# Effects of Different Exercise Types on Sleep in Patients with Chronic Primary Insomnia

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## BACKGROUND

- Chronic insomnia affects approximately 16 percent of adults, making it more prevalent than heart disease, cancer, AIDS, neurological disease, breathing problems, urinary problems, diabetes, and gastrointestinal problems (Lichstein, Durrence, Riedel, Taylor, & Bush, 2004).

- Researchers estimate the total annual direct cost (medication and physician visits, for example) of insomnia to be $13.9 billion, with total costs (i.e. including indirect costs) of $30 billion to $35 billion per year (Walsh & Engelhardt, 1999).

- Studies have shown that people who exercise show physical and psychological benefits (e.g., reduced stress; King, Taylor & Haskell 1993)

- Certain types of exercise appear to improve sleep (e.g., weight training, aerobic exercise, tai chi, water exercise), while others appear to have limited or no impact (e.g., yoga, walking).

## PURPOSE AND HYPOTHESIS

The objective of this study is to directly compare 3 sessions of different exercise types to a control group, within a university population, to determine the comparative benefits of these interventions on improvement in the sleep of patients with insomnia.

The primary hypothesis is that all three different exercise types will result in greater sleep efficiency improvement from pre-treatment to post-treatment in the experimental groups over the control group.

The secondary hypotheses are that similar effects will be seen in other variables of interest; other sleep variables (sleep quality, sleep onset latency, wake time after sleep onset, for example).

## MATERIALS AND METHODS

This is a two-week experimental, repeated-measures clinical trial designed to compare 3 different types of exercise to a control group, within a university population. The primary dependent variable will be sleep. Secondary dependent variables include anxiety levels, depression ,and fatigue. A total of 40 (10/group) previously sedentary people with chronic insomnia, aged 18-65, will be recruited and randomized into one of four groups:

**Measures**

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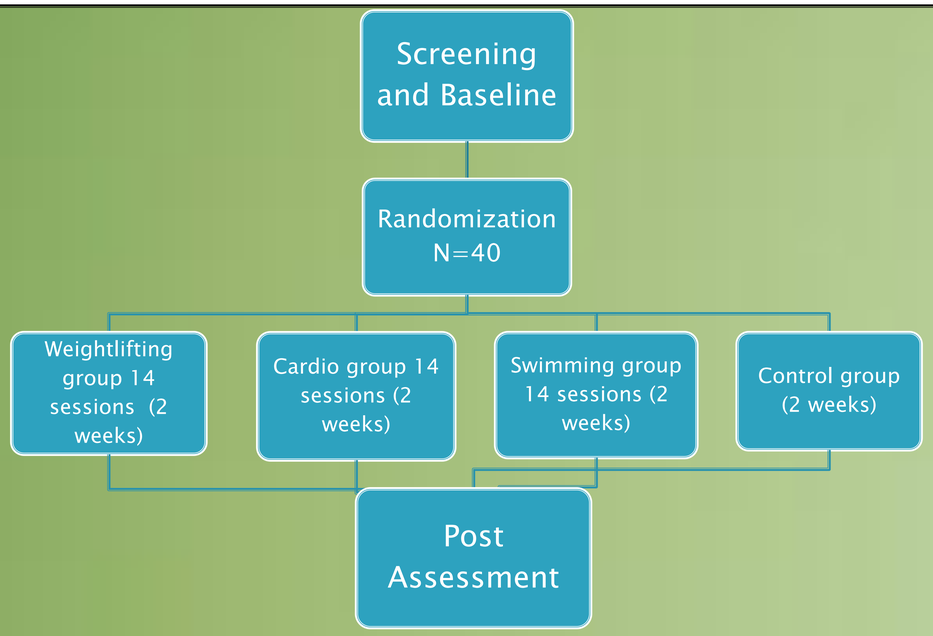
| Actical® Physical Activity Monitor | provides an objective measure of physical activity pre- and post-intervention. compact, wrist-worn, battery-operated activity monitors; monitor the occurrence and degree of motion |
| Actigraphy | |
| Structured Clinical Interview for DSM-IV Axis I Disorders – Clinician Version (SCID) | interview designed to assess for the presence of a major mental disorder such as a psychotic disorder, mood disorder, anxiety disorder, or substance abuse disorder. |
| Duke Structured Interview for Sleep Disorders (DSISD) | obtain a sleep history and indicate whether a participant meets criteria for a sleep disorder |
| Sleep Diaries | used to measure subjective sleep patterns in order to monitor progress throughout the study |
| Insomnia Severity Index (ISI) | measure that assesses perceived severity of insomnia |
| Pittsburgh Sleep Quality Index (PSQI). | assess seven domains of sleep quality: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction |
| Dysfunctional Beliefs and Attitudes about Sleep (DBAS) | measure that contains 16 statements reflecting beliefs and attitudes about sleep |
| Epworth Sleepiness Scale (ESS) | measure in which participants rate their probability of falling asleep in hypothetical everyday situations |
| Morningness – Eveningness Questionnaire (MEQ) | classifies people along a continuum of morningness to eveningness in regards to their circadian rhythms |
| Multidimensional Fatigue Inventory (MFI) | assesses five dimensions of fatigue: general fatigue, physical fatigue, mental fatigue, reduced activity, and reduced motivation |
| Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LES-QSF) | self-report questionnaire that assesses quality of life |
| Quick Inventory of Depressive Symptomatology (QIDS) | assesses nine symptom domains of depression: sleep disturbance, psychomotor disturbance, changes in weight, depressed mood, decreased interest, decreased energy, worthlessness and guilt, concentration and decision making, and suicidal ideation |
| State-Trait Anxiety Inventory, Trait Scale, Form Y (STAI) | measures general feelings of apprehension, tension, and increased autonomic activity |
| Perceived Stress Scale (PSS) | assess stress levels in the domains of unpredictability, lack of control, burden overload, and stressful life circumstances |
| Alcohol Use Disorders Identification Test (AUDIT) | assess for hazardous and harmful patterns of alcohol consumption |
| Marijuana Problem Scale (MPS) | assesses for negative social, occupational, physical, and personal consequences of marijuana dependence |
| Multidimensional Scale of Perceived Social Support (MSPSS) | measures perceived social support from three sources: family, friends, and significant others |
| Brief COPE | measure designed to assess effective and ineffective coping styles |




## Design and Data Analysis Plan

Design

A multiple baseline A–B experimental design across participants with replications and follow-ups will be used to evaluate the efficacy of treatment (Kazdin, 1992). Phase A will consist of a baseline period during which participants complete a sleep diary daily.

Phase B will consist of treatment that will be administered over a 2-week period. Data collected during Phase A will serve as a point of comparison to evaluate the therapeutic gains resulting from treatment (i.e., Phase B).

A post treatment evaluation and 3-month and 6-month follow-up evaluations will be conducted to assess the maintenance of therapeutic gains.

A single-case research designs will allow valid inferences about the efficacy of an intervention by comparing the same individuals over time, provided that a sufficient number of observations is available for each study phase (Kazdin, 1992).

Data Analysis Plan

The effectiveness of different exercise types for insomnia will be investigated using subjective (i.e., sleep diary) and objective (i.e., polysomnography) measures of TWT and SE variables. Daily sleep diaries will be initially analyzed by visual inspection of graphic representations, a standard method used in single-case experimental studies (Morley & Adams, 1991). Then, intervention time series analyses (ITSA) will be conducted to determine whether the observed changes were statistically significant.

## CONCLUSIONS

Many clinicians are unfamiliar with the research and practice of psychological treatments of insomnia and thus do not use them with their patients (Taylor & Roane, 2010). Despite the long-term superiority of psychological therapies, medication is still the most common form of treatment offered to people with chronic and transient insomnia (Krystal, 2009). Considering the number of individuals who are prescribed anti-anxiety and anti-depressant medications a prescription for exercise could be a viable first-step intervention or complementary treatment.

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