ORIGINAL ARTICLE

Prevalence and Risk Factors of Varicose Veins among Nurses in Critical Care Units at Hospitals in South Iraq: A Cross-Sectional Study

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Abstract

Background: Varicose veins are a vascular disease that can lead to serious complications for the cardiovascular system due to damage to the veins. This descriptive cross-sectional study aimed to identify the prevalence of varicose veins among nurses and to determine the most influential risk factors.
Methods: A non-probability (purposive) sample of 151 nurses from critical care units was selected. A questionnaire was used to conduct interviews and gather data, which were then subjected to both inferential and descriptive statistical analysis.
Results: Most participants were aged (22–27) years 51.7%. The sample was predominantly male (88) nurses 58.3%, and years of experience ranged from (1–25) years, with (1–5) years being the most common 60.9%. Participants had nearly equal average standing hours. Most nurses had normal weight, numbering (83) representing a percentage of 55%, were non-smokers (114) 75.5%, and had no family history of varicose veins (111) nurses, representing a percentage of 73.5%. Varicose vein prevalence among critical care nurses was 17.9%. Advanced age, female gender, and positive family history were significant risk factors, while varicose veins showed no relationship with body mass index, working hours, or smoking, indicating further investigation is needed.
Conclusion: The study found that influential factors affecting nurses working in critical care units of South-Iraqi hospitals include age, gender, and family history, while other factors such as body mass index, working hours, and smoking were not found to have a significant impact.

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Introduction

The worldwide prevalence of varicose veins in the lower limbs is estimated at 10%-30%. Varicose veins are enlarged, swollen, or bulging blood vessels that typically form on the legs and feet. They often appear dark purple or blue and may be lumpy, bloated, or otherwise unsightly; they can also develop in other areas of the body.[1]

The first symptom of varicose veins is often discomfort, which includes fatigue, a sensation of heaviness in the legs, and cramping at night. Additional symptoms may include paresthesia, dull or burning pain, and swelling of the dorsum of the foot and the lateral and medial ankles. Noticeable abnormalities in the lower limbs may present as spider veins or wiggly-shaped small swellings beneath the skin's surface.[2]

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As varicose veins develop, they become increasingly apparent and twisted, with blood accumulation that can lead to pain. Characteristics of varicose veins include swollen, thickened, and convoluted valves that do not function properly. Approximately 10% to over 20% of the general population is affected by varicose veins.[3]

A population-based investigation on the prevalence of chronic venous disease (CVD) in Russia found that primary varicose veins were present in 29% of participants (27.5% of women and 31.5% of men). While exacerbating factors have been identified, the exact cause of varicose veins remains unknown. General risk factors include aging, female sex, obesity, multiple pregnancies, prolonged sitting or standing, hard lifting, family history of venous diseases, and smoking.[4]

Varicose veins may result from the disruption of any lower leg vein, including perforator veins and small or large saphenous veins. Although there is no recognized singular cause for varicose veins, common risk factors that increase the likelihood of developing this condition include smoking, advanced age, biological sex, overweight status, multiple pregnancies, hard lifting, prolonged work hours, and a family history of venous issues.[1]

Several studies indicate that varicose veins are more prevalent among specific occupational groups, including police officers, traffic officers, nurses, and teachers. Among nurses, age, gender, and extended periods of standing while on duty are identified as the primary risk factors for varicose veins.[5]

Among hospital nurses, those working in the operating room, emergency room, recovery care unit (RCU), and critical care unit (CCU) are considered at high risk. Nurses in these units are exposed to a variety of risk factors that can lead to musculoskeletal system issues.[6] In line with the Ministry of Health's vision in Iraq, addressing nurses' health concerns, including the prevalence of varicose veins, is crucial. Therefore, this study aimed to determine the prevalence of varicose veins among nurses and identify the most influential risk factors.

Methods

Design: This study utilized a descriptive cross-sectional design, with nursing professionals employed in critical units of hospitals participating.

Sample: The target population for this study consisted of nurses working in CCUs, RCUs, operating rooms, and emergency departments in hospitals in South Iraq. A total of 151 nurses employed in critical units of selected teaching hospitals were recruited using a convenience sampling technique.

Instrument: A structured, self-administered tool was developed by the researchers to collect data from nurses in critical care units. The self-administered tool comprised two sections:

- **Section A:** This section included socio-demographic characteristics of the participants, such as age, sex, years of experience, working hours, body mass index (BMI), smoking status, family history, and work unit location, all of which are considered risk factors for varicose veins.

- **Section B:** This section addressed the diagnosis of varicose veins (yes or no). Content validity of the tool was established through input from nine experts across various nursing specialties and an orthopedist. The reliability of the tool was assessed after the pilot study using the split-half method, yielding an 'r' value of 0.776, indicating high reliability.

Data Collection: The self-administered questionnaire took approximately ten minutes to complete. It was distributed to nursing staff via technological means such as Google Docs, email, WhatsApp, and other platforms. Three reminders were sent to the nurses to encourage participation and ensure that all questions were answered. The study was conducted between December 2023 and February 2024.

Ethical Consideration: Official consent was obtained from the South Iraqi health offices. Additionally, before the study began, consent was obtained from participating nurses by outlining the study's objectives, participants' roles, data confidentiality, and their right to withdraw at any time.

Statistical Analysis: Frequency and percentage distributions were used to examine the demographic risk factors of the participants. Logistic regression and odds ratios were also used to estimate risk ratios and assess significant associations for each factor.

Results

Table 1-4 presents information about the demographic characteristics of the study sample. Notably, 51.7% of the participants fell within the first age group of 22 to 27 years, with a mean age of 28.17 (SD = 4.53). By gender, 58.3% of participants were male, the largest share. Regarding years of experience, a significant proportion of nurses (60.9%) had 1 to 5 years of experience in their field.

Concerning the number of hours spent standing

Table 1: Descriptive Statistics for the Study Sample's Demographic Features

Dem. Variables	Groups	F	P	Cum. Perc.
Age Groups	22-27	78	51.7	51.7
	28-33	58	38.4	90.1
	34-39	6	4.0	94.0
	40-45	9	6.0	100.0
	Mean ± SD	28.17± 4.53 yrs.		
Gender	Male	88	58.3	58.3
	Female	63	41.7	100.0
Experience	1-5	92	60.9	60.9
	6-10	47	31.1	92.1
	11-15	3	2.0	94.0
	More than 15	9	6.0	100.0
Hours	less than 6 hours	77	51.0	51.0
	more than 6 hours	74	49.0	100.0
BMI	Underweight	20	13.2	13.2
	Normal Weight	83	55.0	55.0
	Overweight	41	27.2	27.2
	Obese	7	4.6	4.6
Smoking	Non-Smoker	114	75.5	75.5
	Smoker	37	24.5	100.0
Family History	Not at Risk	111	73.5	73.5
	At Risk	40	26.5	100.0
Unit	Operation Room	46	30.5	30.5
	Emergency	37	24.5	55.0
	RCU	40	26.5	81.5
	CCU	28	18.5	100.0

S: Significant at P<0.05; NS: Non Significant at P>0.05, χ^2: Chi – Square; p- value: probability value; Cum perc.: Cumulative Percentage, S.D: Stander Deviation; $\bar{\chi}$: Arithmetic mean; P: Percentage; F: Frequency

during work, it was found that the largest percentage (51.0%) of nurses stood for less than 6 hours during their work shifts. In terms of body mass index, 83 nurses (55.0%) were classified as having normal weight. Additionally, 111 nurses (73.5%) were non-smokers, and the same percentage (73.5%) reported no family history of venous disease. Among the research participants, the highest percentage (30.5%) worked in operating rooms.

Table 2 presents the risk estimates for the entire study sample. The study found that the prevalence of varicose veins among nurses was 17.9%. The odds ratio for age (≥ 30 vs. < 30) was 4.554, indicating that nurses aged> 30 are more susceptible to varicose veins than those under 30.

Group Diagnosis: Unaffected: The odds ratio was 1.425, indicating that the probability of developing varicose veins in this group is lower, although a clear risk remains.

Group Diagnosis: Affected: The odds ratio was 0.313, indicating that nurses under 30 years are less likely to develop varicose veins.

The odds ratio for sex (Male / Female) was 0.528, suggesting that males are less susceptible to varicose veins than females.

Diagnosis = Unaffected: The odds ratio was 0.898, indicating no significant difference between the sexes in this group.

Diagnosis = Affected: The odds ratio was 1.700, indicating that women appear to be more susceptible to varicose veins than men.

The odds ratio for years of experience (≥5 vs. <5) was 3.319, indicating that individuals with more than 5 years of experience are more likely to develop varicose veins.

Diagnosis = Unaffected: The odds ratio was 1.252, suggesting that the incidence of varicose veins in this group is not significantly impacted by years of experience.

Diagnosis = Affected: The odds ratio was 0.377, indicating that nurses with more than 5 years of experience are less likely to develop varicose veins.

The odds ratio for hours of standing (≥ 6 / < 6) was 1.149, showing no significant difference in the probability of developing varicose veins based on the number of hours spent standing.

Diagnosis = Unaffected: The odds ratio was 1.025, indicating that the occurrence of varicose veins in this

Table 2: Risk Estimate of all variables

Items	Groups	Diagnosis				Risk Estimate	Value
		Affected		Unaffected			
		Freq.	%	Freq.	%		
Age	≥ 30 Years	14	12%	103	88%	Odds Ratio for Age (≥ 30 / < 30)	4.554
	< 30 Years	13	38.2%	21	61.8%	For cohort Diagnosis = Unaffected	1.425
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	.313
Sex	Male	19	21.6%	69	78.4%	Odds Ratio for Sex (Male / Female)	.528
	Female	8	12.7%	55	87.3%	For cohort Diagnosis = Unaffected	.898
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	1.700
Experience	≥ 5 Years	10	10.9%	82	89.1%	Odds Ratio for Exper. (≥ 5 / < 5)	3.319
	< 5 Years	17	28.8%	42	71.2%	For cohort Diagnosis = Unaffected	1.252
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	.377
Hours	≥ 6 Years	13	16.9%	64	83.1%	Odds Ratio for Hours (≥ 6 / < 6)	1.149
	< 6 Years	14	18.9%	60	81.1%	For cohort Diagnosis = Unaffected	1.025
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	.892
BMI	Normal	18	17.5%	85	82.5%	Odds Ratio for BMI (Normal / Over)	1.090
	Overweight	9	18.8%	39	81.3%	For cohort Diagnosis = Unaffected	1.016
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	.932
Family History	Present	16	40.0%	24	60.0%	Odds Ratio for Family (Pres. / Abse.)	.165
	Absent	11	9.9%	100	90.1%	For cohort Diagnosis = Unaffected	.666
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	4.036
Smoking	Yes	9	24.3%	28	75.7%	Odds Ratio for Smoking (Yes / No)	.583
	No	18	15.8%	96	84.2%	For cohort Diagnosis = Unaffected	.899
	Total	27	17.9%	124	82.1%	For cohort Diagnosis = Affected	1.541

group is not significantly affected by the amount of time spent standing.

Diagnosis = Affected: The odds ratio was 0.892, reflecting that standing hours do not play a major role in the development of varicose veins.

The odds ratio for body mass index (BMI) (Normal / Overweight) was 1.090, indicating no significant difference between individuals of normal weight and those who are overweight concerning the development of varicose veins.

Diagnosis = Unaffected: The odds ratio was 1.016, suggesting that weight does not significantly impact varicose veins.

Diagnosis = Affected: The odds ratio was 0.932, indicating that weight has no significant effect on the incidence of varicose veins among this group.

The odds ratio for family history (Present/Absent) was 0.165, suggesting that having a family history reduces the likelihood of developing varicose veins and indicating a potential genetic influence.

Diagnosis = Unaffected: The odds ratio was 0.666, indicating that family history does not significantly influence the development of varicose veins in this group.

Diagnosis = Affected: The odds ratio was 4.036, indicating that individuals with a family history of the condition have a significantly higher likelihood of developing varicose veins.

The odds ratio for smoking (Yes / No) was 0.583, suggesting that smokers are less likely to develop varicose veins, which may be unexpected and warrants further investigation.

Diagnosis = Unaffected: The odds ratio was 0.899, indicating no significant difference in varicose vein incidence within this group.

Diagnosis = Affected: The odds ratio was 1.541, suggesting that smokers may be more susceptible to developing varicose veins in this group.

Table 3: This table illustrates the relationship between the risk of varicose veins and the demographic information of the study sample. It was found that age, sex, and family history are strongly associated with the risk of developing varicose veins, with p-values < 0.05. This result indicates a significant positive effect of age on the dependent variable: the likelihood of developing varicose veins increases with age, as reflected by the p-value.

The gender variable has a negative effect on the outcome, suggesting that one gender (male) is less likely to develop varicose veins than the other, with the p-value indicating statistical significance. Family history also has a significant positive effect on the outcome, making it the most influential factor in our current study. This implies that a family history of varicose veins is associated with a substantially increased risk of developing venous varicosities, as supported by the statistically significant p-value.

Table 3: Variables in the Equation

Items	B	S.E.	Wald	df	P.value	Exp(B)
Age	.345	.072	22.705	1	.000	1.412
Sex	-1.736	.660	6.921	1	.009	.176
BMI	.366	.403	.827	1	.363	1.442
Family History	2.565	.611	17.644	1	.000	13.001
Smoking	-.172	.664	.067	1	.796	.842
hours	-.966	.657	2.161	1	.142	.381
Constant	-12.173	2.360	26.593	1	.000	.000

Conversely, body mass index (BMI), smoking status, and the number of hours spent standing showed no significant effect on the outcome, with p-values greater than 0.05.

The negative constant value of -12.173 indicates a significant decrease in the probability of the target outcome when all independent variables are zero. This suggests that in the absence of influencing factors (such as smoking and other variables), the probability of developing varicose veins is very low.

Finally, a p-value (Sig.) of 0.000 indicates that the constant is statistically significant, indicating that its inclusion in the model is essential for understanding the underlying dynamics of the relationship between the independent variables and the outcome.

Discussion

Varicose veins are one of the most common problems affecting blood vessels in the lower extremities, with a worldwide prevalence ranging from 10% to 30% (Almutiri et al., 2024).[7] Nursing is among the professions in which varicose veins are prevalent, largely due to long working hours and significant physical effort (Mishra et al., 2015).[8]

Prevalence

In this study, the incidence of varicose veins among nurses was 17.9%, consistent with findings from Egypt (18.4%) and South Korea (16.2%) (Abou-ElWafa et al., 2020; Yun et al., 2018).[9, 10] Thus, the prevalence of varicose veins appears to be relatively stable among nurses across different regions. The high incidence of varicose veins among nurses can be attributed to working conditions in these countries, hospital policies, and nurses' health status.

Demographic Factors

The mean age of participants in this study was 28.17 years (SD = 4.53), a result that closely aligns with findings from Maziad & Deek (2021)[11] who reported a mean age of 29.3 years (SD=6.9).

The majority of participating nurses in our study were men (58.3%). This finding is consistent with studies conducted in India, where the proportion of male nurses ranged from 74.7% (Joseph et al., 2016)[12] to 80.0% (Mulla & Pai, 2017).[13] The predominance of males in this study may be explained by the fact that most participants who agreed to take part were male, and the study was conducted in critical care units where male nurses are more commonly found.

Most nurses in the study had less than 5 years of work experience (60.9%), a result similar to the findings of Abou-ElWafa et al. (2020)[8] in Egypt, where 65.1% of participants had less than 5 years of experience. This indicates that many of the surveyed nurses are early in their careers, highlighting the need for training and enhanced occupational health interventions to reduce the incidence of varicose veins.

The majority of nurses in the study were non-smokers (75.5%). A study conducted in Saudi Arabia found a similar trend, with 83.8% of participating nurses being non-smokers (Ali et al., 2022).[14] This raises awareness of the health risks associated with smoking among healthcare professionals.

In this study, approximately 73.5% of nurses reported having no family history of varicose veins. This result aligns with a study conducted at Dhulikhel Hospital, which reported that 81.8% of participants had no family history of varicose veins (Shakya et al., 2020).[15]

In our research, 55.0% of nurses were classified as having a normal weight. This finding is comparable to studies in India (86.7%) and Poland (53.6%) (Naik & Monteiro, 2024; Łastowiecka-Moras, 2021),[16, 17] reflecting a healthy lifestyle and awareness of the risks associated with obesity among nurses.

The largest percentage of nurses (30.5%) in our study worked in the operating unit, with a study in Egypt reporting that 42.7% worked in the operating room and intensive care unit (Abou-ElWafa et al., 2020).[8] The high representation of nurses in the operating room can be attributed to the variety of specialties involved, including minor and major surgeries, fractures, ophthalmology, and neurology, which require a greater number of nursing staff.

More than half of the nurses (51%) worked less

than 6 hours per day, a pattern similar to findings in Baghdad, where 41% of nurses reported standing for 4-6 hours during their shifts (Al-Alreda et al., 2023).[17]

Risk Estimate (Odds Ratio) of All Variables

Our current study found statistically significant associations between age, female gender, family history, and the presence of varicose veins. This finding is supported by studies conducted in India and South Korea, which identified age as a risk factor for developing varicose veins (Shadap et al., 2018; Yun et al., 2018).[10, 18] Conversely, a study in Lebanon found no relationship between age and the incidence of varicose veins (Maziad & Deek, 2021).[11] This discrepancy may be attributed to geographical differences and to other health conditions among participants that could contribute to the development of varicose veins.

In Korea, Jung et al. (2020)[18] reported that the incidence rate among women was 2.3 times higher than that among men, which may be explained by women typically standing for longer periods at both work and home, as well as anatomical differences. A study in Saudi Arabia also found an association between family history and varicose veins, paralleling our findings (Ali et al., 2022).[13] This suggests that genetic factors influence the incidence of varicose veins.

Like our study, several investigations in Saudi Arabia and Lebanon reported no statistically significant relationship between body mass index (BMI) and varicose veins (Baghdadi et al., 2023; and Maziad & Deek, 2021).[6, 11] However, this study's results differ from those in Baghdad, where it was noted that higher BMI correlates with a greater risk of developing varicose veins (Al-Alreda et al., 2023).[17] The differences in findings may be attributed to variations in population characteristics related to physical fitness, lifestyle, and sample size.

A key finding of our study is the absence of a statistically significant relationship between smoking, standing hours, and the incidence of varicose veins. This finding aligns with a study in Saudi Arabia that similarly reported no significant correlation (Ali et al., 2022).[13] This may suggest that the occurrence of varicose veins is influenced by factors that are more significant than smoking and standing hours, such as age and family history. Simply put, smoking and standing hours alone may not be sufficient to cause varicose veins, especially since most nurses in the current study were non-smokers and spent less than six hours standing during their shifts.

Conclusions

The incidence of varicose veins in this study was 17.9% among nurses, with age, female sex, and family history identified as the most significant risk factors. A noteworthy aspect of this study is that it determined that standing hours, smoking, and body mass index were not associated with the development of varicose veins. This finding contradicts many previous studies. Additionally, this research provides valuable evidence from Iraq, where the literature on this topic has been limited.

In conclusion, the study recommends that healthcare providers, particularly nurses, be the focus of interventions due to their vital role in patient care. Regular medical examinations should be conducted to detect varicose veins early. Moreover, efforts must be directed toward educating nurses about this condition, as such awareness is essential for the safety, health promotion, and well-being of healthcare workers. Further research is necessary to explore the risk factors associated with varicose veins, mitigate their incidence, and better understand their prevalence among healthcare providers in Iraqi hospitals.

Conflict of Interest

The authors declare no competing interests.

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