KNOWLEDGE AND PREVALENCE OF RISK FACTORS FOR DEEP VEIN THROMBOSIS AMONG ADULT SAUDI POPULATION

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Abstract

While the reported annual incidence of venous thrombo-embolism varies widely, ranging from 43.7 to 145 per 100 000, the true incidence in the Kingdom of Saudi Arabia (KSA) remains unknown. Deep Vein Thrombosis (DVT) is a term that refers to blood clots inside a deep vein in the body, most commonly in lower extremities (usually calf or thigh); in rare cases, it can be in upper extremities. The main aim of this study was to assess the public knowledge and extent of DVT and to assess the influence of socio-demographic factors. The objectives were:

- To test the association between gender and the prevalence of DVT.
- To test the association between body mass index (BMI) and the prevalence of DVT.
- To test whether recent or current pregnancy and DVT are significantly associated.
- To test the significance of a family history of DVT and the prevalence of DVT among members of the same family.
- To fit binary logistic models that flag the important factors for DVT

Methods

The study was cross-sectional and it involved the adult population in Saudi Arabia. The total enumeration method was used to include male and female that agreed to answer the questionnaire in this study. The questionnaire included demographic information and knowledge and attitudes towards the symptoms, and risk factors measures.

Results

The ages of 317 of the 484 respondents who agreed to fill out the questionnaire were between 19 and 30 years. Males were 35.8% and females 64.2%, while 21.8% of the respondents reported having an incidence of DVT. DVT was statistically significantly associated with gender and pregnancy condition $p < .05$ in both cases while the highest risk factor was gender where females were 2.205 more times likely to have DVT than males [95% CI; 1.85, 2.63, $p < .000$].

Conclusions

There is a general increase in knowledge for DVT and also a general increase in incidences of DVT in Saudi Arabia compared to previous literature. BMI, gender, and pregnancy condition are the main risk factors of DVT.

Keywords: Deep vein thrombosis, risk factors, Surgery, Saudi Arabia

Introduction

In the last century, deep vein thrombosis (DVT) was one of the most common causes of death in hospitalized patients (1). The reported annual incidence of venous thrombo-embolism varies widely, ranging from 43.7 to 145 per 100 000 (published rates were age- and sex- adjusted to the 1980 US white population) for deep vein thrombosis (2). The true incidence in Saudi Arabia (KSA) is unknown. Assuming a similar rate as in other parts of the world, approximately 25,000 people are affected in the KSA annually. (3) DVT is a term that refers to blood clots inside a deep vein in the body, most commonly in lower extremities (usually calf or thigh); in rare cases, it can be in upper extremities (4). DVT results from 3 factors described by Virchow for over a century, which contribute to form clot inside blood vessels including damage to endothelial wall, impaired venous return, and coagulopathy (5). Many

predisposing factors are responsible for deep vein thrombosis; most important factors are hospital admission for surgical condition (5). Pregnancy, oral contraceptive, and hormonal replacement therapy, all will increase female hormone estrogen, which causes the blood to clot more easily. Being inactive or immobile for a long time will cause stasis of blood flow, which increases the risk of clots developing (5,6). In some cases of DVT, when they occur in the small calf veins, are asymptomatic but when the clot(s) cause partial or complete blocking of circulation in the vein it leads to pain, swelling, tenderness, discoloration or redness of the affected area, and warm skin around the area of the clot (7). History and physical examination help to determine the probability of DVT, but it is difficult to diagnose by depending on its symptoms alone. So, it should be established by special investigation like D-dimer test, Doppler ultrasound, Computerized tomography (CT), or magnetic resonance imaging (MRI) scans. (8)

Patients who are confirmed with DVT are most commonly treated with subcutaneous low molecular weight heparin and rapidly anticoagulant. Additionally, thrombolysis should be considered, but they have a higher risk of bleeding compared to the anticoagulants (9). Sometime anticoagulant medications do not work effectively, and we need to stop them using the alternative treatment (Inferior vena cava (IVC) filter). Surgical thrombectomy is another type of surgery that removes a blood clot from an artery or vein by making an incision into the blocked blood vessel, and the clot is then removed. However, surgical treatment is rarely needed (10). If left untreated, the most serious complication of DVT is a pulmonary embolism (PE), which occurs in over one-third of DVT patients. PE is the blood clot that travels through blood stream to heart and then to the lungs resulting in reduced blood flow and blockage of the pulmonary artery. PE is a serious, life-threatening complication (11). DVT carries a varied risk for developing complications, such as post- thrombotic syndrome, and a pulmonary embolism event can lead to pulmonary hypertension and cardiac-respiratory failure and collapse (12, 13).

Primary Objective

Our primary aim is to assess the extent of public knowledge and extent of DVT and to assess the influence of socio-demographic factors.

Specific objectives

- To test whether gender and DVT condition are significantly associated
- To test whether BMI varies significantly across levels of DVT
- To test whether recent or current pregnancy and DVT condition are significantly associated
- To test whether a family history of DVT and individual incidence of DVT are associated
- To fit binary logistic models that flag the important factors for DVT

Methods

Study design

The study was cross-sectional conducted in different regions of Saudi Arabia in the year 2019 and it involved adults. Their knowledge of the deep vein thrombosis and the risk factors were tested. A sample of 484 respondents was successfully drawn and through a cross- sectional study design after obtaining consent from the ethics committee, the study began.

The defined population was thus the adult population including males and females within the territories of Saudi Arabia, who volunteered to participate in the study and agreed to answer the questionnaires. Pre-tested questionnaires were used in data collection. The questionnaire included demographic information and knowledge and attitudes towards the symptoms, risk factors, complications and preventative methods for DVT. Data cleaning and analysis were done using SPSS version 25.

Analysis and Results

317 of the 484 respondents who agreed to fill out the questionnaire were aged between 19 and 30 years, which represented the largest proportion of the sample (65.2%). Individuals aged between 61 and 74 years were only 0.6%, while males were 35.8% and females at 64.2%. The proportion of people who reported to know about DVT was not significantly different from the proportion of respondents who said they did not have any knowledge of DVT ($p=.856$), while 395 (81.3%) of the study respondents said they did not have family members with DVT. Only 23 (6.5%) of the women in the study were currently or were recently pregnant, while the most reported symptom of DVT including pain, headache and skin change. The average BMI was 25.95 with a standard deviation of 6.29. See table 1 for more details.

Discussion

The primary goal of the present study was to assess public knowledge of DVT and the significance of the demographic factors that contribute to the prevalence of DVT. Like most survey studies, the present study found more female respondents than male respondents, even though the proportion of males was not twice as much as that of females (Duffy, Smith, Terhanian & Bremer 2017) (143). Age was not found to be a risk factor for DVT (Cieslik, Mrozinska, Broniatowska, & Undas, 2018) (14), given that the proportions of ages were significantly different from each other. Almost half (49.6%) of the study participants reported having some knowledge of DVT, which was significantly different from the study by Almodaimegh et al (2017) (15), where about 15% of the respondents in their study have knowledge about deep venous thromboembolism.

The present study however found no significant difference between the respondents who said they knew DVT and those who did not have any knowledge. The present study found that 21.8% of the study participants reported having an experience either currently or in the past about deep vein thrombosis. This is in comparison to the study by Elkhadir et al (2015) (16) that detected DVT in 15.7% of the sample participants and the findings of Almodaimegh et al (2017)

- Where 18.4% reported having an experience. From these three studies a possible emerging trend shows an increase in the public knowledge of DVT and possibly and indirectly an increase in the incidences of DVT over the 5 years that these studies were conducted. More than half (57.0%) of the present study's participants correctly identified DVT symptoms, in comparison to the 40.7% of the study participants who did not have knowledge of the symptoms of DVT.

The prevalence of DVT, as reported by previous studies (Almodaimegh, 2017 and Elkhadir et al., 2015) (15, 16) could explain why only about half of populations have knowledge of the symptoms of DVT, while about 40% of the population do not have this knowledge. Most of the

participants correctly identified the risk factors of DVT as obesity (74.6%), immobility (18.2%) and smoking (5.2%). However, immobility is the commonest risk factor for DVT when compared to obesity (Baglin et al., 2003) (17). This is however a sign of more prevalent knowledge in comparison with the study by Almodaimegh (2017) (15) where about 30% of the respondents did not correctly identify the risk factors of DVT.

While the main aim of the study was to explore the knowledge about DVT, the analysis went a step further to determine the aspects of demography that would be associated with DVT. One of the major findings was that gender and whether a woman was recently or currently pregnant were significantly associated with DVT. The fact that more men (59) versus women (47) exhibited incidences of DVT showed an increased risk in males than in females, a finding that supported with the existing literature that men

have a higher chance at DVT than women (Roach et al., 2014) (18). Recently pregnant women could be at a higher risk of developing DVT than other women, potentially due to the increased weight during pregnancy (Hedge, 2018) (19). Age was not a significant predictor of DVT, an inconsistent factor when compared to the findings of Fujiwara et al. (2019)(20). This is probably due to their sample including larger proportion of participants older than 70 years.

In conclusion, the present study was predominantly descriptive, but a few inferences were made, which could form a basis for further research in the future. The findings of the study may be limited due to self-reported responses considered to be biased. The main finding was that BMI, gender and pregnancy are the main risk factors of DVT. Add to this an increasing knowledge about DVT.

Table 1: Summary and Descriptive Statistics

Variable	Frequency (%)	P value
Gender		0.000
Female	312 (64.2%)	
Male	174 (35.8%)	
Age		0.000
<18	24 (4.9%)	
19-30	317 (65.2%)	
31-40	86 (17.7%)	
41-60	56 (11.5%)	
61-74	3 (0.6%)	
Knowledge of DVT		0.856
Yes	241 (49.6%)	
No	245 (50.4%)	
History of experience with DVT		0.000
Yes	106 (21.8%)	
No	380 (78.2%)	
Family history of DVT		0.000
Yes	91 (18.7%)	
No	395 (81.3%)	
Symptoms of DVT		0.000
Pain/headache with skin changes	236 (48.6%)	
Swelling/joint pain and others	41 (8.4%)	
Other	11 (2.3%)	
No knowledge	198 (40.7%)	
Pregnancy		0.000
Yes	23 (5.4%)	
No	289 (92.6%)	
Risk factors		0.000
Immobility	63 (18.2%)	
Obesity	258 (74.6%)	
Smoking	18 (5.2%)	
Others	7 (2%)	

DVT was statistically significantly associated with gender and pregnancy condition ($p < .05$) in both cases. However, there was no significant association between family history and DVT $p > .05$. See table 2 below.

Table 2: Associations with DVT condition

Variable	Chi-Square (df)	P value
Gender	4.29 (1)	0.038
Pregnancy	3.997 (1)	0.046
Family History of DVT	2.105 (1)	0.147

From our binary logistic model, the highest risk factor was gender, where females were 2.205 more times likely to have DVT than males [95%CI; 1.85, 2.63, $p < .000$], while age was not a significant predictor of DVT condition ($p > .05$).

Table 3: Binary logistic fit

Variable	Exp (B)	P value	95% CI
BMI	2.205	0.000	1.85-2.63
Gender	6.664	0.000	2.73-16.26
Pregnancy	0.352	0.34	0.134-0.926
Age group			Not significant
< 18	0.000	0.000	
19-30	0.726	0.726	
31-40	0.194	0.194	
41-60	0.256	0.256	

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