleeping Better’ experience.

### **Service Context and Clinician Characteristics**

The clinician (CC) was a 22-year-old female Psychological Wellbeing Practitioner (PWP), who had a year’s experience of delivering brief, low intensity interventions with adults. CC was working as an honorary assistant psychologist in an outpatient mental health service for children and adolescents with anxiety and depression. The service was part of the UK National Health Service and so was open to anyone living within the catchment area and free to access. This was based in a large town (population approx. 235,000) in the south of England. The clinician’s primary role in the service was to deliver the ‘Sleeping Better’ Programme to adolescents with depression and their families. She was supervised by a Clinical Psychologist and a Research Psychologist.

### **Delivery of ‘Sleeping Better’**

‘Sleeping Better’ follows a structured approach. Sophia attended four sessions over six weeks. She attended every session and engaged well. Sophia’s mother was able to attend three of the sessions (sessions one, two and four), and was contacted by telephone after session three. Sophia did not receive any other psychological or pharmacological interventions during this period.

### **Measures**

Routine outcome measures and specific sleep and treatment feedback measures were collected.

#### ***Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS; Kaufman et al., 1997)***

The K-SADS is a semi-structured diagnostic interview used to identify DSM-5 diagnoses of affective disorders and schizophrenia, with strong psychometric properties



(Kaufman et al., 1997). The depression section was used to identify depression and sleep disturbances.

### ***Sleep Diary***

Sophia completed the Consensus Sleep Diary, a self-report measure of sleep (Carney et al., 2012). This obtained information on time into bed, time of lights out, sleep onset latency, number and duration of awakenings, wake-time, and rise-time. From these data total sleep time (TST) and total time in bed (TIB) can be calculated to create a sleep efficiency score (percentage of time in bed spent actually asleep –  $TST/TIB \times 100$ ).

### ***Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000)***

The RCADS and associated parent version (RCADS-P) are both 47-item questionnaires that assess symptoms of anxiety and low mood in young people aged 8–18 years. Age and gender-adjusted t-scores can be used to identify normal, borderline and clinical ranges. The full RCADS and RCADS-P were completed in the assessment (one week before treatment started), and at treatment session 4. The self-report and parent-report RCADS depression subscales were completed during every ‘Sleeping Better’ session, including an additional item on suicidal thoughts.

### ***Outcome Rating Scale (ORS; Miller & Duncan, 2000)***

On the ORS, adolescents, and parents, are asked to rate, on a 10 cm line, the young person’s functioning in four key areas: Individual, Interpersonal, Social, and Overall. Scores for each area are summed to create a total functioning score (max = 40), with higher scores indicating better functioning. The ORS was completed before every ‘Sleeping Better’ session by Sophia and her mother.

### ***Session Rating Scale (SRS; Duncan et al., 2003)***

The SRS is a four-item scale designed to measure the therapeutic relationship in four areas Relationship, Goals and Topics, Approach or Method, and Overall Alliance. It is similar to the ORS in that the client is asked to indicate their scores on a 10cm line for each subscale, and these scores are summed to provide a total alliance score. The SRS was completed after each session by Sophia.

### ***‘Sleeping Better’ Feedback Questionnaire***

Sophia and her mother each completed a 12-item questionnaire about their experiences of the ‘Sleeping Better’ Programme. Questions consisted of forced-choice and open-ended questions to examine acceptability of the programme, and to identify suggestions for improvement. Forced choice questions prompted for a response on a 5-point scale, and included questions such as, ‘Did you find the Sleeping Better Programme useful?’ with a scale from ‘*very useful*’ to ‘*not at all useful*’. Open-ended questions were used to identify any additional information, and included questions such as ‘What did you like best/least about the Sleeping Better Programme’ and ‘How would you improve the Sleeping Better Programme?’

### ***Goals***

The primary goal of ‘Sleeping Better’ is to adhere to the prescribed sleep schedule. Sophia’s prescribed sleep schedule was identified during the first treatment session, using standard sleep restriction procedures. The prescribed wake time was set as the earliest time Sophia needed to be awake each morning (7am). The prescribed wake time, and Sophia’s sleep diary data, was then used to calculate Sophia’s prescribed bed time (1.25am).

Additional treatment goals are also agreed upon in the first session of ‘Sleeping Better’. Progress towards these goals was rated at each session from 0 (No progress) to 10 (Goal Achieved). Sophia set two goals in addition to adhering to her new sleep schedule. Firstly, she wanted to watch TV downstairs every day, rather than in her room, and she wanted to achieve this within two weeks. She felt that she was currently 0/10 towards

achieving this goal. Sophia also wanted to do more exercise, specifically walking or running three times a week, and she wanted to achieve this at the end of week six of the ‘Sleeping Better’ Programme. She felt that she was currently 3/10 towards achieving this goal.

### **Themes from ‘Sleeping Better’**

Discussion with Sophia and her mother in treatment sessions, and subsequent discussions in supervision sessions, identified a number of challenges that the family and therapist faced whilst completing the ‘Sleeping Better’ programme. These challenges were largely overcome by the therapist and client and are described below.

#### *Theme 1: Practical challenges of Sleep Diaries and Sleep Calculations*

Both Sophia and her mother found it difficult to complete the sleep diaries and to complete sleep calculations. In the first ‘Sleeping Better’ session, the therapist identified some mistakes in the sleep diary entries.

Clinician: So, how did you find filling out the sleep diary?

Mother: It was confusing.

Sophia: Confusing. [laughter]

Clinician: Yeah. Okay that’s fine, I just want to check in on that confusion to make sure we’re kind of on the same page. What did you find confusing?

Sophia: I didn’t understand when it said like “day 1”, I was like, oh what.

Clinician: Okay, so it’s sort of easier to put the days in there.

Sophia: Yeah.

Clinician: Yeah, that’s fine.

...

Clinician: I just want to check a couple of days that I’ve starred here. So you said that you tried to go to bed at nine-thirty on Sunday, is that right?

Sophia: Yeah.

Clinician: Then is that 3 hours to get to sleep?

Sophia: No, that's the time I got to sleep.

Clinician: Okay so that's three A.M. that you managed to get to sleep, okay.

Sophia: Yeah... I got a bit confused with it.

Clinician: That's alright, don't worry, that's fine.

...

Clinician: So, for question 3 if you're able to write the time in hours or minutes, that would be brilliant.

Sophia: Yeah that's fine.

In the second session, Sophia and her mother were more confident with the calculations and had correctly worked out the arithmetic. In the week between sessions two and three, as instructed, Sophia sent her diary to the therapist via email, and it was noted that there was a single error that had made the sleep prescription incorrect. As the prescription instructed Sophia to go to bed later than was needed, CC emailed the family to let them know of the mistake. No further difficulties with calculations were noted in the final 'Sleeping Better' programme. Sophia recognised her mother's support in calculating the arithmetic and adjusting her sleep prescription each week.

### *Theme 2: Adherence to Sleep Rescheduling*

The sleep rescheduling calculations after session one identified that for the next week Sophia should go to bed at 1.25am and get up at 7am in the morning. Session one was conducted the week before Sophia had a one-week school holiday and Sophia's mother anticipated that it would be hard for Sophia to stick to the prescription of getting up at 7am.

Mother: The only thing is, obviously next week it's going to be different because there's no school.

Clinician: Yeah, so are you willing to stick to this next week as well?

Mother: Ha-ha good luck with that.

Sophia: Mum's going to have fun because she's getting up with me. [laughter]

Clinician: Yeah so you will need to stick to it, and weekends as well.

Sophia: That's okay.

Clinician: We really want a consistent sleep schedule, so we are trying to re-set that internal clock, and that means we need to be consistent. Is that okay?

Sophia: Yeah, I'll try my best.

Clinician: Most young people normally find the thought of it a lot worse than it is.

However, Sophia was motivated to do this, and was largely successful. Sophia's mother also recognised Sophia's independence in adhering to her sleep prescription.

Clinician: How have you found going to bed at 25 past one in the morning and getting up at seven, how's that been for you?

Sophia: It's been alright; I've found it quite hard to wake up in the morning.

Clinician: Okay and what was difficult about the mornings? Was it because it's been half term or...

Sophia: Err, yeah.

Mother: Also, we've had a friend round who wanted to sleep longer and things.

Clinician: Okay.

Mother: It's a bit of an odd week to start with it not being school hours and whatever.

Clinician: What I can see from your sleep diary, it looks like you've done really well actually, to get up at nearly seven o'clock on most of those days, so I think that's really important to recognise... you've done a really good job at sticking to that prescription.

In session two, Sophia reported that she had fallen asleep in the day on two occasions for 30 minutes. CC re-iterated the importance of avoiding daytime sleep if at all possible (to maintain synchrony in the circadian rhythm and build up sleep pressure for the evening) and discussed ways to help stay awake such as going for a gentle walk. CC also recommended that Sophia consider going to bed 10 or 15 minutes earlier than prescribed if she was very tired, rather than napping in the day. Sophia and her mother were happy with this.

Clinician: How have you found daytime tiredness? So, I know you said you can sometimes sort of fall asleep in the day. Have you been sleeping in the day at all?

Sophia: I think occasionally I might have accidentally when I've been sat down and just fallen asleep.

Clinician: Okay and do you know, sort of how often that happened?

Sophia: Um I think twice in the last week.

Clinician: And sort of how long would you fall asleep for?

Sophia: Half an hour.

Clinician: Okay. I can understand that if you have been really tired that is something that can quite easily happen. As we said last week it is really important to try not to fall asleep in the day, if you can. Given that, obviously we're trying to build up your pressure to sleep, we want to build up that drive.

And if you sleep in the day, that can reduce all of the drive to sleep that's been building up. So if you can make a real conscious effort to try not to fall asleep, I know it is really difficult, but what I might perhaps encourage is if you are feeling absolutely exhausted then maybe you could look at getting into bed at a time maybe 10 minutes earlier if you needed to, rather than sort of sleeping in the day.

Sophia: Okay.

Clinician: How does that sound?

Sophia: Yeah that sounds good.

### *Theme 3: Using ROMS and Risk Monitoring Every Session*

Routinely asking about symptoms, including specific risk monitoring, was highly relevant. In her assessment, Sophia shared that she had been self-harming (cutting) very late at night when on her own in her bedroom when her parents were asleep. This was dealt with explicitly by discussing it with Sophia and her mother immediately after the assessment.

Each treatment session included a risk assessment to check on any progress or changes since the assessment. This was particularly important as the sleep prescription involved a later bedtime, and therefore it was possible that this provided more opportunities for Sophia to self-harm.

In the first 'Sleeping Better' treatment session, Sophia reported that although she had not self-harmed since the assessment, she was having urges each day. She described difficulties using the safety action plan and the clinician used problem-solving techniques with her. This resulted in the therapist and Sophia collaboratively agreeing to put the safety plan in a more accessible place and agreeing that Sophia would wake up her mother if she had urges to self-harm during the following week. In session two, Sophia reported no passive

suicidal thoughts and had still not engaged in any self-harm. She reported using her safety plan and the distraction techniques. The therapist suggested that adhering to the sleep stimulus control techniques (i.e. spending the evening away from her bedroom until she was ready to sleep) may also reduce the triggers and opportunities for spontaneous self-harm. In remaining sessions, Sophia reported some thoughts of not wanting to be awake or to move when she woke up, but was unsure if this reflected passive suicidal ideation or just a desire for a different kind of life. Sophia continued to be able to distract herself from acting on urges to self-harm.

### **Outcome of ‘Sleeping Better’**

Sophia’s sleep diary across the six weeks indicated that the rescheduled sleep routine had resulted in immediately reducing the amount of time Sophia was lying awake in bed (see Table 2), and this subsequently improved Sophia’s sleep efficiency i.e. the amount of time spent asleep as a percentage of the amount of time in bed (see Figure 2). The initial implementation of a later bed time between sessions one and two resulted in a greater sleep pressure which meant that Sophia was able to fall asleep immediately. This improved sleep efficiency meant that Sophia was able to add time onto her sleep schedule each week so that by week six, Sophia was getting just over six and a half hours sleep a night, with over five hours more sleep each week than when she started the programme.

[Insert Table 2]

[Insert Figure 2]

At the end of treatment, Sophia reported clear improvements as a result of ‘Sleeping Better’. She described no longer feeling exhausted and was able to engage more fully at



school and at home. Sophia was also no longer self-harming or experiencing suicidal thoughts.

Clinician: How have you been finding your sleep over the last couple of weeks?

Sophia: It feels nice 'cause I'm not like, exhausted when I wake up in the morning.

Clinician: Okay, because I know that's something you were struggling with, so even though we'd kind of changed the time you were going to sleep, you were still feeling quite tired in the day. But it sounds like that's improved.

Sophia: Yeah, yeah, a lot better.

Mother: You haven't done any daytime sleeping have you?

Sophia: No, no napping or anything.

...

Clinician: Okay. And how's that been at school? Because I know that you were struggling, and you found yourself kind of drifting off at school a bit. How's that been over the last week or so?

Sophia: Yeah, I think it's a lot better than it was.

Clinician: Yeah, okay. So, it sounds like the sleep has really sort of improved.

Sophia: Mmm yeah [agreement].

Sophia also reported making progress towards her additional goals; she rated goal one 'watch TV downstairs every day, rather than in her room' as 10/10, and goal two 'do more exercise, specifically walking or running three times a week' was rated as 6/10.

Sophia and her mother's routine outcome measures indicated that after starting 'Sleeping Better', Sophia's depression scores reduced, and her functioning improved. While the change on RCADS self-reported depression symptoms was relatively small, there was a

clinically significant and reliable improvement on the RCADS-P depression subscale (see Figure 3), and on the child and parent ORS (see Figure 4).

[Insert Figure 3]

Sophia and her mother also gave feedback about their experience of ‘Sleeping Better’. Sophia stated that the aspect she liked best was “the support given to me and my mum”. She rated ‘liked’ ‘Sleeping Better’ (range: really liked it – hated it), and that it was ‘fairly useful’ (range: very – not at all). Sophia’s mother rated that she ‘really liked’ the programme. The aspects that she liked best were that the programme made it clear that good quality sleep is the most important thing to start with. Both Sophia and her mother reported that the thing they liked least was completing the sleep diaries. Sophia’s mother also added an additional comment of “This programme has been really helpful to Sophia’s sleep”.

[Insert Figure 4]

## Discussion

This case illustration demonstrates the use of the ‘Sleeping Better’ programme with a young person with major depressive disorder and long-term difficulties getting to sleep. It also highlights adaptations that have been made to the adult brief CBT-I (Ellis et al., 2015) to make it suitable for adolescents. ‘Sleeping Better’ involves the basic principles from CBT-I including sleep- and psycho-education, sleep hygiene, stimulus-control, and sleep restriction. By focusing on the behavioural maintenance cycle (low mood, difficulty sleeping, tired, daytime napping), and basic rationale of improving sleep quality before quantity, Sophia and her mother seemed to engage well with the model.

This case highlights the immediate improvement in sleep onset latency and sleep efficiency, supporting Ellis's (2015) one-session approach. We predicted that young people would require more support than adults to understand the rationale and incorporate the programme into their daily routine. This was confirmed in that there was some initial misunderstanding and mistakes when using the sleep diaries and calculations. It is important that the young person can take ownership of their healthy sleep habits and that they are able to continue rescheduling their sleep after treatment has ended. However, in order to achieve this ownership and understanding, parental support is important. Furthermore, because depressed adolescents commonly experience suicidal thoughts (Orchard, Pass, Marshall, et al., 2017) and this intervention increases time awake in the evening, additional risk support is required from parents during treatment.

It was anticipated that young people would experience difficulties adhering to sleep hygiene techniques, particularly reducing the use of electronic devices at night. However, Sophia was motivated to adhere to this sleep hygiene technique and was successful in reducing her use of electronic devices at bed-time. This may be a challenge for future adolescents who undertake 'Sleeping Better', thus it is crucial therapists and parents negotiate electronic device usage with the young person. Especially due to the established relationship between electronic device usage and sleep disturbances in adolescence (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, Grob, 2015).

It was unclear whether young people would adhere to the sleep rescheduling regime, especially because depressed adolescents typically struggle with motivation and fatigue. We also expected that parents might resist the approach especially the need to establish late bedtimes and incorporate these into family life. However, these concerns were not confirmed in this single case, although the family found the regime difficult, they were willing to try it out, and were able to stick to the sleep prescriptions. Sophia began her sleep prescription

during a week-long school holiday. She managed to adhere to the prescription, but it might have been more difficult during the longer school holidays e.g. Christmas, Easter or summer. It is possible that some young people will be less motivated to change their sleep habits. In these cases, we believe that parental involvement is very important to support the young person to carry out the programme and to help the adolescent to engage in activities to support this e.g. going for walks, getting up early, or staying up late. Clarke and Harvey (2012) also recognise adolescents may benefit from ‘motivational enhancement’ to facilitate their participation in CBT-I treatment. This approach has been shown to increase patient motivation across a range of interventions (Hettema, Steele & Miller, 2005) and would involve reviewing the adolescents’ perceived benefits and drawbacks of changing their sleep habits (Clarke & Harvey, 2012). This could be utilised with future adolescents who receive ‘Sleeping Better’ as a simple tool to increase the young persons’ motivation to change.

The challenges that were identified regarding the use of sleep diaries, and the arithmetic required for calculating the sleep prescription, pose a practical barrier that is important to overcome. Difficulties with the sleep diary seem to relate mostly to how information needed to be entered. These difficulties should be easy to rectify with further usability testing, to make the diaries clearer. The challenges with sleep calculations are harder to remedy. One option is to take the responsibility of calculating the sleep prescription from the family and provide a spreadsheet with formulas embedded that work out the arithmetic automatically, or to use a mobile phone app that computes the calculations automatically. There are some possible limitations of this approach. Firstly, if mistakes still occur in the sleep diaries, the formulas could easily produce incorrect prescriptions. Secondly, if families have not embraced the rationale for the prescription, they may be less motivated to engage. However, these options will be piloted in future work to identify the best approach.

Because of the likelihood that a depressed young person is experiencing suicidal thoughts or engaging in self-harm behaviours (e.g. Orchard et al., 2017), it is critical to monitor and manage risk throughout the sleep intervention (as with any treatment for depressed adolescents). It was helpful that Sophia's parent was included in treatment and that she and Sophia were able to manage the potential increase in risk during the period of sleep restriction. It was extremely helpful to use explicit measures of risk, mood and anxiety every session and to review these in each session. These helped identify any changes in risk, mood, anxiety and functioning, which helped engage Sophia and her mother in treatment.

'Sleeping Better' is a promising treatment for sleep disturbances in depressed adolescents and may offer an alternative to more complex and lengthier CBT-I programmes. Other techniques and methods could be further explored as part of 'Sleeping Better', for example, technology has great potential, especially as it may increase engagement with adolescents that are used to interacting with such tools. These may include smartphone apps, electronic versions of therapy workbooks, and sleep watches. Many of these can also be shared so that clinicians and clients can track progress simultaneously.

### **Conclusion**

This single case report illustrates the successful delivery of a brief CBT-I intervention for depressed adolescents, 'Sleeping Better'. It was delivered by a Psychological Wellbeing Practitioner, who had minimal previous experience working with adolescents. The outcomes from this case suggest that 'Sleeping Better' is a promising brief intervention that can be delivered with adolescents with depression and their families. The intervention was acceptable to the young person and their parent, and the young person was able to engage with sleep rescheduling according to the sleep prescription. 'Sleeping Better' requires refinement on a practical level to facilitate simple and accurate sleep prescription calculations. Further evaluation is needed with more adolescents, and longer-term follow up

to determine possible impact on symptoms of mood and anxiety once they are at a stable level of sleep and regular sleep routine.

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Table 1. Key adaptations in ‘Sleeping Better’ from adult Brief CBT-I

Adaptation from adult Brief CBT-I	Rationale for adaptation	Example in ‘Sleeping Better’
Treatment structure	Anticipated need for greater support for adolescents to make changes	Four sessions; Six week period. During the weeks when sessions do not take place, families emailed their sleep diaries to the clinician.
Consideration of developmental constraints	Adolescent-specific biological, developmental, environmental differences and limited autonomy	Age appropriate treatment workbook; Use of diagrams/images; Case examples illustrating concepts specific to adolescents
Focus on engagement and adherence	To gain ‘buy in’ from adolescent and parent(s)	Collaborative goal setting; Problem-solving with a focus on family habits
Inclusion of parents	Parents approval for sleep restructuring, possible need to monitor risk	Parental input in every session; Parental input in homework; Collection of parent questionnaires
Use of child and young person routine outcome measures (ROMs) including regular parent-involved risk assessment	To monitor symptoms and functioning, to keep parents aware of risk and able to keep adolescent safe	Questionnaires collected at every session; Explicit question on risk at every session; Risk management

Table 2. Sleep diary outcome data

Average sleep variable (mean)	Week 1 (session 1)	Week 2 (session 2)	Week 3	Week 4 (session 3)	Week 5	Week 6 (session 4)
Sleep onset latency (mins)	140.71	5.33	11.71	12.67	12.17	2.86
Number of awakenings	0.57	0.00	0.29	0.00	0.00	0.00
Wake after sleep onset (mins)	25.71	0.00	5.71	0.00	0.00	0.00
Total sleep time (hours/mins)	5h 49min	6h 15min	5h 39 min	6h 1min	6h 5min	6h 34min

Figure 1. Example maintenance cycle of low mood and disturbed sleep

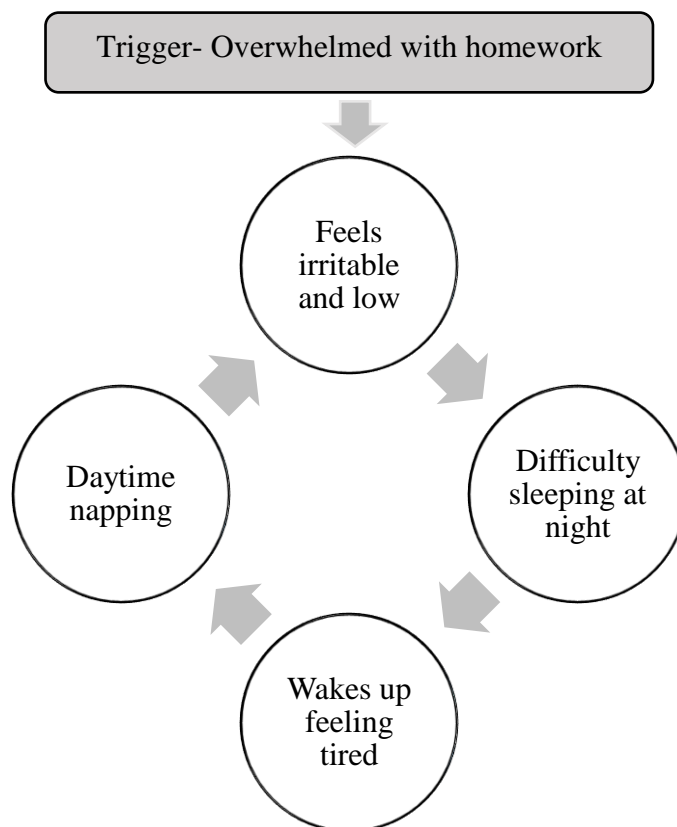




Figure 2. Sophia's sleep efficiency across six-week programme

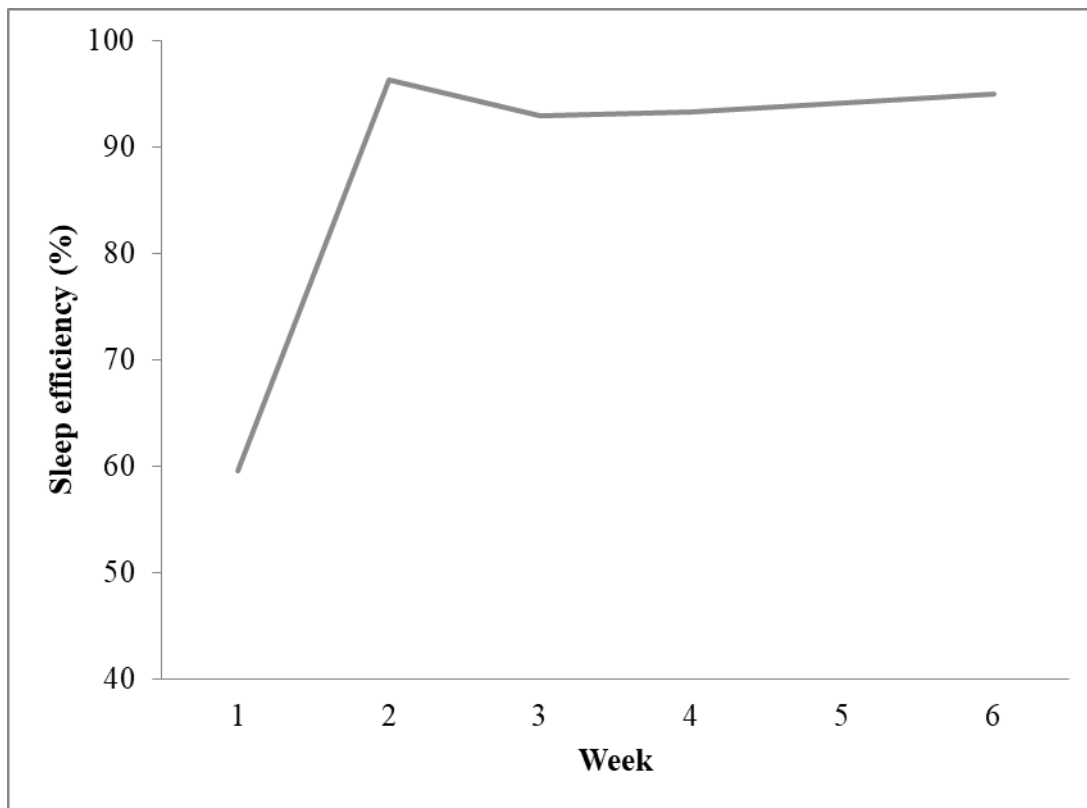


Figure 3. Sophia's pre- and post-treatment RCADS scores from parent and child report

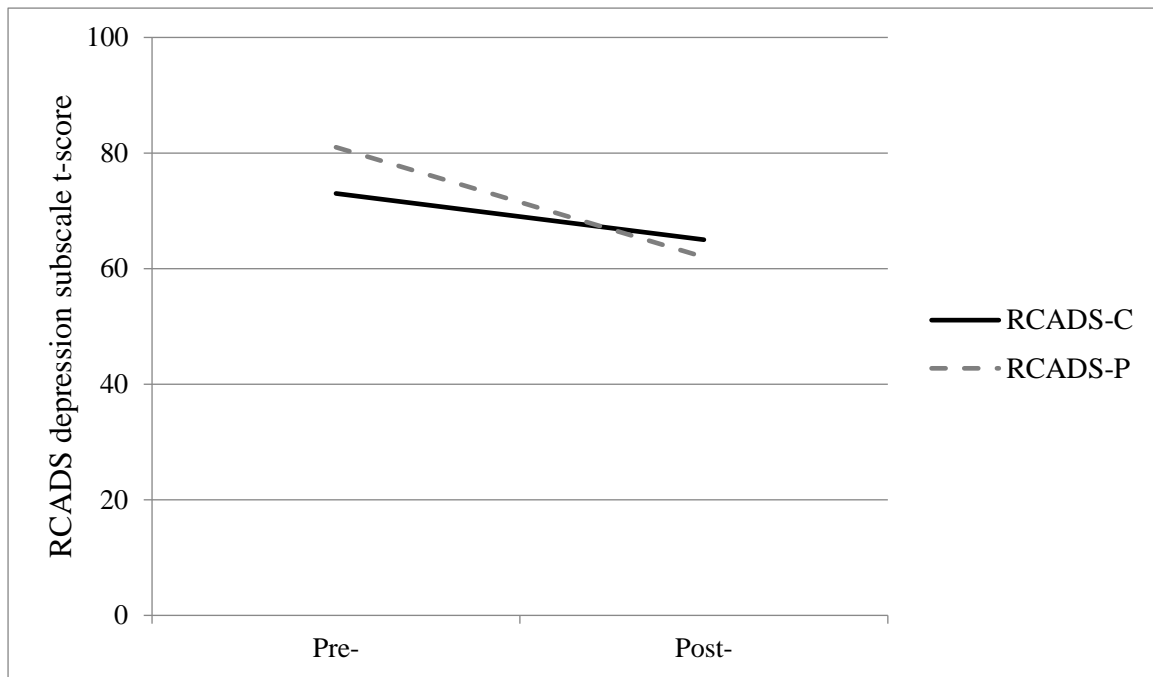


Figure 4. Sophia's pre- and post-treatment ORS scores from parent and child report

