Introduction

Venous thromboembolism (VTE) contains deep vein thrombosis (DVT) and pulmonary embolism (PE). It is a disabling circumstance with a high probability of recurrence and doubtlessly deadly. VTE is a significant public health issue affecting thousands of patients globally and is accountable for a high number of hospitalizations annually. VTE mortalities and morbidity are more than that caused by car accidents, AIDS, and breast cancer. VTE is typically symptomless and can result in future complications significantly PE, so it is called the “silent killer.”

Background: Venous thromboembolism (VTE) contains deep vein thrombosis (DVT) and pulmonary embolism (PE). It is a disabling circumstance with a high probability of recurrence and doubtlessly deadly. VTE is a significant public health issue affecting thousands of patients globally and is accountable for a high number of hospitalizations annually. Methods: A total of 1661 Saudis were surveyed in a cross-sectional observational study. A questionnaire that has already been designed was used to gather information about sociodemographic characters, knowledge about DVT, risk factors, symptoms, complications, relation to patient’s activity, the seriousness of DVT leading to death, and symptoms of PE. Result: Approximately 45.5% among participants had prior awareness of DVT. Overweight and long-term travel was the most well-known risk factors. Most of the participants (60%) were aware that DVT occurs when a patient spends most of their time in bed relaxing, the most frequent clinical manifestations were pain and discomfort (97.8%) and local leg pain (73.8%). 45.3% of the participants knew DVT can result in mortality, 36.4% knew more than one pulmonary embolism syndrome, and 12.6% were aware that post-coagulation syndrome and pulmonary embolism are problems. 12% had a better understanding of DVT and 79% had poor knowledge. Participants who were above 66 years had a university degree, worked in a health specialty, knew about DVT, and received such information from their studies as medical students had a much higher mean knowledge score on DVT than others. Conclusion: Poor knowledge necessitates community education programs about risk factors, signs and symptoms, and sequelae of DVT.

Keywords: Awareness, DVT, population, Saudi, western region
Aging. Others factors worldwide are the obesity epidemic and the aging population. Another research is done in 2018 in China to assess the nurse’s knowledge about VTE and found that the more practiced, highly educated, lead nurses have better knowledge. In 2014, VTE has been studied to raise public awareness, through social media and 47% of them knew what a DVT was. A VTE knowledge assessment study was undertaken in 2014 among elderly patients and caregivers with post-hipt fracturing. The research found that 80% of patients and caregivers reported hearing about DVT, the most frequently defined risk factor was immobility or bed rest for longer than 3 days (83.3% of patients, 86.2% of caregivers), trauma (70% of patients, 62% of caregivers), long airplane travel (63.3% of patients, 75.9% of caregivers), and cancer (13.3% of patients, 26.7% of caregivers). And for symptoms, calf pain, swelling, redness, and discomfort of the legs, and fever were the most known ones. In 2016, research was conducted in the Kingdom of Saudi Arabia (KSA) to evaluate the effectiveness of educational programs regarding mechanical prophylaxis of DVT on nurse’s knowledge and practice. According to the research, there has been a considerable improvement in nurses’ knowledge after the program. Another study was carried out in 2017 in King Abdulaziz Medical City, Riyadh to evaluate patients’ awareness of VTE. According to findings of research that only 15% noted knowledge of DVT and PE respectively. 55% correctly identified leg swelling as a sign of DVT, and nearly half correctly identified Factors that Increase Your Chances of Getting a Blood Clot. Participants’ awareness of DVT or PE did not differ substantially by demographics in this study, but those with a personal or family history of VTE had much more knowledge. In 2020, a study was undertaken to shape the extent of VTE knowledge among Riyadh citizens. Females were shown to have a substantially higher awareness of DVT and PE than males, with no significant difference in age. In 2020, new research was conducted in Jeddah city to assess women’s awareness of the risk of DVT during pregnancy and puerperium. The study discovered that adult Saudi women were aware of VTE during gestation and puerperium with a marked defect in their knowledge about risk factors and the possible PE. The awareness level was positively related to the participants’ socioeconomic level. In 2021, research has been conducted in the Aseer population, Saudi Arabia about VTE awareness and the result was lacking knowledge and satisfaction. Due to the limited data on public awareness about DVT in the western region of KSA, this study was done to evaluate the knowledge about DVT among KSA western region residents. Our study shows deficient knowledge about VTE among the general population, and this could be corrected by frequent educational programs and awareness promotion campaigns as one of the primary health care center’s activities guided by primary care physicians.

Methods

Study design

This cross-sectional, survey-based study was carried out in Saudi Arabia. Participants were all from Saudi Arabia’s western area. The inclusion criteria were all residents of both genders of all nationalities in the western region of Saudi Arabia (Jeddah city, Makkah city, Taif city, Medina city, Yanbu city) older than 15 years. And the exclusion criteria were residents younger than 15 years and residents from other regions. Completed surveys were added in the statistical analysis.

Data collection

Data were collected by a pre-designed self-administered questionnaire. The questionnaire was divided into two parts, each with 23 questions. The first section contained questions about sociodemographic data and the second section contains questions about knowledge of the DVT; “where DVT often occurs, risk factors, symptom, complication, relation to patient’s activity, the seriousness of DVT leading to death, and symptoms of PE. For every response, the right answer was given a score of “2” and the wrong and I don’t know to answer a score of “1” was given. For symptoms and risk factors of DVT, every right answer was given a score of “1”, leaving a total score for symptoms of “6” and risk factors of “12”. And for characters with pulmonary embolism, every right answer was given a score of “1” leaving a total score of “4”. So, the total score of all knowledge questions was 36. Participants who got a score of <18 (50% of total score) were divided as having poor knowledge, those who had a score ranging from 19-27 (50-75% of total score) were divided as having fair knowledge, and those who had a score of ≥27 were divided as having good knowledge (>75% of total score).

Statistical analyses and sample size calculation

Data were analyzed by the IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, New York) was used to perform all statistical calculations, version 21 for Microsoft Windows, where qualitative data were expressed as numbers and percentages, and to assess the relationship between variables, the Chi-squared test ($\chi^2$) was used. Quantitative data were expressed as mean and standard deviation and Mann-Whitney and Kruskal-Wallis tests were used for non-parametric variables. Spearman’s correlation test was used and a $P$ value of <0.05 was considered as statistically significant. Taking a 95% confidence level into account, a marginal error of 5%, and a response distribution of 50% (maximum uncertainty), it was planned to include a sample of 385 participants in this study. A total of 1661 people who were eligible answered the survey and were encompass in the statistical analysis.

Ethical considerations

A statement was included at the beginning of the questionnaire clarifying that the collected data will be anonymous and will be used for research purposes only. All participants were asked if they agree or not to take section in the study. Only those who agreed to participate were included. Before conducting any study-related procedures, ethical approval was obtained from Research Ethics Committee at Taif University, Saudi Arabia (reference: IRB 42-0012).
Results

(Table 1) shows that 80.7% of the volunteers were males, 61.3% were single, 93.5% had a Saudi nationality, and 38.5% were residents of Taif city. Most of the volunteers had an age ranging from 15-25 years (54.8%), 77.8% had a university education, and 4.1% were university students. Of the volunteers, 75.5% did not have any chronic diseases and of those who had, 9% were diabetics.

(Table 1) shows that 45.5% of the participants had previous knowledge about DVT, of the 38.1% got this knowledge from sources like social media, the internet, scientific books, study.

(Table 2) shows that only 26.2% of the participants knew that DVT often occurs in deep veins in the lower extremities, and the most known risk factors of DVT were: overweight/obesity (85%), long-term travel (6 hours), whether by car/plane (67.1%), and excessive prolong duration of sitting (60%). About 60% of the participants knew that DVT occurs when the patient relieves most of the time in bed, and the most known symptoms of DVT were: pain and discomfort (97.8%), local pain (in the leg) (73.8%), or without symptoms (65%). About 45% (45.3%) knew that DVT is dangerous and may lead to death, 36.4% knew more than one character of pulmonary embolism, while 45.8% did not know any character. More than one-third (35%) of the participants knew that post-coagulation syndrome is a complication of DVT and only 12.0% knew that pulmonary embolism is a complication.

(Figure 2) illustrates that no one of the volunteers had an excellent knowledge about DVT, 12% had fair knowledge and 79% had poor knowledge.

(Figure 2) demonstrates that participants with an age more than 66 years, those of university education, those who were working in any health specialty, those who reported knowing DVT, and those who got this knowledge from their study as a medical student had a significantly higher mean knowledge score about DVT compared to others ($P =< 0.05$). On the contrary, a non-significant relationship was found between mean knowledge scores and participants’ gender, marital status, nationality, residence, and having chronic diseases.

Discussion

The main aim of the present study was to explore and measure the awareness level of Deep vein thrombosis among people in the western region, Saudi Arabia. The design of the study was thus a cross-sectional descriptive design of the awareness level of DVT.

In this study, a sample of 385 respondents of adult males and females (at least 15 years of age) were the study participants. Our sample by age-group content differed from the sample present in a previous Saudi study that assessed the public perception and knowledge about venous thromboembolism, where the medium age of the respondents was between 25 and 39 years.[16] The discovering of our study indicated a low grade of awareness of VTE, with a percentage of 79%. The most identified risk factors for DVT in our study were overweight/obesity (85%), long-term travel (6 hours), whether by car/plane (67.1%), and excessive prolong duration of sitting (60%). About 45% (45.3%) knew that DVT is dangerous and may lead to death, 36.4% knew more than one character of pulmonary embolism, while 45.8% did not know any character. More than one-third (35%) of the participants knew that post-coagulation syndrome is a complication of DVT and only 12.0% knew that pulmonary embolism is a complication.

In the current study, people were less aware that PE is one of the most serious consequences of DVT. At the King Abdulaziz Medical City in Riyadh, Saudi Arabia, research was conducted to assess the knowledge of venous thromboembolism and thromboprophylaxis among hospitalized patients. In this study, the degree of knowledge of VTE, DVT, and PE among hospitalized patients was shown to be low. Only 15% of individuals polled...
stated they were aware of deep vein thrombosis (DVT) and pulmonary embolism (PE) (PE). According to the conclusions of this study, greater attention must be devoted to patient education to provide safe and high-quality patient care. Another research conducted in the United Kingdom revealed that overall understanding of DVT was low, supporting the notion of a VTE public awareness campaign and the need to raise awareness among hospitalized patients and the public.

A study was done in Riyadh City, Saudi Arabia found that the level of awareness and knowledge of signs and symptoms of VTE was relatively low (38% for PE and 19% for DVT).

Where in another study, the grade of knowledge Leg swelling was the most commonly identified symptom of DVT (40%) and shortness of breath was the most popular symptom of PE (46%) of participants.

A study was done Al-Qassim region, Saudi Arabia among women who have attended primary health care centers. This study revealed a lack of awareness about signs and symptoms. This is consistent with the discovering of the present study.

This work revealed that no one of the participants had excellent knowledge about DVT, 12% had fair knowledge and 79% had poor knowledge. Many individuals (72%) in prior Saudi research were on thromboprophylaxis, although Only 32% of those polled said they were aware of DVT and pulmonary embolism, respectively (PE), respectively. In this study, swelling of the leg was reported as a symptom by 55% of participants who had heard of DVT. Around half of the participants accurately identified blood clot risk factors. The respondents’ degree of understanding about DVT or PE did not differ substantially based on their demographics. Individuals with a personal or family history of VTE, on the other hand, were far more conscious of DVT or PE. Participants had positive attitudes toward thromboprophylaxis and were pleased with treatment (>69 percent), but they had negative attitudes toward its side effects and were less grateful with the information given about DVT and PE (46 percent).

In a previous study, the percentage of respondents who knew about thrombosis, DVT, and PE (68%, 44%, and 54%, respectively) was below than the percentage who knew about other thrombotic disorders like heart attack and stroke (88% and 85%, respectively) and health conditions like hypertension, breast cancer, prostate cancer, and AIDS (90%, 85%, 82%, and 87%, respectively). In this study, 45.3% knew that DVT is dangerous and may lead to death and 36.4% knew more than one character of pulmonary embolism. A previous report found that the 8-year average for those 85 and older was 13 times higher at baseline than for those 45–55, with an absolute rate of 7 per 1000 per year.

Thrombosis tends to have a greater morbidity effect on the elderly, with a steeper increase in PE incidence as opposed to DVT with age. As a result, older people have a higher thrombosis case fatality rate. These figures are properly
Table 2: Distribution of the studied participants according to their response to knowledge items regarding DVT (n=1661)

| Variable                                                                 | n (%)   |
|--------------------------------------------------------------------------|---------|
| Deep vein thrombosis often occurs in:                                    |         |
| - Deep veins in the lower extremities (correct answer)                   | 436 (26.2) |
| - Femoral vein                                                           | 100 (6)  |
| - Popliteal vein (behind the knee)                                       | 371 (22.2) |
| - Muscle vein                                                            | 0 (0.0)  |
| I don't know                                                             | 754 (45.4) |

In your view, which of the following risk factors causes deep vein thrombosis? (all are correct)

| Risk Factor                                                                 | n (%)   |
|-----------------------------------------------------------------------------|---------|
| - Smoking                                                                   | 342 (20.5) |
| - A member of the family was previously injured                              | 212 (12.7) |
| - Pregnancy/postpartum period                                                | 117 (7)  |
| - Birth control pills                                                       | 98 (5.9)  |
| - Inflammatory bowel disease (Crohn's disease/ulcerative colitis)          | 75 (4.5)  |
| - Hereditary blood clotting diseases                                        | 1116 (67.1) |
| - Long-term travel (6 hours), whether by car/plane                           | 998 (60)  |
| - Excessive sitting for long periods                                        | 320 (19.2) |
| - Cancer                                                                   | 62 (3.7)  |
| - Performing a previous surgery/hospitalization for more than two days      | 1413 (85) |
| - Overweight/obesity                                                       | 399 (24)  |
| - Chronic diseases (diabetes/pressure/chronic heart disease/high cholesterol) | 205 (12.3) |
| I don't know                                                               | 4.75±3.38 |

Mean number of known risks (mean±SD)

| Risk Factor                                                                 | n (%)   |
|-----------------------------------------------------------------------------|---------|
| Deep vein thrombosis occurs according to the degree of patient activity if: |         |
| - The patient is very active                                                | 27 (1.6)  |
| - The patient uses a walking aid himself                                    | 35 (2.1)  |
| - The patient needs help from others (correct answer)                       | 78 (4.7)  |
| - The patient relaxes most of the time in bed (correct answer)              | 1000 (60.2) |
| I don't know                                                               | 521 (31.4) |

The most important symptoms of deep vein thrombosis include:

| Symptom                                                                 | n (%)   |
|-------------------------------------------------------------------------|---------|
| - Local pain (in the leg) (all are correct)                             | 1227 (73.8) |
| - Pain and discomfort                                                    | 1326 (97.8) |
| - Ascites (swelling/swelling) of the lower limb.                         | 211 (12.7) |
| - Redness of the skin                                                    | 127 (7.6)  |
| - High body temperature                                                  | 87 (5.2)  |
| - Without symptoms                                                       | 931 (65)  |
| I don't know                                                             | 656 (39.5) |

Mean number of known symptoms (mean±SD)

| Symptom                                                                 | n (%)   |
|-------------------------------------------------------------------------|---------|
| In your view, deep vein thrombosis is dangerous and may lead to death?  |         |
| - Ye (correct answer)                                                    | 752 (45.3) |
| - No                                                                    | 397 (23.9) |
| I don't know                                                             | 512 (30.8) |

Pulmonary embolism: it occurs when a blood clot settles in a lung artery coming from the veins; This obscures blood flow to a part of the lung and leads to respiratory and hematological dysfunction. It is often characterized by: (all are correct)

| Symptom                                                                 | n (%)   |
|-------------------------------------------------------------------------|---------|
| - Shortness of breath                                                   | 165 (9.9) |
| - Throwing my chest                                                     | 17 (1)   |
| - Chest pain                                                            | 100 (6)  |
| - Headache                                                              | 14 (0.8) |
| - More than one character                                               | 605 (36.4) |
| I don't know                                                            | 760 (45.8) |

What are the, choose from the following what you know:

| Syndrome                                                                 | n (%)   |
|--------------------------------------------------------------------------|---------|
| - Pulmonary embolism (correct answer)                                    | 209 (12.6) |
| - Post-coagulation syndrome (venous insufficiency characterized by pain, heaviness, cramping in the affected limb) (correct answer) | 581 (35)  |
| - Both Pulmonary embolism and post-coagulation syndrome                  | 240 (14.4) |
| I don't know                                                             | 631 (38)  |

underestimates because thrombosis is likely underdiagnosed in many debilitated elderly patients. The causes of an increased thrombosis chance with age are unknown, but they may be related to the prevalence of other illnesses that predispose to thrombosis, changes in coagulation capacity, or a combination of these factors.
VTE is a major health problem and is accountable for a high rate of death and hospitalization. Although, it may cause serious complications significantly PE in the late diagnosis. In this study, 1661 of the Saudi population, most of them had an age ranging from 15-25 years and previous knowledge about DVT. Most risk factors of DVT were overweight/obesity and long-term travel for at least 6 hours. However, the most presenting symptom was pain.
and discomfort. Most of the volunteers had poor knowledge. The low level of DVT revealed from this study necessitates community education campaigns about DVT risk factors, symptoms, and complications. The limitation of this study is the use of a self-reported questionnaire may have a recall bias.

Ethics approval

Institutional research ethics board approval was acquired before conducting any study-related procedures. At the start of the questionnaire, a statement was included explaining that participation in the study is voluntary and that the data obtained would be anonymous and used exclusively for this study.

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Conflicts of interest

There are no conflicts of interest.

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