

Prevalence of chronic venous disease in health staff and its impact on quality of life at 6 months

Prevalencia de enfermedad venosa crónica en personal de salud y su impacto en calidad de vida a 6 meses

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Abstract

Objective: To determine the frequency and stages of chronic venous disease (CVD) in health staff and its impact on the quality of life. **Method:** Cross-sectional study on health workers, between the ages of 20 and 60, indistinct gender, to remain standing position ≥ 6.5 hours per day for at least 5 days a week. Socio demographic variables were recorded. The Clinical-Etiology-Anatomy-Pathophysiology (CEAP) scale was used to stage the CVD; to measure the quality of life, the CIVIQ-20 (Chronic Venous Insufficiency Questionnaire) survey was applied at baseline, at 3 and 6 months. All patients underwent detailed clinical examination followed by color Doppler ultrasound and angiography review. **Results:** Included 37 patients, 62.1% woman. Average age was 36.6 ± 8.8 years. By CEAP the 78.3% of the patients presented CVD and the highest prevalence was C1; corroborating by Doppler ultrasound only in 29.7% of the patients. The predominant symptoms were night cramps (54.5%). **Conclusion:** The frequency of CVD is like the literature. Patients with chronic venous disease have poor quality of life which improves with treatment.

Keywords: Venous insufficiency. Standing position. Prevalence.

Resumen

Objetivo: Determinar la frecuencia y estadios de la enfermedad venosa crónica (EVC) en personal de salud y su impacto en calidad de vida. **Material y métodos:** Estudio transversal en trabajadores de la salud, edad de 20 a 60 años, sexo indistinto, con bipedestación ≥ 6.5 horas/día por al menos 5 días a la semana. Se registraron variables sociodemográficas. La EVC se estadió con la escala CEAP (Clinical-Etiology-Anatomy-Pathophysiology); la calidad de vida se midió basal, a 3 y 6 meses con la encuesta CIVIQ-20 (Chronic Venous Insufficiency Questionnaire 20). Además, se realizó examen clínico, ultrasonido Doppler y valoración por angiología. **Resultados:** Incluyó 37 participantes, el 62.1% mujeres, edad promedio 36.6 ± 8.8 años. Acorde a la CEAP el 78.3% de los pacientes presentaron EVC (prevalencia mayor de C1). Se corroboró por ultrasonido Doppler en el 29.7%. El 54.5% presentaba calambres nocturnos. **Conclusiones:** La frecuencia de EVC en personal de salud es similar a la reportada en la literatura; los individuos con EVC tienen mala calidad de vida.

Palabras clave: Insuficiencia venosa. Bipedestación. Prevalencia.

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Introduction

Chronic venous disease (CVD) includes a cascade of physiopathological consequences derived from venous hypertension in the lower limbs, which can have multiple etiologies; this venous hypertension is associated with venous reflux caused by incompetent venous valves reducing venous return and leading to the accumulation of blood, hypoxia, and inflammation¹.

The term chronic venous insufficiency (CVI) is used when there are more advanced signs of CVD (classes C3-C6)¹. CVI is related to deficient blood flow in deep veins in the legs, generally caused by inadequate venous valves, and is characterized by sustained venous hypertension and reflux using a Doppler ultrasound. Reflux is typically defined as backward blood flow in the lower limbs greater than 0.5 s after provocation², or > 0.5 s in superficial veins, and 1.0 s for deep veins³; as well as blood accumulation in deep veins of the legs. Additionally, CVI may favor chronic leg ulcers and deep vein thrombosis².

The prevalence of CVI varies significantly by gender, ethnic origins, and age group, with an estimated 5-65%^{1,2,4}, where nursing staff has a high risk of developing varicose veins⁵, mainly due to standing for long periods of time, and is predominantly present in females.

In the legs, the signs (telangiectasia, edema, and trophic changes in the skin, such as eczema, hyperpigmentation, and induration) and symptoms (cramps, pain, heaviness, burning, and fatigue) have different degrees and forms of presentation^{1,2}, which may significantly affect quality of life and lead to missed work, as well as become a significant burden for healthcare systems^{1,6}.

The spectrum of clinical presentations of CVD has been defined in accordance with the *Clinical-Etiological-Anatomical-Pathophysiological* (CEAP) classification system, where the clinical description varies from C0 to C6^{1,2}.

The purpose of the study was to determine the frequency and the stages of CVD in healthcare personnel and the impact on quality of life.

Materials and methods

Transversal study performed in a second-level hospital, approved by the ethics and research review committees, with recruiting between 10/1/2017 and 1/30/2018, with convenience sampling in healthcare workers between the ages of 20 and 60, regardless of gender, who remain standing for more than 6.5 hours/day, at least 5 days a week. After signing the

informed consent, a clinical history was performed collecting data such as age, gender, body mass index (BMI), job, time performing job, time standing, drug addiction, hereditary history of CVD, and OB/GYN history (number of pregnancies, deliveries, miscarriages, and contraception method). Patients with prior CVI diagnosis and/or in treatment, pregnant women, and pelvic limb amputees.

The lower limbs of patients were evaluated by an angiologist while standing for a minimum of 30 seconds, and the physician classified the findings according to the CEAP scale⁶, previously used in Mexico⁷, which allows to find the prevalence for each clinical class, progression, and relationship to gender, age, obesity, and other risk factors⁶; it is based on the worst leg and recognized as class IB recommendation. In order to measure quality of life a baseline was applied at 3 and 6 months after the CIVIQ survey (*Chronic Venous Insufficiency Questionnaire 20*), which is a tool comprised of questions distributed in four areas (physical, psychological, social functioning, and pain). Questions are graded between 1 and 5 points (Likert type), the score ranges from 0 to 100, where 0 is the best and 100 is the worst quality of life⁶; based on the CIVIQ-20, the *Global Index Score* (GIS) was calculated to express the global and quality of life values, inverting the scores in such a way that 0 is the worst and 100 is the best.

Additionally, participants were asked about the presence of clinical symptoms, such as heavy legs, burning or heat, edema, itching, and cramps. The ultrasound (US) was performed by an experienced certified physician in the field with the MyLab™Six Esaote SC3123 equipment following international guidelines and recommendations, measuring the femoro-popliteal segment in both limbs, and considering it pathological if greater than 0.5 seconds^{5,6}.

Subsequently, the angiologist assigned individualized treatment (compression therapy, hygiene and diet measures, exercise, drug or surgical treatment) independently from the researchers.

For the statistical analysis, the normal distribution was identified with the Kolmogorov-Smirnov test. Numerical values are reported with averages and standard deviation ($\pm$ SD), nominal values are shown with numbers and percentages. Descriptive statistics were performed with absolute frequencies, for variables without normal distribution of data a non-parametric test was used. Inferential statistics were used to determine the difference in the quality of life score after treatment. The program SPSS® v 20.0, and every bilateral $p < 0.05$ value was considered significant.

Results

The study analyzed 37 participants, 62.1% were females, 19 subjects (17 females and 2 males) were nursing personnel, and 18 were physicians (7 females and 11 males). The average age was 36.6 ± 8.8 years, and the average BMI was 25.7 ± 3.2 .

64.8% of patients had family history of CVD, all subjects reported no drug addictions or chronic degenerative conditions; 40.5% exercised according to the recommendations of the World Health Organization, 40.5% of patients had normal weight, 45.9% was overweight, and 13.5% were obese. Among the 23 females, 12 had several pregnancies, 4 had one pregnancy, and 7 had never been pregnant, none of them use hormonal contraceptive methods. The average time spent standing up was 8.8 ± 1.4 hours.

Using the CEAP, 78.3% patients had CVD confirmed by a Doppler US in 29.7% of patients. According to the CEAP stages, the highest prevalence was C1 (17 patients), followed by C2 (12 patients), and C0 (8 patients). Among the 11 patient with CVD, the average age is 24.2 ± 6.9 years, and the average BMI is 25.2 ± 3 kg/m². The most frequent symptoms were tired legs in 36.3%, night time cramps and burning pain in 27.7%; it is worth noting that patients with CVD had a high score according to the CIVIQ-20 scale, the rest of variables are shown in table 1.

Among patients with CVD, 7 patients had deep venous system disorders, and 4 patient had superficial venous system disorders, and in 8/11 there was inversion of the right flow, 7/11 had inversion of the left flow, and bilateral inversion in 5 of them (Fig.1). The average right inversion speed with Doppler was 13.7 ± 8.4 s seconds and the left was 13.8 ± 2.2 seconds.

When analyzing the 11 patients who received treatment with the Wilcoxon test, a statistically significant improvement according to the CIVIQ-20 scale (Table 2), the GIS shows a score of 36.45 ± 25.3 in patients with CVD. According to the components of the CIVIQ-20, the most affected area is the psychological area (7 patients), followed by the physical (3 patients), and social (1 patient) areas.

Discussion

Based on the Doppler US, a CVD frequency was found in 29.7%, which is similar to the findings of international literature²⁻⁴, however, if only the CEAP

Table 1. Comparison between patients with and without chronic venous disease using Doppler ultrasound

Variable	With disease (n = 11)	Without disease (n = 26)
Age (years)	34.2 ± 6.9	37.6 ± 9.4
Gender: male/female	5/6	9/17
Average body mass index $\pm$ SD:		
18-24.9 (n)	5	10
25-29.9 (n)	5	12
> 30 (n)	1	4
Heredofamilial history of chronic venous disease (%)	63.6	65.3
Profession:		
Physicians	9	9
Nurses	2	17
Pregnancies:		
No pregnancy	1	6
First pregnancy	2	2
Several pregnancies	3	9
Hours standing	9.5 ± 1.5	8.5 ± 1.2
CEAP stage		
C0	0	8
C1	6	11*
C2	5	7
Presentation		
Burning pain	3	1
Heaviness	1	15*
Tired legs	4	6
Itching	0	2
Edema	0	2
Night time cramps	3	0*
Baseline CIVIQ-20 (global score)	70.9 ± 20.2	$28 \pm 14.1^{\dagger}$
Global Index Score (GIS)	36.45 ± 25.3	$89.58 \pm 17.43^{\dagger}$

*p < 0.05.

[†]p < 0.001.

SD: standard deviation; CEAP: Clinical-Etiology-Anatomy-Pathophysiology; CIVIQ-20: Chronic Venous Insufficiency Questionnaire 20.

scale is used, it will increase up to 78.3%, which is higher than other reports^{8,9}.

Yun et al.⁵, with the use of ultrasound, report a prevalence of varicose veins of 16.1% in nursing personnel, compared to 29.7% (5 males and 6 females), which can be influenced by the fact that the diagnosis was made with Doppler US, and that the patients included are younger, and 40.5% of subjected of the study had normal weight.

Contrary to Eberhardt et al.³, who report a higher prevalence in women compared to men at a ratio of 3:1,

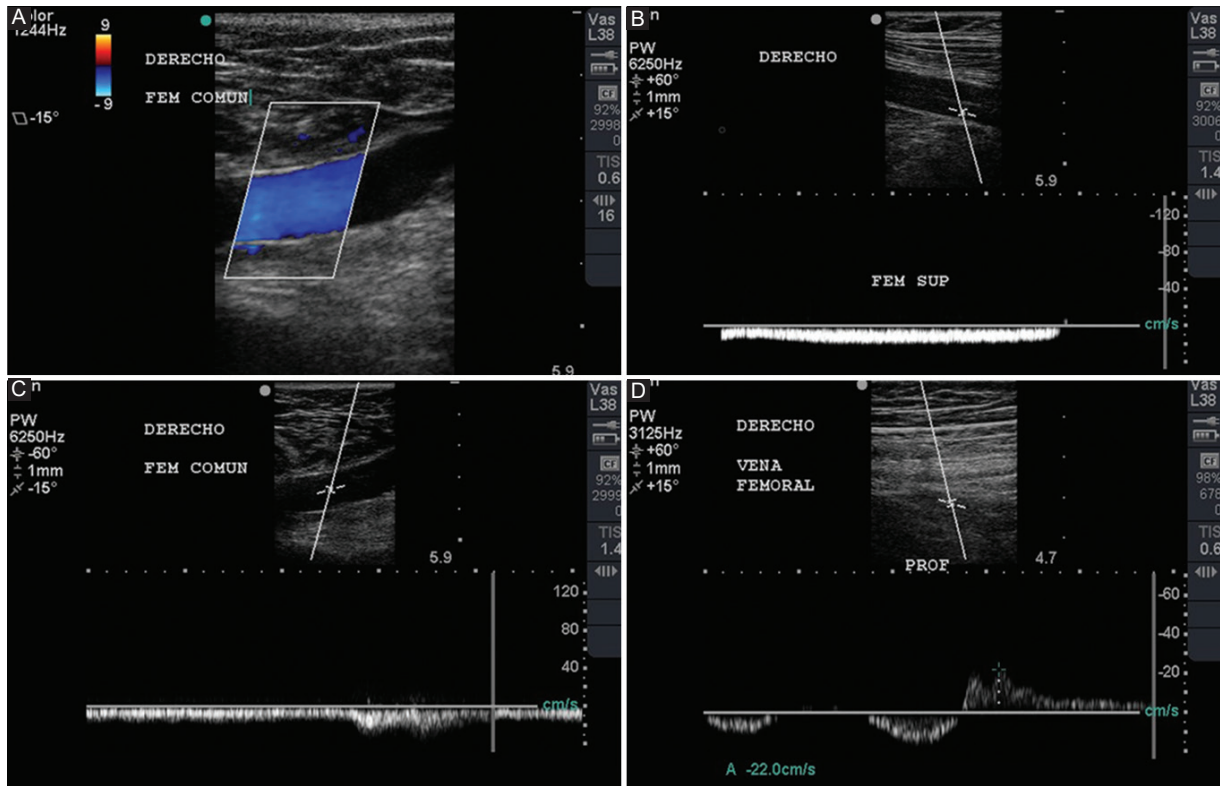


Figure 1. A: doppler signal with normal color; homogeneous signal with complete filling of the light of the common femoral vein, which represents permeability. B: normal pulse Doppler spectrum; the Doppler spectrum can be seen, which is respiratory phasic, below the baseline, with a small peak above the baseline due to adequate valve closure, without reflux during the Valsalva maneuver. C: muscle systole response; during the muscle systole an increase in the spectrum can be seen, without delimiting the flow, showing distal permeability with no insufficiency data. D: doppler spectrum above the baseline during the Valsalva maneuver, 22 cm/second, at least for two seconds, representing reflux due to venous insufficiency.

Table 2. CIVIQ-20 results (Chronic Venous Insufficiency Questionnaire 20) before and after treatment (n = 11). Mean $\pm$ standard deviations are reported

Variable	Baseline CIVIQ-20	CIVIQ-20 3 months after treatment	CIVIQ-20 6 months after treatment
CIVIQ-20 (global score)	70.9 $\pm$ 20.2	40 $\pm$ 8.9*	28.1 $\pm$ 9.8*
Global Index Score (GIS)	36.45 $\pm$ 25.3	75 $\pm$ 11.1*	89.8 $\pm$ 12.2*

*p < 0.05 after 3 and 6 months with regards to baseline.

it was found that 45% of patients with CVD are males, and this coincides with other international studies in general populations^{1,10}, showing higher prevalence in males.

In more than 60% in both group of the study, with or without CVD, there is family history of CVD, which is higher than what was reported by previous studies^{10,11}.

The CEAP scale is highly recommended for the evaluation of CVD⁵, in our study, since we only used that scale, we have a prevalence of 78.3%, which is similar to the 73.9% reported by Sharif Nia et al.¹¹, however, when used without the support of Doppler US, its prevalence increases; similarly to other authors, we consider that the Doppler US is a more specific diagnostic tool that allows us to identify even subclinical patients⁸, and it must be considered the golden standard for CVD diagnosis⁶.

Obesity is defined as a risk factor for CVI^{3,10,11}, however, the average BMI in the group was 25.2 kg/m², and it is worth noting that only 10% of overweight and obese patients had CVD.

Yun et al.⁵ report that risk factors for venous reflux in pelvic limbs are age and long work hours of 4 hours or more while standing, in our study group the average number of hours was 8.8, however, subjects are younger than in the previously quoted study; it is worth noting that patients with CVD remain

standing for an average of 1 more hour, but this is not statistically relevant, perhaps due to the sample size.

When measuring reflux in the lower limbs with Doppler US, we found times over 0.5 s with more impact on the deep right system, which indicates a more severe condition, however, similarly to other authors, we did not find any correlation between the degree of impact and the clinical manifestations³. According to the literature, the majority of venous symptoms are secondary to inflammation, as well as leukocytes and excess fluids, particularly in early stages of the disease¹². The feeling of tired legs was the most frequent symptom in 36.3% of patients, similar to other authors^{12,13}, however, they report more advanced stages of the disease and in older patients; furthermore, in our patients, burning pain and night time cramps were more prevalent, contrary to the findings of Duque et al.¹⁴

According to the CEAP, the most frequent disease in this population was C1 (telangiectasia or reticular veins) in 54.5%, contrary to other authors, who found that the main stage is C0 (no palpable visible sign)⁸ and C3 (edema)¹⁵. 11 patients with CVD diagnosis by Doppler US were stages C1 and C2 (varicose veins).

Finally, according to the CIVIQ-20, it was found that patients with CVD score 2.5 times higher during the last 4 weeks, indicating lower quality of life in light of the symptoms presented, and this may impact job and personal performance of the subjects.

Non-pharmacological treatment was provided with the use of mild to moderate leg compression, which has been proven to restore vein tone, reduce reflux and ambulatory vein pressure, as well as to normalize vein hemodynamics, resulting in the partial elimination of skin edema¹⁵.

The literature reports that the value obtained in the CIVIQ-20 is directly proportional to the degree of decline in the quality of life¹⁶; it is evident that patients with CVD show a decline in their quality of life (shown in the GIS) due to this pathology, and they improve after treatment, which can avoid disabilities and increase daily performance of healthcare personnel.

Conclusions

The frequency of CVD in healthcare personnel is similar to the literature. Individuals with CVD have poor quality of life, which improves with treatment. Healthcare personnel is vulnerable to this pathology and it

must be included in preventative care programs, and the use of compression measures during work hours for individuals with risk factors must be promoted.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of people and animals. The authors declare that the procedures followed were in accordance with the ethical standards of the responsible human experimentation committee and with the World Medical Association and the Declaration of Helsinki.

Data confidentiality. The authors declare that they have followed the protocols of their work center regarding the publication of patient data.

Right to privacy and informed consent. The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

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