

## Assessment of Daytime Sleepiness in Varicose Vein Patients

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### Abstract

**Aim:** This study aimed to investigate the potential association between varicose veins and daytime sleepiness (DS), as evaluated using the Epworth Sleepiness Scale (ESS). The study also explored various demographic, symptom-related, and laboratory variables in individuals with varicose veins.

**Material and Method:** A total of 160 patients diagnosed with varicose veins were included in the study. The ESS was administered to assess daytime sleepiness, and demographic information and laboratory results were documented. Statistical analyses, including the Shapiro-Wilk test, Student's T test, Mann-Whitney U test, Chi-Square test, Fisher's exact test, Wilcoxon test, and McNemar or marginal homogeneity tests, were conducted.

**Results:** The results revealed no significant associations between increased daytime sleepiness and demographic variables, including age and gender ( $p > 0.05$ ).

Additionally, there were no significant correlations between daytime sleepiness and symptoms commonly associated with varicose veins, such as leg pain, varicose vein pack, cramp, and edema ( $p > 0.05$ ). Smoking status and alcohol use also did not show a clear relationship with daytime sleepiness ( $p > 0.05$ ). Laboratory variables demonstrated slightly lower Thyroxine (T4) levels in individuals with increased daytime sleepiness ( $p = 0.048$ ), while vitamin B12 levels were significantly higher in this group ( $p = 0.010$ ).

**Conclusion:** This study contributes to our understanding of the potential association between varicose veins and daytime sleepiness. While demographic variables, symptoms, and most laboratory variables did not show significant associations, the findings regarding vitamin B12 and T4 levels warrant further investigation. Understanding this association can guide the development of targeted interventions to improve the quality of life for individuals affected by these conditions

### Keywords

Varicose vein; Daytime sleepiness; ESS

## Introduction

Varicose veins, those bulging and twisted veins most commonly found in the legs, have long been recognized as a common circulatory condition affecting millions of people worldwide. While they are often seen as a cosmetic concern, causing individuals to feel self-conscious about their appearance, recent research suggests that varicose veins may have implications beyond mere aesthetics [1]. Surprisingly, a growing body of evidence points to a potential association between varicose veins and daytime sleepiness, raising intriguing questions about the interplay between these seemingly unrelated conditions.

Varicose veins occur when the valves within the veins, which help regulate blood flow and prevent backflow, become weakened or damaged. As a result, blood pools and accumulates in the affected veins, causing them to enlarge, twist, and become visible beneath the skin's surface. Factors such as age, gender (women being more susceptible), pregnancy, obesity, prolonged periods of standing or sitting, and a family history of the condition contribute to the development of varicose veins [2,3]. Individuals with varicose veins often experience symptoms such as pain, aching, heaviness, swelling, and itching in the affected areas [4].

While the discomfort and physical implications of varicose veins have been well-documented, recent studies have begun to explore their potential impact on daytime sleepiness [5]. Daytime sleepiness (DS) refers to an excessive and overwhelming sense of sleepiness or the inclination to doze off during waking hours, even in situations that should normally keep a person alert and awake. It can significantly impact an individual's overall quality of life, cognitive functioning, productivity, and safety.

The relationship between varicose veins and daytime sleepiness is complex and multifactorial. One proposed explanation suggests that the physical discomfort caused by varicose veins, combined with disrupted sleep due to pain or discomfort, may contribute to daytime sleepiness. The persistent throbbing or aching sensations in the legs can make it challenging to find a comfortable position for

sleep, leading to fragmented and less restorative sleep patterns. Additionally, varicose veins might indirectly impact sleep quality by triggering restless leg syndrome (RLS), a neurological condition characterized by an irresistible urge to move the legs, particularly at night, further disrupting sleep and contributing to daytime sleepiness [6].

To evaluate daytime sleepiness objectively, medical professionals often employ the Epworth Sleepiness Scale (ESS). Developed by Dr. Murray Johns in 1990, the Epworth Scale is a standardized self-administered questionnaire that measures an individual's propensity for dozing off or falling asleep in various situations encountered during the day [7]. It assesses the likelihood of experiencing sleepiness in activities such as sitting and reading, watching television, sitting inactive in a public place, and being a passenger in a car.

In this article, we delve into the intriguing association between varicose veins and daytime sleepiness, focusing on the evaluation of daytime sleepiness using the Epworth Scale. We explore the possible mechanisms underlying this connection, examine relevant research findings, and discuss the implications for individuals affected by varicose veins. Furthermore, we will provide insights into effective management strategies for both varicose veins and daytime sleepiness, aiming to improve overall well-being and quality of life. By unraveling this intriguing relationship, we can gain a deeper understanding of the broader impact of varicose veins and pave the way for improved clinical approaches and interventions.

## Material and Methods

The study included patients who presented to the Cardiovascular Surgery outpatient clinic with varicose veins. The Epworth Sleepiness Scale (ESS) was administered to 160 patients. The scale is made up of eight items, each of which is scored on a scale of 0 to 3, with higher scores indicating a greater likelihood of daytime sleepiness. Total scores can range from 0 to 24, with scores greater than 10 indicating significant daytime sleepiness.

The patients' demographics and laboratory results were documented. Patients under the age of 18, with a history of deep vein thrombosis, symptomatic peripheral artery disease, or restless legs, were excluded from the study.

IBM SPSS Statistics for Windows 20.0 was used for statistical analysis. The Shapiro-Wilk test was used to assess data distribution. For normally and non-normally distributed data, numerical variables were presented as mean standard deviation or median (min-max). Numbers and percentages were used to express categorical variables. To compare numerical variables between groups, the Student's T test or Mann-Whitney U test was used, while the Chi-Square test or Fisher's exact test was used to examine the relationship between categorical variables. The Wilcoxon test was used to assess changes in numerical measurements after the operation, and the Mc Nemar or marginal homogeneity tests were used to assess categorical variables.  $P < 0.05$  was considered statistically significant.

## Results

A total of 160 patients who were diagnosed varicose vein was evaluated. The comparison of variables between individuals with normal daytime sleepiness and those with increased daytime sleepiness was presented in table 1. Age was slightly higher in the increased daytime sleepiness group ( $44.4 \pm 6.8$  years) compared to the normal group ( $49.1 \pm 10.8$  years), but this difference was not statistically significant ( $p=0.144$ ). Gender distribution was similar between the two groups, with no significant differences observed ( $p=0.999$ ). Regarding symptoms, there were no significant differences between the groups in terms of leg pain ( $p=0.999$ ), varicose vein packs ( $p=0.999$ ), cramp ( $p=0.302$ ), edema ( $p=0.999$ ), smoking status ( $p=0.805$ ). Alcohol use was not reported in either group (Table 1).

Laboratory variables were compared to individuals with normal daytime sleepiness and those with increased daytime sleepiness. The ferritin levels were slightly lower in the increased daytime sleepiness group (43, (9.8-80.4)) compared to the normal group (63, (4.3-421)), but the difference was not statistically significant ( $p=0.127$ ). There were no significant differences in low ferritin levels ( $p=0.459$ ), iron levels ( $p=0.898$ ), or C-reactive protein (CRP) levels ( $p=0.65$ ) between the two groups. However, the vitamin B12 levels were significantly higher in the increased daytime sleepiness group (377.5, 238-583) compared to the normal group (295, (62-2000)) ( $p=0.010$ ). The thyroid stimulating hormone (TSH) levels showed no significant differences ( $p=0.107$ ), but the T4 levels were slightly lower in the increased daytime sleepiness group (1.0, (0.2-1.2)) compared to the normal group (1.1, (0.6-4.2)) ( $p=0.048$ ). Low-density lipoprotein (LDL) levels, hemoglobin levels, and albumin levels did not differ significantly between the groups (Table 2).

Variables	Daytime Sleepiness		
	Normal	Increased	P
Age, years	49,1±10,8	44,4±6,8	0,144
Gender, n(%)			
Female	101(68,2)	8(66,7)	0,999
Male	47(31,8)	4(33,3)	
Symptoms, n(%)			
leg pain	140(94,6)	12(100,0)	0,999
Varicose vein pack	116(78,4)	9(75,0)	0,999
Cramp	123(83,1)	8(66,7)	0,302
Edema	10(6,8)	1(8,3)	0,999
Smoker, n(%)	36(24,3)	2(16,7)	0,805
Pack/year	12,5(1-30)	7,5(5-10)	0,344
Alcohol user, n(%)	2(1,4)	0	0,999

**Table 1:** Daytime sleepiness and demographic parameters in varicose vein patients.

Variables	Daytime Sleepiness		
	Normal	Increased	P
<b>Ferritin (ng/mL)</b>	63(4,3-421)	43(9,8-80,4)	0,127
<b>Low (&lt;12 ng/mL)</b>	19(12,8)	3(25,0)	0,459
<b>Iron (mcg/dL)</b>	77(15-201)	75(36-140)	0,898
<b>Vitamin B12 (pmol/L)</b>	295(62-2000)	377,5(238-583)	0,010*
<b>TSH (mIU/L)</b>	1,6(0,3-28,6)	2,2(1,1-57,1)	0,107
<b>T4 (µg/dL)</b>	1,1(0,6-4,2)	1(0,2-1,2)	0,048
<b>CRP (mg/L)</b>	2(0,2-16,2)	1,5(0,7-26,4)	0,65
<b>Albumin (g/dL)</b>	44,9±4,4	41,0±13,8	0,782
<b>LDL (mg/dL)</b>	113(41-253)	111(65-215)	0,231
<b>Hemoglobin (g/dl)</b>	13,7±1,6	13,8±1,1	0,958

**Table 2:** Daytime sleepiness and laboratory parameters in varicose vein patients.

## Discussion

The present study aimed to investigate the potential relationship between varicose veins and daytime sleepiness, as evaluated using the Epworth Sleepiness Scale, and to examine various demographic, symptom-related, and laboratory variables in individuals with varicose veins [5]. The findings from this study provide important insights into the association between these two conditions.

In terms of demographic variables, age and gender were not significantly associated with increased daytime sleepiness in individuals with varicose veins. Some studies state the effect of daytime sleepiness on age and gender but in this study it suggests that age-related factors or gender alone may not be strong determinants of daytime sleepiness in this context [8,9,10]. However, it is important to note that the sample size of this study may have influenced the statistical power to detect significant differences, particularly with age.

Regarding symptoms associated with varicose veins, no significant associations were observed between increased daytime sleepiness and common symptoms such as leg pain, varicose vein pack, cramp, or edema. These findings indicate that the presence of these symptoms alone may not directly contribute to daytime sleepiness in individuals with varicose veins. However, it is worth noting that other factors, such as the severity or frequency of these symptoms, were not considered in this analysis and may warrant further investigation.

Interestingly, the study did not find any significant differences in smoking status or alcohol use between individuals with normal daytime sleepiness and those with increased daytime sleepiness. While smoking and alcohol consumption can have an impact on sleep patterns [11] and overall health, their direct association with daytime sleepiness in the context of varicose veins remains unclear and may require larger sample sizes or more specific measures of consumption to establish clearer links.

In terms of laboratory variables, the study found higher B12 levels in individuals with increased daytime sleepiness compared to those with normal daytime sleepiness. This unexpected finding raises intriguing questions about the potential influence of B12 levels on sleep patterns in individuals with varicose veins [12]. Further research is needed to explore the underlying mechanisms and clarify the significance of this association. Additionally, slightly lower T4 levels were observed in individuals with increased daytime sleepiness. T4 is a thyroid hormone that plays a role in regulating metabolism and energy levels.

It is worth noting that this study has certain limitations. The sample size was relatively small, which may have limited the statistical power to detect significant associations. Additionally, the study primarily relied on self-reported measures, such as symptom presence and sleepiness levels, which may introduce subjective bias. Moreover, the cross-sectional design of the study does not allow for establishing causality or determining temporal relationships between varicose veins and daytime sleepiness.

## Conclusion

This study contributes to our understanding of the potential link between varicose veins and daytime sleepiness. While no significant associations were found between demographic variables, symptoms, and most laboratory variables, intriguing findings regarding B12 and T4 levels warrant further investigation. Future studies with larger sample sizes, longitudinal designs, and objective measures of sleepiness and associated factors are needed to better elucidate the complex relationship between varicose veins and daytime sleepiness. Ultimately, such research can inform the development of targeted interventions to improve the quality of life for individuals affected by these conditions.

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