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Dom zdravlja "Novi Sad", Služba za zdravstvenu zaštitu radnika¹
Medicinski fakultet, Novi Sad, Zavod za fiziologiju²
Viša poslovna škola, Novi Sad³

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PROFESIONALNI STRES I KARDIOVASKULARNE BOLESTI KOD ZDRAVSTVENIH RADNIKA

JOB STRESS AND CARDIOVASCULAR DISEASES WITH HEALTH WORKERS

Olesja NEDIĆ¹, Danka FILIPOVIĆ² i Zdravko ŠOLAK³

Sažetak - Zdravstveni radnici su u poslednjih desetak godina zbog povećanog broja pacijenata, smanjenih mogućnosti dijagnostike i terapije, kao i loših materijalnih uslova života bili izloženi dodatnim stresnim faktorima obolevanja. Zato se želelo utvrditi uticaj obavljanja profesionalnih aktivnosti zdravstvenih radnika obolelih od arterijske hipertenzije na pojavu kardiovaskularnih komplikacija. Istraživanjem su obuhvaćeni zaposleni koji se leče u zdravstvenoj stanici "Bolnica" i radnici Doma zdravlja "Novi Sad". Na osnovu evidencije o hroničnim masovnim nezaraznim bolestima MONICA projekta, izdvojeni su oboleli od arterijske hipertenzije u ranijem životnom periodu. Sa aspekta mogućeg uticaja zanimanja na nastanak kardiovaskularnih komplikacija kod već obolelih od arterijske hipertenzije, formirana je ispitivana grupa koju su činili lekari i medicinske sestre. U kontrolnoj grupi bili su laboranti, službenici, spremačice i radnici uslužnih delatnosti (bravari, stolari, vodoinstalateri, tapetari, radnici iz kuhinje, vešeraja i slično). U ovom radu je utvrđeno da su, tokom kriznih godina kroz koje je prolazilo zdravstvo, lekari i medicinske sestre sa registrovanom hipertenzijom bili izloženi uvećanom riziku za nastanak kardiovaskularnih komplikacija ($RR=3,7$; 95% interval poverenja $1,6 < RR < 8,6$).

Ključne reči: Radno mesto; Profesionalna izloženost; Stres; Kardiovaskularne bolesti; Medicinsko osoblje; Rizik

Summary - Due to increasing number of patients, reduced possibilities of diagnostics and therapy as well as poor living conditions as a result of total socio-political and economic situation in our country in the last ten years, health workers have been exposed to additional stress factors. Therefore, we wanted to establish to what extent professional stress affects appearance of complications in arterial hypertension with health workers. The examination included employees treated in the health centers "Hospital" and "Novi Sad". According to register for chronic mass non-contagious diseases of MONICA Project, younger patients suffering from arterial hypertension were excluded. From the aspect of possible causative factors of occupation on appearance of cardiovascular complications in patients already suffering from arterial hypertension, the examined group involved doctors and nurses. The control group included laboratory technicians, clerks, cleaners and service workers. It was established that doctors and nurses with hypertension registered in earlier life periods, were more vulnerable to angina pectoris, myocardial infarction and cerebrovascular insult as complications, compared to the rest of employees (if age as a risk factor is excluded) ($RR=3,7$; 95% confidence interval $1,6 < RR < 8,6$).

Key words: Workplace; Occupational Exposure; Stress; Cardiovascular Diseases; Medical Staff; Risk

Uvod

Radno mesto kao potencijalni izvor stresa sve više zaokuplja pažnju stručnjaka. Poznato je da profesionalna aktivnost može imati pozitivne, ali i negativne efekte na zdravstveno stanje, posebno na pojavu kardiovaskularnih oboljenja. Rad gde postoje visoki zahtevi a mala sloboda odlučivanja (*work of high demands and low control*) ima negativne efekte na zdravlje. Visoki zahtevi na radom mestu u Karasekovom modelu [1] utvrđuju se na osnovu odgovora na pitanja tipa "raditi brzo", "raditi teško" uz "malo vremena da se posao završi". Mala sloboda odlučivanja se ogleda kroz ograničavanje upotrebe stečenog znanja i veština na radu. Neke studije dodaju i

Introduction

Workplace as a potential source of stress increasingly receives attention of experts. It is well known that professional activity can have positive, but also negative effects on health, especially on appearance of cardiovascular diseases. High demand and low-control work (in making decisions) has negative effects on health. The Karasec demand-control model [1], is established according to questionnaire answers like: "working quickly", "working hard", and "little time to complete the work". Low control (in making decisions) means restricted usage of knowledge and skills at work. Some studies also mention the third component, which relates to the existence of social

Skraćenice

RR	- relativni rizik
$\bar{x}$	- aritmetička sredina
SD	- standardna devijacija

treću komponentu koja se odnosi na postojanje socijalne podrške na radnom mestu [2,3]. Ekonomski troškovi koji nastaju u takvim uslovima privredivanja generalno posmatrano (apsentizam i smanjenje produktivnosti) veoma su visoki [4]. Međutim, najvažnije je da postoji veliki potencijal u prevenciji mnogih bolesti i smrtnosti koje su posledica rada u takvim uslovima.

Stres predstavlja stanje psihofizičke napetosti neophodno za obavljanje životnih funkcija, po principu uraditi ili ne uraditi, boriti se ili pobeći (*fight or flight*). Iz faze alarma i anticipacije, prelazi se u adaptaciju, a ako stres duže traje u iscrpljenost ili oporavak [5]. U početku dolazi do jače kontrakcije srca, ubrzane frekvencije, povećanja krvnog pritiska, naročito sistolnog, sa vidljivim pulziranjem velikih arterija vrata. Javlja se hiperfunkcija endokrinih žlezda: hipofize, tireoideje, nadbubrežnih žlezda, pankreasa i ovarijuma. U kliničkom stanju se prvo zapaža neurovegetativna distonija, neuroza srca, hiperfunkcija štitne žlezde, latentni pa potom manifestni dijabetes, Kušingov sindrom hiperfunkcije nadbubrežne žlezde, arterijska hipertenzija, stresni ulkus želuca i duodenuma. Dolazi do pojave rane ateroskleroze i njene progresije u brojne komplikacije: anginu pectoris, srčani infarkt i cerebrovaskularne bolesti.

"Svaka profesija nosi određene rizike, a medicina, budući da je predmet njene delatnosti čovek, predstavlja profesiju visokog rizika. Medicinu možemo ubrojiti u jednu od najsloženijih ljudskih delatnosti jer je ona istovremeno naučno-teorijska (spoznajna), sa kompleksom specifičnih veština (lekarske tehnike - umetnost) i praktična delatnost (shvaćena kao odnos među ljudima u društvenim zajednicama)" [6].

U poslednjih desetak godina zdravstveni radnici su bili izloženi specifičnim uticajima koji su predstavljali dodatni izvor stresnih faktora obolevanja, kao što su povećan broj pacijenata, smanjena mogućnost dijagnostike i terapije, loši materijalni uslovi života i na kraju, 1999. nezapamćena vojna agresija na našu zemlju. Zdravstveni radnici su bili na svojim radnim mestima i izvršavali radne zadatke u krajnje teškim uslovima.

Cilja rada je ispitivanje uticaja obavljanja profesionalnih aktivnosti na pojavu kardiovaskularnih komplikacija, kao što su infarkt miokarda, cerebrovaskularni insult i angina pectoris kod zdravstvenih radnika obolelih od arterijske hipertenzije u zdravstvu Novog Sada.

Materijal i metode

Tokom perioda od 1993. do 2000. godine praćeni su oboleli od arterijske hipertenzije na osnovu evi-

Abbreviations

RR	- relative risk
$\bar{x}$	- arithmetical mean
SD	- standard deviation

support at work [2,3]. Economic expenses which are made in such economic conditions (absenteeism and reduced productivity) are very high. Although it is difficult to estimate, it is believed that they are about several billions a year [4]. However, the important thing is that there are great potentials in prevention of many diseases and mortality, which are consequence of working in such conditions.

Stress is a condition of psychophysical tension necessary for all life functions according to the principal to do or not to do, to fight or not to fight (*fight-or-flight*). Alarm reaction is transformed into anticipation and then into adaptation but if stress lasts longer, it leads either to exhaustion or recovery [5]. At the beginning there are strong heart contractions, rapid frequency, increased blood pressure, especially the systolic one with visible pulsing of great arteries on the neck. There is also hyperactivity of endocrine glands: hypophysis, thyroid gland, adrenal gland, pancreas and ovaries. In clinical conditions first we notice neurovegetative dystonia, heart neurosis, hyperactivity of thyroid gland, first latent then manifesting diabetes, Cushing syndrome of adrenal gland hyperactivity, arterial hypertension, duodenal and gastric stress ulcer. There is also early arteriosclerosis and its progression into numerous complications: angina pectoris, myocardial infarction and cerebrovascular diseases.

"Every profession is associated with some risk, but medicine, dealing with man as its object, is a profession of high risk. Medicine is one of the most complex human professions, being at the same time scientific-theoretical (cognitive) with complex skills ("doctor techniques" - art) and practical work (relations among people in social communities)" [6].

In the last ten years health workers have been exposed to specific conditions which were additional source of stress factors like: increasing number of patients, reduced possibilities of diagnostics and therapy, poor living conditions and in the end the aggression on our country. Health workers were at their workplaces doing their assignments in extremely difficult conditions.

To explore the impact of professional stress on appearance of cardiovascular complications, myocardial infarction, cerebrovascular insult and angina pectoris in health workers suffering from arterial hypertension in the health workers of Novi Sad.

Material and methods

During the period 1993-2000 we followed-up patients with chronic mass non-contagious diseases

dencije o hroničnim masovnim nezaraznim bolestima MONICA programa i CINDI projekta u zdravstvenoj stanici "Bolnica" i Domu zdravlja "Novi Sad". Podaci su uzeti iz zdravstvenih kartona i kartončića hroničara. U momentu posmatranja utvrđeno je prisustvo ili odsustvo kardiovaskularnih komplikacija (angina pectoris, infarkt miokarda i cerebrovaskularni inzult).

Sa aspekta mogućeg uticaja zanimanja na nastanak kardiovaskularnih komplikacija kod već obolelih od arterijske hipertenzije, formirana je ispitivana grupa koju su činili lekari i medicinske sestre. U kontrolnoj grupi bili su laboranti, službenici, spremačice i radnici uslužnih delatnosti (bravari, stolari, vodoinstalateri, tapetari, radnici iz kuhinje, vešeraja i slično). Kod svih je utvrđena zastupljenost određenih rizika faktora kao što su pušenje, gojaznost, nedovoljna fizička aktivnost, genetski faktor, stres, konzumiranje alkohola i hiperholesterolemija.

Epidemiološkoj analizi prikupljenih podataka prethodila je osnovna statistička obrada. Za analizu međuzavisnosti korišćen je Fisherov egzaktni test, χ^2 test, stratifikovana Mantel-Haenszelova analiza, računat je relativni rizik i njegova intervalna ocena (RR) [7].

Rezultati rada

Od 282 pregledana radnika uzorak je činilo 160 pregledanih (56,7%), i to 47 lekara (29,4%) i 113 medicinskih sestara i tehničara (70,6%). U odnosu na polnu strukturu bilo je 28 muškaraca (17,5%) i 132 žene (82,5%) (tabela 1). Od 47 lekara 17 (36,2%) su bili muškarci, a 30 (63,8%) žene. Od 113 medicinskih sestara i tehničara 11 su bili medicinski tehničari (9,7%), a 102 medicinske sestre (90,3%).

Kontrolnu grupu je činilo 122 (43,3%) pregledanih radnika, i to 31 laborant (25,4%), 23 službenika (18,9%), 42 spremačice (34,4%) i 26 radnika uslužnih delatnosti (21,3%). U kontrolnoj grupi je bilo 18 muškaraca (14,8%) i 104 žene (85,2%) (tabela 1). Od 18 muškaraca 5 su laboranti (27,8%), 3 službenika (16,7%) i 10 radnika uslužnih delatnosti (55,6%). Od 104 žene 26 je laborantkinja (25,0%),

Tabela 1. Polna struktura lekara, medicinskih sestara i kontrolne grupe

Table 1. Sex distribution of doctors, nurses and control group

Pol/Sex	Lekari i medicinske sestre/Doctors and nurses		Kontrolna grupa/Control group		Ukupno Total	
	N	%	N	%	N	%
Muškarci Men	28	17,5	18	14,8	46	16,3
Žene Women	132	82,5	104	85,2	236	83,7
Ukupno Total	160	100,0	122	100,0	282	100,0

(MONICA and CINDI Project), health workers suffering from arterial hypertension established in earlier life period (Health centers "Hospital" and "Novi Sad"). The study was to establish presence or absence of angina pectoris, myocardial infarction and cerebrovascular insult.

From the aspect of possible impact of occupation on the appearance of cardiovascular complications in patients already suffering from arterial hypertension, the examination group involved doctors and nurses. The control group comprised laboratory technicians, clerks, cleaners and service workers. Presence of some risk factors was established: smoking, obesity, insufficient physical activity, genetic factor, stress, alcohol consumption and hypercholesterolemia. Basic statistic indicators were calculated: arithmetic mean ($\bar{x}$), percent (%), standard deviation (SD). Fisher exact test was used for analyses of variables, as well as relative risk (RR) [7].

Results

Out of 282 examined workers the sample made 160 examinees (56,7%); 47 doctors (29,4%) and 113 nurses and technicians (70,6%). There were 28 men (17,5%) and 132 women (82,5%) (table 1). Out of 47 doctors, 17 (36,2%) were men and 30 (63,8%) women. Out of 113 nurses and technicians 11 were male technicians (9,7%) and 102 nurses (90,3%).

The control group comprised 122 (43,3%) examined workers: 31 laboratory technicians (25,4%), 23 clerks (18,9%), 42 cleaners (34,4%) and 26 service workers (21,3%). There were 18 men (14,8%) and 104 women (85,2%) (table 1). Out of 18 men, 5 were laboratory technicians (27,8%), 3 clerks (16,7%) and 10 service workers (55,6%). Out of 104 women, 26 were laboratory technicians (25,0%), 20 clerks (19,2%), 42 cleaners (40,4%) and 16 (15,4%) service workers (kitchen, laundry service).

Tabela 2. Dobna struktura lekara, medicinskih sestara i kontrolne grupe

Table 2. Age distribution of doctors, nurses and control group

Dobne grupe (godine) Age (years)	Lekari i medicinske sestre/Doctors and nurses		Kontrolna grupa/Control group		Ukupno Total	
	N	%	N	%	N	%
-35	5	3,1	-	-	5	1,8
35 - 39	11	6,9	7	5,7	18	6,4
40 - 44	21	13,1	24	19,7	45	16,0
45 - 49	30	18,8	38	31,1	68	24,1
50 - 54	55	34,4	31	25,4	86	30,5
55 - 59	30	18,8	16	13,1	46	16,3
60 -	8	5,0	6	4,9	14	4,9
Ukupno Total	160	100,0	122	100,0	282	100,0
x	49,4		48,8		49,1	
SD	7,0		6,0		6,6	

20 službenica (19,2%), 42 spremačice (40,4%) i 16 radnica uslužnih delatnosti (iz vešeraja, pegleraja, kuhinje) (15,4%).

Prosečna starost uzorka iznosila je 49,4 godine, SD=7,0, a kontrolne grupe 48,8 godina, SD= 6,0 (tabela 2). Prosečna dužina ukupnog radnog staža uzorka bila je 26,6 godina, SD= 6,6, a kontrolne grupe 24,0 godine, SD= 6,8 (tabela 3).

Tabela 3. Lekari, medicinske sestre i kontrolna grupa prema ukupnom radnom stažu

Table 3. Total work experience of doctors, nurses and control group

Ukupan radni staž (godine)/Total work experience (years)	Lekari i medicinske sestre/Doctors and nurses		Kontrolna grupa/Control group		Ukupno Total	
	N	%	N	%	N	%
<10	3	1,9	-	-	3	1,1
10 - 14	6	3,8	6	4,9	12	4,3
15 - 19	15	9,3	23	18,9	38	13,5
20 - 24	25	15,6	28	22,9	53	18,8
25 - 29	50	31,3	38	31,1	88	31,2
30 - 34	61	38,1	23	18,9	84	29,7
35-	-	-	4	3,3	4	1,4
Ukupno/Total	160	100,0	122	100,0	282	100
$\bar{x}$	26,6		24,0		25,5	
SD	6,6		6,8		6,8	

Osnovni zaključak na osnovu analize epidemiološkog rizika je da su lekari i medicinske sestre sa arterijskom hipertenzijom značajnije ugroženiji pojavom kardiovaskularnih komplikacija (18,2%) u odnosu na ostale zaposlene (4,9%). Utvrđena je visoko statistički značajna povezanost pojave kardiovaskularnih komplikacija i zanimanja RR=3,7 (95% interval poverenja 1,6 <RR<8,6) (tabela 4).

Tabela 4. Kardiovaskularne komplikacije kod lekara, medicinskih sestara i kontrolne grupe

Table 4. Cardiovascular complications in doctors, nurses and control group

Kardiovaskularne komplikacije/Cardiovascular complication	Lekari i medicinske sestre/Doctors and nurses		Kontrolna grupa/Control group		Ukupno Total		Relativni rizik Relative risk
	N	%	N	%	N	%	
Prisustvo Presence	29	18,2	6	4,9	35	12,4	RR = 3,7 95% interval poverenja 1,6 <RR<8,6
Odsustvo Absence	131	81,8	116	95,1	247	87,6	95% confidence limit
Ukupno/Total	160	100,0	122	100,0	282	100,0	1,6 <RR<8,6

Kad su u pitanju lekari i medicinske sestre, infarkt miokarda je utvrđen kod njih 11 (6,9%), cerebrovaskularni inzult kod njih 6 (3,8%) i kod 12 angina pectoris (7,5%). Kod kontrolne grupe po dvoje radnika je imalo infarkt miokarda, cerebrovaskularni inzult i anginu pectoris (1,6%). Od 47 lekara 8 ima

The average age of the sample was 49.4 years, SD=7.0, and of the control group 48.8 years, SD= 6.0 (table 2). The average working experience of the sample was 26.6 years, SD= 6.6 and of the control group 24 years, SD= 6.8 (table 3).

According to the epidemiological risk analysis our basic conclusion is that doctors and nurses with arterial hypertension are remarkably more vulnerable to appearance of cardiovascular complications (18.2%) in relation to the rest of the employed (4.9%). It was established that there was highly statistically significant correlation between cardiovascular complications and occupation RR= 3.7 (95% confidence interval 1.6<RR<8.6) (table 4).

Investigation of doctors and nurses showed that 11 (6.9%) of them suffered myocardial infarction, 6 (3.8%) had cerebrovascular insult and 12 of them suffer from angina pectoris (7.5%). In the control group two workers had myocardial infarction, cerebrovascular insult and angina pectoris (1.6%). From 47 doctors, 8 had myocardial infarction (17.0%), one had cerebrovascular insult (2.1%) and three angina pectoris (6.4%) which totally makes 12 ill people (25.5%). From 113 nurses and technicians, three had myocardial infarction (2.7%), five cerebrovascular insult (4.4%) and nine angina pectoris (7.9%) which totally makes 17 ill people (15.0%).

Investigation of all the ill from the examination and control group revealed that myocardial infarction as cardiovascular complications were present in 11 men (23.9%) cerebrovascular insult in two (4.3%) and angina pectoris in three (6.5%) ill people. Angina pectoris was present in 11 women (4.7%), cerebrovascular insult in 6 (2.5%) and myocardial infarction in two (0.8%). Our investigation of men and women showed that relative risk of cardiovascular complications was extremely more significant in men in relation to women RR= 4.3 (95% confidence interval 2.4<RR<.7) which points out the protective role of female sex.

Presence of risk factors in the examination and control group is presented in table 5. We can notice presence of physical inactivity, genetic factor and hypercholesterolemia in the control group. Analysis of special effects of cholesterol was carried out by stratified analysis. Doctors and nurses, in relation to the control group, were exposed to higher risk of getting ill, both in stratum with higher cholesterol (RR= 3.7; 95% confidence interval 1.1<RR<12.7) and in stratum with normal cholesterol (RR= 3.5; 95% confidence interval 1.1<RR<1.3). Mantel-Haenszel analysis of relative risk RR= 3.6 (95% confidence interval 1.5<RR<8.4) greatly differs from 1 (p<0.01). By stratified analysis for physical inactivity (RR= 3.5; 95% confidence interval 1.6<RR<8.0) and for genetic factor (RR= 3.6; 95% confidence interval 1.6<RR<8.1) we came to the same conclusion (p<0.01). The hypothesis about the unitary value of relative risk was also rejected (p<0.01).

infarkt miokarda (17,0%), jedan cerebrovaskularni inzult (2,1%), a troje anginu pectoris (6,4), što ukupno iznosi 12 obolelih (25,5%). Od 113 medicinskih sestara i tehničara troje ima infarkt miokarda (2,7%), petoro cerebrovaskularni inzult (4,4%), a devetoro anginu pectoris (7,9%), što ukupno iznosi 17 obolelih (15,0%).

Posmatrajući ukupno sve obolele iz ispitivane i kontrolne grupe, uočava se da infarkt miokarda kao kardiovaskularnu komplikaciju ima 11 muškaraca (23,9%), cerebrovaskularni inzult dvoje (4,3%) i anginu pectoris troje (6,5%) obolelih. Anginu pectoris ima 11 žena (4,7%), cerebrovaskularni inzult 6 (2,5%) i infarkt miokarda dve (0,8%). Posmatrajući ukupno sve ispitivane muškarce i žene, utvrđeno je da je relativni rizik pojave kardiovaskularnih komplikacija kod muškaraca značajno veći u odnosu na žene $RR=4,3$ (95% interval poverenja $2,4 < RR < 7,7$) čime se ističe zaštitna uloga ženskog pola.

Zastupljenost posmatranih riziko faktora kod ispitivane i kontrolne grupe prikazana je na tabeli 5. Uočava se značajno viša zastupljenost fizičke neaktivnosti, genetskog faktora i hiperholesterolemije u kontrolnoj grupi. Analiza posebnog uticaja holesterola sprovedena je stratifikovanim analizom. Lekari i medicinske sestre u odnosu na kontrolnu grupu bili su izloženi većem riziku obolevanja, kako u stratumu sa povišenim holesterolom ($R=3,7$; 95% interval poverenja $1,1 < RR < 12,7$), tako i u stratumu sa normalnim holesterolom ($RR=3,5$; 95% interval poverenja $1,1 < RR < 11,3$). Sumarna Mantel-Haenszelova ocena relativnog rizika $RR=3,6$; (95% interval poverenja $1,5 < RR < 8,4$) značajno se razlikuje od 1 ($p < 0,01$). Stratifikovanim analizom za fizičku neaktivnost ($RR=3,5$; 95% interval poverenja $1,6 < RR < 8,0$) i za genetski faktor ($RR=3,6$; 95% interval poverenja $1,6 < RR < 8,1$) dolazi se do istog zaključka ($p < 0,01$). Takođe je odbačena hipoteza o jediničnoj vrednosti relativnog rizika ($p < 0,01$).

Diskusija

Pošto je uočeno češće obolevanje novosadskih lekara i medicinskih sestara, u toku svakodnevnog rada, u odnosu na ostale zaposlene koji se leče u spomenutim zdravstvenim stanicama, nametnula se potreba za traženjem dodatnih faktora koji opterećuju zdravstvene radnike.

Analiza je uključila 282 radnika koji su registrovani kao hipertoničari i zaposleni u zdravstvenom sektoru. Nije bilo statistički značajne starosne razlike među njima ($p=0,54$), a dvogodišnja razlika u dužini prosečnog radnog staža, mada statistički značajna, sa stanovišta medicinskog problema koji se ispituje nije mogla imati značajnije dejstvo.

I pored veće zastupljenosti pojedinih posmatranih riziko faktora u kontrolnoj grupi obolevanje od kardiovaskularnih komplikacija bilo je učestalije među lekarima i medicinskim sestrama nego u kontrolnoj

Tabela 5. Zastupljenost posmatranih riziko faktora kod lekara, medicinskih sestara i kontrolnoj grupi

Table 5. Distribution of risk factors in doctors, nurses and control group

Riziko faktor <i>Risk factors</i>	Lekari i medicinske sestre <i>Doctors and nurses</i>		Kontrolna grupa <i>Control group</i>		Nivo značajnosti <i>Level of significance</i>
	N	%	N	%	
1. Pušenje (<i>Smoking</i>)	50	31,3	39	31,9	ns
2. Gojaznost (<i>Obesity</i>)	50	31,3	41	33,6	ns
3. Fizička neaktivnost (<i>Physical inactivity</i>)	29	13,8	44	36,0	**
4. Genetski faktor (<i>Genetic factor</i>)	74	46,3	85	69,7	**
5. Stres (<i>Stress</i>)	26	16,3	29	23,8	ns
6. Alkoholizam (<i>Alcoholism</i>)	3	1,9	4	3,3	ns
7. Hiperlipoproteinemija (<i>Hyperlipoproteinemia</i>)	62	38,8	68	55,7	**

Legenda: ns - nije značajno; * - $p < 0,05$; ** - $p < 0,01$

Legend: ns - not significant; * - $p < 0,05$; ** - $p < 0,01$

Discussion

Since it has been noticed that doctors and nurses of Novi Sad get ill more frequently during everyday work, in relation to other health workers who are treated in the mentioned health centers, we felt the need to search for some additional factors which affect health workers.

The analysis included 282 registered hypertensive workers who are employed in the health sector. There was no statistically significant difference in age ($p=0,54$); two-year difference in average working experience, although statistically significant, from the point of view of medical problem explored, could not have a significant role.

Although some risk factors were more evident in the control group, cardiovascular complications were more frequent among doctors and nurses than in the control group. The stratified analysis proved that risk was higher in doctors and nurses. Further analysis included stratification, both examination and control group, on the stratum in which all the factors were present and the stratum where they were not present, but relative risk was determined for both them. This stratified analysis showed that doctors and nurses suffering from hypertension were exposed to higher risk for developing cardiovascular complications.

grupi. Stratifikovana analiza je pokazala da je rizik obolevanja kod lekara i medicinskih sestara veći. Dalja analiza je uključila stratifikaciju, kako osnovne grupe tako i kontrolne, na stratum u kojem su ovi faktori prisutni i na stratum u kojem nisu prisutni, a relativni rizik je ocenjen za oba stratuma. Ova stratifikovana analiza je pokazala da radno mesto lekara i medicinskih sestara obolelih od hipertenzije nosi uvećan rizik za pojavu kardiovaskularnih komplikacija.

Poslednjih decenija su se pojavila nova saznanja u pogledu izučavanja riziko faktora za nastanak kardiovaskularnih oboljenja. Radnom mestu se poklanja sve više pažnje i pokušava se ući u suštinu problema [8]. Postoje mnoga istraživanja koja kao doprinosni uzrok pojave kardiovaskularnih oboljenja navode rad na radnim mestima koja karakterišu visoki zahtevi a mala sloboda odlučivanja. To su radna mesta gde postoji produženo radno vreme, noćni rad, dugotrajna stalna napetost, nesigurnost na radu, društvena izolacija, buka, temperaturni ekstremi, sedentaran način rada, razne hemijske nokse i drugo. Po Karasekovom modelu zdravstveni radnici, pogotovu medicinke sestre se nalaze u grupi poslova sa visokim zahtevima, a malom slobodom odlučivanja koji rezultuju stvaranjem jake napetosti kod radnika [9].

Kardiovaskularni aparat je jedan od najosetljivijih indikatora reakcije na stres. Theorell [10] utvrdio je kod muškaraca Švedana starosti 35-55 godina signifikantnu povezanost granične hipertenzije dijastolnog tipa sa napetošću na radu, i to na visokom nivou značajnosti, a kod medicinskih sestara Švedanki [11], napetost na poslu sa povišenim sistolnim i dijastolnim krvnim pritiskom. Harenstam [12] utvrdio je kod Švedana čuvara zatvora značajnu povezanost sistolnog krvnog pritiska sa ograničavanjem upotrebe veština, a sloboda odlučivanja nije bila od uticaja na krvni pritisak. Van Egren [13] istakao je takođe veoma značajnu povezanost povišenog sistolnog krvnog pritiska sa nivoom značajnosti od $p < 0,001$ sa napetošću na radnom mestu, nešto nižu u kućnim uslovima ($p < 0,05$), a nesignifikantnu u spavanju. U Framingamskoj studiji je utvrđen značajan relativni rizik obolevanja od kardiovaskularnih bolesti kod radnika koji na radnom mestu osećaju napetost [14]. Mensch je kod zaposlenih 5335 muškaraca i 4874 žene, starosti od 19 do 27 godina utvrdio značajnu povezanost napetosti na poslu, pušenja i pojave kardiovaskularnih bolesti [15].

Tokijska deklaracija [16] je dala okvire za formiranje zdravog radnog mesta i zdravih uslova rada i očekuje se da će se aktivnije krenuti na tom polju u cilju eliminisanja delovanja štetnih uslova rada na zdravlje zaposlenih.

Za uspeh u prevenciji kardiovaskularnih oboljenja i sniženju nivoa, odnosno eliminaciji rizičnih faktora među njima i onih faktora koji se vezuju za posebne karakteristike radnog mesta potreban je timski rad koji bi uključivao specijaliste medicine rada, epide-

New scientific knowledge in last decades has studied risk factors for development of cardiovascular diseases. Workplace is given more attention and it was an attempt to get into the heart of the problem. There are many studies which lead to the fact that workplace with high demands and low control can be the causative factor for development of cardiovascular diseases. Such workplaces are those with extended working time, night work, long constant tension, insecurity at work, social isolation, noise, temperature extremes, sedentary way of work, various chemical noxes and so on. According to Karasec model, health workers especially nurses, belong to the group of professions with high demands and low control, which results in great tension [9].

Cardiovascular measurements are the best indicators of reaction to stress. Theorell [10] came to the conclusion that in male Swedes, aged 35-55, there is a significant correlation between diastolic hypertension and tension at work but in female Swede nurses [11] there is tension at work and higher systolic and diastolic blood pressure. Harenstam [12] discovered in male Swede prison guards, a significant correlation between systolic blood pressure and limited usage of skills, but possibility in making decisions did not affect their blood pressure. Van Egren [13] also pointed out the significant correlation between higher systolic blood pressure, with significance level $p < 0.001$ and tension at work, a little lower at home conditions ($p < 0,05$) and non significant during sleep. The Framingham study, a significant relative risk for development of cardiovascular diseases in workers who feel tension at work [14]. Mensch discovered a significant correlation between tension at work, smoking and development of cardiovascular diseases in 5.335 employed men and 4.874 women, 19-24 years of age [15].

Tokyo Declaration [16] provided a framework for healthy workplaces and healthy working conditions and it is expected that there would be a greater activity in that field in order to eliminate the impact of poor working conditions. Workplace is given much more attention and there are attempts to get into the heart of the problem.

In order to decrease the risk factors connected to the development of cardiovascular diseases due to working it is necessary to organize teamwork including specialists of occupational medicine, epidemiologists, economists, engineers, workers and managerial structures, whose help and understanding may have an important role.

miologe, ekonomiste, inženjere, predstavnike radnika, odnosno rukovodećih struktura čija pomoć i razumevanje igra značajnu ulogu, oslanjajući se na preventivne programe kardiovaskularnih oboljenja u široj društvenoj zajednici, ako oni postoje.

Utvrđivanjem rizika (razni upitnici, monitoring uslova rada i sl.) specijalisti medicine rada bi trebalo da igraju jednu od vodećih uloga u kreiranju zdravog radnog mesta, da rade na ranoj dijagnostici, evaluaciji i lečenju kardiovaskularnih bolesti. Posebnu ulogu treba da imaju u radu sa grupom radnika koji se nalaze u visokom riziku za nastanak kardiovaskularnih bolesti [17].

Nameće se potreba utvrđivanja profesionalnog stresa putem specijalizovanih instrumenata bazirajući se na međunarodnim iskustvima u ovoj oblasti uz adaptaciju koja bi uvažila specifičnosti lokalne sredine kojoj su izloženi zdravstveni radnici. To istraživanje bi pružilo poruke za reformu zdravstva kako bi se u regulatorne mehanizme ugradili elementi zaštite zdravstvenih radnika na njihovim radnim mestima od izvora stresa.

Prevenција - poboljšanje stila života i menjanje loših navika i bolja kontrola i tretman riziko faktora za pojavu kardiovaskularnih oboljenja glavni su faktori smanjenja smrtnosti i obolevanja, razvijanjem populacione zdravstvene strategije i strategije visokog rizika. Inkorporisanje preventivnih mera u najranije životno doba, formiranje zdravog načina života, bez pušenja, sa zdravom ishranom, regularnim fizičkim aktivnostima i zdravom životnom i radnom sredinom [18,19] su najvažnije smernice u prevenciji pojave riziko faktora kod dece i omladine [20], kao i ostale populacije kod koje još nije došlo do pojave riziko faktora, a eliminisanje već prisutnih riziko faktora u celoj populaciji, naročito kad se oboljenje već javilo, promovisanjem zdravog načina života menjanjem loših navika, lečenjem oboljenja koja predstavljaju riziko faktore za pojavu kardiovaskularnih oboljenja itd. [21-28].

Zdravstveni radnici su nosioci zdravstvene zaštite stanovništva i promoteri unapređenja zdravlja cele populacije. Zato i zaslužuju da se njima posveti naročita pažnja. Ograničavanje kreativnosti na radu dovodi do pasivnosti radnika, osećaja beskorisnosti kako na radnom mestu, tako i uopšte u društvenoj zajednici. U tom slučaju dolazi i do povećavanja rizika za nastanak srčanih oboljenja. U protivnom, povećavanje aktivnosti, kreativnosti i samopouzdanja dovodi do motivisanosti za rad sa manje štetnih efekata na zdravlje.

Na osnovu svega iznesenog nameće se potreba za detaljnijim sagledavanjem radnog mesta lekara i medicinskih sestara i tehničara radi utvrđivanja opterećujućih faktora koji dovode do razvijanja unutrašnje napetosti koja, posle izvesnog vremena, može dovesti do pojave raznih psihosomatskih oboljenja, među kojima su naročito učestala kardiovaskularna oboljenja.

By exploring the risks (questionnaires, monitoring of working conditions, and so on) specialists of occupational medicine should have one of the leading roles in creating healthy workplaces and work on early diagnostics, evaluation and treatment of cardiovascular diseases. They should have a special role with group of workers who are at high risk for cardiovascular diseases.

It is necessary to establish professional stress by special instruments, based on international experiences in this field together with adaptation which would include specificities of local environment to which the health workers are exposed. Such a search would provide ideas for the reform of health service in order to incorporate elements of protection of health workers from stress into regulatory mechanisms.

Prevention and improvement of lifestyle, changing bad habits and better control and treatment of risk factors for cardiovascular diseases, are main factors for decrease of mortality and diseases, by developing popular health strategy and strategy of high risk. Preventive measures at young age, healthy lifestyle, no smoking, healthy food, regular physical activities and healthy living and working environment [18,19] are most important directives in prevention risk factors in children and youth [20] as well as in the rest of the population with no risk factors and elimination of already present risk factors in entire population. Moreover, if the disease is already present, it is necessary to promote healthy lifestyle, changing of bad habits, treatment of diseases which are risk factors for cardiovascular diseases and so on [21-28].

Health workers provide health care for all citizens and are promoters of improvement of health generally speaking. Therefore, a special attention should be paid to them. Limited creativity at work can lead to passivity of workers, feeling of uselessness both at work and in the social community. In such cases, risks for heart diseases are more likely to develop. On the contrary, increased activity, creativity and self-confidence generate motivation for work with less bad effects on health.

According to all presented, there is a need for more detailed observation of workplaces of doctors, nurses and technicians in order to establish factors which lead to development of inner tension which may after some time lead to some psychosomatic diseases, most frequently-cardiovascular diseases.

Zaključak

U ovom radu je utvrđeno da su tokom kriznih godina kroz koje je prošlo zdravstvo, lekari i medicinske sestre sa hipertenzijom bili izloženi uvećanom riziku za nastanak kardiovaskularnih komplikacija.

Conclusion

This study showed that during hard years through which our health service has gone through, doctors and nurses with hypertension were exposed to higher risk for development of cardiovascular diseases and complications.

Literatura

1. Karasek RA, Theorell T. *Healthy Work*. Basic Books. 1990.
2. Johnson J.V. Hall, EM. Job strain, work place social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *Am J Public Health* 1988;78:1336-42.
3. Falk A, Hanson BS, Isacsson S-O, Ostergren P-O. Job strain and mortality in elderly men: Social network, support and influence as buffers. *Am J Public Health* 1992;82:1136-9.
4. Landsbergis PA, Schnall PL, Schwartz JE, Warren K, Pickering TG. Job strain, hypertension and cardiovascular disease. In: *Organisational Risk Factors for Job Stress*, eds. SL Sauter, LR Murphy. Washington, DC: American Psychological Association, 1995:97-112.
5. Nedeljković S, Vukotić M. Vaš krvni pritisak. Društveno preduzeće za izdavačku delatnost i stručno usavršavanje kadrova Beograd, 1996:199.
6. Popović D. Medicinska delatnost-rizici i vidovi odgovornosti. Simpozijum Zdravstvo u uslovima promena. Pravoteorija i praksa. Novi Sad, 1999:55-61.
7. Fleiss JL. *Statistical methods for rates and proportions*. 2nd ed. New York: John Wiley, 1981:69-108.
8. Schnall PL, Landsbergis PA, Baker D. Job Strain and Cardiovascular Disease. *Ann Rev Public Health* 1994;15:381-411.
9. Karasek RA, Gardell B, Lindel J. Work and non-work correlates of illness and behaviour in male and female Swedish white collar workers. *J Occup Behav* 1988;8:187-207.
10. Theorell T, de Faire U, Johnson J, Hall EM, Perski A, Stewart W. Job strain and ambulatory blood pressure profiles. *Scand J Work Environ Health* 1991;17:380-5.
11. Theorell TPG, Ahlberg-Hulten G, Jodko M, Sigala F, Soderholm M, de la Torre B. Influence of job strain and emotion on blood pressure in female hospital personnel during work hours. *Scand J Work Environ Health* 1993;19:313-318.
12. Harenstam AB, Theorell TPG. Work conditions and urinary excretion of catecholamines- A study of prison staff in Sweden. *Scand J Work Environ Health* 1988;14:257-64.
13. Van Egren LF. The relationship between job strain and blood pressure at work, at home, and during sleep. *Psychosom Med* 1992;54:337-43.
14. LaCroix AZ. High demand/low control work and incidence of CHD in the Framingham Cohort. PhD Thesis. Univ. North Carolina: Chapel Hill, 1984.
15. Mensch BS, Kandel DB. Do job conditions influence the use of drugs. *J Health Soc Behav* 1988;29:169-84.
16. The Tokyo Declaration on Work-Related Stress and Health In Three Postindustrial Settings-The European Union, Japan and United States. "Triangular" Conference; november Tokyo, 1998.
17. Nedić O, Radulović N, Šolak Z. Uslovi rada i kardiovaskularne bolesti kod zdravstvenih radnika Kliničkog centra u Novom Sadu. In: *I jugoslovenski stručni sastanak sa međunarodnim učešćem "Bolesti u vezi sa radom"*, Arandelovac, 1999: zbornik rezimea. Udruženje medicine rada Jugoslavije, 1999: 73-4.
18. Darwin R, Labarthe, et al. Development of Cardiovascular Risk Factors From Ages 8 to 18 in Project Heart Beat! *Circulation* 1997;95:2636-42.
19. Gregory P. Curnew. Preventing The Initial Cardiovascular Event: What's New In Secondary Prevention? *Can J Diagnosis* 1997;(Suppl):3-5.
20. Lawrence A. Leiter. Primary And Secondary Prevention In General Practice: Evaluating The Risk And Efficacy of Treatment. *Can J Diagnosis* 1997;(Suppl):10-2.
21. Jules YT Lam. Hypolipidemic Agents: Achieving Optimal Control In Primary And Secondary Prevention. *Can J Diagnosis* 1997;(Suppl):13-6.
22. Scott MG, et al. When to Start Cholesterol-Lowering Therapy in Patient With Coronary Heart Disease. *Circulation*, 1997;1683-5.
23. Sidney CS, et al. Preventing Heart Attack and Death in Patients With Coronary Disease. *Circulation*, 1995;92:2-4.
24. Ronald MK, et al. Dietary Guidelines for Health American Adults. *Circulation*, 1996;94:1795-80.
25. Beaglehole R. WHO MONICA PROJECT. In: *The XIV international scientific meeting of the International epidemiological association*. Nagoya, Japan, 1996:76.
26. Labarthe D. Preventing Cardiovascular Risk Factors in The First Place. In: *The XIV international scientific meeting of the International epidemiological association*. Nagoya, Japan 1996:76.

27. Yamori Y. WHO-CARDIAC Study for monitoring of global nutrition and cardiovascular diseases in changing environment. In: The XIV international scientific meeting of the International epidemiological association. Nagoya, Japan, 1996: 113.

28. Namekata T, et al. Coronary Heart Disease And Its Risk Factors Among Japanese Americans in Seattle And Native Japanese In Japan. In: The XIV international Scientific meeting of the International epidemiological association. Nagoya, Japan, 1996:113.

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Organizacioni odbor:

Prim. dr Ivan Omerović
Institut za zaštitu zdravlja Srbije
11000 Beograd, Dr Subotića 5
Fax: +38111 659 138
E-mail: kongres@batut.org.yu
E-mail: ivano@batut.org.yu
E-mail: ljiljacr@batut.org.yu

Prim. dr Mirjana Milankov
Institut za zaštitu zdravlja Novi Sad
21000 Novi Sad, Futoška 93
Fax: +38121 613 989
E-mail: izzz@eunet.yu