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Effect of Lifestyle and Symptom Intensity Factors on the Severity of Lower Limbs Veins of Varicose Among Nurses in North Khorasan Hospitals, Iran

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ABSTRACT

Introduction:
Scarce data have been reported regarding the risk factors of lower limb varicose veins (VVs) in Iranian nurses. This study investigated the social and occupational parameters and lifestyle related to the development of VVs in a group of Iranian nurses.

Materials and Methods:
In the current cross-sectional study, 235 volunteered nurses filled the consent forms and were then examined by a vascular specialist. Varicose veins of the patient nurses were ranked based on Clinical, Etiological, Anatomical, and Pathophysiological criteria. Afterward, the patients completed the lifestyle questionnaire.

Results:
In this study, there were 163 (69.4%), 64 (27.2%), and 8 (3.4%) cases with mild, moderate, and severe VVs. It was revealed that VVs severity had a significant relationship with age, laboring times, abortion times, and body mass index (P<0.005). It was also found that weight control and nutrition (odds ratio [OR] =3.76) and physical activity (OR=4.038) significantly affected the VVs intensity.

Conclusion:
This study highlighted lifestyle risk factors of VVs, which can be considered in improving the lifestyle and quality of life of nurses in long term.

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Introduction

Varicose veins (VVs) are considered one of the most common diseases that affect a range of 10-30% of people throughout the world (1,2). Varicose veins severely impact the patients' quality of life (1). This disease, as venous valves insufficiency, has some prominent risk factors, including age, number of given-birth children, family history (3), female gender, body mass index, and weight (3,4). Moreover, the results of related investigations revealed that some occupations with long-hour standing or walking had a substantial risk for varicose (5-8).

Among the different occupations, nurses are at high prospective risk of VVs due to their job modalities, such as the elongated standings at patient bedsides, the need for high mobility, and tiring physical positions. Moreover, throughout the nations, most of the nurses are female (6,9,10).

The working efficiency and old-age health can be jeopardized by VVs. This illness can cause other health-threatening complications, including thrombotic problems (10).

Although there are clear relations between the nature of nursing and the development of lower limb varicosities, no studies have been conducted on varicose among nurses due to occupational exposure at the workplace in Iran. Health services, including in hospitals, can deliver safer approaches in the near future by leading works on nurses' safety culture (11,12). This observational study was performed among practitioner nurses in Imam Ali, Imam Reza, Bentolhoda, Javadolaameh, and Imam Khomeini Hospitals in North Khorasan Province, Iran, to estimate the effect of lifestyle and symptom intensity factors on the severity of VVs.

Materials and Methods

This descriptive cross-sectional study was related to the Iran University of Medical Sciences, Tehran, Iran, within January-May 2019 under the local ethical committee code of 1395.9213655205.

This research was performed on five care hospitals in North Khorasan Province, including Imam Ali, Imam Reza, Bentolhoda, Javadolaameh, and Imam Khomeini. These care hospitals are affiliated with North Khorasan Medical University, Bojnourd, Iran.

Our target population consisted of employed nurses in the respected hospitals for more than 2 years. Moreover, the informed consent forms were obtained from all nurses to voluntarily participate in the present study prior to the interview. The participants were informed about the possibility of study withdrawal at any research stage and confidentiality and anonymity of their information from the interviews. Nurses with pregnancy, more than 60 years old age, and VVs lesions or any vascular diseases were excluded from the study.

Sampling

The sample size was calculated using Medical 15.8. The results of previously unpublished data showed that 6 out of 30 nurses had varicose veins as detected by Doppler ultrasonography.

Therefore, the sample size was considered at least 235 cases considering the alpha error of 0.05, study power of 0.90, precision of 5%, and confidence interval of 95%. Subsequently, the total number of on-duty nurses were contacted during the study and requested to be included in the study. Accordingly, 201 nurses completed the related questionnaires and participated in the Doppler examination (response rate of 96.6%).

Study tools

A questionnaire was applied to gather the data regarding the subjects and their characteristics (including age, gender, weight, height), a history of family, related risk parameters for VVs (including pregnancy, number of births, number of abortions, use of oral contraceptives medicines [OCM]), and occupational risk factors (including overtime, night works, long standing, long walking, and static sitting, employer's experience, and education level). Body mass index (BMI) we calculated using the formula of dividing the person's weight by the square of height (Kg/m^2).

Participants were assessed according to the Etiological, Clinical, Pathophysiological, and Anatomical classification (13). Under this scale, the disease severity was objectively categorized. The clinical tool for the detection of VVs severity is graded in the range of 0-6, with a higher score representing an increased severity of the disease.

Based on this scale, the score of C0 represents no palpable or visible venous disease sign; C1 means reticular or telangiectasia veins; C2 demonstrates varicose veins; C3 shows Oedema; C4 means eczema or pigmentation, atrophied blanche, lipodermatosclerosis, or improved venous ulcer; C5 indicates cured leg ulcer; and C6 represents active venous ulcer. Accordingly, the patients were divided based on the severity of their disease into three different groups, severe (more than C3), moderate (C2), and mild (C1).

All study participants were interviewed for the lifestyle questionnaire (LSQ).

The local reliability and validity of this questionnaire were confirmed later (13). In the present study, five components of this multidimensional questionnaire were used, including social and physical health, exercise and fitness, psychological and spiritual health, drug and alcohol avoidance, and weight control and nutrition.

Data analysis

The collected data were analyzed in the SPPS software (version 20) by describing the variables as percentages and numbers. The quantitative variables were reported as mean±standard deviation and evaluated by the independent t-test/Mann-Whitney U test. Moreover, the qualitative variables were entered as percentages and frequencies and evaluated using Chi-square/Fisher's exact test if necessary.

The backward stepwise method was applied for the significant predictors of VVs in bivariate analysis.

These data were entered into a multivariate logistic regression and the resulting odds ratios were calculated.

Moreover, the relation between LSQ components and VVs severity (as two forms; mild, moderate, and severe) was calculated by logistic regression using the backward stepwise method. For all analyses, a p-value of less than 0.05 was considered statistically significant.

Results

Study Participants

This cross-sectional study investigated varicose among 235 employed nurses. It was revealed that among studied participants, 163 (69.4%), 64 (27.2%), 8 (3.4%) cases had mild, moderate, and severe severity of VVs, respectively.

Table 1 summarizes the frequencies of studied social and demographic characteristics. Most of the subjects were employed (87.23%), female (81.7%), and married (80.42%) nurses. Most of the studied cases lacked any experience of abortion (59.88%) and had two pregnancies (50.92%) and two children (52.14%). Moreover, using OCM (84.78%), near regular defecation (68.52%), and a positive family history of VVs (68.08%) were common.

Severity of varicose veins and nursing

This study investigated the frequencies of occupational risk factors and their probable relations with VVs severity (Table 2). Study results indicated that the majority of the nurses had higher than 4 h of walking (72.34%) in their related wards. Moreover, static standing in most of the cases was lower than 4 h (75.32%). The results of the analysis showed that nurses with more overtimes in a month and more experience had significantly higher VVs severity, compared to the others with mild or moderate severities (P<0.001).

Additionally, the relationship between nurses' night work and VVs severity was significant (P<0.001).

It was also found that the relationship of VVs severity with static standing, walking, and static sitting in the related wards was significant (P<0.001). Nurses with higher than 4 h of walking and static standing in related wards experienced a higher frequency of mild VVs, compared to moderate and severe VVs (P=0.001). Moreover, nurses with lower than 4 h of static sitting in related wards experienced a higher frequency of mild VVs, compared to moderate and severe VVs (P=0.001).

Table1: Demographic characteristics of studied participants

Characteristics		**Mean±SD Or Frequency (percentage)**
Age, years		38.38±4.81
Weight, Kg		68.70±5.13
Height, cm		162.85±4.66
Body mass index, Kg/m^2		25.91±1.89
Gender	Female	191 (81.27)
	Male	44 (18.73)
Married status	Married	189 (80.42)
	Single	32 (13.62)
	Widow	3 (1.27)
	Divorced	11 (4.69)
Laboring times	Not yet	26 (15.95)
	Once	29 (17.79)
	Twice	83 (50.92)
	More than twice	3 (25)
Abortion times	Not yet	97 (59.88)
	Once	41 (25.30)
	Twice	24 (14.82)
Number of children	Not yet	22 (13.49)
	One	31 (19.01)
	Two	85 (52.14)
	Three	25 (15.36)
OCM consumption	Yes	117 (84.78)
	No	21 (15.22)
Defecation	Regular	11 (4.68)
	Near-regular	161 (68.52)
	Not-regular	63 (26.80)
Menopause	Yes	12 (7.90)
	No	140 (92.10)
Hormone therapy	Yes	67 (44.97)
	No	82 (55.03)
Family history	Yes	160 (68.08)
	No	75 (31.92)
Employment status	Official	103 (43.83)
	Contractual	102 (43.40)
	Cooperative	28 (11.91)
	Not-official	2 (0.86)
Housing status	Proprietary	57 (24.26)
	Renting	154 (65.53)
	Others	24 (10.21)

OCM: Oral contraceptive medicines

Table 2: Reports related to occupational risk factors of studied cases

Characteristics		Mean±SD Or Frequency (Percentage)	Varicose severity			P-value
			Mild	Moderate	Severe	
Overtime in month, hours		194.26±15.61	53.43±20.77	66.67±16.89	74.16±9.17	*0.001
Experience, year		12.28±4.7	10.39±3.36	12.72±5.10	13.75±5.36	*0.002
Night work, days		6.40±2.05	7.11±2.10	6.36±2.72	5.75±1.28	*0.004
Level of education	Bachelor of Nursing Master of Nursing	227 (96.60) 8 (3.40)	157 (69.2) 6 (75)	62 (27.3) 2 (25)	8 (3.5)	1
Walking in wards	Less than 4 h More than 4 h	65 (27.66) 170 (72.34)	65 (100) 98 (57.64)	64 (37.64)	8 (4.72)	0.001
Static sitting	Less than 4 h More than 4 h	177 (75.32) 58 (24.68)	143 (81.1) 20 (32.7)	34 (18.90) 30 (52.80)	8 (14.5)	0.001
Static standing	Less than 4 h More than 4 h	80 (34.04) 155 (65.96)	75 (94.9) 88 (56.9)	4 (3.8) 60 (38.6)	1 (1.3) 7 (4.5)	0.001

*****P-value obtained from Kruskal-Wallis H Test and the others calculated by Fisher's exact test

The probable relation between the studied social and demographic variables and VVs severity is presented in Table 3.

Our analysis showed that among different studied variables, only the relationship of VVs severity with age, laboring times, abortion times, and BMI was significant (P<0.001). A higher percentage of old and obese cases had severe severity of VVs, compared to mild and moderate severity (P=0.001).

Mild severity of VVs was more frequent in cases with a once or twice history of laboring, in comparison to the others (P<0.001). This point was presented for the cases with a once or twice history of abortion compared to the others (P=0.001).

No significant relationship was observed of VVs severity with married status, the number of children, employment status, and housing status of the cases (P>0.05). Furthermore, the analysis indicated that VVs severity had no significant relationship with the number of children, a positive history of VVs, menopause status, OCM consumption, receiving hormone therapy, and defecation status. Regression analysis of the relationship of VVs severity with significant variables, such as age, laboring times, abortion times, and BMI, is presented in Table 4.

Our analysis showed that BMI had significantly the highest odds ratio among the other factors (P<0.001).

Table 3: Relationship with varicose severity and studied characteristics of participants

Variables		Varicose Severity (Percentage)			P-value
		Mild	Moderate	Severe	
Gender	Female Male	44 (100) 119 (62.3)	-- 64 (33.50)	--- 8 (4.20)	0.001
Age, years; Mean±SD		35.84±3.95	38.70±5.20	40.62±5.29	*0.001
Weight, Kg; Mean±SD		66.94±6.72	68.51±6.71	70.66±1.97	*0.001
Height, cm; Mean±SD		162.62±5.48	162.81±6.09	162.12±2.41	*0.18
Body mass index, Kg/m^2; Mean±SD		25±2.26	25.84±2.15	26.89±1.27	*0.002
Married status	Married Single Widow Divorced	115 (60.84) 27 (84.4) 3 (100) 6 (4.5)	66 (34.92) 5 (15.6) -- 5 (45.5)	8 (4.24)	0.23
Laboring times	Not yet Once Twice More than twice	22 (84.6) 23 (79.30) 53 (63.9) 8 (32)	4 (15.4) 6 (20.70) 27 (32.5) 12 (48)	 3 (3.6) 5 (20)	0.001
Abortion times	Not yet Once Twice	72 (74.2) 20 (48.8) 15 (62.5)	24 (24.7) 14 (34.1) 9 (37.5)	1 (1) 7 (17.1)	0.001
Number of children	Not yet One Two Three	15 (68.2) 25 (80.6) 56 (65.9) 10 (40)	5 (22.7) 6 (19.4) 26 (30.6) 12 (48)	2 (9.1) - 3 (3.5) 3 (12)	0.03
OCM Consumption	Yes No	68 (58.2) 17 (81)	41 (35) 4 (19)	8 (6.8)	0.11
Defecation	Regular Near-regular Not-regular	9 (81.8) 112 (69.6) 42 (66.66)	2 (18.2) 47 (29.2) 15 (23.80)	-- 2 (1.2) 6 (9.54)	0.06
Menopause	Yes No	7 (58.3) 94 (67.1)	3 (25) 40 (28.6)	2 (16.7) 40 (28.6)	0.11
Hormone therapy	Yes No	46 (68.7) 51 (62.2)	19 (28.3) 25 (30.5)	2 (3) 6 (7.3)	0.45
Family history	Yes No	103 (64.4) 60 (80)	49 (30.6) 15 (20)	8 (5)	0.06
Employment status	Official Contractual Cooperative Not-official	62 (60.3) 74 (72.5) 25 (89.28) 2 (100)	36 (35) 25 (24.5) 3 (10.72)	5 (4.9) 3 (3)	0.09
Housing status	Proprietary Renting Others	39 (68.4) 102 (66.23) 22 (91.3)	15 (26.3) 47 (30.52) 2 (8.7)	3 (5.3) 5 (3.25)	0.14

OCM: Oral contraceptive medicines *P-value calculated by Kruskal-Wallis H test and the others calculated by Fisher Exact Test.

Table4: Regression analysis related to significant social demographic variables and varicose severity

Lifestyle components	Regression analysis		P-value
	Confidence interval	Odds ratio	
Age, year	1.07-1.30	1.18	0.001
Laboring times	1.26-4.53	2.39	0.007
Abortion times	1.27-4.09	2.28	0.005
Body mass index, Kg/m2	2.96-24.15	8.46	0.001

Furthermore, an analysis of the relationship between lifestyle components from LSQ and the severity of VVs was performed (Table 5). Our analysis showed that among five studied components, only the relationship of VVs severity with physical health and weight control was statistically significant (P<0.001). Regression analysis showed that there was not any statistically significant relationship between the severity of VVs and the other components of lifestyle, including social health, psychological and spiritual health, and drug and alcohol avoidance (P>0.001).

Table 5: Regression analysis related to lifestyle components and varicose severity

Lifestyle components	Mean± SD	Regression analysis		P-value
		Confidence interval	Odds ratio	
Social health	1.56±0.44	0.81-2.81	1.51	0.19
Physical health	1.47±0.44	2.82-11.58	5.72	0.001
Psychological and spiritual health	1.20±0.39	0.89-3.75	1.82	0.10
Drug and alcohol avoidance	0.35±0.51	0.57-1.71	0.99	0.99
Weight control and nutrition	1.57±0.53	2.54-8.99	4.78	0.001

Discussion

In the present study, the relationship of social, demographic, and occupational risk parameters for VVs development was investigated among employed nurses in North Khorasan, Iran. Our results showed that the relationship of VVs severity with age, laboring times, abortion times, and BMI was statistically significant. Our analysis indicated that among five studied lifestyle components, the only significant independent predictors of VVs were physical health and weight control. Moreover, static standing and inward walking and sitting postures were determined to be the most independent occupational risk parameters for VVs among participants with active employments. Following previous studies, it was revealed that age was an independent predictor of VVs that was related to VVs severity (7,10,14-16). The findings of the current study showed that gender and the family history of VVs were not related to varicose severity, which was in line with the results of a study conducted by Elamrawy (17). Another study by Ziegler et al. reported that age was not a risk factor for VVs in similar research (18).

In addition, there are some reports declaring that there is a positive association between family history and VVs (2, 19). Considering that VVs are common issues among society members, these results might be interpreted because of the large proportion of their study patients with a positive family history of VVs. Although the results of the present study showed that female gender and severity of VVs were associated significantly, this relation was not valuable due to a higher portion of the female gender, compared to male cases.

Nevertheless, previous reports accredited this point between female gender and VVs possibility (10,14,15,18).

The various reproductive risk factors distribution among women in various works might have led to inconsistent results. Pregnancy and the number of children might elevate the risk of VVs and severity of varicose among females, in comparison to males.

Different findings could be the result of different study protocols, target samples, nature of work, and social characteristics of related studied participants. In agreement with the findings of previous studies, the results of the current research reported that a higher risk of mild VVs was associated with high numbers of children and abortion times (1,7,16,17,20). An increase in the risk of VVs in pregnancy might be explained by the elevated pressure and valve failure due to an increase in intra-abdominal pressure and blood volume and the return of central venous resulting from fetal growth and its weight gain (21).

Moreover, the roles of hormones, including estrogen, relaxin, and progesterone, in the time of pregnancy have been established for VVs progression. Nonetheless, the findings of a study did not support the association of VVs

with the number of children, which was inconsistent with those of the present study (20). This discrepancy can be attributed to the differences in our study participants and their related reproductive risk factors.

Previous reports showed a positive relationship between the level of education and VVs possibility (10,18,22). In this study, there was not any relationship between the level of education and VVs severity. This issue is explained by the difference in the sampled participants as the population of this study was limited to nurses, while that of the previously mentioned studies consisted of a wide range of hospital employers, including farmers, laborers housewives, cleaners, nurses, and utility workers (10,18,22).

Regarding the occupational risk factors, the results of the present study indicated that over time in a month, standing, sitting, and walking postures had a significant relationship with the severity of VVs. Consistent with our results, the findings of a study reported the standing posture as an independent VVs predictor among participants in the hospital (17). The results of most investigations revealed that employees involved in a job that included prolonged standing postures might have the elevated prevalence and severity of VVs (2, 10,18,23). Furthermore, in the current research, it was found that most of the studied cases had irregular constipation and there was marginal significance between constipation and VVs development. Based on the results of previous investigations, irregular defecation was an independent predictor of VVs due to eating habits and intestinal motility, including lack of receiving enough dietary fiber and drinking water (i.e., less than four glasses per day) (1, 10, 21, 24). This point might be explained by the result of an aggravated abdominal pressure leading to the venous return obstruction.

Considering the components of the lifestyle questionnaire, the results of the present study showed that activities related to physical health, including physical exercise and fitness and frequent lifting of heavy objects, had a significant relationship with the risk of VVs development. This finding was confirmed by the results of a study carried out by Tabatabaeifar et al. reporting that physical activity and standing for more than 4 h per day were determined to be independent predictors (7). Although regular exercising was determined to be a protective parameter for the development of VVs (10,14), Yun et al. found there was not any relationship between regular physical exercise and VVs development (16). Discrepancies in the results of studies might be attributed to the different explanations of the regular exercising term.

Regarding our results, another significant component of LSQ with VVs development was weight control and nutrition. In agreement with the findings of our study, Seidel et al. reported the positive relation between VVs and obesity only among women (8).

This point might be explained by the fact that most of the studied cases were married women with twice parity. Additionally, parity could act as a confounding factor since multiparous women tend to have a high average body weight (8). Nevertheless, Elamrawy et al. reported there was no relationship between weight control and the development of VVs (15) due to no difference in the gender distribution among the studied participants (17). However, the correlation of VVs and obesity is still debatable in the literature, and whether obesity has an aggravating or independent influence on the development of VVs is still a challenge (7).

Conclusion

This study investigated the independent factors of VVs development related to the lifestyle risk factors among nurses. These conclusions suggest a planning strategy for VVs prevention, which can be considered in improving the lifestyle and quality of life of nurses in the long-time.

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