ACTA MED OKAYAMA 2000; 54(1): 33-38

Work Conditions as Risk Factors for Varicose Veins of the Lower Extremities in Certain Professions of the Working Population of Rijeka

Ivica KONTOŠIĆ[a]*, Mihovil VUKELIĆ[a], Ivan DREŠČIK[b], Elika MESAROŠ-KANJSKI[c], Eris MATERLJAN[a] and Anto JONJIĆ[c]

[a]University of Rijeka, School of Medicine, Department of Social Medicine and Health Ecology, Rijeka 51000, Croatia, [b]Clinical Hospital Centre Rijeka, Rijeka 51000, Croatia and [c]Public Health Institute of "Primorsko-Goranska" County, Rijeka 51000, Croatia

This research aims to establish the effect of working conditions on the appearance of varicose veins. The epidemiological study was carried out on 1,324 examinees, 530 males and 794 females, employed in 5 highly represented groups of professional activities in Rijeka (catering, trade, light industry, heavy industry and finances). The data were collected by survey and clinical examination. Varicose veins were more prevalent in the trade than in the office workers (odds ratio (OR) = 2.08; 95% confidence interval (CI) = 1.31-3.31), and more prevalent in catering industries than in the office workers (OR = 1.56; 95% CI = 1.001-2.43). χ^2-testing suggested that standing in the workplace (OR = 1.35; 95% CI = 0.95-1.92), weight handling while working (OR = 1.29; 95% CI = 1.01-1.64) and working indoors (OR = 1.61; 95% CI = 1.02-2.53) were risk factors for varicose veins. By multiple logistic regression, the following risk factors were isolated in the total population: female sex (OR = 1.92; 95% CI = 1.37-2.67), workplace (OR = 0.89; 95% CI = 0.78-0.99), age (OR = 1.05; 95% CI = 1.03-1.07), body mass index (OR = 1.04; 95% CI = 1.01-1.07) and family history of the disease (OR = 1.99; 95% CI = 1.55-2.57).

Key words: varicose vein, lower extremities, risk factor, profession, work condition

Previous investigations have estimated that the incidence of varicose veins ranges from 10% to 20% of the total population in Anglo-American countries (1, 2). An investigation in Austria determined that the prevalence of vein disorders was 5.9% (3), while another study established an incidence of 29.6% in a senescent (65 to 95 years of age) Italian population (4). And among Croatians, the prevalence ranges from 7% to 8.7% in males and from 21% to 23.5% in females (5, 6).

The most frequently, reported risk factors for the development of varicose veins are female sex (3, 4, 7-19), pregnancy or menopause (4), a history of varicose veins in the family (1, 9, 12, 20-27), older age (1, 3, 7, 9, 10, 12, 13, 28-32), obesity (4, 8, 12-14, 32), flat feet (14, 20), and standing still (2, 7, 12, 14, 24, 32-34), or sitting (8) for long periods of time in the workplace. Less frequently reported risk factors include physical labor, exposure to high temperature, and repetitive use of the legs to engage/disengage leg levers and gears (35). On the other hand, some authors have reported finding of no correlation between varicose veins and female sex (28, 36), positive family history of varicose veins (11, 36), age (4, 8), obesity (11, 13, 29, 30), number of pregnancies and/or births (8, 37), oral contraception (38), long standing in the workplace (39), physical labor (9), exposure to high temperature (40), or smoking (4, 30).

The present research attempts to determine the effects of various factors at the workplace, as well as the effects of anthropometric and clinical parameters, on the occurrence of varicose veins in working populations of the most common professions in and around the City of Rijeka.

Patients and Methods

Every fourth person from an alphabetical list of employees in companies representative of the most common professional activities in the Rijeka Community was interviewed and examined. Prior to the investigation,

* To whom correspondence should be addressed.

representative companies were chosen by analyzing the statistical yearbook of all human activities in Rijeka, and it was determined that 5 professional subgroups, defined in following text, were representative for the total working population in Rijeka.

This cohort was then divided into 5 subgroups based on the type of work: the Trade group (group 1) consisted of retail sales or supermarket employees; the Catering group (group 2) consisted of personnel from the 3 largest hotels and about 80% of the restaurants in Rijeka; the Office workers group (group 5) consisted of clerks in the largest bank in Rijeka; and the industrial workers were employees of the 2 largest shipyards in Rijeka, of an iron foundry, of the Rijeka paper mill, or of the port of Rijeka, and were classified as $Industry_1$ workers (group 3; light physical labor mainly including arm and leg movements, no weight lifting, and no whole body intensive movements) or $Industry_2$ workers (group 4; heavier physical labor including walking, whole body movements, and heavy-load handling, *i.e.*, over 25 kg for males and over 15 kg for females). The data obtained by the interview were compared with the data from official forms of workplace description (16). About 200 persons refused participation in the study and 1,514 persons were physically examined and interviewed. Among them, 190 did not fill the questionnaires out correctly or completely. Thus 1,324 persons, 530 males and 794 females, were included in the analysis. The following data were used for the analysis: sex, workplace, posture (standing or sitting), body movements, handling weight and exposure to high temperature most of the time while at workplace, age, body mass index, family history of varicose veins, the presence of flat feet and the duration of fertile period, and the number of pregnancies and deliveries in women. Female sex was coded "2" and male sex "1". The presence of work related characteristics was coded "1" and the absence "0". Data on the family history of varicose veins were similarly coded "1" for present and "0" for absent. The physical examination provided data on flat feet (present = "1" and absent = "0") and clinical signs of vein disease. Physical examinations for varicose veins were conducted by 2 experienced general practitioners after detailed consultations with a vascular surgeon experienced in vein surgery and after 1 month of training to obtain a uniform approach to the physical examination of lower limb varicosities, whose very detailed and precise patterns will be described later in the text. All examinations, data collecting and polls were performed over a period of 6 months.

Persons suffering from varicose veins were divided by clinical stage of varicose veins development or chronic vein insufficiency. They were coded, with slight modifications, according to the method of Bunta (9) and of Legović and Mohar (41). The stage "0" was assigned to completely normal findings and to the presence of fishnet venectasias and teleangiectasias at levels not causing any functional difficulties. Stage "1" was defined as the presence of uniformly dilated main irrigating trunks or the presence of strictly localized varicosities followed by subjective symptoms of fatigue, weight and tension in the legs, cramps or pain in the calves, and temporary oedema registered in anamnesis. Stage "2" was distinguished by the presence of varicosis along the main irrigating trunks and oedema on the ankles with more explicit subjective discomfort than in stage "1" and occurring after a longer period of standing. Stage "3" represented clearly dilated and varicose veins of the entire leg accompanied by initial complications such as dermatitis due to stasis, phlebitis, or thrombosis, oedema on the ankles and explicit subjective discomfort during long periods of standing, sitting or walking. In stage "3" they were also included all conditions remained after previous thrombosis or surgical treatment of affected veins, without varicose veins present at the moment of research. To the above mentioned we added stage "4" (42), which consisted of persons suffering from clearly marked dermatitis due to stasis accompanied by sclerotic-indurative and atrophic cutaneous and subcutaneous changes on the legs, lower leg oedema, recent vein ulcer or scars of previously ruptured ulcer, with pigmentation changes. Subjective discomfort while lying was also one of the characteristics of this stage.

All persons from stage "1" to stage "4" were categorized within the group of "varicose vein positive" subjects (coded "1") and the others as "varicose vein negative" (coded "0").

In statistical analyses the χ^2-test was used to compare the prevalence of varicose veins with other examined characteristics of the interviewed persons.

To minimize the effect of confounding factors, we performed multiple logistic regression with presence or absence of varicose veins as a dependent variable and other possible risk factors as independent variables.

Results

Varicose veins prevalence was significantly higher in females than in males. Varicose veins were diagnosed in 34.6% or 275 out of 794 females and in 18.9% or 100 out of 530 males (odds ratio (OR) = 1.84).

Prevalences of varicose veins in catering and trade employees were significantly higher than in any other profession, especially in relation to the office workers (OR = 1.56 and 2.08) (Fig. 1 and Table 1).

χ^2-test revealed that the prevalence of varicose veins was significantly higher in persons who primarily stand than in those who primarily sit in their workplace (OR = 1.35), in those who generally work indoors than in those who generally work outdoors (OR = 1.61), and in those

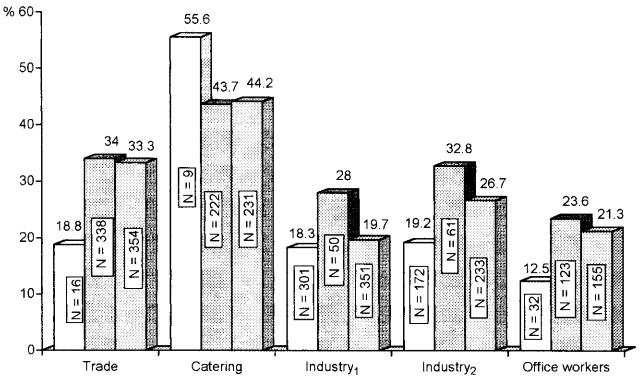

Fig. 1 The prevalence of varicose veins in comparison to the profession and sex.
N, total number of subjects; □, males; ▨, females; ▩, all.

Table 1 Comparison of varicose veins prevalences in relation to the profession, sex, working posture, workplace location, moving at workplace, handling of heavy loads while working and high temperature at workplace

	Prevalence (%)		OR (95% CI)	*P*
Profession	Trade	Office workers		
	118/ 354 (33.3)	33/ 155 (21.3)	1.56 (1.001-2.43)	< 0.01
	Catering			
	102/ 231 (44.2)		2.08 (1.31-3.31)	< 0.001
	Industry$_1$			
	69/ 351 (19.7)		0.92 (0.58-1.47)	—
	Industry$_2$			
	54/ 233 (26.7)		1.25 (0.77-2.04)	—
Sex	Females	Males		
	275/ 794 (34.6)	100/ 530 (18.9)	1.84 (1.42-2.39)	< 0.001
Working posture	Standing	Sitting		
	271/ 827 (32.8)	49/ 202 (24.3)	1.35 (0.95-1.92)	< 0.05
Workplace location	Indoors	Outdoors		
	333/1090 (30.6)	25/ 132 (18.9)	1.61 (1.02-2.53)	< 0.01
Moving at workplace	Yes	No		
	315/1067 (29.5)	60/ 257 (23.3)	1.26 (0.92-1.73)	—
Handling of heavy loads while working	215/ 676 (31.8)	160/ 648 (24.7)	1.29 (1.01-1.64)	< 0.005
High temperature at workplace	66/ 239 (27.6)	309/1085 (28.5)	0.97 (0.71-1.33)	—

OR, odds ratio; CI, confidence interval; *P*, the significance level of χ^2-test. Non-significant levels are signed by hyphen.

who handle heavy loads than in those who do not (OR = 1.29) (Table 1).

Multiple logistic regression analysis in all subjects revealed that the following were risk factors for varicose veins: female sex (OR = 1.92), older age (OR = 1.05), higher body mass index (OR = 1.04), positive family history of the disease (OR = 1.99) and workplace. In males, advanced age was found to be a risk factor (OR = 1.06). In females, advanced age (OR = 1.06), higher body mass index (OR = 1.05), positive family history of the disease (OR = 2.18) and workplace were found to be risk factors. In all groups of subjects, varicose veins were more prevalent in trade and catering than in the other professional groups (Table 2).

Discussion

The 28.3% prevalence of varicose veins observed for the total sample in this study, was somewhat higher than those (5.9 to 20%) previously reported for the general populations of several countries (1-3). It was even higher than the prevalence in a much older Italian population of individuals between 65 and 95 years of age (4). Some authors have stated that more than 70% of individuals in Germany show pathological changes in their vein systems (28). However, our samples were more specific than a general population because only certain professions were selected. The prevalence of varicose veins from our study falls in range from 18.6% to 29.7% established in some researches in Slovenia that examined similar professions (9). It is important to mention that the prevalence of varicose veins from our study was lower than that found in one of researches carried out in Rijeka about 20 years ago (41). Significantly higher prevalence of varicose veins that we found in females (OR = 1.9) is a usual finding, both in our country and in the world, where it ranged from 1.3 to 10.0 (2, 4, 6-8, 10-14, 16-19, 30, 31, 38, 39, 42). In former studies in Croatia the odds ratio for females compared to males was approximately 3.0 (5, 6).

In our research the prevalence of varicose veins was significantly higher in the catering and trade professions than in the other professions, which may, at least in part,

Table 2 The results of multiple logistic regression between some predictors for varicose veins and varicose veins

Predictors	All (N = 1324) df = 1316; P = 28.3%		Males (N = 530) df = 523; P = 18.9%		Females (N = 794) df = 783; P = 34.6%		Females$_1$ (N = 683) df = 675; P = 32.5%	
	mr = 0.34^e		mr = 0.27^e		mr = 0.34^b		mr = 0.32^d	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Sex (female/male)	1.92	(1.37-2.67)^e						
Workplace (trade/catering/industry$_1$/ industry$_2$/office workers)*	0.89	(0.78-0.99)^a	0.90	(0.67-1.20)	0.86	(0.73-0.99)^a	0.80	(0.68-0.95)^c
Working posture (standing: yes/no)	1.15	(0.70-1.88)	2.53	(0.96-6.73)	0.67	(0.33-1.36)	0.70	(0.33-1.52)
Moving at workplace (yes/no)	0.86	(0.55-1.16)	1.12	(0.57-2.17)	0.63	(0.33-1.18)	1.42	(0.37-1.34)
Handling of heavy loads while working (yes/no)	0.79	(0.60-1.04)	0.82	(0.52-1.29)	0.79	(0.55-1.13)	0.93	(0.63-1.37)
High temperature at workplace (yes/no)	1.11	(0.79-1.54)	0.96	(0.57-1.62)	1.22	(0.79-1.91)	1.01	(0.60-1.69)
Workplace location (outdoors/indoors)	0.89	(0.64-1.24)	0.90	(0.65-1.27)	0.92	(0.43-1.96)	0.95	(0.41-2.21)
Age (years)	1.05	(1.03-1.07)^e	1.06	(1.03-1.06)^e	1.06	(1.02-1.11)^d	1.07	(1.01-1.14)^a
Body mass index ((kg*10^4)/cm^2)	1.04	(1.01-1.07)^b	1.02	(0.96-1.09)	1.05	(1.01-1.09)^c	1.02	(0.98-1.06)
Positive family anamnesis for varicose veins (yes/no)	1.99	(1.55-2.57)^e	1.55	(0.98-2.47)	2.18	(1.58-3.01)^e	2.53	(1.78-3.62)^e
Presence of flat feet (yes/no)	1.30	(0.99-1.69)	1.49	(0.98-2.28)	1.19	(0.84-1.67)	1.13	(0.78-1.63)
Duration of fertile period (years)					0.98	(0.94-1.02)	1.00	(0.94-1.06)
Number of pregnancies (0/#)					0.93	(0.79-1.10)	0.93	(0.78-1.12)
Number of deliveries (0/#)					1.22	(0.94-1.59)	1.31	(0.97-1.77)

Females$_1$, premenopausal women; N, total number of subjects; df, degrees of freedom of multiple logistic regression; p, varicose veins prevalence in analyzed group; mr, multiple correlation coefficient of logistic regression; OR, odds ratio; ^{a} = P < 0.05; ^{b} = P < 0.02; ^{c} = P < 0.01; ^{d} = P < 0.005; ^{e} = P < 0.001; * trade, catering, industry$_1$, industry$_2$, office workers = coded with 1, 2, 3, 4, 5, respectively; cells with statistic values for variables not entered in regression are shaded.
#, one or more than one pregnancies or deliveries.

be attributed to the predominant number of females in these professions. A previous study in Slovenia also found that varicose veins were most prevalent among the catering and trade professions (9). And in a study analyzing the catering professions in Rijeka, a similar prevalence was found among females (45.1%), but the prevalence among males was significantly higher than in our research (42.9%) (41). Other authors do not consider profession to be a risk factor (9, 11).

Isolated predictors (while controlling the effects of confounders by multiple logistic regression) for varicose veins were female sex, older age, positive family anamnesis of varicose veins, and workplace. Body mass index and workplace were risk factors in all subjects as a consequence of their effect on the presence of varicose veins in women. Workplace was predominantly a risk factor among premenopausal women. Our finding that there was a higher prevalence of varicose veins among individuals with a positive family history of disease was in keeping with the generally established importance of family history in the occurrence of varicose veins (2, 5, 9, 12, 20-23, 27, 33, 43). Some researches, however, have found no correlation between higher varicose veins prevalence and family history of varicose veins (11, 36).

Our χ^2-test results indicated that high temperature at the workplace may be a risk factor for varicose veins, a finding which agreed with those of previous investigations (1, 34, 35).

The χ^2-test revealed that the prevalence of varicose veins was significantly higher in persons who stand most of the time at their workplace than in persons who sit most of the time, as well as in those who generally work indoors than in those who generally work outdoors. The prevalence was also higher for those handling heavy loads than for those not handling heavy loads.

If we wished to isolate specific work conditions responsible for the fact that employment in trade and catering were risk factors for varicose veins, we would obviously have to look for other work-related factors, or state that the work conditions we found as risk factors were significant only in the presence of other significant predictors of varicose veins.

Numerous other studies have similarly concluded that standing at the workplace is a risk factor for varicose veins (7, 12, 14, 24, 32, 34), although at least one other study has failed to confirm this correlation (39). Hard physical labor was also found to be a risk factor in some studies, especially if connected with weight lifting (35). And although other authors have claimed that physical work is not a risk factor, these authors have generally not analyzed the connection between the appearance of varicose veins and such other factors as weight lifting (9, 10, 40). Some authors have concluded that flat feet are a considerable risk factor for varicose veins, especially for females in the trade and catering industries (1, 33, 44, 45). In the present study, however, flat feet were not determined to be a significant predictor for varicose veins.

Finally, we must take into consideration the limitations of this study: it was a cross-sectional study with a possibility of inter-correlations among several existing risk factors, and the presence of varicose veins was determined by 2 doctors of general practice.

References

1. Robbins SL: Varicose veins; in Pathological Basis of Diseases I. 1st Croation Ed, Školska knjiga, Zagreb (1985) pp680 (in Croatian).
2. Wild LR: Vascular structural disorders; in Medical-Surgical Nursing, JB Lippincott Company, London (1986) pp656-658.
3. Schmeiser-Rieder A, Kunze U, Mitsche N, Rosenberger A and Kunze M: Self-reported prevalence of venous diseases in the general population of Austria-results of the SERMO (Self-Reported Morbidity) study. Acta Med Austriaca (1998) **25**, 65-68.
4. Canonico S, Gallo C, Paolisso G, Pacifico F, Signoriello G, Sciaudone G, Ferrara N, Piegari V, Varricchio M and Rengo F: Prevalence of varicose veins in an Italian elderly population. Angiology (1998) **49**, 129-135.
5. Barić Lj: The diseases of aorta, arteries and veins; in Internal Medicine in Practice, Školska knjiga, Zagreb (1984) pp683-699 (in Croatian).
6. Mimica M, Šarić M, Malinar M and Mađarić M: Chronic diseases and complaints in a young population with regard to their occupational group. Arh Hig Rada Toksikol (1980) **31**, 201-208 (in Croatian).
7. Aranđelović P, Živadinović N and Jovanović Ž: Occurrence of varicosities on lower extremities in three groups of workers and some aspects of work capacity evaluation; in Phlebology, Symposium on Pathological Conditions of Venous Circulation, Lek, Ljubljana (1976) pp755-761 (in Serbo-Croatian).
8. Brand FN, Dannenberg AL, Abbott RD and Kannel WB: The epidemiology of varicose veins: The Framingham Study. Am J Prev Med (1988) **4**, 96-101.
9. Bunta S: Epidemiology and ecology of pathological conditions of venous circulation in lower extremities; in Phlebology, Symposium on Pathological Conditions of Venous Circulation, Lek, Ljubljana (1976) pp15-37 (in Serbo-Croatian).
10. Bunta S, Dražić B, Jensterle J and Rjazancev A: Contribution to the study of the disorders of venous circulation in lower extremities in workers of jesenice ironworks; in The 3rd Yugoslav Congress on Occupational Health-Proceedings, Lek, Ljubljana (1971) pp554-558 (in Slovenian).
11. Callam MJ: Epidemiology of varicose veins. Br J Surg (1994) **81**, 167-173.
12. Carpentier P and Priollet P: Epidemiology of chronic venous

insufficiency. Presse Med (1994) **23**, 197-201 (in French).
13. Mimica M, Pavlinović Ž and Malinar M: Varicose veins of the legs in a working population. Arh Hig Rada Toksikol (1977) **28**, 145-155 (in Croatian).
14. Sisto T, Reunanen A, Laurikka J, Impivaara O, Heliovaara M, Knekt P and Aromaa A: Prevalence and risk factors of varicose veins in lower extremities: Mini-Finland health survey. Eur J Surg (1995) **161**, 405-414.
15. Stanković D: Professional Diseases. Svjetlost, Sarajevo (1986) (in Croatian).
16. Šarić M, Ribić Z, Čengić-Buranji Z and Sertić Z: Work ability, institut za medicinska istraživanja i medicinu rada, Viša tehnička škola za sigurnost pri radu i zaštitu od požara, Zagreb (1984) (in Croatian).
17. Tonković-Lojović M, Žuškin E, Kopjar B, Ivanković D and Mataija M: Varicosities of the lower extremities in workers in positions requiring continuous standing or sitting position. Arh Hig Rada Toksikol (1989) **40**, 421-424 (in Croatian).
18. Boccalon H, Janbon C, Saumet JL, Tafani A, Roux T and Vilain C: Characteristics of chronic venous insufficiency in 895 patients followed in general practice. Int Angiol (1997) **16**, 226-234.
19. Laurikka J, Laara E, Sisto T, Tarkka M, Auvinen O and Hakama M: Misclassification in a questionnaire survey of varicose veins. J Clin Epidemiol (1995) **48**, 1175-1178.
20. Brala Z: The assessment of work ability and invalidity of patients with vein disorders; in Work Ability and Invalidity 2, Sveučilište u Zagrebu Medicinski fakultet-SIZMIORH Zagreb-RO "Zrinski" TIZ Čakovec, Čakovec-Zagreb (1986) pp245-264 (in Croatian).
21. Cornu-Thenard A, Boivin P, Baud JM, De Vincenzi I and Carpentier PH: Importance of the familial factor in varicose disease. Clinical study of 134 families. J Dermatol Surg Oncol (1994) **20**, 318-326.
22. Dindelli M, Basellini A, Rabaiotti E, Corsi G, Ferrari PA, Zucca R and Ferrari A: Epidemiological analysis of the incidence of varicose pathology in pregnancy. Ann Ostet Ginecol Med Perinat (1990) **111**, 257-264 (in Italian).
23. Ivanković M: Etiopathogenesis of varicosities of the lower extremities. Liječ Vjesn (1990) **112**, 365-369 (in Croatian).
24. Komsuoglu B, Goldeli O, Kulan K, Cetinarslan B and Komsuoglu SS: Prevalence and risk factors of varicose veins in an elderly population. Gerontology (1994) **40**, 25-31.
25. Krajcar J: Evaluation of doppler-sonography in hemodinamyc events of deep venous system in persons with reflux phlebopathies of lower extremities. Medicina (1992) **28**, 86-93 (in Croatian).
26. Scappaticci S, Capra E, Cortinovis M, Cortinovis R, Arbustini E, Diegoli M and Fraccaro M: Cytogenetic studies in venous tissue from patients with varicose veins. Cancer Genet Cytogenet (1994) **75**, 26-30.
27. Scott TE, LaMorte WW, Gorin DR and Menzoian JO: Risk factors for chronic venous insufficiency: A dual case-control study. J Vasc Surg (1995) **22**, 622-628.
28. Diehm C: Epidemiology and pathogenesis of varicosities. Herz (1989) **14**, 267-273 (in German).
29. Dindelli M, Parazzini F, Basellini A, Rabaiotti E, Corsi G and Ferrari A: Risk factors for varicose disease before and during pregnancy. Angiology (1993) **44**, 361-367.
30. Hirai M, Naiki K and Nakayama R: Prevalence and risk factors of varicose veins in Japanese women. Angiology (1990) **3**, 228-232.
31. Petruzzellis V, Florio T, Quaranta D, Troccoli T and Serra MA: Epidemiologic observations on the subject of phlebopathy of the legs and its dermatologic complications. Minerva Med (1990) **81**, 611-616 (in Italian).
32. Krijnen RM, de Boer EM, Ader HJ and Bruynzeel DP: Venous insufficiency in male workers with a standing profession. Part I: Epidemiology. Dermatology (1997) **194**, 111-120.
33. Bunta S and Popovič J: Healthy and Unhealthy Legs, ČZP Kmečki glas, Ljubljana (1984) (in Slovenian).
34. Radak Đ, Đukić V, Maksimović Ž, Kalezić V, Sinđelić R, Đukanović B, Činara I, Lukić J, Pelivan N and Rosato E: Causes and risk factors in venous diseases. Acta Chir Iugosl (1989) **36**, S253-S255 (in Serbo-Croatian).
35. Dreščik I: Work ability assessment of patients with peripheral vascular diseases; in Co-operation in Health Services-Proceedings, Dom zdravlja Pazin, Pazin (1987) pp133-137 (in Croatian).
36. Legović V: Prevention possibilities of pathological conditions of venous circulation in employed population; in Phlebology, Symposium on Pathological Conditions of Venous Circulation, Lek, Ljubljana (1976) pp699-706 (in Croatian).
37. Ćirić S and Tričković A: Invalidity caused by varicose syndrome; in Phlebology, Symposium on Pathological Conditions of Venous Circulation, Lek, Ljubljana (1976) pp743-750 (in Serbo-Croatian).
38. Mlačak B: The relation between childbirth and hormonal contraception and the incidence of varices. Liječ Vjesn (1983) **105**, 141-144 (in Croatian).
39. Lake M, Pratt GH and Wright IS: Arteriosclerosis and varicose veins: Occupational activities and other factors. JAMA (1942) **119**, 696-701.
40. Aleksić P and Bunta S: In which extent bad temperature environment influence the development of veins diseases?; in Phlebology, Symposium on Pathological Conditions of Venous Circulation, Lek, Ljubljana (1976) pp69-73 (in Serbo-Croatian).
41. Legović V and Mohar N: Relations of some anthropometric indicators and varicosity phenomenon. Medicina (1978) **15**, S43-S45 (in Croatian).
42. Duchosal F and Widmer LK: Varicose veins; in Encyclopaedia of Occupational Health and Safety-volume 2, 3rd Ed, ILO, Geneva (1983) pp2242-2243.
43. Kappert A: Diagnosis of Peripheral Vascular Diseases, Hans Huber Publishers, Bern (1971).
44. Baričevič J: Skin diseases caused by the disorders of venous and arterial circulation; in Dermatology and Venerology, Medicinska knjiga, Beograd-Zagreb (1981) pp326-334 (in Serbo-Croatian).
45. Goldman MP and Fronek A: Anatomy and pathophysiology of varicose veins. J Dermatol Surg Oncol (1989) **15**, 138-145.

Received February 16, 1999; accepted July 29, 1999.