

THE EFFECT OF OCCUPATIONAL STRESSORS IN PUBLIC COMPANIES ON TEMPORARY AND PERMANENT WORKING ABILITY OF WORKERS WITH ARTERIAL HYPERTENSION

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The aim was to quantify the presence of professional stressors in public companies and to analyze their effect on temporary and permanent working ability of workers with arterial hypertension. The research included 500 workers with arterial hypertension, without other diseases or disorders, employed in public companies. The exposed group consisted of 350 workers with arterial hypertension, exposed to occupational stress index (OSI) above 50 points. The control group was composed of 150 workers with arterial hypertension, without stressors in their workplaces (OSI under the 50 points). The exposed group showed a significantly higher level of total OSI and high demands stressor index, conflict index, underload and time limit index, compared to control group ($p < 0.001$). The analysis of temporary working inability determined statistically significant higher level of lost workdays per worker in the exposed group compared to the control group ($p < 0.05$). Average number of lost workdays per worker (temporary working disability) in the exposed group in one year increased with statistical significance along with OSI values at their workplace ($p < 0.001$). In the exposed group, the number of workers who qualify for disability retirement (permanent working disability) over a period of one year was significantly higher compared to control group ($p < 0.05$). The number of workers who qualify for disability retirement in the exposed group increased with statistical significance along with OSI values at their workplace ($p < 0.001$). Occupational stress is a significant factor of reduction of temporary and permanent work ability of exposed workers with arterial hypertension.

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Key words: occupational stress index, arterial hypertension, work ability, public companies

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participation in decision-making, conflicts, emotional demands at work, physical factors of working environment, work force management, job monotony and promotion opportunities (4).

Aim of the study

The aim was to quantify the total occupational stress level and presence of specific groups of occupational stressors and to analyze their effect on temporary and permanent work ability of workers with arterial hypertension.

Methodology

The research included 500 workers with arterial hypertension without the presence of other diseases and disorders, employed in public companies. The exposed group was composed of 350 workers with arterial hypertension, exposed to occupational stress index (OSI) above 50 points. The control group was composed of 150 workers with arterial hypertension, without stressors in their workplaces (OSI under the 50 points).

Introduction

Occupational stress is constantly expanding and it represents a significant risk factor of exposed workers (1, 2, 3). Workers who are under stress smoke more, eat irregularly, consume alcohol and drugs more often, they are less motivated to work, have problems with colleagues and family, they are more prone to diseases and work injuries. The most common occupational stressors are work load, deadlines, shifts and night hours, changes in time zones, job dissatisfaction, insufficient or significantly low

Standardized questionnaire was used to analyze the presence and intensity of some occupational stressors and total Occupational Stress Index (OSI) which represents the total stress load in occupational environment, as well as stress load caused by some occupational stressor groups. The standardized questionnaire by Karen Belkic (5) was used in which occupational stressors are classified into 7 groups (high demands, strictness, conflicts, underload, exposure to danger, time limit and exposure to noxious agents). Using statistical significance tests (t-test, chi-square test, correlation tests) we analyzed and compared the levels of occupational stress indexes and number of work days lost per worker during one year (temporary working disability) and the number of workers who qualify for disability retirement (permanent working disability) during the same year in exposed and control group.

group classified as high job demands, conflicts, underload and time limit, compared to the control group ($p < 0.001$) (Table 1).

The analysis of temporary work inability in exposed and control group determined significantly higher level of lost workdays per worker in the exposed group compared to control group ($p < 0.05$) (Table 2). Average number of lost workdays per worker in the exposed group increased with statistical significance with respect to OSI values at the workplace ($p < 0.001$) (Table 3). Within one year, the exposed group had a significantly higher number of people who qualify for disability retirement, compared to the control group ($p < 0.05$) (Table 4). The number of workers with the right to disability retirement in the experimental group increased with respect to OSI at their workplaces ($p < 0.001$) (Table 5).

Results

The exposed group had a significantly higher level of total OSI and index of stressors from the

Table 1. The values of occupational stressors index in workers from exposed and control group

Stressor	Control group (n = 150)		Exposed group (n = 350)		P
	\bar{X}	SD	\bar{X}	SD	
High demands	15.02	4.25	17.65	4.24	< 0.001
Strictness	13.68	5.23	13.86	5.34	n.s.
Conflicts	11.21	2.18	15.81	4.11	< 0.001
Underload	9.07	3.43	12.15	3.34	< 0.001
Exposure to danger	9.19	4.35	9.25	6.54	n.s.
Time limit	4.21	1.9	5.83	1.27	< 0.001
Exposure to noxious factors	7.18	4.02	7.62	4.92	n.s.
Total OSI	69.57	3.58	82.57	3.12	< 0.001

n.s. = difference is not significant

Table 2. Average number of lost workdays of workers from exposed and control group

Number of lost workdays	Exposed group			Control group			P
	N	\bar{X}	SD	N	\bar{X}	SD	
	350	63.25	6.21	150	36.12	3.12	

Table 3. Average number of lost workdays during one year in the exposed group with respect to the OSI level

OSI values	N	Number of lost workdays	Statistical significance among subgroups
		$\bar{X} \pm SD$	
50.0 to 67.0	117	43.20 ± 3.17	p < 0.001
67.1 to 80.0	114	59.92 ± 4.61	
80.1 to 97.0	119	86.15 ± 7.18	
Total	350	63.25 ± 6.21	

Table 4. Number of workers who qualify for disability retirement for a period of one year in the exposed and control group

Fulfilled the right to disability retirement	Exposed group			Control group			p
	N	number	%	N	number	%	
	350	34	9.71	150	1	0.66	p < 0.05

Table 5. Number of workers who qualify for disability retirement in the exposed group with respect to OSI level

OSI values	N	Workers who qualify for disability retirement		Statistical significance among subgroups
		number	%	
50 to 67.0	117	2	1.71	p < 0.001
67.1 to 80.0	114	8	7.02	
80.1 to 97.0	119	24	20.17	
Total	350	34	9.71	

Discussion

The results of this research have shown that occupational stressors represent significant factors which favor the reduced working ability of exposed workers.

Several aspects of stress have been quantified (underload, high demands, limitations, time limits, external noxious effects, danger prevention and conflicts) and total OSI was calculated in the exposed and control group. The underload aspect includes the reception of homogenous signals, reception of rare signals, working alone without the need to communicate with others, instant decision-making based on obtained information, performing similar and simple tasks, constant amount of payment regardless of the effort, insufficient payment, no opportunities for improvement and promotion and lack of acknowledgement for the work done, monotonous jobs. The aspect named high demands includes several sources of information at the same time, different information, primary visual perception, great amount of incoming information, three simultaneous sensory stimuli, the need to communicate during work, making complex and quick decisions which also influence other workers, payment according to performance, lack of breaks, jobs done in shifts and night shifts and lack of yearly vacations. Limitation aspect (strictness) includes detection of all incoming signals, doing tasks according to strictly determined standards, fixed body position during work, working in small, cramped rooms, limited influence in choosing the colleague. External time pressure (time limit) refers to inability to postpone decision-making, reduced possibility to control task performance, the need to speed up work and time limits for doing a job. Exposure to external noxious factors includes exposure to blinding light, flashes, noise, vibrations, temperature extremes, gases, steam, dust and load lifting. Avoidance of dangers

as an element of mental stress refers to constant attentiveness to avoid possible harmful effects, presence of visually disturbing scenes and events, working around inflammable substances, accidents, testifying in court concerning accidents at work. Conflicts (discrepancy) refer to unclear difference between various incoming signals, lack of important information needed for decision-making, obtaining contradictory information, facing unexpected events which demand changes in existing plans of work thus creating conflict and indecisiveness in decision-making, interruptions by other people, working environment impaired by interpersonal conflicts, lack of support and help from colleagues, no possibility to progress, work for definite time, firing threats, breaking personal norms and behavior standards. Occupational stress index (OSI) is the sum of the complete model and provides characteristics and amount of stress at workplace.

The literature data show that the total level of occupational stress 40 and above leads to significant increase in systole and diastole blood pressure in the experimental group (2). Possible pathogenic mechanisms of blood pressure increased in this way are hyperactivity of adrenergic nervous system, increased concentration of circulating catecholamines and adrenal steroids, increased activity of renin-angiotensin-aldosterone system, increased production of free radicals, disturbed serotonin secretion or changes in vasopressin receptors under the influence of occupational stressors (6).

The results point to a high correlation between the presence of occupational stressors and reduced work ability. Such results are in accordance with the results obtained by other authors who have studied the problem of leave of absence and demonstrated great financial losses due to absenteeism, as well as that they may be reduced by various anti-stress interventions (7, 8).

Conclusion

Occupational stress and stressors from the groups classified as high demands, conflicts, under-

load and time limits represent a significant factor in faster development of reduced temporary and permanent work disability of exposed workers.

References

1. Jovanović J, Stefanović V, Stanković DN, Bogdanović D, Kocić B, Jovanović M, Antić Z, Nikolić M, Jovanović JJ. Serum Lipids and Glucose Disturbances at Professional Drivers Exposed to Occupational Stressors, Cent Eur J Public Health 2008;16 (2):54-8. [\[CrossRef\]](#) [\[PubMed\]](#)
2. Jovanović J, Jovanović M. Occupational stress and arterial hypertension. Med Pregl 2004;(3-4):153-8. [\[CrossRef\]](#) [\[PubMed\]](#)
3. Stefanović V, Jovanović J, Jovanović M. Impact of occupational stress on the lipid status of drivers in road traffic. Med Pregl 2010;LXII (1-2):57-61. [\[CrossRef\]](#) [\[PubMed\]](#)
4. Helm D, Laussmann D, Eis D. Assessment of environmental and socio-economic stress. Cent Eur J Public Health. 2010;18(1):3-7. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Belkić K. The Occupational Stress Index: An Approach Derived from Cognitive Ergonomics and Brain Research for Clinical Practice. Cambridge International Science Publishing: Cambridge; 2003.
6. Chon KH. Accurate identification of periodic oscillations buried in white or colored noise using fast orthogonal search. IEEE Trans Biomed Eng 2001;48(6):622-9. [\[CrossRef\]](#) [\[PubMed\]](#)
7. Klink JJ van der, Blonk RW, Schene AH, van Dijk FJ. Reducing long term sickness absence by an activating intervention in adjustment disorders: a cluster randomized controlled design. Occup Environ Med. 2003; 60:429-37. [\[CrossRef\]](#) [\[PubMed\]](#)
8. Delp L, Wallace SP, Geiger-Brown J, Muntaner C. Job stress and job satisfaction: home care workers in a consumer-directed model of care. Health Serv Res. 2010;45(4):922-40. [\[CrossRef\]](#) [\[PubMed\]](#)

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UTICAJ PROFESIONALNIH STRESORA U JAVNIM PREDUZEĆIMA NA PRIVREMENU I TRAJNU RADNU SPOSOBNOST RADNIKA SA ARTERIJSKOM HIPERTENZIJOM

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Cilj ovog istraživanja je da se utvrdi prisustvo profesionalnih stresora u javnim preduzećima i analizira njihov uticaj na privremenu i trajnu radnu sposobnost radnika sa arterijskom hipertenzijom.

Istraživanje je obuhvatilo 500 radnika sa arterijskom hipertenzijom, bez drugih bolesti ili poremećaja, zaposlenih u javnim preduzećima. Izloženu grupu činilo je 350 radnika sa arterijskom hipertenzijom, izloženih indeksu profesionalnog stresa (OSI) iznad 50 bodova. Kontrolnu grupu činilo je 150 radnika sa arterijskom hipertenzijom, bez stresora na radnom mestu (OSI ispod 50 bodova).

Kod radnika iz eksponovane grupe, registrovan je značajno viši nivo ukupnog OSI i visok indeks stresora iz grupa konfliktnosti, podopterećenja i vremenskog limita, u poređenju sa radnicima iz kontrolne grupe ($p < 0,001$). Analizom privremene radne nesposobnosti utvrđen je statistički značajno veći broj izgubljenih radnih dana po radniku u eksponovanoj grupi u poređenju s kontrolnom grupom ($p < 0,05$). Prosečan broj izgubljenih radnih dana po radniku (privremena radna nesposobnost) u jednoj godini u eksponovanoj grupi povećava se statistički značajno sa vrednostima OSI na njihovom radnom mestu ($p < 0,001$). U izloženoj grupi, broj radnika, koji su stekli uslov za invalidsku penziju (trajna radna nesposobnost) tokom jedne godine, bio je značajno veći u odnosu na broj radnika iz kontrolne grupe ($p < 0,05$). Broj radnika koji su stekli uslov za invalidsku penziju u eksponovanoj grupi povećava se statistički značajno sa vrednostima OSI na radnom mestu ($p < 0,001$).

Profesionalni stres je značajan faktor umanjenja privremene i trajne radne sposobnosti izloženih radnika, koji pate od arterijske hipertenzije.

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Ključne reči: indeks profesionalnog stresa, arterijska hipertenzija, radna sposobnost, javna preduzeća