

Results: Students with greater LMS social jet lag had a lower grade point average (ANCOVA: $F_{9,32269} = 44.8$, $P < 0.001$). Social jet lag was larger in students with a later LMS login rhythm on non-school days (later chronotype) and for earlier school start times. The phase response curve revealed that the direction and magnitude of social jet lag were strongly dependent on the phase of students' diurnal rhythm when their first class of the day took place. Phase shifts of up to 12 h were observed when school start times occurred out of phase with students' diurnal rhythm.

Conclusion: School start times have a profound impact on students' diurnal behaviour. Students whose diurnal patterns of LMS logins were similar on both school days and non-school days obtained better grades than their peers with LMS social jet lag. Universities can potentially improve learning by scheduling classes at times that are better aligned with students' diurnal learning rhythm.

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EXPLORING THE INFLUENCING FACTORS OF SLEEP DISTURBANCE AND WORK WELL-BEING AMONG SHIFT-WORK NURSES IN TAIWAN

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Introduction: Job-related stress and sleep disturbances are common problems among registered nurses (RNs). At present, more than half of the nursing staff in Taiwan have the intention to leave, so this is a problem that cannot be ignored. This cross-sectional correlational research based on Job Demands-Resources Model aimed to explore the influencing factors of work well-being from sleep and job crafting perspective.

Methods: A total of 220 (13.3% was male) shift-work RNs (mean age = 30.6, SD = 6.5), were recruited from seven intensive care units of a teaching hospital in central Taiwan. All nurses completed a battery questionnaires measuring their job-related stress, sleep disturbances, fatigue severity, self-efficacy, job crafting, and work well-being. In addition, a 7-day sleep diary were collected to estimate their total sleep time (TST).

Results: Majority of the RNs reported poor sleep quality (61.5%), insufficient sleep quantity (62.8%), and poor daytime functioning (49.5%). According to the sleep diary, their average TST (464 minutes, SD = 91.7) was close to what they needed to feel refreshed (472 minutes, SD = 87.5); however, more than three-quarters of them experienced clinically significant fatigue before bedtime (92.3%) and after waking up (72.7%). Job-related stress was measured by the Copenhagen Psychosocial Questionnaire II, the top three stressors were from value at work level, interpersonal relations and leadership, and work organization. Sleep disturbances was correlated with poor work well-being. After controlling for personal factors (age, gender, and years in nursing) and sleep disturbances, self-efficacy, job-related stress, and job crafting explained 49.8% of work well-being; work organization, value at work level, and job crafting are the significant predictors.

Conclusion: Most RNs in this study reported sleep disturbances and severe fatigue, which had a negative impact on their work

well-being. Job-related stress contributed to sleep disturbances, and calls for further study on job-crafting and shift work coping.

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WORK DURATION AFFECTS HOW PRIOR-NIGHT SLEEP PREDICTS NEXT-DAY ENERGY EXPENDITURE IN EMERGENCY RESPONSE SYSTEM TELECOMMUNICATORS

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Introduction: ERS telecommunicators are the first of the first responders challenged with solving complex, time-sensitive problems while managing workplace presence. Very little is known about sleep, work, and lifestyle factors among workers in this industry. One study demonstrated that 85% of ERS telecommunicators are overweight, suggesting that job-related factors may place these workers at risk for sedentary lifestyles. To test this hypothesis, we examined whether 14 day total work duration moderated the daily relationship between prior-night total sleep time and next day energy expenditure.

Methods: Over the course of 14 days (M = 6.9 days on-shift; SD = 1.9 days), 47 ERS telecommunicators were instructed to (a) wear actigraphs on their waist to gather estimates of average energy expenditure (EE, kcal/hour), (b) wear actigraphs on their wrist to gather estimates of total sleep time (min), and (c) complete daily shift logs to gather information about work duration (hours). Mixed linear modeling was employed to examine whether prior night within-subject total sleep time (TST) predicted next day energy expenditure, as moderated by between-subject work hours (n = 525 cases).

Results: A significant cross-level Work Duration x TST interaction (Estimate = .007, SE = .002, $p < .001$, 95% CI [.003, .011]) indicated that less prior-night TST was associated with less next-day EE among telecommunicators who worked more hours over the last 14 days. Conversely, telecommunicators who worked fewer hours expended more energy per hour the next day when they slept less than usual. Simple effects indicated that for each extra 102 minutes sleep (+1 SD), telecommunicators expended 5 kcal/hr (90 kcal over 18 hours awake). These results remained stable when controlling for between-subject differences in sleep and within-subject changes in work duration, night-shift work, and other relevant covariates.

Conclusion: The effect of total sleep time on next-day EE is unique to each telecommunicator's typical sleep levels and the total hours worked over the course of two weeks. These two risk factors operate on EE as a function of one another. Findings provide support for the implementation of policy-level intervention to minimize chronic overwork and individual-level intervention to support sleep prioritization.

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