
Executive summary

Health Council of the Netherlands. Shiftwork and health risks - possibilities for prevention. The Hague: Health Council of the Netherlands, 2015; publication no. 2015/25.

In the Netherlands, working at night is quite common. A total of about 16 per cent of the working population do night work. The practice is most common in the care sector, the hotel and catering industry, the transport sector and certain manufacturing industries. In scientific literature, there are indications that (prolonged) night working can lead to health problems, both in the short term and in the long term. The supposition is that such problems are mainly due to interference with the circadian rhythm and the consequent disturbance of bodily processes that follow a daily cycle. Being concerned about the situation, the Minister of Social Affairs and Employment asked the Health Council for advice. In particular, the minister asked what preventive measures could be taken to protect workers against the health risks associated with night work, and what effects could thus be prevented or reduced. In order to answer the minister's questions, the Health Council set up a special committee to consider the scientific data available from research into the effects of action to prevent health problems amongst night workers. The committee selected three recently published reviews as the primary sources of information.

Preventive measures

There are various preventive measures (interventions) described, intended to reduce the health problems associated with night work. The interventions may be divided into four general categories:

- Shift schedule changes
- Changes to workers' exposure to light
- Behavioural and lifestyle changes
- Use of medication and other substances.

Within each of those categories, a variety of interventions have been trialled and studied. Alternative approaches to shift schedule changes have included changing from a backward-rotating system to a forward-rotating system, or vice versa. Increasing or decreasing the length of the roster cycle has also been tried; so has making a combination of such changes. Interventions aimed at changing workers' exposure to light have included using light sources of different strengths and colour temperatures, sometimes in combination with the provision of tinted glasses to filter out light of certain wavelengths. The light-related interventions also differed in terms of timing and duration. The behavioural and lifestyle changes reported in the literature vary considerably, but the intervention that has been studied most is the introduction of naps during night shifts. In some study scenarios, workers napped in the first half of the night shift, while in other studies they napped in the second half of the shift. Various nap durations have been studied. Finally, there have been experiments with various medications and other substances, each with its own aim.

Effects of the interventions

The preventive measures so far reported in the literature are all intended to reduce the short-term effects of working at night. Those effects include drowsiness and impaired alertness; reduced sleep quality; fatigue; changes associated with the circadian rhythm (e.g. changes to endogenous melatonin levels and body temperature); cardiovascular and metabolic changes (e.g. changes in blood pressure and cholesterol levels); behavioural changes and (social) welfare changes. No research into measures designed to prevent possible long-term effects, such as breast cancer, has been published.

Shift schedule changes

In many cases, shift schedule changes have been found to result in increased alertness and reduced drowsiness during night shifts and to better post-shift sleep quality. In some studies, however, no effects on those parameters were observed. In most of the studies, but not all, a forward-rotating system was found to have a beneficial influence on the effects in question. On the basis of the available

research findings, therefore, it is not possible to say with confidence how a shift schedule should be set up in order to prevent or reduce health problems. Nevertheless, decisions must be made in practice about the type of schedule to be used in situations where regular night working is normal. Therefore, although the scientific evidence is not very reliable, the committee expresses the opinion that the adoption of a forward-rotating roster is likely to limit adverse effects on sleep quality and alertness.

Changes to workers' exposure to light

In a number of studies, light-related interventions led to increased alertness, reduced drowsiness and improved sleep quality. Again, however, beneficial effects were not observed in all studies. The great heterogeneity of the interventions means that it is not possible to say what form of light-related intervention is most effective. Furthermore, although no research data on the subject are available, it is conceivable that using tinted glasses might lead to additional safety risks. It is possible that extra exposure to light during the night shift could aggravate disturbance of the circadian rhythm, with unknown longer-term consequences. Therefore, the committee is reserved with respect to the introduction of light related interventions.

Behavioural changes: naps during night shifts

In general, the introduction of naps during night shifts led to increased alertness during the shift and reduced fatigue. It was however found that when workers resumed work after their naps, they experienced a (temporary) dip in performance. Furthermore, the effect of napping on post-shift sleep quality is not clear from the studies. The committee accordingly concludes that it is unclear what napping regimes are advisable. The committee is nevertheless optimistic that the introduction of napping can be an effective means of increasing alertness or reducing fatigue. It is not yet possible to say whether such effects are likely to continue in the longer term.

Use of medication and other substances

The use of melatonin led to inconsistent sleep quality outcomes and had no effect on alertness or drowsiness. Differences in the dosages used and the timing of use may have influenced the outcomes, but it is not possible to determine that from

the available research data. The committee has yet to find any evidence that melatonin can prevent or reduce the adverse effects of night working.

The use of both sleep-promoting and alertness-increasing medications was tested only on patients suffering from night-work-related sleep disturbance. In such patients, the medications had their intended effect. However, it remains unclear whether the medications in question could also prevent sleep disturbance in healthy night workers. Furthermore, the medications in question are known to have side-effects and contra-indications. The committee therefore advises against the use of such products for primary prevention, i.e. to prevent healthy workers developing problems.

The use of caffeine to increase alertness underwent only limited investigation in the context of simulation studies with volunteers. Although the results were positive, the committee is of the opinion that the evidence yielded by the studies is insufficient to support recommendations regarding night workers.

Recommendations

In order to prevent health problems arising from night working, the committee advises minimising night work. Such a policy is in line with the occupational health and safety strategy of removing the causes of health problems.

Insofar as night work is unavoidable, the following advice applies. Where the prevention of short-term problems is concerned, the committee concludes that the available research evidence is not very strong. Nevertheless, the committee expects that forward-rotating shift schedules are likely to have the least adverse effect on alertness and sleep quality. In addition, the introduction of naps during night shifts may reduce drowsiness. However, the committee cannot determine from the available research data what nap timing and duration are likely to have the most beneficial effect. With respect to changes in the exposure to light and the use to medication of other substances, the committee advises against these interventions as a preventive measure.

Much remains uncertain about the prevention of long-term problems. It is not known whether any of the interventions referred to above will be effective in the longer term. Nor is it apparent whether the prevention or reduction of short-term problems, such as drowsiness, sleep quality impairment and fatigue, is associated with the prevention or reduction of potential long-term effects. The committee therefore emphasises the importance of monitoring and following up the health of night workers (periodic occupational health examinations).