

Sleep and stress at work and in the family among young people



Gafarov V.V.^{1,2}, Gromova E.A.^{1,2}, Gagulin I.V.^{1,2}, Panov D.O.^{1,2}, Tripelgorn A.N.^{1,2}, Gafarova A.V.^{1,2}

¹Scientific Research Institute for Therapy and Preventive Medicine, Federal Research Center Institute of Cytology and Genetics, Russian Academy of Sciences, Novosibirsk;

²Interdepartmental Laboratory of Epidemiology of Cardiovascular Diseases, Novosibirsk

^{1,2}175/1, B. Bogatkova St., Novosibirsk 630089, Russia

Objective: to investigate the relationship between the quality and duration of sleep and stress at work and at home in people aged 25–44 years living in Novosibirsk.

Material and methods. The study of a representative cohort of people aged 25–44 years was conducted in 2013–2016 in one of the districts of Novosibirsk (budget topic No. AAAA-A17-117112850280-2). A total of 975 individuals were examined (427 men, mean age – 34 ± 0.4 years, response rate – 71%; 548 women, mean age – 35 ± 0.4 years, response rate – 72%). The general examination was conducted according to the standard methods of the WHO program “MONICA-psychosocial (MOPSY)”. The standard Jenkins questionnaire was used to assess the quality and duration of sleep. Scales to assess stress at home (scale “Knowledge and attitude towards one’s own health”) and at work (Karazek scale) were included in the standard questionnaire.

Results. Men aged 25 to 44 with sleep disorders were more likely to report that they “dislike their work” (52.2%) and that their attitude towards work is “average” (50.7%). It is rare for both men (46.8%) and women (56.6%) to relax and have rest after a normal working day. Women with sleep problems (56.5 %) stated that they are unable to rest adequately at home. Both men and women with sleep disorders confirmed that there had been serious conflicts in the family in the last 12 months: “several” times” (57.1 % and 55.8 % respectively) or “often” (53.3 % and 68.4 % respectively). Women with a sleep duration of 5–6 hours stated that they “never” (36.4 %) or “rarely” (36.8 %) manage to relax and recover after a regular working day; for 33.3 %, responsibilities at work have “increased”; 37.2 % have started to do extra work.

Conclusion. A correlation was found between sleep disturbances and their duration and stress both at work and at home.

Keywords: sleep; sleep disorders; sleep duration; sleep quality; family stress; stress at work; population.

Contact: Valery Vasilyevich Gafarov; valery.gafarov@gmail.com

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Sleep disorders are closely associated with significant medical, psychological and social impairments. Chronic sleep restriction is a growing problem in many countries. Because the body's stress systems play a critical role in adapting to an ever-changing and complex environment, it is important to ask whether these systems are affected by sleep loss. The human body mobilizes protective processes in adaptive efforts to maintain homeostasis. If these defense mechanisms do not work, insomnia may occur. Short-term insomnia can be caused by changes in routine, such as mental illness, disability, and stress [1].

Stress is a complex condition with emotional, cognitive and biological factors. Excessive stress causes long-term or short-term disability in various human systems and activates the defense system of the central nervous system [2]. The Academy of Sleep Medicine and the Sleep Research Society in the United States have determined that adults require ≥ 7 h of sleep per day to maintain optimal health [3]. Short sleep duration (< 7 h/day) is associated with adverse health outcomes, including cardiovascular disease, obesity, diabetes, depression and anxiety, as well as safety concerns associated with drowsy driving and injury [4]. Additional research has shown that sleep duration is associated with characteristics such as race, education, marital status, obe-

sity, smoking, and stressful events at home [5]. Work-related factors such as job stress, work hours, shift work, and physically demanding work have been found to be associated with sleep duration and quality [6, 7]. Despite growing recognition of the consequences of sleep problems, particularly in the working population, research on the relationship between sleep quality and duration, and psychological stressors at work and at home is limited [8].

The purpose of our study was to study the association between sleep quality, sleep duration and stressful situations at home and at work in an open population of young men and women aged 25–44 years living in Novosibirsk.

Material and methods. A screening study of a representative sample of people aged 25–44 years was carried out in one of the districts of Novosibirsk (budget topic No. AAAA-A17-117112850280-2) at the V (Fifth) screening in 2013–2016. A total of 975 individuals were examined (427 men, mean age – 34 ± 0.4 years, response rate – 71%; 548 women, mean age – 35 ± 0.4 years, response rate – 72%). The general examination was carried out according to standard methods included in the WHO program «MONICA-psychosocial (MOPSY)» [9].

To assess the quality and duration of sleep, the standard Jenkins questionnaire was used. Scales for stress at home (the

«Knowledge and attitude towards one's health» scale) and at work (the Karazek scale) were included in the standard questionnaire. Study participants completed the questionnaire independently; persons who filled out the questionnaire incorrectly were excluded from the mathematical analysis. Statistical analysis was carried out using the SPSS software package version 20 [10]. To test the statistical significance of differences between groups, Pearson's chi-square test (χ^2) was used [18]. Significance was accepted at a significance level of $p < 0.05$.

Results. Among people 25–44 years old living in Novosibirsk, 39.4% of men and 44.8% of women experienced sleep disturbances ($\chi^2 = 2.698$; $df = 1$; $p > 0.05$).

When conducting a comparative analysis in the population, men and women were asked the question: «Do you like your job?» It turned out that among men experiencing sleep disorders, the predominant answer was «I don't like it» (52.2%) or «so-so» (50.7%; $\chi^2 = 17.661$; $df = 4$; $p < 0.001$); and among women with sleep disorders there was a tendency for the answer «I don't like it at all» to prevail (57.1%; $\chi^2 = 2.073$; $df = 4$; $p > 0.05$).

When asked «Have you been able to relax and have a rest after a regular working day over the past 12 months?» – men with sleep disorders more often answered «rarely» (46.8%), and among men without sleep disorders the answers «often» (75.6%) and «yes, always» (72%; $\chi^2 = 12.415$; $df = 3$; $p < 0.05$); similarly, among women with sleep disorders the answer «rarely» (56.6%) prevailed, and among women without sleep disorders the answers «often» (74.1%) and «yes, always» (69.8%; $\chi^2 = 25.434$) were more frequent; $df = 3$; $p < 0.001$; Table 1).

When asked: «Does anything prevent you from resting peacefully at home?», men with sleep disorders more often answered «yes» (45.8%; $\chi^2 = 2.834$; $df = 1$; $p > 0.05$), and among women with sleep problems, 56.5% of respondents answered positively ($\chi^2 = 19.001$; $df = 1$; $p < 0.001$). All study participants were asked the question: «Have you had any serious conflicts in your family over the past 12 months?» Men with sleep disorders answered «several times» (57.1%) and «often» (53.3%; $\chi^2 = 10.477$; $df = 3$; $p < 0.05$); a similar picture was observed

Table 1. *Sleep disorders and stress at work in people aged 25–44 living in Novosibirsk, n (%)*

Category of respondents	Do you like your work?				
	I don't like it at all	I don't like it	So-so	I like it	I like it very much
Men:					
without sleep disorders	4 (57.1)	11 (47.8)	74 (49.3)	130 (68.8)	24 (75)
with sleep disorders	3 (42.9)	12 (52.2)	76 (50.7)	59 (31.2)	8 (25)
total	7 (100)	23 (100)	150 (100)	189 (100)	32 (100)
$\chi^2 = 17.661$; $df = 4$; $p < 0.001$					
Women					
without sleep disorders	6 (42.9)	18 (56.2)	83 (52.2)	147 (57.6)	36 (55.4)
with sleep disorders	8 (57.1)	14 (43.8)	76 (47.8)	108 (42.4)	29 (44.6)
total	14 (100)	32 (100)	159 (100)	255 (100)	65 (100)
$\chi^2 = 2.073$; $df = 4$; $p > 0.05$					
	Have you been able to relax and have a rest after a normal working day over the past 12 months?				
	no, never	rarely	sometimes	often	yes, always
Men:					
without sleep disorders	5 (50)	58 (53.2)	103 (57.5)	59 (75.6)	18 (72)
with sleep disorders	5 (50)	51 (46.8)	76 (42.5)	19 (24.4)	7 (28)
total	10 (100)	109 (100)	179 (100)	78 (100)	25 (100)
$\chi^2 = 12.415$; $df = 3$; $p < 0.05$					
Women:					
without sleep disorders	11 (50)	75 (43.4)	107 (54)	60 (74.1)	30 (69.8)
with sleep disorders	11 (50)	98 (56.6)	91 (46)	21 (25.9)	13 (30.2)
total	22 (100)	173 (100)	198 (100)	81 (100)	43 (100)
$\chi^2 = 25.434$; $df = 3$; $p < 0.001$					

Table 2. *Sleep disturbances and stress at home in people aged 25–44 living in Novosibirsk, n (%)*

Category of respondents	Does anything prevent you from resting peacefully at home?			
	No	Yes		
Men				
without sleep disorders	179 (63.3)	64 (54.2)		
with sleep disorders	104 (36.7)	54 (45.8)		
total	283 (100)	118 (100)		
	$\chi^2=2.834$; df=1; p>0.05			
Women:				
without sleep disorders	201 (62.8)	90 (43.5)		
with sleep disorders	119 (37.2)	117 (56.5)		
total	320 (100)	207 (100)		
	$\chi^2=19.001$; df=1; p<0.001			
Have you had any serious conflicts in your family over the past 12 months?				
	no	only one	several	often
Men:				
without sleep disorders	176 (64)	36 (65.5)	24 (42.9)	7 (46.7)
with sleep disorders	99 (36)	19 (34.5)	32 (57.1)	8 (53.3)
total	275 (100)	55 (100)	56 (100)	15 (100)
	$\chi^2=10.477$; df=3; p<0.05			
Women:				
without sleep disorders	195 (60)	48 (54.5)	42 (44.2)	6 (31.6)
with sleep disorders	130 (40)	40 (45.5)	53 (55.8)	13 (68.4)
total	325 (100)	88 (100)	95 (100)	19 (100)
	$\chi^2=11.970$; df=3; p<0.01			

among women with sleep disorders – among them the answers «several times» (55.8%) and «often» (68.4%; $\chi^2=11.970$; $df=3$; $p<0.01$; Table 2) predominated).

The association between sleep duration and stress was tested in an open population of young people. Respondents were asked: «Have you been able to relax and have a rest after a normal working day over the last 12 months?» We did not find significant differences among men ($\chi^2=3.348$; $df=8$; $p>0.05$). Among women with a sleep duration of 5–6 hours, the answers «no, never» (36.4%) and «rarely» (36.8%; $\chi^2=19.433$; $df=8$; $p<0.05$) were more common. The next question was: «Has your responsibility at work changed over the last 12 months?» There were no significant differences among men ($\chi^2=5.521$; $df=4$; $p>0.05$), and among women with a sleep duration of 5–6 hours the answer «increased» was more common (33.3%; $\chi^2=12.611$; $df=4$; $p<0.05$). Answers to the question: «Has your workload changed over the past 12 months?» did not differ much in the male population ($\chi^2=8.935$; $df=4$; $p>0.05$), but 37.2% of women with a sleep duration of 5–6 hours began to do additional work ($\chi^2=36.224$; $df=4$; $p<0.001$; Table 3).

Discussion. Among people 25–44 years old, 39.4% of men and 44.8% of women experienced sleep disturbances, which is a high rate. It is believed that sleep disturbance caused by various stress factors can be prevented and controlled by controlling daily habits [11]. Taking into account the above facts, we asked respondents questions regarding stressful situations that arise both at home and at work. In our population, men with sleep disorders more often answered that they «didn't like» their work (52.2%), or their attitude toward work was described as «so-so» (50.7%); It is rare for both men (46.8%) and women (56.6%) to relax and have a rest after a regular working day. Women experiencing problems with sleep (56.5%) answered that they could not rest peacefully at home. Both men and women with sleep disorders confirmed that there had been «several» conflicts in the family over the past 12 months (57.1% and 55.8%) or that they had conflicts «often» (53.3 and 68.4%). Women with a sleep duration of 5–6 hours answered that they «never» (36.4%) or «rarely» (36.8%) managed to relax and have a rest after a regular working day; responsibility at work «increased» for 33.3%; 37.2% began to do additional work.

Research on the association between psychosocial stressors at home and work and sleep problems is limited [12], especially compared with the large body of research examining the association between occupational stressors and other health outcomes [13]. The literature on work and sleep has focused on how long working hours, especially shift work, affect sleep quality. These studies suggest that shift patterns in work schedules negatively impact sleep patterns [12–14], although some workers are able to tolerate such changes better

Table 3. *Sleep duration and stress at work among people aged 25–44 living in Novosibirsk, n (%)*

Category of respondents taking into account sleep duration	Have you been able to relax and have a rest after a normal working day over the last 12 months?				
	no, never	rarely	sometimes	often	yes, always
Men					
5–6 hours	2 (20.0)	31 (28.4)	46 (25.6)	18 (23.1)	5 (19.2)
7–8 hours	7 (70.0)	64 (58.7)	119 (66.1)	51 (65.4)	18 (69.2)
9–10 hours	1 (10.0)	14 (12.8)	15 (8.3)	9 (11.5)	3 (11.5)
Total	10 (100)	109 (100)	180 (100)	78 (100)	26 (100)
$\chi^2=3.348$; df=8; p>0.05					
Women					
5–6 hours	8 (36.4)	64 (36.8)	43 (21.5)	15 (18.5)	7 (16.3)
7–8 hours	11 (50.0)	94 (54.0)	137 (68.5)	55 (67.9)	30 (69.8)
9–10 hours	3 (13.6)	16 (9.2)	20 (10.0)	11 (13.6)	6 (14.0)
Total	22 (100)	174 (100)	200 (100)	81 (100)	43 (100)
$\chi^2=19.433$; df=8; p<0.05					
Has your responsibility at work changed over the last 12 months?					
	no change	increased		decreased	
Men					
5–6 hours	42 (24.0)	59 (28.2)		1 (5.6)	
7–8 hours	117 (66.9)	127 (60.8)		15 (83.3)	
9–10 hours	16 (9.1)	23 (11.0)		2 (11.1)	
Total	175 (100)	209 (100)		18 (100)	
$\chi^2=5.521$; df=4; p>0.05					
Women					
5–6 hours	48 (20.4)	83 (33.3)		7 (16.7)	
7–8 hours	158 (67.2)	141 (56.6)		30 (71.4)	
9–10 hours	29 (12.3)	25 (10.0)		5 (11.9)	
Total	235 (100)	249 (100)		42 (100)	
$\chi^2=12.611$; df=4; p<0.05					
Has your workload changed over the past 12 months?					
	They began to perform additional work	Has not changed		Decreased, or they stopped performing additional work	
Men					
5–6 hours	44 (28.6)	43 (25.7)		15 (18.5)	
7–8 hours	99 (64.3)	108 (64.7)		51 (63.0)	
9–10 hours	11 (7.1)	16 (9.6)		15 (18.5)	
Total	154 (100)	167 (100)		81 (100)	
$\chi^2=8.935$; df=4; p>0.05					
Women					
5–6 hours	70 (37.2)	56 (24.0)		12 (10.9)	
7–8 hours	109 (58.0)	146 (62.7)		75 (68.2)	
9–10 hours	9 (4.8)	31 (13.3)		23 (20.9)	
Total	188 (100)	233 (100)		110 (100)	
$\chi^2=36.224$; df=4; p<0.001					

than others [12]. Researchers often rely on the theoretical basis of the model suggested by R.A. Karasek (1979) [15] in terms of the relationship between health and psychosocial work stressors such as job demands and control. Job demands include work overload and conflicting roles and tasks, while job control focuses on the degree of responsibility in decision-making that workers have regarding how they perform their jobs. The argument is that high demands and low control are risk factors for a variety of negative health outcomes [15]. Indeed, individual studies have shown that this theoretical framework can be applied to sleep problems. Thus, a positive relationship was confirmed between role conflicts and problems with falling asleep [16], between high work demands, disturbed sleep and non-restorative sleep [12], and the relationship between general indicators of psychosocial stressors and sleep quality [17]. According to a meta-analysis conducted by B. Yang et al. [18], higher levels of job stress, effort/reward imbalance, high demand, heavy workload, low social support, and family conflicts are associated with a higher risk of sleep disturbance, which is somewhat consistent with our results. Although the mechanism by which family and work stress leads to insomnia is still unclear, researchers continue to report potential pathways through which stress affects sleep. Sleep reactivity which has been defined as a tendency to experience

significant sleep disturbances in response to stress is considered a premorbid predisposition to future insomnia; understanding of this mechanism may reduce stress-associated risks in the development of insomnia [17]. Additionally, a twin study demonstrated that sleep reactivity in response to stress involves a significant genetic element in addition to environmental influences [19]. For example, in a study conducted by S. Huang et al. [20], showed an interaction between the gene and work stress in relation to the prevalence of insomnia, considering that the serotonin transporter gene-related polymorphic region (5-HTTLPR) may modify the impact of work-related stress on sleep disturbances in workers. It is expected that additional theoretical and experimental research, particularly focusing on biological mechanisms, will improve our understanding of how sleep quality and duration are associated with family and work stress [19].

Conclusion. Men with sleep disorders often report that they «don't like» their work or describe their attitude towards work as «so-so». It is rare for both men and women to relax and have a rest after a regular working day. Half of patients with sleep disorders have had serious conflicts in the family over the past 12 months. Women with a sleep duration of 5–6 hours (more than one third) report that they «never» or «rarely» manage to relax and have a rest after a regular working day.

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Gafarov V.V. <https://orcid.org/0000-0001-5701-7856>
Gromova E.A. <https://orcid.org/0000-0001-8313-3893>
Gagulin I.V. <https://orcid.org/0000-0001-5255-5647>
Panov D.O. <https://orcid.org/0000-0002-8101-6121>
Tripelgorn A.N. <https://orcid.org/0000-0002-3898-3247>
Gafarova A.V. <https://orcid.org/0000-0001-5380-9434>