A Study of Demographic Factors and Clinical Profile of Varicose Veins in Adults

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ABSTRACT

BACKGROUND
Varicose veins in lower limbs cause a lot of morbidity in humans and a significant financial burden on the health care system. Varicose veins do not threaten life and are seldom disabling. A high prevalence of varicose veins has been documented in India. Hence, we decided to conduct a study on the demographic factors and clinical profile of varicose veins in adults.

METHODS
It is an observational study. 200 patients aged>12 years with varicose veins of the lower limbs were studied. Statistical Analysis was performed with help of Epi Info (TM) 7.2.2.2.

RESULTS
200 patients were studied, of whom 87.5 % were aged ≥ 35 Years; 74.5 % were males, 25.5 % were females; 70.0 % had normal BMI, 75.9 % were from the urban area, 11.5 % had a family history of varicose veins, 10.5 % had addictions, 57.0 % had a duration of standing >5 hours. 62.0 % were examined at OPD, 82.5 % were unilateral and 17.5 % bilateral. The heights of the patients were significantly higher than the normal height of average Indians. The most common symptoms were varicosities and pain present in 80.85 % and 71.49 % of cases respectively. Out of 235 lower limbs, 48.93 % had the involvement of only GSV, 18.72 % only SSV, 32.35 % both; incompetent saphenofemoral junction was present in 67.24 % clinically and 74.89 % radiologically; 150 mid-thigh, 62 above-knee, 55 below-knee, 106 calf, 72 ankle perforators were incompetent clinically; 165 mid-thigh, 80 above-knee, 65 below-knee, 118 calf, 95 ankle perforators were incompetent radiologically; 65 (27.66 %) belonged to C2 class, 60 (25.53 %) to C4 class and 60 (25.53 %) to C6 class.

CONCLUSIONS
Age > 35 years, male gender, tall height, and prolonged standing are associated with increased risk of varicose veins whereas obesity, family history and addictions do not have any association. Varicose veins are more commonly unilateral with the involvement of a great saphenous vein. Colour Doppler is better at detecting incompetent perforators compared to clinical assessment.

KEYWORDS
Varicose veins, Lower Limbs, Saphenofemoral Junction, Perforators

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BACKGROUND

The term varicose is derived from the Latin word ‘varix’ meaning ‘bent’. The varicose limb which has lost its valvular efficiency as a product of the resultant venous hypertension in a standing position becomes dilated, tortuous, elongated and thickened. Varicose veins are known from antiquity since Hippocrates. World Health Organization has defined primary varicose veins as “saccular or cylindrical widened superficial veins where the widening may be circumscribed or segmental.”[1] Visible, dilated, tortuous and elongated/prominent subcutaneous lower limb veins have been considered pathological and the description has been used to define superficial venous incompetence in many epidemiological studies of larger populations,[2-5] where detailed ultrasound examination of vein trunks has been difficult and possibly too time-consuming to perform.

Varicose veins of the lower limb are the most common vascular disorder affecting human beings. It’s almost certainly the price we pay for the two-legged erect posture. Delicate valves that evolved through thousands of years of ambulation on four legs are unable to bear the increased gravitational pressure in a two-legged upright posture. Though we have achieved cures for various diseases, till now no reliable cure has been found for venous insufficiency. Surgery has been the gold standard for treating chronic venous insufficiency.

The challenge for the surgeon dealing with varicose veins has always been balancing a cosmetically acceptable result with a low incidence of recurrence and complications.

Increasingly well-informed patients who pressurize the treating surgeon for cosmetically acceptable results in conjunction with the expansion of minimally invasive techniques have made the treatment of superficial venous reflux and varicose veins a rapidly evolving field. Varicosties in the lower limbs are one of the most significant conditions of the venous system.

The epidemiological factors and clinical profile of patients with varicose veins have been a focus of some recent studies. To the best of our knowledge, the demographic and clinical profile of the patients with varicose veins is not fully elucidated.

Hence, we decided to perform a study on the epidemiology and clinical profile of patients with a varicose vein in the lower limbs.

METHODS

After taking approval from the Institutional Ethics Committee, the study was carried out in the Department of General Surgery, SSKM Hospital, Kolkata. It is a prospective observational study.

All patients with varicose veins of the lower extremity attending the OPD between January 2020 and June 2021 were included in the study.

Patients with cardiac disease and age <12 years were excluded. A total of 200 patients meeting the inclusion and exclusion criteria were considered.

RESULTS

| Age Group (In Years) | Number | %    |
|----------------------|--------|------|
| <20                  | 4      | 2.0  |
| 20-34                | 21     | 10.5 |
| 35-49                | 101    | 50.5 |
| 50-64                | 63     | 31.5 |
| >65                  | 11     | 5.5  |
| Total                | 200.0  | 100  |

| Sex                  | Number | %    |
|----------------------|--------|------|
| Female               | 51     | 25.5 |
| Male                 | 149    | 74.5 |

| Height               | Number | %    |
|----------------------|--------|------|
| Height (in cm)       |        |      |
| <165                 | 46     | 20.9 |
| >165                 | 103    | 69.1 |
| Total                | 149    | 100.0 |
| Male                 | 8      | 15.7 |
| Female               | 43     | 84.3 |

| BMI (IN KG/m2)       | Number | %    |
|----------------------|--------|------|
| BM1<18.5             | 101    | 50.5 |
| BM1=18.5-23.0        | 49     | 24.5 |
| BM1>23.0             | 50     | 25.0 |
| Underweight          | 4      | 2.0  |
| Normal               | 140    | 70.0 |
| Overweight           | 39     | 19.5 |

| Residence            | Number | %    |
|----------------------|--------|------|
| Rural                | 48     | 24.0 |
| Urban                | 152    | 76.0 |

| Occupation           | Number | %    |
|----------------------|--------|------|
| Housewife            | 40     | 20.0 |
| School Teacher       | 24     | 12.0 |
| Farmer               | 22     | 11.0 |
| Clerk                | 21     | 10.5 |
| Shopkeeper           | 20     | 10.0 |
| Roadside Vendor      | 19     | 9.5  |
| Bus conductor        | 18     | 9.0  |
| Daily Wage Labourer  | 14     | 7.0  |
| Sweeper              | 8      | 4.0  |
| Others               | 14     | 7.0  |

| Family History       | Number | %    | Z-Value | P-Value |
|----------------------|--------|------|---------|---------|
| Absent               | 177    | 88.5 | 0.64    | 0.52    |
| Total                | 200    | 100  |         |         |
| Addiction            | 179    | 99.5 | 0.58    | 0.56    |
| Present              | 21     | 10.5 |         |         |
| Average hours of standing per day | Number | %    | 2.12    | 0.034   |
| 1-5                  | 86     | 43.0 |
| 6-10                 | 114    | 57.0 |
| Place of Examination | Number | %    | 5.18    | <0.001  |
| Ipd                  | 76     | 38.0 |
| Odp                  | 124    | 62.0 |
| Left                 | 71     | 35.5 |
| Right                | 94     | 47.0 |
| Bilateral            | 35     | 17.5 |
| Duration of Disease  | Number | %    | 9.33    | <0.001  |
| <5                   | 56     | 28.0 |
| >=5                  | 144    | 72.0 |

Statistical Analysis

Data collected were entered in Microsoft Excel and Statistical Analysis was performed with help of Epi Info (TM) 7.2.2 EPI INFO is a trademark of the Centers for Disease Control and Prevention (CDC). Descriptive statistical analysis was performed to calculate the means with corresponding standard deviations (SD).

Table 1. Distribution of Age, Sex, Height, BMI, Residence, Occupation

Table 2. Distribution of Family History, Addiction, Duration of Standing Per Day, Place of Examination, Laterality, Duration of Disease

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Abnormalities of the veins in the lower limbs are responsible for significant and widespread morbidity. Several studies revealed an association between increasing age and varicose veins.[8,9,10,11,12] On the contrary, in Ziegler et al. study, age was not a risk factor for varicose veins.[13] In our study, 87.5% of the patients were with age ≥ 35 years which was significantly higher than other ages. (Z=10.74; P<0.0001). Thus, in this study varicose veins were more prevalent among the patients with age ≥ 35 years. Incidence peak was noted in both sexes but the difference was statistically significant only in women compared to the study of Callam MJ.[14]

Many studies reveal an association between the female gender and varicose veins.[8,9,11,13] In this study, however, males (74.5%) were at higher risk of having varicose veins than females (25.5%) (Z=7.07; P=0.001) which is similar to one study reporting significantly higher prevalence of trunk varicose veins in men compared with women.[15] If the prevalence of varicose veins was truly higher in men than women in this population, it may be that changes in lifestyle, working practices or the environment would have led to a change in the difference in prevalence between the sexes. The evidence to support any association between varices and many lifestyle factors such as prolonged standing, tight undergarments, toilet posture, chair sitting, and dietary fibre intake is variable. Laurikka J et al.[16] reported no association whereas Elamrawy et al. identified modifiable lifestyle factors.

We found that for both males and females, the heights of the patients were significantly higher than the normal height of Indian males or females (P < 0.0001). Thus, as per this study height might be considered a significant cause of varicose veins for both males and females. In as much as the height measurement is related to venous pressure in the standing position, this association has some physiologic significance.[2,17] 70.0% of the patients had normal BMI which was significantly higher than other BMIs (Z=6.47; P=0.001). We could not find any significant relationship with obesity like the study of Patrick H et al.[18] This makes it more difficult to assess the influence of overweight because any index of body mass is based on the relation of weight to height. Furthermore, only the present weight was measured, which could well minimize the power to detect the influence of overweight on the development of varicose veins, because of potentially large variations in weight over time. Therefore, it is not surprising that conflicting results were found in cross-sectional studies.[19] It should be noted, however, that two longitudinal studies confirmed a positive relationship in women.[3,20] In our study, 11.5% of the patients had a positive family history of varicose veins (Z=0.64;P=0.52). No significant association was found between family history and the occurrence of varicose veins. Many studies have found an association between family history and venous disease,[21,22] although not all.[23,24]

In the present study, 10.5% of the patients had a history of addiction to tobacco or alcohol. (Z=0.58; P=0.56). No significant association was found between smoking and alcoholism and the occurrence of varicose veins which was comparable with the reports of Carpentier et al.[25] but contrary to the findings of Gourgou S et al.[26] Elamrawy et al.[27] noted that smoking was an independent predictor of lower limb varicose veins, smokers had a 2.53 times greater risk to develop varicose veins. They even noted that smoking intensity was significantly associated with varicose veins; moderate/heavy smokers had a 6.27 times greater risk to develop varicose veins. It has been hypothesized that smoking leads to hypoxia, production of proinflammatory factors within the vessel wall, biochemical modifications on the venous endothelium that increases the vasomotor tonicity in the venous walls, and lengthening of scarring time which influences the trophic disorders associated with varicose veins.[28]

The mean (±SD) average hour of standing per day of the patients was 5.93±2.13 hours with a range of 2-10 hours and a median of 6 hours. 57.0% of the patients had a duration of standing > 5 hours which was significantly higher than in patients with duration of standing ≤ 5 hours. (Z=2.12; P=0.034). Most studies indicate that working in a position resulting in protracted orthostasis may increase the prevalence and severity of varicose veins. A significantly higher prevalence of varicose veins was found in persons working in a prolonged standing posture.[11,13,21]
The mean (±SD) duration of varicose veins of the patients was 7.16 ± 2.80 years with a range of 2-12 years and a median of 8 years. 66.5% of the patients were having duration of disease > 5 years which was significantly higher than the patients with duration of disease ≤ 5 years (Z=9.33; P < 0.0001).

In our study, 75.9% of the patients were from the urban areas which were significantly higher than the patients from rural areas (24.1%). (Z=4.78; P < 0.0001). Urban people were at higher risk of having varicose veins. 62.0% of the patients were examined at OPD which was significantly higher than those examined at IPD. This result indirectly indicates that most patients with varicose veins are treated on OPD basis with conservative management than surgery.

82.5% of the cases were unilateral which was significantly higher than bilateral cases (17.5%). (Z=9.33; P < 0.0001) In a study by Staniszeswksa et al,[27] majority of patients had unilateral lower limb varicose veins which correlates with our study. Many studies reported an increased involvement of the left limb which is contrary to our present study. The explanation of left limb involvement may be due to compression of left iliac veins by a left-loaded colon, left common iliac vein crossing over the left iliac artery, and the longer course travelled by left iliac veins. The study by M Ganesan et al.[28] showed 84% with unilateral and 16% with bilateral varicose veins, 44% with the right side and 40% with left-sided varicosity which is comparable to our study where 47% had right-sided and 35.5% had left-sided varicosity.

In our study, almost 40% of patients belonged to the group whose occupation involved prolonged standing similar to the study of Staniszeswksa et al.[27]

Pain (71.49%) and dilated tortuous veins (80.85%) of lower limbs were the most common presenting features of varicose veins of lower limbs for which patients came seeking treatment in the Department of General Surgery. This finding correlates well with the study done by Campbell et al. with cosmetic symptoms being 90% and aching pain at 57%.[29]

In our study, 48.93% had the involvement of only a great saphenous vein, while only a short saphenous vein was involved in 18.72% cases, both involved in 32.34% (Z=2.44; P=0.014) Prasad et al. found that the long saphenous vein was involved in 76% of cases (38 patients), the short saphenous vein in 4% and both long and short in 20% (10 cases).[16] AlMuhlim et al. found that long saphenous vein was involved in 68.4% of cases and a short saphenous vein in 7.1% of cases.[30]

In our study, 67.23% of the patients clinically had SFJ incompetence (Z=4.80; P < 0.001) and 74.89% radiologically had SFJ incompetence (Z=7.07; P < 0.001) which is comparable to the study of Vashist et al. in which 72% of the patients were detected to have SFJ incompetence on clinical tests while 80% of patients were found to have SFJ incompetence on colour Doppler.[14]

Clinically, 150 mid-thigh, 62 above-knee, 55 below-knee, 106 calf, and 72 ankle perforators were incompetent. Radiologically, 165 mid-thigh, 80 above-knee, 65 below-knee, 118 calf, and 95 ankle perforators were incompetent. Thus, as per both clinical examination (Z=2.28; P=0.022) and radiological examination (Z=3.69; P=0.0002), mid-thigh perforator incompetence was significantly highest among perforators other than the SFJ. In the study by Vashist et al., 104 perforators were detected by clinical tests while 100 perforators were detected by colour Doppler.[31] USG Colour Doppler study detects more SFJ incompetence as well as more perforator incompetence.

As per clinical classification, C2 (27.66%), C4 (25.53%) and C6 (25.53%) were more or less equally distributed (Z=0.31; P=0.74). However, they were significantly higher than C3 (13.62%) and C5 (3.40%) (Z=2.12; P=0.034).

**CONCLUSIONS**

The following conclusions can be drawn from the study: In terms of age distribution, inference can be drawn that varicosity of the lower limb is common in the 41-50 years age group i.e., the 5th decade of life.

- As far as sex distribution is concerned, males outnumbered females in the prevalence of varicosity in lower limbs (Male: female = 2.9:1).
- Most of the patients presenting with lower limb varicose veins have a height more than the standard Indian height (Male=165 cm, Female=152 cm).
- Lower limb varicose veins are common in occupational groups which demand long-standing hours and violent muscular efforts like roadside vendors, daily wage labourers, and farmers.
- Pain and dilated tortuous veins of lower limbs were the most common presenting features of varicose veins of lower limbs for which patients came seeking treatment in the Department of General Surgery.
- We could not find any significant relationship with being overweight. In contrast, we found a significant relation with height in both sexes in the present study.
- Colour Doppler is superior to clinical examination in the evaluation of superficial and perforator veins incompetence.

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