A recent Cochrane systematic review (Liira et al, 2014) looked at workers undertaking shift work and the effects of pharmacological interventions on:

» Reducing sleepiness;
» Improving alertness at work and decreasing sleep disturbances while off work;

The cost-effectiveness of these interventions was also examined.

Work implications
Shift work can result in sleep-awake disturbances or, if serious, in a more permanent shift work sleep disorder. The symptoms include sleepiness during night shifts and sleep disturbances after them. These symptoms may increase the chances for human errors and changes in basic biological and physiological functions. The negative effects of shift work on alertness and sleeping could be counterbalanced by pharmacological interventions.

Study details
The review examined 15 randomised placebo-controlled trials. Participants, who do shift work and may or may not have sleep problems, as well as those with diagnosed shift work sleep disorder, were included.

BOX 1. PRIMARY OUTCOME MEASURES
- Sleep length and sleep quality while off work
- Alertness and sleepiness, or fatigue, while at work
- Total sleep time (diary or actigraphy)

The studies evaluated the effect of:

» Melatonin and hypnotics on improving sleep problems;
» Drugs (modafinil and armodafinil) to promote wakefulness;
» Caffeine plus naps in decreasing sleepiness or increasing alertness.

The primary outcome measures are outlined in Box 1.

Of the nine studies for the melatonin placebo comparison two had a high risk of bias, while the study size was small in eight trials and the evidence quality was considered low. Trials of armodafinil (two trials) and modafinil (one trial) had low risk of bias and quality of evidence was considered moderate, whereas for the study looking at caffeine plus naps, there was a high risk of bias. Likewise, the trials using hypnotics (two trials) had a high risk of bias.

Primary outcome
Effect of melatonin (1-10mg) on sleep length after the night shift was measured by seven trials and its use may increase sleep length during day- and night-time sleep. A dose-response effect was not found. Furthermore, melatonin’s effect on sleep latency times (the amount of time it takes to fall asleep) was evaluated by five trials (74 participants), which concluded that its use leads to similar sleep latency times as placebo. Daytime sleep length after a shift was measured by one trial (28 participants), which compared zopiclone (hypnotic) with a placebo. The study did not demonstrate a significantly longer sleep length. In contrast, in two trials of armodafinil taken before the night shift, there was reduced sleepiness and increased alertness in a simple reaction time test. Likewise, modafinil presented similar effects on sleepiness and alertness in the psychomotor vigilance test in the same patient group. Finally, one trial found the effect of caffeine plus naps taken before the night shift is likely to decrease sleepiness. No trials reported on the secondary outcomes of the drugs’ cost effectiveness.

Recommendations
This review suggests melatonin may improve sleep length after a night shift but may not improve other sleep parameters. Modafinil and armodafinil – although being associated with adverse events – increased alertness and reduced sleepiness during the night shift in employees who have shift work sleep disorder. In addition, pre-shift caffeine plus pre-shift naps may increase alertness during the night shift. The evidence available does not allow conclusions to be drawn about whether or not hypnotics improve sleep length or sleep quality after a night shift.

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References