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Evolution of Cognitive Behaviour Therapy for Insomnia: A Model of Components and Related Mechanisms

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Abstract. Insomnia is one of debilitating disorders that presents in many psychosocial and physical states. Several studies have focused on the evidence-based efficacy of cognitive behaviour therapy (CBT) for sleep disorders over the years. Nonetheless, little have been done in the area of identifying the specific components, mediators and moderators associated with CBT for insomnia (CBT-I). This study aims at bringing to light the variables and mechanism supporting CBT-I. The systematic review shows that although CBT-I is noted as effective, much research is needed to validate its advancement.

Keywords: Insomnia; Cognitive Behaviour Therapy; Sleep; Psychopathology.

Introduction

Insomnia as a disorder is not limited to only psychiatric conditions but even observed in medical conditions. In effect, insomnia affects the general wellbeing of the individual and the society as well. Prevalence estimates of insomnia had shown a growing tendency with infiltration across anxiety and depression [1], medical conditions illnesses [1], and even in cases of deteriorated quality of life [2] A recent study noted the economic burden of insomnia to incur huge financial burden on both the individual and the global economy at large [3].

Cognitive Behaviour Therapy (CBT) is among the best known evidenced-based interventions for several psychological disorders. History of CBT's efficacy can be traced in areas, including depression [4], anxiety disorders [5], Pain [6], medical illnesses [7] and eating disorders [8]. Although much work have been done CBT for insomnia (CBT-I), little have been offered in the area of identifying the specific advancements that contribute to the success or failure of therapy outcomes.

Theoretical Framework of Insomnia

The mechanism of insomnia has been explained by a multidisciplinary framework of theories. One of the general theories on insomnia was proposed by Spielman, Caruso, and Glovinsky [9]. They suggested a model of insomnia founded on three main factors; predisposing factors, precipitating factors, and perpetuating factors. Subsequent to this model have been other biological, behavioural and cognitive models of insomnia. With respect to the two separate physiological systems that regulate wakefulness-sleep cycle (homeostatic system and the circadian system) [10], adaptive and maladaptive behaviour patterns can affect these normal systems to

impair sleep negatively [11]. In addition, cognitive factors like anxiety, irrational beliefs about sleep and other negative arousal states tend to affect sleep [12].

CBT-I Protocol and Assessment

Although CBT-I has been endorsed as an immediate option due to its long-term efficacy [13], a combined drug-therapy validate analogous effectiveness in insomnia treatment [14]. A classic CBT-I entails between four to eight sessions [15]. CBT-I centers on psycho-education, behavioural and cognitive strategies [16] with clinical focus on stimulus control, sleep restriction, cognitive therapy, sleep hygiene, and relaxation training [11].

CBT-I therapists are noted to select from a broad range of instruments for their client assessment. A good therapist must be able to have a sound basis to establish a baseline score and subsequent controls to observe changes in therapy outcome. Relevant to these instruments are their significant theoretical basis guiding their usage. In modern times, CBT-I therapists may have the luxury to adopt and adapt to their clients' needs.

The Pre-Sleep Arousal Scale (PSAS) was developed over two decades and have been effective in measuring the hyper-arousal state before sleep [17]. This is important as arousal state before sleep can have an adverse effect on the sleep pattern.

Another valuable instrument that has been seen as valuable is the e*lectroencephalogram* (EEG). This is used to measure the cortical arousal in the brain [18].

Functional magnetic resonance imaging has been used by therapists to get neuro-images of patients' brain [19]. This technique allows visual appreciation of the brains anatomical state.

Biological feedback mechanisms usually called the *Autonomic Physiological variables* are also taken into consideration during care. These variables include pulse rate, blood pressure, body temperature, basal metabolic rate, galvanic skin response and cortisol levels [20].

One of the oldest techniques of cognitive therapies is client record system which may be used as both a therapeutic process and a data collection instrument. *Sleep diaries* are used in CBT-I to record daily sleep habits like time in bed, thoughts before sleeping, napping, and so on.

In addition, the *Brief Symptom Inventory* (BSI) is used to measure the psychological functioning of the clients. This inventory has subscales that include Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation and Psychoticism [21].

Finally the *Dysfunctional Beliefs and Attitudes about Sleep Scale* (DBAS) is used to measure the variations in sleep-related beliefs and attitudes of clients [22].

Summary of CBT-I Model

On the average, therapists using CBT-I engages their clients in an eight session therapy. The eight sessions systematically take various components of CBT-I sessions (focus and methods). Some of these focuses (and their respective methods) include; Sleep: Psychobiological perspective (Problem solving, applied relaxation), Insomnia: Psychobiological perspective (Worry time), Worry and arousal Distraction (Observation exercise, Paradoxical intention), Sleep hygiene (Sleep hygiene practices), Sleep habits (Stimulus control, Sleep restriction), Cognitions and sleep (Identifying dysfunctional cognitions), Stress (Stress management techniques), Dysfunctional beliefs and attitudes about sleep (Functional beliefs and attitudes about sleep), Sleep medication (Limiting sleep medication), Daytime symptoms (Coping with daytime symptoms), Sleep management program, Risk analysis, and Relapse prevention (Constructing sleep management program & Problem solving) [23-24].

Mediator and moderators variables in CBT-I as hypothetically stated in this study were observed in the review of extensive literature. In theory, "the moderator function as a third variable, which partitions a focal independent variable into subgroups that establish its domains of maximal effectiveness in regard to a given dependent variable, while the mediator functions as a third variable, which represents the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest" [Pp. 1173] [25].
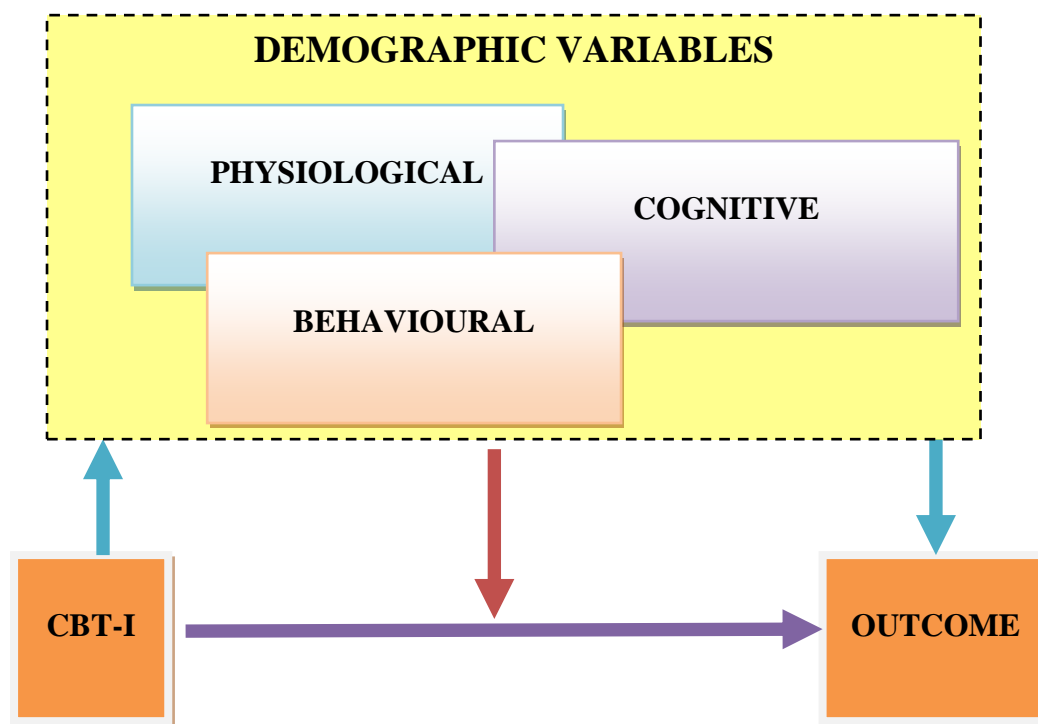
Figure 1: Summary of CBT-I Model

As summarised in Figure 1, significant moderators are anticipated to cause a change the strength (not the direction) of the direct effect of the predictor (CBT-I) on the criterion variable (i.e., Insomnia) as oppose mediators [26]. Thus, following the theory supporting the psychopathology of insomnia, these variables may also be grouped under behavioural, cognitive and physiological.

Under Behavioural variables, possible mediators may include decreased time in bed, decreased napping, decreased bedtime and rise time variability [27]. Even though these variables have been noted as mediators, possible moderation analysis can be done to see their moderation effect.

Other cognitive variables like decreased maladaptive beliefs and attitudes about sleep can also be tested. Additionally, decreased sleep effort, increased sleep-related self-efficacy, and increased internal sleep locus of control and arousal variables like decreased physiological arousal, and decreased cognitive arousal may also be tested as possible mediators or moderators when examined carefully with some physiological indicators like normal pulse rate, blood pressure, and basal metabolic rate. Other demographic factors like sex, age and type of occupation may also be tested in future studies. It is proposed that pre- to post-CBT-I modifications in the targeted physiology, cognitions and behaviours will generally predict, mediate or moderate the effects of therapy on insomnia disability.

References:

1. Taylor, D. J., Lichstein, K. L., Durrence, H. H., Reidel, B. W., & Bush, A. J. (2005). Epidemiology of insomnia, depression, and anxiety. *Sleep, 28,* 1457–1464.

2. Kyle, S. D., Morgan, K., & Espie, C. A. (2010). Insomnia and health-related quality of life. *Sleep Medicine Reviews, 14,* 69–82.

3. Daley, M., Morin, C. M., LeBlanc, M., Grégoire, J., & Savard, J. (2009). The economic burden of insomnia: Direct and indirect costs for individuals with insomnia syndrome, insomnia symptoms, and good sleepers. *Sleep, 32,* 55–64.

4. Quilty, L. C., McBride, C., & Bagby, R. M. (2008). Evidence for the cognitive meditational model of cognitive behavioural therapy for depression. *Psychological Medicine, 38,* 1531–1541.

5.   Hofmann, S. G., Meuret, A. E., Rosenfield, D., Suvak, M. K., Barlow, D. H., Gorman, J. M., et al. (2007). Preliminary evidence for cognitive mediation during cognitive-behavioral therapy of panic disorder. *Journal of Consulting and Clinical Psychology, 75,* 374–379.

6.   Eccleston, C., Morley, S., Williams, A. C., Yorke, L., & Mastroyannopoulou, K. (2002). Systematic review of randomized controlled trials of psychological therapy for chronic pain in children and adolescents, with a subset meta-analysis of pain relief. *Pain, 99,* 157–65.

7.   Knoop, H., van Kessel, K., & Moss-Morris, R. (2012). Which cognitions and behaviours mediate the positive effect of cognitive behavioural therapy on fatigue in patients with multiple sclerosis? *Psychological Medicine, 42,* 205–213.

8.   Murphy, R., Cooper, Z., Hollon, S. D., & Fairburn, C. G. (2009). How do psychological treatments work? Investigating mediators of change. *Behaviour Research and Therapy, 47,* 1–5.

9.   Spielman, A. J., Caruso, L. S., & Glovinsky, P. B. (1987). A behavioral perspective on insomnia treatment. *Psychiatric Clinics of North America, 10,* 541–553.

10.   Webb, W. B. (1988). An objective behavioral model of sleep. *Sleep, 11,* 488–496.

11.   Edinger, J. D., & Means, M. K. (2005). Cognitive-behavioral therapy for primary insomnia. *Clinical Psychology Review, 25*, 539–558.

12.   Harvey, A. G. (2002). A cognitive model of insomnia. *Behavior Research and Therapy, 40,* 869–893.

13.   Espie, C. A. (2009). "Stepped Care": A health technology solution for delivering cognitive behavioral therapy as a first line insomnia treatment. *Sleep, 32,* 1549–1558.

14.   Morin, C. M., Vallières, A., Guay, B., Ivers, H., Savard, J., Merette, C., et al. (2009). Cognitive behavioral therapy, singly and combined with medication, for persistent insomnia: A randomized clinical trial. *Journal of the American Medical Association, 301,* 2005–2015.

15.   Morin, C. M., Bootzin, R. R., Buysse, D. J., Edinger, J. D., Espie, C. A., & Lichstein, K. L. (2006). Psychological and behavioral treatment of insomnia: Update of the recent evidence (1998–2004). *Sleep, 29,* 1398–1414.

16.   Edinger, J. D., & Carney, C. E. (2008). *Overcoming insomnia: A cognitive-behavioral therapy approach.* New York: Oxford University Press.

17.   Nicassio, P. M., Mendlowitz, D. R., Fussell, J. J., & Petras, L. (1985). The phenomenology of the pre-sleep state: The development of the pre-sleep arousal scale. *Behavior Research and Therapy, 23,* 263–271.

18.   Merica, H., Blois, R., & Gaillard, J. -M. (1998). Spectral characteristics of sleep EEG in chronic insomnia. *European Journal of Neuroscience, 10,* 1826–1834.

19.   Altena, E., Van Der Werf, Y. D., Sanz-Arigita, E. J., Voorn, T. A., Rombouts, S., Kuijer, J., et al. (2008). Prefrontal hypoactivation and recovery in insomnia. *Sleep, 31,* 1271–1276.

20.   Adam, K., Tomeny, M., & Oswald, I. (1986). Physiological and psychological differences between good and poor sleepers. *Journal of Psychiatric Research, 20,* 301–316.

21.   Derogatis, L. R., & Melisaratos, N. (1983). The Brief Symptom Inventory: an introductory report. *Psychol Med., 13 (3),* 595-605.

22.   Morin, C. M. (1993). Insomnia: Psychological assessment and management. New York: Guilford Press.

23.   Jansson, M., & Linton, S. J. (2005). Cognitive-Behavioral Group Therapy as an Early Intervention for Insomnia: A Randomized Controlled Trial. *Journal of Occupational Rehabilitation, 15 (2),* 117-190. DOI: 10.1007/s10926-005-1217-9

24.   Lundh, L. G., & Hindmarsh, H. (2002). Can meta-cognitive observation be used in the treatment of insomnia? A pilot study of a cognitive-emotional self-observation task. *Behavioural and Cognitive Psychotherapy, 30*, 233–236.

25.   Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology, 51 (6),* 1173-1182.

26.   McFall, G. P., Geall, B. P., Fischer, A. L., Dolcos, S., & Dixon, R. A. (2010). Testing Covariates of Type 2 Diabetes-Cognition Associations in Older Adults: Moderating or Mediating Effects? *Neuropsychology, 24 (5),* 547–562.

27.   Schwartz, D. R., & Carney, C. E. (2012). Mediators of cognitive-behavioral therapy for insomnia: A review of randomized controlled trials and secondary analysis studies. Clinical Psychology Review, 32, 664–675.