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RESEARCH ARTICLE

Awareness and Perception of Thromboembolism and Thromboprophylaxis among Hospitalized Patients in Jordan

Anan S. Jarab[1,*], Sayer Al-Azzam[1], Rawan Badaineh[1], Tareq L. Mukattash[1] and Razan Bsoul[1]

Department of Clinical Pharmacy, Faculty of Pharmacy, Jordan University of Science and Technology, P.O. Box 3030, Irbid, 22110. Jordan

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Abstract: ***Background and Objective***: Despite the established importance of thromboprophylaxis in patients with Venous Thromboembolism (VTE), a limited number of studies have assessed the awareness of VTE and thromboprophylaxis therapy among the affected patients. The aim of the current study was to assess awareness and to explore variables associated with awareness about VTE and its thromboprophylaxis.

Methods: A cross-sectional study was conducted on hospitalized patients who received thromboprophylaxis (5000 units of heparin subcutaneously (SC) q8-12h, or 30-40 mg of enoxaparin SC once daily). In addition to the sociodemographic variables, awareness and perception of VTE and its thromboprophylaxis were assessed using a validated questionnaire. Multiple logistic regressions were conducted to build a model of variables significantly associated with VTE awareness.

Results: A total of 225 patients participated in the study, with only 38.2% and 22.2% of the participants being aware of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE) respectively. Logistic regression showed that the participants with low educational level had 3.046 value, with the odds being not aware of DVT or PE compared with participants with high educational level. Participants without a personal history of VTE had 7.374 value, with the odds being not aware of DVT or PE compared with those who had a personal history of VTE. Participants who had a negative perception of VTE had 2.582 value, with the odds being not aware of DVT or PE compared with participants who had a positive perception and those who did not have any information about DVT or PE had 13.727 value, with the odds being not aware of DVT or PE.

Conclusion: The findings reveal that there is a lack of awareness about VTE and its thromboprophylaxis among the study participants. Patients with lower educational level and those with no history of previous VTE need awareness improvement about VTE and its thromboprophylaxis. Clinical Pharmacists need to focus on providing information about VTE and improving patients' perception about VTE and its thromboprophylaxis with the aim of improving the awareness about VTE, and hence the better health outcome.

Keywords: Venous thromboembolism, thromboprophylaxis, awareness, perception, hospitalized patients, Jordan.

1. INTRODUCTION

Venous Thromboembolism (VTE) is the third most common cardiovascular disease after myocardial infarction and stroke worldwide, manifested as Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE), resulting from thrombus formation in the venous circulation [1]. VTE is considered a major problem in both hospitalized and non-hospitalized patients, in which the hospital-acquired VTE is the most common cause of mortality and morbidity, and it is associated with high total healthcare costs [2, 3]. VTE is associated with significant complications that if left untreated, will lead to life-threatening conditions and subsequently may lead to death [4].

Pharmacological thromboprophylaxis is the standard approach to reduce the incidence of VTE among hospitalized patients. Low Molecular Weight Heparin (LMWH), Low Dose Unfractionated Heparin (LDUH), warfarin and fondaparinux are the most common forms of thromboprophylaxis that have been studied [5]. According to the National Institute of Health and Clinical Excellence (NICE) guidelines, all of the hospitalized patients who meet the criteria for thromboprophylaxis should receive written and verbal information on the magnitude of thromboprophylaxis, risks and the consequences of VTE, the possible adverse effects and risk of

*Address correspondence to this author at the Department of Clinical Pharmacy, Faculty of Pharmacy, Jordan University of Science and Technology, Irbid, 22110. Jordan; Tel: (+962)2-7201000; E-mail: asjarab@just.edu.jo

VTE-reduction strategies such as exercising of calf and ambulation [6].

Increasing patients' awareness about VTE and the rationale for thromboprophylaxis will enhance patients' involvement in the disease management and they will be more likely to adhere to the prescribed medications hence improve health outcomes [7]. Moreover, the knowledge about the disease can easily allow patients to report and assess themselves with the signs and symptoms of the disease during admission and after hospital discharge, thus, enabling emergent medical intervention. Although, the importance of VTE and thromboprophylaxis is well-established, there are few studies that have assessed the awareness and perception of VTE among hospitalized patients, specifically those who are on thromboprophylaxis, and their satisfaction with the prophylactic treatment [7, 8].

2. AIM OF THE STUDY

The aim of the current study was to evaluate the hospitalized patients' awareness and perception of VTE and its thromboprophylaxis. Findings should be fed in future management programs implemented with the aim of improving health outcomes in patients with VTE.

3. MATERIALS AND METHODS

3.1. Study Site and Subjects

The current cross-sectional questionnaire-based study was conducted at King Abdullah University Hospital (KAUH) in Jordan. KAUH is a 678-bed tertiary care hospital that serves people from all areas in the north of Jordan. The study was conducted after obtaining ethical approval by the Institutional Research Board (IRB) at Jordan University of Science and Technology (JUST). Participants were recruited from the internal departments of the hospital from January through March 2019. A list of patients receiving thromboprophylaxis either 30-40 mg of enoxaparin Subcutaneously (SC) once daily or 5000 units of heparin SC q8–12 h was gathered from the hospital's computers in which the history of each patient is recorded in a specialized system for the hospital. Patients who were recently admitted to the hospital were interviewed after 48 hours of admission in order to have the chance to receive information about VTE and its thromboprophylaxis. Other patients who were admitted for more than 48 hours were interviewed immediately by the researcher. All the participants who agreed to participate in the study were asked to sign a consent form after being provided with a complete description of the study and its objectives. The participants were asked to self-complete the questionnaire with an average interview time of 15 minutes. The overall number of patients who were prescribed pharmacological thromboprophylaxis during the data collection was 500 patients. The sample size was calculated by using the Raosoft, Inc., Seattle, WA, USA software calculator. By assuming the margin of error of 5percent, response distribution of 50percent, a confidence level of 95percent, and the population size of 500, the minimum recommended sample size was 218.

3.2. Study Instrument

The questionnaires were designed by modifying items in previously validated research [7-9]. A forward and backward translation from English to Arabic and Arabic to English again was performed, and the final versions were compared together to ensure their validity. The study instrument was reviewed for face and content validity by a panel of experts including a surgeon, an internal medical physician, residents' physician and two clinical pharmacists, one works at the internal medicine department and the other one at the orthopedic surgery department. The instrument was also validated by a pilot-testing on hospitalized patients (n=15) who were excluded from the study. The survey involved 33 closed-ended questions prepared to discern: demographic information such as age, sex, marital status, educational level, monthly income, smoking status, presence of chronic diseases, and the reason for admission, family or personal history of VTE and current or previous history of thromboprophylaxis. Additionally, patients' awareness about DVT and PE were evaluated in terms of knowledge about definition, underlying causes, risk factors, signs and symptoms, possible complications and disease prevention. Other questions were conducted to evaluate the patients' perception of thromboprophylaxis and VTE, patients' satisfaction with thromboprophylaxis and related information received on VTE. The Likert scale from strongly disagree to strongly agree was used to assess some of the study items. The completed questionnaires were stocked in the principal investigator's office to assure confidentiality.

3.3. Data Analysis and Modeling

Data were analyzed and coded using IBM SPSS statistics version 20.

3.4. Descriptive Statistics

The sociodemographic information, history of VTE, history of and the current treatment with thromboprophylaxis, the participants' responses about causes, correct and incorrect signs and symptoms, complications, risk factors and prevention of DVT and PE, perception of VTE, perception of and satisfaction by thromboprophylaxis were presented in tables of frequencies as numbers and percentages.

3.5. Single-predictor Analysis

For continuous variables, normality was tested using the Kolmogorov-Smirnov test. Group differences with regard to VTE awareness were examined using the independent sample t test and the Mann-Whitney U-test for normally and non-normally distributed continuous variables respectively. Chi-squared was used to identify the significant associations between different categorical variables and disease awareness. A p-value of less than 0.05 was considered statistically significant.

3.6. Multiple-predictor Analysis

Binary logistic regression was carried out to predict the awareness of DVT or PE of participants. Factors with P-value < 0.2 at the single-predictor analysis were subjected to multiple-predictor analysis to create a model with variables that best predicted the awareness of participants towards DVT or PE. The odds ratios were used to measure the relative impact of each predictor in the analysis on the outcome variable.

4. RESULTS

Of the 500 patients who received thromboprophylaxis, a total of 225 patients participated in the study. Table **1** shows the characteristics of the study participants. The mean age of the participants was 50.44±18.699. Most of the study participants were females (60.9%), had a low level of socio-economic status (73.3%), low education level (60.4%), non-smokers (76.0%) and had chronic diseases (53.3%). Reasons for hospital admission were 48percent for surgical reasons, followed by 37.8percent for medical treatment. The majority of the participants (92%) reported no personal history of VTE, reported no family history of VTE (91.1%), knew that they were receiving pharmacological/non-pharmacological thromboprophylaxis (91.6%), and 52.0percent reported no history of thromboprophylaxis.

4.1. Awareness of VTE

As shown in Table **2**, only 38.2% of the participants knew what DVT was, and only 22.2percent knew what PE was. Among the participants who were aware of DVT (n=86), 81 patients recognized that the cause of DVT was a blood clot in the leg veins. Swelling of the leg (n=61), noticeable changes in the color of the leg (n=52), pain/tenderness of the leg (n=53), and the warming of the leg (n=22) were correctly recognized by participants as a sign and symptom of DVT. Regarding the complications of DVT, recurrent DVT (25.3%), PE (17.3%), death (10.7%), and post-thrombotic syndrome (21.8%) were correctly recognized by participants.

Of the 50 participants who recognized what PE was, shortness of breath (n=42), chest pain (n=30), lightheadedness (n=18), rapid heart rate (n=30) and coughing blood (n=20) were correctly identified by the participants as a sign and symptom of PE. Regarding the complications of PE, death and pulmonary hypertension were correctly recognized by 44 and 33 participants, respectively.

Regarding the question of whether the participants believe that the presence of comorbid diseases such as diabetes, hypertension, myocardial infarction, stroke and heart failure increase the risk of developing VTE, 76.0% of the participants correctly answered the question with 'yes' answer. Regarding the risk factors of VTE, the majority of the participants were able to correctly identify not moving for a long time (75.1%), high blood cholesterol (71.1%), high blood pressure (70.2%), obesity (73.8%) and smoking (72.9%) as risk factors for VTE. On the other hand, the minority of the participants were able to correctly identify hospital stay (33.3%), surgeries (41.3%), pregnancy/giving birth (36.9%), family history (43.1%), age older than 65 (38.2%), cancer (24.4percent), estrogen-based medications (16.9%) and varicose veins (47.6%) as risk factors for VTE.

Regarding the VTE prevention strategies, walking was correctly recognized by 88.4% of the participants.

4.2. Perception of VTE

Most of the study participants (90.7%) considered blood clots as a medical emergency condition that requires ultimate concern and that blood clots could cause death (80.4%).

Table 1. Characteristics of the study participants.

Variable	
Age (Mean ± SD)	50.44±18.699
Gender (n (percent))	
Male	88 (39.1)
Female	137 (60.9)
Marital status (n (percent))	
Married	166 (73.8)
Single	35 (15.6)
Other	24 (7.1)
Education level (n (percent))	
High level	89 (39.6)
Low level	136 (60.4)
An average monthly income (n (percent))	
Less than 750	165 (73.3)
750-1500	42 (18.7)
> 1500	16 (7.1)
Smoking (n (percent))	
Yes	53 (23.6)
No	171 (76.0)
Have chronic diseases (n (percent))	
Yes	105 (46.7)
No	120 (53.3)
Reason for admission (n (percent))	
Surgical	108 (48.0)
Medical treatment	85 (37.8)
Oncology (nonsurgical)	16 (7.1)
Palliative care	16 (7.1)
Personal History of VTE (n (percent))	
Yes	18 (8.0)
No	207 (92.0)
Family History of VTE (n (percent))	
Yes	20 (8.9)
No	205 (91.1)
Receiving Pharmacological/non-Pharmacological thromboprophylaxis currently (n (percent))	206 (91.6)
Yes	19 (8.4)
I don't know	
History of Pharmacological/non-Pharmacological thromboprophylaxis (n (percent))	64 (28.4)
Yes	117 (52.0)
No	44 (19.6)
I don't know	

More than half of the participants were aware that blood clots can be prevented (54.7%), and 62.2% of the participants believed that untreated blood clots will pass to the lungs as shown in Table **3**.

4.3. Perception of Thromboprophylaxis

The majority of the participants (90%) believed that thromboprophylaxis was safe and effective and 60.4 percent of them never minded receiving injections. Nearly two-thirds of the participants (68.4%) reported that the adverse

Table 2. Awareness of participants about VTE.

Items		Aware n (%)
Know what a blood clot in your leg or DVT?		86 (38.2)
Which of the following cause DVT?		
-	Blood clot in vein*	81 (36.0)
	Lack of oxygen in vein	1 (.4)
	A tumor in vein	3 (1.3)
	Not sure	1 (.4)
Signs and symptoms of DVT **		
-	Swelling of leg*	61 (27.1)
-	Itching of leg	3 (1.3)
-	Pain/tenderness of leg*	53 (23.6)
-	Noticeable changes in color of leg*	52 (23.1)
-	The leg feels warm*	22 (9.8)
-	Leg paralysis	39 (17.3)
Most common complications of DVT **		
-	PE*	39 (17.3)
-	Death*	24 (10.7)
-	Recurrent DVT*	57 (25.3)
-	Post thrombotic syndrome*	49 (21.8)
-	Not sure	10 (4.4)
Know what a blood clot in lung or PE?		50 (22.2)
Signs and symptoms of PE **		
-	Shortness of breath*	42 (18.7)
-	Slow shallow breathing	9 (4.0)
-	Chest pain*	30 (13.3)
-	Rapid heart rate*	30 (13.3)
-	Lightheadedness*	18 (8.0)
-	Pain radiating to arm	13 (5.8)
-	Coughing blood*	20 (8.9)
-	Frequent headaches	20 (8.9)
Most common complications of PE **		
-	Death*	44 (19.6)
-	Pulmonary hypertension*	33 (14.7)
-	Pleural effusion	31 (13.8)
-	Not Sure	3 (1.3)
The presence of comorbid diseases like (DM, HTN, MI, stroke, HF) increase 171 (76.0) the risk of developing VTE		

(Table 2) contd….

Items		Aware n (%)
Most common risk factors of developing VTE**		
-	Hospital stay*	75 (33.3)
-	Surgery*	93(41.3)
-	Cancer*	55 (24.4)
-	Not moving for long time*	169 (75.1)
-	Pregnancy/giving birth*	83 (36.9)
-	Using estrogen based meds*	38 (16.9)
-	Family history of blood clots*	97(43.1)
-	Age older than 65*	86(38.2)
-	Too much exercise	27 (12.0)
-	High blood cholesterol*	160 (71.1)
-	Donating blood	17 (7.6)
-	High blood pressure*	158 (70.2)
-	Obesity*	166 (73.8)
-	Varicose veins*	107 (47.6)
-	Smoking*	164 (72.9)
-	Not sure	24 (10.7)
How to prevent VTE **		
-	Walking*	199 (88.4)
-	Stretching legs	89 (39.6)
-	Drinking plenty of fluids	137 (60.9)
-	Eating lots of fiber	110 (48.9)
-	Bed rest	53 (23.6)
-	Washing/bathing regularly	60 (26.7)
-	I Don't know	16 (7.1)

*Correct answers. **More than one answer allowed.

effects of the thromboprophylaxis were tolerable as shown in Table **3**.

4.4. Satisfaction with Thromboprophylaxis

Although few patients complained of receiving the injections in the early morning or during their sleep time, the majority of the participants (96.9%) were satisfied with the time of receiving enoxaparin or heparin injections which did not interfere with their sleep or daily activities. Results showed that only 43.6 percent of them were satisfied with the explanation of the rationale of thromboprophylaxis. Only 12.9 percent of the participants received information about DVT/PE, of whom only 12.4 percent were satisfied with the received information.

4.5. Results of Single-predictor Analysis of Factors Associated with Awareness of DVT or PE

The variables that could affect the participants' awareness of DVT or PE were included in the single predictor analysis. The number of participants who were unaware of DVT or PE was 134 (59.6 percent). The percentage of participants who reported unfamiliarity with either DVT or PE was significantly higher among participants with age of 65 and more (P = 0.015), who had low education level (P = 0.000), who had no personal history of VTE (P= 0.004), who had a negative perception toward VTE (P = 0.001), who were not informed about the rationale of thromboprophylaxis injections (P = 0.000), and those who had not received information about DVT/PE (P = 0.000) as shown in Table **4**.

4.6. Results of Multiple Predictor Analysis of Factors Associated with Awareness of DVT or PE

The final model of the ten variables using logistic regression analysis is presented in Table **5**. Regarding the odds ratio values, participants with low educational level had 3.046 value, with the odds being not aware of DVT or PE compared with participants with high educational level. Participants who did not have a personal history of VTE had

Table 3. Perception of participants about VTE and its thromboprophylaxis.

Items	Agree n (percent)
Perception of participants about VTE	
Need to worry about blood clots and consider it medically emergent condition.	204 (90.7)
Most blood clots can be prevented.	123 (54.7)
Blood clots have not treated will pass into the lung.	140 (62.2)
Blood clots can cause death.	181 (80.4)
Perception of participants about thromboprophylaxis	
Thromboprophylaxis is safe/effective	202 (89.8)
In favor of receiving injections	136 (60.4)
Side effects of thromboprophylaxis are tolerable	154 (68.4)
Satisfaction of participants about thromboprophylaxis	
Time of receiving injections is acceptable	218 (96.9)
Reasons for injections adequately explained	98 (43.6)
Received any information about DVT/PE	29 (12.9)
Satisfied with the information given on PE/DVT	28 (12.4)

Table 4. Single predictor analysis of variables associated with Awareness of DVT or PE.

Variables		Aware n (percent)	Not Aware n (percent)	p-value
Age*	18-40	37 (40.7)	40 (29.9percent)	.015
	41-64	39 (42.9)	49 (36.6)	
	>=65	15 (16.5)	45(33.6)	
Gender	Male	30 (33.0)	58 (43.3)	.120
	Female	61 (67.0)	76 (56.7)	
Educational level*	High level	52 (57.1)	37 (27.6)	.000
	low level	39 (42.9)	97 (72.4)	
Monthly Income	Less than 750	62(68.1)	103(78.0)	.212
	(750-1500)	22 (24.2)	20 (15.2)	
	more than 1500	7 (7.7percent)	9 (6.8percent)	
Personal history of VTE*	Yes	13 (14.3)	5 (3.7)	.004
	No	78 (85.7)	129 (96.3)	
Family history of VTE	Yes	13(14.3)	7 (5.2)	.019
	No	78 (85.7)	127 (94.8)	
Perception of VTE*	Positive perception**	45(54.9percent)	37(45.1percent)	0.001
	Negative perception	46(32.2percent)	97(67.8percent)	
Is time of receiving injections acceptable?	Yes	88 (96.7percent)	130 (97.0percent)	.895
	No	3 (3.3percent)	4 (3.0percent)	
Are reasons for injections adequately explained?*	Yes	54 (59.3percent)	44 (33.1percent)	.000
	No	37 (40.7percent)	89 (66.9percent)	
Do you receive any information about DVT/PE?*	Yes	27 (29.7percent)	2 (1.5percent)	.000
	No	64 (70.3percent)	132 (98.5percent)	
Are you satisfied with information given on PE/DVT?	Yes	26 (96.3percent)	2 (100.0percent)	.782
	No	1 (3.7percent)	0(0.0percent)	

*Significant at 0.05 level. **Those who had agreed with the four questions of the perception of participants about VTE.

Table 5. Multiple predictor analysis of variables associated with DVT or PE awareness.

Variable		p-value	OR (CI 95percent)
Age	18-40	.483	Reference
	41-64	.826	.917(.426-1.977)
	≥65	.351	1.563(.611-3.997)
Gender	Female	-	Reference
	Male	.203	1.556(.788-3.074)
Education level	High level	-	Reference
	Low level	.001	3.242(1.610-6.528)
Personal history of VTE	Yes	-	Reference
	No	.002	7.374(2.027-26.820)
Family history of VTE	Yes	-	Reference
	No	.160	2.386(.709-8.026)
Perception of VTE	Positive perception	-	Reference
	Negative perception	.007	2.582(1.297-5.141)
Reasons for injections are adequately explained	Yes	-	Reference
	No	.140	1.675(.844-3.325)
Is thromboprophylaxis safe?	Yes	-	Reference
	No	.599	1.387(.410-4.690)
Do you prefer to receive injections?	Yes	-	Reference
	No	.563	1.236(.602-2.537)
Do you r receive any information about DVT or PE	Yes	-	Reference
	No	.001	13.727(2.895-65.097)

7.374 value, with the odds of being not aware of DVT or PE compared with those who had a personal history of VTE. Participants who had a negative perception of VTE had 2.582 value, with the odds of being not aware of DVT or PE compared with those who had a positive perception. Patients who reported not receiving information about DVT or PE had 13.727 value, with the odds of being not aware of DVT or PE.

5. DISCUSSION

The current study is the first one that addresses awareness of VTE and its thromboprophylaxis in Jordan. The results of the present study reveal the lack of DVT and PE awareness among hospitalized patients. On the other hand, patients who were aware of DVT and PE were not able to recognize the signs, symptoms and complications of both DVT and PE accurately. Moreover, patients demonstrated a higher level of awareness of DVT than the awareness of PE. This finding could be attributed to the fact that the participants might have not realized PE is a complication of DVT. This lack of awareness is critical because PE is a life-threatening condition and might induce sudden death.

The lack of awareness about the disease in the present study is in agreement with findings from previously published research which include limited studies on public awareness about VTE in general, and among hospitalized patients particularly [7-9]. A cross-sectional survey that was conducted in Saudi Arabia found that 32 percent and 15 percent of the hospitalized patients were found to have poor knowledge and awareness about DVT and PE [8]. Another cross-sectional survey was conducted by Alzoubi *et al*. in KAUH to evaluate the level of awareness of VTE among patients who had a cesarean section demonstrated that there was a lack of awareness of VTE among participants in general and among the young in particular, with 46 percent and 18.7 percent being aware of DVT and PE, respectively[10]. Another study was conducted by Sousou *et al*. in ambulatory active cancer patients and showed that more than half of the participants (53 percent) were unaware of the increased risk of VTE with cancer [11].

The current study findings demonstrated that participants had insufficient knowledge of the risk factors and prevention strategies of DVT and PE, all of which are necessary for hospitalized patients to actively participate in VTE preven-

tion. The most commonly reported risk factor of VTE was not moving for a long time, which was in agreement with other studies [7-9]. This finding reflects the attempts of health-care providers to inform and encourage hospitalized patients to ambulate as much as possible. Similar to earlier study findings [8, 9], other risk factors including surgeries, pregnancy, family history and cancer were not recognized by the study participants. Accordingly, more information should be provided to cancer patients, woman who are pregnant and patients who undergo specific surgeries including orthopedic and abdominal surgeries in order to pay more attention to the disease and to understand the rationale of thromboprophylaxis.

Consistent with earlier research findings [7, 8], most of the participants agreed with walking as a major method to prevent DVT or PE, particularly after surgeries.

In a study conducted in nine countries to assess the awareness of public about VTE, the results showed that the participants were less likely to agree with the statement that blood clots could be prevented (45percen) and that untreated blood clots could spread to the lungs (56 percent) [9]. Another study that was conducted by Almodaimegh *et al*. showed that 42 percent of the participants believed that blood clots could be prevented and only 37 percent of the participants knew that untreated blood clots could spread to the lungs [8]. Although our results show that the participants were more aware of the two statements compared to the previous studies [8, 9], the association of DVT with PE is underestimated, and this is probably because of the pathophysiological nature of PE.

Regarding the perception of participants about thromboprophylaxis, most of them believed that thromboprophylaxis is effective and safe because they believed that physicians would not prescribe any medication unless it is safe and effective. The patients' satisfaction with the explanation of the rationale of thromboprophylaxis was poor, and few participants received information about DVT and PE. Such finding could justify the low awareness of VTE and its manifestations in the current study participants, which in turn shed the light on the necessity to provide and education to improve patients' awareness about VTE and its thromboprophylaxis.

The current study explored factors that affect the awareness of VTE. Patients with a personal history of VTE were found to be more aware because they were already familiar with the signs and symptoms, risk factors and how to prevent VTE. In general, more educated people are usually more willing to improve their health and more able to identify signs and symptoms of VTE. The current study has also revealed that patients who received information about VTE had a significantly higher awareness level than those who did not. Receiving information increases tendencies to learn more about the disease and its manifestation, and this allows more attention to be given to any sign and symptom of the disease which in turn, encourages the patients to follow the risk-reduction strategies. In a recent study conducted in Saudi Arabia [8], awareness of DVT or PE was significantly higher among participants with a family or personal history of VTE with no impact of demographic characteristics on the level of awareness, which is consistent with the current study finding. Additionally, the correlation between educational level and receiving information about the disease and its manifestation with the awareness of the disease is also demonstrated in other studies [12]. A study conducted by Oh *et al.* showed that the awareness of stroke and its signs and symptoms was higher in those with high educational level and in those who had received education about the disease through campaigns, websites, and public education [12]. A randomized controlled study demonstrated that the level of awareness and knowledge about VTE was significantly higher and improved after the implementation of educational programs that were introduced by nurses among postpartum women; from 8.0percent to 87.0% [13]. This demonstrates that when the patients are encouraged to be involved in educational programs about VTE and its manifestation, this will result in decreasing the incidence of hospitalized acquired VTE. In another study conducted to assess the knowledge of medical patients who were on thromboprophylaxis about VTE after watching an educational video about VTE, findings showed that 83 percent of the participants who watched the video and completed a survey to assess their knowledge of VTE and its manifestations correctly answered the knowledge-based questions, compared to only 62 percent of the participants in the no video group [14].

6. STUDY LIMITATIONS

The closed-ended questions may have helped the participants to guess the answers rather than answering the questions based on their own knowledge. Additionally, due to a large number of other researchers and students who interviewed the patients in parallel time of the current study, the patients were sometimes discouraged to take part in the present study. Finally, although the recommended sample size of patients was achieved, increasing the sample size may allow for more robust conclusions to be drawn.

CONCLUSION

The current study findings demonstrate the lack of awareness of DVT and PE among hospitalized patients. The observed lack of deep information by the study subjects about the disease is reflected in their responses. Patients who were unaware of the disease and its manifestations, were found to have a negative perception about VTE, which subsequently could affect their engagement in the disease management. The study also demonstrated that limited information about VTE, DVT, and PE in addition to the rationale of thromboprophylaxis was provided by the healthcare professionals including clinical pharmacists. Future VTE management programs should focus on improving the awareness and knowledge of hospitalized patients about VTE, its causes, signs and symptoms, risk factors, and potential complications. Such improvement could be achieved by improving patients' perception of VTE and its thromboprophylaxis, in addition to make the patients involved in the disease and safety management programs. The rationale for thromboprophylaxis should be adequately explained by the health care provider, particularly the clinical pharmacists, in order to ensure their safety and enhance their quality of care.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted after obtaining ethical approval by the Institutional Research Board (IRB) at Jordan Univer-

sity of Science and Technology (JUST Jordan with Ethical approval number is 20180439).

HUMAN AND ANIMAL RIGHTS

No animals were involved in the study. All research procedures were followed in accordance with the human ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2008 (http://www.wma.net/en/20activities/10ethics/10helsinki/)

CONSENT FOR PUBLICATION

All patients provided informed consent.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available in the principle investigator's (Prof. Anan Jarab) office in the Faculty of Pharmacy at Jordan University of Science and Technology.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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