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demonstrated a trend towards decreased verbal memory consolidation ($F=3.1$, $p=0.084$; $PETAS=0.06$, medium effect size), but no differences for visual memory consolidation ($F=1.4$, $p=0.241$; $PETAS=0.03$, small effect size). Neuropsychological testing showed no significant group differences for psychomotor functioning, vigilance or attention. Overnight memory consolidation was not correlated with standard polysomnographic parameters.

Conclusion: These findings support the hypothesis that patients with primary insomnia demonstrate deficits in sleep-related memory consolidation. The results were not explained by general neuropsychological deficits. The lacking correlation between memory and polysomnographic parameters might indicate that neural processes beyond the level of visually staged sleep might underlay the observed disruption of memory consolidation in primary insomnia.

0761

IMPROVEMENT IN EXERCISE PERFORMANCE IS ASSOCIATED WITH ENHANCED SLEEP IN OLDER ADULTS WITH CHRONIC INSOMNIA

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Introduction: Chronic insomnia is common in older adults. Although previous studies have shown that regular physical activity can improve sleep quality in older adults, its mechanism remains unclear. The aim of the current study is to elucidate cardiopulmonary factors that may have an intermediary role between exercise and sleep in chronic insomniacs.

Methods: Sedentary older adults (>55 yo) with chronic insomnia were randomized to 16 weeks of either aerobic exercise regimen (30-40min at 60-75% of maximal heart rate (mHR), 3-5x/wk) plus sleep hygiene education or non-physical activity program plus sleep hygiene. Patients with other sleep disorders and unstable medical or psychiatric conditions were excluded. Cardiopulmonary exercise testing (CPET), sleep questionnaires, and three nights of in-patient polysomnography were performed at baseline and post-treatment. The change in pre- and post-treatment CPET data and sleep measures were correlated with Pearson correlation coefficient.

Results: Eleven subjects have completed the study to date. mHR in the exercise group changed by 9.4 ± 12.8 bpm vs. -2.5 ± 11.9 bpm in the standard care group ($p = 0.25$). Significant correlation exists between changes in mHR and changes in latency to stage 2 sleep ($r = -0.68$, $p < 0.05$), and correlation is also seen between changes in mHR and changes in PSQI ($r = -0.54$, $p = 0.08$). No significant correlations are detected between changes in VO_{2max} or O₂ pulse and sleep measures ($p > 0.5$).

Conclusion: In older subjects with chronic insomnia, an increase in the change of mHR with exercise correlates with improvements in objective and subjective sleep measures. This provides a mechanism which links exercise regimen to improved sleep. We hypothesize that VO_{2max} is not associated with sleep parameters because older subjects may be unable to readily augment O₂ pulse in response to exercise, thus limiting the change in VO_{2max} during exercise.

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0762

THE ROLE OF TRAIT VULNERABILITY TO SLEEP DISTURBANCE IN THE MODERATION OF THE RELATIONSHIPS BETWEEN STRESS AND SLEEP QUALITY

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Introduction: Individual differences in the vulnerability to sleep disturbance has been proposed to predispose the development of chronic insomnia. The vulnerability to stress-related sleep disturbance, as measured by the Ford Insomnia Response to Stress Test (FIRST), was found to predict an individual's first night of sleep in the laboratory and daytime sleepiness. This study is to further clarify the role of the trait vulnerability in the moderation of the effect of stress on sleep.

Methods: The participants consisted of 333 college students without reported insomnia. All participants completed the FIRST, the Pittsburgh Sleep Quality Index (PSQI), and a single-item visual analog scale for the degrees of stress experienced in the previous three days.

Results: Based on the median of FIRST score, the participants were divided into a high-vulnerability (HV) group and a low-vulnerability (LV) group. While both groups showed significant correlations between stress rating and global PSQI score, the HV group demonstrated higher correlation ($r=.32$) than the LV group ($r=.18$). In addition, the profiles of correlations between stress and the subcomponents were different for the two groups. In HV group, significant correlations were obtained between stress and the components of subjective sleep quality ($r=.29$), sleep latency ($r=.11$), sleep duration ($r=.17$), habitual sleep efficiency ($r=.11$), and daytime dysfunction ($r=.23$). In LV group, stress correlated significantly with the components of subjective sleep quality ($r=.20$), sleep disturbances ($r=.19$), and daytime dysfunction ($r=.27$).

Conclusion: The results show that although participants with both levels of trait vulnerability showed associations between stress level and sleep quality, the patterns of associations were different for the two groups. Stress level predicted symptoms of insomnia in individuals with high vulnerability, and predicted other symptoms that may interfere with sleep in individuals with low vulnerability.

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0763

BIBLIOMETRIC ANALYSIS OF INSOMNIA-RELATED RESEARCH IN THE PERIOD OF 1991-2005

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Introduction: Our purpose was to study the insomnia research performance based on 4,692 documents published in Science Citation Index (SCI)-indexed periodicals between 1991 and 2005. These documents were analyzed and evaluated according to publication distribution and were used to determine the quantitative characteristics of the research.

Methods: Documents used in this study were based on the databases of the SCI which was accessed from the ISI Web of Science, 'Insomnia' was used as keywords to search titles, abstracts, and keywords. Parameters analyzed included type of document, page count, authorship, journal, author keywords and country of publication.

Results: Six document types were found in the total of 4,692

documents. Seventy-three percent of all documents are articles. All articles were published in the total of 781 journals. Eighty-six percent of all articles were published in journals which listed in the category of Sleep. Of the 3,376 articles in SCI, 2,116 articles had author keyword information. Among 10,484 keywords, 3,315 (32%) keywords were used only 1 time. A summary of the remaining most-frequently used author keywords is provided. The five most used author keywords were 'insomnia', 'sleep', 'depression', 'sleep disorders', and 'polysomnography'. There was logarithmic relation between yearly cumulative number of publications and the year from 1991 to 2005. Yearly production has extremely increased with the United States producing 38% the articles followed by the Japan with a 7% contribution. The G7 industrial countries (U.S.A., Japan, U.K., Germany, France, Italy, and Canada) represent a share of corresponding authors of 53% of world articles.

Conclusion: Insomnia research was a constant growth rate on publications in the fifteen year. The results of the study not only offer a comprehensive picture of insomnia by bibliometric research, but also demonstrate the performance of research countries.

0764

RANDOMIZED CONTROLLED TRIAL OF AN ACCELERATED INSOMNIA THERAPY

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Introduction: In clinical research studies Stimulus Control Therapy (SCT) has been most consistently successful for the treatment of sleep onset insomnia. However, the effort and commitment often required for SCT may reduce compliance in clinical settings. To address this potential issue we have been investigating Flinders Accelerated Sleep Therapy (FAST). The therapy involves a 40-hour period of acute sleep deprivation during which 50 sleep onset opportunities produce numerous short sleep onset latencies (most less than 6 minutes) to reduce the putative psychophysiological conditioned response of primary insomnia. The present study evaluated FAST with a randomised controlled trial.

Methods: Sixty-eight volunteer chronic primary insomniacs with sleep latencies > 30 min (48 f, 20 m, Mean age = 41 (13) yrs) were randomly allocated to four conditions: 1. sleep hygiene control, 2. FAST, 3. Four week SCT, and 4. Combined FAST and SCT. Reported here is the short term efficacy comparing sleep diary and subjective questionnaires prior to, during, and following the four week treatment or control period.

Results: While the control group showed minimal, non-significant changes at post treatment, mean sleep latencies of the active treatment groups decreased by 25-40 minutes, wake time decreased by 20-50 min, and total sleep time increased by 32-60 min. Global assessments of sleep (PSQI, sleep self efficacy) improved more in the active groups and daytime feelings of fatigue, stress, impaired functioning, and dysfunctional sleep beliefs decreased more in the active treatment groups. A detailed week-by-week analysis during treatment consistently showed immediate improvements in the FAST group and more gradual but comparable final improvements in the SCT group. The combined group generally showed both early and further gradual improvement resulting in trends for the greatest overall improvements.

Conclusion: This preliminary analysis indicates therapeutic potential for FAST, especially in combination with follow-up SCT.

Support (optional): National Health and Medical Research Council of Australia

0765

OSTEOPATHIC TREATMENT VERSUS PLACEBO-CONTROLLED RELAXATION THERAPY IN PRIMARY INSOMNIA: EFFECTS ON PERCEIVED SLEEP QUALITY

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Introduction: This study was designed to find out whether osteopathic treatment can improve sleep quality in primary insomnia by influencing sympathetic and parasympathetic tone.

Methods: In a study of equivalence we compared osteopathic treatment and progressive relaxation therapy, the latter proven to be superior to placebo in several studies. 24 subjects (16 women and 8 men), were randomized and received four treatments over four consecutive weeks each.

In addition to a pre versus post study Pittsburgh Sleep Quality Index (PSQI) and the Depression Anxiety Stress Scale (DASS), the Brussels Indices of Sleep Quality (BISQ) questionnaire was completed daily seven days before and after treatment, and for two days before and after the third intervention. The osteopathic treatment involved techniques that intend to decrease sympathetic tone and increase parasympathetic tone, thereby decreasing the overall level of physiological hyperarousal. The relaxation therapy consisted of a basic programme for progressive muscle relaxation.

Results: Statistical equivalence testing (critical t-value= ± 2.074 ; $\alpha=0.05$) demonstrated that both groups were equivalent for all sleep items of the BISQ pre versus post treatment. Absolute values however showed slightly better results for the relaxation group. Equivalence was also demonstrated for the pre-post comparison on the PSQI and for the DASS Anxiety and Stress score, but not for the Depression or total DASS score. With the exception of the BISQ Sleep Efficiency score, osteopathic treatment was superior to relaxation therapy the two nights after one single intervention.

Conclusion: This study showed that during a treatment period of 4 weeks osteopathy and progressive muscle relaxation are equivalent treatment approaches for primary insomnia. These findings further investigation of this treatment modality; especially its possible long term beneficial effects have to be demonstrated.

0766

INCIDENCE AND RISK FACTORS OF INSOMNIA IN A POPULATION-BASED SAMPLE

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Introduction: Insomnia is a prevalent condition but there is little prospective data on its incidence and risk factors. This study estimated the incidence of insomnia and examined its risk factors in a population-based sample of self-defined good sleepers followed over a one-year period.

Methods: Participants were 394 self-defined good sleepers randomly selected from the adult population. They completed three postal evaluations over a one-year period (i.e., baseline, six months and twelve months later) which included assessment of sleep and insomnia, psychological and personality variables, stressful life events and coping skills, and health-related quality of life. Participants were categorized into three subgroups: (a) good sleepers (i.e., participants who remained good sleepers at the three evaluations), (b) incident cases of insomnia symptoms (i.e., good sleepers who developed insomnia symptoms either at six month or twelve month follow-up) and (c) incident cases of