

Journal Scan

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1. *Int J Occup Med Environ Health. 2014 Dec; 27(6): 1005-12.*

Falling asleep at the wheel among Italian professional drivers (PDs): results from the HiRis PD study.

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OBJECTIVES: A high percentage of professional drivers (PDs) often report feeling fatigue during their work, and falling asleep at the wheel (FAW) is a major contributing factor to the occurrence of near-miss or actual accidents. The aim of this study is to evaluate the prevalence of FAW among Italian PDs and the effect of fatigue on this occurrence (corrected for the main predictive factors already known).

MATERIAL AND METHODS: We performed a cross-sectional questionnaire survey. Data from PDs (N = 497) were used for analyses. Logistic regression analyses were performed to assess the association of reported sudden-onset sleep at the wheel with working conditions and general lifestyle factors.

RESULTS: Forty-one percent of the interviewees experienced at least 1 episode per month of sudden-onset sleep at the wheel (4.7% per week). Predictive factors of self-reported FAW were: age > 55 years old (odds ratio (OR) = 4.91, confidence interval (CI): 1.79-13.50, p < 0.01), traveling more than 40 thousand miles per year (OR = 1.86, 95% CI: 1.08-3.22, p < 0.05), body mass index \geq 30 (OR = 2.16, 95% CI: 1.01-4.64, p < 0.05) and Chalder Fatigue Questionnaire score > 22 (OR = 3.93, 95% CI: 1.90-8.14, p < 0.01).

CONCLUSIONS: There are different work and human factors underlying FAW among PDs. The Chalder Fatigue

Questionnaire might be useful in measuring fatigue in this group and in detecting PDs at high risk of experiencing FAW.

2 *Sensors (Basel). 2014 May 5;14(5):8126-49.*

Evaluation of candidate measures for home-based screening of sleep disordered breathing in Taiwanese bus drivers.

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BACKGROUND: Sleepiness-at-the-wheel has been identified as a major cause of highway accidents. The aim of our study is identifying the candidate measures for home-based screening of sleep disordered breathing in Taiwanese bus drivers, instead of polysomnography.

METHODS: Overnight polysomnography accompanied with simultaneous measurements of alternative screening devices (pulse oximetry, ApneaLink, and Actigraphy), heart rate variability, wake-up systolic blood pressure and questionnaires were completed by 151 eligible participants who were long-haul bus drivers with a duty period of more than 12 h a day and duty shifting.

RESULTS: 63.6% of professional bus drivers were diagnosed as having sleep disordered breathing and had a higher body mass index, neck circumference, systolic blood pressure, arousal index and desaturation index than those professional bus drivers without evidence of sleep disordered breathing. Simple home-based candidate measures: (1) Pulse oximetry, oxygen-desaturation indices by $\geq 3\%$ and 4% ($r = 0.87-0.92$); (2) Pulse oximetry, pulse-rising indices by $\geq 7\%$ and 8% from a baseline ($r = 0.61-0.89$); and (3) ApneaLink airflow detection, apnea-hypopnea indices ($r = 0.70-0.70$), based on recording-time or Actigraphy-corrected total sleep time were all significantly correlated with, and had high agreement with, corresponding polysomnographic apnea-hypopnea indices [(1) 94.5%-96.6%, (2) 93.8%-97.2%, (3) 91.1%-91.3%, respectively]. Conversely, no validities of SDB screening were found in the multi-variables apnea prediction questionnaire, Epworth Sleepiness Scale, night-sleep heart rate variability, wake-up systolic blood pressure and anthropometric variables.

CONCLUSIONS: The indices of pulse oximetry and apnea flow detection are eligible criteria for home-based screening of sleep disordered breathing, specifically for professional drivers.

3. *Aviat Space Environ Med.* 2014 May;85(5):497-503.

Attention and visual tracking degradation during acute sleep deprivation in a military sample.

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BACKGROUND: Fatigue due to sleep restriction places individuals at elevated risk for accidents, degraded health, and impaired physical and mental performance. Early detection of fatigue-related performance decrements is an important component of injury prevention and can help to ensure optimal performance and mission readiness. This study used a predictive visual tracking task and a computer-based measure of attention to characterize fatigue-related attention decrements in healthy Army personnel during acute sleep deprivation.

METHODS: Serving as subjects in this laboratory-based study were 87 male and female service members between the ages of 18 and 50 with no history of brain injury with loss of consciousness, substance abuse, or significant psychiatric or neurologic diagnoses. Subjects underwent 26 h of sleep deprivation, during which eye movement measures from a continuous circular visual tracking task and attention measures (reaction time, accuracy) from the Attention Network Test (ANT) were collected at baseline, 20 h awake, and between 24 to 26 h awake.

RESULTS: Increases in the variability of gaze positional errors (46-47%), as well as reaction time-based ANT measures (9-65%), were observed across 26 h of sleep deprivation. Accuracy of ANT responses declined across this same period (11%).

DISCUSSION: Performance measures of predictive visual tracking accurately reflect impaired attention due to acute sleep deprivation and provide a promising approach for assessing readiness in personnel serving in diverse occupational areas, including flight and ground support crews.

4. *Chronobiol Int.* 2014 May;31(4):532-41.

Chronotype-dependent circadian rhythmicity of driving safety.

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Among the factors associated with driving safety, sleep-related variables constitute a leading cause of road accidents. Circadian fluctuations of driver's somnolence has been previously linked to road safety. However, the role of chronotype in this relationship has been poorly investigated. Thus, the aim of the present work was to address whether driving performance is influenced by circadian patterns, in turn modulated by the driver's chronotype and the time of day (i.e. synchrony effect). We assessed 47 healthy young adults with specific chronotypes in several simulated driving sessions, both in the morning and in the evening. We collected driving performance data, along with self-reported levels of activation prior to each driving session and other sleep-related variables.

Participants drove less safely when testing times took place outside their optimal time of day, as determined by their chronotype and confirmed by self-reported levels of activation. These differences were more pronounced in the morning, when morning types shown a better driving performance. Our results suggest that chronotype plays an important role as a modulator of the relationship between the time of day and driving safety. Therefore, it is necessary to acknowledge this variable in theoretical models of driving behavior, and for the improvement of occupational accidents prevention programs.

5. *Indian J Occup Environ Med.* 2014 May;18(2):39-47.

Sleep apnea and occupational accidents: Are oral appliances the solution?

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BACKGROUND: Dental practitioners have a key role in the quality of life and prevention of occupational accidents of workers with Obstructive Sleep Apnea Syndrome (OSAS).

AIM: The aim of this study was to review the impact of OSAS, the Continuous Positive Airway Pressure (CPAP) therapy, and the evidence regarding the use of oral appliances (OA) on the health and safety of workers.

MATERIALS AND METHODS: Searches were conducted in MEDLINE (PubMed), Lilacs and SciELO. Articles published from January 1980 to June 2014 were included.

RESULTS: The research retrieved 2188 articles and 99 met the inclusion criteria. An increase in occupational accidents due to reduced vigilance and attention in snorers and patients with OSAS was observed. Such involvements were related to excessive daytime sleepiness and neurocognitive function impairments. The use of OA are less effective when compared with CPAP, but the results related to excessive sleepiness and cognitive performance showed improvements similar to CPAP. Treatments with OA showed greater patient compliance than the CPAP therapy.

CONCLUSION: OSAS is a prevalent disorder among workers, leads to increased risk of occupational accidents, and has a significant impact on the economy. The CPAP therapy reduces the risk of occupational accidents. The OA can improve the work performance; but there is no scientific evidence associating its use with occupational accidents reduction. Future research should focus on determining the cost-effectiveness of OA as well as its influence and efficacy in preventing occupational accidents.

6. *J Occup Environ Med.* 2014 May;56(5):510-5.

Association of sleep habits with accidents and near misses in United States transportation operators.

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OBJECTIVE: To explore sleep risk factors and their association with adverse events in transportation operators.

METHODS: Self-reported sleep-related behaviors were analyzed in transportation operators (drivers, pilots, and rail operators) aged 26 to 78 years who completed the National Sleep Foundation's 2012 "Planes, Trains, Automobiles, and Sleep" survey. Regression analyses were used to assess the associations of various sleep-related variables with the combined outcome of self-reported accidents and near misses.

RESULTS: Age- and body mass-adjusted predictors of accidents/near misses included an accident while commuting (odds ratio [OR] = 4.6; confidence interval [CI], 2.1 to 9.8), driving drowsy (OR = 4.1; CI, 2.5 to 6.7), and Sheehan Disability Scale score greater than 15 (OR = 3.5; CI, 2.2 to 5.5). Sleeping more than 7 hours nightly was protective for accident/near misses (OR = 0.6; CI, 0.4 to 0.9).

CONCLUSION: Recognized risk factors for poor sleep or excessive daytime sleepiness were significantly associated with self-reported near misses and/or accidents in transportation operators.

7. *Ann Pharmacother.* 2014 Apr;48(4):476-82.

Potentially driver-impairing (PDI) medication use in medically impaired adults referred for driving evaluation.

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BACKGROUND: Potentially driver-impairing (PDI) medications have been associated with poorer driving performance and increased risk of motor vehicle collision.

OBJECTIVES: To describe the frequency of medication use and to determine the association between routine use of PDI medications and performance on driving and cognitive tests.

METHODS: A total of 225 drivers with medical impairment (mean age 68 ± 12.8 years, 62.2% male) were referred to an occupational therapy-based driving evaluation clinic. Medication lists were reviewed to identify PDI drugs, as defined by a previous study examining medications and crash risk. Outcome variables included road testing on the modified Washington University Road Test and cognitive scores on Trail Making Test Parts A and B, Snellgrove Maze Task, Clock Drawing Task, Driving Health Inventory (DHI) Useful Field of View, DHI Motor Free Visual Perceptual Test, Epworth Sleepiness Scale (ESS), Geriatric Depression Scale, and Functional Assessment Questionnaire.

RESULTS: PDI medication use was documented in 68.9% of the sample, with the average subject taking 1.4 PDI drugs. Drivers taking routine PDI medications had a mean ESS score of 7.8 compared to 6.0 in the control group, suggesting increased somnolence (P = .007). Total number of routine medications, regardless of PDI designation, also correlated positively with ESS scores (P = .023).

CONCLUSIONS: Use of PDI medications was associated with informant ratings of daytime drowsiness on the ESS, which has been linked to motor vehicle crash risk. Further investigation of individual drug classes is warranted using larger sample sizes and a high-powered study design.

8. *Electron Physician*. 2014 May 10;6(2):827-31.

Examining fatigue and insomnia symptoms among workers of a gas transmission industry in 2013.

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BACKGROUND: Fatigue, which interferes with one's physical and mental operation, resulting in strength reduction and weakness, is considered one of the most important issues in the workplace. In addition, it can cause diseases, occupational accidents, and a reduction in an individual's efficiency. The aforementioned effects can be aggravated by fatigue in shift workers who experience sleep disturbance. The aim of this study was to investigate fatigue and the Insomnia Severity Index (ISI) among workers of a gas transmission industry in 2013.

METHODS: This descriptive analytical study was conducted among 300 workers of the aforementioned industry and required data was collected via the face-to-face survey method and questionnaires. Data analysis was done with the following techniques: Mann-Whitney, variance analysis test, independent t-test, Kruskal-Wallis, Spearman's correlation test, and chi square test.

RESULTS: The highest fatigue scores among fixed-dayshift and rotating-shift workers were 6 and 7, respectively, and the fatigue level for both groups was 4. The average of all symptoms associated with fatigue and the total score on the Insomnia Severity Index in rotating-shift workers were higher than for dayshift workers and there was a significant difference between them ($P=0.001$). Lack of concentration, exhaustion, and fatigue during work were the most common symptoms of fatigue among the aforementioned shift workers in this evaluation.

CONCLUSION: The findings indicated that the level

of fatigue and severity of insomnia among workers of this gas transmission industry is very high. Since this can lead to occupational accidents and efficiency reduction, it is necessary to provide workers with opportunities such as short breaks during working hours, rest and exercise during work, paying adequate attention to the workers' human needs, and improving work systems.

9. *Int J Occup Environ Med*. 2014 Apr;5(2):84-93.

Determinants of occupational injury in Kombolcha textile factory, North-East Ethiopia.

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BACKGROUND: Textile factory is among the most common manufacturing industries that has higher rate of work-related injuries. Knowing the associated factors of work-related injuries can be a critical step for improving the working condition of workers in the sector.

OBJECTIVE: To assess the major determinants of occupational injury among workers in Kombolcha textile factory, North-East Ethiopia.

METHODS: An institution-based cross-sectional study was conducted from April 1 to 15, 2013 on 455 randomly selected workers after stratification by working departments. The data was collected using a structured questionnaire through face-to-face interview by data collectors of 6 occupational health experts and 6 nurses.

RESULTS: Working >48 hrs/wk (aOR: 2.71, 95% CI: 1.18-6.24), handling objects >20 kg (aOR: 2.35, 95% CI: 1.24-4.45), visual concentration (aOR: 3.10, 95% CI: 1.42-6.75), timely maintenance of machine (aOR: 1.80, 95% CI: 1.11-2.93), and sleep disorder (aOR: 2.95, 95% CI: 1.47-5.92) were significant factors for the occurrence of occupational injuries.

CONCLUSION: Many factors including working for a long time with accurate instruments and sleep disorders can cause occupational injury in textile industries.

10. *BMJ Open*. 2014 Mar 6;4(3):e003434.

Health assessment of commercial drivers: a meta-narrative systematic review.

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BACKGROUND: Motor vehicle accidents associated with commercial driving are an important cause of occupational death and impact public safety.

OBJECTIVES: We summarise the evidence regarding the type, prevalence and impact of medical conditions discovered during health assessment of commercial drivers.

EVIDENCE REVIEW: We conducted a systematic review of multiple electronic databases and made a manual search for relevant studies that enrolled commercial drivers in any country and reported the outcomes of health assessment carried out in the context of commercial driving through November 2012. Data were extracted by a pair of independent reviewers and synthesised using a meta narrative approach.

RESULTS: We identified 32 studies of moderate methodological quality enrolling 151 644 commercial drivers (98% men). The prevalence of multiple health conditions was high (sleep disorders 19%, diabetes 33%, hypertension 23% and obesity 45%). Some conditions, such as sleep disorders and obesity, were linked to increased risk of crashes. Evidence on several other highly relevant medical conditions was lacking. Cost-effectiveness data were sparse.

CONCLUSIONS: Several medical conditions are highly prevalent in commercial drivers and can be associated with increased risk of crashes, thus providing a rationale for health assessment of commercial drivers.

11. *Scand J Work Environ Health*. 2014 Mar;40(2):146-55.

The effects of rest breaks, work shift start time, and sleep on the onset of severe injury among workers in the People's Republic of China.

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OBJECTIVE: The aim of the present study was to investigate the effects of the duration and timing of rest breaks on traumatic injury risk across a shift in a relatively large sample of hospitalized workers with severe work-related hand injury in the People's Republic of China (PRC).

METHODS: Hospitalized workers from multiple industries with severe work-related traumatic hand injury were recruited from 11 hospitals in three industrially-developed cities in the PRC: Ningbo, Liuzhou, and Wuxi. Cox regression was used to compare time into the work shift of injury across categories of rest breaks, while evaluating several potential covariates including age, gender, work hours, work start time and duration, injury day and time, duration and quality of last sleep, alertness/sleepiness, job control, and several transient work-related factors. Effect modification by work shift start time was also evaluated.

RESULTS: With four days of injury, 703 hospitalized workers completed a face-to-face interview. After adjusting for significant covariates, workers with rest breaks of 1-30, 31-60, and >60 minutes were able to work significantly ($P < 0.001$) longer into their work shift without an injury (>5 hours) than those with no rest break. A significant interaction was also observed between rest break status and start time of the work shift.

CONCLUSION: The results of this study suggest that rest breaks of any duration have a significant effect on delaying the onset of a work-related injury, which is modified by the time of day in which a shift begins.

12. *Sleep Breath.* 2014 Mar;18(1):59-68.

Sleepiness and sleep-disordered breathing in truck drivers: risk analysis of road accidents.

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BACKGROUND: Portugal has one of the highest road traffic fatality rates in Europe. A clear association between sleep-disordered breathing (SDB) and traffic accidents has been previously demonstrated. This study aimed to determine prevalence of excessive daytime sleepiness (EDS) and other sleep disorder symptoms among truck drivers and to identify which individual traits and work habits are associated to increased sleepiness and accident risk.

METHODS: We evaluated a sample of 714 truck drivers using a questionnaire (244 face-to-face interviews, 470 self-administered) that included sociodemographic data, personal habits, previous accidents, Epworth Sleepiness Scale (ESS), and the Berlin questionnaire (BQ).

RESULTS: Twenty percent of drivers had EDS and 29% were at high risk for having obstructive sleep apnea syndrome (OSAS). Two hundred sixty-one drivers (36.6%) reported near-miss accidents (42.5 % sleep related) and 264 (37.0 %), a driving accident (16.3 % sleep related). ESS score ≥ 11 was a risk factor for both near-miss accidents (odds ratio (OR)=3.84, $p < 0.01$) and accidents (OR=2.25, $p < 0.01$). Antidepressant use was related to accidents (OR=3.30, $p = 0.03$). We found an association between high Mallampati score (III-IV) and near misses (OR=1.89, $p = 0.04$).

CONCLUSION: In this sample of Portuguese truck drivers, we observed a high prevalence of EDS and other sleep disorder symptoms. Accident risk was related to sleepiness and antidepressant use. Identifying drivers at risk for OSAS should be a major priority of medical assessment centers, as a public safety policy.

13. *Ann Occup Environ Med.* 2014 Apr 25;26:7.

A case of obstructive sleep apnea and assessments of fitness for work.

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BACKGROUND: Obstructive sleep apnea is a common sleep disorder that can cause excessive daytime sleepiness and impairment of cognition. These symptoms may lead to the occurrence of occupational accidents in workers with obstructive sleep apnea.

CASE PRESENTATION: A 36-year-old man who worked as a dimensional control surveyor caused a vehicle accident while he was driving at the work site. Although he experienced loss of consciousness at the time of the accident, he had no other symptoms. His brain computed tomography and laboratory test did not show any specific findings. Medical tests were conducted to evaluate his fitness for work. Decreased sleep latency was observed on the electroencephalography image, which is suggestive of a sleep disorder. He frequently experienced daytime sleepiness and his Epworth sleepiness score was 13. The polysomnography showed a markedly increased apnea-hypopnea index of 84.3, which led to a diagnosis of severe obstructive sleep apnea. The patient was advised to return to work only when his obstructive sleep apnea improved through proper treatment.

CONCLUSION: Proper screening for obstructive sleep apnea among workers is important for preventing workplace accidents caused by this disorder, but screening guidelines have not yet been established in Korea. An effort toward preparing practical guidelines for obstructive sleep apnea is needed.

14. *BMC Med Educ.* 2014;14 Suppl 1:S3.

Managing and mitigating fatigue in the era of changing resident duty hours.

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The medical establishment is grappling with the complex issue of duty hour regulations - an issue that is a natural consequence of the numerous changes in medical culture and practice that have occurred over the course of decades. Sleep deprivation resulting from long duty hours has a recognized impact on resident health and wellness. This paper will briefly outline the evolution of the concept of well-being in residency, review the specific theme of fatigue management within that context, and describe strategies that may be used to mitigate and manage fatigue, as well as approaches that may be taken to adapt to new scheduling models such as night float. Finally, the paper will call for a change in the culture in our workplaces and among our residents and faculty to one that promotes good health and ensures that we maintain a fit and sustainable medical workforce.

15. *Ind Health.* 2014;52(1):13-24.

Obstructive sleep apnea in North American commercial drivers.

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The most common medical cause of excessive daytime sleepiness (EDS) is obstructive sleep apnea (OSA). Specifically, among an estimated 14 million US commercial drivers, 17-28% or 2.4 to 3.9 million are expected to have OSA. Based on existing epidemiologic evidence, most of these drivers are undiagnosed and not adequately treated. Untreated OSA increases the risk of vehicular crashes as documented in multiple independent studies and by meta-analysis. Therefore, identifying commercial drivers with OSA and having them effectively treated should decrease crash-related fatalities and injuries. Several strategies are available for screening and identifying drivers with OSA. The simplest and most effective objective strategies use body mass index (BMI) cutoffs for obesity.

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Functional screens are promising adjuncts to other objective tests. The most effective approach will likely be a combination of a good questionnaire; BMI measures; and a careful physician-obtained history complemented by a functional screen.

16. *Turk J Med Sci.* 2014;44(2):249-54.

The association of nocturia with sleep disorders and metabolic and chronic pulmonary conditions: data derived from the polysomnographic evaluations of 730 patients.

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AIM: To evaluate the prevalence of nocturia among different degrees of obstructive sleep apnea (OSA) and its association with various clinical conditions.

MATERIALS AND METHODS: In 730 OSA patients, the prevalence and frequency of nocturia was determined, and the association of nocturia with clinical and laboratory variables such as the apnea-hypopnea index (AHI), apnea duration, and minimum oxygen saturation and clinical conditions such as diabetes mellitus, coronary heart disease, and chronic obstructive pulmonary disease (COPD) was determined.

RESULTS: The overall prevalence of nocturia (≥ 2 wakes/night) was 50.9%. Prevalences of nocturia in simple snoring and mild, moderate, and severe OSA patients were 40.6%, 44.4%, 58.6%, and 57.1%, respectively ($P < 0.005$). The frequency of nocturia significantly increases with the severity of OSA (1.4 ± 1.0 wakes/night in mild OSA vs. 2.0 ± 1.4 wakes/night in severe OSA, $P = 0.001$). Age, AHI, average oxygen saturation, and presence of diabetes mellitus, hypertension, and COPD were found to be significant risk factors associated with nocturia ($P < 0.001$).

CONCLUSION: The frequency of nocturia increases as the severity of OSA increase. The increased prevalence of nocturia in patients with OSA, diabetes mellitus, hypertension, and COPD indicates the complex physiological background of this bothersome urologic symptom.

17. *Patient Prefer Adherence*. 2014 Dec 10;8:1699-704.

Experience of insomnia, symptom attribution and treatment preferences in individuals with moderate to severe COPD: a qualitative study.

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Persons with chronic obstructive pulmonary disease (COPD) are known to have poor sleep quality. Acceptance of and adherence to therapies for sleep problems may depend on how the person with COPD regards the source of his sleep problem, yet little is known about their attribution as to the cause of these sleep symptoms.

The objective of this study was to describe the subjective sleep complaints of individuals with COPD along with their attributions as to the cause of these symptoms, and their treatment preferences for insomnia. Three focus groups were conducted (N=18) with participants who have moderate to severe COPD. Focus group data were transcribed, compared and contrasted to identify themes of attribution. Participants reported difficulty falling asleep, staying asleep, and daytime sleepiness. They attributed their sleep problems primarily to their pulmonary symptoms, but also poor air quality (thick humid air) and death anxiety when awake during the night. There was no clear preference for type of treatment to remedy this problem (medication, cognitive therapy), although they indicated that traveling to the clinic was difficult and should be avoided as much as possible.

These data suggest that environmental manipulation to improve air quality (eg, air conditioning) and modifications to reduce death anxiety could be beneficial to persons with COPD. In-person multi-session therapy

may not be acceptable to persons with moderate to severe COPD, however internet-based therapy might make treatment more accessible.

18. *Sleep Breath*. 2015 Sep;19(3):921-30.

Zopiclone effects on breathing at sleep in stable chronic obstructive pulmonary disease.

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PURPOSE: More than half of patients with chronic obstructive pulmonary disease (COPD) experiences sleep-related problems and about one fourth uses hypnotics regularly. We explored what the effect zopiclone, a commonly used hypnotic, had on nocturnal gas exchange and the apnea/hypopnea frequency in stable COPD.

METHODS: Randomized crossover study of 31 (ten males) inpatients at a pulmonary rehabilitation hospital, median age 64 years, of which 20 had a forced expiratory volume first second <50% of predicted. Subjects investigated in randomized order of either baseline sleep or intervention with 5 mg zopiclone by polysomnography including transcutaneous measurement of carbon dioxide pressure increased ($\dot{A}P_{tCO_2}$).

RESULTS: Zopiclone increased the mean $\dot{A}P_{tCO_2}$, from baseline both in rapid eye movement (REM) sleep, non-REM sleep, and even in stage N0 (awake after sleep onset) with a mean (SD) of 0.25 (0.40) kPa, 0.22 (0.32) kPa, and 0.14 (0.27) kPa, respectively. Subjects with sleep hypoventilation as defined by the American Academy of Sleep Medicine increased from 6 subjects (19%) to 13 subjects (42%) (P=0.020). REM sleep minimum oxygen saturation (minSpO₂) did not change significantly from baseline median (interquartile range [IQR]) minSpO₂, 81.8 (12.1) % to zopiclone sleep median (IQR) minSpO₂, 80.0 (12.0) % (P=0.766). Interestingly, zopiclone reduced the number of apneas/hypopneas per hour (AHI) in subjects with overlap (AHI \geq 15) with a median difference (IQR) of -8.5 (7.8) (N= 11, P = 0.016).

CONCLUSIONS: In stable COPD, zopiclone moderately increases the mean $\dot{A}P_{tCO_2}$, without

changing minSpO₂ at night and reduces AHI in overlap (COPD and obstructive sleep apnea) subjects.

19. *Semin Respir Crit Care Med.* 2014 Oct;35(5):593-603.

Auto-adjusting and advanced positive airway pressure therapeutic modalities.

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Continuous positive airway pressure (CPAP) therapy is the first-line treatment for obstructive sleep apnea (OSA). Although the gold standard for the treatment of OSA, CPAP may not be the optimal modality to treat more complex sleep disordered breathing such as Cheyne-Stokes respirations, opioid-induced central apnea, and complex sleep disordered breathing related to chronic hypoventilation syndromes (obesity-hypoventilation syndrome, restrictive thoracic disease due to neuromuscular or thoracic cage disease, chronic obstructive pulmonary disease). Newer generation auto-adjusting PAP devices are increasingly being used to treat OSA. Advanced positive airway pressure modalities have been developed in an effort to improve treatment of the more complex sleep disordered breathing syndromes including automated servo ventilation and volume-targeted pressure-limited ventilation. This article is intended to provide the clinician reader with a description of newer PAP modalities, a review of evidence-supported indications for use, as well as to provide a framework for managing patients with advanced positive airway pressure therapy.

20. *Respir Res.* 2014 Oct 21;15:122.

Observational study to characterise 24-hour COPD symptoms and their relationship with patient-reported outcomes: results from the ASSESS study.

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BACKGROUND: Few studies have investigated the 24-hour symptom profile in patients with COPD or how symptoms during the 24-hour day are inter-related. This observational study assessed the prevalence, severity and relationship between night-time, early morning and daytime COPD symptoms and explored the relationship between 24-hour symptoms and other patient-reported outcomes.

METHODS: The study enrolled patients with stable COPD in clinical practice. Baseline night-time, early morning and daytime symptoms (symptom questionnaire), severity of airflow obstruction (FEV₁), dyspnoea (modified Medical Research Council Dyspnoea

Scale), health status (COPD Assessment Test), anxiety and depression levels (Hospital Anxiety and Depression Scale), sleep quality (COPD and Asthma Sleep Impact Scale) and physical activity level (sedentary, moderately active or active) were recorded.

RESULTS: The full analysis set included 727 patients: 65.8% male, mean \pm standard deviation age 67.2 ± 8.8 years, % predicted FEV1 $52.8 \pm 20.5\%$. In each part of the 24-hour day, >60% of patients reported experiencing ≥ 1 symptom in the week before baseline. Symptoms were more common in the early morning and daytime versus night-time (81.4%, 82.7% and 63.0%, respectively). Symptom severity was comparable for each period assessed. Overall, in the week before baseline, 56.7% of patients had symptoms throughout the whole 24-hour day (3 parts of the day); 79.9% had symptoms in ≥ 2 parts of the 24-hour day. Symptoms during each part of the day were inter-related, irrespective of disease severity (all $p < 0.001$). Early morning and daytime symptoms were associated with the severity of airflow obstruction ($p < 0.05$ for both). Night-time, early morning and daytime symptoms were all associated with worse dyspnoea, health status and sleep quality, and higher anxiety and depression levels (all $p < 0.001$ versus patients without symptoms in each corresponding period). In each part of the 24-hour day, there was also an association between symptoms and a patient's physical activity level ($p < 0.05$ for each period).

CONCLUSIONS: More than half of patients experienced COPD symptoms throughout the whole 24-hour day. There was a significant relationship between night-time, early morning and daytime symptoms. In each period, symptoms were associated with worse patient-reported outcomes, suggesting that improving 24-hour symptoms should be an important consideration in the management of COPD.

21. *Singapore Med J.* 2014 Sep;55(9):488-92.

Overlap syndrome between chronic obstructive pulmonary disease and obstructive sleep apnoea in a Southeast Asian teaching hospital.

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INTRODUCTION: Overlap syndrome between obstructive sleep apnoea (OSA) and chronic obstructive pulmonary disease (COPD) is important but under-recognised. We aimed to determine the prevalence of overlap syndrome and the predictors of OSA in patients with COPD.

METHODS: Patients aged ≥ 40 years were recruited from a dedicated COPD clinic and underwent overnight polysomnography. A diagnosis of OSA was made when apnoea-hypopnoea index (AHI) was ≥ 5 .

RESULTS: In all, 22 patients (aged 71 ± 9 years), predominantly men, were recruited. Mean values recorded were: predicted forced expiratory volume in the first second percentage 55 ± 15 ; body mass index 23.7 ± 6.5 kg/m²; Epworth Sleepiness Scale score 5.6 ± 5.8 ; and AHI 15.8 ± 18.6 . Among the 14 patients with OSA (prevalence of overlap syndrome at 63.6%), the mean number of hospital visits for COPD exacerbations in the preceding one year was 0.5 ± 0.7 . Patients with overlap syndrome had worse modified Medical Research Council dyspnoea scale scores and a lower percentage of rapid eye movement (REM) sleep than patients without. There were no other statistical differences in lung function or sleep study indices between the two patient groups.

CONCLUSION: The majority of our patients had overlap syndrome and minimal exacerbations, and were not obese or sleepy. Significant differences between patients with and without overlap syndrome were seen in two aspects - the former was more dyspnoeic and had less REM sleep. Our findings suggest that standard clinical predictors cannot be used for patients with overlap syndrome, and therefore, a high index of suspicion is needed.

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A review of fatigue in fishermen: a complicated and underprioritised area of research.

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BACKGROUND: Fatigue in fishing has been a highly underprioritised area of research, even though fatigue has been found to be the largest single contributing factor in accidents.

AIM: The aim of this article/paper is to provide an overview of the research conducted on fatigue in fishermen up to date, in order to establish a starting point for further research in this area.

MATERIALS AND METHODS: The review is mainly

based on journal articles from PubMed, Google Scholar, International Maritime Health, Science Direct and some relevant articles links were also followed.

RESULTS: The research revealed that only 5 articles have been published concerning fatigue in fishermen. The articles all confirmed that fatigue is a serious health and safety issue among fishermen, and that further research therefore is warranted.

CONCLUSIONS: Only 2 of the 5 studies of fishermen's fatigue used objective measures and in one of these, the sample size was small (n = 19), effectively limiting the statistical analysis and its application. Further research using larger samples is needed, preferably with a mix of objective and subjective measures, where of some of the questions should be scenario based and some should be from standardised questionnaires. Greater understanding is also needed to assess how much of the variance in fatigue is attributable to e.g. length of trip, hours of work without rest, and type of job and specific tasks. A greater understanding of the similarities and differences between acute and long-term fatigue is also needed.