

**A clinico-epidemiological study of cutaneous manifestation in chronic venous insufficiency among security personnel: A cross-sectional study**

<sup>1</sup>Dr Smruthi B Prakash, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

<sup>2</sup>Dr Girish P N, Head of the Department, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

<sup>3</sup>Dr Ashna Ashraf, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

<sup>4</sup>Dr Anirudh H Shetty, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

<sup>5</sup>Dr Nehla Amir, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

<sup>6</sup>Dr Maria Ansari, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

**Corresponding Author:** Dr Smruthi B Prakash, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India.

**How to citation this article:** Dr Smruthi B Prakash, Dr Girish P N, Dr Ashna Ashraf, Dr Anirudh H Shetty, Dr Nehla Amir, Dr Maria Ansari, “A clinico-epidemiological study of cutaneous manifestation in chronic venous insufficiency among security personnel : A cross-sectional study”, IJMACR- February - 2024, Volume – 7, Issue - 1, P. No. 33 – 40.

**Open Access Article:** © 2024, Dr Smruthi B Prakash, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

**Abstract**

**Introduction:** Chronic venous insufficiency (CVI) is a condition characterized by impaired venous return, often due to venous valve incompetence or obstruction, leading to inadequate blood flow from the lower extremities back to the heart. Prolonged working in a standing position increases the prevalence of chronic venous insufficiency and is an important occupational

risk factor. This chronic condition can significantly impact an individual's quality of life, affecting mobility and predisposing them to complications.

**Objectives:** To determine the prevalence, epidemiology, risk factors and cutaneous manifestation in chronic venous insufficiency among security personnel.

**Methods:** This is a cross sectional study of 78 security personnel conducted over a period of two months from

April 2023 to May 2023 in our hospital AJ Institute of Medical Sciences and Research Centre, Mangalore.

**Inclusion criteria:** All the security personnel above the age of 20 years were considered.

**Exclusion criteria:** Pregnant woman, patients with lymphedema, congestive heart failure, static foot disorders like flat foot or hollow foot.

**Results:** The final analysis included 78 security personnel. Among them the prevalence of cutaneous manifestation in CVI was 43.6%. Advancing age, prolonged standing and smoking are found to be significant risk factors. The commonest skin finding in present study is edema (20.5%) followed by eczema (7.7%). Venous Clinical Severity Score (VCSS) of the patient ranged from 1-14 with a mean of 0.79 and Standard deviation of 1.875. The mean Dermatology Life Quality Index (DLQI) was 8.12 with SD of 4.368. Strong positive correlation was found between DLQI and VCSS ( $p=0.002$ ).

**Conclusion:** This cross sectional study underscores the significant impact of chronic venous insufficiency (CVI) on the cutaneous health of security personnel. By identifying key environmental risk factors, we emphasize the importance of early recognition and targeted interventions to address CVI-related skin issues in this occupational group.

**Keywords:** Chronic venous insufficiency (CVI), venous clinical severity score (VCSS), Dermatology Life Quality Index (DLQI)

### **Introduction**

Chronic Venous Insufficiency (CVI) is a condition characterised by impaired blood circulation in the lower extremities leading to various pathologies, including oedema, pain, skin changes, and ulcerations (1). Varicose veins account for about 75% of all chronic leg

ulcers. At least 1 % of general population gets affected by venous ulcers during their lifetime and results in considerable morbidity, affecting the quality of life in these patients. The cutaneous manifestation of the disease is often overlooked by healthcare-professionals because of its complexity in clinical presentation.

Venous pathology occurs when venous pressure is increased and return of blood is impaired through several mechanisms. This may be due to valvular incompetence leading to retrograde flow of blood called as reflux or venous obstruction, or a combination of these two mechanisms.

Incompetency of valves and hence reflux serves to increase the hydrostatic pressure in veins of lower limb. Incompetency of valves in superficial veins is due to pre-existing weakness in the vessel wall or valve or secondary to direct injury, superficial phlebitis, or hormonal effects or high pressure leading to distension of vessel wall (2). The damage to the valves of deep veins because of previous deep venous thrombosis causes dysfunction of valves in deeper veins. Reflux leads to backflow of blood from deep veins to superficial veins causing venous hypertension, hence leading to varicosity and cutaneous manifestations. Obstruction of the veins limits the outflow of blood resulting in venous hypertension and its complications.

As a result of these causes, continuous venous hypertension occurs which results in distension in the capillary vessel walls and leakage of macromolecules such as fibrinogen from capillaries into the dermis, subcutaneous tissue, and nail bed. Leaked fibrinogen forms pericapillary fibrin plugs hindering fibrin/oxygen diffusion, which causes cell death and disruption of tissue integrity. According to another view, increased venous pressure causes a decrease in the pressure

difference between arterial and venous systems, and reduced flow in the capillaries causes erythrocyte aggregation and leukocyte clustering, which results in tissue ischemia and tissue damage due to the proteolytic enzymes that are released (3).

Risk factors include advancing age (usually presents in fifth decade of life), female population, subjects with mutations in mutations in FOXC2 gene, NOTCH 3 gene, TGF $\beta$ -2 receptor gene, BMI > 25, occupation involving prolonged sitting or prolonged standing, sedentary lifestyle with lack of exercise, pregnancy, smoking, diabetes and atherosclerosis. In India it commonly affects people belonging to low socioeconomic groups and in occupations requiring prolonged standing. Aetiology of the disease is not completely understood. Occupational risk factors and complications pertaining to the disease is not well known and there are very few studies done on this (4).

Cutaneous manifestations include hyperpigmentation (common in the gaiter zone), stasis eczema (characterized by erythematous, scaly, and pruritic papules and plaques), lipodermatosclerosis, atrophic Blanche (porcelain white plaque with surrounding telangiectasia and hyperpigmentation).

It has been identified as one of the prevalent health concerns among security personnel and hence this study was done in a tertiary care set up of our hospital in Mangalore, Karnataka, India.

### **Aims and Objectives**

To determine the prevalence, epidemiology, risk factors and cutaneous manifestation in chronic venous insufficiency among security personnel above the age of 20 years.

### **Methods and Materials**

**Study design:** Cross sectional, observational study

**Study duration:** April 2023 to June 2023.

**Source of data:** This is a field study. All security personnel in our tertiary care centre, AJ Institute of Medical Sciences and Research Centre were randomly selected for the study. Institutional ethics committee permission was obtained prior to the start of the study and written informed consent was obtained from all the patients.

**Sample size:** 78

**Inclusion criteria:** All the security personnel above the age of 20 years were considered.

**Exclusion criteria:** Pregnant woman, Patients with Lymphedema, congestive heart failure, static foot disorders like flat foot or hollow foot.

**Description of the process:** The subjects were approached and interviewed in person. History regarding the duration and progression of the disease, type of work, working hours, job experience, exercise activity, cigarette smoking, alcohol intake, number of pregnancies, abortion, fetal loss, BMI, history of past venous disease, family history of venous disease were recorded.

Subjects were asked about the nature of their work and it was categorised into three groups.

- 1) Occupation with prolonged sitting
- 2) Occupation with prolonged standing
- 3) Actively moving subjects

Subjects were enquired about their working hours and classified into two groups.

- 1) Subjects working for < 8 hours
- 2) Subjects working for > 8 hours

Participants were surveyed regarding their physical activity, and their responses were used to categorize them into two groups.

- 1) Subjects with exercise activity of less than one session per week of atleast 15min duration.
- 2) Subjects with exercise activity of atleast one session per week of atleast 15min duration.

Participants were interviewed about lifestyle habits like alcohol and smoking. They were further grouped into two categories:

- 1) Smoking history of atleast 1 year
- 2) Smoking history of less than 1 year

Female patients were surveyed about marital status, pregnancies (including first-trimester abortions and fetal demise).

### Venous data collection

Participants were questioned about venous symptoms like leg heaviness, pain, edema, pigmentation, and ulcers, with the data entered into a standardized questionnaire. Past venous disease history and treatments received were documented. Initial clinical examination was conducted in a seated position, followed by assessment while standing to identify varicose veins.

Clinical examination of the patient was done and clinical classification of CEAP was considered (5).

Table 1: CEAP Classification

Clinical Classification ( C )	Etiological classification ( E )
C0 = No visible or palpable signs of venous disease	Ec = Congenital
C1 = Telangiectasia or reticular veins	Ep= Primary
C2 = Varicose veins	Es = secondary
C3 = Oedema	En = no venous aetiology identified
C4a = Pigmentation and / or eczema	<b>Anatomic Classification</b>
C4b = Lipodermatosclerosis and/or atrophie blanche	As = Superficial veins
C5 = Healed venous ulcer	Ap = Perforator veins
C6 = Active venous ulcer	Ad = Deep veins
	An = no venous location identified
	<b>Pathologic Classification</b>
	Pr = Reflux
	Po = Obstruction
	Pr, o = Reflux and obstruction
	Pn = no venous pathology identified

### Venous clinical severity score (VCSS) (6)

Venous clinical severity score is used to measure the severity of the disease. VCSS is a dynamic scoring system consisting of 10 components with 30 point

maximum score. It includes pain, varicose vein, edema, pigmentation, inflammation, induration, ulcer size, number of ulcers, duration of ulcer and use of stockings which are graded from zero, one, two, three corresponding to absent, mild, moderate and severe respectively. The VCSS has been evaluated in clinical practice and validated as an important instrument for longitudinal research to assess outcomes after treatment with low variability.

### Dermatology Life Quality Index (DLQI) (7)

DLQI, developed by A.Y. Finlay and G.K. Khan in the year 1994, is considered the first specific assessment instrument of QoL in dermatology. It comprises a 10-item questionnaire that covers seven domains: symptoms, feelings, daily activities, leisure items, work and school, personal relationship, treatment. Skin disorders have a detrimental effect on the quality of life of patients. This psychosocial aspect of skin disease needs to be addressed for optimal management of patients. The DLQI is estimated by totaling up the outcomes of each question, giving rise to a maximum score of 30 and a minimum score of 0, with the score being directly correlating with the impairment.

### Statistical analysis

Collected data was summarised by frequency, percentage, mean and s.d

Comparison was performed using chi square test and Fishers exact test. Analysis was performed using SPSS 23 software P value less than 0.05 was considered to be statistically significant.

### Results

The final analysis included 78 security personnel. Majority of the subjects belonged to the age group of 30-39 years (43.6%).

Table 2: Age distribution

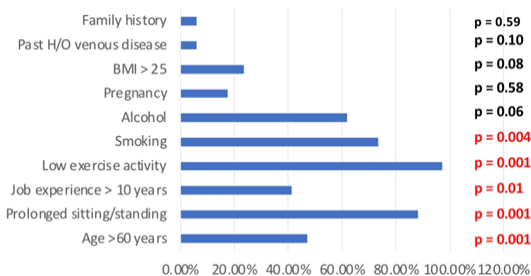
Age	Number of patients (n=78)	Percentage (%)
20-29	13	16.7
30-39	34	43.6
49-49	13	16.7
50-59	10	13
Above 60	8	10

Table 3: Gender Distribution

Sex	Number of patients (n=78)	Percentage (%)
Male	59	75.6
Female	19	24.4

Majority of patients in our study belonged to male group (75.6%).

Figure 1: Risk factor distribution



History of smoking, low exercise activity, subjects working in the same job for more than 10years, work activity requiring prolonged standing/ sitting and advancing age were found to be significant risk factors in the occurrence of the disease.

Table 4: Prevalence of skin changes

Skin changes	N=78	%
1) No visible changes	44	56.4
2) Reticular and varicose veins	9	11.6
3) Pigmentation	6	7.7
4) Induration and white atrophy	2	2.56
5) Erosions / ulcers	1	1
6) Scars	0	0
7) Oedema	16	20.51

The commonest skin changes in our subject was edema (20.51%) followed by reticular and varicose veins

(11.6%). 56.64% of the subjects showed no visible skin changes.

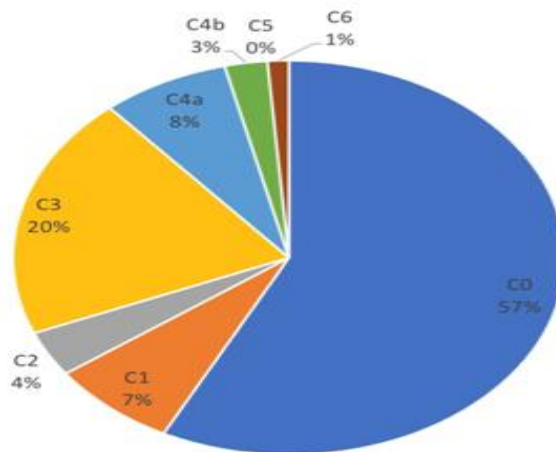


Figure 2: CEAP Classification

Majority of the subjects with CVI belonged to C3 ( 20%) stage of CEAP classification, followed by C4a (8%).

VCSS Score

Venous Clinical Severity Score (VCSS) of the patient ranged from 1-14with a mean of 0.79 and Standard deviation of 1.875.

DLQI

Mean value of Dermatology Life Quality Index (DLQI) was 8.12 with SD of 4.368.

Majority of the affected patients (53%) had moderate effect on quality of life which impacted their work life and clothing preferences.

26.47% of patients had very large effect on quality of life which disrupted their work routine completely.

Strong positive correlation was found between DLQI and VCSS (p=0.002).



Figure 3: Stasis eczema and varicosities



Figure 4: Stasis Eczema



Figure 5: Atrophic Blanche



Figure 6: Active venous ulcer over medial malleolus

### Discussion

Chronic venous insufficiency is a venous disease that occurs due to damage to veins of lower limb. Varicose veins account for about 75% of all chronic leg ulcers.

Once developed, there is no spontaneous recovery, and symptoms are exacerbated in proportion to disease duration. Therefore, varicose veins should be treated actively in their early phases. More importantly, their risk factors should be counteracted before the symptoms appear.

In a study conducted by Vijay Shankar et al, 85% of the patients with the disease were above the age of 50 years. Majority of the patients in our study belonged to the age group of 31-40 years (8). However the occurrence of disease was most commonly seen in patients above the age of 60 years.

In a study conducted by Myeong ja yun in korea on prevalence and risk factors for varicose veins in nurses working at a hospital, increasing age, prolonged working hours, pregnancy and delivery were the risk factors attributed to the condition (9). In another study conducted by Vijay Shankar et al, prolonged standing or sitting and lack of exercise were the contributing risk

factors for the occurrence of the disease (8). Risk factors contributing to the occurrence of the disease in our study included advancing age, prolonged sitting or standing, low exercise activity, and smoking.

The significance of the risk factors like gender distribution, alcohol, obesity, pregnancy, family history of thromboembolic disorder could not be established in our study.

In a study conducted by Fadime in turkey, the commonest skin finding was varicose veins followed by stasis dermatitis (10). The commonest skin finding in present study is edema (20.5%) followed by eczema (7.7%).

It is clear that cutaneous manifestations of CVI are influenced by various occupational, life style habits and environmental risk factors. Hence strategies aimed at awareness and promoting a healthy life style with precautions at the work place will go a long way in reducing the incidence and the prevalence of the disease.

### **Limitations**

- 1) Follow-up of the patients with cutaneous manifestations in CVI was not done since our study is one time cross-sectional study.
- 2) Required investigations like USG Doppler of lower limbs was not done since our study was a field study.

### **Conclusion**

This cross-sectional study conducted revealed a notable correlation between various risk factors and chronic venous disease. Our research validates the importance of various environmental risk factors, occupation and life style habits in the development of cutaneous symptoms in CVI. A diverse array of disease presentation was noted with edema and eczema being the most common. This study sheds light on identifying the risk factors for early

detection, prevention, and effective management of patients with cutaneous manifestations in CVI.

### **Acknowledgement**

We acknowledge the valuable contributions of Dr Maria Ansari and Dr Nehla Amir for their insightful feedback and guidance throughout the study.

### **References**

1. 'Book Reviews', Annals of the Royal College of Surgeons of England, 93/2 (published online 1 Mar. 2011) < <https://doi.org/10.1308%2F003588411X561062> > accessed 13 Feb. 2024, 176-180.
2. Nicholls, S. C., 'Sequelae of Untreated Venous Insufficiency', Seminars in Interventional Radiology, 22/03 (n.d.) < <https://doi.org/10.1055/s-2005-921960> > accessed 13 Feb. 2024, 162-168.
3. Kulac, M et al., 'Venous Insufficiency in Patients with Toenail Onychomycosis', Journal of Ultrasound in Medicine. 24/8 (n.d.) < <https://doi.org/10.7863/jum.2005.24.8.1085> > accessed 13 Feb. 2024, 1085-1089.
4. Joseph, N et al., 'A Multicenter Review of Epidemiology and Management of Varicose Veins for National Guidance', Annals of Medicine & Surgery. 8 (n.d.) < <https://doi.org/10.1016%2Fj.amsu.2016.04.024> > accessed 13 Feb. 2024, 21-27.
5. Eklöf, B et al., 'Revision of the CeaP Classification for Chronic Venous Disorders: Consensus Statement', Journal of Vascular Surgery. 40/6 (n.d.) < <https://doi.org/10.1016/j.jvs.2004.09.027> > accessed 13 Feb. 2024, 1248-1252.
6. Rutherford, R. B et al., 'Venous Severity Scoring: An Adjunct to Venous Outcome Assessment', Journal of Vascular Surgery. 31/6

(n.d.) < <https://doi.org/10.1067/mva.2000.107094> >  
accessed 13 Feb. 2024, 1307-1312.

7. Finlay AY and Khan GK. Dermatology Life Quality Index (DLQI): a simple practical measure for routine clinical use. < <https://doi.org/10.1111/j.1365-2230.1994.tb01167> > accessed 13 Feb. 2024.
8. Shankar, S. V, V. N. S. A. Shariff, and S. Nirmala, 'Clinico-epidemiological Study of Stasis Eczema', International Journal of Research in Medical Sciences, 5/9 (published online 26 Aug. 2017) < <https://doi.org/10.18203/2320-6012.ijrms20173955> > accessed 13 Feb. 2024, 3921.
9. Yun, M et al., 'A Study on Prevalence and Risk Factors for Varicose Veins in Nurses at a University Hospital', Safety and Health at Work. 9/1 (n.d.) < <https://doi.org/10.1016%2Fj.shaw.2017.08.005> > accessed 13 Feb. 2024, 79-83.
10. Kılınc, F et al., 'Cutaneous Findings in Patients with Chronic Venous Insufficiency', Journal of Cosmetic Dermatology. 21/5(n.d.) < <https://doi.org/10.1111/jocd.14337> > accessed 13 Feb. 2024, 2106-2112.