

## COGNITIVE BEHAVIOUR TECHNIQUES FOR PRIMARY INSOMNIA. A NON-RANDOMIZED STUDY AMONG UNIVERSITY STUDENTS

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### ABSTRACT

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The main objective of this study is to investigate the efficacy of cognitive behavior techniques on insomnia among university students. In order to achieve this, a non-randomized design involving pretest posttest experimental/control group was used and a total sample size of twenty-four volunteered students (cognitive-behavior technique = 12, control group = 12), with a mean age of 25.3, who were identified with primary insomnia condition were purposively selected and used for the study. The intervention (stimulus control, sleep restriction, sleep hygiene education, and cognitive technique) administered lasted for a period of six weeks. The outcome measure used was the insomnia severity index, which was filled at pre and post intervention stages to assess treatment outcome. The data collected were analysed using mean and standard deviation to answer research questions while the null hypotheses were tested using one-way between group analyses of covariance. The statistical package for the social sciences (SPSS v24) was used for the analysis. After adjusting for the covariate, finding suggests a significant effect of cognitive behaviour techniques,  $F(1,21) = 22.416, p = .000$ , in reducing insomnia among university students, with cognitive behaviour techniques producing a within group average remission of about 65% when compared to 9% for the control group. The study did not find significant differential effect of cognitive behaviour techniques,  $F(1,9) = .106, p = .752$ , in reducing insomnia of male compared to female university students. Both male and female students reported 65% and 66% decrease respectively. Based on these findings, the study concludes that six weeks CBT successfully decrease primary insomnia among students. It is therefore, recommended that psychologists and counsellors should explore the benefits of cognitive behaviour techniques for insomnia to help students manage their sleep difficulty since the techniques show good level of effectiveness without significant gender bias.

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## INTRODUCTION

Insomnia is a common sleep disorder that consists of frequent nighttime sleep difficulties that result in reduced functioning during the daytime. People with insomnia experience persistent difficulties sleeping despite allowing themselves adequate time to sleep and having a comfortable bedroom setting. Insomnia is a very common problem that may be short-lived and temporary, intermittent, or persistent over time. Primary insomnia is a prevalent and costly mental health problem both as a symptom and as a syndrome. In the general population, approximately 10% to 15% of people report chronic insomnia (Ohayon, 2002), while 25% to 35% of people experience occasional or mild insomnia (Ancoli-Israel & Roth, 1999). Although, complaints of insomnia are most frequently reported by older age groups with higher rate among women and older patients (Ohayon, 1996; Gureje, Oladeji, Abiona, Makanjuola & Esan, 2011), a significant percentage of young people experience insomnia (Lichstein, 2004; Ohayon, 2002). In Nigeria, Gureje, et al. (2011) reported 26% prevalence of insomnia among people aged 18 – 30. In one longitudinal study of over 1,000 randomly selected

young adults ages 21-30, it was found that 16.6% reported experiencing insomnia (Breslau et al., 1996). Forty-five percent of these young adults with insomnia continued to report sleep problems at a 3.5-year follow-up. Of the young adults without insomnia at baseline, 13.1% developed insomnia during the course of study in school.

Studies conducted in Europe have found 4%-14% of young adults between the ages of 19-24 experience insomnia (Ohayon & Roberts, 2001; Ohayon, Roberts, Zulley, Smirne, & Priest, 2000). A study of American college students found 15% reported having poor sleep quality and 12%-13% reported experiencing difficulty falling asleep, waking during the night, or waking too early in the morning at least three times per week (Buboltz et al., 2001). A study conducted at the University of North Texas (UNT) found 28.4% of students' report experiencing insomnia at least once a week (Taylor et al., 2007). Out of over 1,000 college students surveyed, 6.8% of students use medication (either prescription or over the counter) to help them sleep and 11.4% use alcohol as a sleep aid (Taylor & Bramoweth, 2010).

The effects of insomnia among university students' population is worrisome. When compared to normal sleepers, students who have trouble sleeping have slower reaction times, lower GPAs, higher levels of daytime sleepiness, fatigue, worry, and a higher risk for substance abuse (Lindsay, Hanks, Hurley, & Dane, 1999; Means et al., 2000; Trockel, Barnes, & Egget, 2000). Students with insomnia are also more likely to experience depression or attempt suicide as young adults (6-7 years later) than those without insomnia (Roane & Taylor, 2008). A long-term study of Johns Hopkins Medical School graduates found male medical students who reported experiencing insomnia or difficulty sleeping during times of stress had a significantly higher risk of experiencing depression more than twenty years later than students who slept well. Those who experience persistent insomnia also tend to have greater medical and psychiatric morbidity (Espie, Inglis & Tessier, 2001) and a reduced quality of life, higher absenteeism, impaired day time performance, higher health care utilization, and inferior general functioning and well-being compared to individuals without insomnia (Edinger, Wohlgemuth, & Radtke, 2001).

Pharmacological method used to be the main intervention for insomnia but in recent time, there are several alternative treatment options for insomnia. Several of the non-pharmacologic treatments have shown efficacy in reducing insomnia (Perlis, Smith, Orff, Andrews & Giles, 2001; Merica, Blois & Gaillard, 1998). Cognitive-behavioral therapy (CBT) is one of the non-pharmacological method, which provides a safe and effective treatment for insomnia, both as a monotherapy and as an augmentation of hypnotic drugs. CBT includes three components—behavioral, cognitive, and educational—that can be used to help patients modify the learned behaviors and cognitions that propagate sleep disturbances. When administered correctly, CBT has the potential to alleviate various forms of insomnia and, more importantly, to help patients understand and eliminate 70-80% of the condition.

For instance, in one randomized clinical trial, Edinger, Olsen, Stechuchak, Means, Lineberger, Kirby and Carney (2009) investigated the effects of Cognitive behavioral therapy for patients with primary insomnia or insomnia associated predominantly with mixed psychiatric disorders: Eighty-one

adults (n = 11 women; mean age, 54.2 years) with chronic primary (n = 40) or comorbid insomnia associated predominantly with mixed psychiatric disorders (n = 41) participated in the study. Patients were screened via structured interviews and diagnostic polysomnography, and then were randomly assigned to receive CBT (sleep education, stimulus control, and time-in-bed restrictions; or sleep hygiene. Treatment included 4 biweekly sessions with a post treatment assessment and a follow-up conducted at 6 months. Patient completed questionnaires measuring global insomnia symptoms, general sleep quality, and sleep-disruptive beliefs before treatment, immediately following treatment, and at the follow-up time point. Edinger et al (2009) reported that consistent with previous studies, CBT outperformed sleep hygiene (control) across several study outcome measures for the sample as a whole. CBT appears to be a viable psychological insomnia therapy both for those with primary insomnia and for groups composed mainly of patients with insomnia and nonpsychotic psychiatric conditions. A fixed 4-session "dose" of CBT produced good benefits for patients with primary and those with comorbid

insomnia across most measures examined.

## STATEMENT OF THE PROBLEM

Insomnia, a common sleep complaint affect normal functioning of students. It could affect students' academic activities and may contribute to the development of several comorbidities like severe psychiatric condition, memory deterioration and substance abuse if not addressed. Recently, it was reported by Gureje, et al. (2011) that insomnia affects about a quarter of young people aged 18 – 30 in Nigeria. While studies report that cognitive-behavioral technique is effective in reducing insomnia in general population, studies examining its efficacy among university students domiciling in the hotels are lacking. With this in mind, it is hoped that if university students can be taught strategies to mitigate insomnia, then painful and costly problems may be prevented in the future, and that is why a study of this nature examining the efficacy of cognitive-behaviour technique on insomnia among students of Ahmadu Bello University, Zaria, Nigeria, becomes imperative.

## OBJECTIVES OF THE STUDY

The research was targeted towards achieving the following objectives;

- i. To assess the efficacy of cognitive behaviour technique on primary insomnia among university students
- ii. To find out if there is differential effect in responsiveness of male and female university students with insomnia exposed to cognitive behaviour technique

## Research Questions

The study was guided by the following research questions;

- i. What is the efficacy of cognitive behaviour technique on primary insomnia among university students?
- ii. Is there differential effect in responsiveness of male and female university students with insomnia exposed to cognitive behaviour technique?

## Hypotheses

The following hypotheses were formulated and tested in the study:

- i. There is no significant effect of cognitive behaviour technique on insomnia among university students

- ii. There is no significant differential effect in responsiveness of male and female university students with insomnia exposed to cognitive behaviour technique

## METHODOLOGY

### Study Design

The study used a non-randomized pretest, posttest experimental/control group design. This is because it is useful in experimental study where intervening variables are difficult to control. It also enables the researcher to select the desired sample of the study on purpose or based on established criteria or presence of a condition of interest.

### Participants

Twenty-four students of Ahmadu Bello University, Zaria who were identified with primary insomnia condition were purposively selected and assigned into group (cognitive behaviour techniques = 12; control group = 12). The students were volunteers who have agreed to participate in the study after they were identified with the primary insomnia condition.

### Recruitment Procedure

The twenty-four volunteered students who participated in the study in order to resolve their

insomnia problem were gotten via notices placed around hostels, sharing handbills, and through one-on-one contact on campus. Similar strategy for recruiting volunteers for insomnia research was also used by Carney, Harris, Moss and Edinger (2010), and Vitiello, Rybarczyk, Von Korff, and Stepanski (2009). It is a recommended technique by Agency for Healthcare Research and Quality (2012).

### **Measure**

The outcome measure used was Insomnia Severity Index developed by Bastien, Vallieres and Morin (2001), to assess students' insomnia condition. The Insomnia Severity Index (ISI) was designed to be both an identification tool of insomnia severity and an outcome measure for use in insomnia intervention research (Bastien, et al. 2001). The ISI measured subjective insomnia severity during the previous weeks and the measure is relevant for the entire age range (Edinger, Buysse, Deriy, Germain, Lewin, Ong, & Morgenthaler, 2015). The measure included seven questions bothering on sleep onset, sleep maintenance, and consequences. The scores ranged from 0 to 28, and total scores are categorized into 'absence of insomnia (0-7), 'sub threshold

insomnia' (8-14), 'moderate insomnia' (15-21) and 'severe insomnia' (22-28). Consistent with Bastien et al. (2001) recommendation, a cutoff of  $\geq 8$  (Gellis, Arigo & Elliott, 2013) serves as threshold for participation in the study.

Three experts from educational psychology and counselling department, Ahmadu Bello University, Zaria, assessed the face validity of the instrument. Morin et al. (2011), reported a reliability index of 0.90 for Insomnia Severity Index. The ISI has also demonstrated 80% sensitivity and specificity (Bastien et al., 2001). Insomnia research experts, Buysse, Ancoli-Israel, Edinger, Lichstein, and Morin (2006), recommended ISI as a tool for assessment of insomnia.

### **Treatment Phases**

The treatment regimen was discussed in three phases:

#### **Pretreatment Phase (week 1)**

Before administration of instrument, the researcher introduced himself to the research participants and exchange pleasantries to create good rapport and friendly atmosphere. After that, the students were briefed on the essence of the study. Consent was obtained from them after

which, they were asked to filled questionnaire that was used to assess their insomnia severity. Consistent with Bastien et al. (2001) recommendation, a cutoff score of  $\geq 8$  (Gellis, Arigo& Elliott, 2013) on the insomnia severity index serves as threshold for participation in the study. Meanwhile, insomnia-screening questionnaire (Alberta Health and Wellness, 2007) was used to assess for absence or presence of a medical/psychiatric condition, substance abuse disorder, and other sleep disorder. These criteria are consistent with Diagnostic and Statistics Manual of Mental Disorders (DSM-5) algorithm for diagnosis of primary insomnia (DSM, 2013; Lichstein, Durrence, Taylor, & Riedel, 2003; Morin & Espie, 2003; and American Academy of Sleep Medicine, 2005). Data collected at this point served as baseline data, and bases for inclusion. Participants were taught how to fill the instruments, after which arrangements were made regarding further meetings.

#### **Treatment Phase (week 2-5)**

During this period, cognitive behaviour intervention procedures were applied to the treatment group. In order to prevent or reduce interaction effect, different location and time of the day (Saturday) was used for

administering the intervention to the intervention group. The treatment sessions lasted for a period of six-weeks. The intervention was administered during first semester, 2016. After each week of intervention, participants were given a handout containing treatment recommendations, to serve as a guide or reminder during practice. All treatment instructions were delivered around the participants' hostel at an agreed time and sometimes at a serene location for convenience. The average time observed per session was 40 minutes and the range was between 30 – 1hour. All the interventions were offered with the help of a female research assistant who was taught on the study protocol. The CBT intervention used as shown on the table 1 were based on two treatment manuals developed by Morin and Espie (2003), and Perlis et al. (2005).

Table 1. Brief Description of Weekly Intervention

<b>CBT for Insomnia</b>	<b>Brief Description</b>
Stimulus control	This approach is based on the assumption that both the timing (bedtime) and sleep setting (bed/ bedroom) are associated with repeated unsuccessful sleep attempts and, over time, become conditioned cues for arousal that perpetuate insomnia. As a result, the goal of this treatment is that of re-associating the bed and bedroom with successful sleep attempts. In practice, this therapy requires instructing the patient to: (a) go to bed only when sleepy; (b) establish a standard wake-up time; (c) get out of bed whenever awake for long periods; (d) avoid reading, watching TV, eating, worrying and other sleep incompatible behaviors in the bed/bedroom; and (e) refrain from daytime napping.
Sleep restriction	Sleep restriction therapy reduces nocturnal sleep disturbance primarily by restricting the time allotted for sleep each night so that, eventually, the time spent in bed closely matches the individual's presumed sleep requirement. This treatment typically begins by calculating the individual's sleep efficiency; (TST/TIBX100). After that, an initial time-in-bed (TIB) prescription may either be set at the TST or at a value equal to the TST plus an amount of time that is deemed to represent normal nocturnal wakefulness. The initial TIB prescription should not be set below 5hr per night. Achieving SE of 85% should be the goal
Sleep hygiene	Patients are educated about healthy sleep behaviors and sleep-conducive environmental conditions. Typically, they are encouraged to exercise daily, eliminate the use of caffeine, alcohol, and nicotine, eat a light snack at bedtime, reduce excessive intake of liquid at night, and ensure that the sleeping environment is quiet, dark, and comfortable, and so on and forth
Cognitive technique	It is a psychological method aimed at countering negative intrusive thoughts at bedtime and belief about sleep

As seen on table 1, the intervention sessions focused on the different components of cognitive behaviour

techniques. Although, each session differs in specific content, all sessions center on the following main activities:



- i. Finding out about progress,
- ii. Ascertaining problems in home practice,
- iii. Encouraging level of adherence and
- iv. Introducing new intervention.

The interventions used are those that have been shown efficacious in prior researches and have been recommended by the American Academy of Sleep Medicine for the treatment of insomnia (Morgenthaler, Kramer, Alessi, Friedman &Boehlecke, 2006).

#### Post-treatment Phase (week 6)

During this phase, post intervention test using Insomnia Severity Index was administered. This was used to compare with pretest data to examine changes that have occurred over the course of the intervention. Attrition rate among participants from both group was 0% as all participants who started the study also, completed it. The reason for this might not be unconnected to fact that intervention took place around the participant’s hostel. Before termination, the researcher informed the participants on what to do when there is a relapse. Finally, the participants were made to understand that longitudinal data

suggests that treatment gains are extremely durable with time. They are most often maintained or improved over time, and that relapse rates will be small provided they continue good habits (abstain from things that precipitate and perpetuate the condition in the first place).

Typically in research such as this, the untreated control group needs attention as well after the study. Therefore, for ethical reason, participants in the control group were given the treatment handout containing systematic implementation of the intervention for self-help at the completion of the study. Self-help method using cognitive behaviour technique has been shown to produce durable benefits for insomnia sufferers.

#### RESULTS

In analyzing the data collected, mean and standard deviation was used to answer research questions while one-way between group analyses of covariance was used to test the two null hypotheses stated for the study.

**Research Question 1.**What is the effect of cognitive behaviour technique on insomnia among university students?

**Table 2:** Means and Standard Deviation of Pretest and Posttest Insomnia Condition of Cognitive Behaviour Technique and Control group

<i>Condition</i>	<i>Intervention</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>
Pretest Insomnia	CBT	12	14.75	4.18
	Control group	12	10.92	2.02
	Total	24	12.83	3.76

Posttest Insomnia	CBT	12	5.08	.79
	Control group	12	9.92	2.84
	Total	24	7.50	3.20

Table 2 shows the pretest and posttest mean scores and standard deviation of participants in the intervention group and control group. It reveals that at pretest, students assigned to receive cognitive behaviour technique had a higher mean score ( $M = 14.75, SD = 4.18$ ) when compared to students in the control group ( $M = 10.92, SD = 2.02$ ). However, after treatment, students in the intervention group had a mean score lower ( $M = 5.08, SD = .79$ ) than control group ( $M = 9.92, SD = 2.84$ ). This outcome suggests that the intervention

has an effect with intervention group achieving normalization with group average remission rate of 65% when compared to 9% for the control group. To test null hypothesis one, whether cognitive behaviour technique is significantly effective when compared to control in reducing primary insomnia, a one-way analysis of covariance was carried out and pretest mean scores of students who received cognitive behaviour technique, and that of control were used as the covariate to control for initial differences. The result is presented in table 3.

**Table 3:** one-way between group analyses of covariance on efficacy of cognitive behaviour technique against a control group

<i>Source</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Corrected Model	140.167 <sup>a</sup>	2	70.083	15.357	.000
Intercept	76.233	1	76.233	16.705	.001
Pretest Insomnia	.000	1	.000	.000	.996
Group	102.295	1	102.295	22.416	.000
Error	95.833	21	4.563		
Total	1586.000	24			
Corrected Total	236.000	23			

a.  $R^2 = .594$  (Adjusted  $R^2 = .555$ )

Table 3 shows a one-way between groups analyses of covariance which was conducted to compare the effectiveness of cognitive behaviour technique interventions designed to reduce participants' primary insomnia condition against an untreated control

group. The independent variable was the group (cognitive behaviour technique vs control), and the dependent variable was student's posttest scores on the Insomnia Severity Index administered after the intervention was completed. Participants' pretest scores on Insomnia

Severity Index were used as the covariate in this analysis. After adjusting for the covariate, there was a statistically significant effect of cognitive behaviour technique in reducing primary insomnia when compared to control group,  $F(1,21) = 22.416, p = .000$ . The R Squared value suggests that 59.4% of variance in the post intervention scores as measured by the

insomnia severity index can be explained by the independent variable (intervention) after adjusting for covariate. Therefore, the null hypothesis, which states that there is no significant effect of cognitive behaviour technique on insomnia among university students is rejected.

**Research Question 2.** Is there differential effect in responsiveness of male and female students with insomnia exposed to cognitive behaviour technique?

**Table 4:** Means and standard deviation of Pretest and Posttest Insomnia Condition of Male and Female Subjects Exposed to Cognitive Behaviour Technique

<i>Condition</i>	<i>Sex</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>
Pretest Insomnia	Male	6	14.67	2.42
	Female	6	14.83	5.71
	Total	12	14.75	4.18
Posttest Insomnia	Male	6	5.17	.41
	Female	6	5.00	1.09
	Total	12	5.08	.79

Table 4 shows the pre-intervention and post intervention mean scores of male and female participants exposed to cognitive behaviour technique for insomnia. It reveals that at pretreatment stage, male subjects assigned to receive cognitive behaviour technique for insomnia had a lower mean score ( $M = 14.67, SD = 2.42$ ) when compared to female subjects ( $M = 14.83, SD = 5.71$ ). However, after treatment, male subjects exposed to cognitive behaviour technique had a mean score marginally higher ( $M = 5.17, SD = .41$ ) than the female counterpart ( $M = 5.00, SD = 1.09$ ).

This outcome suggests an average remission rate of 66% for the female subjects when compared to about 65% for the male subjects. To test null hypothesis two, whether there is significant gender variation in responsiveness to cognitive behaviour technique in reducing insomnia condition, a one-way between group analyses of covariance was carried out and pretest mean scores of male and female participants were used as the covariate. The result was presented in table 5.

**Table 5:** One-way between group analysis of covariance on differential effect of cognitive behaviour technique in reducing insomnia of male and female university students

<i>Source</i>	<i>Type III Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
Corrected Model	.389 <sup>a</sup>	2	.195	.268	.771
Intercept	26.466	1	26.466	36.491	.000
Pretest Insomnia	.306	1	.306	.422	.532
Gender	.077	1	.077	.106	.752
Error	6.527	9	.725		
Total	317.000	12			
Corrected Total	6.917	11			

*a. R Squared = .056 (Adjusted R Squared = -.153)*

Table 5 shows a one-way between groups analyses of covariance (ANCOVA) which was used to compare the responsiveness between male and female participants exposed to cognitive behaviour technique. After adjusting for the covariate, the result of the analysis suggests there was no statistically significant variation in responsiveness between male and female students who received cognitive behaviour technique for insomnia,  $F(1,9) = .106, p = .752$ . The R Squared value of .056 indicates that only 5.6% of the variance in post intervention scores can be explained by gender after adjusting for covariate. The non-significant differential effect outcome suggests that the intervention (CBT) was just as effective for the male as it was for the female as both group show good level of improvements after intervention. Therefore, the null hypothesis, which states that there is no significant differential effect of cognitive behaviour technique on insomnia

condition of male and female university students is retained

## DISCUSSION

The findings of the study reveals that cognitive behaviour technique is successful in reducing primary insomnia among students of Ahmadu Bello University Zaria. When compared to control group which experience 9% decrease, those exposed to CBT intervention achieved normalization and reported a within group average remission rate of about 65%. This outcome corroborates Edinger et al (2009) who reported that consistent with previous studies, CBT outperformed control group across several study outcome measures for the sample as a whole. That a fixed 4-session "dose" of CBT produced good benefits for patients with primary and those with comorbid insomnia across most measures examined. Thus, CBT appears to be a viable psychological insomnia

therapy both for those with primary insomnia and for groups composed mainly of patients with insomnia and nonpsychotic psychiatric conditions.

In addition, when differential gender effect of CBT was assessed, it was found that CBT does not significantly discriminate on the bases of gender as male students reported achieving an average remission of 66% while the female subjects reported an average of 64% remission. This finding although agrees with Lami, et al. (2016), report in their study on "Gender Differences in Patients with Fibromyalgia Undergoing Cognitive-Behavioral Therapy for Insomnia", that both groups showed significant improvements in sleep quality. Other researchers (e.g., Edinger et al. 2001; 2009; and Fornal-Pawłowska & Szelenerger 2013), also reported significant improvement in all sleep parameters at post intervention for both male and female subjects exposed to cognitive behaviour technique. However, in another way, the finding differs in other aspect as Lami, et al. (2016) observed significant differential treatment response between sexes. Male group exhibited significant changes at post-treatment in sleep disturbances compared to the female. A claim this study could not established. One reason could be the small sample size of six males and six females used. Usually,

smaller sample have lower power of detecting significant effect. Other reasons could be severity of the insomnia condition of the participants. Most of them have subthreshold to moderately severe level of insomnia, which was quite different from the chronic or very severe insomniac participants used by Lami, et al. (2016). In addition, while Lami, et al. study was on comorbid insomnia, this study was conducted on students with primary sleep complain. Further studies may be needed for more clarification.

## CONCLUSION

It was concluded based on the findings of the study that six-week cognitive behaviour technique intervention is successful in reducing primary insomnia and produced about 65% remission rate. Fortunately, the intervention does not discriminate on the bases of gender as both male and female reported significant improvement in their sleep after intervention. Therefore, school psychologists, counsellors, mental health practitioners and school heads can explore the benefits of cognitive behaviour technique for insomnia to help male and female university students with sleep difficulty regain control over their sleep and enhance day time functioning.

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