

THE STUDY OF INSOMNIA IN DIFFERENT GROUPS OF WORKERS DURING THE COVID-19 PANDEMIC

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ABSTRACT

To understand the contribution of the work-related and extra-professional factors on the risk of insomnia during the COVID-19 pandemic.

The survey was prepared on a GoogleDrive form. The questionnaire was distributed online and collected data from 769 responders. The dependent variable was the presence or absence of insomnia. Non parametric tests and correlations were used to find the main predictors linked with a greater chance of developing insomnia.

The onset or the aggravation of the insomnia was reported by 41.01% of responders. The maximum rate was in healthcare workers (42.01%). Significant direct correlations were found between insomnia and work load, fear for the inefficiency of the personal protective equipment, changes in workplace, procedures and working schedule, belonging to a vulnerable health group, general psycho-social strain and lack of social recognition. A significant occupational stressor related to insomnia was represented by the contact with COVID-19 patients followed by fear of developing infection at work. The personal perception of risk was found a composite indicator and it was the only non-occupational factor related to insomnia. The best identified predictors for insomnia consisted in work overload (OR=2.13, CI=1.7-2.5, p=0.03), occupations supposing contact with COVID-19 patients (OR=2.04, CI =1.7-2.3, p=0.01), belonging to a vulnerable health group (OR=1.53, CI=1.1-2.3, p=0.001), personal perception of risk (OR=1.26, CI =1.2-1.3, p=0.001) and lack of social recognition (OR=1.21, CI =1-1.3, p=0.02).

The study highlights the main risk factors that should be avoided in order or to reduce the occurrence of insomnia and its consequences.

Keywords: work load, occupation, insomnia, vulnerable health group, COVID-19.

INTRODUCTION

Insomnia has affected many people during the pandemic. The level of stress increased greatly during the pandemic, people were very worried about their health, financial resources and changes in their daily life. (1)

A major health issue is insomnia associated with great psychological burden. The study of insomnia was insufficient during the pandemic. (1)

Most studies, focused on different occupational activities, have emphasised the role of the occupational stressors, while others referring to general population underlined the impact of socio-economic factors. The interaction between extraprofessional and occupational stress factors in the prevalence of insomnia, in the context of the COVID-19 pandemic, is insufficiently explored.

In a study exploring sleep difficulties, conducted in Greece on the population during the COVID-19 pandemic, the insomnia rate was 37,6%. This study shows that the most affected were those who live in the city (rural residence can have a protective role, thus having more opportunities for physical activities, in nature and less strict application of restrictive measures) and women. (1)

The COVID-19 pandemic has significantly affected the mental health of healthcare workers (HCW). (2) Thus, it is necessary to monitor and follow them in order to understand their needs and prevent depression, anxiety and insomnia among these workers. (3)

This high prevalence of insomnia calls for a better identification of risk factors and for implementing the proper preventive measures. A linear relation was observed between chronic diseases and insomnia(4), but isolated cases of insomnia without clearly defined comorbidities are not uncommon. Primary insomnia, the most frequent clinical entity, is generated by distress succeeding acute or chronic stressful events. The latest are considered better predictors, , financial chronic stressors, the work related stress plays an important role.(5)

The relation between work stress and insomnia is bilateral. The lack of enough sleep or the poor quality of sleep influence the work ability can impact the social and emotional relations between individuals of a working group, favouring the perception of a higher demand and lower control and adding supplementary job-related stress.

In a multidimensional approach, we have investigated the influence of insomnia in a large group of Romanian workers in order to finding which risk factors are involved.

METHODS

The survey was prepared on a GoogleDrive form. It was, initially, distributed to the staff of the «Carol Davila» University of Medicine and Pharmacy, Bucharest, followed by the invitation to sharing the questionnaire to other participants. Invitations were also sent via email to the personal networks and social media accounts of the team's members. The study started immediately after the end of COVID-19 lockdown in Romania, when community first wave of SARS CoV2 infection began to spreading, and ended when the second wave was imminent to occur.

Demographic data of gender, age, occupation, tenure, occupation supposing a contact with COVID-19 patients, data influencing the personal perception of the SARS CoV2 infection risk, personal medical history (hypertension, diabetes, malignancies, autoimmune disorders, chronic respiratory diseases, chronic renal disease or any other comorbidity), as well as occupational and general stressors were recorded.

The list of occupations included different categories of HCW: physicians, nurses, pharmacists, laboratory personnel, ambulance workers, assistant nurses, medical facility cleaning personnel. Responders could select the option "other occupation" and to nominate it, but the nomination was not a mandatory field.

The occupational stressors were evaluated regarding the work overload, the changes in the working procedures or location (such as telework) and changes in the working schedule. The psychological support provided by the organization was also analyzed.

Two categories of factors were considered as influencers of the level of personal risk perception (PRP): a) objective factors related to the risk of SARS CoV2 infection such as contact with COVID-19 patients or infected colleagues, isolated in quarantine; b) subjective factors such as fear (e.g. transmission of the disease from patients to family members, fear of going to work) and the

infodemic during disease outbreak. The latest issue was assessed using items such as the interest in pandemic and the effect of the false or misleading information found on the internet.

The general psycho-social strain (GPSS) was evaluated by questioning the extra-occupational tasks (such as having a vulnerable person to look after at home, having a dependent person at home) and the level of support provided by other family members to fulfil these duties.

The lack social recognition (LSR) was evaluated by two items related to the level of appreciation or discrimination, due to the possibility of transmitting the virus.

Insomnia was assessed using two questions: the first concerned the history of insomnia before the pandemic and the second referred to its presence or worsening during the SARS CoV2 pandemic. Based on these two answers, the study sample was divided in two groups: persons with onset or worsening of insomnia during the pandemic (cases) and persons without insomnia (controls). Individuals with stable manifestations of previous insomnia were excluded. As HCW represented a category at risk, comparisons of the differences were done between the HCW and the non HCW.

Positive response to all questions was coded by 1 and negative response was coded by 2; therefore, the lower risk scores for PPR, GPSS and SR represented a higher frequency of the risk factor in our sample. Responses such as “*I don't want to answer/don't know*” were classified as “missing data” and were not included in the statistical analysis.

For the statistical processing of data, the dependent variable was the presence or absence of insomnia. After carrying out a descriptive analysis and the nonparametric tests, we highlighted main significant factors differentiating statistically the two groups. Correlation tests between the work variable (presence, absence of insomnia) and the main indicators were performed. The 95% probability was used to define the statistical significance. In order to find the main predictors linked with a greater risk of developing insomnia, final binary regression (backwards LR method) was carried out, with covariates being the main questions and scores from the questionnaire.

The study was approved by the Ethical Committee of the «Carol Davila» University of Medicine and Pharmacy, Bucharest.

RESULTS

On total, 769 persons completed the questionnaire. Among them 600 were HCW and 169 responders with occupations not related to healthcare, including 90 office workers from a variety of domains, 51 teachers from colleges and universities and 28 responders with no specified occupation and no selection of HCW occupations, classified in the non HCW category.

From the initial 769 sample, 57 responders with unchanged pattern of previous insomnia were excluded. So, the analysis was further conducted for 712 responders divided into 292 cases and 420 controls.

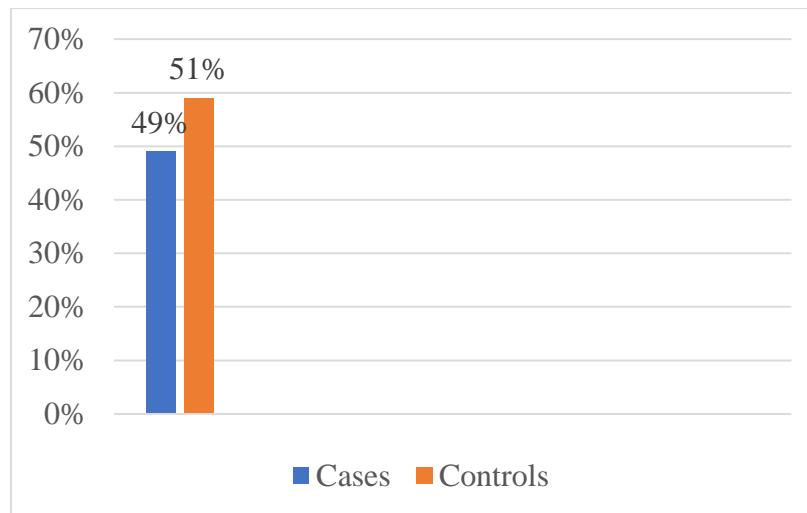


Fig 1. Distribution of cases and sampling controls

Before the pandemic, 173 (22.3%) of the responders reported insomnia, equally distributed between HCW and non HCW (19.21% versus 20.64%; $\chi^2 = 0.15$, $p = 0.69$).

The number of subjects reporting insomnia increased to 338 (43.6%) during the pandemic, of which 292 (41.01%) had new or more severe forms of insomnia and 46 remained with unchanged form of insomnia.

There was no difference in prevalence of insomnia between the HCW (42.01%) and the non HCW group (37.42%) ($\chi^2 = 1.05$, $p = 0.3$) during the pandemic.

Insomnia was more prevalent in women than in men, but the gender difference did not reach the statistical threshold ($\chi^2 = 3.36$, $p = 0.06$). In terms of dwelling, the distribution was similar, neither the place of residence, nor the type of house having a different distribution.

The direct contact with COVID-19 patients in the workplace was significantly higher in the insomnia group ($\chi^2 = 19.61$, $p = 0.00006$). As expected, it was dependent on occupation.

Among the HCW group, 213 (38.24%) responders had direct contact with COVID 19 infected patients, and 105 (18.85%) were uncertain about any infectious contact. In the non HCW group, the proportion was significantly different, with only 8 (5.16%) subjects directly exposed to contact with COVID-19 patients and 10 (6.45%) with no certain exposure ($\chi^2 = 108.39$, $p < 0.0001$). Insomnia reported by HCW was more frequent reported by directly SARS CoV2 exposed individuals ($n=113$) than not exposed individuals ($n=77$) or those who did not know, but couldn't reject a possible infectious contact ($n=44$) ($\chi^2 = 20.07$, $p = 0.00004$). In the nonHCW group, insomnia prevalence was similar among those with or without contact with COVID-19 patients ($\chi^2 = 0.03$, $p = 0.98$).

Persons with insomnia were more scared to go to work (58.9%) versus those without insomnia, who were frightened in a lower percentage (31.67%) ($\chi^2 = 55.47$, $p = 0.00001$). A significant difference of insomnia distribution was maintained for the contacts of COVID-19 patients ($\chi^2 = 29.45$, $p = 0.000001$) as well as in those with no obvious contact with infected COVID-19 patients ($\chi^2 = 12.25$, $p = 0.002$), no matter if they were HCW or non HCW.

The fear of inefficient personal protective equipment (PPE) was significantly higher in the insomnia group (56.5% vs. 33.34%, $\chi^2 = 39.65$, $p = 0.000001$), and almost equal in HCW (50.87%) and non HCW group (52.5%), after removing from the analysis the ones who answered that they did not need a PPE at work ($\chi^2 = 0.07$, $p = 0.78$).

Several occupational related stressors were statistically significant different in cases compared to controls, as work overload (85.27% vs 74%, $\chi^2 = 12.44$, $p = 0.0004$), changes in workplace or

procedures (26.02% vs. 19%, $\chi^2 = 5.64$, $p=0.02$), changes in working schedule (83.56% vs. 76.19%, $\chi^2 = 5.68$, $p=0.02$).

Concerning the work overload, the direct correlation was maintained only in the HCW group, where the great majority of both insomniacs ($n=210$; 89.74%) and non-insomniacs (77.09%) reported an increase in their work load ($\chi^2 = 14.99$, $p=0.0001$). Inside the non HCW group, there was also a higher perception of work load increasing in insomniacs (67.24%), than in subjects without insomnia (64.95%), but this difference was not statistically significant ($\chi^2=0.08$, $p=0.77$).

A small group of persons ($n=22$) admitted the need for psychological assistance and only 5 of them received this support from their organization. Among these 22 persons, 19 reported insomnia. In total, 133 organizations provided psychological counselling, 458 did not provided this service to their employees. There were 80 persons who denied this response and 41 who considered it was not needed. The percentage of organizations which provided psychological counselling was almost the same in cases (22.65%) and in controls (22.39%) ($\chi^2=0.006$, $p=0.94$). It was no significant difference between HCW and nonHCW organizations: 107 (19.21%) HCW organizations, compared to 26 (16.67%) nonHCW organizations provided psychological counselling to their employees ($\chi^2 = 3.98$, $p=0.13$).

The scores for PRP and GPSS and for the LSR were significantly lower in the study group.

There were 185 persons with chronic medical conditions. Belonging to a vulnerable health group was more frequently associated with insomnia ($\chi^2=7.85$, $p=0.02$), but it was not associated with an augmentation in workload ($\chi^2 = 3.14$, $p = 0.2$).

During COVID-19 pandemic, there was a direct, significant correlation between insomnia and the PRP of SARS CoV2 infection ($R = 0.229$, $p = 0.00001$), work overload ($R = 0.132$ $p = 0.0001$), direct contact with COVID-19 patients in the workplace ($R = 0.113$, $p=0.001$), belonging to a vulnerable health group ($R = 0.101$, $p = 0.005$), general psycho-social strain ($R = 0.099$, $p= 0.008$) and lack of social recognition ($R = 0.074$, $p= 0.048$).

Table 1: Mean and standard deviations of insomnia risk scores

Score	Study group	Control group	The value of p
Psycho-social overload*	5.65 ±1.26	5.87 ± 1.33	0.008
Personal risk perception score*	10.91 ± 1.87	11.78 ± 1.94	0.0001
Lack of social recognition*	2.69 + 1.12	2.82 + 1.21	0.048

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Including all these factors into a regression model, the best predictors for insomnia consisted in a mixture of occupational and non-occupational stressors.

DISCUSSION

The infection with the new coronavirus SARS-CoV-2 was declared a global health emergency in early 2020 and, two months later, became recognized as a pandemic, affecting the world's population regardless of age, ethnicity, geographical area. (6)

The current COVID-19 pandemic is a long lasting *nightmare*, a very stressful situation, with widespread repercussions. During the pandemic, distress increased dramatically all over the world. An US national survey showed serious distress in 13.6% of the adult population as compared to the 3.9% in the previous year (7). In a review of several European studies dedicated to HCW, the psychological distress varied from mild to extremely severe (8), but, on average, it was found moderate. In other national surveys, more than a quarter of the population (26.5%) perceived a high level of stress (higher than 8, on a scale of 1 to 10) during the isolation and quarantine (9). The COVI iSTRESS Global Survey, which included a large sample of population from different continents, found the mean value of the composite score of the perceived level of stress scale (PSS-10) between 2.30 and 3.13 (10).

1. The overall prevalence of insomnia during the pandemic was 43.6%. The onset or the aggravation of the insomnia, during the first pandemic wave was reported by 41.01% of responders, with a maximum rate in the HCW group (42.01%). Inside the heterogeneous non HCW group, the prevalence of insomnia was high (37.42%). This study also revealed a doubled prevalence attributable to SARS CoV2 pandemic compared to previous rate of insomnia, but the augmentation was not statistically different in HCW than in nonHCW group.

2. Two occupational factors (workload and infectious contact in the workplace with COVID-19 patients), and those connected to the occupation, social recognition were associated with the insomnia occurrence.

3. A significant occupational stressor related to insomnia was the contact with COVID-19 patients followed by fear of developing infection at work. This was a particular characteristic of HCW group, but we cannot ignore the contribution of other factors such as the safety of their loved ones, death of their own colleagues, friends of family members, and even the ethical concerns on rationing treatment in the intensive care units (11).

Our data show insomniacs are more concerned about going to work. Their fear reflects mainly the perception of imminent risk of SARS CoV2 infection. Fear was perceived by people with insomnia, no matter the close contact with COVID-19 patients was. Fear for going to work and having inadequate PPE are associated to presenteeism.

4. Patients with chronic diseases (angina, arthritis, hypertension, asthma, COPD, stroke, diabetes) had a significantly increased chance of insomnia occurrence.

5. The personal perception of risk was a composite indicator and it was the only non-occupational factor related to insomnia. The relation between the risk perception and insomnia occurrence was described in other studies concerning HCW and general population (210 during lockdown). COVID-19-related worries and fear represented the most important risk factor for insomnia in general population. (12)

6. Another factor related to work and associated with insomnia was that the lack of social support and valorization of ones' profession. Experimental data support our findings showing that social rejection significantly affected insomnia. It has prolonged the period before going to bed and shortened the sleep duration (13).

As with the other risk factors, the relation is bilateral. Insomnia predicts less desire for social support, a known coping strategy during stressful events, particularly in social exclusion predisposed by the pandemic (14).

CONCLUSIONS

Our results support a joining approach of the occupational and the non-occupational risk factors of insomnia. Insomnia seems to be very much dependent on the workload and safety. Therefore, work efficacy training and adaptation to the online tools together with the design of the appropriate safety measures are the key preventive elements. For those with chronic medical conditions, appropriate personalized measures, including individual strategies to manage the high perception of risk might help in preventing insomnia. Permanent communication, trainings on coping with stress should be provided by the organization to reinforce resilience. Our findings may guide the management of the occupational stressors to minimize insomnia and the consequences of this sleep disorder.

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