Prevalence, risk factors, and clinical patterns of chronic venous disorders of lower limbs: A population-based study in France

Patrick H. Carpentier, MD,[a,b] Hildegard R. Maricq, MD,[d] Christine Biro, MD,[b] Claire O. Ponçot-Makinen, MD,[a] and **Alain Franco, MD,[c]** *La Léchère and Grenoble, France; and Charleston, SC*

Objectives: **The goals of this study were to document the prevalence of varicose veins, skin trophic changes, and venous symptoms in a sample of the general population of France, to document their main risk factors, and to assess relationships between them.**

Methods: **This cross-sectional epidemiologic study was carried out in the general population of 4 locations in France: Tarentaise, Grenoble, Nyons, and Toulon. Random samples of 2000 subjects per location were interviewed by telephone, and a sub-sample of subjects completed medical interviews and underwent physical examination, and the presence of varicose veins, trophic changes, and venous symptoms was recorded.**

Results: **Prevalence of varicose veins, skin trophic changes, and venous symptoms was not statistically different in the 4 locations. In contrast, sex-related differences were found: varicose veins were found in 50.5% of women versus 30.1% of men ($P < .001$); trophic skin changes were found in 2.8% of women versus 5.4% of men (P = NS), and venous symptoms were found in 51.3% of women 51.3% versus 20.4% of men ($P < .001$). Main risk factors for varicose veins were age and family history in both sexes, and pregnancy in women. Female sex was a significant factor only for non-saphenous varicose veins. Varicose veins, age, and pitting edema were the most significant risk factors for trophic skin changes. The risk factors for venous symptoms were female sex, varicose veins, and prolonged sitting or standing. A negative relationship with age was found in women.**

Conclusion: **Our results show a high prevalence of chronic venous disorders of the lower limbs in the general population of France, with no significant geographic variations. They also provide interesting insights regarding the association of varicose veins, skin trophic changes, and venous symptoms. (J Vasc Surg 2004;40:650-9.)**

Chronic venous disorders include several signs and symptoms assumed to be related to chronic venous dysfunction in the lower limbs. Clinical manifestations include varicose veins of any type; vein-related skin trophic changes, ranging from pigmented dermatitis to lipodermatosclerosis, white atrophy, and leg ulcers; pitting ankle edema; and symptoms attributable to venous dysfunction, such as aching, pain, congestion, skin irritation, and muscle cramps,[1] heaviness, tension, feelings of swelling, and itching.[2]

Thus chronic venous disorders are an important cause of discomfort and disability that is widespread in the industrialized countries and that result in a substantial medical and economic problem. The health care demand is massive, ranking in France as the seventh most often declared reason for consulting a general practitioner. The cost to society is huge, exceeding 10 million Euros per million inhabitants per year in Belgium,[3] France,[4] Italy,[5] and the United Kingdom[6] for direct costs only. Despite the magnitude of the problem, little effort has been made to effectively prevent such chronic disorders.

Over the last decades new knowledge has been collected about the pathophysiologic features of the venous system, mainly from the hemodynamic point of view, and the importance of valvular dysfunction in superficial, deep, and perforating veins has been clearly demonstrated in relation to both varicose veins and skin trophic changes.[7] Still, both the pathogenesis of chronic venous disorders and their natural history remain unclear, probably because of their progressive onset and multifactorial origin, which makes it difficult to determine the causative factors.

Do all types of varicose veins have potential to lead to skin trophic changes and ulcers? Are "venous symptoms" always related to venous dysfunction? Do they have any prognostic significance? These are some of the numerous questions, with no clear answers, that patients and physicians face every day, which shows that even the conceptual framework associating varicose veins, skin trophic changes, and venous symptoms remains unclear.

The epidemiologic approach is mandatory for improving our understanding of these pathogenetic and conceptual problems. Population-based surveys of these venous disorders are rare, and usually restricted to a few subsets. Therefore, when we had the opportunity to investigate the

From the University Research Center[a] of La Léchère, the Division of Vascular Medicine, Department of Pluridisciplinary Medicine[b] and Department Community Medicine,[c] University Hospital, Grenoble and the Division of Rheumatology and Immunology, Department of Medicine, Medical University of South Carolina,[d] Charleston.

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Reprint requests: Patrick H. Carpentier, Centre de Recherche Universitaire de La Léchère, F-73260 Grenoble, France (e-mail: patrick.carpentier@ujf-grenoble.fr).

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epidemiology of chronic venous disorders of the lower limbs in the general population of France, we focused on 2 main objectives: to evaluate the prevalence, risk factors, and possible geographic variations of varicose veins, vein-related skin trophic changes, and venous symptoms; and to elucidate the epidemiologic relationship between these 3 clinical manifestations.

METHODS

Study organization. This study was carried out as an offshoot of an American-French epidemiologic survey of Raynaud phenomenon conducted from 1988 to 1992, the sampling procedure of which has been detailed[8-10] and can be briefly summarized as follows. Random samples from households of 4 geographic areas of France, that is, Tarentaise (Savoie), Grenoble (Grésivaudan), Nyons (Baronnies), and Toulon (Côte d'Azur), were obtained from telephone lists. Every subject aged 18 years or older and living in the selected households was included in the survey until the planned sample size of 2000 subjects per geographic area was attained. The subjects were interviewed by telephone (phase I) about demographic and socioeconomic data and the occurrence of cold-related symptoms in the hands, suggestive of Raynaud phenomenon, the primary focus of the original study. No questions were asked about chronic venous disorders in this stage. All cold-sensitive subjects and a random sample of non-cold-sensitive subjects in equivalent number were invited to be interviewed and undergo medical examination (phase II). Venous data were recorded during this phase.

Venous data collection. Data regarding venous symptoms, history of venous diseases and treatments, and presence of varicose veins, edema, and skin trophic changes in the legs were systematically evaluated clinically by a trained vascular medicine physician as part of a standardized medical interview and examination. No ultrasound examination was performed.

Varicose veins were defined as enlarged, tortuous, subcutaneous veins, either visible or palpable clinically with the patient standing.[11] They were classified as follows. Saphenous varicose veins were those that involved the saphenous trunks (great and small saphenous veins) or the first-order tributaries of the great saphenous vein (accessory anterior and posterior great saphenous veins). Other subcutaneous varicose veins were classified as non-saphenous varicose veins.

Intradermal visible veins and venules (telangiectasia, "hyphen webs," reticular veins, CEAP C1) were not considered in this study, because of difficulties in setting up operational criteria to clearly differentiate normal from abnormal.

Subjects were classified as having saphenous varicose veins if they had at least 1 such vein in 1 lower limb; they usually had smaller varicose veins as well. Subjects classified as having non-saphenous varicose veins had only non-saphenous varicose veins in either 1 or both lower limbs.

The venous symptoms inquired about were sensations of heaviness, swelling, or restlessness in the legs, abnormally felt in usual daily living; these are the symptoms most frequently quoted by French patients with venous disorders of the legs.[12] They were recorded before medical examination in a standardized interview that asked whether they had "sensations of heaviness in the legs, swollen legs, or restless legs, abnormally felt in usual daily living." No mention of a venous origin was made in the questionnaire about these symptoms. In the analysis, subjects were considered to have venous symptoms if they complained of any of these 3 symptoms.

Skin trophic changes of the gaiter area and lower leg, such as pigmentation (pigmented dermatitis), dermatitis (venous eczema), induration (lipodermatosclerosis), white atrophy, ulcer scars, and active leg ulcers were carefully evaluated.[13] The presence of pitting edema in the pre-tibial or malleolar areas was also noted.

History of thromboembolic disease was based on the word of the subject that a medical diagnosis of deep vein thrombosis or pulmonary embolism was made after specific imaging studies and followed by anticoagulation therapy. Special efforts were made to rule out superficial thrombophlebitis and undocumented suspicion of deep vein thrombosis or pulmonary embolism.

Potential risk factors. Family history of varicose veins was restricted to first-degree relatives, and was evaluated according to information obtained from the subjects.

Subjects were placed in 1 of 3 categories: prolonged sitting, prolonged standing, or actively moving, according to their usual daily activity. The first 2 categories were merged for logistic regression analysis.

Exercise activities were evaluated in 4 categories, and subsequently were combined into 2 groups for logistic regression analysis: less than 1 session or at least 1 session of exercise per week, routinely.

Education level was recorded on a 10-grade scale, but a 2-grade classification (primary school only, more than primary school) was used in the logistic regression.

Occupations were recorded and classified into 30 categories, and subsequently were combined into 2 classes (skilled, unskilled) for logistic regression. Pensioned subjects were classified according to their last active occupation before retiring.

Early abortions and fetal losses were taken into account in the number of pregnancies.

Cigarette smoking and use of alcoholic beverages were quantitatively evaluated in a standardized questionnaire.[11] For logistic regression, they were further categorized as follows: never smoked ($<$100 cigarettes), current smoker (during the past year), no alcohol ever ($<$10 g of alcohol per week any time), and current alcohol consumption ($>$10 g of alcohol per week during the last year).

Statistical analysis. Prevalence estimates for each location were calculated from age-standardized data to the whole population. Because of the stratified sampling procedure, estimates of prevalence were computed by multiplying the proportion of the population in each class of cold sensitivity (from phase I) by the proportion of that class that was found to have the condition examined in phase II.

Table I. Prevalence of chronic venous disorders of lower limbs in general population of 4 French locations

Geographic area	*Varicose veins of any type*		*Skin trophic changes*		*Venous symptoms*		*History of thrombo-embolic disease*	
	%	P	%	P	%	P	%	P
Tarentaisee								
Men (n = 31)	34.5		3.4		20.7		0.0	
		.004		NS		.07		NS
Women (n = 26)	74.1		3.7		44.4		0.0	
Grenoble								
Men (n = 74)	27.0		8.5		23.0		1.4	
		<.001		.008		<.001		NS
Women (n = 175)	50.3		0.0		48.6		1.1	
Nyons								
Men (n = 115)	33.1		5.1		21.4		4.3	
		.008		NS		<.001		NS
Women (n = 225)	48.4		3.1		54.4		3.1	
Toulon								
Men (n = 57)	27.1		1.7		15.3		3.4	
		.004		NS		<.001		NS
Women (n = 132)	49.6		5.3		51.1		6.0	
4 Areas combined								
Men (n = 277)	30.1		5.4		20.4		2.9	
		<.001		NS		<.001		NS
Women (n = 558)	50.5		2.8		51.3		3.2	
Geographic variations								
Men		NS		NS		NS		NS
Women		NS		NS		NS		NS

NS, Not significant.

Adding the 2 resulting products gave the estimated prevalence of the condition in the entire sample.

In the risk factor analysis, no weighing for cold sensitivity was made, because cold sensitivity was not significantly related to chronic venous disorders. Separate evaluations were made for women and men whenever possible, because many risk factors for the venous system are sex-related. Analyses were performed with SPSS software, version 6.1.3. The χ^2 test was used for categorical data, with a Mantel-Haenszel test for linear association, when appropriate. For multivariate evaluation of risk factors, logistic regression enforcing every factor of interest was used to ensure maximal adjustment for potentially confounding variables.

RESULTS

Prevalence of clinical manifestations of chronic venous disorders of lower limbs. Prevalence estimates of varicose veins, skin trophic changes, venous symptoms, and of history of venous thromboembolism in the 4 investigated geographic areas are shown in Table I. Large sex-related differences contrast with the absence of conspicuous geographic variations.

Varicose veins: Risk factors and distribution pattern. Risk factors for varicose veins are summarized in Table II, *A and B.* Age (Fig 1), and a history of varicose veins in first-degree relatives were the most important risk factors in both sexes. In women, height and number of pregnancies were positively associated with the presence of varicose veins. In men, lack of sufficient routine exercise ($P = .028$) and unskilled work ($P = .053$) were associated with higher risk (Table II, *B*).

The distribution pattern of varicose veins found in the lower limbs of women and men is shown in Table III. No difference was found between left and right legs. The prevalence of saphenous varicose veins was similar in women and men. By contrast, a 3-fold higher prevalence of non-saphenous varicose veins was found in women compared with men ($P < .001$). No difference in other risk factors was found between saphenous or non-saphenous varicose veins. Both types were equally associated with venous symptoms (70.1% in women with saphenous varicose veins vs 63.7% with non-saphenous varicose veins [$P =$ NS], vs 36.4% and 34.0%, respectively, in men [$P =$ NS]), but skin trophic changes were mostly associated with the saphenous type (13.4% vs 4.2%, combined data for women and men; $P = .003$).

Skin trophic changes: Risk factors and clinical pattern. Skin trophic changes were found only in subjects with varicose veins. Therefore subsequent analyses for risk factors were performed in the subgroup of subjects with varicose veins, combining data from men and women to alleviate the problem of small numbers (Table IV). Age (Fig 2) and presence of pitting ankle edema were the best associated variables after adjustment. Family history of varicose veins and personal history of venous thromboembolism were of borderline significance ($P = .044$ and $P = .052$, respectively).

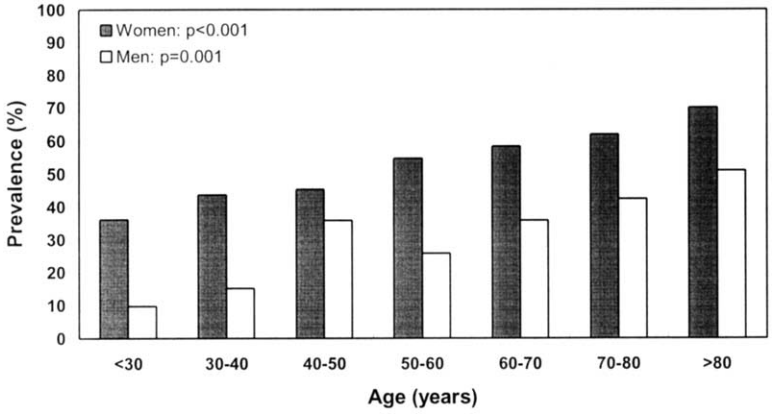

Fig 1. Prevalence of varicose veins as a function of age.

Table II. Risk factors for varicose veins: Distribution and full logistic model

	Varicose veins				
	Distribution				
A. Risk factors in women	+ *(n = 289)*	– *(n = 269)*	*OR*	*95% CI*	P
Age (y) (OR per additional year)	—	—	1.04	1.02; 1.05	<.001
Family history of varicose veins	64.8	37.0	3.47	2.38; 5.07	<.001
History of thromboembolic disease	6.2	1.9	1.93	0.66; 5.72	.223
≥1 Pregnancies	85.9	77.4	1.98	1.20; 3.25	.007
Activity (prolonged sitting or standing)	60.0	60.7	1.16	0.78; 1.73	.441
Unskilled work	23.8	16.3	1.31	0.80; 2.17	.266
Exercise less than once a week	58.6	55.6	0.87	0.59; 1.30	.475
Height >1.65 m	36.9	30.0	1.32	1.08; 1.62	.007
Body mass index >23 kg/m^2	45.2	35.2	0.93	0.61; 1.43	.802
	Varicose veins				
	Distribution				
B. Risk factors in men	+ *(n = 88)*	– *(n = 189)*	*OR*	*95% CI*	P
Age (y) (OR per year)	—	—	1.05	1.02; 1.07	<.001
Family history of varicose veins	52.3	28.9	3.53	1.91; 6.54	<.001
History of thromboembolic disease	4.5	2.6	1.58	0.22; 5.29	.549
Activity (prolonged sitting or standing)	51.1	43.7	1.48	0.80; 2.72	.211
Unskilled work	60.5	53.6	1.94	0.99; 3.80	.053
Exercise less than once a week	65.9	46.8	1.97	1.08; 3.61	.028
Height >1.75 m	42.0	34.2	1.62	0.67; 2.46	.127
Body mass index >25 kg/m^2	38.6	35.8	0.73	0.40; 1.44	.318

Logistic regression adjusted also for the following variables: "Geographic area" (4 categories), "Never smoked," "No alcohol ever," "Education: primary school," and "Estrogen therapy" (women only); not significant and not shown in table.
OR, Odds ratio; *CI*, confidence interval.

Limb-by-limb analysis of the data showed no difference between left and right sides. Association pattern of the different types of skin trophic changes found in the same limb showed that major trophic changes, such as induration of lipodermatosclerosis, white atrophy, and ulcer scars, seldom occur in limbs without pigmentation (7.5%).

Venous symptoms: Risk factors, associations, and significance. Only one of the 33 subjects with pitting ankle edema did not have venous symptoms ($P < .001$), which made it impractical to enter in the logistic regression analysis. Female sex also was a risk factor, as shown by a much larger prevalence in women compared with men.

Other main risk factors for these symptoms were prolonged sitting or standing during daily activity, presence of varicose veins in both sexes, and history of venous thromboembolic disease (Table V, *A and B*). A negative relationship with age was unexpectedly found in women, in con-

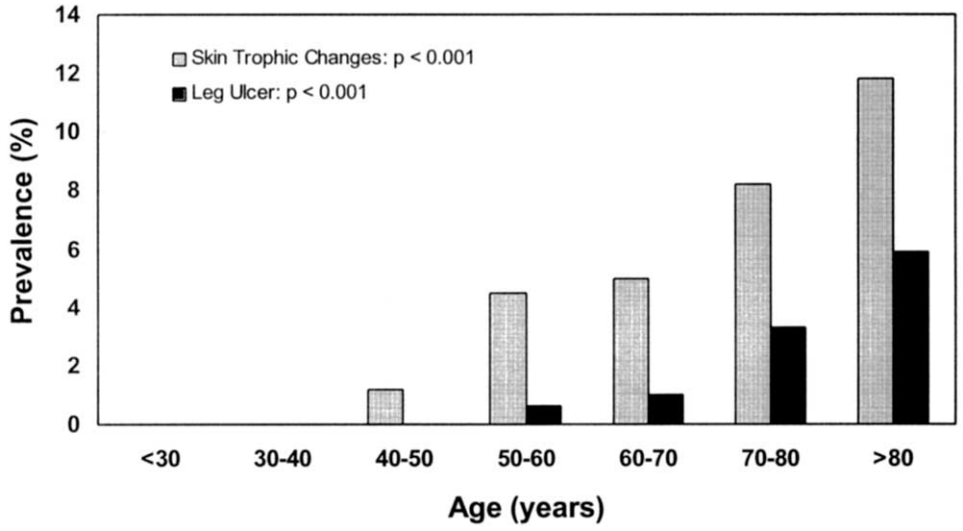

Fig 2. Prevalence of skin trophic changes and history of leg ulcers as a function of age.

Table III. Distribution of varicose veins

Prevalence of varicose veins	*Women (n = 558)*		*Men (n = 277)*	
	Right leg (%)	*Left leg (%)*	*Right leg (%)*	*Left leg (%)*
Saphenous varicose veins	15.7	18.4	15.9	14.9
Great saphenous vein and main tributaries	13.9	15.6	14.4	14.2
Small saphenous vein	4.3	5.2	4.0	2.7
Nonsaphenous varicose veins only*	27.7	26.0	8.0	9.4

*P .001, women vs men.

Table IV. Risk factors for skin trophic changes in subjects with varicose veins: Distribution and full logistic model

Risk factors (subjects with varicose veins)	*Skin trophic changes*				
	Distribution				
	+ *(n = 33)*	– *(n = 378)*	*OR*	*95% CI*	P
Age (OR/y)	—	—	1.08	1.04; 1.13	<.001
Family history of varicose veins	72.7	60.9	2.81	1.03; 7.71	.044
History of thromboembolic disease	21.2	4.3	3.54	0.99; 12.72	.052
Pitting edema	42.4	4.3	9.19	3.08; 27.44	<.001
Venous symptoms	75.8	53.9	1.91	0.67; 5.66	.224
Activity (prolonged sitting or standing)	60.6	57.7	1.31	0.53; 3.24	.558
Unskilled work	39.4	31.7	1.48	0.56; 3.90	.429
Height (women >1.65 m; men >1.75 m)	24.2	28.7	0.86	0.51; 1.44	.561
BMI (women >23 kg/m^2; men >25 kg/m^2	57.6	42.3	1.03	0.42; 2.51	.951

Logistic regression adjusted also for the following variables: "Geographic areas" (4 categories), "Never smoked," "No alcohol ever," and "Education: primary school"; not significant and not shown in table.
OR, Odds ratio; *CI,* confidence interval.

trast to the direct relation to age shown for varicose veins and skin trophic changes (Fig 3).

Association pattern. The 3 symptoms assessed in the interview were highly associated with each other. The sensation of heaviness in the legs was the most typical symptom in the French population, with only 6.7% of women and 19.7% of men with symptomatic disease not mentioning it.

Chronic venous disorders of lower limbs: Associa-

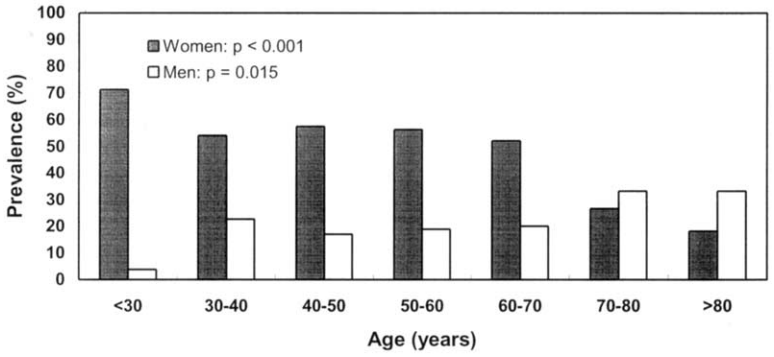

Fig 3. Prevalence of venous symptoms as a function of age. Negative relationship in women remained significant ($P < .001$) after adjusting for presence of varicose veins. By contrast, in men an apparently significant increase with age is removed by adjusting for varicose veins.

Table V. Risk factors for venous symptoms: Distribution and full logistic model

	Venous symptoms				
	Distribution				
A. Risk factors in women	+ *(n = 298)*	– *(n = 260)*	*OR*	*95% CI*	P
Age (OR/y)	—	—	0.97	0.96; 0.99	<.001
Varicose veins	61.2	38.8	2.11	1.43; 3.13	<.001
Family history of varicose veins	56.9	45.2	1.39	0.96; 2.03	.081
History of thromboembolic disease	6.0	1.9	3.05	1.06; 8.81	.039
Pregnancy ≥1	82.3	81.2	1.13	0.69; 1.84	.625
Activity (prolonged sitting or standing)	66.6	53.3	1.66	1.13; 2.46	.009
Unskilled work	19.7	20.8	1.06	0.65; 1.75	.825
Exercise less than once a week	59.9	54.0	1.21	0.82; 1.79	.319
Height >1.65 m	33.4	33.7	0.93	0.76; 1.13	.442
BMI >23 kg/m^2	41.8	38.7	1.31	0.84; 1.90	.178
	Venous symptoms				
	Distribution				
B. Risk factors in men	+ *(n = 63)*	– *(n = 214)*	*OR*	*95% CI*	P
Age (y) (OR/y)	—	—	1.02	0.99; 1.04	.213
Varicose veins	54.0	25.1	2.37	1.19; 4.72	.014
Family history of varicose veins	50.8	32.1	1.67	0.84; 3.32	.146
History of thromboembolic disease	7.9	1.9	4.42	0.97; 20.11	.054
Activity (prolonged sitting or standing)	65.1	40.5	3.45	1.62; 7.38	<.001
Unskilled work	57.4	55.3	1.45	0.54; 2.70	.325
Exercise less than once a week	58.7	51.2	1.19	0.44; 1.90	.617
Height > 1.75 m	50.8	32.6	2.09	1.05; 4.14	.035
BMI >25 kg/m^2	30.2	38.6	0.46	0.22; 0.94	.033

Logistic regression adjusted also for the following variables: "Geographic areas" (4 categories), "Current smoker," "Current alcohol consumption," "Education: primary school," and "Estrogen therapy" (women only); not significant and not shown in table.
OR, Odds ratio; *CI*, confidence interval.

tion pattern of 3 manifestations studied. The association pattern of varicose veins, skin trophic changes, and venous symptoms in women and men is shown in Fig 4, *A and B*, which illustrates the strong link between varicose veins, ankle pitting edema, and trophic changes, although the latter 2 represent only a small subset of subjects with varicose veins; the link of pitting edema with venous symptoms; and a sizable overlap, greater in women, between varicose veins and venous symptoms.

The association pattern of these manifestations can also be seen in the prevalence of the CEAP clinical classes (Table VI). The large size of class 2 in both women (45.9%) and men (27.9%) is in contrast with the much smaller number of subjects included in CEAP classes C3 to C6, that is, those with

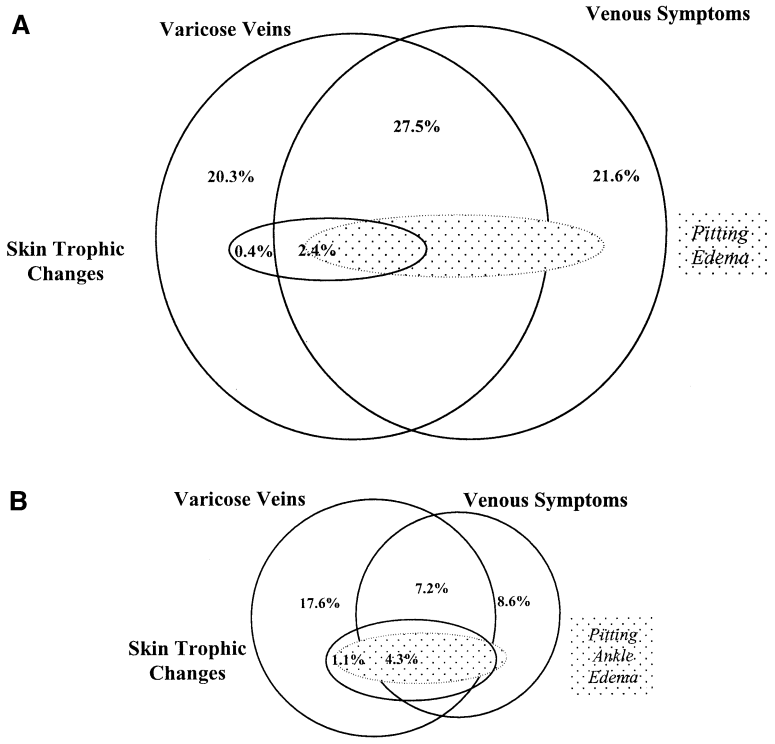

Fig 4. A, Chronic venous disorders in women. Diagram of associated pattern of varicose veins, venous symptoms, and skin trophic changes. Figures show prevalence of subjects in each association category; total prevalence was 72.2%. Presence of pitting edema at physical examination is superimposed with a *dashed line* (prevalence, 4.5%). **B,** Chronic venous disorders in men. Diagram of associated pattern of varicose veins, venous symptoms, and skin trophic changes. Figures show prevalence of subjects in each association category; total prevalence is 38.8%. Presence of pitting edema at physical examination is superimposed with a *dashed line* (prevalence, 4.3%).

Table VI. Prevalence of CEAP clinical classes, and relative prevalence of venous symptoms in each class*

		Women (n = 558)		*Men (n = 277)*	
CEAP class	*Clinical definition*	*Prevalence (%)*	*Venous symptoms (%)*	*Prevalence (%)*	*Venous symptoms (%)*
	None of the below venous disorders	48.7	42.5	69.8	12.4
C2	Varicose veins	46.3	56.2	23.7	25.8
C3	Edema	2.2	100	1.1	100
C4	Skin changes ascribed to venous disease (pigmentation, venous eczema, lipodermatosclerosis)	2.1	83.3	4.0	72.7
C5	Skin changes as defined above, with healed ulceration	0.7	100	1.4	100
C6	Skin changes as defined above, with active ulceration	0	—	0	—

*Trend for association with higher classes: $P < .001$ in both women and men.

more severe disease. The prevalence of the latter nevertheless reached 5.0% among women and 6.5% among men. It is interesting that the proportion of subjects positive for venous symptoms is steadily increasing with the CEAP clinical class ($P < .001$).

DISCUSSION

This study is the first to analyze the prevalence of chronic venous disorders of the lower limbs in a general population-based sample in France. The prevalence of varicose veins appears to be high, with approximately half of women and a third of men affected. High figures have also been found in industrialized countries such as Switzerland,[14] Wales,[15] the United States,[16] Israel,[17] Brazil,[18] Italy,[19] England,[20] Japan,[21] and Scotland,[22] with some variations probably explained by the criteria used to define varicose veins, and the age limits of the investigated populations. Regarding the sex-related difference in prevalence,

most other studies found a higher female-male ratio than we did, with the exception of the Basle Study III and the Edinburgh Vein Study,[22] in which a male preponderance was found. Several factors could explain this discrepancy. Reporting or selection biases can occur in studies based on subject self-evaluation or with sampling drawn from clinical practice or industry. As pointed out by Evans et al,[22] most studies were carried out several decades ago; in the meantime, changes in lifestyle have occurred, leading to smaller differences in environmental factors that affect men and women. Differences in lifestyle may also account for some geographic variations, as shown by Beaglehole et al[23] and discussed by De Backer.[24] We could not, however, show any significant differences between our 4 geographic areas of France, ranging from an Alpine valley to the shore of the Mediterranean Sea, and including 2 rural and 2 urban areas. Differences in lifestyle between these geographic areas are certainly small in comparison with what could be found between different countries. The use of different operational criteria could also be an important factor. Indeed, trunk saphenous varicose veins seem to be at least as prevalent in men as in women, according to Widmer,[14] Evans et al,[22] and our study, whereas varices of smaller veins, although defined differently, were found more frequently in women than in men in all 3 studies mentioned. Some other studies did not looked at subtypes of varicose veins, and some have included telangiectases, which are much more prevalent in women, as shown by Evans et al[22] and Guberan et al.[25] The corona phlebectatica is also treated differently in the clinical classification of dilated veins by various authors. It is therefore difficult to compare results of different studies. A distinction between saphenous and non-saphenous varicose veins is of great practical interest, because saphenous varicose veins are more strongly linked with cutaneous trophic changes than are non-saphenous varicose veins. The prognostic significance of this distinction remains to be confirmed in longitudinal studies. We think that a clear-cut topologic classification used by an experienced physician trained in the field of vascular medicine is an important methodologic tool for further epidemiologic studies. Additional use of duplex ultrasound scanning could aid in mapping the entire venous system, but this examination is time-consuming, and its use in epidemiologic surveys has been restricted to evaluation of the main trunks.[26,27] It was not possible in this study, which was originally designed to examine the Raynaud phenomenon. However, inasmuch as the definition of varicose veins remains clinical, this could not alter prevalence estimates.

The results obtained are, however, not biased by using the same random sample from the general population, because we could not find any association between Raynaud phenomenon (or cold sensitivity) and chronic venous disorders. The recruitment of phase II, in which clinical examinations were performed, was not related to any venous disease, and subjects in the study were not aware of our main research interest.

Age was the most important risk factor in both men and women, in this study and in all others.[28] A family history of varicose veins in first-degree relatives also proved to be a strong risk factor. This evidence was based on information reported by the subjects (no family members were examined), but it corroborates previous family studies based on clinical examination of relatives.[29,30] Pregnancy was also a significant risk factor, as reported in several studies,[17,18,23,31,32] and remained significant after adjusting for age, which is also consistent with the fact that the differences in prevalence were mainly related to first and second pregnancies.

We find it interesting that in men lack of exercise was an independent factor linked with varicose veins, which is consistent with our knowledge of the positive influence of the muscle pump function on the venous system, which, we may hypothesize, somehow prevents development of varicose veins. The borderline significance of unskilled work as a predictor of varicose veins, although a rough categorization, corroborates some descriptions in working populations[33] and underlines the need for further studies in the workplace.

We could not find any significant relationship with overweight. In contrast, we found a significant relation with height in women ($P = .007$), and a similar, but non-significant trend ($P = .127$) in men. Other authors have found significant relationships with height in both sexes.[17,23] Inasmuch as the height measurement is related to venous pressure in the standing position, this association has some physiologic significance. This makes it more difficult to assess the influence of overweight, because any index of body mass is based on the relation of weight to height. Furthermore, only the present weight was measured, which could well minimize the power to detect the influence of overweight on development of varicose veins, because of potentially large variations in weight over time. Therefore it is not surprising that conflicting results were found in cross-sectional studies.[34] It should be noted, however, that two longitudinal studies confirmed a positive relationship in women.[35,36]

The prevalence of skin trophic changes was found in the same range as previously published by others, in particular for leg ulcers and their strong relation with age.[34,37,38] In our sample we included pigmentation, dermatitis, induration, ulcers, and white atrophy. Our prevalence estimates are somehow lower that the estimation of "chronic venous insufficiency" in the Basle[14] and Edinburgh[22] studies, but this may be explained by inclusion of the corona phlebectatica in these studies.

Prevalence of venous symptoms was also high in this study, with an important disproportion between women and men. Few data can be found on this subject in the literature.[22,27,39] In addition, comparison between studies is difficult because the words used to express the feeling of discomfort by patients with venous disorders vary between countries. It is possible that the link we found between venous symptoms and varicose veins, stronger than seen in the Edinburgh Vein Study, is related to a smaller number of more specific words we used and to the restriction to symptoms "abnormally felt in usual daily living," which

enabled us to rule out subjects who experience such feelings in exceptional conditions. The almost constant complaint of such symptoms in subjects with pitting ankle edema is in accordance with the popular notion that these symptoms are probably related to the perception of increased interstitial fluid volume, whether clinical or sub-clinical. But the unexpected and striking decrease in prevalence of venous symptoms with age in women shows that varicose veins are not the only etiologic factor and that the presence of venous symptoms without varicose veins should not be considered a preclinical phase of varicose disease, as feared by many young women. Our results suggest that lifestyle, that is, prolonged sitting or standing, has an important role, in addition to varicose veins, in the pathogenesis of venous symptoms in both sexes, that also refers to the physiology of the venous system. With this in mind, other environmental factors related to clothes and shoes that could account for some part of the unexplained and important difference found between women and men should be explored in future studies. A history of venous thromboembolism was also significantly related to venous symptoms, which further emphasizes the importance of venous physiologic features in the genesis of these symptoms. We were unable to find any link between such symptoms and a history of osteoarthritis (n = 144; 20.2% vs 15.0%; P = NS) or of peripheral arterial disease (n = 11; 0.8% vs 1.7%; P = NS), as previously suggested.[39] Therefore, we think they deserve their usual denomination as venous symptoms, although we agree with Bradbury et al[2] that they should not be considered strictly as symptoms of varicose veins.

CONCLUSIONS

This cross-sectional study shows a high prevalence of varicose veins, venous symptoms, and skin trophic changes in the general population of 4 geographic areas of France. This is consistent with what has been found in other industrialized countries, and explains the heavy medical and social consequences of chronic venous disorders.

This study also confirms the importance of environmental factors for varicose veins and venous symptoms, and also suggests that occupational factors such as position (sitting, standing) while working deserves more interest in future studies.

We show a strong relationship between varicose veins, skin trophic changes, and venous symptoms. Venous symptoms appear to be well named, because they are linked to venous risk factors, other clinical manifestations of chronic venous disorders, and their severity, as evaluated according to the CEAP clinical classification.

Our data also suggest that pigmentation dermatitis precedes induration, white atrophy, and ulceration, which should make persons aware of possible complications and the potential usefulness of this sign for active prevention.

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