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RISK FACTORS FOR VARICOSE VEINS IN BLUE-COLLARED WORKERS AT THE GLODOK MAKMUR SHOPPING CENTRE JAKARTA

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ABSTRACT

Varicose veins, apart from affecting daily activities such as walking, also impact aesthetics. Varicose veins are dilated veins characterized by the bulging of blood vessels. In Europe, varicose veins are experienced by 50% of the population, while in Indonesia, it is around 25-30% of the population. Although varicose veins have a low mortality rate, the discomfort, swelling, and hyperpigmentation they cause can progress to more complex health problems. This study aims to determine the risk factors for lower limbs varicose veins in blue-collar workers at the Glodok Makmur shopping centre Jakarta. A case-control design was used in this research. A total of 40 cases, namely male workers with lower limb varicose veins, and 40 controls, namely male workers without lower leg varicose veins, were selected using purposive sampling. Data from respondents were collected through questionnaires and analyzed using the Chi Square test with a significance of $\alpha = 0.05$. From the results of the analysis, it was found that lower limbs varicose veins had a significant relationship with high BMI (OR = 4.667, 95% CI = 1.507-14.455), dominant working position standing (OR = 7.071, 95% CI = 2.519-19.850), smoking habits (OR = 0.648, 95% CI = 0.503-3.018), and family history of varicose veins (OR = 6.000, 95% CI = 2.207-16.313). The results of this study indicate that high BMI, dominant working position standing, smoking habit, and family history of varicose veins are potential risk factors for the occurrence of lower leg varicose veins in blue-collar workers at the Glodok Makmur shopping centre Jakarta.

Keywords : Varicose Veins., High BMI., Long-Standing., Smoking., Family History

ABSTRAK

Varises pada tungkai bawah selain berpengaruh terhadap aktivitas sehari-hari yaitu berjalan juga berpengaruh pada estetika. Varises merupakan dilatasi pada vena yang ditandai dengan penonjolan pembuluh darah. Di Eropa, varises dialami oleh 50% populasi sedangkan di Indonesia berkisar 25-30% populasi. Meskipun varises memiliki mortalitas yang rendah, rasa tidak nyaman yang disertai pembengkakan dan hiperpigmentasi yang ditimbulkan dapat berlanjut menjadi masalah kesehatan yang lebih kompleks. Penelitian ini bertujuan untuk mengetahui faktor-faktor risiko terjadinya varises di tungkai bawah pada buruh di Pertokoan Glodok Makmur Jakarta. Rancangan case-control digunakan dalam penelitian ini. Sebanyak 40 kasus yaitu buruh pria dengan varises tungkai bawah dan 40 kontrol yaitu buruh pria tanpa varises tungkai bawah dipilih secara purposive sampling. Data dari responden dikumpulkan melalui kuisioner dan dianalisis menggunakan uji Chi Square dengan signifikansi $\alpha = 0,05$. Dari hasil analisis didapatkan, varises tungkai bawah memiliki hubungan yang signifikan dengan IMT tinggi (OR = 4,667, 95% CI = 1,507-14,455), posisi kerja dominan berdiri (OR = 7,071, 95% CI = 2,519-19,850), kebiasaan merokok (OR = 0,648, 95% CI = 0,503-3,018), dan riwayat varises dalam keluarga (OR = 6,000, 95% CI = 2,207-16,313). Hasil penelitian ini menunjukkan bahwa IMT tinggi, posisi kerja dominan berdiri, kebiasaan merokok, dan riwayat varises dalam keluarga berpotensi sebagai faktor risiko terhadap terjadinya varises tungkai bawah pada buruh di Pertokoan Glodok Makmur Jakarta.

Kata kunci : Varises, IMT Tinggi, Berdiri lama, Merokok, Riwayat Keluarga

1. INTRODUCTION

Varicose veins are often found in the community, this is related to genetics, which is reinforced by the sedentary lifestyle of the community. Varicose veins are experienced by approximately 50% of the population on the European continent, both men and women, which will affect health and quality of life. Varicose veins in Indonesia reach a prevalence of 25-30% of the population where varicose veins in the lower limbs in Indonesia are influenced by occupational factors, especially jobs with long-standing time requirements, such as nurses.[1] A study revealed that

the risk of developing varicose veins in the lower limbs is 59.8 times higher in individuals who consistently lift heavy items, and 3.65 times higher in those who stand continuously for more than 4 hours per day.[2] Manual laborers who perform physically demanding work that requires energy also exhibit a higher prevalence. This includes workers at the Glodok Makmur store in Jakarta, a hub for electrical equipment, where employees often lift heavy loads such as cables, generators, and water pumps weighing tens of kilograms.[3]

Varicose veins are dilated venous vessels that cause protrusion of the vessels and are more common in the lower extremities. Varicose veins are a multifactorial event caused by genetics, vessel walls that lack integrity, increased intravenous pressure due to obesity, and several other factors, such as a lifestyle of often standing or walking and smoking.[4] Varicose veins are often underestimated due to the low mortality caused. Varicose veins cause discomfort, swelling, hyperpigmentation, static dermatitis, and scabs, leading to other more complex health problem.[5]

Obesity is one of the factors contributing to varicose veins and can be assessed from body mass index (BMI)-where there is an imbalance of body mass and height, which risks causing more complications such as heart disease and diabetes.[6] Varicose veins can also be caused by constant standing, walking, and sitting for long periods, leading to musculoskeletal system disorders.[3]

Varicose veins in the inferior extremities are very often found in the community, especially in manual workers who use energy to do their work, for example, transport workers and workers in the construction field. Likewise, workers at the Glodok Makmur shopping centre in Jakarta whose task are associated with lifting various heavy items to be moved from the storage warehouse to the transport truck and then to the buyer's place, this will certainly put pressure on the veins wall, especially in the inferior extremity veins which are in the distal part of the body that will support the load.

2. MATERIALS AND METHODS

This study has obtained ethical clearance from the Research Ethics Commission of the Faculty of Medicine, Udayana University number 220/UN14.2.2.VII.14/LT/2023. Research period is from December 2022 to October 2023. Case-control design is used and the participants of this study were blue-collar workers at the Glodok Makmur Shopping Centre in Jakarta, selected based on the inclusion criteria aged between 20-65 years old, male, has no history of intervention to varicose veins, and is willing to participate in the research with an exclusion criterion of less than 2-year work experience, has a history of veins problems, and didn't fill all the questionnaire question. A total of 80 participants, 40 with varicose veins and 40 without varicose veins were included in the study.Respondents who have been classified into case groups who have varicose veins and controls who do not will be searched for risk factors such as high BMI, prolonged standing, smoking habits, and family history of varicose veins using questionnaires.[7]

The collected data will be processed using the Statistical Package for the Social Sciences (SPSS) for Windows ver.26.0 program. The data distribution from both groups will be analyzed for correlation with risk factors using chi-square analysis. The strength sequences of the variable relationship were analyzed using logistic regression.

3. RESULTS

Of the total sample, most workers' BMIs was in the class 1 obesity group, with 20 people (50%) in the case group and 17 people (42.5%) in the control group. In comparison, other BMI group such as obesity class 2 has eight people (20%) in the case group and two (5%) in the control group, while other group such as underweight has only 1 participants in the case group (2.5%), normal BMI has 16 participants in the control group(40%) and 4 participants in the case group(10%), overweight has 5 in the control group(12.5%) and 7 in case group (17.5%) and the overall average BMI of respondents was 25.86. The dominant working position of the case group workers was standing with 33 people (82.5%). In comparison, workers with the dominant working position of sitting, which amounted to 24 people (60%).

The majority of respondents from the case group had a family history of varicose veins, totaling 24 people (60%), whereas the majority of respondents from the control group did not have a family history of varicose veins 32 people (80%). The majority of both group respondents had a history of smoking, totaling 25 people (62.5%) of the case group and 23 people (57.5%) of the control group. The majority of respondents from the case group had an age group of 41-50 years with 16 people (40%) and the lowest was 21-30 (2.5%), while the majority of respondents from the control group had an age group of 31-40 years with 14 people (35%) and the lowest was 21-30 with 5 people (12.5%).

Based on the chi square test on table 2, a significant relation is found between varicose veins and high BMI (≥ 23 kg/m2) with *p* value of 0.005 and odds ratio of 4.667 with 95% CI with lower limit of 1.507 and upper limit of 14.455 meaning people with high BMI has 4.667 more chance to develop varicose veins than those with normal BMI. A significant relation is also found between varicose veins and standing dominant working position with *p* value of 0.000 and odds ratio of 7.071 with 95% CI with lower limit of 2.519 and upper limit of 19.850 meaning people with standing working position has 7.071 more chance to develop varicose veins than those with sitting dominant position. Another significant relation is found between varicose veins and family history with *p* value of 0.000 and odds ratio of 6.000 with 95% CI with lower limit of 2.207 and upper limit of 16.313 meaning people with family history of varicose vein has 6.000 more chance to develop varicose veins than those without family history of varicose vein. Meanwhile, it is found that there are no significant relations between varicose veins and smoking history with *p* value of 0.648.

Table 1. Characteristics of blue-collared workers at Glodok Makmur Shopping Centre Jakarta

Variables	Control frequency (%)	Case frequency (%)	Total (%)
BMI status			
Underweight	0 (0%)	1 (2.5%)	1 (1,3%)
Normal	16 (40%)	4 (10%)	20 (25%)
Overweight	5 (12.5%)	7 (17.5%)	12 (15%)
Obesity class 1	17 (42.5%)	20 (50%)	37 (46.3%)
Obesity class 2	2 (5%)	8 (20%)	10 (12.5%)
Dominant working position			
Sitting	24 (60%)	7 (17.5%)	49 (61.3%)
Standing	16 (40%)	33 (82.5%)	31 (38.3%)
Family history of varicose veins			
No	32 (80%)	16 (40%)	48 (60%)
Yes	8 (20%)	24 (60%)	32 (40%)
Smoking history			
No	17 (42.5%)	15 (37.5%)	32 (40%)
Yes	23 (57.5%)	25 (62.5%)	48 (60%)
Age group			
21-30	5 (12.5%)	1 (2.5%)	6 (7.5%)
31-40	14 (35%)	10 (25%)	24 (30%)
41-50	12 (30%)	16 (40%)	28 (35%)
51-65	9 (22.5%)	13 (32.5%)	22 (27,5%)
Total	40 (100%)	40 (100%)	80 (100%)

Table 2. Results of chi-Square test analysis of factors associated with the varicose veins in blue-collared workers at Glodok Makmur Shopping Centre Jakarta

Variables	Case f (%)	Control f (%)	Total	*p* - value	OR	95% CI	
						Lower	Upper
BMI group							
Normal	5 (12.5%)	16 (40%)	21	0.005	4.667	1.507	14.455
High BMI	35 (87.5%)	24 (60%)	59				
Dominant working position							
Sitting	7 (17.5%)	24 (60%)	31	0.000	7.071	2.519	19.850
Standing	33 (82.5%)	16 (40%)	49				
Family history of varicose veins							
No	16 (40%)	32 (80%)	48	0.000	6.000	2.207	16.313
Yes	24 60%)	8 (20%)	32				
Smoking history							
No	16 (40%)	32 (80%)	48	0.000	6.000	2.207	16.313
Yes	24 60%)	8 (20%)	32				
Total	40 (100%)	40 (100%)	80				

Table 3. Results of logistic regression multivariate analysis

Models	Variables	*p* - value	EXP (B)	95% CI.for EXP(B)	
				Lower	Upper
1[a]	Normal/high BMI (1)	0.006	6.552	1.710	25.101
	Dominant working position (1)	0.001	6.810	2.084	22.249
	Family history (1)	0.020	3.872	1.236	12.129
	Smoking history (1)	0.738	0.826	.271	2.523
	Constant	0.000	0.149		
2[a]	Normal/high BMI (1)	0.006	6.413	1.693	24.293
	Dominant working position (1)	0.001	6.902	2.117	22.500
	Family history (1)	0.019	3.887	1.244	12.147
	Constant	0.000	0.133		

Based on table 3 it was found that high BMI had *p*-value 0.006 with an exponential odds ratio of 6.413. Standing dominant work position has *p*-value 0.001 with an exponential odds ratio of 6.902. Family history of varicose veins has *p* = 0.019 with an exponential odds ratio of 3.887. Smoking history was eliminated in the logistic regression table because it did not meet the maximum significance of 0.05 so the significant variable that affects varicose veins were high BMI, dominant working position of standing, and family history of varicose veins and the variable most affecting varicose vein were dominant working position.

4. DISCUSSION

4.1 BMI and varicose veins

There is a significant relationship between varicose veins of the inferior extremities and high body mass index (BMI), with *p*-value 0.005 and odds ratio of 4.667, which means that people who have high BMI have a risk of experiencing varicose veins 4.667 times greater than those with normal BMI. This is in line with the research of Gawas et al. in 2022, which said that varicose veins are an advanced disease of high BMI due to reduced femoral veins flow.[8] According to Sabputra's research in 2019, there is a relationship between high BMI ≥23 and varicose veins due to damage to the structure of venous vessels due to increased blood volume.[1] High BMI includes overweight, obesity class 1, and obesity class 2. An overweight condition measured by a body mass index (BMI) of more than 23 kg/m2, according to WHO Asia Pacific 2000.[9]

Body mass index increases with age due to physiological changes and body composition that occur with age and weight that will continue to increase according to age due to decreased physical activity.[10] In the study, it was found that as many as 87.5% of respondents with varicose veins had a high BMI, namely overweight and above. The high BMI rate in respondents puts high pressure on the veins, so due to the tremendous pressure, the veins are blocked and swollen.[11]

4.2 Dominant working position and varicose veins

Respondents included in this study were workers who worked in a dominant position of sitting and standing constantly ≥ 6 hours a day.[12] There is a significant relationship between varicose veins in the lower extremities and prolonged standing work positions, with a significance value of p = 0.000 in respondents and an odds ratio of 7.071. This implies that individuals who predominantly work in a standing position have a risk of experiencing varicose veins that is 7.071 times greater than those who predominantly work in a sitting position. Further complications can include valve dysfunction, problems with the vein walls, and inflammation.[13] included in this research were workers who worked in a dominant position of sitting and standing constantly >= 6 hours a day

According to Sabputra's research in 2019, there is a relationship between prolonged standing and the occurrence of varicose veins in the lower limbs because prolonged standing can cause increased hydrostatic pressure that cannot be resisted by the veins so that the valves become incompetent.[1] Prolonged standing can significantly cause venous stasis in the lower leg veins. This can lead to musculoskeletal problems. Yazuli et al., [14] report that among the respondents who experienced varicose veins, 22 respondents (55%) experienced symptoms such as stiffness or cramps in the calf muscles, and eight respondents (20%) experienced sudden pain when standing for extended periods.

4.3 Family history and varicose veins

There is a significant relationship between varicose veins of the inferior extremities and a family history of varicose veins, with *p*-value 0.000 and odds ratio = 6.000, this suggest that people who have a family history of varicose veins have a risk of experiencing varicose veins 6.000 times greater than those who do not have a family history of varicose veins. According to Aly's research in 2020 found that 72.4% of respondents with varicose veins had a family history of varicose veins[15] Genetics with weakened veins walls and valves and dilated vessels in average blood pressure conditions will cause incompetence in the body's circulatory system.[16]

4.4 Smoking history and varicose veins

Smoking is the activity of actively inhaling processed tobacco products, including cigars or other forms of cigars or tobacco.[17] There was no significant relationship between inferior extremity varicose veins and smoking history, obtained significance p = 0.648 in respondents so that the odds ratio value was not used, in contrast to Nagaraj's research in 2019, which states that smoking causes disturbances in the vessel system because it makes molecular imbalance.[18]. However, a decrease in blood fibrinolytics was observed in most of the previous

respondents.[10] There was no significant relationship found between varicose veins in the lower extremities and smoking history, with a significance value of p = 0.648 in respondents. This contrasts with Nagaraj's 2019 research, which states that smoking causes disturbances in the vascular system due to molecular imbalances.[18] Yet, this is consistent with Aslam's 2022 research, which found that varicose veins were not significantly present in smokers. This could be because the tendency of men to smoke is one of the reasons for the lack of significant reports. However, a decrease in blood fibrinolytics was observed in most of the previous respondents. [19,20]

5. SUMMARY

Based on the results of research on risk factors for varicose veins of the inferior extremities in workers at Glodok Makmur Shops in Jakarta to find the relationship between varicose veins of the inferior extremities with body mass index (BMI), a history of long-standing, a history of smoking, and a family history of varicose veins in the case group and control group. It can be concluded that there is a significant relationship between varicose veins of the inferior extremities with high BMI (p = 0.005, OR = 4.667), dominant work position (p = 0.000 OR = 7.071), and family history with varicose veins (p = 0.000 OR = 6.000). With the conclusion that people with high BMI have a risk of having varicose veins 4.667 times greater than those with normal BMI, people who have a dominant position of work standing have a risk of having varicose veins 7.071 times greater than those who have a dominant position of work sitting, people who have a family history of varicose veins have a risk of having varicose veins 6.000 times greater than those who do not have a family history of varicose veins. The most influential risk factor is the dominant work position of standing, followed by high BMI and a family history of varicose veins. Collaborating with the cardiovascular department to conduct follow-up examinations is recommended to make a more definitive diagnosis of inferior extremity varicose veins in respondents and ask for further advice regarding the disease. To reduce the effects of varicose veins on daily life, management through lifestyle changes such as conservation and advanced surgery can be applied. It is hoped that the results of this study can motivate other researchers as additional reference material for further research purposes. For future research, more meaningful results can be obtained, and if possible, further research can be carried out related to other variables that have not been studied in this study.

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