

Health app: Sleepio for adults with poor sleep

Medtech innovation briefing

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[nice.org.uk/guidance/mib129](https://www.nice.org.uk/guidance/mib129)

Summary

About this app

- Sleepio is designed for adults with poor sleep, to help improve their sleep through a cognitive behavioural therapy approach.
- It is a self-help tool that is available on a website and as an app on iOS mobile devices. The app can link to wearable fitness devices that track sleep.
- Sleepio costs £200 per user per year for individual purchases. Discounts are offered for commissioners for multiple licences, or unlimited access within a population for a fee based on population size.

Evidence summary

- **Clinical effectiveness:** Sleepio has potential to have a positive impact for adults with poor sleep compared with standard care. There is good quality evidence that Sleepio improves sleep but the effect size varies between studies, and none of the studies compared Sleepio with face-to-face cognitive behavioural therapy for insomnia (CBT-I).
- **Cost and resource impact:** Based on limited economic evidence, Sleepio may save costs by avoiding face-to-face CBT-I. Sleepio has been used as part of improving access to psychological therapies (IAPT) services and based on the recovery rate compared with CBT-I, Sleepio is cost saving.

- **User benefits:** Sleepio is currently available to patients accessing IAPT services through 10 clinical commission groups. It has the potential to increase the availability of CBT-I and there is some evidence of good user engagement and experience.

The technology

Sleepio (Big Health) is a self-help sleep improvement programme based on cognitive behavioural therapy for insomnia (CBT-I). It is accessed through a website or an app for iOS mobile devices, and can link to a compatible wearable fitness tracker to monitor sleep (currently Fitbit and any other device that uses Apple's Healthkit).

The programme is structured around a series of 6 weekly interactive sessions, lasting about 20 minutes each. Users can access the programme for 12 months after their first login. They can also access electronic library articles, online tools and the online Sleepio user community.

A daily sleep diary helps users to track their progress, and the programme tailors advice to individuals. Users can fill in the diary manually, or the data may be automatically uploaded from a compatible wearable tracking device.

Sleepio has undergone a technical evaluation using the NHS [Digital Assessment Questions](#), a pilot tool currently available to developers in beta form. The tool comprises 7 domains: clinical safety; security and privacy; confidentiality (information governance); usability and accessibility; technical stability; change management (updates and version control); and regulatory approval. NHS Digital has confirmed that Sleepio passed this assessment. The completed assessments are not currently published.

Table 1 Technology components

| Component (first UK launch, version number) | Regulatory status | Cost |
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| <p>Sleepio website (February 2012, v6.80.0)</p> | <p>The developer has stated that Sleepio does not meet the current eligibility criteria for CE marking as a medical device or for regulation by the Care Quality Commission.</p> | <p>£200 for 12 months' access (individual purchases). Discounts are offered for commissioners for multiple licences, or unlimited access within a population for a fee based on population size.</p> |
| <p>Sleepio app for iOS (September 2014, v1.6.19)</p> | <p>As above.</p> | <p>Users who have created a Sleepio account online may also use the app at no extra cost.</p> |

Novel system benefit

- Sleepio may improve access to CBT-I, which is usually delivered over the course of 6 to 8 weekly face-to-face sessions with a trained therapist. This could potentially improve access to treatment if current demand exceeds local service capacity.
- Sleepio can integrate data from wearable tracking devices, which is intended to allow faster and more accurate recording of a sleep diary than manual input.

Current care pathway

The NICE guidelines on [depression in adults](#) and [depression in adults with a chronic physical health problem](#) state that advice on good sleep hygiene should be offered if needed.

The NICE clinical knowledge summary on [insomnia](#) states that after good sleep hygiene advice, a short course of a hypnotic drug should be prescribed only if daytime impairment is severe. The treatment needs to be reviewed after 2 weeks and the person referred for CBT if symptoms persist.

NICE technology appraisal guidance on [zaleplon, zolpidem and zopiclone for the short-term management of insomnia](#) states that the choice of management strategy depends on the presenting symptoms. Non-pharmacological interventions such as CBT have been shown to be effective in managing persistent insomnia. However, in practice, access to many of these therapies is restricted through a combination of a lack of trained providers, cost and a poor understanding of available options.

Population, setting and intended user

Sleepio can be used by anyone aged over 16 years with poor sleep (that is, people who have difficulty falling or staying asleep, or who consistently wake up unrefreshed). It should not be used by pregnant women or children, because the sleep-restriction technique used in Sleepio is not suitable for people who need extra sleep. It may be used directly through self-referral, or through referral from a healthcare professional. It would be used in place of, or in addition to, a range of current interventions.

Equality considerations

NICE is committed to promoting equality, eliminating unlawful discrimination and fostering good relations between people with particular protected characteristics and others. In producing guidance and advice, NICE aims to comply fully with all legal obligations to: promote race and disability equality and equality of opportunity between men and women, eliminate unlawful discrimination on grounds of race, disability, age, sex, gender reassignment, marriage and civil partnership, pregnancy and maternity (including women post-delivery), sexual orientation, and religion or belief (these are protected characteristics under the Equality Act 2010).

Sleepio can only be used by people who have regular and reliable access to the website. The Sleepio app is currently only available for iOS mobile devices.

Evidence on effectiveness

A literature search was carried out for this briefing. The most relevant or best available published evidence relating to the clinical effectiveness of the technology has been summarised below. Further information about how the evidence for this briefing was selected, and full summaries of the included studies, are available on request by contacting medtech@nice.org.uk.

This briefing summarises 6 out of a total of 23 identified studies on Sleepio (table 2). This includes 1 unpublished and 5 published studies, involving 8,097 users of Sleepio in total. The evidence is based on 5 well-designed and well-reported randomised controlled trials and 1 large prospective unpublished audit.

Table 2 Summary of evidence

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| Espie et al. (2012) |
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| Study size, design and location | Randomised, placebo-controlled trial comprising n=164 adults meeting proposed DSM V criteria for insomnia disorder, UK. |
| Intervention and comparator(s) | 3 arms: digital cognitive behavioural training (n=55, dCBT-I: Sleepio), imagery relief therapy (n=55: placebo), treatment as usual (n=54). Primary endpoint: sleep efficiency (total time asleep expressed as a percentage of the total time spent in bed). |
| Key outcomes | dCBT-I was associated with sustained improvement at post-treatment and at 8 weeks follow-up, compared with both treatment as usual and imagery relief therapy. |
| Strengths and limitations | Placebo-controlled study design. Random, blind assignment to each group. The inclusion of healthcare providers in the study design limits the generalisability of the results to the self-referral setting. This study evaluated the web-based version, not the app. Patients were recruited by online survey and may represent a cohort with a high interest in addressing sleep problems. They all had access to, and competencies in, using the internet, thus limiting the generalisability of this cohort to the wider population with insomnia. |
| <u>Bostock et al. (2016)</u> | |
| Study size, design and location | Parallel group, randomised controlled trial comprising n=270 people self-identified as having poor sleep, US. |
| Intervention and comparator(s) | 2 arms: Sleepio (n=135, by website and app) and 'waiting list' control (n=135). Patients in the waiting list group did not have any intervention or advice. |
| Key outcomes | Patients having Sleepio showed a statistically significant improvement in Sleep Condition Indicator score compared with the waiting list group (1.66 vs 0.52 respectively). This benefit was maintained at 3-month follow-up. Workplace performance was also statistically significantly enhanced. |

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| Strengths and limitations | <p>A formal screening of other disorders of sleep was not done, so it is unknown if patients had sleep breathing or sleep motor problems.</p> <p>The sleep diary is a staple tool of insomnia assessment. Only the Sleepio group used diaries as part of their therapy programme, so it is not possible to compare these data between the 2 groups.</p> |
| <u>McGrath et al. (2017)</u> | |
| Study size, design and location | Phase II blinded, randomised controlled trial comprising n=134 community-based patients with self-reported insomnia and hypertension, Ireland. |
| Intervention and comparator(s) | <p>Intervention: 8 weekly dCBT-I sessions (n=67) delivered with the Sleepio website in addition to standard care (a vascular risk factor education session, delivered by specialist trained nurses in small groups over 30 minutes during week 1 of the trial).</p> <p>Comparator: standard care only (n=67).</p> |
| Key outcomes | <p>After 8 weeks, there were statistically significant differences between groups seen across all 3 sleep measures, and also for the assessments of depression and anxiety.</p> <p>However, there was no difference between the 2 groups in terms of blood pressure control.</p> |
| Strengths and limitations | Only the short-term effect of Sleepio on blood pressure was assessed, which limits the generalisability of the results in cases with long-term follow-up. Only 50% of patients completed all 6 online sessions, which may limit the ability to detect a treatment effect. The sleep measures and the assessments of depression and anxiety are secondary outcomes and therefore the study was not adequately powered to detect significant differences. |
| <u>Barnes et al. (2017)</u> | |
| Study size, design and location | Parallel group, randomised controlled trial comprising n=223 adults with self-reported insomnia. Patients were recruited through the international World Sleep Survey. |

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| Intervention and comparator(s) | <p>2 arms: dCBT-I (n=117) and waiting list (n=106) control.</p> <p>Intervention: 6 weekly dCBT-I were delivered with the Sleepio website.</p> <p>Comparator: no intervention or advice. Patients in this group completed all major assessments for the trial and were offered Sleepio 10 weeks after the study period.</p> |
| Key outcomes | <p>After 10 weeks, the Sleepio group had statistically significant improvements in sleep quality, mood, job satisfaction and self-control. Sleep efficiency was improved by 27% in both groups.</p> |
| Strengths and limitations | <p>The use of an experimental design with a waiting list control group aids the degree to which causal inferences can be made.</p> <p>No placebo intervention.</p> <p>The outcome variables were all self-reported. Self-reports may include distortions that lower the accuracy of this method of data collection. However, the analyses were within individuals. Thus, distortions such as response biases that occur at the person-level of analysis are already statistically controlled for.</p> <p>Patients were recruited by online survey and may represent a cohort with a high interest in addressing sleep problems. They all had access to, and competencies in, using the internet, thus limiting the generalisability of this cohort to the wider population with insomnia.</p> |
| <p><u>Luik et al. (2017)</u></p> <p>Submitted for peer review but unpublished at the time of writing.</p> | |
| Study size, design and location | <p>Prospective audit comprising n=3,551 Sleepio users who had graduated from the programme and had completed a post-intervention assessment. No information on the location of the study was provided.</p> |
| Intervention and comparator(s) | <p>Intervention: 6 weekly dCBT-I sessions delivered with the Sleepio website.</p> <p>No comparator.</p> |
| Key outcomes | <p>Sleep quality significantly improved following Sleepio (p<0.001), as did mental health symptoms, stress, life satisfaction and work productivity.</p> <p>Those who use a wearable device have similar therapy effects to those who do not, although those who do connect a wearable device tend to interact with the programme more.</p> |

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| Strengths and limitations | There was no comparator for this study. Based on the Sleep Condition Indicator, similar effectiveness was observed for Sleepio in this real-world practice as in randomised controlled trials. The sample of users had completed a post-therapy survey, which might create a selection bias. |
| <u>Freeman et al. (2017)</u> | |
| Study size, design and location | Single-blind, randomised controlled trial comprising n=3,755 university students with self-reported insomnia, UK. |
| Intervention and comparator(s) | <p>2 arms: dCBT-I (n=1,891) and control (n=1,864).</p> <p>Intervention: 6 weekly dCBT-I were delivered with the Sleepio website.</p> <p>Control: usual practice; the authors describe this as either no intervention or medication prescription for a small proportion of the patients. Patients were offered Sleepio after their final assessment.</p> |
| Key outcomes | <p>Sleepio was associated with significant reductions, at all time points (3, 10 and 22 weeks), in insomnia, paranoia and hallucinations compared with the control group (all p<0.0001). Treatment effects were greater for patients who completed the whole programme.</p> <p>Mediation analysis revealed that early changes in sleep explain approximately half of the total sleep-mediated changes in psychotic experiences by the end of treatment, supporting the study's hypothesis that insomnia is a contributory cause of psychotic experiences.</p> <p>The dropout from the study assessments was high (50%), and was greater in the treatment group than in the control group.</p> |
| Strengths and limitations | <p>The dropout rate was high, leading to a high number of missing data which will impact data analyses. However, the treatment differences were robust to 3 types of sensitivity analyses for missing data.</p> <p>The control group was essentially no treatment because only 3% of the population had medication and 7% psychological treatment.</p> <p>The outcome variables were all self-reported. Self-reports may include distortions that lower the accuracy of this method of data collection.</p> <p>Patients were predominately in the non-clinical range of psychotic experiences, restricting the conclusions to the less severe cases. The generalisability of the results might be further restricted by the fact that the patients were self-reported for inclusion into the trial.</p> |

Abbreviation: dCBT-I, digital cognitive behavioural therapy for insomnia.

Overall assessment of the evidence

- The size of the treatment effect varies between studies. [Espie et al. \(2012\)](#) reported a 20% improvement in sleep efficiency (SE) from baseline after Sleepio in patients who met the DSM-V criteria, whereas [Bostock et al. \(2016\)](#) and [McGrath et al. \(2017\)](#) reported an increase in SE of only 10%. In [Freeman et al. \(2017\)](#), Sleepio was associated with significant reductions at all time points (3, 10 and 22 weeks) in insomnia, paranoia and hallucinations compared with the control group (all $p < 0.0001$).
- The baseline SE varied between studies. Patients in [Espie et al. \(2012\)](#) had close to 60% SE at baseline, whereas [Bostock et al. \(2016\)](#) and [McGrath et al. \(2016\)](#) reported baseline SE rates of 76% and 81% respectively. The [Barnes et al. \(2017\)](#) randomised controlled trial reported a higher increase in SE (27%) in both the Sleepio and control groups, but this study also reported a lower baseline SE of approximately 69%. Normal SE is around 85% to 90%. Therefore the different size effects in the different population settings could be attributed to SE reaching the normal limit with a smaller improvement in the less severely affected populations.
- All 6 included studies list employees of the developer among the study authors, and so the studies may be subject to bias.
- None of the available studies compared Sleepio with face-to-face cognitive behavioural therapy for insomnia (CBT-I).
- None of the studies indicates which Sleepio version was used. The developer states that there have been no substantive changes to the CBT-I content since launch, but it is not known how any other changes may affect the generalisability of the evidence to the current version.
- Although the 4 randomised controlled trials ([Espie et al. 2012](#), [Barnes et al. 2016](#), [Bostock et al. 2016](#), [McGrath et al. 2016](#)) are relatively small compared with the potential reach of Sleepio, all except for [McGrath et al.](#) are adequately powered, well-designed and reported. The randomised controlled trial by [Freeman et al.](#) had to revise the sample size calculation because the dropout rate was more than expected.
- Sample sizes are similar to those in other randomised controlled trials done on digital CBT-I technologies ([Seyffert et al. 2016](#)). [Freeman et al. \(2017\)](#) represents the largest randomised controlled trial of a psychological intervention for a mental health problem.

- Three of the studies were done in the UK; it is not clear if the results of the others are generalisable to an NHS setting.
- Although evidence on reduced prescribing of hypnotics with Sleepio has not yet been published, the developer has presented unpublished data from a case study on Sleepio's use in a large US company involving approximately 17,500 employees.
- The reported outcomes on sleep improvement, psychological wellbeing, improved labour market participation and productivity, and reduced prescribing of hypnotics are all relevant to the NHS care pathway.

Recently completed and ongoing studies

Three recent, ongoing or in-development trials on the use of Sleepio for people with insomnia were identified in the preparation of this briefing.

- Digital insomnia therapy to assist your life as well as your sleep ([ISRCTN60530898](#)). Recruitment completed.
- Efficacy of a sleep quality intervention in people with low back pain: protocol for a feasibility randomized co-twin controlled trial ([ACTRN12615000672550](#)). According to the developer, the anticipated completion date is 2017.
- Sleep treatment outcome predictors (STOP; [NCT03062891](#)). Currently recruiting patients by invitation.
- A sleep program to improve sleep quality in people with HIV ([NCT02571595](#)). Currently recruiting patients.
- Sleep to prevent evolving affective disorders (SPREAD; [NCT02988375](#)). Currently recruiting patients.
- Research on expecting moms and sleep therapy (REST; [NCT02805998](#)). Currently recruiting patients.
- Defining the impact of improved sleep on cognitive function ([ISRCTN89237370](#)). Recruitment completed.

Costs and resource use

Economic evidence

No published economic evidence was found.

The developer provided a budget impact model that evaluates the cost-saving potential for a single NHS clinical commissioning group if Sleepio were introduced in 50% of eligible patients (defined as people with insomnia having cognitive behavioural therapy [CBT-I]). The model used recovery rates from [Luik et al. \(2017\)](#). The analysis does not satisfy the requirements of a model-based economic evaluation but suggests that Sleepio has cost-saving potential. Cost savings would most likely result from a reduction in direct treatment costs compared with face-to-face CBT-I, but only if Sleepio were used instead of CBT-I. Cost savings in terms of reduced hypnotic drug prescribing and further primary and secondary care contact depend on the longer-term relative effectiveness of Sleepio. There is no published evidence directly comparing Sleepio with face-to-face therapy, or that provides long-term outcomes on which to judge the likelihood of savings.

Technology costs

Sleepio costs £200 per year, or £3.85 per week. After the first year, users may renew as 'graduate' users at a reduced price of £5.99 per month. Pricing models for the NHS may vary depending on the number of users, so discounts may be available.

Comparator costs

Hypnotic drugs include short-acting benzodiazepines and non-benzodiazepines. These should not be taken for more than 3 weeks and preferably for only a week. Assuming that the maximum adult dose is taken each day, it costs around £1.50 to £9.00 for a week's course and £4.50 to £27.00 for a 3-week course ([British National Formulary 2016](#)). A conventional CBT-I session lasts around 55 minutes and costs £97 ([Personal Social Services Research Unit 2016](#)), which amounts to £582 for 6 sessions.

Potential resource impact

Sleepio could be cost saving if it were shown to be as effective as face-to-face CBT-I (£200 compared with £582). Cost savings may also result from reduced hypnotic drug prescribing treatment. However, there is currently no published evidence to support these scenarios.

Sleepio is a digital technology and so no changes in NHS facilities or infrastructure should be needed.

Usage and user experience

Current usage and reach

Sleepio is currently available to improving access to psychological therapies (IAPT) patients from 10 clinical commissioning groups in England and to NHS staff in 3 NHS trusts.

The developer manages the Sleepio website and app. Sleepio has been designed as a scalable population health intervention, so the developer expects to manage any increase in users from the NHS.

Table 3 Evidence of usage and reach

| Evidence | Source |
|---|--|
| 19% of 17,500 employees at a company using Sleepio engaged with the personalised light sleep help and 8% with the full Sleepio programme. 79% of people using the full programme were actively using the programme for more than 12 weeks. On average each person had completed 53 sleep diaries. | The developer |
| 82% of Sleepio users completed all their online therapy sessions compared with 79% in the control group. In the study with community-based patients with self-reported insomnia, 93% of people who activated the online intervention completed just 1 Sleepio session and 50% completed all 6 sessions. | Espie et al. 2012 ; McGrath et al. 2016 |
| Progress through the programme was similar between people in the treatment group and waiting list group, with 54% and 52% respectively completing all 6 sessions. The response rate for the final survey was 45%. | Barnes et al. 2016 |
| In a study analysing data from a single IAPT service, 74% of patients completed all 6 Sleepio sessions. This was higher than the current IAPT services average completion rate of 48%, which demonstrates the feasibility of a digital self-help programme in IAPT services. | Luik et al. 2017 |

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| <p>In a large randomised controlled trial, 50% of patients assigned to use Sleepio dropped out. This rate was higher than the control group (25% at 3 weeks). By week 10 and 22 the dropout rate was 61% and 68% respectively.</p> <p>Treatment uptake was relatively low. There was a progressive decline in the number of patients engaging with the programme. From 69% of the patients who logged on for at least 1 treatment session, only 18% accessed all 6 sessions.</p> | <p>Freeman et al. 2017</p> |
| <p>Reported user experience</p> | <p>Source</p> |
| <p>Self Help has made Sleepio available to 505 users since 2015. It reported that using Sleepio helped users to cope with their sleep problems better, had a positive impact on overall wellbeing, confidence and their ability to cope with stressful situations. Users did not experience any technical difficulties with the programme.</p> | <p>Self Help</p> |
| <p>A patient who had previously not used any other systems or drugs for insomnia found Sleepio very simple and easy to use, and described a benefit in falling asleep as well as learning relaxation techniques. As with face-to-face CBT-I, some people who try Sleepio do not like it and some actively disliked it. However, most users find it very helpful and the feedback is generally positive. Some users like the fact that they can buy ongoing subscriptions and can therefore have booster sessions when they need them.</p> | <p>Specialist commentators</p> |
| <p>This study reported an online survey exploring the reasons for deciding to engage with the online community feature of Sleepio. People related their community experiences to engagement with the Sleepio program, with many stating it had supported their efforts to improve their sleep, as well as helping with adherence and commitment to the program. Despite some concerns, members regarded the Sleepio community as a valuable resource.</p> | <p>Coulson et al. 2016</p> |
| <p>According to unpublished developer data, 88% of Sleepio users would recommend Sleepio to a friend or colleague with sleep troubles. Based on user feedback, Sleepio helped improve sleep, reduced use of over-the-counter sleep aids and provided support in the form of resources and techniques.</p> | <p>Unpublished data from the developer</p> |
| <p>Abbreviations: CBT-I, cognitive behavioural therapy for insomnia; IAPT, improving access to psychological therapies.</p> | |

Case study: Self Help

Self Help is a registered mental health charity that is commissioned by the NHS to provide a range of primary care mental health services, including eTherapy services.

Self Help delivers Sleepio as part of the 'step 2' IAPT services that is included in its eTherapy programme. It has prescribed Sleepio to 505 users since 2015. These were people who identified poor sleep as their main problem at the first appointment. In addition to using it from home, users can access Sleepio at any of Self Help's community venues where eTherapy is available. Self Help provides Sleepio instead of face-to-face support with a psychological wellbeing practitioner, but users have weekly face-to-face or over-the-phone support from an eTherapy coordinator while using Sleepio.

Self Help found that Sleepio can improve psychological and physical health, reduce alcohol and drug use to aid sleep, and lead to lifestyle improvements, including increased activity levels, improvements in diet and weight loss. In addition, it may lead to fewer GP visits for medication prescriptions and subsequently reduce patient spending on prescriptions. It can potentially reduce work absence caused by fatigue, illness, and physical or mental health problems. Self Help also claims that using Sleepio can lead to improved academic achievement through improvements in cognitive functioning.

Overall assessment of user benefits

- According to published evidence, there is mixed usage and engagement with Sleepio. In some studies the number of patients engaging with the programme progressively declines throughout treatment.
- Many people do not have access to CBT-I. Sleepio could reach large numbers of people who would otherwise have no access to this kind of therapy. However, practical matters such as access to mobile devices and the internet, and costs, may limit the range of patients who will benefit.

Most users have found Sleepio very helpful and provided generally positive feedback.

Specialist commentators comments

Comments on this technology were invited from specialist commentators working in the relevant fields and relevant patient organisations. The comments received are individual opinions and do not represent NICE's view.

Three out of 5 specialist commentators were familiar with or had used Sleepio in practice.

Level of innovation

The commentators noted that although cognitive behavioural therapy for insomnia (CBT-I) is not innovative, Sleepio is innovative as a means of delivering CBT-I. They felt that any method of making this content more easily available to people is worth considering. One commentator noted that the other innovative aspect of Sleepio is that it can integrate patient data directly from a wearable device, personalising and automating the data collection.

Two commentators noted evidence (from 1 randomised controlled trial and 2 meta-analyses), which shows that computerised CBT-I is no better than other forms of CBT-I.

Potential patient impact

The commentators noted that Sleepio could help improve not only sleep quality but also quality of life, anxiety and depression. Self-disciplined, motivated people without complex comorbidities may benefit most. Face-to-face CBT-I has a high dropout rate so user adherence is crucial for it to be effective.

Most commentators stated that Sleepio may lead to fewer hospital visits, but 1 noted that it has not been possible to demonstrate a clear benefit in long-term health with Sleepio, and there is no evidence that CBT-I reduces hospital visits. The same commentator noted that there is a need to educate patients and GPs about CBT-I in order to fully benefit.

According to 1 commentator, insomnia is highly prevalent, has an enormous negative effect on patients' quality of life, and it is rarely adequately treated.

The specialist commentators report no safety issues with Sleepio. One commentator noted that all CBT-I treatments that involve sleep-restriction (including Sleepio) increase daytime sleepiness and so can affect driving safety and lower seizure threshold.

Three commentators considered that users will need some guidance on how to use Sleepio because CBT-I is not suitable for everyone with insomnia, such as some people with complex comorbidities.

Potential system impact

Three specialist commentators noted that Sleepio could be cost saving for the NHS without needing any changes in infrastructure or other facilities. They noted that face-to-face CBT-I can cost up to £750 for 5 sessions.

One commentator stated that GP clinical systems may need upgrading to encourage the prescription of apps such as Sleepio and the collection of related data. Training in sleep disorders exists within the improving access to psychological therapies (IAPT) programme but not necessarily in other health disciplines, so staff may have limited knowledge of sleep disorders and insomnia. This would mean extra training.

One commentator noted that there is a cost for training psychological wellbeing practitioners to use Sleepio and to screen the right patients.

One commentator felt that the direct cost of hypnotic drugs is unlikely to be reduced by using Sleepio. However, indirect costs may be reduced in terms of patient distress and time off work. Costs may also be lower than the comparator cost of face-to-face CBT-I. Sleepio may help to reduce waiting times for some patients with insomnia.

One commentator noted that despite the clear health benefits treating insomnia with CBT-I, and the potential side effects of hypnotic drugs, there is insufficient evidence to demonstrate cost savings in the UK.

General comments

One commentator noted that sleep management would typically be used as part of a CBT-I package for a wide range of illnesses, diseases and problems. Another noted that wider public adoption of smartphones and access to the internet would be needed for Sleepio to be used.

Specialist commentators

The following specialist commentators provided comments on a draft of this briefing:

- Professor Trudie Chalder, professor of cognitive behavioural psychotherapy, South London and Maudsley NHS Foundation Trust. Professor Chalder is on 2 NHS England committees related to an improving access to psychological therapies (IAPT) initiative to roll out training for therapists to treat long-term conditions and medically unexplained syndromes.

- Dr Keith Grimes, GP. At the time of commenting, Dr Grimes was the clinical innovation lead for both the Eastbourne, Hailsham and Seaford clinical commissioning group (CCG) and the Hastings and Rother CCG, and was a governing body member for Eastbourne Hailsham and Seaford CCG. He is a digital health consultant and a salaried employee (GP) of a social enterprise company (Integrated Care 24) that provides out-of-hours, primary care and 111 services to the NHS. He has liaised with the developer to explore potential avenues for Sleepio's use.
- Mrs Gillian Olds, sleep nurse specialist, Newcastle Regional Sleep Service. Mrs Olds works with Dr Kirstie Anderson and contributes to the delivery of face-to-face cognitive behavioural therapy for insomnia (CBT-I) in a nurse-led clinic.
- Dr Kirstie Anderson, consultant neurologist and honorary senior lecturer. Newcastle Regional Sleep Service. Dr Anderson developed the clinical content for the Sleepstation app, a similar technology to Sleepio. She currently receives no salary but holds shares in the company. She uses online CBT-I within the sleep service as well as face-to-face CBT-I.
- Dr Hugh Selsick, consultant in sleep medicine and psychiatry, Royal London Hospital for Integrated Medicine. Dr Selsick has received speaker's fees from a pharmaceutical company for delivering talks on the treatment of insomnia, and has done a clinical trial of Sleepio.

Development of this briefing

This briefing was developed for NICE by King's Technology Evaluation Centre. Please contact medtech@nice.org.uk for more information.

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