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

Jorge Roman, Department of Biological Sciences, College of Arts and Sciences & Honors College
Faculty Mentor: Daniel Taylor, Department of Psychology, College of Arts and Sciences

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 (Lichtstein, Durieux, 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). Other variables of interest; other sleep variables (sleep quality, sleep onset latency, wake time after sleep onset, for example).

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**

- **ActiGraph Physical Activity Monitor**
- **Structured Clinical Interview for DSM IV Axis I Disorders - Clinician-rated interview designed to assess the presence of major mental disorder such as a psychotic disorder, mood disorder, anxiety disorder, or substance abuse disorder.**
- **Sleep Diary**
- **Business Anxiety Index (BAI)**
- **Pittsburgh Sleep Quality Index (PSQI)**
- **Sleep Hygiene Beliefs and Attitudes about Sleep (SHEL)**
- **Epworth Sleepiness Scale (ESS)**
- **Morningness - Eveningness Questionnaire (MEQ)**
- **Multidimensional Fatigue Inventory (MFI)**
- **Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (QLESQ)**
- **Inventor of Depression Symptomatology (IDDS)**
- **State-Trait Anxiety Inventory, Trait Scale, Form Y (STAI-Y)**
- **Pain Visual Analog Scale (PAIN)**
- **Alcohol Use Disorder Identification Test (AUDIT)**
- **Mood and Anxiety Disorders in Adolescents (MADAS)**
- **Multidimensional Scale of Perceived Social Support (MSPSS)**

**Screening and Baseline**

**Randomization**

N=40

**Weightlifting group 14 sessions (2 weeks)**

**Cardio group 14 sessions (2 weeks)**

**Swimming group 14 sessions (2 weeks)**

**Control group (2 weeks)**

**Post Assessment**

**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 common form of treatment offered to people with chronic and transient insomnia (Kristof, 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.

**REFERENCES**


**ACKNOWLEDGEMENTS**

Warren Burggren, Provost and Vice President for Academic Affairs
Gloria C. Cox, Dean, Honors College
Susan Brown Eve, Associate Dean, Honors College
Andrea Kirk, Honors College
Daniel Taylor, Department of Psychology, College of Arts and Sciences