

Implementation of Online Cognitive Behavioral Therapy for Insomnia (CBT-i) in Malaysia: A Narrative Review

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Insomnia is a highly prevalent sleep disorder with a high burden of diseases and high comorbidity. Cognitive behavioral therapy for insomnia (CBT-i) is effective but is rarely offered due to the limited access, time constraints, and financial constraints. The inability to treat insomnia has the potential to leave a significant impact in life. Therefore, CBT-i delivered through internet is thought to be more feasible and accessible alternative. The current paper reviewed is based on the narrative review approach. The relevant articles were obtained through computerized searches of databases such as PubMed, SAGE, and ERIC. The findings of this paper highlight the effectiveness of CBT-i based on empirical evidence of previous studies. The focal variables are on sleep hygiene and education, stimulus control therapy, sleep restriction therapy, and relaxation techniques. Having a better understanding how online CBT-i works can provide more input for intervention management.

Keywords: insomnia, stimulus control therapy, sleep restriction therapy, cognitive behavioral therapy for insomnia, online CBT for insomnia

Sleep has been a prominent physiological need for an adequate functioning and healthy well-being (Rao, Hammen, & Poland, 2009; Chaput, Dutil, Featherstone, Ross, Giangregorio, Saunders et al., 2020). Many investigations during the past several decades have documented that abnormal sleep patterns play a major neurological feature in most of the psychiatric disorders such as anxiety and depression (Benca, Obermeyer, Thisted, & Gillin, 1992). According to Sharma and Andrade (2012), insomnia is the most well researched sleep abnormality and reported as the most commonly reported sleep problem.

The recent Diagnostic and Statistical Manual of Mental Health (DSM-5) has described insomnia as difficulty initiating and maintaining sleep that may cause

clinically significant distress to an individual (American Psychiatric Association, 2013). To diagnose insomnia, the DSM-5 has provided a list of impairments that individuals with insomnia would have to meet (American Psychiatric Association, 2013).

Insomnia can be further divided into two subtypes: primary and secondary insomnia. Primary insomnia is defined as psychophysiologic insomnia where a disorder of somatized tension (somatic hyperarousal while attempting to sleep) and learned sleep preventing associations that results in complaints of insomnia (Bootzin & Epstein, 2011). Bootzin and Epstein (2011) further explains that secondary insomnia is the most common type of insomnia which referred to a side effects of

other stimuli such as medications and anxiety. Research exploring the underlying mechanism of insomnia has been conducted and documented several negative cognitive, physiological and psychological effects (Tsuno, Besset & Ritchie, 2005).

Insomnia is widely prevalent and is reported to occur up to one third of the adult population (Sharma & Andrade, 2012). In Malaysia, Zailinawati, Ariff, Nurjahan and Teng (2008) conducted a cross-sectional epidemiology survey among Malaysian adults based on four Malaysian states using semi-structured questionnaire to investigate the prevalence and pattern of insomnia. They found that the prevalence of insomnia symptoms was 33.8% and 12.2% individuals experienced chronic insomnia. Similarly, Zailinawati, Mazza and Teng (2012) performed a cross-sectional survey amongst 2049 Malaysian primary care adults. The study documented that a third of primary care attendees have insomnia associated with significant daytime dysfunction. The results lend support to the hypothesis that insomnia problems has increased rapidly over the years.

Following the logic above, Bootzin and Epstein (2011) claimed that younger adults are more likely to have sleep problems, whereas older adults are more likely to experience sleep maintenance problems. There is also a difference in prevalence between women and men where women are more likely to develop insomnia (Bootzin & Epstein, 2011). In relation to gender vulnerabilities, a research from Chong Qing, China found prevalence of insomnia in men and women was 48.2% and 63.2% respectively (Tang et al., 2017). However, it is reported that Asian countries have less women predisposition to insomnia than Western countries (Zailinawati, Mazza & Teng, 2012). One possible explanation for this is because there is a lack of research investigating the relationship between

insomnia and gender in Asian countries, particularly in Malaysia.

Past studies clarified how sleep loss affects capacity to which a person can engage in activity. A study conducted among 123 participants found that sleep loss is associated with a decreased inclination towards engaging with others (Axelsson, Ingre, Kecklund, Lekander, Wright & Sundelin, 2020). This is due to the adverse consequences of insomnia. Insomnia can be associated with various adverse effects across multiple life domains such as disturbed mood, fatigue, and suicidal ideation (Roberts, Roberts & Cheng, 2001). Insomnia has a significant impact on individual health and daytime consequences such as poor performance at work and impaired memory consolidation. Sleep may be considered as a sensitive entity to stress and emotional distress. Major life events such as death of loved ones and interpersonal difficulties at work may cause sleep abnormality and causes few brief awakenings in the middle of the night (Morin & Espie, 2003). Although sleep patterns may return to normal once the problem has been resolved, it is important to highlight that sleep disturbances may become chronic due to perpetuating factors such as maladaptive habits and dysfunctional cognitions. Under this line of thinking, Bootzin and Epsin (2011) assert that maladaptive sleep habits such as irregular sleep-wake schedules, extended time in bed and irregular napping should become the target of insomnia treatment.

To date, there are a few successful interventions on insomnia including, pharmacological treatment, cognitive behavioral therapy, and cognitive therapy. Unfortunately, due to financial difficulties and time constraints, many individuals with insomnia symptoms are unable to get the appropriate diagnosis and treatment (Andersson & Titov, 2014).

With the advancement of technology, Internet use has become more widespread due to the involvement of various devices such as computers and telephones, as well as various applications (Shen & Williams, 2011). This easy accessibility to Internet has doubled the Internet use over the past 15 years, which in turn gained the attention of researchers regarding the various forms of online based therapy (Kuss et al., 2014).

The current paper aims to implement and provides scientific evidence of online intervention module to assist those who are experiencing insomnia symptoms. This will be done by reviewing past research to first examine the magnitude of the problem and criteria of insomnia outlined by DSM-5. Secondly, the paper will review articles related to intervention with insomnia. By reviewing several aspects of insomnia and successful available intervention, the current paper allows for a more comprehensive review of online based intervention module. It is argued that there is sufficient scientific evidence to show that psychotherapy could be a help in combating insomnia. Although the current literatures are supporting the psychotherapy used for insomnia, there are still many individuals are left undiagnosed and treated due to financial difficulties, time constraint and limited access to therapist. Given these considerations, this study serves to expand the findings of previous work on the use of psychotherapy for treating insomnia as an online based intervention.

Method

The papers on this study are selected mainly through the Pubmed, SAGE and ERIC as the main search engine. Keywords used are 'insomnia', 'sleep disorder', 'sleep hygiene', 'stimulus control therapy', 'sleep restriction therapy', 'relaxation technique', 'cognitive behavioral therapy for insomnia' and 'online CBT for insomnia'.

Current interventions of insomnia

To date, there are a few effective available treatments for insomnia including pharmacological treatment, cognitive behavioral therapy, and cognitive therapy. For the purpose of implementing online based intervention, this paper will emphasize on cognitive behavioral therapy. Nonetheless, it is proven that medications and psychotherapy work effectively hand in hand.

Pharmacological treatment

Although the focus of this review is based on psychotherapy, pharmacological treatments continue to be the most widely available treatment for insomnia. The most commonly prescribed medication is benzodiazepine, a hypnotic medication that will affect the gamma aminobutyric acid (GABA) neurotransmitter (Bateson, 2010; Bootzin & Epsin, 2011). However, it is highly debated as prescribed medications may cause side effects which are usually dose dependant, thus the lowest effective dose for insomnia should be prescribed.

Cognitive Behavioral Therapy

Another intervention for insomnia is the element of cognitive behavioral therapy for insomnia (CBT-i) which covers a broad range of multicomponent treatment intervention. Involvement of CBT-i can be explained based on Spielman 3P model (Spielman, Saskin & Thorpy, 1987). From Figure 1, maladaptive coping style will further perpetuate the insomnia symptoms. This is accompanied with hyperarousal that will further worsen the ability to fall asleep (figure 2). CBT-i is thought to overcome and reduce hyperarousal that act as a barrier in achieving sleep.

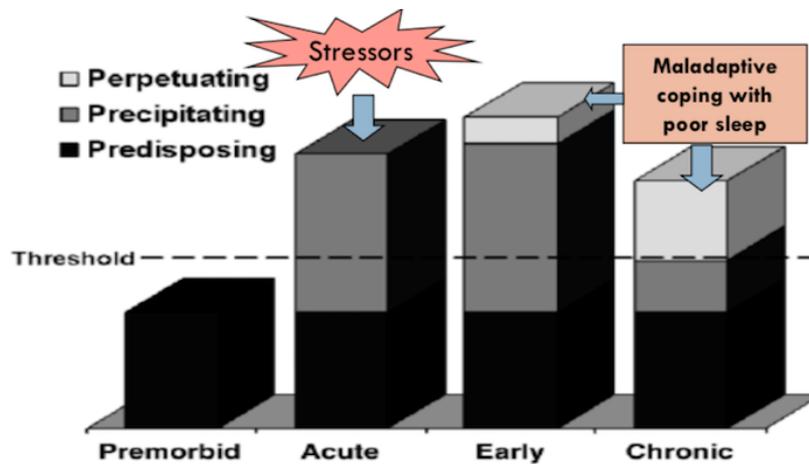


Figure 1 Nature of insomnia over time: 3P model (Source: Spielman, Saskin, & Thorpy, 1987)

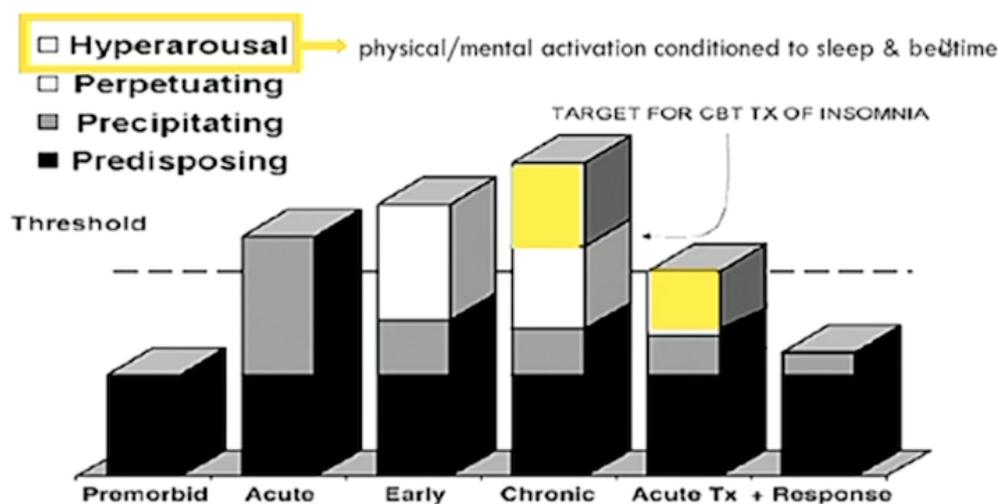


Figure 2 From acute to chronic – conditioned hyperarousal (Source: Adapted from Spielman 3p Model, 1987)

Currently, multi components treatments include stimulus control therapy, sleep restriction therapy, psychoeducation and sleep hygiene. In addition, relaxation techniques and cognitive therapy have been added to the multi-components package.

Sleep Hygiene and Psychoeducation

Sleep hygiene was first introduced by Dr. Peter Hauri (1977) and it consists of rules regarding lifestyles that could potentially

improve sleep quality (Morin & Espie, 2003). Sleep hygiene is reported to have minimal effect on insomnia, yet it has face validity due to its focus on sleep improvement. It is focusing more on the optimal sleep environment, avoiding stimulating activities and education on normal sleep habits (Edinger et al., 2009; Morin et al., 2009). Psychoeducation serves the purpose in helping people to understand the theories underneath the interventions such as sleep restriction therapy (SRT) and

stimulus control therapy (SCT). As such, psychoeducation and sleep hygiene will be the first component delivered under CBT-i.

Stimulus Control Therapy

SCT has been proposed by Bootzin (1972, 1977) and it is the first non-pharmacological treatment developed specifically for treating insomnia. SCT apply Pavlovian conditioning component in the development of insomnia treatment where bedroom has become the conditioned stimuli for frustration associated with the difficulty of falling asleep (Bootzin & Epsin, 2011). The golden rule in SCT is not to use the bedroom for any activities apart from sleeping and sexual activities. Individuals must not stay in bed for more than 10 minutes when sleep is difficult to achieve. They are required to leave the bed and return when they feel sleepy. SCT is used to develop a consistent sleep wake pattern and to strengthen the bed as cues for sleep.

Sleep Restriction Therapy

SRT was first introduced by Spielman (Spielman, Saskin, & Thorpy, 1987). SRT is a six weeks behavioral therapy emphasizes on theoretical concepts that individuals with insomnia spend too much time in bed attempting to sleep which lead to increased fatigue and fragmented sleep. In SRT, a sleep-wake schedule based on sleep diary is developed to limit time spent in bed. However, the allowed amount of time spent in bed must not be less than five hours. During each week of therapy, the time spent in bed is advanced for about 15 minutes to 30 minutes based on the previous week sleep pattern. It is based on the sleep efficiency. If sleep efficiency is more than 85%, the time in bed can be increased up to 30 minutes. Otherwise, it

should be reduced to 15-30 minutes time spent in bed.

Relaxation Technique

Relaxation technique is mostly used as an active coping skill in reducing the symptoms. Relaxation technique aims to diminish barriers in achieving sleep such as cognitive and somatic arousal by yielding physiological and experiential calm (Lichstein et al., 2011). Relaxation techniques may include progressive muscle relaxation, mindfulness, yoga, imagery relaxation and music relaxation technique. Relaxation technique is often used as part of the relapse prevention in CBT-i. To make it effective, it has to be done twice a day during low stress situation for the purpose of exercising.

Cognitive Restructuring

Cognitive restructuring is used to target the hyperarousal that interrupt the desired sleep. Similar to the concept used by other cognitive restructuring for various disorders, cognitive restructuring for insomnia involves challenging the negative belief. For instance, a person with insomnia may disputes belief about negative consequences of sleep by examining the evidence (Clarke et al., 2015). Some misconceptions regarding sleep will be addressed in cognitive restructuring. They will also be directed in key elements on how to counteract anxieties and tensions that interfere with sleep onset.

Results

Details of the four online studies are provided in Table 1.

Table 1
Studies Investigating The Components and Effectiveness of Online Cognitive Behavior Therapy

Reference	Sample	Method	Findings
Suzuki, Tsuchiya, Hirokawa, Taniguchi, Mitsuhashi, and Kawakami (2008)	-Randomized control trial - 43 volunteers were recruited and randomly assigned to either an intervention group (n=21) or a waiting-list group (n=22)	Components of the module: 1)Basic education on sleep and ways to improve sleep, 2)“Sleep e-diary” 3)Daily personalized automatic messages to encourage participant weekly self-monitoring of the effects of the participants’ behavior changes on sleep quality that incorporate both visual presentation and personalized advice summaries. -Two weeks intervention	-The sleep quality score increased in the intervention group at post-intervention, with a significant interaction effect -Sleep-related behavior also greatly increased in the intervention group at post-intervention -Sleep-onset latency reduced in the intervention group at follow-up -The Internet- based self-help program improves subjective sleep quality and sleep-onset latency.
Espie et al. (2012)	-165 adults meeting criteria of insomnia disorders listed out by DSM 5 -They are equally divided into two groups; intervention and placebo	Treatment content : 1)Sleep information/education 2)Sleep hygiene 3)Relaxation, 4)Stimulus control 5)Sleep restriction 6)Cognitive techniques (restructuring, paradox, mindfulness, imagery, putting day to rest, thought stopping) -Six sessions over minimum 6 weeks -Consisted of graduation ceremony upon completion -Social community of users, moderated by experts -Reminders by email and text messages -Praise on progress	-CBT-i delivered through web application with automated support is effective in improving sleep quality associated with insomnia
Straten et al. (2013)	-118 patients recruited from general population (59 for intervention and 59 for control group) -Randomized control trial	-Six weeks guided internet intervention - Six lessons guided online treatment : 1) Psychoeducation 2) Sleep hygiene	-72.9% of the patients completed the whole intervention. - Intention-to-treat (ITT) analysis showed that the treatment had statistically significant

		<ul style="list-style-type: none"> 3) Stimulus control and sleep restriction 4) Relaxation exercise to minimise worrying : progressive relaxation muscle 5) Erroneous cognitions about sleep 6) Summary and plan for the future 	<p>medium to large effects ($p < 0.05$; Cohen's d between 0.40 and 1.06), and resulted more often in clinically relevant changes, on all sleep and secondary outcomes with the exception of sleep onset latency (SOL) and number of awakenings (NA).</p>
Ritterband et al. (2017)	<ul style="list-style-type: none"> -Randomized control trial -Consisted of 303 adults with chronic insomnia -151 participants reported having at least one medical or psychiatric comorbidity -Participants are divided into two groups; internet CBT-i intervention and online patient education group. 	<p>CBT-i components :</p> <ul style="list-style-type: none"> 1) Sleep restriction, 2) Stimulus control 3) Cognitive restructuring 4) Sleep hygiene 5) Relapse prevention <ul style="list-style-type: none"> -Quizzes is included - Graphical feedback based on symptoms -Automated emails are sent as an encouragement 	<p>-Those under CBT-i treatment reported to improve in sleep compared with those who only received access to the education website.</p>

Referring to Table 1, most of the CBT-i is originated from Western countries. Findings from Straten et al. (2013) who conducted a study on a general population over a duration of six weeks of intervention and three months of follow up showed that the patients in the intervention group has improved in terms of sleep quality and feeling refreshed in the morning. The effectiveness is later assessed by calculating the sleep efficiency and Pittsburgh Sleep Quality Index (PSQI). Finding indicates that sleep efficiency among adults with insomnia increased within the intervention duration. Similarly, Espie et al. (2012) found a significant improvement in sleep quality among those who are assigned to online CBT-i compared to those in the placebo group. The intervention group is associated with an adequate daytime functioning after underwent the online

CBT-i. Therefore, a general conclusion can be drawn in that the adult population with insomnia may appear to benefit from the online CBT-i.

Among studies that conducted with insomniac adults, Ritterband et al. (2017) who recruited 303 adults with chronic insomnia that are further divided into two groups: online CBT-i intervention (Sleep Healthy Using The Internet: SHUT-i) and online patient education group, found that the remission status is less among SHUT-i participants compared to online patient education. The human contact in SHUT-i is thought to contribute to the effectiveness and lower remission rate. Similarly, Espie et al. (2012) also implemented the human contact and resulted in positive impact in improving sleep.

Subsequently, Suzuki et al. (2008) in a randomized control trial who recruited two groups of subject: 21 and 22 participants in intervention and waiting list group respectively of adult workers in Japan found that the sleep onset latency has reduced in the intervention group. The sleep quality is also reported a significant improvement. This includes the sleep related behavior that is thought to improve due to the SCT and SRT.

Based on the above mentioned online CBT-i, the SRT and SCT are thought to be most effective when they are combined together even if it can stand alone as a single intervention. The association of psychoeducation and sleep hygiene help to facilitate the insight of patients in getting better Espie et al. (2012). Similarly, Straten et al. (2013) highlight the importance of education as a vehicle to achieve a better sleep quality.

Conclusion

The high prevalence of insomnia coupled with limited available trained therapist specifically in Malaysia has influenced the directions of research. The current paper reviewed past studies on CBT for insomnia in order to evaluate the effectiveness whether there is a significant improvement to prove use of CBT-i as an online based intervention. The present paper further examined the issue of insomnia specifically in Malaysia and the implication of it. Components of CBT-i are also discussed in the current paper. After reviewing these areas of research, it can be argued that there are sufficient evidence to prove use of CBT-i in an online based could be a form of alternative to the traditional face to face CBT-i, as well as increase the amount of treatments offered in combating insomnia. The cost- effectiveness of online CBT-i might help in increasing the amount of people seeking for a professional help. Nevertheless, it should be highlighted that most of the online CBT-i interventions are developed in Western countries, therefore, it suits their cultures more than the Asian culture. Thus, online intervention for Malaysia should be developed taking the culture differences into consideration. By doing so, it would allow more synthesised module of online CBT for insomnia that is free from culture bias.

Funding

This research was funded by MARS-JOHAN Company Limited.

Acknowledgement

We thank the Ethical Committee of Universiti Kebangsaan Malaysia for approving the study (Ethical code: NN-2018-060.)

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