

Prevalence of chronic venous insufficiency in the Saudi adult population

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ABSTRACT

Objective: To estimate the prevalence of chronic venous insufficiency (CVI) in the Saudi adult population and to identify the association of CVI with possible risk factors.

Methods: Sixteen Primary Health Care (PHC) centers have been randomly selected in various districts of 3 major cities of Kingdom of Saudi Arabia, including Jeddah, Makkah and Dammam during the year 2001. Every Saudi patient, of both sexes and aged ≥ 18 years, visiting the selected PHC centres for any reason, was eligible. The study was conducted during 6 consecutive days. Patients' history, demographics and risk factors were recorded and clinical examination was performed in order to diagnose CVI according to the latest clinical severity, etiology or cause, anatomy, pathophysiology (CEAP) classification.

Results: A total of 2566 participants were recruited. Out of these, 2350 were included. Fifty-three percent of

the included patients were females and 66% were from the Western region. The overall prevalence of CVI (from class 0 to 4) was 45.6% (95% confidence interval [CI] 43.6 - 47.6). Considering CVI with visible signs only (class 1 to 6), the prevalence was 38.3% (95% CI 36.6 - 40.2). It was found higher in female (49.6%) and in the Western region (43.0%). Chronic venous insufficiency was significantly associated with age, family history of CVI, prolonged standing occupation and the use of hormonal therapy.

Conclusion: These data demonstrated a high prevalence of CVI in the Saudi population, which is higher than in Western countries, especially in the Western region. This is probably linked to the high frequency of risk factors in the Saudi population and to the current lifestyle.

Saudi Med J 2005; Vol. 26 (2): 225-229

Chronic venous insufficiency (CVI) of the legs is a major problem in many countries, and results in considerable morbidity. There are some confusions between the definition of varicose veins and CVI. Varicose veins of the legs that are dilated, engorged and tortuous are only considered one class of CVI, which has a wider range starting from symptoms and telangiectasia to the disabling chronic venous ulceration. Although chronic venous disease causes considerable morbidity, few epidemiological research has been carried out, may be due to society's false perception that it is not a major problem. Some studies were carried out in the United States of America, Europe and New

Zealand. Total prevalence of CVI was approximately 25-40% among women and 10-20% among men^{1,3} with annual incidence of 2-6% in women and 1.9% in men.⁴ The impact of the disease on the economic aspect was studied in some countries, and found to be tremendously costly, approximately 8 billion FF/year in France, 1.4 billion D.M/year in Germany 640 billion Lira in Italy and 300 million Sterling in the United Kingdom.⁵ The quality of life proved to be lower in patients with CVI or leg ulcers compared to the general population.⁶ In spite of all these facts, there are no data on CVI prevalence in the Kingdom of Saudi Arabia (KSA) as this has not been studied

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Received 5th July 2004. Accepted for publication in final form 14th September 2004.

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before. The aim of this study is to evaluate the prevalence of CVI in the Saudi adult population and the associated risk factors.

Methods. This study is a cross-sectional and multi-centric. It was carried out through Primary Health Care (PHC) Centers in 3 of the main cities in the KSA (Jeddah, Makkah and Dammam) during the year 2001. The 3 cities were divided into sectors, which stands as representative of the various socio-economic communities: 6 for Jeddah, 5 for Makkah and 5 for Dammam. One PHC center has been randomly selected from each sector and therefore, 16 PHC centers participated in the study. The study was conducted for 6 consecutive days at the same time. Every other Saudi patient visiting the selected PHC centers for any reason, of both sexes, aged ≥ 18 years was eligible for the study. Prior to the study, a written consent was obtained.

A structured questionnaire was designed for the purpose of this study, and all doctors who participated in the study in 3 cities were trained by the same trainer in filling the questionnaire and performing full clinical examination and assessment according to the most recent scale for CVI, which is the clinical severity, etiology or cause, anatomy, pathophysiology (CEAP) scale.

For each patient, the following variables and history were recorded: gender; age; weight; height; family history of CVI; occupation with prolonged standing as teacher, policeman and so forth; use of oral contraceptives and number of pregnancies (for female only). Then the patient's complaints were recorded in 2 forms: 1) spontaneous complaints, linked to CVI, 2) complaints linked to CVI, expressed after questioning of the following: intermittent interference with daily activities, constant interference with daily activities, heaviness of leg at the end of the day, constant heaviness of leg, pruritus, paresthesias, feeling of burning, restless legs, night cramps, pain, redness of the skin, skin changes, telangiectasias, small varicosities, varicose veins of the lower limb, other varicose locations, swelling (edema) at the end of the day, constant edema, active leg ulcer, healed leg ulcer, and other manifestations. Then, a full clinical examination and assessment were performed according to the most recent scale for CVI, the CEAP scale, and it was classified as: complaints but no visible or palpable signs of venous disease (class 0), telangiectasias or reticular veins (class 1), varicose veins (class 2), edema (class 3), skin changes related to the venous disease (class 4), skin changes defined as healed venous ulcers (class 5), skin changes defined as active venous ulcers (class 6).

The analysis was carried out using Statistical Package for Social Sciences 10. Continuous variables were summarized as mean and standard

deviation and qualitative variables as frequency and percentage. Independent student t-test was carried out on quantitative variables, where Pearson chi-square tests were performed on qualitative variables. Multiple logistic regression was performed to adjust for confounding. All results were deemed significant with $p < 0.05$.

Results. Two thousand five hundred and sixty-six participants were recruited, out of these 216 (8.4%) patients were excluded from the analysis due to missing data. The final number included in the study was 2350 (1099 males and 1251 females). Two thirds of the population was recruited in the Western region (Makkah and Jeddah). The mean \pm SD of age for males was 41.5 ± 15.8 and females was 37.6 ± 13.4 . Mean body mass index (BMI) was significantly lower among male compared to females (Table 1). Table 1 represents the mean weight, height and BMI of the studied population.

Only 166 (7.1%) of the studied population had family history of CVI, 816 (34.8%) declared prolonged standing occupation and 646 (27.6%) reported past or current usage of hormonal therapy for ≥ 1 year (>50% were females) (Table 2).

As shown in Table 3, the prevalence of CVI among the study population was 1071 (45.6%) (95% CI 43.6%-47.6%) when considering all CEAP classes, including class 0 (without visible signs), and 899 (38.3%) (95% CI 36.3% - 40.2%) when considering CEAP classes 1 to 4 (with some visible signs). Classes 1 and 2 were the most frequently recorded, accounted for almost 80% of the patients diagnosed with CVI. No patient was diagnosed in classes 5 or 6 (skin ulceration) (Figure 1). Females with CVI have a higher mean number of pregnancy than those without CVI (6 pregnancies [4 SD] versus 4.4 pregnancies [4SD] [$p < 0.001$]).

Table 4 describes the association of various risk factors with CVI diagnosis (classes 1 to 4). Patients diagnosed with CVI were significantly older and had a higher BMI. Prevalence of CVI was 621 (54%) in females, and it was only 278 (27%) in males. Similarly, prevalence of CVI was much higher in the family with a history of CVI (105 [70.9%]) compared to the rest of the studied population (780 [38.9%]). The frequency of CVI was higher in the Western region (667 [45.8%]) compared to the Eastern region (232 [32%]). The prevalence of CVI was significantly higher among those whose occupation required prolonged standing position and also among those receiving hormonal therapy (53.9% versus 34.6% and 59.6% versus 34.5%). Further analysis was performed to adjust for confounding variables using Multiple Logistic regression, using CVI as the outcome variable and all other variables as independent variables as shown in Table 5. Females had more than 2-folds

Table 1 - Age and anthropometric characteristics of the studied population break down by gender.

Characteristics of the population	Male (n=1099)	Female (n=1251)	p-value*	Missing data
Age (years)	41.5±15.8	37.6±13.4	<0.001	21
Weight (kg)	67.6 ± 16.9	72.3 ± 17.6	<0.001	18
Height (cm)	166.5 ± 6.8	154.7 ± 6.5	<0.001	21
BMI (kg/m ²)	27.6 ± 5.8	30.1 ± 7.1	<0.001	26
*independent t-test; data expressed as mean ± SD				

Table 2 - Characteristics of the studied population (N=2350).

Characteristics of the population	Frequency	Percentage (%)	Missing Data
Gender			
Male	1099	(46.8)	-
Female	1251	(53.2)	-
Family history of CVI			
Yes	166	(7.1)	26
No	2158	(92.9)	
Region of residency			
East	800	(34)	-
West	1550	(66)	
Prolonged standing occupation			
Yes	816	(34.8)	4
No	1530	(65.2)	
Receiving hormonal therapy			
Yes	646	(27.6)	6
No	1698	(72.4)	

Table 3 - Prevalence of chronic venous insufficiency break down by CEAP class in the studied population

CEAP class	Analyzed population n (%)	95% CI
No CVI	1279 (54.4)	52.6 - 56.4
CVI - class 0-4	1071 (45.6)	43.6 - 47.6
CVI - class 1-4	899 (38.3)	36.3 - 40.2
Class 0	172 (7.3)	6.3 - 8.4
Class 1	581 (24.7)	23 - 26.5
Class 2	270 (11.5)	10.3 - 12.8
Class 3	43 (1.8)	1.4 - 2.5
Class 4	5 (0.2)	0.09 - 0.5
Total population analyzed	2350 (100)	
CVI - chronic venous insufficiency, CEAP - clinical severity, etiology or cause, anatomy, pathophysiology, CI - confidence interval		

higher risk than male to develop CVI. Persons whose occupation required prolonged standing had also 2-folds higher risk to develop CVI than others. In the regression model, all other risk factors were significantly CVI determinants except BMI (Table 5).

DISCUSSION. Few epidemiological studies have been carried out on venous system diseases. This may be due to underestimation of venous disease as a considerable cause of morbidity. Recently, some epidemiological studies have been carried out to describe the prevalence, geographical variations and risk factors for the venous diseases. Yet, most of these studies have not covered the complete spectrum of the disease, but have been restricted to one aspect. Also, most of these studies have been carried out on selected groups and not on randomly selected subjects from the general population.^{7,8} Furthermore, the study populations and the diagnostic techniques, usually vary widely from one study to another.⁹

The selection procedure of the centers by randomization of the centres within the selected cities ensured a good representation of the population in each city. Similarly, selection bias of the study population seems to be unlikely as the sampling technique, which includes wide range of demographic characteristics. The prevalence of venous disease in the current study was higher than in the western countries. Approximately 50% of females and 25% of males were suffering of CVI in the current study compared to 30% among females and 15% among males in the Western countries. A positive correlation was found between the prevalence of varicose veins and the number of previous pregnancies, independent of age.¹⁰ High number of pregnancies is very common in Saudi Arabia and reasons are not clear why pregnancy might increase the risk of developing varicose veins. The widely held belief that it is due to pressure of pregnant uterus is mostly not correct as the majority of varicosities appear during the first 3 months of pregnancy when the uterus is not large enough to cause mechanical obstruction. It has been suggested that a hormonal factor may be responsible.¹¹ This also can be supported by the increased prevalence among females receiving hormonal therapy (54% compared to 32% in patients not receiving hormonal therapy). Pregnancy may merely be an exacerbating factor in those already predisposed, rather than a primary cause.¹²

As reported in previous studies, the mean age of CVI patients was higher compared to the population without any sign of CVI. The exact explanation may not be fully understood, but most probably due to weakness and loss of tonicity of walls of veins with age. Some studies showed that prevalence of varices increased in men from 3% in their 30s, to be

Table 4 - Association between potential risk factors and diagnosis of chronic venous insufficiency (class 1 to 4 of CEAP) in the studied population.

Risk factors	CVI (class 1 to 4 of CEAP)		p-value	Missing data
	Yes n %	No n %		
Age (years) (mean \pm SD)	42.3 \pm 14.2	37.5 \pm 14.8	<0.001*	21
Body mass index (kg/m ²) (mean \pm SD)	29.6 \pm 6.6	28.4 \pm 6.5	<0.001*	26
Gender				
Male	278 (27)	751 (73)	<0.001†	-
Female	621 (54)	528 (46)		
Family history of CVI				
Yes	105 (70.9)	43 (29.1)	<0.001†	26
No	780 (38.9)	1224 (61.1)		
Region of residency				
East	232 (32.1)	491 (67.9)	<0.001†	-
West	667 (45.8)	788 (54.2)		
Prolonged standing occupation				
Yes	403 (53.9)	344 (53.9)	<0.001†	2
No	494 (34.6)	933 (65.4)		
Receiving hormonal therapy				
Yes	348 (59.6)	236 (40.4)	<0.001†	6
No	548 (34.5)	1040 (65.5)		

*Independent Student t-test, †Pearson Chi Square test.

CVI - chronic venous insufficiency, CEAP - clinical severity, etiology or cause, anatomy, pathophysiology

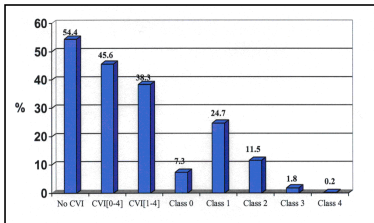


Figure 1 - Prevalence of chronic venous insufficiency (CVI) broken down by CEAP class in the studied population. CEAP - clinical severity, etiology or cause, anatomy, pathophysiology.

Table 5 - Factors associated with CVI (class 1 to 4 of CEAP) among the studied population.

Variables	OR	CVI 95%CI	p-value
Age	1.03	1.03 - 1.04	>0.001
Gender	2.4	1.9 - 3.1	>0.001
Family history of CVI	2.8	1.9 - 4.2	>0.001
Region	1.9	1.5 - 2.3	>0.001
Long standing occupation	2.0	1.6 - 2.5	>0.001
Using hormonal therapy	1.5	1.2 - 1.9	>0.001

CVI - chronic venous insufficiency,

CEAP - clinical severity, etiology or cause, anatomy, pathophysiology, CI - confidence interval

40% in their 70s, while for women it increased from 20% in their 30s to 50% in their 70s.^{2,13} Although obesity is believed to be an important risk factor for venous disease, no significant association was proved when the BMI was entered to the regression model. Some studies showed that overweight significantly related to varicose veins in women but not in men.¹⁴ Varicose veins were more common in overweight women, than in men, only telangiectasia and reticular veins were more common in overweight individuals.¹⁵ An extended study proved that an excess risk of varicose veins of approximately 33% was found in those with a BMI above 27 kg/m². Genetic predisposition was also evaluated in our study in the form of family history of CVI. It proved an association between the diagnosis of chronic venous disease and family history of CVI. Studies showed that weakness of the walls of the veins could be inherited as part of weak mesenchymal tissue syndrome between individuals. Also number of valves is an inherited factor differing between races.¹⁶ As the marriage between the same family is very common in KSA, this could explain the high prevalence of CVI. As reported in previous studies, the current study showed an association between long periods of standing and venous diseases.^{17,18}

In conclusion, higher prevalence of CVI in the Saudi population was reported, than in Western countries, especially in the Western region. Further studies are recommended to include all regions of KSA. Moreover, risk factors need to be elaborated in more details.

Acknowledgment. The authors gratefully acknowledge all research assistants for their excellent commitment. Great thanks for all study participants for their cooperation.

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