

Public awareness of venous thromboembolism in Riyadh, Saudi Arabia



Khaleel I. Alyahya^{1,*}, Fatima S. Alangari², Danyah K. Saja², Leen O. Alothaim², Shoag J. Albugami², Sama O. Alharbi²

¹Department of Anatomy, College of Medicine, King Saud University, Riyadh, Saudi Arabia

²College of Medicine, King Saud University, Riyadh, Saudi Arabia

ARTICLE INFO

Article history:

Received 3 October 2019

Received in revised form

5 January 2020

Accepted 9 January 2020

Keywords:

Public awareness

Venous thromboembolism

Deep vein thrombosis

Pulmonary embolism

Saudi Arabia

ABSTRACT

Venous thromboembolism (VTE) is a fatal disease associated with high morbidity and mortality rate. Increasing the level of knowledge and awareness might be beneficial in a certain population by making people more engaged in treatment and in the need for prophylaxis. The aim of the study is to determine the level of awareness of VTE among residents in Riyadh, Saudi Arabia and to determine if there is a difference in the level of awareness regarding gender and age. A quantitative observational cross-sectional study was performed in Riyadh, Saudi Arabia, in the period of September 2018 to March 2019. The total number of study participants was 349. Females showed a significantly higher awareness of deep vein thrombosis (DVT) and pulmonary embolism (PE) compared to males, while there was no significant difference as regard age. The study highlighted the urgent need for structured awareness promotion programs on DVT for the residents in this regard.

© 2020 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Venous thromboembolism (VTE) refers to a blood clot that starts commonly in veins. It is the third leading vascular disease after a heart attack and stroke. It includes two types; deep venous thrombosis (DVT) and pulmonary embolism (PE). DVT is defined as a clot in a deep vein, usually in the leg. It sometimes affects the arm or other veins, while PE occurs when a DVT clot breaks free from a vein wall, travels to the lungs and then blocks some or all of the blood supply. There are several risk factors that can affect disease occurrences such as old age, obesity, cancer, heavy long-distance traveling, hypertension, major surgery, and cigarette smoking (Anderson and Spencer, 2003; Goldhaber, 2010).

VTE is a fatal disease associated with high morbidity and mortality rate possibly due to its difficult diagnosis since it fails to appear on clinical screenings (Ekwere et al., 2015; Almodaimegh et al., 2017). Because of its nonspecific signs and symptoms that vary between individuals, it cannot be simply prevented (Almodaimegh et al., 2017;

Kharaba et al., 2017). VTE has high prevalence and incidence worldwide with an approximate annual incidence rate of 1-2 per 1000 persons a year and with an approximate death of 60,000-100,000 in the United States of America (Al-Hameed et al., 2015; Ekwere et al., 2015; Scheres et al., 2018). Lavall (2014) suggested the need for health professionals to educate patients and the public about VTE in order to decrease its incidence. A street survey was done in the United Kingdom (UK) stated that most of the participants who were knowledgeable about DVT are women and that people older than 70 tend to have less knowledge than any other age group (Boulton et al., 2015). A global survey on public awareness of VTE showed that lower awareness was associated with younger age and being male (Wendelboe et al., 2015). Another study, performed in the pre-operative assessment clinic in the UK, stated that most patients already possess an awareness of VTE, however, specific knowledge regarding its risk factors and methods of prevention is lacking (Haymes, 2016). In Saudi Arabia, there is no adequate information regarding the incidence and prevalence of VTE, thus an appropriate awareness is urgently needed.

The aim of this study is to estimate the general public awareness of VTE and to determine if there is a difference in the level of awareness between males and females, with different age groups.

* Corresponding Author.

Email Address: alkhleel@ksu.edu.sa (K. I. Alyahya)

<https://doi.org/10.21833/ijaas.2020.03.014>

Corresponding author's ORCID profile:

<https://orcid.org/0000-0003-3211-7759>

2313-626X/© 2020 The Authors. Published by IASE.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

2. Subjects and methods

This study was a quantitative observational cross-sectional study designed to investigate the public awareness of VTE in Riyadh, Saudi Arabia. It was carried out in the period of September 2018 to March 2019. The participants were selected using a convenience sampling technique to collect the data. The sample size was 322, calculated by using this equation $\{n=z\alpha^2P(1-p)/d^2\}$, where $P=0.788$, $d=5\%$, $z\alpha$ for $95\%=1.96$, the result was equal to $256.7\sim 257$, and assuming a non-response is 25% the sample size will be 322. The study included residents of Riyadh above 18 years and excluded all medical professionals.

Four different shopping malls were randomly chosen to collect data. A sample size of 25% was collected from each mall. The time frame for collecting the data was set from 6/1/2019-7/2/2019.

The questionnaire used, formed of 10 questions, was taken from an already validated questionnaire from a previous study, after getting written consent from the authors (Wendelboe et al., 2015). It assessed the knowledge of VTE symptoms, signs and risk factors. It is also included age and gender factors. Answers of the questionnaire were exported to Microsoft Excel where coding was performed. Data were analyzed using SPSS 24.0 version statistical software.

Descriptive statistics (mean, standard deviation, frequencies, and percentages) were used to describe the quantitative and categorical variables. Statistical analysis was carried out using appropriate (student's t-test, ANOVA) statistical tests, based on the type of study and outcome variables. A p-value of <0.05 and a 95% confidence interval was used to report the statistical significance and precision of results.

Regarding the ethical considerations, institutional review board (IRB) approval was obtained and the consent was taken from the participants verbally after explaining the purpose of the study and the right of the participants to withdraw at any time without any obligation towards the study teams.

3. Results

The total number of the current study participants was 349, more than half (58.7%) of them were females; the largest percentage (71.9%) were in the age group of 18-39 years old (Table 1).

Table 1: Baseline characteristics of the studied participants

		No. (%)
Age	18 – 39	251(71.90)
	40 – 64	95(27.20)
	65+	3(0.90)
Gender	Male	144(41.30)
	Female	205(58.70)

Generally, the level of knowledge about DVT and PE cases was low, since it was known by only 18.6% , and 38.7% of the respondents, respectively (Fig. 1).

Participants' awareness of the correct signs and symptoms of these cases was low (Fig. 2). The most commonly identified symptoms of PE was shortness of breath (51.6%), followed by chest pain (45.6%), while DVT swelling of the leg and skin color changes were the most recognized symptoms (43.3% , and 39.3% , respectively). To validate the measures of awareness, incorrect symptoms and signs were included for selection. Leg paralysis and itching were thought to be signs of DVT by 28.1% and 13.2% , respectively, while slow, shallow breathing and pain radiating to the arm were thought to be symptoms of PE by 26.1% , and 18.3% , respectively.

More than half of the respondents were aware that immobility is a risk factor for thrombosis, while 43.80% and 35% were aware that old age and family history are also risk factors, however, hospital stay was the least recognized risk factor. It was noticed that 43.3% of participants cited high blood cholesterol and 33% cited high blood pressure as risk factors for thrombosis. Other risk factors, such as estrogen-based medications, cancer, surgery, and pregnancy were also tested (Fig. 3).

On a five-item scale, the respondents were asked to rate the statements regarding the treatment, prevention, and urgency of blood clots. Respondents were more likely to agree with the statement "blood clot can cause death" (43.80%). In contrast, there were more likely to disagree with all other statements which were "people aged <40 have to worry about blood clots" (44.10%); "most blood clots cannot be prevented" (by 32.70%); "It is not likely that a blood clot in the leg left untreated can travel to your lungs" (34.70%); "Having a blood clot is considered a medical emergency" (62.80%) (Fig. 4).

Overall; the awareness score of the current study questionnaire ranged from zero to 22, and the total mean ($\pm SD$) score was $7.91 (\pm 4.91)$, being statistically highly significant among females (8.91) compared to males (6.49), with a P-value of <0.001 , indicating a low awareness level about VTE. The results of the current study revealed that there was no significant ($P=0.347$) difference in the awareness level among different age groups; where the mean score of the awareness level was 8.14 , 7.35 , and 6.33 among the age groups of 18-39, 40-64, and >65 years, respectively, (Table 2).

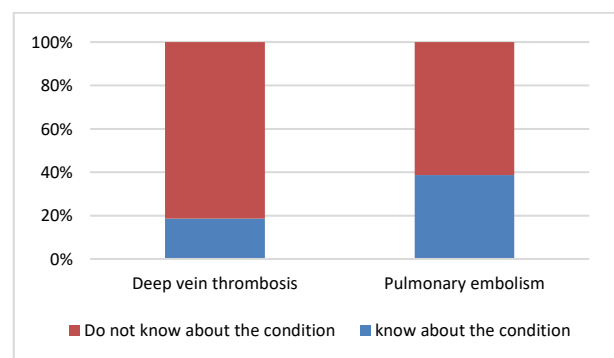


Fig. 1: General knowledge of DVT and PE

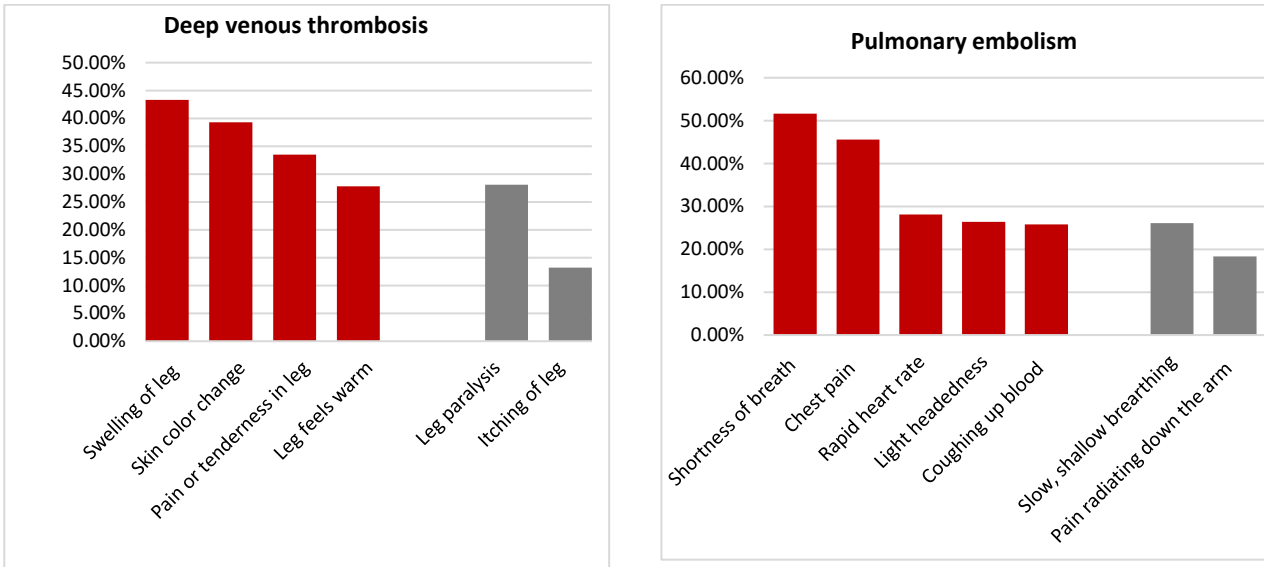


Fig. 2: Distribution of response towards awareness of correct and incorrect signs and symptoms of deep vein thrombosis and pulmonary embolism

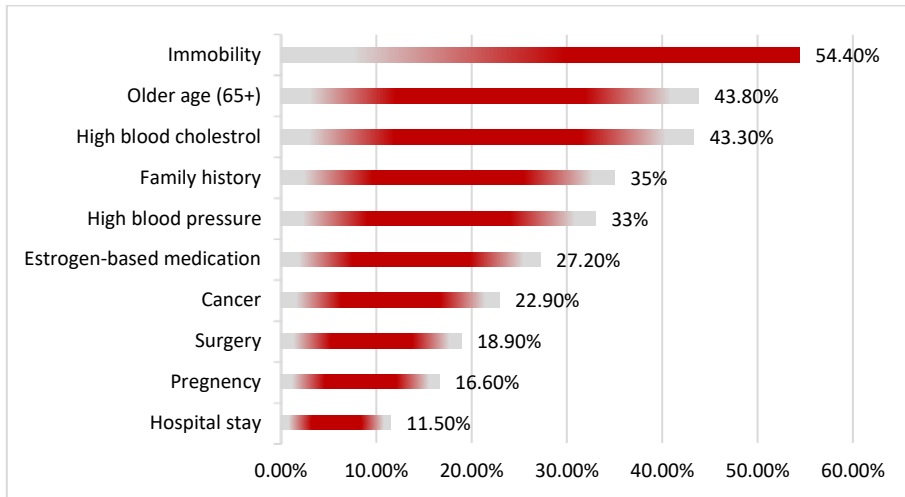


Fig. 3: Distribution of awareness of risk factors for thrombosis

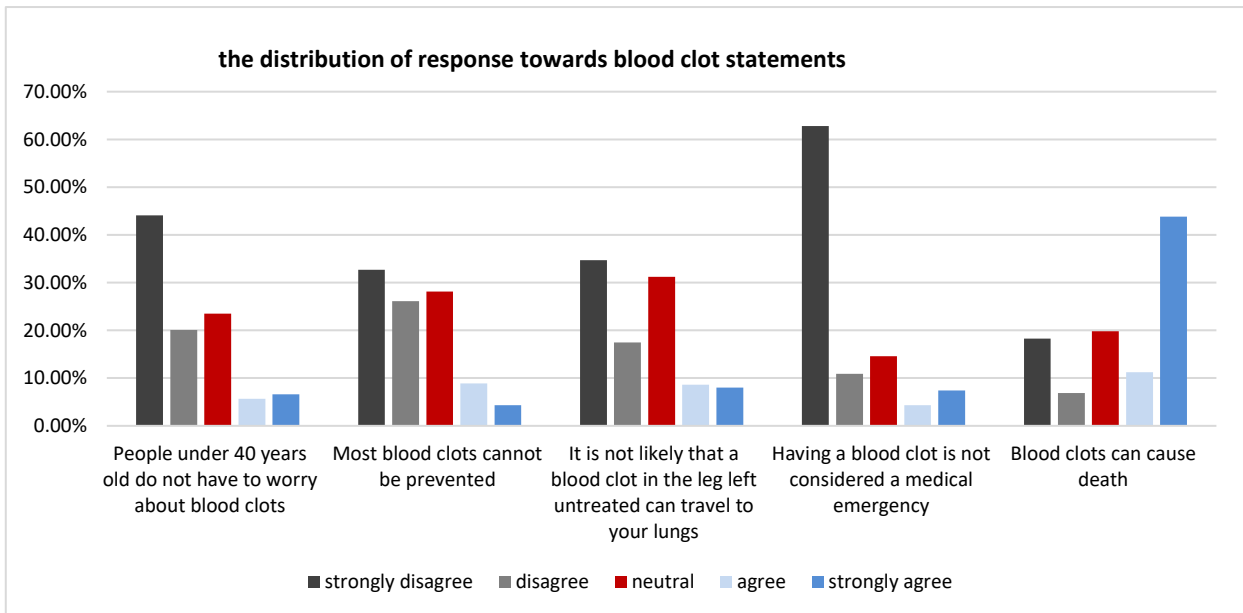


Fig. 4: The distribution of response towards blood clot statements

Table 2: Comparison of the mean score of awareness in relation to age group and gender

		Mean	P-value
Age	18 - 39	8.14	0.347
	40 - 64	7.35	
	65+	6.33	
Gender	Male	6.49	<0.001
	Female	8.91	

4. Discussion

The present study measured the public awareness of VTE among Riyadh residents, Saudi Arabia in the period of September 2018 to March 2019. To the best of authors' knowledge, this study would be the first public awareness research to be conducted in Saudi Arabia. It also would hopefully encourage other researchers in Saudi Arabia to conduct similar studies. Increasing the level of knowledge might be beneficial for the Saudi population by making them more engaged in treatment and in the need for prophylaxis. Furthermore, the increase in awareness, in general, could help to make strategies to prevent VTE in individuals who admitted to the hospital and known to be at high risk (Van Zyl et al., 2014).

The findings of our study indicated a low level of awareness of VTE focusing mainly on its two types; DVT and PE, with a percentage of 18.6%, and 38.7%, respectively. The present results were in coincidence with those of a previous study, conducted globally, that found low awareness of each of DVT (44%) and PE (54%) (Wendelboe et al., 2015). Similarly, one study was conducted among hospitalized patients in King Abdulaziz Medical City, Riyadh, Saudi Arabia with a percentage of DVT and PE were 32% and 15%, respectively (Almodaimagh et al., 2017). Those results were also similar to other studies conducted among cancer patients (Sousou and Khorana, 2010).

The study survey focused on VTE signs, symptoms, risk factors and complications. The most identified signs and symptoms for DVT in our study were swelling of the leg followed by skin color changes (43.3% and 39.3%, respectively), in contrast with results of the global research (Wendelboe et al., 2015) that mostly identified pain/tenderness in the leg followed by swelling of the leg (78% and 74%, respectively). Another research conducted among hospitalized patients stated that swelling of the leg followed by pain/tenderness was the most identified signs and symptoms with a percentage of 54.4% and 49%, respectively (Almodaimagh et al., 2017). However, both studies agreed that "leg feels warm" was the least identified one among the correct answers, and that "itching of the leg" was the least recognized incorrect signs and symptoms. Regarding PE, the present study, in accordance with the two studies, agreed that shortness of breath and chest pain was the most identified signs and symptoms. Regarding VTE risk factors, all three studies stated that immobility was the most selected correct answer. Awareness that PE is one of the major

complications of DVT was lower in the present study, compared to the two previous studies.

Regarding the difference in gender, the present study showed that females have more awareness than males, consistent with the results of Wendelboe et al. (2015). In contrast with the present study, Almodaimagh et al. (2017) showed no difference between gender awareness. Regarding age, the non-significant results obtained in the present study were probably due to few numbers of elderly participants compared to younger age groups, usually found in the shopping malls.

Based on previous studies, we assumed, before the beginning of the study, that less than 50% of Riyadh residents were aware of VTE, and the level of awareness increases in females than in males. The results of the present study were consistent with that assumption. In contrast, we also assumed that the awareness level of VTE increases in older residents than younger residents which are inconsistent with the present results stating that there was no significant difference between different age groups.

The study had some limitations. The first limitation was that questions were closed-ended, meaning that the participants had to choose from multiple answers which might help them speculating the correct answers rather than writing what they were really aware of. The second was that the place for data collection (shopping malls) might not be a proper one (few old residents, lack of accuracy due to the engagement of people in shopping). However, being the first study conducted in Riyadh, Saudi Arabia, the study would highlight the low level of public awareness of VTE and would direct the attention for the importance of increasing awareness campaigns regarding this serious disease.

5. Conclusion and recommendations

To conclude, the present study showed that the level of knowledge of PE and DVT is low among Riyadh residents. Participants do not only have a low level of awareness about DVT and PE but also about their signs, symptoms, risk factors and complications. The knowledge of PE and DVT is higher in females compared to males and there is no difference in the level of awareness among different age groups. Further studies and investigations should be carried out to measure accurately the level of awareness and to raise public awareness. in general.

The authors recommend conducting future surveys in the form of open-ended questions. Also, it would be more appropriate to collect the samples in places like libraries, gyms and public parks rather than shopping malls to target all possible age groups. Finally, the authors encourage organizations to increase the level of awareness by using different methods such as conducting more campaigns addressing the serious consequences of VTE.

Acknowledgment

The authors extend their appreciation to the Deanship of Scientific Research at King Saud University for funding this work through the Undergraduate Research Support Program, Project no. (URSP-4-19-73).

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

References

- Al-Hameed F, Al-Dorzi HM, Shamy A, Qadi A, Bakhsh E, Aboelnazar E, and Brozek J (2015). The Saudi clinical practice guideline for the diagnosis of the first deep venous thrombosis of the lower extremity. *Annals of Thoracic Medicine*, 10(1): 3-15.
- Almodaimegh H, Alfahaid L, Alsuehany N, Bustami R, Alharbi S, Alkatheri A, and Albekairy A (2017). Awareness of venous thromboembolism and thromboprophylaxis among hospitalized patients: A cross-sectional study. *Thrombosis Journal*, 15: 19.
<https://doi.org/10.1186/s12959-017-0144-2>
PMid:28814942 PMCID:PMC5518121
- Anderson F and Spencer F (2003). Risk factors for venous thromboembolism. *Circulation*, 107(23): 9-16.
<https://doi.org/10.1161/01.CIR.0000078469.07362.E6>
PMid:12814980
- Boulton A, Fenton M, Loka T, Sharif Z, and Greenfield S (2015). Public knowledge of deep vein thrombosis (DVT): A street survey in the suburbs of Birmingham, UK. *Quality in Primary Care*, 23(1): 31-39.
- Ekwere TA, Ino-Ekanem BM, and Ekanem A (2015). Venous thromboembolism: Awareness and practice of thromboprophylaxis among physicians in a tertiary-care hospital. *International Journal of Medicine and Biomedical*

Research, 4(1): 14-20.

<https://doi.org/10.14194/ijmbr.4.1.3>

- Goldhaber SZ (2010). Risk factors for venous thromboembolism. *Journal of the American College of Cardiology*, 56(1): 1-7.
<https://doi.org/10.1016/j.jacc.2010.01.057> **PMid:20620709**
- Haymes A (2016). Venous thromboembolism: Patient awareness and education in the pre-operative assessment clinic. *Journal of Thrombosis and Thrombolysis*, 41(3): 459-463.
<https://doi.org/10.1007/s11239-015-1224-4>
PMid:25991380
- Kharaba A, Al Aboud M, Kharabah MR, Alyami K, and Al Beihany A (2017). Venous thromboembolism risks and prophylaxis in King Fahad Hospital, Madinah, Saudi Arabia. *Journal of Epidemiology and Global Health*, 7(4): 295-298.
<https://doi.org/10.1016/j.jegh.2017.09.003> **PMid:29110872**
- Lavall KA (2014). Increasing public awareness of venous thromboembolism through social media. Available online at: <https://bit.ly/2uKsGGL>
- Scheres LJ, Lijfering WM, and Cannegieter SC (2018). Current and future burden of venous thrombosis: Not simply predictable. *Research and Practice in Thrombosis and Haemostasis*, 2(2): 199-208.
<https://doi.org/10.1002/rth2.12101>
PMid:30046722 PMCID:PMC6055567
- Sousou T and Khorana AA (2010). Cancer patients and awareness of venous thromboembolism. *Cancer Investigation*, 28(1): 44-45.
<https://doi.org/10.3109/07357900902744544>
PMid:20001296
- Van Zyl M, Wieczorek G, and Reilly J (2014). Awareness of venous thromboembolism in mental health services for older people. *Journal of Psychiatric and Mental Health Nursing*, 21(4): 375-378.
<https://doi.org/10.1111/jpm.12082> **PMid:23998290**
- Wendelboe AM, McCumber M, Hylek EM, Buller H, Weitz JI, Raskob G, and Kakkar A (2015). Global public awareness of venous thromboembolism. *Journal of Thrombosis and Haemostasis*, 13(8): 1365-1371.
<https://doi.org/10.1111/jth.13031> **PMid:26084415**