THE EFFECTIVENESS OF COGNITIVE BEHAVIORAL THERAPY ON SLEEP DYSFUNCTION AMONG MIDDLE AGED

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Abstract

Well-being is a growing area in the recent decade, which relates to cognitive sense as well. Theories of mental health agree about the role played by cognition. Cognitive processes such as worry, repetitive thinking regarding daily troubles, have a threat on mental health and an effect on sleep quality. Poor sleep itself causes cognitive, emotional and behavioral problems which are associated with other obstacles for well-being on middle aged. This study is focused on insomnia which makes rapid psychosocial changes with long-term effects on well-being as the main role in quality of life. Middle aged have reduced ability to manage cognitive and behavioral determinants cooperating with sleep, which is a contributor in their physical and psychosocial well-being. Therefore, the aim of this study with fourteen participants (N=14) is presenting the cognitive and behavioral approach on treatment of insomnia along with highlighting the metacognitive behavior therapy concepts. The enhanced protocol of cognitive behavior therapy with the help of metacognitive behavior concepts has been applied as intervention and PSQI, ISI, PSAS and Sleep Log have been used for measurement sleep quality, insomnia severity, pre cognitive and somatic arousals, WASO, SOL, sleep efficacy and sleep satisfaction before and after intervention. Using the Statistical Package for Social Sciences (SPSS-23.0), the effectiveness were tested using Paired Sample t-test and clinical significance of change (A%). Introducing metacognitive and behavioral concepts such as mindfulness, self-regulation, commitment and acceptance, resulted the improvement of sleep quality and decreasing the cognitive arousal related to sleep among middle aged with insomnia.

Keywords: *Cognitive Behavior Therapy, Psychological Wellbeing, Insomnia, Middle aged, Sleep Dysfunction*

1.INTRODUCTION

1.1 Middle age

Middle age is a period with different dimensions such as mental, emotional and physical aspects defined in different resources such as DSM-IV-TR (2000), developmental psychology and psychosocial stages of Erikson which include physiological, cognitive, social changes. The appropriate management and regulation in this age lead to a sense of well-being and have a positive impact on their life and society because they are increasingly engaging in local, national, and global conversations (Erikson. 1959).

1.2 Sleep

In a discussion about sleep and quality of well-being, sleep duration alone is not the main factor, the substantial factor is the quality of sleep which is been affected by several variables. Due to the effectiveness of sleep on wellbeing and satisfaction of individuals, the kinds of help should be given to middle aged people to consider about their sleep and the factors which control sleep quality and quantity. The DSM-5 highlights difficulty in initiating, maintaining sleep and early-morning awakening as dissatisfaction with sleep quantity or quality which should cause sleep disturbance in at least 3 nights per week for at least 3 months. The DSM-5's criteria concerned to results of insomnia are recurring impairment or creates distress in, occupational, educational, social academic and behavioral situations. DSM-5 highlights that insomnia does not co-occur with another sleep or mental disorders. Also, it does not call it insomnia in case of existing under other medical conditions (American Psychiatric Association, 2013). This study includes psychological factors related to sleep quality. In current study, sleep has been considered as one of wellbeing`s factor in middle aged.

1.3 Mental Health

Within the movement of positive psychology, the definition of mental health and nature of well-being has been revisited. The individuals' ability to function well and realizing their abilities despite having to face challenges instead of being referred to the absence of pathology (Keyes, 2007; World Health Organization, 2004). Westerhof and Keyes consider the definition of positive mental health as involving the psychological and social aspects of well-being (Westerhof & Keyes, 2010). Mental health needs appropriate mental development. In comparison to the general population, there are individuals who meet the criteria, which causes them to face a negative attitude (Merikangas, He, Burstein, et al., 2010).

1.4 Wellbeing

McMahan and Estes study mentioned self- development through a focus on experiencing pleasure (McMahan and Estes, 2011).Global Youth Wellbeing Index defines six domains of well-being which are resulting from the environment along with providing the opportunities to the youth. Health, education, safety, and security are the domains of this index which give a comprehensive account for the quality of life (Goldin et al. 2014) , But in middle age health does not seem as a bold component

of personal identity from a person's points of view (Frazier, Hooker, Johnson, & Kaus, 2000). In some studies, well-being is defined as overall life satisfaction and has domain aspects about work and social relationships (Diener, 1985).

1.5 Cognitive - behavioral approaches

The effectiveness of treatment for insomnia is important and also, its impacts are effective in management of symptoms. Traditional Cognitive Behavior Therapy follows some restrictive techniques where it creates tension or arousal, that makes it more difficult to fall asleep. Stimulus control technique causes the fear of absence of sleep (Bootzin, Epstein. 2000), makes the patients to avoid going to bed and gets them engaged in activities which increase inner arousals like worry (Carney, Berry, Geyer, 2012). High performance anxiety results from controlling of thoughts and collaborating with increasing cognitive arousal (Alladin.Assen, 2008). Individuals reported a difficult experience in long-term practice of sleep restriction (Dalrymple, Fiorentino, Politi. 2010). Sleep hygiene increases the concern and stress of patients to follow the rules and make habitual and environmental changes, which seem difficult to achieve for the patients (Hauri,1991) and cognitive restructuring teaches person as to how to achieve positive thoughts by changing the negative thoughts about sleep and change itself confirms the cause of stress and fear. Advent of third wave of cognitive behavior therapy can help insomniacs to achieve improved relief from the symptoms of insomnia.

2. LITERATURE REVIEW

The role of satisfaction and happiness in the improvement of life quality has been highlighted (Westerhof & Keyes, 2010). In the last decade, psychological well-being has been defined with conceptions of positive functioning (Bradburn, 1969). Life satisfaction, as the main key would lead to well-being, which was seen as the most effective dimension of positive functioning and supplement for happiness (McKennell &Andrews, 1980; Veroff & Bryant, 1982). The wellbeing in middle aged includes concepts of psychosocial health (Hoppmann, Gerstorf, & Luszcz, 2008, Henry, Berg, Smith, & Florsheim, 2007). One of factors which has effect on middle age wellbeing is health. Mental, emotional and physical wellness are the roots of health (Robert W. Blum, et al., 2012; Susan M. Sawyer et al., 2012). Sleep plays an important role in setting up the body and mind's functions. Emotional well-being requires good sleep which is essential for the physical and psychological health specially for middle age community (Harvey and Altevogt, 2006).William James considered "mental states" and linked physiological data to education and activities which requires the control of the mind (James. 1892). In the study of Modinos and colleagues (2010), the association between mindfulness and the activation of amygdala has been stated (Modinos, Ormel, & Aleman, 2010). Some people with sleep difficulties are fighting involvement with psychological disturbances such as repetitive thoughts about daily problems, worries which make mind busy before sleep, ruminating thoughts and other cognitive arousals. Sleep has deleterious effect on function of the frontal lobe (Harrison and Horne, 1997). Cognitive processes are affected by sleep and so are attention and decision making (Harrison and Horne, 2000). According to the metacognitive approach of Wells (2012), phenomena of worry, caused by cognitive-attentional syndrome (CAS) causes distress effect in the difficulty in sleeping (Sella. Enrico, et al. 2016). William James believed that consciousness consisted of a stream of thoughts, emotions and perceptions and has two separate factors (James. William, 1890). Monitoring through the component of attention, known as focusing one's awareness on any thought (Segerstrom, Tsao, Alden, & Craske, 2000). Accepting the presence of a worrisome thoughts causing poor sleep without being so seriously involved, can help instead of indulging in worries by giving them full attention whenever they intrude or by trying to avoid them. It can help the youth to allow arousals related to poor sleep to come and go without any struggle. In a study which was done by Singh.N and his colleagues in 2007, mindfully returning the attention was reported as beneficial in distressing situations.

The third way cognitive - behavioral approach helps the youth in observing themselves, which is to have the attitude of openness and accepting the interventions for self-development and wellbeing through mental health. Acceptance, Mindfulness, and Commitment are the approaches which include awareness about self and thoughts, considered in positive evaluation of self and accept one's own self and the troubles as they are and maintain purpose for life according to values which all are domains to reach wellbeing. Mindfulness is associated with reduction in increased positive affective states, negative affective states (Sorocco, Kristen Hilliard. 2011). Defusing cognition and observing thoughts within the person itself is one of mindfulness and acceptance approach which leads to releasing of thoughts and rumination related to sleep (Hayes et al, 1999). Commitment therapy identifies valuable things in life such as family, communication with outsiders and etc. The role of commitment has been highlighted as one of third-way behavioral approaches. Acceptance and commitment principle is about helping the middle aged to clarify what is truly important and meaningful to them as values and use this knowledge to guide, inspire and motivate to change their life for the better (Dalrymple, K.L., Fiorentino, L., Politi, M.C. 2010) and mindfulness and acceptance principles encourage actions in regard to favor of values (Dahl & Lundgren, 2006). According to Hayes, the first goal in acceptance is to identify those unsuccessful strategies and a detailed review of all kinds of techniques that person has tried in order to improve his or her sleep and those that have not worked (Hayes, 1999). Self-acceptance is important in older ages as they have evaluated their experiences and teaching this approach can help youths to prepare themselves for this aspect of psychological well-being for future life as well. Negative self-evaluation may represent one way that perceptions of aging have an effect on psychological well-being (Forman & Davis, 2005; Levy, 2001) and in another hand " Self-Acceptance " as positive evaluation of youths by themselves and "Purpose in Life" for purposeful beliefs about life highly correlate with psychological wellbeing (Ryff Keyes ,1995).

3. RESEARCH METHOD

3.1 Population

The sample of study comprises of 14 middle aged people within the age range of 40-65 years. These participants were selected from patients referred to sleep disorder and insomnia section of Imam Khomeini Hospital and Baharloo Hospital affiliated to Tehran University of Medical Sciences and School of Medicine with the diagnosis of insomnia according to Diagnostic and Statistical Manual of Mental Disorders (DSM-5) module for insomnia.

The inclusion Criteria was about participants' adequate literacy to complete all questionnaires, age which would be between 40 and 65. The participants should currently have the history of insomnia and the DSM-5 symptoms of insomnia. The exclusion

Criteria included participants with current mental illnesses or psychiatric problems and other symptoms suggestive of another sleep disorder. Participants should not have engaged in any current psychotherapy intervention. Untreated current mood, anxiety, or psychotic disorder and usage of traditional or herbal agents, illicit drugs, or alcohol should not be there.

3.2 Data and Sources of Data

For this study fourteen participants selected from two hospitals and the data gathered from four questioners. The quality of sleep was assessed using the Pittsburg Sleep Quality Index (Appendix A). This has 19-items to measure sleep duration, subjective sleep quality, habitual sleep efficiency, sleep disturbances, sleep latency, daytime dysfunction and use of sleeping medication (Buysse et al ,2006). Internal homogeneity, consistency (test-retest reliability), and validity of original questionnaire were obtained from an 18-month period of study in healthy sleepers (n = 52) and poor sleepers with depression (n = 54) and sleep-disorder patients (n = 62). A global PSQI score > 5 yielded a diagnostic sensitivity of 89.6% and specificity of 86.5% (kappa = 0.75, $p \leqslant 0.001$) in distinguishing good and poor sleepers. Shahri Far (2009) reported the reliability of PSQI being reported as 89/5 and the validity as 86/5 for Persian version. **Insomnia Severity Index (ISI)** with 7-items has been used for measurement of sleep quality. There is 5-point Likert scale ranging from 0 to 4. A person gives score to each sentence according to his/her severity of both nighttime and daytime symptoms of insomnia over the past week. Furthermore, a person can get a maximum total scale score of 28. Individuals with a higher score represent greater symptom severity and the scores more than 11 have been known to have clinical levels of insomnia. The internal consistency reported as Cronbach's alpha=.74 to .78 with evidence supporting concurrent, predictive, and content validity. The Persian version of this index was used in the research of Sabri and colleagues in 2008. The validity for Persian version of this questionnaire is 56% (Mes & Parsaei Rad, 2010). In another research by Heidari and colleagues (2010), the acceptable validity of ISI through Cronbach and split half reported as 78% and 72%. Parsaei Rad and Meshak concluded the validity of ISI in their research as 56% (2010). In the study of Dastani and colleagues (2011), the Internal consistency of the Persian version of ISI was 79% by Cronbach. The levels of cognitive and somatic arousals have been measured through **Pre-Sleep Arousal Scale (PSAS).** This includes eight symptoms of somatic arousal experience and eight items with symptoms of cognitive arousals as disturbances at bedtime (Nicassio et al ,1985). It has 5-point Likert scale and scores are used to rate the extent to which each item is experienced. A person can get a total score from 8 to 40 and getting a high score in both subscales indicates higher arousal rates. It accesses the internal consistency and test–retest reliability. Cronbach Alpha is 89 ($p<0.001$). The internal consistency of somatic arousal experienced is 0.76 and it is 0.81 for cognitive scale. In Iran, the Persian version's reliability of PSAS was obtained as 85% and the validity reported as 88% (Doos Ali Vand, Gharraee, Asgharnejad Farid, Ghaleh Bandi,2014). **The Daily Sleep Diary** was used for reporting sleep patterns each morning. It requires to report about sleep onset latency (SOL), wake after sleep onset (WASO) and sleep efficacy (SE). The sleep log items include reporting about the time the person goes to bed, the time sleep onset occurred, the number and length of any nighttime awakenings following the presumed causes and activities during these moments. The score number 1 offers a high severity of fatigued or sleepy moments and score 10 goes for optimally energetic/alert state. The use of medication needs to be answered in this report. The Sleep Diary of Buysse, Ancoli-Israel, Edinger, Lichstein, & Morin (2006) follows the recommendations for standardized research assessment of insomnia (Buysse,Israel, Edinger, Lichstein,Morin, 2006). In addition, ratings of sleep quality, daytime sleepiness, and daytime fatigue were assessed using a 10-point Likert scale (1 to 10). Participants should be asked to complete the diary 7 days prior to treatment. The internal consistency of 0.89–0.95, and stability across time make diary useful (Rogers, Caruso, Aldrich1993).

Table 1: Research Group

	Pretest	Intervention	Posttest
Experimental group (Enhanced CBTI)	O_1	X_1	O_2

3.3 Theoretical framework

Variables of the study contains dependent and independent variable. The independent variable is enhanced cognitive behavior therapy intervention. The dependent variables include sleep quality, severity of insomnia, cognitive arousals, somatic arousals, sleep efficacy and sleep satisfaction.

3.3.1: Dependent Variables (DVs)

D V 1: Sleep quality, D V 2: Sleep Severity, D V 3: Cognitive arousals, D V 4: Somatic arousals, D V 5: Sleep Efficacy, D V 6: Sleep Satisfaction

3.3.2: Independent Variables (IVs)

I V 1: Enhanced Cognitive Behavior Therapy, I V 2: Medication

3.4 Procedure

After selecting participants according to the criteria, they were assured about their consent. The demographic questionnaire was filled up, along with taking of history from participants. The post tests were conducted and the Enhanced Cognitive Behavior Therapy protocol for insomnia was applied which consisted of 6 sessions of 60-minutes each, scheduled typically weekly in structured sequence.

First Session of intervention started with evaluating client's Insomnia. Inquiry about any physical or psychological symptoms caused by sleep problems have been highlighted as an important note. Furthermore, after establishing rapport with client, principles of enhanced cognitive behavior therapy for insomnia and the protocol of sessions were explained to participants. Researcher starts sharing general information about normal sleep. This included simple explanation about circadian rhythm and review of

homeostatic sleep drive, specially discussing about how normal functions impact sleep. Delivering information about factors which effect both sleep quality and quantity, educating about insomnia and cognitive arousals related to sleep have been included as well. The first session was continued by thought suppression exercise and mindfulness training. The protocol was included to challenge the beliefs regarding thoughts, ruminations and tension which are called uncontrollable by insomniacs. A brief explanation of next session's schedule and function should be given to client and ensured to them that a discussion about their specific problems for insomnia will be done, which will improve through mindfulness, acceptance and commitment. At the end of first session, homework should be given to participants about practicing the mindfulness technique at home which has been taught to them during the sessions, asking patients to complete their sleep diary each day for next week and bringing it in the next session. The daily sleep diary, gradually helps patients to realize a cause of their daytime sleepiness and building up a picture of their sleep habits known as sleep hygiene. Participants feedback is taken regarding the entire session. The Second session is started by taking a look through the homework specially regarding the use of sleep diary and asking primary questions. According to participant's sleep log, specific problems which make the sleep log different from normal sleep routines have to be highlighted. Delaying in initiating or maintaining sleep, causes and arousals as well as other important variables have been checked. The session is continued with mindfulness techniques, which starts by focusing on client's awareness about the sleep problems in sleep log and cognitive arousals. In this session cognitive fusion is an important technique, which means that emotional and cognitive control should be seen as the core obstacle preventing successful solution of the client's problems. According to that, the session continued with self-regulative executive function model (Matthews) exercise. As the participants with extreme insomnia are involved in thoughts, physical states, irrational beliefs and mood faced with external threats, this may stop them from getting new information which may not support negative beliefs and thoughts. Attention regulation technique, rumination and tension control reduction technique, postponement of rumination have been involved in protocol of second session. Progressive Muscle Relaxation is taught to participants as they need to be able to lower their overall tension. The third session is started by going through the homework. Session includes educating about acceptance, emotional willingness, psychologically presenting component and de-attachment to cognitive arousals. Living in present moment, engaging in special positive activities instead of engaging in controlled information processing had been done with challenging emotional coping strategy. Practicing reprisal and respond by less stressed emotions instead of completely suppressing the stress which person is experiencing, while facing an unpleasant event which would be done by guided thinking strategy. Participants discussed about ability of making decisions and more concern put in for skills related to attention. Participants are asked for feedback and the homework specified as practicing relaxation, recognizing and changing emotional coping strategy and doing positive activities.

The fourth session starts with engaging the participants about their homework. Mindfulness is practiced once more in fourth session. Emotion regulation based on schemas recognition and challenging irrational beliefs as adjusted belief replacement is done. The values and barriers have been evaluated as commitment therapy rather than focusing on sleep itself. This encourages the person to make their life valuable and dynamic. Flexibility, equanimity and balancing appraisals of sleep expectations have been included in fourth session. Homework being handed out as practicing relaxation and applying behavioral examination based on irrational beliefs challenges. Session five is started by reviewing homework. Thought suppression technique and rational alternative beliefs replacement exercises are practiced during the session. Participant is asked to note down therapy sessions. The homework being, the person to be asked to work out on therapy plans and fill one-week sleep log. The sixth session is follow-up session where the review of whole intervention had been taken from participants and treatment protocol from participants and then post- tests had been collected from participants.

3.5 Statistical tools

3.5.1 Descriptive Statistics

Descriptive Statics has been used to find the maximum, minimum, standard deviation and mean of the data of all the variables of the study.

3.5.2 Clinical Significance of Changes (A%)

Clinical significance of changes (A%) has been conducted to find out the recovery percentage of participants after enhanced cognitive behavior therapy.

4. RESULTS AND DISCUSSION

On the basis of the results obtained in the present investigation, the majority of participants were female. The mean of age is 49 years old. Majority of them was married and in next level mostly they divorced as it has been mentioned on **table 2.**

Table 2: Sample Descriptive Statistics for Demographic Characteristics of study

	ECBTI	
	N (%)	Mean(SD)
Age		49.1 (7.68)
Gender		
Male	3(21.43)	
Female	11(78.57)	
Academic Level		3.5(1.60)
Primary School	1(7.1)	
Middle School	4(28.6)	
Diploma	2(14.3)	
Advance Diploma	3(21.4)	
BA	2(14.3)	
PhD	2(14.3)	
Marital Status		
Single	2(14.28)	
Married	7(50)	
Widow/Widower	3(7.14)	
Divorced	4(28.57)	
Number of Children		
Without child	7(50)	
One	1(7.1)	
Two		
Three		

The data incorporated in **table 3**, shows that the scores of insomnia severity in post-test (M= 11.07, SD= 5.45) were lesser than the scores of severity of insomnia on pre-test (M = 18.5, SD= 3.89), *t* (9.49), p<0.001, d= 2.53. The *p* <0.001 and the severity of insomnia is highly statically significant and it very unlikely to occurred by chance alone. The mean difference showed a significant difference in Sleep Severity before and after intervention in enhanced cognitive behavior therapy group (Mean difference= 5.8125) To find out whether this change was because of reduction in severity of insomnia nor not, the mean of the pre-test had to be compared with the post-test's mean. The special results showed there was a significant difference in severity of sleep before and after enhanced cognitive behavior therapy, and this intervention resulted in reduction of severity of insomnia. The effect size of severity of insomnia is (d= 2.53) which fall under the category of high (d= 0.8) as mentioned by Cohen.The scores in ECBTI group on pre-test (M= 14.43, SD= 2.34) were higher than the scores of sleep quality on post-test (M = 8.43, SD= 3.13), (*t*=7.93), *p*-value<0.05, d= 2.12.

On the *p*-value<0.05 and $\alpha = 0.05$, There was a significant difference in sleep quality on pre-test and after ECBTI as intervention (*t*=7.93, p=0.002). The higher score in PSQI determined a lesser sleep quality. The mean difference (6) showed the effect of intervention on post test scores of sleep quality. Therefore, the enhanced cognitive behavior therapy resulted in improvement of sleep quality. The effect size of sleep quality is (d= 2.12) which fall under the category of high (d= 0.8) as mentioned by Cohen.The scores of pre cognitive arousals on pre-test (M= 30.14, SD = 3.88) were higher than the scores of pre cognitive arousal on post-test (M= 19.57, SD = 5.37), (*t*=8.75), p<0.001, d= 2.33 . The *p* <0.001 and the pre cognitive arousal is highly statically significant and it very unlikely to occurred by chance alone. The cognitive arousals before intervention is significant . Mean difference of pre and post-test (10.57) on pre-cognitive arousals related to sleep, showed a difference of cognitive arousals scores before and after enhanced cognitive behavior therapy. To find out whether this change was because of reduction in cognitive arousals after ECBTI or not, the mean of the pre-test had to be compared with the post-test's mean. The lesser mean of post-test determined better results and better effect of intervention. Final result showed that enhanced cognitive behavior therapy resulted in decreasing the cognitive arousals related to sleep. The effect size of pre cognitive arousals is (d= 2.33) which fall under the category of high (d= 0.8) as mentioned by Cohen.The scores of pre-somatic arousal on pretest (M= 13.92, SD= 4.12) were higher than the scores of pre-somatic arousal on post-test (M = 11.28, SD = 2.97), (*t*=3.61), *p*-value<0.05, d= 0.96. The difference of pre-somatic arousal's mean before and after this intervention (2.62) determined a difference of scores on pre-test and post-test. The lesser scores of PSAS after taking enhanced cognitive behavior therapy showed that the participants had better condition on they experienced less somatic arousals related to sleep than before intervention. The table and significant difference of pre-somatic arousals before and after treatment

with ECBTI (t=3.61, P = 0.003) showed that enhanced cognitive behavior therapy resulted in decreasing the level of somatic arousals cause insomnia. The effect size of pre somatic arousals is (d= 0.96) which fall under the category of high (d= 0.8) as mentioned by Cohen.

There was a mean difference (43.92) between sleep onset latency of pre-test and post-test on enhance cognitive behavior therapy group. This showed that there were some changes in the results of post-test due to intervention. The scores of sleep onset latency on pre-test (M= 83.928571, SD= 55.47621) were higher than scores of sleep onset latency on post-test (M = 40, SD= 31.80), t(13)= 4.68, p-value<0.05, d=1.25 . On the p-value<0.05 and α = 0.05, The p value of sleep onset latency before intervention on group taking ECBTI (p=0.004) showed there was significant difference in sleep onset latency before and after this non-pharmacological intervention. Result of this table showed that treating with the enhanced cognitive behavior therapy protocol in this research decreased the sleep onset latency and showed improvement. The effect size of sleep onset latency is (d= 1.25) which fall under the category of high (d= 0.8) as mentioned by Cohen. The scores of wakefulness after sleep onset on pre-test (M=117.86, SD= 95.2) were higher than scores of wakefulness after sleep onset on post-test (M=75.71, SD= 62.0), t (13) =2.10, p-value<0.05, d=0.54 . This showed a change of wakefulness after sleep onset before and after ECBTI.

On the p-value<0.05 and α = 0.05, The p value of wakefulness after sleep onset was lesser than p value (t= 2.10, p= 0.004) and it showed the significant difference of wakefulness after sleep onset before and after enhanced cognitive behavior therapy intervention. The effect size of wakefulness after sleep onset is (d= 0.56) which fall under the category of medium (d= 0.2) as mentioned by Cohen. The scores of sleep efficacy on pre-test (M=2.5, SD=1.35) is higher than the scores of sleep efficacy on post-test (M=1.35, SD=0.92), t (13)= 4.94, p-value<0.05, d= 1.32. The mean difference of pre and post-test (1.14) showed the change of sleep efficacy within ECBTI. On the p-value<0.05 and α = 0.05, it showed there was a significant difference before and after enhanced cognitive behavior therapy intervention on sleep efficacy (t= 4.94, p= 0.002). The effect size of sleep efficacy is (d= 1.32) which fall under the category of high (d= 0.8) as mentioned by Cohen. The scores of sleep satisfaction on post-test (M= 1.71, SD= 1.08) were lesser than the scores of sleep satisfaction on pre-test (M=3.56, SD= 0.51), t (13)= 5.5, p-value<0.05, d= 1.47 . The result highlights that participants were satisfied from improvement of their insomnia after taking medication. But there should be a final comparison between the levels of satisfaction within two groups as well. On the p-value<0.05 and α = 0.05, There was significant difference in the level of sleep satisfaction before and after taking medication in this table. As the sleep satisfaction is measured through Likert scale and it is reverse scored, a higher mean shows less satisfaction (t= 5.5, P= 0.001). The effect size of sleep satisfaction is (d= 1.47) which fall under the category of high (d= 0.8) as mentioned by Cohen.

Table 3: Summary of paired sample t-test of Enhanced Cognitive Behavior Therapy Group Before and After Intervention (N=14)

		Mean	SD	t	P	Cohen's d
Insomnia Severity	Before	18.5	3.89	9.49	0	2.53
	After	11.07	5.45			
Sleep Quality	Before	14.43	2.34	7.93	0.0002	2.12
	After	8.43	3.13			
Pre Cognitive Arousals	Before	30.14	3.88	8.75	0	2.33
	After	19.57	5.37			
Pre Somatic Arousal	Before	13.92	4.12	3.61	0.003	0.96
	After	11.28	2.97			
Sleep Onset Latency	Before	83.92	55.47	4.68	0.000428	1.25
	After	40	31.8			
Wakefulness after onset sleep	Before	117.85	95.2	2.1	0.05	0.56
	After	75.71	62.96			
Sleep Efficacy	Before	2.5	0.75	4.94	0.0002	1.32
	After	1.35	0.92			
Sleep Satisfaction	Before	3.56	0.51	4.39	0.0005	1.47
	After	2.625	1.08			

Note: Cohen's d: Small size= 0.2, Medium size= 0.5, large size=0.8

The data incorporated in **table 4**, shows the recovery percentage of participants in each variable in enhanced cognitive behavior therapy group. The recoveries percentage of insomnia severity ($M_{A\%}$ = 40%), the recoveries percentage of sleep quality ($M_{A\%}$ = 41%), the recoveries percentage of pre sleep cognitive arousals ($M_{A\%}$ = 35%). The recoveries percentage of pre sleep somatic arousals ($M_{A\%}$ = 18%), the recoveries percentage of sleep efficacy ($M_{A\%}$ = 46%) and the recoveries percentage of sleep satisfaction ($M_{A\%}$ = 46%). This table indicated that participants achieved to the adequate recovery percentage of sleep quality, reduction of insomnia, reduction level of cognitive arousal, sleep efficacy and sleep satisfaction after enhanced cognitive behavior therapy. The current enhanced protocol does not have high percentage of recovery for participant regard somatic arousals' level.

Table 4: Recovery percentage of clinical significance of changes (A%)

Variables	ECBTI (A%)
Insomnia Severity	40%
Sleep Quality	41%
Pre Arousal (Cognition)	35%
Pre Arousal (Somatic)	18%
Sleep Efficacy	46%
Sleep Satisfaction	46%

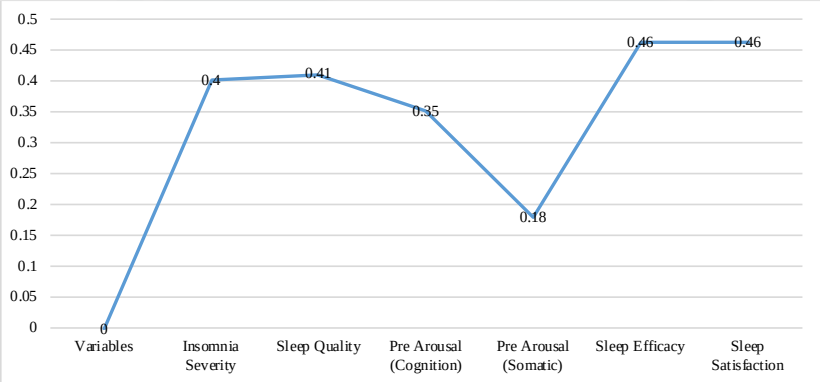

Figure 1: Clinical significance (recovery percentage) of each variable in medication and ECBTI group

Metacognitive behavior therapy techniques are useful to manage thoughts, worries, anxiety and other sleep related cognitive arousals related to insomnia among middle aged. This study assessed the enhanced protocol for treatment of insomnia and the findings concluded that sleep quality is significantly different after enhanced cognitive behavior therapy rather than before intervention. Cognitive arousals related to sleep were reduced after intervention.

The following conclusion sums up the findings as well as places the results in the context of findings from previous research. The findings are found to be effective and useful for middle aged who already suffer from insomnia, and for preventing or predicting perpetuating factors of insomnia. The higher level of sleep satisfaction after intervention has been identified and treatment of insomnia with the help of enhanced cognitive behavior therapy includes awareness, mindfulness, acceptance, commitment, self-executive functioning regulation which it itself is based on metacognitive technique and other concepts would improve the psychological wellbeing. It is a cycle, in which mental health plays a responsible role in the quality of sleep and the fulfillment sleep has an effect in maintaining mental health itself. The cycle of sleep and mental health is recognized as psychological well-being variables.

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