

National Health and Nutrition Education Survey on Chronic Venous Insufficiency

Lilibeth Maravilla, M.D.*; David Raymund Salvador, M.D.**; and Maria Teresa Abola, M.D.***

Abstract

Introduction: Chronic venous disease is an under-recognized condition which may result in significant morbidities with considerable costs. There is scarce data on chronic venous disease in the Philippines.

Methods: The National Nutrition and Health Survey II was conducted to determine the national prevalence of different risk factors and clinical conditions. The primary objective of this study is to determine the prevalence of chronic venous disease in adults aged 20 years and older using the Southern Tagalog Venous Insufficiency Questionnaire (STVIQ).

Results: A total of 7,212 subjects, were randomly surveyed. Chronic venous disease has a crude overall prevalence

rate of 52.5%, is frequently seen in females (60%) and with increasing age. About 38.6% of the population have typical venous symptoms but only 1.6% have edema, stasis pigmentation and healed venous ulcers. Prevalence of chronic venous disease is not related to urban residence and type of occupation.

Conclusion: Chronic venous disease in the Philippines is common, reported in approximately five out of 10 Filipinos, most of whom are asymptomatic.

Keywords: chronic venous disease, chronic venous insufficiency, varicose veins, prevalence, Asian, Philippine

Introduction

There is scarce data on the prevalence of chronic venous disease in the Asian population.^{1,2} The actual prevalence of this condition in the Philippines is unknown. In 2008, a survey questionnaire, the Southern Tagalog Venous Insufficiency Questionnaire (STVIQ), was designed in order to create a survey tool that can be used for a planned nationwide survey for the prevalence of chronic venous disease. The STVIQ was validated against vascular specialist diagnosis which is based on history and physical examination findings using the clinical classification of chronic venous disease, as the gold standard. The calculated sensitivity of the picture questionnaire was 48% with a specificity of 97%. The positive predictive value was 97% with a negative predictive value of 46%. The likelihood ratio for a positive test is 16.³ This tool may, therefore, be helpful in measuring the

overall burden of chronic venous disease in the Philippines. In the absence of a physician to give the diagnosis, a trained nurse or research assistant can rule in the disease with a great degree of confidence.

The primary objective of this study is to determine the prevalence of chronic venous disease in a cross-sectional study involving a community-based population in the Philippines using the STVIQ. Secondary objectives are 1) to determine the overall prevalence of chronic venous disease, 2) to determine the prevalence of chronic venous disease according to age, gender, urbanization and occupation, and 3) to determine the prevalence of symptomatic peripheral arterial disease (PAD) defined by the presence of intermittent claudication among those with chronic venous disease. This is the first paper to report the local prevalence of chronic venous disease, which causes recurrent leg symptoms like heaviness, cramps, edema and leg ulceration resulting in the patient's inability to perform his daily activities. Interventional together with medical therapy have a high success rate. Life threatening complications may include venous thromboembolism and chronic thromboembolic pulmonary hypertension. Upon establishing the burden of chronic venous disease, we can recommend measures on its primary prevention and avoidance of disease progression and complications. Controlling signs and symptoms of chronic venous insufficiency (CVI) with

* Department of Internal Medicine, Daniel Mercado Medical Center, Tanauan City, Philippines

** Department of Internal Medicine, De La Salle University Medical Center, Dasmariñas, Cavite, Philippines

*** Division of Education, Philippine Heart Center, Quezon City; Cardiovascular Section, Philippine General Hospital, College of Medicine, University of the Philippines, Manila Philippines

Corresponding author: Lilibeth Maravilla, M.D., Daniel Mercado Medical Center, Tanauan City, Philippines
Email: lilibeth.maravilla@yahoo.com

exercise, compression, pharmacologic or mechanical intervention may prevent the most severe complications including lipodermatosclerosis and venous ulcerations.⁴

Methods

The data on the prevalence of chronic venous disease was derived from the National Nutrition and Health Survey. The study protocol was approved by the Technical Committee and Ethics Review Board of the Department of Science and Technology. This survey used the National Statistics office (NSO) 2008 Labor Force Survey (LFS) master sample and employed a stratified multistage sampling design to represent each of the 17 regions of the country. The first stage was the selection of primary sampling units (PSUs) in a barangay (household unit) or contiguous barangays with at least 500 households, with a probability proportional to the estimated number of households. The second stage was the selection of enumeration areas (EAs) within the samples PSUs, with 150 to 200 households serving as the secondary service units (SSUs). The last stage was the selection of housing units within the sampled EAs, which served as the ultimate sampling unit (USU). As such, the household was considered a cluster, in which all the units became part of the survey. The clinical component included adults 20 years and older. All participants gave written informed consent for the survey.

The National Nutrition and Health Education Survey used six questionnaires for the data collection of clinical and health components. These questionnaires were standardized and validated by the corresponding medical specialty associations. The Venous Insufficiency Questionnaire was standardized and validated by the Southern Tagalog Peripheral Vascular Specialists under the Philippine Heart Association Council on Stroke and Peripheral Vascular disease.³ This questionnaire evaluated the respondents on the presence of symptoms and signs of chronic venous disease. The booklet was translated from English to Filipino to avoid any misunderstanding of the questionnaires and to ease the interview process (Appendix A and B).

Pre-testing of the questionnaires was conducted last April 2008 in Bicutan, Taguig City in order to test the correctness, clarity, time requirement and suitability of each question before the booklets were finalized and reproduced. It was also approved by the Ethics and Clearance Committee of the National Statistical Coordination Board.

Booklet 8A was used to list all the household members for the sampled households and some background information on each member like age, sex, relation with the head, civil status and physiological status. Booklet 8F was referred as the NNHeS: 2008 questionnaire, containing all information regarding other noncommunicable diseases (NCD) which included peripheral vascular disease.

The seventh NNS field operations were carried out by four major survey teams, each was headed by a team coordinator. A team consisted of six sub-teams and a total of 24 sub-teams participated in the entire seventh NNS survey. Each sub-team consisted of a team leader, two anthropometric researchers, two dietary researchers, two clinical researchers (one registered medical technologist and one nurse), one biochemical researcher and a science aide. Specifically, a registered medical technologist and a nurse comprised the clinical component for each sub-team.

Prior to the actual field data collection, all members of the clinical survey team were required to attend the series of training sessions provided by the consultants/experts from the participating medical societies. The training included lectures, demonstrations and hands-on examinations.

Another training session was dedicated for the venous insufficiency questionnaire and ankle brachial index (ABI) determination provided by the Philippine Heart Association (PHA) Council on Peripheral Vascular Disease. The last part was the one-week training given by the FNRI-DOST which was primarily intended for orientation and familiarization with the different questionnaires used in the field as well as to have an in-depth understanding of the standard interview process. Finally, all researchers including field supervisors attended the field practicum and reliability tests to ensure adequate skills for nutritional assessment.

Data collected in the field were checked for completeness of entries. Data entry was done by hired data encoders using the MySQL database. Two rounds of proofreading were done to ensure correctness and validity of encoded data. After manual and computer data validation, several data files were merged to create a master dataset followed by another round of checking and validation of the dataset to eliminate errors and inconsistencies. Sampling weights were computed and attached to the master dataset in preparation for data analysis. Stata software Release 11 (Serial No. 196048004) was used to process and analyze the data. Distribution and prevalence of CVI and chronic venous disease based on signs and symptoms and were categorized according to age and sex.

For this phase of the NNHeS study, only associations with age and gender can be analyzed.

Estimates of disease prevalence were corrected for false positive and false negative results of the instruments used. True disease prevalence was calculated using the Marchevsky formula:

$$P = \frac{A - (100\% - Sp)}{Sn - (100\% - Sp)}$$

where P is the estimated true prevalence in percent, A is the crude prevalence in percent as determined by the survey instrument, and Sn and Sp are its sensitivity and specificity,

respectively. As can be seen from this formula, adjustments are only possible when both A and Sn are greater than (100 – Sp). Otherwise, a negative prevalence would be predicted. This meant that when the prevalence by questionnaire was rare (A is low), then Sp should be very high. Other limitations of the Marchevsky formula are 1) when $A > S_n$ (because P will be >1) and 2) when $A < (1-sp)$ or $S_n < (1-Sp)$ because P will be less than 0. Thus, for such crude prevalence rates, no adjustment using the Marchevsky formula will be applied, and limitations shall be acknowledged

Results

A total of 7,212 subjects, 3,319 males and 3,893 females, 20 years old and above, were randomly surveyed using the Southern Tagalog Venous Insufficiency Questionnaire (STVIQ). The crude overall prevalence rate of chronic venous disease is 52.5%, (3,788/7,212).

Table I. Prevalence of chronic venous disease in the general population according to age and gender

Gender/Age	Patients with chronic venous disease	
	n	% (SE)
Males	3,319	45.2 (1.2)
20-29	822	33.4 (2.0)
30-39	757	44.7 (2.1)
40-49	742	49.4 (2.0)
50-59	490	46.7 (2.5)
60-69	314	57.0 (3.1)
70+	194	58.0 (3.8)
Females	3,893	58.6 (1.0)
20-29	922	43.0 (1.7)
30-39	894	55.3 (1.8)
40-49	807	63.9 (1.8)
50-59	604	68.1 (2.0)
60-69	398	70.6 (2.4)
70+	268	69.7 (3.1)
Overall	7,212	52.5 (0.9)

Table II. Distribution of the general population according to age, gender and clinical staging (based on CEAP Classification)

Gender/Age	C0 No visible/ palpable signs %(SE)	C1 Spider/Reticular veins %(SE)	C2 Varicose veins %(SE)	C3 Edema %(SE)	C4 Pigmentation/ Eczema %(SE)	C5 Healed venous ulcer %(SE)
Males	54.8 (1.2)	29.3 (1.1)	14.7 (0.7)	1.0 (0.2)	0.1 (0.05)	0.02 (0.02)
20-29	66.6 (2.0)	26.1 (1.8)	6.8 (1.0)	0.4 (0.2)	0 (0)	0 (0)
30-39	55.2 (2.1)	29.6 (1.8)	14.0 (1.4)	1.1 (0.4)	0 (0)	0 (0)
40-49	50.6 (2.0)	31.3 (1.8)	17.3 (1.5)	0.7 (0.3)	0.1 (0.1)	0 (0)
50-59	53.3 (2.5)	28.5 (2.3)	16.4 (1.7)	1.8 (0.6)	0 (0)	0 (0)
60-69	43.0 (3.1)	32.8 (2.9)	22.1 (2.6)	1.8 (0.8)	0.3 (0.3)	0 (0)
70+	42.0 (3.8)	29.7 (3.4)	25.6 (3.3)	1.3 (0.8)	0.8 (0.6)	0.4 (0.4)
Females	41.4 (1.0)	41.6 (0.9)	15.2 (0.6)	1.7 (0.2)	0.1 (0.05)	0.1 (0.04)
20-29	57.0 (1.7)	39.3 (1.7)	3.6 (0.6)	0.08 (0.08)	0 (0)	0 (0)
30-39	44.7 (1.8)	42.5 (1.8)	11.5 (1.2)	1.1 (0.4)	0.1 (0.1)	0.1 (0.1)
40-49	36.1 (1.8)	46.8 (2.0)	15.9 (1.4)	1.1 (0.4)	0 (0)	0 (0)
50-59	31.9 (2.1)	41.0 (2.2)	23.8 (1.8)	2.9 (0.7)	0.1 (0.1)	0.1 (0.1)
60-69	29.4 (2.4)	38.4 (2.6)	28.0 (2.5)	3.6 (1.0)	0.4 (0.3)	0.2 (0.2)
70+	30.3 (3.1)	36.6 (3.3)	27.8 (2.8)	5.0 (1.4)	0.3 (0.3)	0 (0)
Overall	47.5 (0.9)	36.0 (0.8)	15.0 (0.5)	1.4 (0.2)	0.1 (0.04)	0.05 (0.02)

Table III. Distribution of the subjects with chronic venous disease according to age, gender, and clinical staging (CEAP)

Gender/Age	n	Clinical staging of subjects with chronic venous disease				
		Reticular veins	Varicose veins	Edema	Pigmentation/ Eczema	Healed venous ulcer
		%(SE)	%(SE)	%(SE)	%(SE)	%(SE)
Males	1,510	64.8 (1.4)	32.6 (1.4)	2.3 (0.4)	0.2 (0.1)	0.05 (0.05)
20-29	273	78.2 (2.6)	20.5 (2.6)	1.3 (0.8)	0	0
30-39	339	66.2 (2.7)	31.2 (2.8)	2.6 (0.8)	0	0
40-49	367	63.4 (2.6)	35.0 (2.6)	1.4 (0.6)	0.2 (0.2)	0
50-59	239	61.1 (3.4)	35.2 (3.3)	3.8 (1.3)	0	0
60-69	178	57.4 (4.1)	38.8 (4.1)	3.2 (1.4)	0.6 (0.6)	0
70+	114	51.3 (4.8)	44.2 (4.8)	2.3 (1.3)	1.4 (1.0)	0.8 (0.8)
Females	2,278	71.0 (1.1)	25.9 (1.0)	2.8 (0.4)	0.2 (0.09)	0.1 (0.06)
20-29	392	91.5 (1.3)	8.3 (1.3)	0.2 (0.2)	0	0
30-39	491	76.8 (2.2)	20.7 (2.0)	2.0 (0.8)	0.2 (0.2)	0.2 (0.2)
40-49	511	73.3 (2.2)	25.0 (2.1)	1.8 (0.6)	0	0
50-59	414	60.3 (2.6)	35.0 (2.6)	4.3 (1.0)	0.2 (0.2)	0.2 (0.2)
60-69	278	54.4 (3.3)	39.6 (3.2)	5.1 (1.4)	0.6 (0.5)	0.2 (0.2)
70+	192	52.5 (3.9)	39.9 (3.7)	7.2 (2.0)	0.4 (0.4)	0
Overall	3,788	68.6 (0.97)	28.5 (0.9)	2.6 (3.2)	0.2 (0.3)	0.09 (0.04)

Table IV. Distribution of the clinical subgroups in the general population according to the clinical staging based on the CEAP classification

Clinical Subgroups	Total	No visible sign	Reticular veins	Varicose veins	Edema	Pigmentation	Healed venous ulcer
Asymptomatic	4172	2391	1241	499	39	2	0
Typical symptoms	2784	1033	1170	511	59	7	4
Atypical symptoms	256	0	157	94	5	0	0
Total	7212	3424	2568	1104	103	9	4

Table V. Prevalence of typical symptoms among those with chronic venous disease (n = 3,788)

Gender/Age	Patients with chronic venous disease with visible veins	
	n	% (SE)
Males	634/1510	40.6 (1.5)
20-29	100/273	35.4 (3.0)
30-39	137/339	39.5 (2.8)
40-49	150/367	39.8 (2.7)
50-59	107/239	43.7 (3.4)
60-69	80/178	43.7 (3.8)
70+	60/114	48.9 (4.5)
Females	1117/2278	47.4 (1.1)
20-29	180/392	44.3 (2.7)
30-39	231/491	45.7 (2.4)
40-49	244/511	45.8 (2.2)
50-59	214/414	50.1 (2.6)
60-69	138/278	47.8 (3.0)
70+	110/192	57.0 (3.6)
Overall	1751	44.8 (1.0)

Table VI. Prevalence of chronic venous disease according to age, gender and urbanization (%) in the general population (N = 7,212)

Location of residence	Prevalence of chronic venous disease (%)		
	Gender		
	Both	Males	Females
Age	% (SE)	% (SE)	% (SE)
20-29	29.3 (1.7)	24.9 (2.2)	32.8 (2.5)
30-39	32.9 (1.8)	26.1 (2.3)	37.9 (2.3)
40-49	36.0 (2.0)	33.6 (2.7)	37.9 (2.6)
50-59	35.4 (2.2)	28.2 (3.0)	40.7 (3.0)
60-69	42.6 (3.0)	38.1 (4.5)	45.7 (3.8)
70 & over	37.1 (3.6)	29.3 (5.5)	41.5 (4.5)
Total	34.0 (1.0)	28.9 (1.3)	37.9 (1.2)
Rural			
Age			
20-29	37.0 (1.9)	33.0 (2.5)	40.8 (2.4)
30-39	38.0 (2.0)	36.2 (2.6)	39.9 (2.5)
40-49	40.0 (1.8)	33.7 (2.4)	46.3 (2.6)
50-59	45.6 (2.5)	38.2 (3.2)	51.7 (3.3)
60-69	45.4 (2.6)	47.0 (4.0)	44.0 (3.2)
70 & over	52.4 (3.1)	46.4 (4.4)	57.1 (4.0)
Total	41.3 (1.0)	37.0 (1.3)	45.1 (1.3)

Table VII. Prevalence of chronic venous disease by occupation (%) in the general population (N = 7,212)

Occupation	Prevalence of chronic venous disease		
	Both	Males	Females
	% (SE)	% (SE)	% (SE)
Officials	37.7 (2.2)	27.8 (3.3)	43.0 (2.8)
Professionals	35.1 (2.3)	21.7 (3.5)	41.4 (2.8)
Service workers	29.0 (2.9)	28.8 (3.9)	29.1 (4.4)
agricultural, farmers, fishermen	38.8 (1.5)	38.7 (1.6)	39.2 (4.0)
skilled workers	33.4 (1.7)	32.7 (1.9)	36.6 (4.3)
unskilled workers	37.5 (1.9)	35.0 (2.4)	40.2 (2.7)
special occup., AFP, PNP	14.6 (7.4)	19.7 (10.2)	None
No occupation	39.4 (1.0)	28.6 (1.8)	42.5 (1.2)

Discussion

The NNHES Survey showed a high crude prevalence rate of chronic venous disease in the Philippines at 52.5% among subjects who are 20 years old and above (Table I). Our overall crude prevalence rate is similar to that reported in a contemporary Asian study using functional tests.^{5,6,7,8} Data from the Edinburgh Vein Study showed an age-adjusted prevalence of CVI of nine percent in men and seven percent in women.⁸ However, if the presence of trunk varices were

Table VIII. Percentage of claudication in the general population with typical chronic venous disease symptoms (n =2,784)

Gender/Age	Subjects with symptomatic chronic venous disease who also have claudication (%)	
	n	% (SE)
Males	58/1137	5.2 (0.7)
20-29	16/246	6.2 (1.6)
30-39	13/343	5.8 (1.6)
40-49	9/258	3.3 (1.1)
50-59	9/169	5.6 (1.8)
60-69	7/139	5.5 (2.0)
70+	4/82	5.9 (2.8)
Females	105/1647	6.1 (0.7)
20-29	25/339	6.2 (1.3)
30-39	29/356	7.9 (1.6)
40-49	23/347	6.9 (1.5)
50-59	15/283	5.1 (1.3)
60-69	8/186	4.4 (1.7)
70+	5/136	3.1 (1.4)
Overall	161/2784	5.8 (0.5)

considered, the age-adjusted prevalence was 15% in men and 34% in women. Venous insufficiency was medically diagnosed in 14.6% of French men and 33.6% of women in the SUVIMAX cohort but varicose veins were diagnosed in 74.5% of men and 54.2% of women.⁹

About half (47.5%) of the subjects surveyed in our study had no visible leg veins. Over half of the subjects (52.5%) had visible leg veins and skin changes on physical examination. Thirty-six percent (36%) of the general population had spider or reticular veins while 15% had varicose veins; there were more females with reticular veins (41.6% in females vs 29.3% in males) while there were similar rates of varicose veins across both sexes (15.2% in males vs 14.7% in males). Only 1.55% showed signs of CVI (C3-C6) with similar rates among males and females. Crique et.al. reported that, compared with Hispanics, African Americans, and Asians, non-Hispanic Whites had more venous disease.¹⁰ Our prevalence data are very similar to that of the Asians in the study of Criqui et.al., 45.4% had spider veins, 18.7% had varicose veins and 4.8% had trophic changes; only 12.5% of these had superficial vein functional disease and 8.8% deep vein functional disease (Asian population with n=273). On the other hand, in another study using a doppler ultrasound-based diagnostic method, CVI was found to be more common in the Asian group (62.5%), in the common femoral vein and the sapheno-femoral junction compared to other ethnic groups. The underlying factor may be smaller vein diameter among Asians.^{11,12}

There are more women with visible veins (60.1%) and likewise a higher percentage of females with symptomatic venous disease (47.4% in women vs 40.6% in men). The increasing prevalence of visible veins with age seems to indicate the latter as a risk factor for venous insufficiency.¹² However, this finding appears to be more consistent for visible veins rather than for symptomatic CVI as also noted in the San Diego Population Study.¹¹

Epidemiologic studies have been performed in many countries but usually focusing on varicose veins.^{13,14} There was a wide range of reported prevalence rates and this was most likely due to the use of different definitions of chronic venous disease, different age groups studied, and different methods of documenting chronic venous disease. More recently, the CEAP classification has been internationally accepted as a standardized method of classifying and reporting the different manifestations of chronic venous disease.¹³ The reported prevalence rates are now more similar with Classes C0 and C1 together being the most frequently reported in more than 60% of the population.¹⁴ The worldwide prevalence of chronic venous disease was 83.6% with 64% presenting with reticular veins, varicose veins, edema, stasis hyperpigmentation and ulcers. Reticular veins, varicose veins and edema appeared to be more frequent among women in most countries but the rate of severe stages did not differ between males and females.^{15,16,17}

In the Bonn Vein Study, a population-based, cross-sectional, one-year study with participants from a single random sample out of population registers was conducted (n=3072) where 87% of participants had telangiectasia.¹⁸ The most important risk factors were age (over 60), female gender, pregnancies, and family history of varicose veins. The most important risk factors for CVI other than age (over 50) were obesity and urban residence. In the current study, age and gender appear to be significant factors—more females had reticular veins than varicose veins while the opposite was observed among males, with prevalence of chronic venous disease increasing with advancing age. On the other hand, a higher prevalence of chronic venous disease was seen among those residing in rural areas. Type of occupation likewise did not appear to affect prevalence rates. It is traditionally expected to find higher prevalence rates of chronic venous disease among workers with occupations that require prolonged standing.

Symptomatic chronic venous disease and symptomatic PAD as assessed by the Edinburgh Claudication questionnaire coexisted in 5.8% of subjects. In spite of this low percentage, however, a diagnosis of PAD in patients with chronic venous disease needs to be carefully ruled out due to the contrasting nature of the management of these two entities and the definite contraindication of the usage of compression stockings in those with significant PAD.¹⁸ In one study of patients with leg ulcers, 14.5% had mixed arterial and venous disorders.¹⁹ Compression therapy, the cornerstone of medical therapy for chronic venous insufficiency, is contraindicated in patients with significant PAD.

Conclusion

Chronic venous disease in the Philippines is common, reported in approximately five out of 10 Filipinos, both as a symptomatic condition and as manifested by visible veins. It is more common in women and increases in prevalence

with age. Urbanization and type occupation were not important determinants of prevalence. Early recognition and education may be necessary to increase awareness of this disorder. Early therapy may likewise be warranted to prevent its long-term debilitating sequelae. Chronic venous disease also affects a significant segment of the global population, emphasizing the importance of adequate screening for chronic venous disease. Increasing the awareness among primary care physicians and health care providers will contribute to significantly diminishing the burden of chronic venous disease. Early identification and treatment of patients with CVI, especially those with signs of chronic venous insufficiency, may improve symptomatology and prevent complications of advanced chronic venous disease.

Limitations

A history of treatment or intervention for chronic venous disease like sclerotherapy or varicose vein surgery was not elicited. Thus, subjects with chronic venous disease but with no visible signs on the lower extremities as a result of prior intervention may have been misclassified under those who do not have venous disease, further underestimating the prevalence of this condition.

Furthermore, the presence of chronic venous disease was not verified by the use of tests of functional disease like duplex ultrasonography or plethysmography since this would entail more costs and screening for this disease may not then be deemed practical and doable.

Acknowledgements

We would like to recognize the efforts and contribution of the members of the Southern Tagalog Chapter of the Philippine Heart Association in the creation and validation of the questionnaire used in this study. We would also like to thank Ms. Charmaine Duante for the assistance she has provided in the statistical calculations required for this study.

References

1. **MH Criqui, M Jamosmos, A Fronek, JO Denenberg, et.al.** Chronic Venous Disease in an ethnically diverse population: The San Diego Population Study. *Am J Epidemiology*. 158(5):448-56, 2003.
2. **Sam RC, Hobbs SD, Darvall KA, Rehman A, Adam DJ, Silverman SH, Bradbury AW.** Chronic venous disease in a cohort of healthy UK Asian men. *Eur J Vasc Endovasc Surg*. 2007 Jul;34(1):92-6. Epub 2007 Apr 3.
3. **Maravilla L, Salvador DRK, Librojo R, et.al.** The Southern Tagalog Venous Insufficiency Questionnaire (unpublished).
4. **P. Gloviczki, AJ Comerota, MC Dalsing, BG Eklof, et.al.** The Care of patients with varicose veins and associated chronic venous diseases: Clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum. *J Vasc Surg*. 53:2S-48S, 2011.
5. **Robertson L, Evans C, Fowkes FG.** Epidemiology of chronic venous disease. *Phlebology*. 23(3):103-11, 2008.
6. **Beebe-Dimmer JL, Pfeifer JR, Engle JS, Schottenfeld D.** The epidemiology of chronic venous insufficiency and varicose veins. *Ann Epidemiol*. 2005 Mar;15(3):175-84.
7. **Denenberg JO, Criqui MH, Langer RD et al.** Risk Factors for Chronic Venous Disease: The San Diego Population Study. Under revision.
8. **CJ Evans, FG Fowkes, CV Ruckley and AJ Lee.** Prevalence of varicose veins and chronic venous insufficiency in men and women in the general population: Edinburgh Vein Study. *Journal of Epidemiology and Community Health*. 53:149-153, 1999.
9. **Preziosi P, Galan P, Aissa M, Hercberg S, Boccalon H.** Prevalence of venous insufficiency in French adults of the SUVIMAX cohort. *Supplémentation en Vitamines et Minéraux Antioxydants. Int Angiol*. 1999 Jun;18(2):171-5
10. **MH Criqui, M Jamosmos, A Fronek, JO Denenberg, et.al.** Chronic Venous Disease in an ethnically diverse population: The San Diego Population Study. *Am J Epidemiology*. 158(5):448-56, 2003.
11. **Arnost Fronek, MD, PhD, a Julie O. Denenberg, MA, B Michael, H. Criqui, MD, MPH, and Robert D. Langer, MD, MPH.** Quantified duplex augmentation in healthy subjects and patients with venous disease: San Diego population study.
12. **AN Nicolaides.** Investigation of Chronic Venous Insufficiency: A Consensus statement. *Circulation*. 2000;102:e126-e163.
13. **FHA Maffei, C Magaldi, S Z Pinho, S Lastoria, W Pinho, W B Yoshida And H A Rollo.** Varicose Veins and Chronic Venous Insufficiency in Brazil: Prevalence among 1755 Inhabitants of a Country Town. 15(2):210-17, 1986.
14. **McLafferty RB, Passman MA, Caprini JA, Rooke TW, Markwell SA, Lohr JM, et al.** Increasing awareness about venous disease: the American Venous Forum expands the national venous screening program. *J Vasc Surg* 2008;48:394-9.
15. **Rabe E, Pannier F.** Epidemiology of chronic venous disorders. In: Gloviczki P, editor. *Handbook of venous disorders: guidelines of the American Venous Forum*. 3rd ed. London: Hodder Arnold; 2009, p. 105-10.
16. **Rabe, E.** Identifying and accessing patients with chronic venous disease: the large-scale VCP International Study. *Medicographia*. 33(3):321-24, 2011.
17. **Rabe, E.** Epidemiology of severe stages of chronic venous insufficiency in the Bonn Vein Study. *Phlebology*. 2007.
18. **O'Donnell TF Jr, Passman MA, Marston WA, Ennis WJ, Dalsing M, Kistner RL, Lurie F, Henke PK, Gloviczki ML, Eklöf BG, Stoughton J, Raju S, Shortell CK, Raffetto JD, Partsch H, Pounds LC, Cummings ME, Gillespie DL, McLafferty RB, Murad MH, Wakefield TW, Gloviczki P, Society for Vascular Surgery, American Venous Forum.** Management of venous leg ulcers: clinical practice guidelines of the Society for Vascular Surgery® and the American Venous Forum. *J Vasc Surg*. 2014;60(2 Suppl):3S. Epub 2014 Jun 25.
19. **Adam D J, Naik J, Hartshorne T, Bello M, London N JM.** The diagnosis and management of 689 chronic leg ulcers in a single-visit assessment clinic. *Eur J Vasc Endovasc Surg*. 2003;25:462-468.

Appendix A : Southern Tagalog Venous Insufficiency Questionnaire

Sir/Ma'am,

May we ask three (3) minutes of your time to answer the following questionnaire. Your response in this survey will help us determine the extent of this problem in our country. Thank you.

Kung maaari lang po ay makahingi kami ng tatlong (3) minuto ng inyong panahon para masagutan po ninyo ang ilang katanungan. Ang inyo pong mga kasagutan ay makakatulong po upang malaman natin ang kalawakan ng problemang ito sa ating bansa. Maraming salamat po.

Please encircle your response to the following questions:

Pakibilugan po ang inyong kasagutan:

1. Do you experience a sensation of heaviness on your legs during prolonged standing
Nakakaramdam ka ba ng pamimigat ng binti sa tuwing tatayo ng matagal?

Yes / Oo

No / Hindi

If you answered "No", please proceed to Question # 3.

Kung ang sagot nyo po ay "Hindi", dumiretso na po tayo sa pangatlong tanong (Tanong # 3).

2. Is the leg heaviness relieved by leg elevation?
Nawawala ba ang pamimigat ng binti sa tuwing itataas ang binti?

Yes / Oo

No / Hindi

3. Are there visible veins on your legs (just like those in the pictures below)?
May kapunapuna bang mga ugat sa inyong binti (katulad ng mga nakalarawan sa ibaba)?

Yes / Oo

No / Hindi

Appendix B. Picture guide on the CEAP classification of chronic venous disease

