

Journal Scan

Obstructive Sleep Apnea: Women's Perspective

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ABSTRACT

The main characteristics of sleep-disordered breathing (SDB) are airflow limitation, chronic intermittent hypoxia, or apnea, which may lead to tissue hypoperfusion and recurrent arousal from sleep. These episodes of hypoxia or apnea can lead to tissue inflammation and are causal factors of disturbed sleep in both men and women. Several lines of evidence suggest that sleep patterns differ along the lifespan in both male and female subjects, and this may result from the influence of female gonadotropic hormones on sleep. Compared with men, women have more sleep complaints, as women's sleep is not only influenced by gonadotropins, but also by conditions related to these hormones, such as pregnancy. It is therefore, not surprising that sleep disturbances are seen during menopause too. Factors that may play a role in this type of SDB in women include vasomotor symptoms, changing reproductive hormone levels, circadian rhythm abnormalities, mood disorders, coexistent medical conditions, and lifestyle factors.

Conflict of interest statement: DISCLOSURE STATEMENT The authors have read the journal's policy and have the following potential conflicts: This study was not an industry-supported study. S.R. Pandi-Perumal is a stockholder and the President and Chief Executive Officer of Somnogen Canada Inc., a Canadian Corporation. This does not alter his adherence to all of the journal policies. He declares that he has no competing interests that might be perceived to influence the content of this article. All remaining authors declare that they have no proprietary, financial, professional, nor any other personal interest of any nature or kind in any product or services and/or company that could be construed or considered to be a potential conflict of interest that might have influenced the views expressed in this manuscript.

Sleep and Premenstrual Syndrome

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ABSTRACT

The etiology of premenstrual syndrome (PMS) is unknown; it may be due to the normal effect of hormones during the menstrual cycle as it occurs in the late luteal phase of the menstrual cycle. The PMS affects women of childbearing age and remits with the onset of menstruation. The menstrual phase is known to influence stage 2 and rapid eye movement sleep in women, irrespective of premenstrual dysphoric disorder (PMDD). Women with PMDD showed a decreased response to melatonin in their luteal phase as compared with the follicular phase of the menstrual cycle. However, melatonin duration or timing of offset in the morning has not been reported to correlate with the mood. Rather, improvement in mood-related symptoms of PMDD has been found to be influenced by sleep deprivation, be it sleep restrictions in early or late night. Sleep disturbance and decreased melatonin secretions due to hormonal fluctuations during the luteal phase of the menstrual cycle could explain the sleep complaints of PMDD.

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Age Differences in Workplace Intervention Effects on Employees' Nighttime and Daytime Sleep

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Sleep Health 2016 Dec;2(4):289-296.

ABSTRACT

Objectives: To examine the effects of a workplace flexibility/support intervention on employees' sleep quantity and quality during nights and days and whether the effects differ by employee age.

Design: Cluster-randomized controlled trial.

Setting: Information technology industry workplaces.

Participants: US employees (mean age = 46.9 years) at an information technology firm who provided actigraphy at baseline and at 12-month follow-up (N = 396; n = 195 intervention, n = 201 control).

Intervention: The Work, Family, and Health Study intervention aimed to increase workplace flexibility and support. The intervention consisted of facilitated discussions to help employees increase control over when and where they work as well as manager-specific training sessions to increase manager support for employees' work-family issues.

Measurements: Nighttime sleep duration, wake after sleep onset (WASO), and nap duration were measured with wrist actigraphy. Day-to-day variability in these variables (min 2) was also estimated.

Results: Intervention employees increased nighttime sleep duration at 12 months, by 9 minutes per day, relative to control employees. There were interaction effects between the intervention and age on daytime nap duration and day-to-day variability in WASO. Older employees (56–70 years) in the intervention condition decreased nap duration at 12 months relative to older employees in the control condition. Older employees in the intervention condition also exhibited a greater decrease in day-to-day variability of WASO at 12 months compared with their baseline.

Conclusion: The workplace flexibility/support intervention was effective in enhancing employees' sleep health by increasing nighttime sleep duration. Furthermore, the intervention was particularly effective for older employees in decreasing their daytime nap duration and day-to-day variability in WASO.

Evaluating the Impact of Whole-body Vibration on Fatigue and the Implications for Driver Safety

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ABSTRACT

Driver fatigue is a significant contributor to motor vehicle accidents and fatalities, although the exact share of those events attributable to fatigue is still uncertain. In 2013, accidents involving heavy trucks killed more than 3,944 people in the United States, with over 80% of those killed not in the truck. Numerous factors contribute to driver fatigue among commercial drivers, including shiftwork schedules; high prevalence of alcohol and substance use; extended hours; comorbid medical conditions, such as pain; and high prevalence of sleep disorders. Many of these factors have been studied extensively in the trucking industry. Whole-body vibration (WBV) is another potential factor that may contribute to driver fatigue, but it has received little attention. Beginning in January 2015, Bose Corporation and AIG commissioned the RAND Corporation to study the link between WBV and driver fatigue. This article summarizes the findings from RAND's systematic review of the literature on WBV and fatigue as well as considers appropriate study designs and methodology that will inform new areas of research focused on improving the safety of truckers and those who share the road with them. The literature review identified 24 studies examining the impact of WBV on fatigue or sleepiness. The majority of studies (n = 18) found a significant association between WBV and fatigue or sleepiness; however, there are several limitations of the existing literature that preclude definitive conclusions regarding the impact of WBV on these outcomes. This research concludes with recommendations for future studies to strengthen the evidence base.

Sleep and Fatigue among Seafarers: The Role of Environmental Stressors, Duration at Sea, and Psychological Capital

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Saf Health Work 2016 Dec;7(4):363-371.

ABSTRACT

Background: Seafaring is an inherently stressful environment. Because working time and leisure time are spent in the same confined environment for a prolonged period of time, many stressors present in seafaring can also be conceived of as chronic. We explored the effects of duration at sea, seafaring experience, environmental stressors, and psychological capital (PsyCap) on the sleep quality and fatigue of seafarers. PsyCap is a construct that draws upon ideas from positive psychology and positive organizational behavior, and is intended to capture an individual's psychological capacities that can be developed and utilized for performance improvements.

Materials and methods: We collected survey data from a sample of seafarers working in the offshore re-supply industry (n = 402) and a sample of seafarers working on board combined passenger and cargo ships (n = 340).

Results: PsyCap emerged as a robust predictor with statistically significant relations to fatigue and sleep quality in both samples. PsyCap also interacted with duration at sea in explaining fatigue in seafarers working on board the passenger and cargo ships. Seafarers on passenger and cargo ships also reported significantly higher levels of fatigue than those working in the offshore resupply industry.

Conclusion: Coupled with emerging research showing that PsyCap is trainable, our results suggest that maritime organizations could have much to gain by being cognizant of and developing routines for continually developing the PsyCap of their employees.

Sleep Duration and Chronic Fatigue are Differently associated with the Dietary Profile of Shift Workers

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ABSTRACT

Shift work has been associated with dietary changes. This study examined factors associated with the dietary profiles of shift workers from several industries (n = 118, 57 males; age = 43.4 ± 9.9 years) employed on permanent mornings, nights, or rotating 8 or 12-hour shifts. The dietary profile was assessed using a Food Frequency Questionnaire. Shift-related (e.g., sleep duration and fatigue), work-related (e.g., industry), and demographic factors (e.g., body mass index) were measured using a modified version of the Standard Shift work Index. Mean daily energy intake was 8628 ± 3161 kJ. As a percentage of daily energy intake, all workers reported lower than recommended levels of carbohydrate (CHO, 45–65%). Protein was within recommended levels (15–25%). Permanent night workers were the only group to report higher than recommended fat intake (20–35%). However, all workers reported higher than recommended levels of saturated fat (>10%) with those on permanent nights reporting significantly higher levels than other groups (mean = 15.5 ± 3.1%, p < 0.05). Shorter sleep durations and decreased fatigue were associated with higher CHO intake (p ≤ 0.05), whereas increased fatigue and longer sleep durations were associated with higher intake of fat (p ≤ 0.05). Findings demonstrate that sleep duration, fatigue, and shift schedule are associated with the dietary profile of shift workers.

Effect of 6-month Diet Intervention on Sleep among Overweight and Obese Men with Chronic Insomnia Symptoms: A Randomized Controlled Trial

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Nutrients 2016 Nov;8(11): E751.

ABSTRACT

Growing evidence suggests that diet alteration affects sleep, but this has not yet been studied in adults with insomnia symptoms. We aimed to determine the effect of a 6-month diet intervention on sleep among overweight and obese (Body mass index ≥ 25 kg/m²) men with chronic insomnia symptoms. Forty-nine men aged 30 to 65 years with chronic insomnia symptoms were randomized into diet (n = 28) or control (n = 21) groups. The diet group underwent a 6-month individualized diet intervention with three face-to-face counseling sessions and online supervision 1 to 3 times per week; 300 to 500 kcal/day less energy intake and optimized nutrient composition were recommended. Controls were instructed to maintain their habitual lifestyle. Sleep parameters were determined by piezoelectric bed sensors, a sleep diary, and a Basic Nordic sleep questionnaire. Compared with the controls, the diet group had shorter objective sleep onset latency after intervention. Within the diet group, prolonged objective total sleep time, improved objective sleep efficiency, lower depression score, less subjective nocturnal awakenings, and nocturia were found after intervention. In conclusion, modest energy restriction and optimized nutrient composition shorten sleep onset latency in overweight and obese men with insomnia symptoms.

Disability-adjusted Life Years-based Health Risk Assessment of Construction Noise in Beijing, China

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ABSTRACT

Noise produced by construction activities has become the second most serious acoustic polluting element in China. To provide industry practitioners with a better understanding of the health risks of construction noise and to aid in creating environmentally friendly construction plans during early construction stages, we developed a quantitative model to assess the health impairment risks (HIA) associated with construction noise for individuals living adjacent to construction sites. This model classifies noise-induced health impairments into four categories: Cardiovascular disease, cognitive impairment, sleep disturbance, and annoyance, and uses disability-adjusted life years (DALYs) as an indicator of damage. Furthermore, the value of a statistical life is used to transform DALYs into a monetary value based on the affected demographic characteristics, thereby offering policymakers a reliable theoretical foundation for establishing reasonable standards to compensate residents suffering from construction noise. A practical earthwork project in Beijing is used as a case study to demonstrate the applicability of the proposed model. The results indicate that construction noise could bring significant health risks to the neighboring resident community, with an estimated 34.51 DALYs of health damage and 20.47 million yuan in social costs. In particular, people aged 45 to 54 are most vulnerable to construction noise, with the greatest health risks being caused by sleep disturbance.

Sleep Quality of Call Handlers employed in International Call Centers in National Capital Region of Delhi, India

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ABSTRACT

Background: Call center sector in India is a relatively new and fast-growing industry driving employment and growth in modern India today. Most international call centers in National Capital Region (NCR) of Delhi operate at odd work hours corresponding to a time suitable for their international customers. The sleep quality of call handlers employed in these call centers is in jeopardy owing to their altered sleep schedule.

Objective: To assess the sleep quality and determine its independent predictors among call handlers employed in international call centers in NCR of Delhi.

Materials and methods: A cross-sectional questionnaire-based study was conducted on 375 call handlers aged 18 to 39 years employed in international call centers in NCR of Delhi. Sleep quality was assessed using Athens Insomnia scale along with a pretested, structured questionnaire.

Results: The mean age of respondents was 24.6 (standard deviation 2.4) years; 78% of participants were male; 83.5% of respondents were unmarried; 44.3% of call handlers were cigarette smokers. Physical ailments were reported by 37% call handlers; 77.6% of call handlers had some suspicion of insomnia or suspected insomnia; the rest had no sleep problem. Smoking, poor social

support, heavy workload, lack of relaxation facility at office, and prolonged travel time to office were independent predictors of sleep quality ($p < 0.05$).

Conclusion: Call handlers have to compromise upon their sleep owing to the contemporary work settings in call centers. Safeguarding their health becomes an occupational health challenge to public health specialists.

Wake–Sleep Transition as a Noisy Bifurcation

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ABSTRACT

A recent physiologically based model of the ascending arousal system is used to analyze the dynamics near the transition from wake to sleep, which corresponds to a saddle-node bifurcation at a critical point. A normal form is derived by approximating the dynamics by those of a particle in a parabolic potential well with dissipation. This mechanical analog is used to calculate the power spectrum of fluctuations in response to a white noise drive, and the scalings of fluctuation variance and spectral width are derived *vs* distance from the critical point. The predicted scalings are quantitatively confirmed by numerical simulations, which show that the variance increases and the spectrum undergoes critical slowing, both in accord with theory. These signals can thus serve as potential precursors to indicate imminent wake–sleep transition, with potential application to safety-critical occupations in transport, air-traffic control, medicine, and heavy industry.

Sleep Duration and Diet Quality among Women within 5 Years of Childbirth in the United States: A Cross-sectional Study

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Matern Child Health J 2016 Sep;20(9):1869-1877.

ABSTRACT

Objective: Only 9% of women with young children consume a high-quality diet. The association between sleep duration and health may be U-shaped. We examined diet quality in relation to sleep duration among US women within 5 years of childbirth.

Materials and methods: Data were from non-pregnant women aged 20 to 44 years within 5 years of childbirth who completed two 24-hour dietary recalls ($N = 896$) in the National Health and Nutrition Examination Survey 2005 to 2012. Self-reported weekday/workday sleep duration was categorized as short (≤ 6 hours), adequate (7–8 hours), or long (≥ 9 hours). The Healthy Eating Index (HEI-2010, 0–100) estimated overall and components of diet quality. Multivariable-adjusted linear regression models estimated the association between sleep duration and diet quality, adjusting for age, race/ethnicity, and education.

Results: In all, 34% of women reported short, 57.1% adequate, and 8.6% long sleep duration. The average diet quality total score was 47.4 out of 100. Short sleep duration was not associated with diet quality. Long sleep duration was associated with lower quality diet [$\beta = -4.3$; 95% confidence interval (CI) -8.1 to -0.4], lower consumption of total fruit ($\beta = -0.7$; 95% CI -1.3 to -0.1), whole fruit ($\beta = -0.9$; 95% CI -1.6 to -0.2), and total protein ($\beta = -0.7$; 95% CI -1.3 to -0.03), and higher consumption of empty calories ($\beta = 2.2$; 95% CI -4.3 to -0.1).

Conclusion: Future studies should examine the longitudinal association between sleep duration and diet quality among women following childbirth and whether interventions to improve sleep can enhance diet quality.

Sleep and Satisfaction in 8- and 12-hour Forward-rotating Shift Systems: Industrial Employees Prefer 12-hour Shifts

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Chronobiol Int 2016;33(6):768-775.

ABSTRACT

Twelve-hour shift systems have become more popular in industry. Survey data of shift length, shift rotation speed, self-rated sleep, satisfaction, and perceived health were investigated for the associations among 599 predominantly male Finnish industrial employees. The studied forward-rotating shift systems were 12-hour fast (12 fast, DDNN, n = 268), 8-hour fast (8 fast, MMEENN, n = 161) and 8-hour slow (8 slow, MMMM-EEEE-NNNN, n = 170). Satisfaction with shift system differed between the groups (p < 0.01) after controlling for age, gender, shift work experience, and self-rated stress. In the 12 fast, 98% of employees were satisfied with their shift system (75% 8 fast, 54% 8 slow). Negative effects on sleep and alertness were rare (8%) in the 12 fast group (53% 8 fast, 66% 8 slow, p < 0.01) and self-reported sleep difficulties were less frequent than in the 8 fast and 8 slow groups (8, 27, 41% respectively, p < 0.01). The self-reported average sleep duration (12 fast 7:50, 8 fast 7:24, 8 slow 7:15, p < 0.01), and shift-specific sleep before and between morning shifts and after first night shift were longer in the 12 fast group. Perceived negative effects of the current shift system on general health (12 fast 4%, 8 fast 30%, 8 slow 41%, p < 0.001) and work-life balance (12 fast 8%, 8 fast 52%, 8 slow 63%, p < 0.001) differed strongly between the groups. In conclusion, the perceived effects of shift work were dependent on both shift length and shift rotation speed: Employees in the 12-hour rapidly forward-rotating shift system were most satisfied, perceived better work-life balance and slept better than the employees in the 8 fast or especially the employees in the 8-hour slowly rotating systems.

Duty Hours and Incidents in Flight among Commercial Airline Pilots

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ABSTRACT

Introduction: Working long duty hours has often been associated with increased risk of incidents and accidents in transport industries. Despite this, information regarding the intermediate relationship between duty hours and incident risk is limited. This study aimed to test a work hours/incident model to identify the interplay of factors contributing to incidents within the aviation industry.

Materials and methods: A total of 954 European-registered commercial airline pilots completed a 30-item survey investigating self-report attitudes and experiences of fatigue. Path analysis was used to test the proposed model.

Results: The fit indices indicated this to be a good fit model ($\chi^2 = 11.066$, df = 5, p = 0.05; Comparative Fit Index = 0.991; Normed Fit Index = 0.984; Tucker-Lewis Index = 0.962; Root Mean Square of Approximation = 0.036). Highly significant relationships were identified between duty hours and sleep disturbance (r = 0.18, p < 0.001), sleep disturbance and fatigue in the cockpit (r = 0.40, p < 0.001), and fatigue in the cockpit and microsleeps in the cockpit (r = 0.43, p < 0.001).

Discussion: A critical pathway from duty hours through to self-reported incidents in flight was identified. Further investigation employing both objective and subjective measures of sleep and fatigue is needed.

Tests of a New Drowsiness Characterization and Monitoring System based on Ocular Parameters

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ABSTRACT

Drowsiness is the intermediate state between wakefulness and sleep. It is characterized by impairments of performance, which can be very dangerous in many activities and can lead to catastrophic accidents in transportation or in industry. There is thus an obvious need for systems that are able to continuously, objectively, and automatically estimate the level of drowsiness of

a person busy at a task. We have developed such a system, which is based on the physiological state of a person, and, more specifically, on the values of ocular parameters extracted from images of the eye (photo-oculography), and which produces a numerical level of drowsiness. In order to test our system, we compared the level of drowsiness determined by our system to two references: (1) The level of drowsiness obtained by analyzing polysomnographic signals; and (2) the performance of individuals in the accomplishment of a task. We carried out an experiment in which 24 participants were asked to perform several Psychomotor Vigilance Tests in different sleep conditions. The results show that the output of our system is well correlated with both references. We determined also the best drowsiness level threshold in order to warn individuals before they reach dangerous situations. Our system thus has significant potential for reliably quantifying the level of drowsiness of individuals accomplishing a task and, ultimately, for preventing drowsiness-related accidents.

Relationship between Shift Work and Peripheral Total and Differential Leukocyte Counts in Chinese Steel Workers

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J Occup Health 2016;58(1):81-88.

ABSTRACT

Objectives: Even though shift work has been suspected to be a risk factor for cardiovascular disease, little research has been done to determine the logical underlying inflammation mechanisms. This study investigated the association between shift work and circulating total and differential leukocyte counts among Chinese steel workers.

Materials and methods: The subjects were 1,654 line workers in a steel plant, who responded to a cross-sectional survey with a questionnaire on basic attributes, lifestyle, and sleep. All workers in the plant received a periodic health check-up. Total and differential leukocytes counts were also examined in the check-up.

Results: Shift workers had higher rates of alcohol use, smoking, poor sleep, poor physical exercise, and obesity than daytime workers. In further analysis, we found that the peripheral total white blood cells (WBC), monocyte, neutrophil, and lymphocyte counts were also greater in shift workers than in daytime workers. When subjects were divided into quartiles according to total WBC, neutrophil, monocyte, and lymphocyte counts, increased leukocyte count was associated with shift work. Using stepwise linear regression analysis, smoking, obesity, and shift work were independently associated with total WBC, monocyte, neutrophil, and lymphocyte counts.

Conclusion: This study indicates that peripheral total and differential leukocyte counts are significantly higher in shift workers, which suggests that shift work may be a risk factor of cardiovascular disease. Applicable intervention strategies are needed for prevention of cardiovascular disease for shift workers.

Sleep and Need for Recovery in Shift Workers: Do Chronotype and Age Matter?

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Ergonomics 2016;59(2):310-324.

ABSTRACT

This study examined associations of chronotype and age with shift-specific assessments of main sleep duration, sleep quality, and need for recovery in a cross-sectional study among N = 261 industrial shift workers (96.6% males).

Logistic regression analyses were used, adjusted for gender, lifestyle, health, nap behavior, season of assessment, and shift schedule. Shift workers with latest *vs* earliest chronotype reported a shorter sleep duration [odds ratio (OR) 11.68, 95% confidence interval (CI) 3.31–41.17] and more awakenings complaints (OR 4.84, 95% CI 4.45–11.92) during morning shift periods. No associations were found between chronotype, sleep, and need for recovery during evening and night shift periods. For age, no associations were found with any of the shift-specific outcome measures. The results stress the importance of including the concept of chronotype in shift work research and scheduling beyond the concept of age. Longitudinal research using shift-specific assessments of sleep and need for recovery are needed to confirm these results.

Practitioner summary: Chronotype seems to better explain individual differences in sleep than age. In view of ageing societies, it might therefore, be worthwhile to further examine the application of chronotype for individualized shift work schedules to facilitate healthy and sustainable employment.

Household Food Insecurity and Sleep Patterns among Mexican Adults: Results from ENSANUT-2012

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ABSTRACT

To examine the independent association of household food insecurity with sleep duration and quality in a nationally representative survey of adults in Mexico. The Latin American and Caribbean Food Security Scale was used to categorize households as secure, mild (43.7%), moderate (19.0%), or severe (11.8%). We assessed the association between household food insecurity and self-reported sleep duration and quality among 11,356 adults using weighted multinomial and binomial logistic regression. After adjusting for potential confounders, a significant association was found between severe household food insecurity and getting less than the recommended 7 to 8 hours of sleep [adjusted odds ratio (AOR) = 1.83, 95% confidence interval (CI) = 1.37–2.43]. Compared with food-secure households, odds of poor sleep quality increased with level of severity (AOR = 1.27, 95% CI 1.04–1.56 for mild; AOR = 1.71, 95% CI 1.36–2.14 for moderate; and AOR = 1.89, 95% CI 1.45–2.45 for severe household food insecurity). Household food insecurity is associated with inadequate sleep duration and poor sleep quality among Mexican adults. This study underscores the adverse effects of household food insecurity on the well-being of vulnerable populations.