Sleep Medicine

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Insomnia among employees in occupations with critical societal functions during the COVID-19 pandemic

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ABSTRACT

Objective: This study investigates insomnia among employees in occupations critical to the functioning of society (e.g health, education, welfare and emergency services) during the COVID-19 pandemic. Many of these workers experience higher job pressure and increased risk of infection due to their work. It is crucial to investigate which factors that can contribute to insomnia in these important sectors.
Methods: Data was collected using an online survey administered in June 2020. The questionnaire measured demographic variables, sleep, stress, psychosocial factors and health concerns (i.e worrying about health consequences related to the pandemic). The sample in the present study consisted of 1327 (76% females) employees in organizations with societal critical functions.
Results: The employees reported higher levels of insomnia symptoms compared to normative data collected before the pandemic. Health concerns specifically related to COVID-19 had the strongest association to insomnia, followed by work stress. Job demands (i.e workload, time pressure and overtime) had merely a weak association to insomnia.
Conclusion: Worrying about consequences the pandemic can have on your own health and the health of your family or colleagues have a stronger negative impact on sleep than work pressure during the COVID-19 pandemic. Impaired sleep can have detrimental effects on performance and health, and a stronger focus on preventing insomnia as a mean of sustaining critical societal functions both during and after the pandemic is warranted. Organizations should consider interventions aimed at reducing health concerns among their employees during the COVID-19 pandemic.

The COVID-19 pandemic can have severe consequences for occupational health both now and in the years to come, and workers face an increased risk of insomnia, burnout, depression and anxiety [1]. Employees in sectors critical to the functioning of society (e.g healthcare- and social workers, educational staff and emergency services) may experience chronic work strain and pressure, as well as higher risk of infection, related to sustaining societal functions during the crisis [2–4]. In addition to the high work pressure, employees in these sectors must also perform their work knowing there is a risk that they or their close contacts might be or become infected with COVID-19. Combined, these factors can have a severe negative impact on sleep among employees in societal critical occupations.

Findings from recent studies show reduced sleep quality and increased prevalence of sleep disturbances in both the working and general population during the pandemic [5–7]. Sleep is an essential factor for employee health, safety and performance [8]. Without enough sleep, workers may struggle to recover from high stress conditions at work [9,10]. Insomnia is a sleep disorder that is increasingly more common in today's society [11], and comprises difficulties with initiating or maintaining sleep with reduced daytime functioning as a consequence. Insufficient sleep can lead to impaired health, reduced productivity and work-related accidents [12,13]. Insomnia is also identified as a significant risk factor for future sickness absence and disability [14,15]. It is crucial to keep employees who work in sectors critical to the functioning of society as healthy as possible during this pandemic. Hence, it is important to investigate insomnia among these workers.

The present study seeks to examine the level of insomnia symptoms in a population of Norwegian workers employed in sectors critical to the functioning of society, defined by the Norwegian government [16]. These workers provide services that are considered essential for the public, e.g education, health care,

emergency services and welfare. Although some studies on sleep during the pandemic have already been performed, most of this research is on Chinese, American, or southern European samples. Also, the majority of the studies are performed in countries with more societal restrictions and higher infection rates compared to Norway. There is a lack of studies on sleep during COVID-19 in a Scandinavian work context, especially in workers engaged in assignments crucial to the functioning of society. In addition, we lack knowledge on what specific variables that are most important for maintaining good sleep and consequently good health in this group during a crisis situation. Thus, the aims of the present study are to 1) examine the level of insomnia symptoms during the early stages (ie first three months) of the pandemic in Norway, 2) compare the level of insomnia symptoms during the pandemic to normative data, and 3) investigate associations between work strain and health concerns, and insomnia, among employees during the pandemic.

1. Methods

1.1. Procedure and participants

The following paper is based on baseline questionnaire data (Time 1, collected between June 10 to July 10, 2020) from an ongoing longitudinal study on sleep, strain and coping among Norwegian workers during COVID-19, where multiple data collections will be performed until the spring of 2022. The data used in the present study was measured at a single time point (Time 1). Employees with societal critical jobs in a Norwegian municipality and region in central Norway were invited by e-mail to answer an online survey. A total of 1331 participants (15% response rate at baseline) provided their informed consent to participate and answered the first questionnaire. Due to missing data (0.4%), 1327 remained in the final sample. The participants worked within the health care sector (19%), social and family services (11%), education (40%), management and property (9%), labour- and welfare services (16%), and police, fire and rescue services (5%). The sample consisted of 76% females and 24% males with a mean age of 43.67 years (range 18—68, SD 11.37). The study was approved by the Norwegian Centre of Research Data and Regional Committees for Medical and Health Ethics in Norway.

1.2. Measures

The questionnaire contained items measuring demographic and background variables, work time schedule, psychosocial work factors, sleep, and health concerns and worrying specifically related to the ongoing pandemic. The participants were asked to indicate how their work, stress and worrying had been for the last three months, ie since the start of the pandemic in Norway.

1.2.1. Insomnia

The Bergen Insomnia Scale (BIS) was used to measure insomnia and provide normative data on insomnia [17]. Bergen Insomnia Scale has shown good convergent and discriminative validity, and satisfying psychometric properties [17]. The participants were asked to indicate how many days a week (0—7) during the last month they have struggled with six specific symptoms of insomnia (i.e sleep onset, sleep maintenance, early morning awakening, not feeling adequately rested, daytime impairment and dissatisfaction with current sleep). The continuous sum score ranges from 0 to 42. The internal consistency for insomnia was good ($\alpha = 0.84$). The norm data used in the present study is based on a community sample in Norway consisting of 2645 participants (50% females) with a mean age of 48.19 (SD = 15.30) [17].

1.2.2. Health concerns

COVID-19 related health concerns were measured with the following question: "*During the last three months, as a result of the corona pandemic, have you been worried about: 1) your own health, 2) your family's health, and 3) your colleagues health*". The participants responded to the three separate categories on a scale ranging from 1 (not at all) to 5 (to a great extent). The subscores were computed to a mean score, and the variable was labelled "health concerns". A factor analysis showed that one overarching factor explained 71% of the variance in the corresponding items with factor loadings from 0.82 to 86. The internal consistency for health concerns in the present study was acceptable to good ($\alpha = 0.80$).

1.2.3. Work stress

Work stress was measured with a single standardized item that has shown satisfying validity and reliability in previous research [18]. The participants were asked to indicate how stressful their job had been for the last three months on a scale ranging from 1 (not stressful at all) to 5 (extremely stressful).

1.2.4. Job demands

Job demands (i.e time pressure, workload and overtime) was measured with four items from The General Nordic Questionnaire for Psychological and Social Factors at Work (QPS-Nordic) [19,20]. The answers were given on a scale ranging from 1 (very seldom or never) to 5 (very often or always), and afterwards computed to a mean score. The internal consistency for job demands in the present study was acceptable ($\alpha = 0.75$).

1.3. Statistical analyses

All statistical analyses were conducted in IBM SPSS version 27. Pearson correlation analysis was applied to examine correlations between variables. A summary independent-sample t-test were performed to examine mean differences between insomnia in workers during COVID-19 and normative data in a community sample collected before the pandemic. Lastly, we performed a multiple regression analysis with insomnia as dependent variable. The model included age, gender, job demands, work stress and health concerns as independent variables.

2. Results

Descriptive statistics and correlations are presented in Table 1. Insomnia was positively associated with job demands, work stress and pandemic specific health concerns. Age was negatively associated with insomnia. The participants in the present study ($M = 14.36$, $SD = 9.91$) scored significantly higher on insomnia symptoms compared to normative data ($M = 10.67$, $SD = 9.73$) for the Bergen Insomnia Scale ($t(2612) = 11.14$, $p < 0.001$, $d = 0.38$).

Table 2 shows the results from the multiple regression analysis. Gender, age, job demands, work stress and health concerns explained 16% of the variance in insomnia ($F(5, 1321) = 51.52$, $p = 0.000$). Health concerns had the strongest positive association to insomnia, followed by work stress. Job demands had a weak positive association to insomnia, whereas age had a weak negative association to insomnia. No significant association was found between insomnia and gender.

3. Discussion

Results from the present study showed that employees in societal critical occupations during the pandemic reported higher levels of insomnia symptoms compared to the general population

Table 1
Descriptive statistics and correlations (N = 1327).

	Mean (SD)	1	2	3	4	5	6
1. Gender[a]	0.77 (0.43)	—					
2. Age	43.67 (11.37)	-0.05*	—				
3. Job demands	3.19 (0.72)	0.09**	-0.01	—			
4. Work stress	2.86 (1.00)	0.09**	-0.10**	0.57**	—		
5. Health concerns	2.37 (0.94)	0.08**	-0.08**	0.14**	0.27**	—	
6. Insomnia	14.36 (9.91)	0.05*	-0.12**	0.21**	0.30**	0.33**	—

$*p < 0.05$ $**p < 0.01$.
[a] 0 = male, 1 = female.

Table 2
Multiple regression analysis on variables with associations to insomnia (N = 1327).

Outcome		β	SE B	95% CI B	p
Insomnia	Gender[a]	0.00	0.59	[-1.44, 1.16]	0.986
	Age	-0.08	0.02	[-0.11, -0.02]	0.003
	Job demands	0.07	0.42	[0.18, 1.84]	0.017
	Work stress	0.17	0.31	[1.09, 2.32]	0.000
	Health concerns	0.27	0.28	[2.28, 3.37]	0.000

[a] Male = 0, female = 1, CI = confidence interval for the unstandardized beta (B).

before COVID-19. Health concerns related to the pandemic had the strongest association to insomnia, followed by stress at work during the last three months. Job demands had merely a weak association to insomnia. Overall, our findings demonstrate that being worried about your own health or the health of your family and colleagues during the pandemic can have a greater negative impact on sleep than work strain (ie work stress and demands) have.

The findings are in line with studies from other countries and occupational groups reporting high levels of sleep problems during the pandemic [5,21,22]. It is important that both the organizations and society recognize impaired sleep as a serious challenge among employees in sectors critical to the functioning of society. Sleep is a critical factor for employee health and performance, and a stronger focus on preventing insomnia is warranted. Without acknowledging the importance of good quality sleep in these workers, the society may face future challenges in the form of sleep and work-related accidents, reduced health, sickness absences, disability and increased turnover rates.

Although the present study is based on data from a single point in time, it still gives us important information about sleep in societal critical sectors during the first three months of the pandemic in Norway. Due to the longitudinal design of the study, we will be able to follow changes in sleep as the pandemic unfolds. Hence, stronger conclusions about causes and mechanisms behind impaired sleep can be made at a later stage by analysing data from future data collections. Further, even though the response rate at baseline was 15%, the sample size of over 1300 participants provides significant strength to the study and its findings. Lastly, the majority (76%) of the participants in the study were female, but gender had no significant association to insomnia. Hence, the findings may be generalized to both female and male workers in societal critical occupations. However, we encourage future studies to examine potential gender differences in sleep disturbances in the working population during COVID-19.

Employees in occupations that are critical for maintaining societal functions show elevated levels of insomnia symptoms compared to the general population before the COVID-19 pandemic. Health concerns specifically related to COVID-19 (ie worrying about their own or their family's or colleague's health) seems to negatively impact sleep to a greater extent than job demands and work stress. Organizations should recognize the health concerns and levels of worrying among their employees and implement measures that can relieve and reduce concerns, as well as improve sleep. Organizations also need a shift in focus during this pandemic, and not only focus on the general amount of work strain, but also carefully consider the pandemic specific health concerns and risk of infection their employees face on a daily basis.

Credit author statement

TS: Conceptualization, Design, Investigation, Methodology, Formal Analysis, Writing - Original draft preparation, Writing — Reviewing and Editing. IS-L: Writing - Reviewing and Editing, Supervision, Funding acquisition.

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Conflict of interest

The authors declare no potential or actual conflicts of interest.
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