Stress Research Institute

Stockholm University

Summer season improves sleep in shiftwork and daytime work

Arne Lowden[1], Torbjörn Åkerstedt[1,2]

[1] Stress Research Institute, Stockholm University, Stockholm, Sweden [2] Clinical neuroscience, Karolinska Institutet, Stockholm, Sweden

Background

The importance of light in regulation of circadian rhythms has been known as a crucial influence on life, however, little is known about seasonal differences related to daylight exposure. The aim was to test how daylight exposure influences sleep in shift and daytime work. We saw a unique opportunity to examine the scarcity of light in northern Sweden, (latitude 67°86'), above the Arctic Circle.

Methods

1800 miners working both above and underground were invited to participate in a sleep and light questionnaire study in winter (n=1291) and summer (n=909) using a paired t-test to study mean seasonal differences.

Results

60% of the workers felt seasonal changes and increases of low mood and fatigue in winter. Shift workers (3-shift and 2-shift) but not daytime workers consistently followed the same regular sleep patterns (sleep timing and sleep length) regardless of season at different shifts. Daytime workers slept longer in winter on days off ($p<0.01$) mainly due to later waking (winter 08:33 hr ± 0.49; summer 08:05 hr ± 0.59; $p<0.001$).

Both shift workers and daytime workers reported sleep in winter more often being interrupted by awakenings, contained more premature awakenings and workers feeling less refreshed by sleep (see table). Also more lack of energy during work were reported in winter. Significant interactions however between type of work and season showed the shiftworkers being less sensitive to seasonal effects on sleep and daytime energy level but not mood.

	Type of work	Winter	Summer	Season	p	Interaction	p
Problem initiating sleep	Day	2.44 (.06)	2.34 (.05)	7.56	0.006	4.06	0.007
	Shift	2.58 (.09)	2.40 (.09)				
Repeated awakenings	Day	2.43 (.06)	2.28 (.05)	9.23	0.000	4.06	0.007
	Shift	2.35 (.09)	2.19 (.09)				
Less refreshing sleep	Day	3.32 (.06)	3.16 (.06)	13.05	0.000	3.24	0.021
	Shift	2.99 (.10)	2.86 (.09)				
Lowered energy	Day	2.81 (.05)	2.48 (.05)	44.2	0.000	2.99	0.030
	Shift	2.52 (.08)	2.37 (.08)				
Lowered mood	Day	2.14 (.05)	2.00 (.05)	8.14	0.004	0.135	n.s.
	Shift	1.99 (.08)	1.90 (.08)				
Daylight exposure	Day	1.80 (.04)	3.12 (.06)	2227	0.000	15.0	0.000
	Shift	2.16 (.06)	3.39 (.06)				

Light exposure in connection to both workdays and days off in winter was associated with lowered mood and fatigue. A regression analysis demonstrated that the likelihood to develop winter problems was reduced by 30% for every extra half hour workers spent out-doors. Possible less sleep complaints could be buffered by the higher level of daylight exposures observed for the winter season in shiftwork.

Conclusion

The dark period of the year is reported to increase with mood and sleep complaints that possible are associated with daylight exposure. We show that shift workers had a more stable seasonal sleep than daytime workers but sleep quality was lowered in winter independent of work hours. Possible the day light influence in summer supports sleep quality and elevate perceived energy levels despite the observed sleep loss for day workers.

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E-mail info@stressforskning.su.se **Website** www.stressresearch.se

CONTACT
Arne Lowden, Stress Research Institute, Stockholm, Sweden
E-mail arne.lowden@su.se