

Frequency of Varicose Veins in Otherwise Physically Fit Male Candidates Reporting for Military Recruitment: A Pilot Study

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ABSTRACT

Objective: To evaluate the spectrum of varicose veins and superficial venous reflux among candidates who were being evaluated for medical fitness.

Study Design: Cross sectional study.

Place and Duration of Study: Department of Vascular Surgery Combined Military Hospital, Lahore Pakistan, from Jun to Sep 2021.

Methodology: One hundred and one males underwent assessment of lower limbs varicose veins as a part of medical examination for recruitment. Along with demographic assessment, they were examined for varicose veins followed by hand held Doppler and ultrasound Doppler assessment for varicosities and reflux at sapheno femoral and sapheno popliteal junction. Reflux more than 0.5 seconds was considered noteworthy.

Results: A total of 101 male candidates were included in the our study. The mean age of candidates was 19.9±1.75 years. The majority of patient were with C2 disease according to Clinical, Etiological, Anatomical, and Pathophysiological (CEAP) classification 61(66.3%). Reflux at sapheno femoral junction detected by duplex scan was seen in 15(14.85%) of the candidates out of which 11(10.89%) had C2 disease. Chi-square test yielded a statistically significant relationship between the distribution of varicose vein along the length of saphenous vein and the grade of varicose vein according to CEAP classification ($p<0.001$).

Conclusion: There was a statistically significant relationship between the size of varicosity according to CEAP classification and saphenofemoral junction competency, and the distribution of varicose veins along the length of the saphenous vein with the grade of varicose vein according to CEAP classification.

Keywords: Chronic Venous Disease, Doppler, Military Medicine, Saphenofemoral Junction, Varicose Veins, Varicosities.

How to Cite This Article: Bhatti AM, Arif A, Hamza A, Sheikh N, Riaz B, Ahmed Y. Frequency of Varicose Veins in Otherwise Physically Fit Male Candidates Reporting for Military Recruitment: A Pilot Study. *Pak Armed Forces Med J* 2026; 76(Suppl-7): S1032-S1036.

DOI: <https://doi.org/10.51253/pafmj.v76iSUPPL-7.8512>

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INTRODUCTION

Chronic venous diseases (CVD) are a leading cause of morbidity and have a significant financial impact.¹ It is estimated that cost of managing CVD is around \$3 billion in the USA.² It is therefore imperative that this problem should be picked up early in its course and treated appropriately.

Most varicose veins are primary, and only a minority are secondary to conditions such as deep vein thrombosis and occlusion, pelvic tumours, or arteriovenous fistulae.³ Family history, older age, female, pregnancy, obesity, standing occupations, and a history of previous deep venous thrombosis are the predominant risk factors for varicose veins.³

The prevalence of varicose veins increases with age. The overall prevalence of varicose veins in the western world has been estimated at 30% in women and 15% in men.³ For age group 30 years or younger,

the prevalence has been assessed at 1% in males and 10% in females, and for 70 years or older individuals it is 57% for men and 77% in women.⁴ In Pakistan, the prevalence of varicose veins is estimated to be around 36.4% in men and 33% in women.⁵

In the armed forces, a critical evaluation of medical fitness of personnel before their induction is essential because of the potential health issues they pose in future. Furthermore, the physically demanding lifestyle of the armed forces can aggravate these illnesses, leading to long-term consequences. Therefore, every candidate wishing to join armed forces undergoes a thorough medical examination for any significant and potentially disabling abnormalities including varicose veins. Since 'varicose veins can range from minor abnormalities like spider veins and telangiectasias to gross varicose veins with skin changes. In this study, we aimed to investigate spectrum of varicose veins and superficial venous reflux among candidates who are being evaluated for medical fitness.

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Received: 09 Apr 2022; revision received: 08 Jan 2023; accepted: 16 Oct 2023

METHODOLOGY

This pilot observational study was done at the Department of Vascular Surgery Combined Military Hospital Lahore, Pakistan. The study was conducted from June to September 2021 after getting IRB approval from the Institutional Ethical Review Committee (No 333/2021).

Inclusion Criteria: All male candidates between the ages of 16 and 25 year, who were being recruited into the armed forces and referred to the Department of Vascular Surgery for assessment of lower limbs varicose veins as a part of medical examination from various recruitment centres were included.

Exclusion Criteria: Candidates with previous intervention for varicose veins were excluded.

After obtaining informed consent, non-probability consecutive sampling was used to collect data. The candidates were examined according to the method described in the Edinburgh Vein Study.⁶ The clinical severity of the varicose disease was assigned according to CEAP staging as shown in Table-I.⁷ The size and distribution of varicosities, as well as skin abnormalities, was also noted. After that, all of the patients had assessment of reflux at saphenofemoral junction (SFJ) and saphenopopliteal junction (SPF) using hand held doppler. They were then subjected to a duplex ultrasound (DU) scan using 8 MHz probe (GE F7 scanner, General Electric USA), to assess size of long saphenous vein (LSV) and short saphenous vein at two points. Incompetence at the Saphenofemoral junction (SFJ) and saphenopopliteal junction (SPJ) was also assessed. Each evaluation was accompanied by a form that included demographic information, relevant clinical data, and duplex ultrasound scan findings, such as the size of the LSV at three locations and reflux at the saphenofemoral junction. Venous reflux was assessed with candidates in standing position. One of the assistants rapidly squeezed and then released the calf to mimic that standard method used in the Edinburgh Vein study.⁸ Two readings for reflux were taken, and their mean was calculated. Reflux more than 0.5 seconds was taken as suggestive of clinical implications. All exams of the current study were interpreted by a single experienced observer. Data were entered in Statistical Package for Social Sciences (SPSS) version 17 for in-depth analysis. Quantitative data was presented as mean and standard deviation, whereas qualitative data was presented as frequencies and percentages. Chi square test was applied to check

for association between variables. A p -value ≤ 0.05 was considered statistically significant.

RESULTS

During June to September 2021, a total of 4940 of candidates were referred to surgical clinics of various specialties. A total of 101 male candidates were included in the our study. The mean age of candidates was 19.9 ± 1.75 years. Candidates mainly fell into C0, C1, and C2 of CEAP classification as reflected in Figure-1.

Table-I: Clinical (C), Etiological (E), Anatomical (A), and Pathophysiological (P) Classification of Venous Disorders (CEAP)

Classification stage	Clinical picture
C0	No visible or palpable signs of venous disease
C1	Telangiectasies or reticular veins
C2	Varicose veins; distinguished from reticular veins by a diameter of 3mm or more
C3	Edema
C4	Changes in skin and subcutaneous tissue secondary to CVD C4a: Pigmentation or eczema C4b: Lipodermatosclerosis or atrophie blanche
C5	Healed venous ulcer
C6	Active venous ulcer

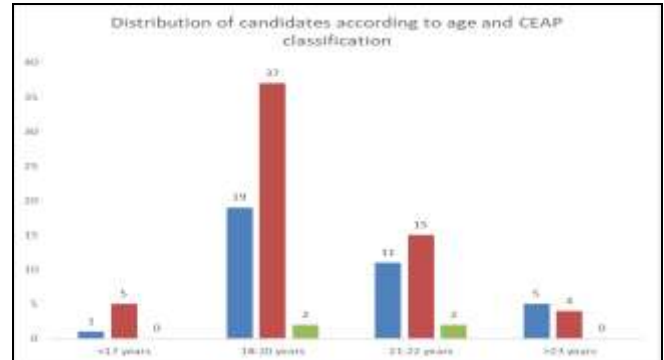


Figure-1: Distribution of Candidates according to Age Group and Clinical, Etiological, Anatomical, and Pathophysiological (CEAP) Staging (n=101)

On physical examination, no skin changes were observed in any candidate and the distribution of varicosities can be seen in Table-II. Of the candidates, 4 candidates (3.96%) had varicosities along the short saphenous vein, 18(17.82%) along the long saphenous vein, and 75 candidates (74.26%) had a non-specific distribution of varicosities or C1 disease. Chi-square test yielded a statistically significant association between the distribution of varicose vein along the length of saphenous vein and the grade of varicose vein according to CEAP classification ($p < 0.001$). Figure-2a shows a varicose vein along the distribution of LSV. Figure-2b shows a varicose vein with lateral atypical distribution.

Frequency of Varicose Veins

Table-II: Distribution of varicosities in patients classified under Clinical Etiological Anatomical Pathophysiological (CEAP) staging (n=101)

Distribution	C0 n(%)	C1 n(%)	C2 n(%)	p-value
No vein involved	4(3.96)	--	--	<0.001
Along short saphenous vein	0(0)	01(0.99)	03(02.97)	
Along long saphenous vein	0(0)	05(04.95)	13(12.87)	
Non-specific location	0(0)	55(54.46)	20(19.80)	



Figure-2a: Left Varicose Vein along the Distribution of Long Saphenous Vein

Table-III reflects the findings of reflux observed with hand-held doppler and the reflux measured at saphenofemoral junction as assessed with the duplex scanner. Fifteen candidates (14.85%) had incompetent SFJ on hand held doppler examination, and 11 candidates (10.89%) had an incompetence at saphenofemoral junction with reflux more than 0.5 sec. The additional four candidates found to have reflux on HHD but not on duplex had shorter reflux time (less

than 0.5 sec). The diameter of the long saphenous vein was measured at origin (4.42 ± 1.42 mm), at mid-thigh (2.37 ± 0.83 mm), below the knee (2.01 ± 0.82 mm) of all the candidates. The diameter of the short saphenous vein was measured at the popliteal fossa on duplex examination was 3.53 ± 1.7 mm and on midcalf was 3.06 ± 3.34 mm of all the candidates. The relationship between reflux at SFJ and the grade of varicose vein according to CEAP classification, the test yielded a significant relationship ($p=0.004$). between the grade of varicose vein according to CEAP classification and SFJ competency also yielded a significant relationship ($p=0.024$).



Figure-2b: Atypical Distribution of Varicose Vein in the Lateral aspect of the Leg

Table-III: Diagnostic Findings on Examination (n=101)

		C0 n(%)	C1 n(%)	C2 n(%)	p-value
Reflux at SFJ with hand held doppler	Absent	04(03.96)	57(56.43)	25(24.75)	0.004
	Present	0(0)	04(03.96)	11(10.89)	
Reflux at SFJ with duplex scanner (reflux >0.5 sec)	Absent	04(03.96)	58(57.43)	28(27.72)	0.024
	Present	0(0)	03(02.97)	08(07.92)	

* SFJ: Saphenofemoral Junction

DISCUSSION

Varicose veins are an underestimated public health problem which are not given their due attention. In the global adult population, venous disease of the lower limb is predicted to affect 40 to 50% of men and 50 to 55% of women. Visible varicose veins are found in 10 to 15% of males and 20 to 25% of females. Prevalence of chronic venous insufficiency defined as CEAP of 3 or more is estimated to be around 7-9% in the general population.⁸ The health implications of varicosities range from the complaint of leg pain, burning sensation, cramps, swelling, throbbing, itching, pigmentations, ecchymosis, and ulcers in the affected limb as reported in a study.⁹ All of these affect the quality of life of the patient, rendering them incapable of performing daily life activities.¹⁰ The economic burden of treating these disorders is huge and was evaluated by a study in Hungary at 3.89 million USD and around 3 billion USD in USA.¹¹

Our study was a pilot study that investigated physical and ultrasound abnormalities in otherwise healthy young males applying for recruitment in armed forces and who were suspected to have varicose veins on initial medical examination. We could not find any similar study to compare to. Our study determined that 75 candidates (74.26%) had non-specific involvement with regards to the presence of varicosities, this finding is supported by a slightly lower number in a study done in Bahawalpur, Pakistan which reported the figure at 66.67%.¹² However, it should be kept in mind that our study population was healthy male adults while the study population of the research being referenced was individuals diagnosed with venous disease. Our study found that 15 candidates (14.85%) had reflux at the saphenofemoral junction on evaluation with a handheld doppler. This finding is supported by an international study where they examined the limbs of 100 consecutive patients referred for routine evaluation, 11 candidates (11%) of which were determined to have reflux.⁹ In another study, Stanek *et al.*, found that reflux was present in 14% in asymptomatic people.¹³ In an Indian study, the incidence of superficial reflux was around 14%. This study also supports our findings of a correlation between SFJ reflux and the size of varicosity according to CEAP classification.¹⁴ Our study found that 10.89% had saphenofemoral junction incompetence, this finding is however not supported by a past study done in Rawalpindi, Pakistan where the figure for

incompetence was found to be 35.9% (n=46).¹⁵ A study from Nepal, however, supported our findings with a relatively lower figure at 21% (128 of 598 limbs examined).¹⁶ The presence of isolated spider or reticular veins may not be an indicator of progression into more advanced varicose veins or chronic venous insufficiency, the presence of varicose veins and reflux do predict that the disease may progress with time. It has been shown in the Edinburgh Vein Study that the presence of varicose veins and superficial venous reflux is an indicator of progression of varicose veins.^{6,17} Therefore, candidates who have clear varicosities or reflux are at a risk of progression during the course of time at a rate of almost 1% per year.^{17,18}

We also found that hand held doppler can be an effective instrument to be used in clinic to detect reflux. It can detect shorter reflux as well. It can be used as an initial screening tool for patients suspected of venous disease.

Our study findings showed that of the 101 candidates that were evaluated, only 15 candidates had varicosities needing medical attention. Most candidates had neither clear varicose veins, nor had reflux. Therefore, their referral to the tertiary care centre was unnecessary. The reason could be a lack of clear instructions and standards for varicose veins. Venous disease can range from isolated telangiectasias to gross varicose veins with venous ulcerations. We need to have a clear idea which candidates who are going to progress during their military tenure. Spider veins are very common and the incidence can be as high as 80%, and they need not to be referred to the specialists. In addition, we need to standardize the way reflux is measured. In this study we used the method described in the Edinburgh vein study, which has been described earlier, but the radiologists generally use Valsalva maneuver while the patient is lying in the supine position.¹⁷ This may lead to errors or non-standardization. Therefore, if a duplex scan is required for the purpose of medical examination, it should be a standardized exam.

LIMITATION OF STUDY

Our study is not without its limitations and warrants improvements. The study evaluated the candidates at a single tertiary care center and reported on systemic issues from a single center point of view. We only assessed reflux at saphenofemoral and junction. Future studies can assess whole long saphenous vein, the short saphenous veins and the deep veins as well, and should take into account the experience and findings of other centers and may add a

longitudinal arm as well to follow-up those who have been selected in armed forces.

CONCLUSION

In conclusion, there was a statistically significant relationship between the size of varicosity according to CEAP classification and saphenofemoral junction competency. There was also a statistically significant relationship between the distribution of varicose veins along the length of the saphenous vein and the grade of varicose vein according to CEAP classification. The study also found that only 15 of the 101 candidates had varicosities that warranted specialist attention.

ACKNOWLEDGMENT

Ammad Asim for his continuous and exceptional technical support.

Conflict of Interest: None.

Funding Source: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

AMB & AA: Data acquisition, data analysis, critical review, approval of the final version to be published.

AH & NS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

BR & YA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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