# **Original Article**

# Prevalence and Severity of Lower-Limb Varicose and Its Related Factors in Nurses Working in Shahid Beheshti Hospital, Kashan, Iran, 2020

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Background: Varicose vein (VV) is a common problem that mostly occurs in legs. This medical condition can influence the quality of life and working condition of nurses. Objectives: The objectives of this study were to assess the prevalence and severity of VV and its related factors in nurses working in Shahid Beheshti Hospital, Kashan, Iran, in 2020. Methods: This cross-sectional study was carried out on 157 nurses. The participants were recruited in the study using systematic random sampling. The Occupational Sitting and Physical Activity and Aberdeen Varicose Vein Questionnaires were used for data gathering. The frequency of varicose and the mean score of the severity were calculated. The related factors were analyzed using Chi-square, Mann-Whitney, Spearman's correlation, and binominal logistic regression statistical tests. SPSS software version 16 was used for data analysis. Results: The prevalence of VV was 42% (66 nurses), the duration of varicose was  $4.4 \pm 3.6$  years, and its severity score was  $32.7 \pm 9.5$ . In bivariate analysis, the female gender (P = 0.015), age (P = 0.002), work experience (P = 0.006), hyperlipidemia (P = 0.017), number of children (P = 0.007), regular exercise (P = 0.001), family history of varicose (P = 0.0001), hours of working overtime (P = 0.018), duration of standing (P = 0.002), walking (P = 0.039), and heavy work (P = 0.038)per day had a significant relation with the prevalence of varicose. In binary logistic regression, family history of varicose (odds ratio = 5.672), number of children (odds ratio = 2.462), and minutes of heavy working during a shift (odds ratio = 1.012) showed a significant relation with VV. No variable showed a significant relation with the severity of varicose. Conclusion: The prevalence of VV in the nurses working in Kashan was high, and many factors showed a significant relation with this problem. Nurses should be informed about preventive measures and treatments for this medical condition.

**Keywords:** Nurses, Risk factors, Varicose vein

## INTRODUCTION

The term "varicose" is derived from the Latin word "varix," meaning bent, and refers to dilated, twisted, and enlarged veins.<sup>[1]</sup> Varicose veins (VVs) are tortuous, twisted, or elongated veins dilated to at least 3 mm in diameter evaluated when a patient is in standing status.<sup>[2]</sup> Symptoms of VVs are foot pain, heaviness and fatigue of foot, and feelings of irritating and itching.<sup>[3]</sup> VVs are common medical problems with

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an estimated prevalence of 1%-73% in women and 2%-56% in men.<sup>[4]</sup> In a study, the prevalence of VV

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among Iranian hairdressers was 51%.<sup>[5]</sup> People who stand on their feet for a long time during their duties such as nurses are at a higher risk of developing VVs.<sup>[6]</sup> In a study in Iran, the prevalence of varicose in nurses was 65.2% which was three times higher compared to other people.<sup>[7]</sup> However, the prevalence was 16.2% in South Korea<sup>[8]</sup> and 46% in Nepal.<sup>[9]</sup> The risk factors also have been reported differently.[3,10] While standing time has been a risk factor for varicose, one study did not find any significant relation in this regard.<sup>[11]</sup> Gender, lifestyle, age, obesity, pregnancy, and family history are some of the risk factors for VVs.<sup>[12,13]</sup> VVs have some consequences such as eczema, deep vein thrombosis, and vascular ulcers.<sup>[14,15]</sup> VVs can negatively influence the quality of life and sleep<sup>[16-18]</sup> and decrease the quality of working life in nurses, although there are effective ways for prevention and treatment of this medical condition. Exercise, elastic stocking, and controlling the weight are some methods for prevention of varicose.<sup>[10,19]</sup> Nurses have to stand for long hours, and VVs may develop in them more frequently that can influence both the quality of their services and the quality of their lives.<sup>[3,9,20]</sup> The prevalence and risk factors of VVs in nurses have not been investigated in Kashan city.

#### **Objectives**

The objective of the study was to evaluate the prevalence, the severity, and the related factors of varicose in nurses working in Shahid Beheshti Hospital in Kashan, Iran, in 2020.

#### **Methods**

#### Study design and participants

A cross-sectional study was carried out in Shahid Beheshti Hospital, in Kashan, Iran, from September to December 2020 that was concurrent with the second peak of the COVID-19 disease. This general hospital has 700 beds. Considering the prevalence of varicose to be 74% according to a previous study,<sup>[4]</sup> the alpha of 95%, and the error of 7.4%, using the formula of  $n = Z^2pq/d^2$ , the sample size was calculated to be 134. Considering the attrition of 15%, 160 nurses were invited to participate in the study, and the data of 157 nurses were analyzed. Inclusion criteria were being a nurse working in one of the departments of the hospital and accepting to participate in the study. Systematic random sampling was used for recruiting the participants.

#### **Data collection instruments**

Three questionnaires were used in this study. The first questionnaire was the list of possible risk factors. Age, gender, work experience, number of children, smoking, working hours per month and hours of working overtime, family history, height, weight, body mass index (BMI), and waist circumference were recorded in this questionnaire. The validity of demographic and anthropometric questionnaires was approved by 10 faculty members. The second questionnaire was the Occupational Sitting and Physical Activity Questionnaire that has four questions and determines the minutes that someone spends sitting, standing, walking, and doing heavy works during a usual working day. The content validity index and internal consistency of this questionnaire have been reported to be 0.9.<sup>[21-23]</sup> In the present study, Cronbach's alpha of this questionnaire was 0.75.

The third questionnaire was Aberdeen Varicose Vein Questionnaire (AVVQ) that was completed only in nurses who had a VV. This questionnaire has 13 questions that determine the symptoms and severity of varicose and its related quality of life. The possible score could be between 0 and 100, and higher scores indicate higher severity of varicose. The content validity ratio and reliability of this questionnaire were 0.7 and 0.81, respectively.<sup>[24-26]</sup> Cronbach's alpha in this study was 0.76. Questionnaires were completed in the hospital departments during the breaking time of the nurses or after their working shift. Waist circumference was measured in standing position with tape measure around bare waist. Height was measured with barefoot and minimum cloths with a stadiometer. All the measurements were performed by the first author and his assistants. Weight also was measured by Xiaomi Mi Smart Digital Scale. Nurses who reported one of the signs and symptoms of VV were investigated by a physiatrist (second author).

#### **Data analysis**

The normality of quantitative variables was analyzed using Kolmogorov–Smirnov test. Descriptive statistics and Chi-square, Mann–Whitney and Spearman's correlation statistical tests were used to describe and analyze the bivariate association of VVs and their severity score with other variables. Considering the presence of varicose as the dependent variable, the variables that showed a significant relation with varicose in bivariate analysis entered the binominal logistic regression analysis as independent variables to determine the multivariate risk factors of VV. Data analysis was performed by SPSS software version 16 (SPSS Inc., Chicago, IL, USA).

#### **Ethical considerations**

The study protocol was approved by the Ethics Committee of Kashan University of Medical Sciences under the ethical code of IR.KAUMS.NHUEPM. REC.1399.046. The objective of the study was explained to the nurses, and written informed consent was completed by the participants. The Declaration of Helsinki was respected in this study.

## RESULTS

One hundred and fifty-seven nurses completed the study, from whom 135 (86%) were women. The characteristics of the participants are shown in Table 1. VVs were diagnosed in 66 nurses (42%); 14 nurses (8.9%) had varices in one leg and 52 nurses (33.1%) had this complication in both legs. The mean duration of VVs was  $4.4 \pm 3.6$  years (range: 1–17). The mean score of severity of varices was  $32.7 \pm 9.5$  (range: 18–70). Bivariate analysis showed that gender, hyperlipidemia, number of children, having regular exercise, family history of varicose, age, work experience, hours of working overtime, minutes of standing on the feet, walking, and heavy work per day had a significant relation with varicose [Table 1]. None of the recorded variables had a significant association with the severity score of the varicose [Table 2].

The variables that had a significant relation with VVs were entered as independent variables in binominal logistic regression. Only the variables of family history of VVs, heavy work per day, and number of children showed a significant relation with VVs with  $R^2 = 0.326$  [Table 3].

Table 1: Prevalence of varicose veins	according to demog	raphic, occupational, and	l anthropometrics data o	f nurses
Variables		Varicose (+), <i>n</i> (%)	Varicose (-), <i>n</i> (%)	Р
Gender				
Female		62 (45.9)	73 (54.1)	0.015
Male		4 (18.2)	18 (81.8)	
Marriage				
Married		59 (45.4)	71 (54.6)	0.062
Single		7 (25.9)	20 (74.1)	
Hyperlipidemia				
Yes		6 (85.7)	1 (14.3)	0.017
No		60 (40)	90 (60)	
Number of children				
0		23 (28.7)	57 (71.3)	0.001
1		21 (47.7)	23 (52.3)	
≤2		22 (66.7)	11 (33.3)	
Regular exercise				
Yes		5 (15.6)	27 (84.4)	0.001
No		61 (48.8)	64 (51.2)	
BMI (weight/heigh <sup>2</sup> )				
≤ 18.4		0	3 (100)	0.403
18.5-24.9		33 (39.8)	50 (60.2)	
25-29.9		26 (46.4)	30 (53.6)	
$\geq$ 30		7 (46.7)	8 (53.3)	
Family history of varicose				
Yes		42 (63.6)	24 (36.4)	0.0001
No		24 (26.4)	67 (73.6)	
Variables		Mean ± SD		Р
	Total	Varicose (+)	Varicose (-)	
Weight (kg)	$68 \pm 13.3$	$68.2 \pm 13.8$	$68 \pm 13$	0.77
Height (cm)	$164.6\pm11.5$	$164 \pm 7$	$165\pm13.9$	0.088
BMI	$25.8\pm13$	$25.2 \pm 3.8$	$26.3\pm16.8$	0.384
Waist circumference (cm)	$85.3\pm9.8$	$85.4 \pm 10$	$85.3\pm9.7$	0.933
Age (years)	$31.9\pm6.7$	$33.6 \pm 6.3$	$30.7\pm 6.8$	0.002
Work experience (years)	$8.3 \pm 6.1$	$9.8\pm5.9$	$7.2 \pm 6.1$	0.002
Working hours per month	$184.6\pm40$	$182.9\pm30$	$185.8\pm46$	0.258
Hours of overwork	$52.4 \pm 58$	$41.4 \pm 25.3$	$60.4 \pm 72.3$	0.018
Minutes of sitting in a working shift	$101.5\pm88$	$98.3 \pm 84.7$	$103.8\pm90.7$	0.667
Minutes of standing in a working shift	$124.1 \pm 71.9$	$141.7 \pm 71.7$	$111.3 \pm 70.2$	0.002
Minutes of walking in a working shift	$193.3\pm171.9$	$187.7\pm233.8$	$197.3\pm108.3$	0.039
Minutes of heavy work in a working shift	$44.3\pm48.4$	$53.7\pm62$	$37.5\pm3434$	0.038

BMI: Body mass index

# DISCUSSION

This study showed a high prevalence of VV among nurses. The reported prevalence of VV in nurses has been different: 16.2% in Korea,<sup>[8]</sup> 65.2% in Iran,<sup>[7]</sup> 73.9% in Iran,<sup>[4]</sup> 46% in Nepal,<sup>[9]</sup> and 18.4% in Egypt.<sup>[27]</sup> It seems that the prevalence of VV in nurses can be widely different. The diagnostic tools can affect the prevalence of VV. Some studies have used clinical tools for the diagnosis of VVs.<sup>[5,28]</sup> Using Doppler sonography for screening can diagnose the milder forms of VV, so the prevalence would increase.<sup>[9,29]</sup>

The severity of the varicose in nurses in the current study was 32.7, and it did not show any significant association with none of the recorded variables. In a study in Iran that also used the AVVQ, the severity score was  $16.2 \pm 8.3$ ;<sup>[26]</sup> in England, the score was  $17.8 \pm 9.1$ ;<sup>[30]</sup> and in Germany, it was  $19.54 \pm 9.1$ <sup>[25]</sup> that were lower than the current study. Although Aberdeen questionnaire

# Table 2: The correlation between varicose severity scoreand demographic, occupational, and anthropometricsvariables of nurses

Variables	Correlation	Р
Weight (kg)	0.009	0.942ª
Waist circumference (year)	0.006	0.960ª
Age (year)	0.095	0.455ª
Working overtime (h)	0.134	0.29ª
Sitting per day (min)	0.038	0.768ª
Standing per day (min)	0.014	0.912ª
Walking per day (min)	-0.016	0.901ª
Heavy work per day (min)	0.172	0.175ª
Variables	Mean ± SD	Р
Gender		
Female	$33\pm9.9$	0.243 <sup>b</sup>
Male	$27.5\pm0.6$	
Hyperlipidemia		
Yes	$38.3\pm12.5$	0.263 <sup>b</sup>
No	$32.1\pm10.7$	
Regular exercise		
Yes	$28.6\pm8.8$	0.229 <sup>b</sup>
No	$33\pm9.6$	
Family history of varicose		
Yes	$32.8\pm8.6$	0.479 <sup>b</sup>
No	$32.5\pm11.3$	

<sup>a</sup>Spearman's correlation analysis, <sup>b</sup>Mann-Whitney analysis.

SD: Standard deviation

is considered a standard tool for measuring the severity of VV and its impact on the quality of life, in this study, it did not show any significant relation with other risk factors. A systematic review showed that although the AVVQ has an acceptable face and construct validity and proper stability, but its content validity and especially its scoring system and weights of every item have considerable bias, and it has a low acceptability.<sup>[31]</sup> The usage of this scale for research purposes needs further investigation.

Different studies, including the present study, have found the same risk factors for VV such as age, female gender, family history, and standing on the feet for a long time.<sup>[8,32,33]</sup> In current study logistic regression showed that family history of varicose, heavy work per day, and number of children were risk factors for VV.

In spite of several studies that suggest obesity as a risk factor,<sup>[32,33]</sup> we did not find any significant relation between weight, BMI, and waist circumference and varicose in nurses. This might be because most of the nurses had an acceptable BMI and the obesity was present in only 9.6% of the participants. In the current study, the prevalence of VV in nurses with positive family history was 63.6%, while it was 26.4% in nurses without family history. Several studies support this finding.<sup>[34,35]</sup>

The minutes of standing during a working shift also were a risk factor for VV. A study showed that the risk of VV increases 27 times with every hour of standing in a working shift.<sup>[9]</sup> It seems that there is a complex interrelated association between different risk factors of VV. These complex relations need further investigation.

Overwork, fatigue, and using personal protective equipment during data gathering that was concurrent with COVID-19 crisis might have influenced the quality of completing the questionnaires by the nurses. This might be a limitation in this study. VV was diagnosed clinically. We suggest using radiologic assessments such as Doppler sonography for future studies. The occupational activities of nurses were measured and their relation with VV was analyzed, which is a strength of the study.

Table 3: Binominal logistic regression analysis of varicose veins' risk factors in nurses									
Independent variable	В	Wald	Significant	Exp(B)	95% CI fo	95% CI for EXP(B)			
					Lower	Upper			
Family history of varicose	1.736	20.077	0.0001	5.672	2.655	12.118			
Heavy work per day	0.012	6.135	0.013	1.012	1.001	1.022			
Number of children	0.901	14.507	0.0001	2.462	1.549	3.914			
GLG C1 1									

CI: Confidence interval

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#### CONCLUSION

The prevalence of VV in nurses in this study was high. Family history of varicose, heavy work per day, and number of children were important risk factors for VV. Walking and regular exercise can have a protective effect against VV, so it is recommended that nurses receive information about the prevention of VV with simple interventions such as isometric and isotonic exercises during their working shift. Especially nurses with positive family history of VV and those with more children need to be informed about the risk factors of VV and the prevention methods.

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#### **Conflicts of interest**

There are no conflicts of interest.

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