

# Journal Scan

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*Indian J Sleep Med 2011; 6.2, 68-78*

## Sleep And Exercise

*J Clin Endocrinol Metab - 01-SEP-2009; 94(9): 3242-50*

Exposure to recurrent sleep restriction in the setting of high caloric intake and physical inactivity results in increased insulin resistance and reduced glucose tolerance.

**Nedeltcheva AV**

**Abstract:**

**CONTEXT:** Epidemiological data indicate that reduced sleep duration is associated with increased incidence of type-2 diabetes.

**OBJECTIVE:** The aim of the study was to test the hypothesis that, when part of a Western-like lifestyle, recurrent bedtime restriction may result in decreased glucose tolerance and reduced insulin secretion and action.

**DESIGN AND SETTING:** We conducted a randomized crossover study at a university clinical research center and sleep research laboratory. **PARTICIPANTS:** Eleven healthy volunteers (five females and six males) with a mean (+/-sd) age of 39 +/- 5 yr and body mass index of 26.5 +/- 1.5 kg/m(2) participated in the study.

**INTERVENTION:** The study included two 14-d periods of controlled exposure to sedentary living with ad libitum food intake and 5.5- or 8.5-h bedtimes.

**MAIN OUTCOME MEASURES:** Oral and iv glucose challenges were used to obtain measures of glucose tolerance, glucose effectiveness, insulin secretion, and

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insulin sensitivity at the end of each intervention. Secondary measures included circulating concentrations of the glucose counter-regulatory hormones, cortisol, GH, epinephrine, and norepinephrine.

**RESULTS:** Bedtime restriction reduced daily sleep by 122 +/- 25 min. Both study periods were associated with comparable weight gain; however, recurrent sleep restriction resulted in reduced oral glucose tolerance (2-h glucose value, 144 +/- 25 vs. 132 +/- 36 mg/dl; P < 0.01) and insulin sensitivity [3.3 +/- 1.1 vs. 4.0 +/- 1.6 (mU/liter)(-1) x min(-1); P < 0.03], and increased glucose effectiveness (0.023 +/- 0.005 vs. 0.020 +/- 0.005 min(-1); P < 0.04). Although 24-h cortisol and GH concentrations did not change, there was a modest increase in 24-h epinephrine and nighttime norepinephrine levels during the 5.5-h bedtime condition.

**CONCLUSIONS:** Experimental bedtime restriction, designed to approximate the short sleep times experienced by many individuals in Westernized societies, may facilitate the development of insulin resistance and reduced glucose tolerance.

*Respir Med - 01-Feb-2010; 104(2): 219-27*

Bilevel ventilation during exercise in acute on chronic respiratory failure: a preliminary study.

**Menadue C**

**Abstract:**

To determine the immediate effects of bilevel non-invasive ventilation plus oxygen (NIV+O(2)) during exercise compared to exercise with O(2) alone in people recovering from acute on chronic hypercapnic respiratory failure (HRF), a randomised crossover study with repeated measures was performed. Eighteen participants performed six minute walk tests (6MWT) and 16 participants performed unsupported arm exercise (UAE) tests with NIV+O(2) and with O(2) alone in

random order. Distance walked increased by a mean of 43.4m (95% CI 14.1 to 72.8,  $p=0.006$ ) with NIV+O(2) compared to exercise with O(2) alone. In addition, isotime oxygen saturation increased by a mean of 5% (95% CI 2-7,  $p=0.001$ ) and isotime dyspnoea was reduced [median 2 (interquartile range (IQR) 1-4) versus 4 (3-5),  $p=0.028$ ] with NIV+O(2). A statistically significant increase was also observed in UAE endurance time with NIV+O(2) [median 201s (IQR 93-414) versus 157 (90-342),  $p=0.033$ ], and isotime perceived exertion (arm muscle fatigue) was reduced by a mean of 1.0 on the Borg scale (95% CI -1.9 to -0.1,  $p=0.037$ ) compared with O(2) alone. Non-invasive ventilation plus O(2) during walking resulted in an immediate improvement in distance walked and oxygen saturation, and a reduction in dyspnoea compared to exercise with O(2) alone in people recovering from acute on chronic HRF. The reduction of dyspnoea during walking and arm muscle fatigue during UAE observed with NIV+O(2) may allow patients to better tolerate exercise early in the recovery period.

*Ind Health. 2010;48(4):395-405.*

Work schedules and health behavior outcomes at a large manufacturer.

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There is evidence that work schedules may influence rates of unhealthy behaviors,

suggesting that addressing work schedule challenges may improve health. Health Risk Assessment (HRA) survey responses were collected during 2000-2008 in a multinational chemical and coatings manufacturer. Responses of 26,442 were sufficiently complete for analysis. Rates of smoking, lack of exercise, moderate to high alcohol use, obesity (BMI  $\geq 30$ ), and short sleep duration were compared by work schedule type (day, night, or rotating shift) and daily work hours (8, 10, or 12 h). Prevalence rate ratios (RRs) were calculated, adjusting for age group, sex, marital/living status, job

tenure, and occupational group. The reference group was 8-h day shift employees. Overall prevalence rates were: sleep duration of 6 h or less per night 47%, smoking 17.3%, no exercise 22.0%, BMI  $\geq 30$  28.3%, and moderate to heavy alcohol consumption 22.2%. Statistically significant RRs include the following: Short sleep duration: 10 h rotating shift (RR=1.6), 12 h day and 12 h rotating shifts (RR=1.3); Smoking: 12 h day and rotating shifts (RR=1.6), 10 and 12 h night and 8 h rotating shift (RR=1.4); No exercise: 8, 10, and 12 h rotating shifts (RR=1.2 to 1.3), 12 h day schedules (RR=1.3). Obesity (BMI  $\geq 30$ ): 8 and 10 h night shifts (RR=1.3 and 1.4, respectively).

*J Clin Sleep Med - 15-JUN-2010; 6(3): 270-*

Effect of acute physical exercise on patients with chronic primary insomnia.

**Passos GS**

**Abstract:**

**STUDY OBJECTIVES:** The aim was to assess and to compare the acute effects of three different modalities of physical exercise on sleep pattern of patients with chronic primary insomnia.

**METHODS:** Forty-eight insomnia patients, 38 female (mean age 44.4  $\pm$  8 y) were randomly assigned to 4 groups: control (CTR,  $n=12$ ), moderate-intensity aerobic exercise (MAE,  $n=12$ ), high-intensity aerobic exercise (HAE,  $n=12$ ), and moderate-intensity resistance exercise (MRE,  $n=12$ ). The patients were assessed on sleep pattern (by polysomnogram and daily sleep log) and anxiety (STAI) before and after the acute exercise

**RESULTS:** The polysomnogram data showed reduction in the sleep onset latency (SOL) (55%) and in the total wake time (TWT) (30%); increase in total sleep time (TST) (18%), and in the sleep efficiency (SE) (13%) in the MAE group. The daily sleep log data showed increase in the TST (26%) and reduction in the SOL (39%). In addition, reduction (15%) in anxiety was also observed after moderate-intensity aerobic exercise

**CONCLUSIONS:** Acute moderate-intensity aerobic exercise appears to reduce pre-sleep anxiety and improve sleep in patients with chronic primary insomnia.

*Res Nurs Health. 2010 Oct;33(5):398-412.*

### Symptom cluster and physical activity in relapsing-remitting multiple sclerosis.

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We compared the explanatory power of two symptom clusters that consisted of either three or five symptoms as correlates of physical activity in individuals with relapsing-remitting multiple sclerosis (RRMS; N = 218). The data were primarily analyzed using covariance modeling in Mplus 3.0. A symptom cluster of fatigue, depression, and pain had a moderate, negative relationship with physical activity, and this relationship was comparable in magnitude with a symptom cluster of fatigue, depression, pain, perceived cognitive dysfunction, and poor sleep quality. The relationships were attenuated after controlling for exercise history and neurological impairment. Such findings further support the consideration of a narrowly defined cluster of three symptoms as an independent correlate of physical activity in persons with RRMS.

*Support Care Cancer - 01-OCT-2010; 18(10): 1329-39*

### Improving sleep quality for cancer patients: benefits of a home-based exercise intervention.

Tang MF

**Abstract:**

**PURPOSE:**

1) To determine the effect of a home-based walking exercise program on the sleep quality and quality of life of cancer patients, as well as 2) to determine if enhanced sleep quality was associated with improvement in quality of life over time.

**METHODS:**

This is a prospective, longitudinal, two-armed, randomized clinical trial. Participants were recruited from oncology outpatient clinics in two university-based medical centers and were allocated to either usual care

(n = 35) or a home-based walking exercise intervention for 8 weeks (n = 36). Measurements included the Taiwanese version of the Pittsburgh sleep Quality Index, the Medical Outcomes Study Short Form-36, the Taiwanese Version Ratings of the Perceived Exertion Scale, and a walking exercise log. This study was analyzed on an intention-to-treat basis. Effects of the walking exercise program on sleep quality and quality of life were analyzed by the generalized estimating equation method.

**RESULTS:**

Patients in the exercise group reported significant improvements in sleep quality (beta = -3.54, p < 0.01) and the mental health dimension of quality of life (beta = 10.48, p < 0.01). Among patients who exercised, enhanced sleep quality also corresponded with reduced bodily pain (beta = 0.98, p = 0.04) and improvements over time in the mental health dimension of quality of life (beta = -3.87, p < 0.01).

**CONCLUSIONS:**

A home-based walking exercise program can be easily incorporated into care for cancer patients who are suffering from sleep disturbances.

*9, Clin Cardiol - 01-JAN-2010; 33(1): 46-51*

### Heart rate recovery and oxygen kinetics after exercise in obstructive sleep apnea syndrome

Nanas S

**Abstract:**

**BACKGROUND:**

Patients who suffer from obstructive **sleep** apnea (OSA) have a decreased **exercise** capacity and abnormal autonomic nervous function. However, the kinetics of early oxygen (O<sub>2</sub>) and heart rate recovery (HRR) have not been described. **METHODS:** We evaluated 21 men with moderate to severe OSA (mean age: 48 +/- 11 yrs, mean apnea-hypopnea index [AHI]: 55 +/- 13) and without known heart disease and 10 healthy men matched for age and body mass index (BMI; controls). Men with OSA underwent overnight polysomnography, and both groups underwent symptom-limited incremental cardiopulmonary **exercise** testing (CPET). We recorded the CPET parameters including peak O<sub>2</sub> uptake (VO<sub>2p</sub>), kinetics of early O<sub>2</sub> recovery by the first degree slope of

VO<sub>2</sub> during the first minute (VO<sub>2</sub>/t slope), the time required for a 50% decline of VO<sub>2</sub>p during recovery (T(1/2)), and early heart rate recovery (HRR = HR at maximal exercise - HR at 1 min of recovery), as well as the chronotropic reserve to exercise ([CR] = [peak HR - resting HR/220 - age - resting HR] x 100). Patients with OSA had a lower VO<sub>2</sub>p (28.7 +/- 4.0 vs 34.7 +/- 6.2 mL/kg/min), VO<sub>2</sub>/t slope (1.04 +/- 0.3 vs 1.4 +/- 0.17 mL/kg/min<sup>2</sup>), and T(1/2) (74 +/- 10 vs 56 +/- 6 sec) compared to controls (all P < 0.001). In addition, both HRR and CR were lower in the OSA group (22.0 +/- 7.0 vs 31.0 +/- 6.0 bpm, P:0.003, and 79.0% +/- 15% vs 99.0% +/- 13.0%, P:0.01, respectively)

#### CONCLUSIONS:

Patients with OSA demonstrate reduced exercise capacity, delayed oxygen kinetics, and reduced HRR. These data point to abnormal oxygen delivery and/or oxidative function of the peripheral muscles and impaired autonomic nervous activity in OSA patients.

*Med Sci Sports Exerc - 01-JAN-2010; 42(1): 16-22*

### Sleep is not disrupted by exercise in patients with chronic fatigue syndromes.

Togo F

#### Abstract:

#### PURPOSE:

Patients with chronic fatigue syndrome (CFS) report that exertion produces dramatic symptom worsening. We hypothesized this might be due to the exacerbation of an underlying sleep disorder, which we have previously demonstrated to exist.

#### METHODS:

Female patients with CFS and matched healthy controls with no evidence of major depressive disorder were studied with overnight polysomnography on a baseline night and on a night after their performance of a maximal exercise test.

#### RESULTS:

CFS patients as a group had evidence for disturbed sleep compared with controls. Although exercise improved sleep for healthy subjects, it did not do this for the group as a

whole. When we stratified the sample on the basis of self-reported sleepiness after a night's sleep, the patient group with reduced morning sleepiness showed improvement in sleep structure, whereas those with increased morning sleepiness continued to show evidence for sleep disruption.

#### CONCLUSIONS:

Sleep is disturbed in CFS patients as a group, but exercise does not exacerbate this sleep disturbance. Approximately half the patients studied actually sleep better after exercise. Therefore, activity-related symptom worsening is not caused by worsened sleep.

*Sleep Breath - 01-JUN-2010; 14(2): 145-51*

### Submaximal exercise in patients with severe obstructive sleep apnea.

Alameri H

#### Abstract:

#### PURPOSE:

Several studies have used the cardiopulmonary exercise test to assess patients with obstructive sleep apnea (OSA). However, no report has investigated the use of the 6-min walk test (6MWT) in this group of patients.

#### METHODS:

We studied consecutive, newly diagnosed, OSA patients (aged >18 years). The control group was composed of matched healthy subjects with no clinical history indicative of sleep breathing disorders. The study population was divided into three groups: an OSA group, a control obese group, and a control lean group. The obese controls were gender-, age- (+/-2 years), height- (+/-5 cm), and weight- (+/-2 kg) matched to the OSA patients, while the lean controls were matched in gender, age, and height, but not weight. All patients underwent sleep study at our Sleep Disorders Center. Each subject underwent a single 6MWT within 1 week of the sleep study.

#### RESULTS:

A total of 55 patients were recruited to the OSA group (age 36.7 +/- 7.9 years, body mass index 38.7 +/- 8.6 kg/m<sup>2</sup>), and apnea hypopnea index 66.6 +/- 34.8/h), 32 subjects to the control obese group, and 30 to the control lean group. There was no difference in distance

walked (6-min walk distance (6MWD)) between the OSA group (389 +/- 70 m) and the obese group (408 +/- 66 m). In the OSA group, the 6MWD results did not correlate with patient age, apnea hypopnea index, or other polysomnographic variables. At the end of the test, heart rate, systolic and diastolic blood pressure, and dyspnea perception were significantly increased in the OSA group compared with healthy subjects.

#### CONCLUSIONS:

The 6MWT is easy to perform and well tolerated by patients with OSA. There were no correlations between the 6MWD and the severity of OSA or other polysomnographic parameters. However, patients with OSA exhibited abnormal hemodynamic responses to submaximal exercise.

*Med Sci Sports Exerc - 01-MAY-2010; 42(5): 893-901*

### Fitness and exercise as correlates of sleep complaints: is it all in our minds?

Gerber M

#### Abstract:

#### PURPOSE:

Restoring sleep is associated with psychological well-being. In contrast, poor sleep leads to impaired daily cognitive, emotional, and social functioning. Both commonplace and expert opinion hold that exercise has a favorable impact on preventing poor sleep and improving its quality. However, the scientific basis for this opinion remains limited, and results are mixed. The aim of the present study, therefore, was to explore the impact of perceived physical fitness, exercise, and a perceived lack of activity on sleep in early adulthood. Gender-related patterns were also examined.

#### METHODS:

A total of 862 participants (639 females and 223 males; mean +/- SD = 24.67 +/- 5.91 yr) took part in the study. Respondents completed a series of self-report questionnaires assessing perceived physical fitness, exercise, perceived lack of physical activity, insomnia (Insomnia Severity Index), dysfunctional sleep-related thoughts (Fragebogen zur Erfassung allgemeiner Persönlichkeitsmerkmale Schlafgestörter), and quality of sleep (Pittsburgh Sleep Quality Index). RESULTS: High perceived physical fitness, but not exercise, was

associated with favorable scores for various sleep indicators. A perceived lack of physical activity was associated with poor sleep. Perceived physical fitness and exercise were moderately correlated. Compared with males, females reported more sleep difficulties and also more dysfunctional sleep-related thoughts.

#### CONCLUSIONS:

For early adulthood, findings did not support commonplace or expert opinion that exercise behaviour has a favourable influence on sleep. Rather, the findings lend support to the importance of cognitive processes in the onset and maintenance of sleep complaints.

*Sleep. 2010 Oct;33(10):1323-31.*

### Sleep disturbances as a predictor of cause-specific work disability and delayed return to work.

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#### STUDY OBJECTIVE:

To examine sleep disturbances as a predictor of cause-specific work disability and delayed return to work.

#### DESIGN:

Prospective observational cohort study linking survey data on sleep disturbances with records of work disability (> or = 90 days sickness absence, disability pension, or death) obtained from national registers.

#### SETTING:

Public sector employees in Finland.

#### PARTICIPANTS:

56,732 participants (mean age 44.4 years, 80% female), who were at work and free of work disability at the study inception.

#### MEASUREMENTS AND RESULTS:

During a mean follow-up of 3.3 years, incident diagnosis-specific work disability was observed in 4,028 (7%) employees. Of those, 2,347 (60%) returned to work. Sleep disturbances 5-7 nights per week predicted work disability due to mental disorders (hazard ratio [HR]

1.6, 95% confidence interval [CI] 1.3-1.9) and diseases of the circulatory system (HR = 1.6, 95% CI 1.2-2.1), musculoskeletal system (HR = 1.6, 95% CI 1.4-1.8) and nervous system (HR = 1.5, 95% CI 1.0-2.2), and injuries and poisonings (HR = 1.6, 95% CI 1.2-2.1) after controlling for baseline age, sex, socioeconomic status, night/shift work, health behaviors (e.g., smoking, exercise), diagnosed somatic diseases, use of pain killers, depression, and anxiety. In addition, sleep disturbances prior to disability were associated with higher likelihood of not returning to work after work disability from musculoskeletal diseases (HR = 1.2, 95% CI 1.1-1.7) and, in men, after work disability due to mental disorders (HR= 4.4, 95% CI 1.7-11.1).

#### CONCLUSIONS:

Sleep disturbances are associated with increased risk for subsequent disabling mental disorders and various physical illnesses. They also predict the outcome of work disability due to musculoskeletal disorders.

*Chronobiol Int. 2010 Oct;27(9-10):1895-910.*

#### Estimation of the benchmark duration of shift work associated with weight gain in male Japanese workers.

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The authors estimated the benchmark durations (BMDs) and their 95% lower confidence limit (BMDL) for the reference duration of shiftwork for weight gain. A 14-yr prospective cohort study was conducted in male workers at a Japanese steel company (n =7254) who had received annual health check-ups between 1991 and or 10% and parameters for the duration of shiftwork and other covariates. For workers aged in their 40s, the BMDL/BMD for shiftwork with a BMR of 5% was 18.6/23.0 yrs (e<sup>-7.5%</sup>) and 16.9/19.4 yrs (e<sup>-10%</sup>). For workers aged e<sup>-50</sup> yrs, the BMDL/BMD with a BMR of 5% was 22.9/28.2 yrs (e<sup>-7.5%</sup>) and 20.6/23.6 yrs (e<sup>-10%</sup>). The reference duration of shiftwork that associated with weight gain was shown to be at least 17 yrs in middle-aged workers. Special attention should be paid to prevent weight gain at an earlier stage and not when this increase in weight has become apparent.

*Sleep Med - 01-OCT-2010; 11(9): 934-40*

#### Aerobic exercise improves self-reported sleep and quality of life in older adults with insomnia.

Reid KJ

#### Abstract:

#### OBJECTIVE:

To assess the efficacy of moderate aerobic physical activity with sleep hygiene education to improve sleep, mood and quality of life in older adults with chronic insomnia.

#### METHODS:

Seventeen sedentary adults aged >or=55 years with insomnia (mean age 61.6 [SD±4.3] years; 16 female) participated in a randomized controlled trial comparing 16 weeks of aerobic physical activity plus sleep hygiene to non-physical activity plus sleep hygiene. Eligibility included primary insomnia for at least 3 months, habitual sleep duration <6.5h and a Pittsburgh Sleep Quality Index (PSQI) score >5. Outcomes included sleep quality, mood and quality of life questionnaires (PSQI, Epworth Sleepiness Scale [ESS], Short-form 36 [SF-36], Center for Epidemiological Studies Depression Scale [CES-D]).

#### RESULTS:

The physical activity group improved in sleep quality on the global PSQI (p<.0001), sleep latency (p=.049), sleep duration (p=.04), daytime dysfunction (p=.027), and sleep efficiency (p=.036) PSQI sub-scores compared to the control group. The physical activity group also had reductions in depressive symptoms (p=.044), daytime sleepiness (p=.02) and improvements in vitality (p=.017) compared to baseline scores.

#### CONCLUSION:

Aerobic physical activity with sleep hygiene education is an effective treatment approach to improve sleep quality, mood and quality of life in older adults with chronic insomnia.

*Prog Brain Res. 2010;185:131-53.*

#### Circadian rhythms and cognition.

Waterhouse J.

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Indian Journal of Sleep Medicine (IJSMD), Vol. 6, No. 2, 2011

Liverpool John Moores University, Liverpool, UK. waterhouseathome@hotmail.com Like all circadian (near-24-h) rhythms, those of cognition have endogenous and exogenous components. The origins of these components, together with effects of time awake upon cognitive performance, are described in subjects living conventionally (sleeping at night and active during the daytime). Based on these considerations, predictions can be made about changes that might be expected in the days after a time-zone transition and during night work. The relevant literature on these circumstances is then reviewed. The last section of the chapter deals with sleep-wake schedules where both regular and irregular sleeps are taken (anchor sleep).

*Proc Natl Acad Sci U S A. 2010 Nov 23;107(47):20541-6.*

### **Impact of the human circadian system, exercise, and their interaction on cardiovascular function.**

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The risk of adverse cardiovascular events peaks in the morning (H<sup>9:00</sup> AM) with a secondary peak in the evening (H<sup>8:00</sup> PM) and a trough at night. This pattern is generally believed to be caused by the day/night distribution of behavioral triggers, but it is unknown whether the endogenous circadian system contributes to these daily fluctuations. Thus, we tested the hypotheses that the circadian system modulates autonomic, hemodynamic, and hemostatic risk markers at rest, and that behavioral stressors have different effects when they occur at different internal circadian phases. Twelve healthy adults were each studied in a 240-h forced desynchrony protocol in dim light while standardized rest and exercise periods were uniformly distributed across the circadian cycle. At rest, there were large circadian variations in plasma cortisol (peak-to-trough H<sup>85%</sup> of mean, peaking at a circadian phase corresponding to H<sup>9:00</sup> AM) and in circulating catecholamines (epinephrine, H<sup>70%</sup>; norepinephrine, H<sup>35%</sup>, peaking during the biological day). At H<sup>8:00</sup> PM, there was a circadian peak in blood pressure and a trough in cardiac vagal modulation. Sympathetic variables were consistently

lowest and vagal markers highest during the biological night. We detected no simple circadian effect on hemostasis, although platelet aggregability had two peaks: at H<sup>noon</sup> and H<sup>11:00</sup> PM. There was circadian modulation of the cardiovascular reactivity to exercise, with greatest vagal withdrawal at H<sup>9:00</sup> AM and peaks in catecholamine reactivity at H<sup>9:00</sup> AM and H<sup>9:00</sup> PM. Thus, the circadian system modulates numerous cardiovascular risk markers at rest as well as their reactivity to exercise, with resultant profiles that could potentially contribute to the day/night pattern of adverse cardiovascular events.

*Int J Chron Obstruct Pulmon Dis. 2010 Oct 5;5:319-26.*

### **Fatigue in patients with COPD participating in a pulmonary rehabilitation program.**

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#### **BACKGROUND:**

Fatigue is a distressing, complex, multidimensional sensation common in individuals with chronic obstructive pulmonary disease (COPD). While fatigue negatively impacts functional performance and quality of life, there has been little study of the fatigue that affects participants in pulmonary rehabilitation programs. The purpose of this study was to examine the emotional, behavioral, cognitive, and physical dimensions of fatigue and their relationships to dyspnea, mental health, sleep, and physiologic factors.

#### **PATIENTS AND METHODS:**

A convenience sample of 42 pulmonary rehabilitation participants with COPD completed self-report questionnaires which measured dimensions of fatigue using the Multidimensional Fatigue Inventory, anxiety and depression using the Hospital Anxiety and Depression Scale, and sleep quality using the Pittsburgh Sleep Quality Index. Data on other clinical variables were abstracted from pulmonary rehabilitation program health records.

#### **RESULTS:**

Almost all (95.3%) participants experienced high levels of physical fatigue. High levels of fatigue were also

reported for the dimensions of reduced activity (88.1%), reduced motivation (83.3%), mental fatigue (69.9%), and general fatigue (54.5%). Close to half (42.9%) of participants reported symptoms of anxiety, while almost one quarter (21.4%) reported depressive symptoms. Age was related to the fatigue dimensions of reduced activity ( $\bar{n} = 0.43$ ,  $P < 0.01$ ) and reduced motivation ( $\bar{n} = 0.31$ ,  $P < 0.05$ ). Anxiety was related to reduced motivation ( $\bar{n} = -0.47$ ,  $P < 0.01$ ). Fatigue was not associated with symptoms of depression, sleep quality, gender, supplemental oxygen use, smoking status, or Medical Research Council dyspnea scores.

#### CONCLUSIONS:

Fatigue (particularly the physical and reduced motivation dimensions of fatigue) was experienced by almost all participants with COPD attending this pulmonary rehabilitation program. Fatigue affected greater proportions of participants than either anxiety or depression. The high prevalence of fatigue may impact on enrolment, participation, and attrition in pulmonary rehabilitation programs. Further investigation of the nature, correlates, and impact of fatigue in this population is required.

*Obes Facts. 2010 Oct;3(5):320-7.*

#### Risk factors for adult overweight and obesity: the importance of looking beyond the 'big two'.

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#### OBJECTIVE:

To compare two traditional (high dietary lipid intake and non-participation in high-intensity physical exercise, namely the 'Big Two' factors) versus three nontraditional (short sleep duration, high disinhibition eating behavior, and low dietary calcium intake) risk factors as predictors of excess body weight and overweight/obesity development.

#### METHOD:

Adult participants aged 18-64 years of the Quebec Family Study were selected for cross-sectional ( $n = 537$ ) and longitudinal ( $n = 283$ ; 6-year follow-up period) analyses.

The main outcome measure was overweight/obesity, defined as a BMI  $\geq 25$  kg/m<sup>2</sup>.

#### RESULTS:

We observed that both the prevalence and incidence of overweight/obesity was best predicted by a combination of risk factors. However, short sleep duration, high disinhibition eating behavior and low dietary calcium intake seemed to contribute more to the risk of overweight and obesity than high dietary lipid intake and non-participation in high-intensity physical exercise. Globally, the risk of being overweight or obese was two-fold higher for individuals having the three nontraditional risk factors combined (OR 6.05; 95% CI 4.26-7.88) compared to those reporting a high percentage of lipids in their diet together with no vigorous physical activity in their daily schedule (OR 2.95; 95% CI 2.18-3.73). Furthermore, the risk of overweight/obesity was also higher for the combination of any two of the nontraditional risk factors than for the combination of the 'Big Two' factors.

#### CONCLUSION:

These results are concordant with previous reports showing that obesity is a multifactorial condition, and emphasize the importance of looking beyond reported measures of the 'Big Two' factors.

*PM R. 2010 Oct;2(10):911-9.*

#### A randomized controlled trial of exercise to improve mood after traumatic brain injury.

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#### OBJECTIVE:

To test the hypothesis that a structured aerobic exercise regimen would decrease the severity of depressive symptoms in people with traumatic brain injury (TBI) who reported at least mild depression severity at baseline.

#### DESIGN:

Prospective, randomized, controlled trial.

**SETTING:**

Community gymnasium.

**PARTICIPANTS:**

Subjects with a history of a prior TBI (6 months to 5 years post-injury), recruited from the community. Inclusion criteria included scoring  $\geq 5$  on the Patient Health Questionnaire-9. Subjects were excluded if they were non-English speakers, had a medical condition precluding exercise, had suicidal ideation, regularly exercised, or could not use standard aerobic exercise equipment.

**INTERVENTION:**

Weekly supervised exercise sessions over a 10-week period consisted of education, warm-up, 30 minutes of aerobic exercise, and cool down. The exercise intensity was adjusted to reach a heart rate goal of 60% of the participant's estimated maximal heart rate.

**MAIN OUTCOME MEASUREMENT:**

Beck Depression Inventory (BDI) comparing exercise to control groups. Post hoc analyses compared groups exercising  $\geq 90$  minutes or  $< 90$  minutes per week.

**RESULTS:**

Between-group comparisons at 10 weeks revealed no difference between groups on the BDI ( $P=.250$ ). For the groups divided by minutes exercised per week, the high-activity group had significantly better depression scores than those in the low-activity group ( $P=.033$ ).

**CONCLUSIONS:**

Although there was no statistically significant difference between the treated and the control group on mood after intervention, those persons with TBI who recounted higher levels of exercise per week also reported less depression and improved sleep, community participation, and overall quality of life.

*J Neurosci Nurs. 2010 Oct;42(5):255-64; quiz 265-6.*

### The future of cognitive remediation training in older adults.

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With the growing population of older adults, nurses will need to address age-related cognitive declines. Evidence demonstrates that cognitive remediation training is effective in improving neuropsychological abilities in older adults, which can translate into improved functioning in instrumental activities of daily living. The future of cognitive remediation training will incorporate health promoting factors (e.g., sleep hygiene, physical exercise), which supports Neuroplasticity and cognitive reserve. By approaching cognitive health holistically, the patient will be primed to receive the maximum benefit from cognitive remediation training. A model emphasizing this approach is provided as a didactic for nurses and other health professionals providing care to their older patients.

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### A personalized approach to metabolic aspects of obesity.

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Metabolic syndrome, which is entwined in semantic controversy as to its actual existence as a distinct entity, links several important health conditions with obesity, and more specifically, excessive visceral adiposity. The most common linked disease states include type 2 diabetes mellitus, hypertension, dyslipidemia, obstructive sleep apnea, and cardiovascular and coronary heart disease. Much of the controversy surrounding the metabolic syndrome case definition is the purported centrality of insulin resistance as root cause, there being no universally agreed-upon standard for measurement of insulin resistance. Over the past decade, the visceral adipocyte itself has emerged as a key contributor rather than passive bystander in the genesis of the metabolic syndrome. Rather than being a simple storage bin for excess triglyceride, the visceral adipocyte is an active endocrine cell secreting a variety of signal hormones known in the aggregate as adipokines. In optimal health, the predominant recognized adipokine is adiponectin, with downstream insulin-sensitizing, anti-inflammatory, antithrombotic, provasodilatory effects systemically. By contrast, metabolic syndrome is characterized by reduced

adiponectin and increased inflammatory adipokine secretion, with downstream effects of insulin resistance, heightened inflammation, prothrombosis, and vasoconstriction. These alternative metabolic states of the adipocyte are characterized in this review as metabolic “yin” and “yang.” Lifestyle modifications and drug therapies that promote weight loss, increased physical exercise activity, and increased adiponectin production tend to modulate the system favorably toward metabolic “yin.”

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### **Internet-enhanced management of fibromyalgia: a randomized controlled trial.**

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Both pharmacological and non-pharmacological interventions have demonstrated efficacy in the management of fibromyalgia (FM). Non-pharmacological interventions however are far less likely to be used in clinical settings, in part due to limited access. This manuscript presents the findings of a randomized controlled trial of an Internet-based exercise and behavioral self-management program for FM designed for use in the context of a routine clinical care. 118 individuals with FM were randomly assigned to either (a) standard care or (b) standard care plus access to a Web-Enhanced Behavioral Self-Management program (WEB-SM) grounded in cognitive and behavioral pain management principles. Individuals were assessed at baseline and again at 6 months for primary endpoints: reduction of pain and an improvement in physical functioning. Secondary outcomes included fatigue, sleep, anxiety and depressive symptoms, and a patient global impression of improvement. Individuals assigned to the WEB-SM condition reported significantly greater improvement in pain, physical functioning, and overall global improvement. Exercise and relaxation techniques were the most commonly used skills throughout the 6 month period. A no-contact, Internet-based, self-management intervention demonstrated efficacy on key outcomes for FM. While not everyone is expected to

benefit from this approach, this study demonstrated that non-pharmacological interventions can be efficiently integrated into routine clinical practice with positive outcomes.

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### **Exercising, sleep-EEG patterns, and psychological functioning are related among adolescents.**

**Brand S**

**Abstract:**

**OBJECTIVES:** Lay and scientific opinion alike hold that physical activity is efficient as both remedy and preventative measure for poor sleep. There is evidence that strenuous exercising of adolescent elite athletes leads to favourable sleep patterns. However, research on this in non-elite athletes is limited. The aim of the present study was to compare sleep-EEG patterns of higher leisure time exercisers and controls.

**METHODS:**

A total 38 adolescents (M = 18.59) took part in the study; 17 were high, and 21 were low exercisers. Mean weekly exercise duration was 8.5 h for high and 2 h for low exercisers. Sleep-EEG recordings were performed following a day without exercise. Participants also completed questionnaires regarding their psychological functioning.

**RESULTS:**

Compared to low exercisers, high exercisers had more slow wave sleep, and less light and REM sleep, higher scores for positive coping and curiosity, and lower scores for depressive symptoms and somatosensory amplification. Multiple regression analyses showed that weekly exercise duration predicted shortened SOL, low number of awakenings, and increased slow wave sleep.

**CONCLUSION:**

Regular, though not necessarily vigorous, exercise is related to improvement in objective sleep patterns and better psychological functioning. Regular physical activity should be promoted and access to sports facilities should be facilitated.