Development of a Novel Behavioral Sleep Medicine Education Workshop Designed to Increase Trainee Psychologists' Knowledge and Skills in Insomnia Management

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Objectives: Despite the clear influence of poor sleep on mental health, sleep education has been neglected in psychology training programs. Here, we develop a novel sleep and insomnia education workshop, the Sleep Psychology Workshop, designed for integration within graduate psychology programs. We also examined the potential efficacy and acceptability of the workshop to upskill trainee psychologists in behavioral sleep medicine (BSM).

Methods: The Sleep Psychology Workshop was developed using a modified Delphi Method. Eleven trainee psychologists completing their Master of Psychology degrees (90% female, 24.4 ± 1.6 years old) attended the workshop, delivered as three, two-hour lectures (total of six hours). Sleep knowledge, attitudes, and practice assessments (GradPsyKAPS) were completed pre-and post-intervention. A focus group and 6-month follow-up survey captured feedback and qualitative data.

Results: Trainees' sleep knowledge quiz scores (% correct) increased from 60% to 79% pre- to post-workshop ($p = .002$). Trainees' self-efficacy to use common sleep-related assessment instruments and empirically supported interventions to manage sleep disturbances increased, along with their confidence to manage insomnia (all $p<.02$). Participant feedback was positive, with 91% of trainees rating the workshop as "excellent" and qualitative data highlighting trainees developing practical skills in BSM. Six months post-intervention, 100% of trainees endorsed routinely asking their clients about sleep, with 82% reporting improvements in their own sleep.

Conclusions: The Sleep Psychology Workshop is a potentially effective and acceptable introductory BSM education program for trainee psychologists, ready for integration within the graduate psychology program curriculum.

Introduction

Poor sleep contributes to poor mental health, with higher rates of sleep disturbances observed in individuals experiencing mental health conditions than in the general population (Bartlett, Marshall, Williams, & Grunstein, 2008; Geoffroy et al., 2018; Morin & Ware, 1996; Roth, 2007). Whilst sleep disturbances are listed as part of the diagnostic criteria of many mental health disorders (e.g., major depressive disorder), current clinical guidelines recognize sleep disturbances, such as insomnia, as independent and treatable conditions to co-morbid mental health disorders (American Psychiatric Association, 2013; Edinger et al., 2021; Qaseem, Kansagara, Forciea, Cooke, & Denberg, 2016; Ree, Junge, & Cunnington, 2017; Riemann et al., 2017). These changes in diagnostic guidelines were informed by research over the past 30 years, which highlighted how sleep disturbances can predict the onset and exacerbation of mental health conditions (Ford & Kamerow, 1989; Hertenstein et al., 2019; Jackson, Sztendur, Diamond, Byles, & Bruck, 2014; Sivertsen et al., 2012). In depression, for example, sleep disturbances can increase the severity and duration of a depressive episode (Staner, 2010), as well as increase the risk of relapse (Franzen & Buysse, 2008; Perlis, Giles, Buysse, Tu, & Kupfer, 1997) and suicide (Perlis et al., 2016; Pigeon, Pinquart, & Conner, 2012). Notably, treating sleep disturbances can improve mental health, with three recent meta-analyses demonstrating that better sleep improves depressive, anxiety, and rumination symptoms, with overall gains in mental health (Hertenstein et al., 2022; Scott, Webb, Martyn-St James, Rowse, & Weich, 2021; Wu, Appleman, Salazar, & Ong, 2015).

Despite the strong links between sleep and mental health, behavioral sleep medicine (BSM) education has largely been neglected in mental healthcare provider training programs (Meaklim et al., 2020). In Australia, almost half of trainee

psychologists receive no education regarding assessment, diagnosis, or treatment for sleep disorders during graduate school (Meaklim et al., 2021). The story is similar in the U.S., with 69% of clinical psychology graduate programs offering no training in the treatment of sleep disorders (Meltzer, Phillips, & Mindell, 2009) and 95% of practicing psychologists reporting no sleep education during graduate school (Zhou, Mazzenga, Gordillo, Meltzer, & Long, 2021). Limited sleep education is likely a result of poor knowledge translation, with it taking approximately 17 years to translate research evidence into standard healthcare education and clinical practice (Morris, Wooding, & Grant, 2011). Additionally, healthcare educators often cite insufficient time, space, and expertise in the curriculum for sleep education (Meaklim et al., 2020; Meaklim et al., 2021; Meltzer, Phillips, & Mindell, 2009; Mindell et al., 2011; Romiszewski et al., 2020). However, this lack of sleep education during graduate training means that many mental healthcare providers do not feel equipped to take a sleep history nor to routinely screen or provide evidence-based treatment for sleep disorders, such as insomnia (Drapeau, 2022; Richardson, Ree, Bucks, & Gradisar, 2021; Zhou et al., 2021). Indeed, sleep disturbances are not a treatment priority for many psychologists (Haycock, Hoon, Sweetman, Lack, & Lovato, 2022). Without exposure to sleep education during graduate training, mental health providers, such as psychologists, are ill-equipped to assess and manage common sleep disorders that so often co-occur with mental health conditions they routinely see in clinical practice.

There is an urgent need to increase BSM education within graduate psychology training programs. The Society for Behavioral Sleep Medicine has led the way by establishing accredited graduate, internship and post-doctoral BSM training programs (Society of Behavioral Sleep Medicine, 2022). However, these programs are limited to select psychology programs, predominantly in the United States of America. Other

education efforts have been made to establish introductory BSM training in the graduate psychology curriculum and yielded promising results. For example, compared to a matched comparison group, graduate doctoral students who attended a 10-week online BSM course demonstrated significant improvements in BSM knowledge and self-efficacy (Peachey & Zelman, 2012). However, despite the effectiveness and importance of this program, it has not been widely implemented in graduate psychology programs. This may be due to programs' intensive 10-week curriculum, which is too long to incorporate into the already jam-packed graduate psychology curriculum. Therefore, to increase the uptake of BSM education into graduate psychology programs, a shorter, more introductory BSM workshop may be more feasible to implement widely.

The current study outlines the development of an introductory, six-hour BSM education workshop, called the Sleep Psychology Workshop, designed for integration within graduate psychology training programs. We also piloted the program and tested whether the Sleep Psychology Workshop could improve trainee psychologists' knowledge, perceived confidence, and self-efficacy to assess and treat sleep disturbances. Lastly, we assessed the acceptability of the Sleep Psychology Workshop via trainees' feedback to establish its broad appeal for graduate psychology training programs.

Materials and Methods

Sleep Psychology Workshop Content Development

The content for the Sleep Psychology Workshop was designed by the research team, all registered psychologists with expertise in BSM, mental health, and/or clinical psychology training. The principles of a modified Delphi Method (Boerner, Coulombe, & Corkum, 2015) were used to achieve curriculum consensus. The first author developed an initial list of key BSM knowledge and skills to include, based on a

narrative review into sleep education for healthcare providers (Meaklim et al., 2020), a survey study into sleep education in graduate psychology programs in Australia (Meaklim et al., 2021), and other published sleep education for healthcare providers literature (Balasubramaniam, Pullinger, & Simmons, 2014; Boerner et al., 2015; DelGuercio, 2018; Lee et al., 2004; Lichstein et al., 1998; Manber et al., 2012; Manber & Simpson, 2016; May, Romiszewski, Norris, Miller, & Zeman, 2019; Mindell, Moline, Zendell, Brown, & Fry, 1994; Moline & Zendell, 1993; Orr, Stahl, Dement, & Reddington, 1980; Papp, Penrod, & Strohl, 2002; Peachey & Zelman, 2012; Rosen et al., 1998; Salas et al., 2013; Salas et al., 2018; Sateia, Reed, & Christian Jernstedt, 2005; Sciberras et al., 2017; Tze-Min Ang, Saini, & Wong, 2008; Zozula, Bodow, Yatcilla, Cody, & Rosen, 2001). In addition, resources and education guidelines from professional psychology and sleep associations (e.g., Society for Behavioral Sleep Medicine, Sleep Research Society, Australian Psychological Society, Australasian Sleep Association, American Academy of Sleep Medicine, European Sleep Research Society) were reviewed, along with behavioral sleep medicine training manuals (Harvey & Buysse, 2017; Meltzer & Crabtree, 2016; Perlis, Aloia, & Kuhn, 2010) and Australian Psychological Accreditation Council (APAC) guidelines, to ensure competency requirements for both BSM and graduate clinical psychology students were met (Australian Psychology Accreditation Council, 2019). The workshop was designed to provide foundational knowledge of the relationship between sleep, circadian rhythms, and mental health, and introduce sleep assessment, diagnosis and evidence-based treatment to trainees, with a focus on treating insomnia disorder due to its high prevalence rate.

The list of BSM knowledge and skills for the workshop went through two rounds of Delphi Method review with three members of the research team (Authors 1, 2 and 8), who made additional suggestions and revisions to the list of topics to be

included in the workshop. Once the revised list of key knowledge, skills, and competencies was finalized, the workshop curriculum and learning objectives were developed and made into PowerPoint slides. The workshop slides contained didactic sleep education, along with interactive/blended learning activities, role-play exercises, video (e.g., two-process model of sleep regulation video on YouTube), web-based resources, readings from evidence-based literature and textbooks, and handouts with sleep psychology exercises for clients. The workshop slides, activities, resources, and readings were then reviewed by the remainder of the research team and their feedback was incorporated into the final version of the workshop. The final workshop was six hours in duration, delivered as three weekly, two-hour in-person interactive lectures. Our prior research indicated that graduate psychology programs could accommodate a median of 4 hours (range 0 – 10) of sleep education into their programs (Meaklim et al., 2021). However, we believed that 4 hours was insufficient to provide students with both basic sleep psychoeducation and the opportunity to practice sleep assessment and treatment skills. Additionally, the course coordinator for the Health Psychology subject could offer six hours of lecture time to deliver the workshop, so content development was aligned with the six hours available.

The workshop was facilitated by the first author, a registered psychologist with master-level qualifications in psychology, internationally certified as a Diplomat in Behavioral Sleep Medicine, with 5 years of clinical experience working as a psychologist in sleep disorder clinics and 10 years of sleep research experience. Author 5, a professor in clinical psychology with extensive experience and expertise in training psychologists in sleep, oversaw the delivery of the sleep psychology workshops to the trainee psychologists. The learning content, class exercises, and homework activities for the Sleep Psychology Workshop are outlined in Figure 1. Learning objectives for the Sleep Psychology Workshop are listed in Figure 2.

Participants

Participants were eleven trainee psychologists completing a Master of Clinical Psychology at an Australian University. Trainees were in their 6th year of psychology training, comprising four years of undergraduate and two years of masters-level education. The Sleep Psychology Workshop was delivered as a part of trainees' Health Psychology subject. Eleven students in total were enrolled in this subject and were required to attend the Sleep Psychology Workshop as part of degree requirements. However, participation in the research activities for the Sleep Psychology Workshop was voluntary. Ethics committee approval was obtained for this study (CHEAN; 05-19/21939).

Measures and Outcomes

The study used a shortened version of the Graduate Psychologists Knowledge, Attitudes and Practice in Sleep scale (GradPsyKAPS), developed by the research team for a previous study (Meaklim et al., 2021). Some items were omitted from the original 97-item version for brevity, leaving 76-items within the current version (see online supplement), but the self-efficacy (7-point Likert scale), preparedness (4-point Likert scale), and treatment confidence (4-point Likert scale) subscales were retained as outcome measures. These scales demonstrated good internal consistency in the original and current studies (α = .75 to .91).

In addition, the Sleep Psychology Knowledge Quiz (35 items) was retained from the GradPsyKAPS and used as the primary efficacy outcome measure. The multiple-choice Sleep Psychology Knowledge Quiz contained items about general sleep and circadian rhythms knowledge (e.g., Current guidelines from the American Academy of Sleep Medicine and Sleep Research Society recommend that per day adults need: (A) at least 6 hours of sleep, (B) at least 7 hours of sleep*, (C) at least 8 hours of sleep, (D) at least 9 hours of sleep) and more targeted BSM knowledge (e.g., When applying Sleep

Restriction Therapy, which is the best response for the Sleep Efficiency (SE) threshold used for increasing prescribed time in bed? (A) 100%, (B) ≥85%*, (C) ≥75%, (D) ≥50%,). The quiz was timed, allowing students 45 seconds to answer each question to reduce the chance of them searching for answers in their notes or online. In the original GradPsyKAPS study, trainee psychologists ($n = 112$) scored an average of 57% on the Sleep Psychology Knowledge Quiz (Meaklim et al., 2021). The GradPsyKAPS was administered in this study to trainees via Qualtrics before and after the Sleep Psychology Workshop (up to two-weeks post-workshop). The order of quiz items was changed post-workshop.

In addition, trainees provided feedback about the workshop via evaluation questions in the post-workshop survey. One in-person focus group was held for all trainees' post-workshop to provide verbal feedback about their training experience with an external facilitator. Lastly, a six-month online follow-up survey was administered to trainees to provide additional information about the usefulness of the Sleep Psychology Workshop in their clinical practice (see online supplement for study measures and focus group interview guide).

Procedures

Trainee psychologists were required to attend the Sleep Psychology Workshop as part of their Health Psychology subject requirements. However, all research activities (pre-post GradPsyKAPS surveys, workshop evaluation/acceptability, focus group, and long-term follow-up survey) were optional. Students could opt-in to the research activities at any point during the study. Students were sent an email early in Semester 1 with information about the study, along with the Participant Information and Consent Form. Author 1 also provided an overview of the study in person before the workshop to introduce the research study and answer any study-related questions. Trainees were

advised that if they participated in the study and scored 50% on the sleep knowledge quiz post-workshop, they would receive a Certificate of Completion for the workshop.

Trainees completed the online pre-GradPsyKAPS questionnaire via Qualtrics in the week prior to the delivery of the Sleep Psychology Workshop. Directly after the running of the third workshop, trainees were invited to attend an in-person focus group to evaluate and provide feedback about the workshop. Trainees were provided with lunch and the opportunity to win a $100 gift card for participating. The focus group was facilitated by an undergraduate psychology tutor external to the research project. Trainees then completed the post-workshop GradPsyKAPS questionnaire and feedback survey online via Qualtrics in their own time, up to two-weeks post-workshop. Lastly, six-months post completion of the workshop, trainees were invited to complete an online long-term follow-up survey with the opportunity to win a $100 gift voucher.

Data Analysis

Data were analyzed using SPSS 28.0. Descriptive statistics were calculated to describe the sample. Workshop acceptability items reported on a 7-point Likert scale were collapsed into overall agreement, midpoint (neither agree or disagree) and disagreement to assist with data visualization. For continuous data, repeated measures *t*-tests were used to compare results from pre- to post-workshop (e.g., sleep knowledge quiz). For ordinal data, Wilcoxon Signed Rank Tests were used (e.g., self-efficacy data, confidence, preparedness scales), with effect size r ($r = z / \sqrt{N}$). The focus group was audio recorded and data transcribed verbatim for the qualitative analysis. Reflexive thematic analysis was used to identify, analyze and report themes within the focus group data (Braun & Clarke, 2006, 2019). Two members of the research team (Author 1 and 2) analyzed the focus group data, using an inductive, data driven approach to identify codes and themes. This allowed for discussion and collaborative decision-making around codes and themes, following the six-phase process as outlined by Braun

and Clarke (2006). Codes and themes were then reviewed and refined by a senior researcher with extensive qualitative methods experience (Author 4).

Results

  A class of eleven trainee psychologists, all second-year Master of Clinical Psychology students completing a Health Psychology subject, were invited to participate in the Sleep Psychology Workshop evaluation study. Seven trainees completed both pre-and post-workshop GradPsyKAPS online assessments, eight completed the post-workshop evaluation survey, ten participated in the focus group, and all eleven completed the six-month follow-up survey. Participants were 23 to 28 years old ($M = 24.44$, $SD = 1.59$), and the majority identified as female (90%). Students reported a median of 6 hours of sleep education during their undergraduate psychology training but zero hours during their graduate degree up to the date of this study.

Potential efficacy

  Pre- to post-intervention sleep psychology knowledge quiz scores are presented in Figure 3. There was a significant improvement in trainees' sleep psychology knowledge quiz scores from pre- to post-workshop, t (6) = -5.18, $p = .002$ (two-tailed), with large effect size (Cohen's $d = 1.96$).

  Wilcoxon Signed Rank Tests revealed that trainees reported a significant increase in their self-efficacy to use standard sleep-related assessment instruments and empirically supported interventions to manage sleep disturbances, with large effect sizes ($r = .58 - .64$; see Table 1). They also reported an increase in their perceived skills to assess and diagnose common sleep and circadian rhythms disorders and knowing where to access further training in sleep, sleep disorders, and circadian rhythms if required. There was also a significant increase in trainees' preparedness to treat sleep disturbances using an evidence-based approach from pre- to post-workshop ($r = .06 -$ .65; see Table 2). Moreover, trainees reported significantly increased confidence in

managing insomnia disorder and obstructive sleep apnea using evidence-based therapy post-workshop.

Training Acceptability

Acceptability of the Sleep Psychology Workshop to trainee psychologists was high. Post-workshop, more than 75% of participants responded that they agreed or strongly agreed across all content, learning, and training experience survey items (Table 3). Additionally, 88% of participants rated the workshop as excellent, with 12% rating it as very good.

Focus Group Feedback

Reflexive thematic analysis of trainees' feedback from the focus group ($n = 10$) supports the Sleep Psychology Workshop as an acceptable training program for improving trainee psychologists' sleep assessment, diagnosis, and management skills. The following themes were identified from the focus group discussion:

Theme 1. Developing practical skills in behavioral sleep medicine

Trainees identified that the Sleep Psychology Workshop was very helpful for developing their practical skills in behavioral sleep medicine. They valued the practical application of the workshop and enjoyed having strategies and techniques to use directly with clients experiencing sleep and circadian rhythm disturbances. The exercises helped trainees to develop insight and awareness into their own and their clients' sleep. For example, several students reported that using a sleep diary to record their own sleep was helpful and alerted them to potential sleep interfering behaviors, like excessive caffeine use and irregular sleep patterns, that may be impacting their sleep quality. Trainees discussed that the workshop helped them to know what to do (i.e., "I get it"), if they encountered a client experiencing a sleep disturbance. They discussed having a better sense of knowing what questions to ask clients about their sleep than before the workshop.

"There were a lot of things that now we know what to be looking for, like time

spent in bed or like those sort of [sleep] latencies that we need to be looking out

for. At least we know now what to be looking or asking because I don't think we

had that. Like it was more like are you waking up on time? Are you sleeping the

same amount of time? But whereas now it's like, what time do you get to bed

and how long does it take to fall asleep? There's better questions and we

understand that now" – (Participant 9)

Theme 2. Knowledge Building/Understanding

The workshop helped trainees to build their knowledge and understanding of behavioral sleep medicine. Trainees discussed how the workshop consolidated their theoretical understanding of sleep and that they were better equipped to understand client's perspectives. They also endorsed that completing sleep diaries and questionnaires themselves was advantageous to understanding barriers that may get in the way of clients completing these exercises. Many trainees reported learning about CBT-I for the first time. Trainees also reported being quite surprised to learn that sleep hygiene was not an empirically supported treatment for chronic insomnia and appreciated this increased understanding of insomnia interventions. They valued understanding the referral process to sleep physicians, knowing where the limits of their skills might be and the type of sleep problems that would be best to refer on.

"Like the sleep diary was not only helpful in understanding our sleep, like

Participant 5 was saying it was, but also like so you are aware of the barriers

that come up if I ask a client to do that. Like some days, I completely forgot, or

like Participant 2 was saying, that you did it for a few days and then thought too

much about it so then you didn't really want to do it anymore. And so, it's like

those sorts of things where it is really important to be so familiar with what you

are asking your clients to do." (Participant 1)

Theme 3. Professionally relevant and level appropriate

Overall, trainees felt that the Sleep Psychology Workshop was professionally relevant and met their current needs. They liked the balance of both theoretical and practical components. They found the workshop relevant to the types of clinical presentations they would see, enjoyed the integration of sleep topics/subjects across the workshops, and felt they had learned useful content that was appropriate to their current level of development as trainee psychologists.

> *"I like how the workshops kind of built on each other. I think it was the first one*
>
> *where [the presenter] talked about the two-process model and she continued to*
>
> *kind of reference them throughout when talking about the interventions and*
>
> *things like that. Which for me was helpful and I guess trying to understand not*
>
> *only why it was useful but how you can communicate it to clients as well."*
>
> *(Participant 5)*

Theme 4. Developing clinical sleep skills and professional judgment

Trainees appreciated the opportunity to problem solve and discuss challenges with implementing sleep assessment and management skills in the workshop. They also utilized their reflection skills, integrating the information learned with the understanding of their own sleep and that of their clients. Overall, trainees endorsed that the Sleep Psychology Workshop helped to build their confidence to assess and manage sleep disturbances in clinical practice, although they were still cognizant of the need to work with their supervisors to hone their sleep knowledge and skills.

"I think coming out of it, we felt like we have the foundation of skills to be able to work

with sleep issues, and obviously you are not going to be the expert in all the different

areas, but now having the foundation we can build on it with the extra bits that we

might need." (Participant 10)

Theme 5. Practical and engaging style of delivery

Trainees enjoyed the practical and engaging delivery style of the Sleep

Psychology Workshop. The practical focus of the workshop was highlighted, with

students finding the role-play activities of the two-process model of sleep, taking a sleep

history, and sleep-restriction therapy calculations useful for developing their skills.

Trainees also appreciated the engaging presentation style, enjoying the interactive

nature of the workshop and the benefits of being able to ask questions to the workshop

facilitator about their own experiences integrating behavioral sleep medicine with their

clients.

> *"I thought having us, um, role play and explain the two-process model was*
>
> *really good because it can be tricky to wrap your head around. So, practicing*
>
> *how you would say it to a client was really helpful because I know, at least*
>
> *myself, I probably wouldn't go and do it in my spare time (laughs). So, it was*
>
> *good to do it." (Participant 1)*

Theme 6. Limitations of the workshop

Trainees acknowledged some limitations of the Sleep Psychology Workshop.

One student commented that learning about sleep made them sleepy. However, the main

limitation endorsed by students was that many clients in general psychology practice

would not meet explicit criteria for a sleep disorder, but instead, display more

subthreshold symptoms. They were also curious about how to address the types of sleep

disturbances that occur in different mental health disorders (e.g., sleep disturbances in

depression *vs.* anxiety) and how to integrate CBT-I strategies, such as sleep restriction

therapy, with other psychological treatments. Trainees also identified the need to attend

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further training to learn about sleep disorders not covered extensively in the workshop (e.g., hypersomnolence disorders).

"I guess just where the focus of the therapy is not necessarily on sleep, where the focus is depression or anxiety, or x or y, how to subtly address the sleep alongside other treatments that we are likely to be doing?" (Participant 3)

Six-month follow-up survey

All eleven trainees completed the six-month follow-up survey. All endorsed using the knowledge learned in the Sleep Psychology Workshop over the past six months and that it had been helpful for their clinical practice. Specifically, 100% routinely asked their clients about sleep, 91% had used psychoeducation about sleep with a client, 82% had administered sleep questionnaires to their clients, 82% had discussed the two-process model of sleep regulation with a client, and 73% reported that they had used a sleep diary with a client.

Overall, 91% felt more confident to take a sleep history and screen for sleep apnea, whilst 82% felt more confident to diagnose a sleep-wake disorder. Notably, 100% of students reported that they better understood the common perpetuating factors of insomnia (e.g., spending too long in bed when they can't sleep) and 91% agreed they felt more confident to treat insomnia using an empirically supported treatment (e.g., CBT-I). Additionally, 91% reported that they now knew where to refer clients who require more support with their sleep (e.g., local sleep physicians and sleep disorder centers).

Notably, 82% reported that their own sleep had improved from attending the Sleep Psychology Workshop. In free-text responses, students identified helpful factors that positively impacted their sleep as: (1) increased awareness of the factors that influence sleep; (2) importance of keeping consistent sleep-wake schedules; (3) challenging their own beliefs about sleep (e.g., it is normal to wake up in the night); (4)

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improved sleep hygiene; (5) greater awareness of their own sleep patterns/habits; and (6) implementing stimulus control.

Overall, 90% of students answered 'no' when asked if there was any aspect of the Sleep Psychology Workshop that could be improved. The one student who responded yes to this question replied: *"The training is so necessary, I would have loved it to be longer to thoroughly explore treatment modalities, role plays, and case examples. I completely understand the limitations of this and remain incredibly thankful for the effort of the educators and researchers in implementing the workshop."* Despite the positive feedback, 63% of students identified additional ways to support their learning from the Sleep Psychology Workshop into clinical practice. Trainees' free-text responses included: (1) supervision from appropriately trained supervisors; (2) support to implement interventions with clients, such as sleep restriction therapy; (3) further training sessions in CBT-I; (4) increased training for clients who are resistant to change; (5) longer term training/support.

Lastly, 100% of trainees agreed that sleep and circadian rhythms education should be on the curriculum for all psychology graduate training programs. They also stated they would all recommend the Sleep Psychology Workshop to other graduate psychology students.

Discussion

This study reports the development of the Sleep Psychology Workshop, an introductory BSM training workshop designed for implementation within graduate psychology training programs. Trainee psychologists who attended the Sleep Psychology Workshop demonstrated significant improvements in their BSM knowledge, skills, and confidence. Trainees also provided overwhelmingly positive feedback about their practical learning experiences from the workshop and endorsed the importance of BSM education for psychologists. Taken together, these results support

the Sleep Psychology Workshop as a potentially effective and acceptable BSM education workshop, ready for broad dissemination into graduate psychology programs.

A strong indicator of the workshop's potential efficacy was the observed increase in trainees' sleep psychology knowledge from pre-to post-workshop. Sleep knowledge quiz scores increased from 60% to 79%, demonstrating significant learning and retention of sleep psychology knowledge. Sleep education studies across trainee healthcare providers generally show low levels of sleep knowledge without specific education and training (Almohaya et al., 2013; Balasubramaniam et al., 2014; Peachey & Zelman, 2012; Salas et al., 2013; Tze-Min Ang et al., 2008; Urquhart, Orme, & Suresh, 2012; Zozula et al., 2001), with a large sample of Australian graduate psychology students ($n = 112$) only scoring an average of 57% on this particular sleep psychology knowledge quiz (Meaklim et al., 2021). Whilst knowledge does not equal competency, these results suggest that the Sleep Psychology Workshop increased trainees' BSM knowledge and awareness of the relationship between sleep and mental health and evidence-based interventions for sleep disturbances.

Another indicator of potential efficacy was trainees' increased confidence and preparedness to address and treat sleep disturbances. Focus group data highlighted trainees developing practical skills in behavioral sleep medicine. They reported that the workshop taught them important sleep assessment questions, tools (e.g., sleep diary), and knowledge about evidence-based treatments for insomnia (i.e., CBT-I). These increases in sleep psychology knowledge and self-efficacy parallel the findings observed by Peachey and Zelman (2012) after a more intensive 10-week online sleep education program. Our results suggest that even a short, six-hour workshop can help to bridge the BSM evidence-practice gap in the mental health field.

Highlighting the acceptability of the workshop, trainees provided extremely positive feedback about their learning experiences in the Sleep Psychology Workshop.

This likely reflects the thoughtful and well-researched learning design of the workshop. The workshop was developed based on BSM theory and used blended learning principles (Alammary, Sheard, & Carbone, 2014) to integrate didactic education, practical role play exercises (e.g., taking a sleep history, describing the 2-process model of sleep regulation, sleep restriction therapy calculations), homework exercises (e.g., completing a sleep diary), video (e.g., two-process model of sleep regulation), audio case study, web resources, and readings. After the training, all trainees endorsed that sleep and circadian rhythms education should be included in graduate psychology curriculum and that all graduate psychology students should attend the Sleep Psychology Workshop. Taken together, trainees increased BSM knowledge, self-efficacy, acceptability ratings, and positive feedback, provided critical preliminary data to support a wider roll-out of the Sleep Psychology Workshop into graduate psychology training programs.

Limitations

One concern with rolling out didactic sleep education to trainees is that they may assume expertise without demonstrating the commensurate clinical competency to manage sleep disturbances in practice. However, trainees in this study reported being aware of the need to continue their learning journey with further BSM education and to seek supervision from appropriately qualified BSM professionals to build their competency in CBT-I. Trainees also reported being aware of the need to refer to sleep physicians when appropriate. Therefore, our research suggests that trainees did not assume BSM expertise from this 6-hour workshop but had learnt more foundational skills that they could build upon in future.

Additionally, our sample size was small due to the limited class size of Master of Psychology degrees which precludes broader generalizations about the efficacy of the Sleep Psychology Workshop at this time. We also only collected self-report data about

improvements in BSM knowledge and self-efficacy, rather than directly assessing students' skills. Assessing students' practical skills through competency-based assessments would have been ideal (Gonsalvez & Calvert, 2014; Stevens, Hyde, Knight, Shires, & Alexander, 2017), but time, staffing, and supervision constraints of the research project precluded this.

One final limitation of the study was that we conducted the focus group directly after the third workshop, before students had completed the individual post-workshop survey. This was done for the students' convenience and to encourage participation, as they were nearing the end of a busy semester and may have struggled to attend the focus group at another time. Participation in the focus group discussion may have influenced the subsequent individual responses on the post-workshop survey.

Conclusions and future directions

This study provides preliminary support for the Sleep Psychology Workshop as an effective and acceptable introductory behavioral sleep medicine program for trainee psychologists, ready for integration within graduate psychology programs. A state-wide roll-out of this workshop is underway to disseminate BSM knowledge and skills into graduate psychology programs more widely. This workshop could also be delivered to psychologists across Australia and internationally, so that both trainee and practicing psychologists alike can learn to address sleep disturbances that so commonly occur alongside mental health conditions in psychology contexts. Future work could also integrate BSM supervision and learning support post-workshop to help attendees develop more competency and confidence in BSM. We could also look to other successful education dissemination efforts, such as the integration of nutrition education into the medical curriculum and the rise of CBT in the mental health field, to help guide our BSM dissemination plan.

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List of Tables and Figures

Table 1. Trainees' self-efficacy to address sleep disturbances in clinical practice from pre- to post-workshop ($n = 7$)

Item	Pre-Workshop (*Mdn*)	Post-Workshop (*Mdn*)	z	p	r
As of today, I feel comfortable using common sleep-related assessment instruments to assess sleep disturbances	3.0	6.0	-2.38	.018	.63
As of today, I feel comfortable using empirically-supported interventions to treat sleep disturbance	3.0	5.5	-2.38	.017	.64
I have the skills to assess and diagnose common sleep disorders	4.0	5.5	-2.39	.017	.64
I know the common sleep disturbances seen in various mental health disorders	6.0	6.0	-.71	.480	.19
I know where to go to access further training in sleep, sleep disorders, and circadian rhythms if required	3.0	6.0	-2.39	.017	.64
I know more about sleep and circadian rhythms than most other postgraduate psychology students	4.0	6.0	-2.16	.031	.58

Note: Items were rated on a 7-point Likert scale, from (1) strongly disagree to (7) strongly agree.

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Table 2. Trainees' preparedness and confidence to work with sleep disturbances from pre- to post-workshop ($n = 7$)

Item	Pre-Workshop (*Mdn*)	Post-Workshop (*Mdn*)	z	p	r
Preparedness: When a client reports symptoms of a sleep disturbance, such as difficulty falling or staying asleep:					
How prepared do you feel to conduct a thorough evaluation of their sleep?	2.0	3.0	-1.89	.059	.51
How prepared do you feel to treat the sleep disturbance using an evidence-based approach?	2.0	3.0	-2.43	.015	.65
Confidence: How confident do you feel about treating the following sleep problems/disorders using evidence-based therapy?					
Insomnia disorder	1.0	3.0	-2.43	.015	.65
Circadian rhythm disorders (e.g., delayed sleep-wake phase disorder)	1.0	3.0	-1.93	.053	.52
Disorders of central hypersomnolence (e.g., Narcolepsy)	1.0	2.0	-1.73	.083	.46
Parasomnias (e.g., sleepwalking, nightmare disorder)	1.0	1.5	-1.41	.157	.38
Obstructive sleep apnoea	1.0	2.0	-2.24	.025	.60
Comorbid sleep disturbances in mental health conditions (e.g., sleep disturbances commonly seen in depression)	3.0	3.0	-1.89	.059	.51

Note. Items were reported on a 4-point Likert scale with items ranging from (1) Not at all; (2) A little; (3) Somewhat; (4) Very.

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Table 3. Observed sample proportions for the Sleep Psychology Workshop acceptability items from the post-workshop survey ($n = 8$)

Item	Disagree/ Strongly Disagree	Neither agree nor disagree	Agree/strongly agree
The workshop objectives were clear	0	0	100
The instructional materials (i.e., readings, handouts, videos) increased my knowledge and skills in the subject matter	0	0	100
The workshop increased my interest in sleep and circadian rhythms	0	0	100
The workshop corresponded to my expectations	0	0	100
The workshop has helped me to develop practical skills in sleep and circadian rhythms	0	0	100
The workload and requirements associated with the workshop were appropriate for the course level	0	0	100
The workshop was organized in a manner that helped me understand underlying concepts	0	0	100
The workshop gave me the confidence to do more advanced work on the subject	0	0	100
I believe that what I was asked to learn in this workshop is important	0	0	100
Expectations for my learning were clearly defined	0	0	100
The homework exercise of completing a sleep diary was useful	0	12.5	87.5
The class exercise of role-playing the two-process model of sleep regulation as a client and therapist was useful	0	12.5	87.5
The class exercise of taking a sleep history was useful	0	12.5	87.5
The class audio and case formulation of the patient with insomnia "John" was useful	0	25	75
Practicing sleep restriction therapy calculations in class was useful	0	0	100

Note: Items were rated on a 7-point Likert scale, from (1) strongly disagree to (7) strongly agree.

Workshop 1: Sleep Psychology – The Basics	Workshop 2: Sleep Assessment, Diagnosis, and Case Formulation	Workshop 3: Evidence-based treatment: Cognitive Behavioral Therapy for Insomnia (CBT-I)
☐Why do psychologists need to know how to manage sleep problems? • Relationship between sleep and mental health • Improve sleep to improve mental health • Biopsychosocial mechanisms underlying the association between sleep and mental health ☐Basics of sleep • Normal sleep physiology • Busting myths about sleep • Two-process model of sleep regulation • Sleep across the lifespan • Causes and consequences of behavioral sleep issues/inadequate sleep • **Class exercise** • Role play explaining the 2-process model of sleep regulation to a client • *Homework* • Complete a sleep diary for the week • Workshop 1 reading list/videos	☐Diagnostic Criteria for Common Sleep Disorders • Insomnia • Obstructive Sleep Apnoea • Hypersomnolence Disorders • Circadian Rhythm Disorders • Restless Legs Syndrome • Parasomnias ☐Assessment • Taking a sleep history • Common sleep questionnaires • Referral to a sleep physician ☐Case formulation for insomnia • Spielman's 3P Model of Insomnia ☐**Class exercise:** • Taking a sleep history in pairs • Case formulation exercise of an insomnia client (Audio of "John") • *Homework* • Complete the Insomnia Severity Index and STOP-BANG questionnaires ☐ Workshop 2 reading list/video	☐Cognitive Behavioural Therapy for Insomnia (CBT-I) overview • Sleep restriction therapy (SRT) • Stimulus Control (SC) • Cognitive therapy • Sleep Hygiene • Relaxation training ☐Counter indications for SRT/SC • e.g., bipolar disorder ☐Improving adherence to CBT-I ☐Review of Workshop ☐Where to access more sleep information and further BSM training ☐**Class exercise** • Sleep restriction therapy calculation exercise for case "John" • *Homework* ☐ Workshop 3 reading list/videos ☐ Review sleep psychology workshop resources and where to access further training

Figure 1. Overview of the Sleep Psychology Workshop

1. *Recall basic sleep knowledge including:*
   - *Normal sleep physiology*
   - *Sleep across the lifespan*
   - *2-Process Model of Sleep Regulation*
     - *Homeostatic sleep drive*
     - *Circadian rhythms*
2. *Understand and apply sleep knowledge relevant to psychologists including:*
   - *The relationship between sleep and mental health*
   - *The causes and consequences of behavioural sleep issues/inadequate sleep*
   - *Bio-psychosocial mechanisms of sleep disturbances*
   - *The role of a psychologist in the management of sleep disturbances*
3. *Understand and apply sleep assessment and diagnostic processes including:*
   - *Conduct a sleep history*
   - *Appropriately score and interpret data from sleep diaries and sleep questionnaires (e.g., Insomnia Severity Index)*
   - *Recall DSM-5 sleep-wake disorder diagnostic criteria*
   - *Construct an initial diagnosis and clinical formulation of a client experiencing insomnia*
   - *Recall risk factors for obstructive sleep apnea*
4. *Understand and apply evidence-based treatments for sleep disturbances:*
   - *Recall how to refer clients with suspected sleep disorders to a sleep physician for assessment and management (e.g., obstructive sleep apnea)*
   - *Cognitive Behavioral Therapy for Insomnia (e.g., provide sleep restriction therapy time-in-bed recommendations)*
   - *The need for further behavioral sleep medicine training and ongoing supervision*

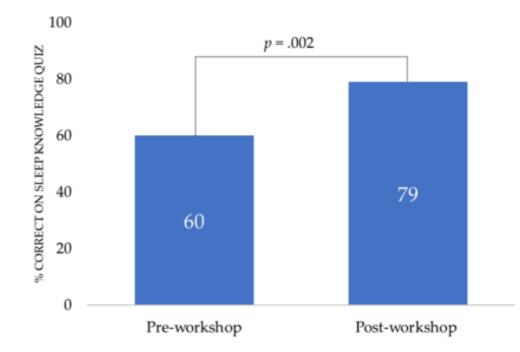Figure 2. Sleep Psychology Workshop Learning Objectives for Trainee Psychologists

Figure 3. Sleep psychology knowledge quiz scores from pre- to post-workshop