

The need for psychological therapies for sleep disorders other than insomnia: Potential for mindfulness

Allie Peters
RMIT University
Melbourne Sleep Disorders
Centre

David Cunnington
Melbourne Sleep Disorders
Centre

Kenneth Mark
Greenwood
James Cook University

The nature of the symptoms of sleep disorders and the impact they have on sleep and waking function mean that distress and negative emotionality are common accompanying features to many sleep disorders. Even though there are specific biological treat-

ments, such as medication for restless legs syndrome, wake-promoting medication for narcolepsy and positive airway pressure for obstructive sleep apnoea, these are not always perfectly effective and there may be a role for adjunctive treatments that address the distress and emotion that become part of these chronic conditions and add to their impact. For people with milder symptoms, psychological treatment alone may provide sufficient symptomatic relief. Many sleep disorders occur in association with other physical or psychiatric conditions, which may contribute to the distress experienced.

However, despite the range of sleep disorders, there is relatively little known about psychological treatment for sleep disorders other than for insomnia. It is important for future research to examine the potential influence of psychological strategies to treat or manage all sleep disorders. This paper outlines current psychological treatments for sleep disorders, with an aim to identify possible areas that require investigation by health psychologists and to encourage researchers to take up this challenge.

Chronic insomnia is arguably the most common

sleep disorder, with 5% to 15% of adults meeting formal (DSM-V) criteria for insomnia (Trauer, Qian, Doyle, Rajaratnam, & Cunnington, 2015). Cognitive behaviour therapy for insomnia (CBT-I) is the most widely used, non-drug treatment for insomnia. CBT-I involves a combination of cognitive and behavioural interventions that together are intended to target and eliminate behavioural and cognitive contributions to an individual's insomnia. Typically provided by a psychologist, CBT-I includes interventions such as cognitive therapy, stimulus control, sleep restriction, sleep hygiene (sleep-promoting behavioural instructions) and relaxation (Harvey, 2005). There is compelling evidence that CBT-I is a lasting, effective treatment for chronic insomnia when it occurs as an independent condition (Trauer et al., 2015). There is also some emerging research indicating that CBT may be useful in the management of other sleep disorders such as narcolepsy (Agudelo, Correa, Sierra, Pandi-Perumal, & Schenck, 2014), restless legs syndrome (Bablas et al., 2015) and parasomnias (Attarian, 2010). However, how CBT-I works, and the unique contribution of each component of the treatment have only recently received research attention. Harvey et al. (2014) conducted an RCT comparing the behavioural components alone (BT), the cognitive component alone (CT) and full CBT-I. They found that, while CBT-I was most effective, both BT which had a rapid effect, and CT which took longer, were also effective. More treatment decomposition research is required to improve our understanding of CBT-I, and this may provide information regarding the potential for CBT to be applied in sleep disorders other than insomnia. A focus on whether therapy can be optimally tailored

to individual characteristics is also required.

In an important review article, Harvey and Tang (2003) proposed that CBT-I requires refining to improve efficacy. The authors pointed out that the magnitude of change in terms of effect size pales in comparison with many other CBT interventions. For example, effect sizes for CBT for depression have been reported to be as high as 2.15, whereas CBT-I effect sizes range between 0.63 to 0.96 (Harvey & Tang, 2003). In the more recent RCT (Harvey et al., 2014), the effect size on the Insomnia Severity Index was a healthy 2.5, but effect sizes on sleep diary variables such as sleep onset latency, wake after sleep time, total sleep time, and sleep efficiency were smaller (effect sizes of around 1 or less). One possible explanation for this is that CBT requires good insight into internal processing, as well as a high motivation to change (Edinger & Means, 2005). Not all individuals with insomnia have good insight into their thinking and beliefs. Unfortunately cognitive restructuring is not possible for all individuals, especially those with rigid thinking styles, for example, people with borderline personality disorder (Blenkiron, 1999). An alternative approach to cognitive restructuring may be able to address maladaptive thinking in individuals who are not suited to CBT-I.

CBT-I addresses two models of insomnia: behavioural and cognitive. However, attention has recently been directed to the hyperarousal model of insomnia (Bonnet & Arand, 1997; Bonnet & Arand, 2010). Hyperarousal can be defined as a state of excessive cognitive, neurological and physiological activation, where the Sympathetic Nervous System (SNS) maintains activation of the nervous system in the absence of a stressor. Hyperarousal includes a change in brain chemistry indicative of the stress response, for example increases in monoamines, cortisol and orexin and decreases in serotonin and adenosine are noted (Saper, Chou, & Scammell, 2001; Saper, Fuller, Pedersen, Lu, & Scammell, 2010). The release of these substances changes the physiological state of the body, and contributes to

difficulties with the initiation and maintenance of sleep (Riemann et al., 2010). Hyperarousal is also likely to be involved in the development and maintenance of other sleep disorders. Whilst disorders such as narcolepsy and periodic limb movement disorder (PLMD) have a clear neurological basis, the impact of symptoms over time leads to the development of changed cognitions around sleep and a conditional arousal response to sleep in narcolepsy (Carter, Adamantidis, & de Lecea, 2011) and in PLMD (Ferri et al., 2014). Parasomnias occur in biologically predisposed individuals but can be triggered during periods of stress, and when they occur and cause problems, a degree of distress about the parasomnia itself develops leading to hyperarousal (Guilleminault, Kirisoglu, da Rosa, Lopes, & Chan, 2006). This model of developing arousal around symptoms of sleep disorders was demonstrated in patients with severe restless legs (Greenwood, Sim, Cunnington, & Swieca, 2015). The evidence for hyperarousal and distress developing in response to the symptoms of other sleep disorders provides a rationale to incorporate psychological treatments for sleep disorders that have the potential to reduce hyperarousal.

Mindfulness has been raised as a potential strategy that may be able to reduce arousal levels and provide an indirect way of reducing worry and rumination about sleep (Ong, Ulmer, & Manber, 2012). Mindfulness can be defined as non-judgmental, present-focused awareness (Kabat-Zinn et al., 1998). There has been a growth of clinical treatment and wellness programs based on the mindfulness based stress reduction (MBSR) program of Jon Kabat-Zinn and his colleagues (Carlson & Garland, 2005). MBSR programs focus on the active development of conscious awareness and self-regulation of attention via techniques such as focused breathing, sitting meditation, 'body scanning' and walking meditation, as well as cognitive treatment elements (Heidenreich, Strohle, & Michalak, 2006).

Mindfulness-based therapies have been investigated as a treatment for insomnia (Britton, Shapiro, Penn, & Bootzin, 2003; Gross et al., 2011; Heidenreich et al., 2006; Ong & Manber, 2011; Ong et al., 2014; Ong, Shapiro, & Manber, 2008; Ong, Shapiro, & Manber, 2009; Peters, 2016; Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003). Results have suggested that MBSR in combination with the behavioural component of CBT-I is a promising treatment for reducing symptoms of insomnia and sleep-related arousal (Cincotta, Gehrman, Gooneratne, & Baime, 2011; Ong et al., 2008). Recently, mindfulness has been suggested as a psychological treatment for restless legs syndrome (Bablas, Yap, Cunnington, Swieca, & Greenwood, 2015). However, to our knowledge there have been no investigations into the feasibility of mindfulness as a treatment for other sleep disorders. Further research is required to assess the usefulness of the approach in sleep disorders other than insomnia. In a recent study focusing on MBSR combined with behaviour therapy in a group of people with insomnia found a moderate positive correlation between changes in mindfulness and changes in number of awakenings (Peters, 2016). This suggests that people who improved in mindfulness were more likely to show reductions in nocturnal awakenings. This fits with theoretical concepts and past findings which support the notion that meditation may reduce stress (Sharma & Rush, 2014), decrease sympathetic activity (Krygier et al., 2013; Lazar et al., 2000; Takahashi et al., 2005; Tang et al., 2009), alter brainwaves (Cahn & Polich, 2006; Simpkins & Simpkins, 2012), and, therefore, potentially improve sleep stability. Although the direction of this relationship is unclear, this finding is particularly interesting and warrants further investigation. Future studies investigating the usefulness of CBT and mindfulness-based therapies in sleep disorders could use a measure of sleep stability, such as the cyclical alternating pattern (CAP), to evaluate changes to sleep stability.

One way of reducing hyperarousal is by addressing unhelpful automatic reactions by increasing insight via metacognition. This may provide an individual with awareness of problematic behaviours that may be perpetuating hyperarousal. The two-level model of arousal devised by Ong and colleagues (2012) distinguishes primary arousal (the cognitive activity directly related to sleep difficulty) from secondary arousal (how one relates to thoughts about sleep). Essentially, this model differentiates cognitive from metacognitive processes. In a theoretical paper, Lundh (2005) described "sleep interfering processes" (p. 29) that affect the normal cognitive deactivation that is required to fall asleep. He proposed that mindfulness may be able to train individuals in skills that counter these sleep interfering processes, such as self-observation and acceptance of spontaneously occurring cognitive processes (Lundh, 2005). Mindfulness training may be able to improve metacognitive processing in order to improve cognitive deactivation of primary cognitive processing. The target of treatment is the relationship with cognition, rather than the thoughts themselves (Ong et al., 2012), which is in turn likely to reduce overall (cognitive, cortical and physical) arousal.

There is support for the use of mindfulness to address maladaptive beliefs and cognitive distortions. Mindfulness has been successfully delivered as a component of Dialectical Behaviour Therapy (Linehan, 2013), which is an approach designed to treat Borderline Personality Disorder (BPD). BPD is a disorder characterised by emotional dysregulation and rigid thinking (Linehan, 2013). One mechanism which may be particularly important for addressing dysfunctional thinking using mindfulness meditation, is the via the increase of metacognitive awareness (Ong et al., 2012). Meditation practice can improve metacognitive awareness, thereby improving a person's ability to disengage from thoughts and emotions, rather than directly challenging them or

reacting to them with maladaptive behaviours (Ong et al., 2012). Mindfulness meditation may be a useful approach to address dysfunctional cognitions in people with sleep disorders, and therefore may be used as an alternative treatment for people who do not respond to cognitive therapy. Given that there are no current psychological alternatives for those who do not respond to CBT-I, mindfulness may provide a valuable addition to the treatment options for those with insomnia and other sleep disorders. To investigate this notion, research is required to investigate the use of mindfulness in participants who did not respond well to cognitive therapy.

The common nature of sleep disorders, and the contribution of psychological factors to the symptoms and distress experienced with sleep disorders, mean that psychologically-based treatments may have a significant role to play in the management of sleep disorders. There is still much interesting and important work to be done in this area, both to identify the psychological contribution to the development and perpetuation of sleep disorders and to develop and implement effective psychologically-based treatments. Health psychologists are uniquely qualified to make a significant contribution in this area.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th Edition Text Revision ed.)*. Washington: American Psychiatric Association.
- Agudelo, H. A. M., Correa, U. J., Sierra, J. C., Pandi-Perumal, S. R., & Schenck, C. H. (2014). Cognitive behavioral treatment for narcolepsy: Can it complement pharmacotherapy? *Sleep Science, 7*, 30-42. doi:10.1016/j.slsci.2014.07.023
- Attarian, H. (2010). Treatment options for parasomnias. *Neurologic Clinics, 28*, 1089-1106. doi:10.1016/j.ncl.2010.03.025
- Bablas, V., Yap, K., Cunnington, D., Swieca, J., & Greenwood, K. M. (2015). Mindfulness-based stress reduction for restless legs syndrome: A proof of concept trial. *Mindfulness, 7*, 396-408. doi:10.1007/s12671-015-0457-9
- Blenkiron, P. (1999). Who is suitable for cognitive behavioural therapy? *Journal of the Royal Society of Medicine, 92*(5), 222-229. Retrieved from <http://jrs.sagepub.com/content/92/5/222.full.pdf>
- Bonnet, M. H., & Arand, D. L. (1997). Hyperarousal and insomnia. *Sleep Medicine Reviews, 1*, 97-108. doi:10.1016/s1087-0792(97)90012-5
- Bonnet, M. H., & Arand, D. L. (2010). Hyperarousal and insomnia: State of the science. *Sleep Medicine Reviews, 14*, 9-15. doi:10.1016/j.smrv.2009.05.002
- Britton, W. B., Shapiro, S. L., Penn, P. E., & Bootzin, R. R. (2003). Treating insomnia with mindfulness-based stress reduction. *Sleep, 26*, A309-A310.
- Cahn, B. R., & Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin, 132*, 180-211. doi:10.1037/0033-2909.132.2.180
- Carlson, L., & Garland, S. N. (2005). Impact of Mindfulness-Based Stress Reduction (MBSR) on sleep, mood, stress and fatigue symptoms in cancer outpatients. *International Journal of Behavioral Medicine, 12*, 278-285. doi:10.1207/s15327558ijbm1204_9
- Carter, M. E., Adamantidis, A., & de Lecea, L. (2011). *The Hypocretins/Orexins: Master regulators of arousal and hyperarousal narcolepsy*. In C. R. Baumann, C. L. Bassetti, & T. E. Scammell (Eds), *Narcolepsy: Pathophysiology, Diagnosis, and Treatment* (pp. 121-128). New York: Springer. doi:10.1007/978-1-4419-8390-9
- Cincotta, A. L., Gehrman, P., Gooneratne, N. S., & Baime, M. J. (2011). The effects of a mindfulness-based stress reduction programme

- on pre-sleep cognitive arousal and insomnia symptoms: A pilot study. *Stress and Health*, 27, E299-E305. doi:10.1002/smi.1370
- Edinger, J. D., & Means, M. K. (2005). Cognitive-behavioral therapy for primary insomnia. *Clinical Psychology Review*, 25, 539-558. doi:10.1016/j.cpr.2005.04.003
- Ferri, R., Cosentino, F. I., Manconi, M., Rundo, F., Bruni, O., & Zucconi, M. (2014). Increased electroencephalographic high frequencies during the sleep onset period in patients with restless legs syndrome. *Sleep*, 37(8), 1375. Retrieved from <http://www.journalsleep.org/ViewAbstract.aspx?pid=29580>
- Gross, C. R., Kreitzer, M. J., Reilly-Spong, M., Wall, M., Winbush, N. Y., Patterson, R., . . . Cramer-Bornemann, M. (2011). Mindfulness-based stress reduction versus pharmacotherapy for chronic primary insomnia: A randomized controlled clinical trial. *Explore-the Journal of Science and Healing*, 7, 76-87. doi:10.1016/j.explore.2010.12.003
- Guilleminault, C., Kirisoglu, C., da Rosa, A. C., Lopes, C., & Chan, A. (2006). Sleepwalking, a disorder of NREM sleep instability. *Sleep Medicine*, 7, 163-170. doi:10.1016/j.sleep.2005.12.006
- Harvey, A. G. (2005). A cognitive theory and therapy for chronic insomnia. *Journal of Cognitive Psychotherapy*, 19, 41-59. doi:10.1891/jcop.19.1.41.66332
- Harvey, A. G., Bélanger, L., Talbot, L., Eidelman, P., Beaulieu-Bonneau, S., Fortier-Brochu, É., . . . Soehner, A. M. (2014). Comparative efficacy of behavior therapy, cognitive therapy, and cognitive behavior therapy for chronic insomnia: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 82, 670. doi:10.1037/a0036606
- Harvey, A. G., & Tang, N. K. Y. (2003). Cognitive behaviour therapy for primary insomnia: Can we rest yet? *Sleep Medicine Reviews*, 7, 237-262. doi:10.1053/smr.2002.0266
- Heidenreich, T., Strohle, G., & Michalak, J. (2006). Mindfulness: Conceptual aspects and results of the Freiburg mindfulness inventory. *Verhaltenstherapie*, 16, 33-40. doi:10.1159/000091521
- Kabat-Zinn, J., Wheeler, E., Light, T., Skillings, A., Scharf, M. J., Cropley, T. G., . . . Bernhard, J. D. (1998). Influence of a mindfulness meditation-based stress reduction intervention on rates of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosomatic Medicine*, 60(5), 625-632. Retrieved from http://journals.lww.com/psychosomaticmedicine/Abstract/1998/09000/Influence_of_a_Mindfulness_Meditation-Based_Stress.20.aspx
- Krygier, J. R., Heathers, J. A. J., Shahrestani, S., Abbott, M., Gross, J. J., & Kemp, A. H. (2013). Mindfulness meditation, well-being, and heart rate variability: A preliminary investigation into the impact of intensive Vipassana meditation. *International Journal of Psychophysiology*, 89, 305-313. doi:10.1016/j.ijpsycho.2013.06.017
- Lazar, S. W., Bush, G., Gollub, R. L., Fricchione, G. L., Khalsa, G., & Benson, H. (2000). Functional brain mapping of the relaxation response and meditation. *Neuroreport*, 11, 1581-1585. doi:10.1097/00001756-200005150-00041
- Linehan, M. M. (2013). *Dialectical behavior therapy*. New York, NY: The Guilford Press.
- Lundh, L.-G. (2005). The Role of Acceptance and mindfulness in the treatment of insomnia. *Journal of Cognitive Psychotherapy*, 19, 29-39. doi:10.1891/jcop.19.1.29.66331
- Ong, J., & Manber, R. (2011). *Mindfulness-based therapy for insomnia*. Chicago, IL: Elsevier.
- Ong, J., Manber, R., Segal, Z., Xia, Y., Shapiro, S., & Wyatt, J. K. (2014). A randomized controlled trial of mindfulness meditation for chronic insomnia. *Sleep*, 37, 1553-U1186. doi:10.5665/sleep.4010
- Ong, J., Shapiro, S. L., & Manber, R. (2008). Combining mindfulness meditation with cognitive-behavior therapy for insomnia: A

- treatment-development study. *Behavior Therapy*, 39, 171-182. doi:10.1016/j.beth.2007.07.002
- Ong, J., Shapiro, S. L., & Manber, R. (2009). Mindfulness meditation and cognitive behavioural therapy for insomnia: A naturalistic 12-month follow-up. *Explore-the Journal of Science and Healing*, 5, 30-36. doi:10.1016/j.explore.2008.10.004
- Ong, J., Ulmer, C. S., & Manber, R. (2012). Improving sleep with mindfulness and acceptance: A metacognitive model of insomnia. *Behaviour Research and Therapy*, 50, 651-660. doi:10.1016/j.brat.2012.08.001
- Peters, A. (2016). Mindfulness and behaviour therapy for insomnia: An assessment of efficacy in a naturalistic Australian sample (Unpublished doctoral dissertation). RMIT, Melbourne, Australia.
- Riemann, D., Spiegelhalder, K., Feige, B., Voderholzer, U., Berger, M., Perlis, M., & Nissen, C. (2010). The hyperarousal model of insomnia: A review of the concept and its evidence. *Sleep Medicine Reviews*, 14, 19-31. doi:10.1016/j.smrv.2009.04.002
- Saper, C. B., Chou, T. C., & Scammell, T. E. (2001). The sleep switch: hypothalamic control of sleep and wakefulness. *Trends in Neurosciences*, 24, 726-731. doi:10.1016/s0166-2236(00)02002-6
- Saper, C. B., Fuller, P. M., Pedersen, N. P., Lu, J., & Scammell, T. E. (2010). Sleep state switching. *Neuron*, 68, 1023-1042. doi:10.1016/j.neuron.2010.11.032
- Shapiro, S. L., Bootzin, R. R., Figueredo, A. J., Lopez, A. M., & Schwartz, G. E. (2003). The efficacy of mindfulness-based stress reduction in the treatment of sleep disturbance in women with breast cancer - An exploratory study. *Journal of Psychosomatic Research*, 54, 85-91. doi:10.1016/S0022-3999(02)00546-9
- Sharma, M., & Rush, S. E. (2014). Mindfulness-based stress reduction as a stress management intervention for healthy individuals: A systematic review. *Journal of Evidence-based Complementary & Alternative Medicine*, 19, 271-286. doi:10.1177/2156587214543143
- Simpkins, A., & Simpkins, A. (2012). *Neuroscience findings: How meditation can change the brainzen meditation in psychotherapy: Techniques for clinical practice*. Hoboken, NJ: Wiley.
- Takahashi, T., Murata, T., Hamada, T., Omori, M., Kosaka, H., Kikuchi, M., . . . Wada, Y. (2005). Changes in EEG and autonomic nervous activity during meditation and their association with personality traits. *International Journal of Psychophysiology*, 55, 199-207. doi:10.1016/j.ijpsycho.2004.07.004
- Tang, Y.-Y., Ma, Y., Fan, Y., Feng, H., Wang, J., Feng, S., . . . Fan, M. (2009). Central and autonomic nervous system interaction is altered by short-term meditation. *Proceedings of the National Academy of Sciences of the United States of America*, 106, 8865-8870. doi:10.1073/pnas.0904031106
- Trauer, J. M., Qian, M. Y., Doyle, J. S., Rajaratnam, S. M., & Cunningham, D. (2015). Cognitive behavioral therapy for chronic insomnia: A systematic review and meta-analysis. *Annals of Internal Medicine*, 163, 191-204. doi:10.7326/M14-2841



Allie Peters
RMIT University, Melbourne,
Australia
Melbourne Sleep Disorders Centre,
Melbourne, Australia
allie.peters2@gmail.com



David Cunningham
Melbourne Sleep Disorders Centre,
Melbourne, Australia
david.cunnington@msdc.com.au



Kenneth Mark Greenwood
James Cook University, Singapore
Ken.Greenwood@jcu.edu.au