Bright Light Improves Sleep and Psychological Health in Shift Working Nurses

Commentary on Huang et al. The effectiveness of light/dark exposure to treat insomnia in female nurses undertaking shift work during the evening/night shift. *J Clin Sleep Med* 2013;9:641-648.

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In this issue of *Journal of Clinical Sleep Medicine*, Huang and colleagues investigated the effectiveness of bright light exposure in shift working nurses on an evening or night shift schedule.¹ Nurses working in a hospital were divided in two groups, where the treatment group received bright light of 7,000-10,000 lux for 30 minutes at about 8 pm (evening shift) or at about 11:30 pm (night shift), whereas the control group did not receive any light treatment. Both groups were instructed to wear dark sunglasses to avoid outdoor light after work and before sleep. The study period was 10-14 days. The outcome measures were well-validated self-report instruments: Insomnia Severity Index (ISI) and Hospital Anxiety and Depression scale (HADS). The results showed that the treatment group impressively improved sleep. Furthermore, the scores on the anxiety and depression scale decreased significantly. No effects were seen in the control group.

Many shift workers suffer from poor sleep and sleepiness. The most afflicted workers may be diagnosed with shift work disorder (SWD), a circadian rhythm sleep disorder, characterized by a complaint of insomnia or excessive sleepiness that is temporally associated with a recurring work schedule that overlaps the usual time for sleep over the course of at least one month.² In nurses, the prevalence of SWD varies according to work schedule, but may be as high as 44% among nurses involved in night shifts.³ On the other hand, it may be surprising that the majority of shift workers, also those involved in night work, do not report insomnia or excessive sleepiness. In addition to poor sleep and sleepiness, some studies show that night workers are at increased risk of anxiety/depression.⁴

Sleep is regulated by an interaction between homeostatic, circadian, and behavioral factors.⁵ Shift work, especially when night work is part of the schedule, results in a misalignment between the endogenous circadian timing system and the external 24-h environment. The treatment options for circadian rhythm sleep disorders comprise bright light treatment and exogenous melatonin administration. Both these chronobiotics need to be timed according to specific phase-response curves to have the wanted effect. For instance, bright light before the minimum (nadir) of the core body temperature will phase delay the circadian rhythm, whereas bright light after nadir produces a phase advance.⁵ This means that incorrectly timed bright light will likely worsen sleep and sleepiness complaints. Nadir is usually

located about 1 to 2 hours before the habitual wake-up time. In the study by Huang and colleagues,¹ the timing of treatment was appropriate, although even better results may have been expected if bright light had been timed according to the nurses' individual circadian rhythms.

The findings presented in the study by Huang and coworkers were surprisingly strong, and more impressive than seen following bright light treatment in, for instance, night workers in the petroleum industry.⁶ One reason may be that all participants in the study by Huang et al. had moderate to severe insomnia before treatment, whereas other studies may include participants with fewer complaints. However, a reduction in ISI score from 17.9 to 5.7 following treatment, compared to no effect in the control group, is amazing. In fact, 80% of the nurses did not have insomnia following treatment, whereas all nurses in the control group still met the criteria for insomnia. Similarly, the HADS scores were clearly reduced in the treatment group. It was somewhat surprising that light attenuation following work and before sleep (control group) had no effect. Other studies have shown that such an approach could help night workers with circadian adaptation.⁷

One of the major take home messages from the Huang et al. study is that such a treatment approach is relatively easy to implement into clinical practice. Bright light exposure of 30 minutes duration seems feasible in the workplace. Furthermore, there were few inclusion/exclusion criteria, suggesting that the findings may generalize to large groups of nurses working evening and/or night shifts. The improvements in sleep and psychological health may also have large consequences in terms of higher productivity, reduced risk of accidents/errors at work, as well as reduced sickness absence.

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Dr. Bjorvatn has participated in speaking engagements for GlaxoSmithKline, Nycomed, ResMed, Confex, and Medi3. Dr. Waage has indicated no financial conflicts of interest.