

## Venous thromboembolism prophylaxis: Nurses' perceived knowledge and barriers



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### ABSTRACT

Nurses, as primary healthcare providers who maintain regular patient contact, play a crucial role in preventing venous thromboembolism (VTE). This study aims to explore nurses' perceptions, knowledge, and barriers related to VTE prevention. A descriptive cross-sectional study was conducted among 263 staff nurses in governmental hospitals in the Hail region, Kingdom of Saudi Arabia. Data collection took place between January and May 2022. The majority of nurses considered VTE prevention to be an important issue (mean = 4.03±0.614) and perceived the current use of anticoagulant strategies as effective (mean = 2.91±1.16). However, nurses expressed some uncertainty regarding the safety of the current anticoagulant use (mean = 3.79±0.822) and felt that they underutilized available anticoagulant strategies (mean = 2.69±1.01). Generally, nurses demonstrated a good level of knowledge about VTE (83.2%). Gender was found to significantly influence knowledge ( $t = -2.841$ ;  $p < 0.005$ ), perception ( $t = -7.919$ ;  $p < 0.000$ ; mean = 3.85±0.707), and barriers ( $t = -4.661$ ;  $p < 0.000$ ). Regarding age, significant differences were observed in knowledge ( $F = 5.665$ ;  $p < 0.004$ ; mean = 15.87±4.39) and perception ( $F = 13.401$ ;  $p < 0.000$ ; mean = 4.16±0.782). No significant differences were found in educational attainment, work experience, and position concerning knowledge, perception, and barriers. The working area was found to have a significant impact on knowledge ( $F = 4.657$ ;  $p < 0.000$ ), perception ( $F = 4.347$ ;  $p < 0.001$ ), and barriers ( $F = 4.257$ ;  $p < 0.001$ ). By providing comprehensive and consistent patient education, nurses can play a critical role in minimizing morbidity and mortality rates associated with VTE, making VTE prevention a vital aspect of their responsibilities.

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### 1. Introduction

Venous thromboembolism (VTE) is responsible for an estimated 2000 fatalities and an additional 30,000 hospitalizations annually. The implementation of prophylaxis has resulted in a significant reduction in VTE morbidity and mortality, thereby providing a considerable long-term health advantage (Gaston and White, 2013). VTE, a critical blood coagulation disorder, poses a life-threatening risk (Heit et al., 2016). It originates from the formation of a thrombus in deep veins, typically in

the legs or hip veins, which subsequently travels through the bloodstream until it reaches the lungs, resulting in pulmonary embolism (PE). Together, deep vein thrombosis (DVT) and PE are collectively referred to as VTE. Within the hospital setting, VTE ranks among the highest-priority conditions (Hinkle and Cheever, 2018), particularly among bedridden patients. Incidence rates of VTE range from 10% to 20% in general medical patients and can reach up to 80% in critically ill patients (Minet et al., 2015). While VTE represents a severe condition, preventive measures can be undertaken, including pharmacological interventions, mechanical devices, physiotherapy, and VTE prophylaxis.

Numerous studies have investigated the knowledge levels, perceptions, and barriers surrounding VTE prophylaxis. For instance, Yu-Fen et al. (2018) found discrepancies in knowledge levels among nurses, with experienced nurses demonstrating greater proficiency compared to their

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junior counterparts. [Feng et al. \(2021\)](#) assessed the knowledge, attitudes, and practices regarding venous thromboembolism among medical staff. While the overall attitude towards VTE prophylaxis was positive, nurses exhibited poor knowledge, which was attributed to a lack of training programs. In a study conducted by [Kiflie et al. \(2022\)](#), it was discovered that at least 65% of nurses possessed a good understanding of VTE prophylaxis. Nurses play a critical role in preventing VTE, and inadequate knowledge is perceived as the primary obstacle to conducting VTE risk assessments ([Lee et al., 2014](#)). In fact, both knowledge and practice are positively influenced by nurse education ([Gaston and White, 2013](#)). According to [Piechowski et al. \(2016\)](#), an individual's attitude can significantly impact their knowledge and practices, with education playing a vital role in improving these attitudes.

This study is of utmost importance as it aims to assess nurses' perceptions, knowledge, and barriers toward VTE prophylaxis, ultimately seeking to enhance VTE prevention and treatment. The findings from this study can be instrumental in tailoring educational interventions to suit the specific needs of various departments and professional ranks.

## 2. Methodology

### 2.1. Research design

This research utilized a descriptive cross-sectional design to investigate the perceptions, knowledge, and barriers among nurses regarding venous thromboembolism (VTE) prophylaxis.

### 2.2. Setting/participants

This study was conducted in Hail City at selected governmental hospitals, namely King Khalid Hospital, Hail General Hospital, and King Salman Specialist Hospital. These hospitals were chosen as they receive patients with diverse diagnoses and serve as referral centers in the Hail region.

The participants of this study consisted of 263 staff nurses employed in government hospitals. Convenience sampling was used to include a larger number of nurses. The inclusion criteria for selecting nurses were as follows: (a) proficiency in English language comprehension and communication, (b) experience or assignment in caring for patients at risk of developing VTE, and (c) willingness to participate in the study.

### 2.3. Data gathering

The data collection process commenced following the approval of the Institutional Review Board of the Ministry of Health and with permission from the hospital authorities. An orientation session was conducted in a lecture hall, during which the researchers provided an explanation of the study's purpose, the extent of participants' involvement,

their rights as respondents, and the assurance of privacy and anonymity. Prior to data collection, the researchers obtained informed consent from the respondents, who were asked to read and sign the informed consent form. Subsequently, the researchers provided the staff nurses who had given their consent with the link to the Google Form (<https://forms.gle/XWDFkJPkvZzqB3Ch9>) for data submission.

### 2.4. Instrument

This research used the questionnaire to gather the data needed. There are four parts of the questionnaire which include: (1) the demographic characteristics of the participants (i.e., age, years of experience). The second part measures the perception of the staff nurses towards VTE. The third part is the basic knowledge about VTE and VTE prophylaxis adapted from [Yu-Fen et al. \(2018\)](#). The fourth part is about the barriers ([Yan et al., 2021](#)).

Face validity was assessed by four experts in the field, two of whom were medically inclined individuals with a master's degree in psychometrics, while the other two were academics with research experience and expertise in questionnaire validation. The four experts unanimously agreed that all items in the questionnaire were relevant and aligned with the study's objectives.

Prior to the actual data collection, the questionnaire was pre-tested on a separate group of 20 individuals who were not part of the final participant pool. The reliability of the questionnaire was evaluated using Cronbach's alpha coefficient, resulting in a value of 0.96 for the perception section, 0.93 for the knowledge section, and 0.91 for the barriers section. These high values indicate that the questionnaire demonstrates strong internal consistency and reliability.

### 2.5. Data analysis

The data analysis was conducted using the Statistical Package for the Social Sciences (SPSS v.26). Demographic characteristics were presented using frequency and percentage distributions. Descriptive statistics, such as means, were employed to describe the levels of perception, knowledge, and barriers related to VTE. Furthermore, statistical tests including t-tests and one-way Analysis of Variance (ANOVA) were utilized to assess whether significant differences existed between demographic variables and the levels of perception, knowledge, and barriers toward VTE.

## 3. Results

[Table 1](#) displays the demographic characteristics of the study participants. The male participants comprised the majority (74.7%), while females accounted for a smaller proportion (23%). Among the participants, the largest age group was in the 31-

35 years old bracket (53.2%). In terms of education, nearly all participants held a Bachelor of Science in Nursing degree (94.3%) and worked as staff nurses (86.3%) in various departments. The highest concentration of participants (40.7%) was observed in the inpatient wards.

Table 2 presents the nurses' perceptions related to VTE prevention. The majority of nurses considered the prevention of VTE in hospitalized patients to be an important issue (mean = 4.03, SD = 0.614). They also perceived the current use of anticoagulant strategies for VTE prevention in

hospitalized patients to be effective (mean = 2.91, SD = 1.16). However, nurses expressed some uncertainty regarding the safety of the current anticoagulant strategies for VTE prevention in hospitalized patients (mean = 3.79, SD = 0.822) and believed that the current strategies were underutilized (mean = 2.69, SD = 1.01).

Table 3 presents the level of knowledge among nurses regarding venous thromboembolism. In general, the majority of nurses demonstrated a high level of knowledge about VTE (83.2%).

**Table 1:** Demographic characteristics of the participants; N=263

Demographics	Frequency	Percent
<b>Gender</b>		
Male	201	74.7
Female	62	23.0
<b>Age</b>		
25-30 years old	109	41.4
31-35 years old	140	53.2
Above 35 years old	14	5.3
<b>Educational level</b>		
BSN	248	94.3
Diploma	13	4.9
Master's degree	2	.8
<b>Current position</b>		
Staff Nurse	227	86.3
Head Nurse	14	5.3
Nursing supervisor	22	8.4
<b>Working unit</b>		
Inpatient wards	107	40.7
ICU	73	27.8
Operating Room Department	8	3.0
Outpatient Department	14	5.3
Emergency Department	43	16.3
Artificial Kidney Unit	18	6.8

**Table 2:** Perception of nurses on venous thrombosis embolism

Perception	Mean	Std. deviation
How important an issue is the prevention of VTE in hospitalized patients?	4.03	.614
How effective are currently used anticoagulant strategies for the prevention of VTE in hospitalized patients	2.91	1.16
How safe are currently used anticoagulant strategies for the prevention of VTE in hospitalized patients	3.79	.822
How are current anticoagulant strategies utilized?	2.69	1.01

**Table 3:** Knowledge level of nurses towards venous thrombosis embolism

	Correct	Incorrect
Deep vein thrombosis (DVT) is a clinical manifestation of Venous thromboembolism	233(88.6%)	30 (11.4%)
Pulmonary embolism (PE) is a clinical manifestation of VTE	220 (83.7%)	43(16.3%)
PE is the most severe complication of DVT	222(84.4%)	41(15.6%)
Decrease blood flow velocity is one of the 3 main causes of VTE formation	224 (85.2%)	39(14.8%)
Blood vessel injury is one of the 3 main causes of VTE formation.	210(79.8%)	53(20.2%)
A high blood coagulation state is one of the 3 main causes of VTE formation	218(82.9%)	45(17.1%)
Hyperlipidemia is one of the 3 main causes of VTE formation.	211(80.2%)	52(19.8%)
Limb swelling, redness, heat, and pain are clinical manifestations of DVT	226(85.9%)	37(13.8%)
Dyspnea is a clinical manifestation of DVT	204(77.6%)	59(22.4%)
Chest pain is not a clinical manifestation of acute DVT	209(79.5%)	54(20.5%)
Chest pain is a clinical manifestation of acute PE	224(85.2%)	39(14.8%)
Dyspnea is a clinical manifestation of acute PE	227(86.3%)	36(13.7%)
Syncope is a major clinical manifestation of acute large-area PE	218(82.9%)	45(17.1%)
Average	83.27%	16.73%

Table 4 presents the possible system barriers to VTE prophylaxis. Nurses moderately perceived the lack of time to consider VTE prophylaxis in every patient (3.84±.667) and the clinician's concerns about increased bleeding risk from anticoagulant

administration (3.78±.854). Table 5 presents the differences between demographic characteristics and knowledge, perception, and barriers related to venous thromboembolism (VTE). The gender of the participants showed a significant difference in

knowledge ( $t=-2.841$ ;  $p<.005$ ), with females scoring higher ( $16.30\pm 3.04$ ), as well as in perception ( $t=-7.919$ ;  $p<.000$ ), with females scoring higher

( $3.85\pm 0.707$ ), and barriers ( $t=-4.661$ ;  $p<.000$ ), with females scoring higher.

**Table 4:** Possible system barriers to VTE prophylaxis

	Mean	Std. deviation
Lack of time to consider VTE prophylaxis in every patient	3.84	.667
Lack of clear indications for VTE prophylaxis (i.e., who should get prophylaxis)	2.82	1.085
Lack of clear contra-indications for VTE prophylaxis (i.e., who should not receive prophylaxis)	3.67	.848
Lack of awareness about the effectiveness of VTE prophylaxis	2.75	1.103
Lack of physician agreement with current VTE prophylaxis guidelines	3.76	.833
Patient discomfort with subcutaneous injections of anticoagulants	2.79	1.051
The clinician is concerned about increased bleeding risk from anticoagulant administration	3.78	.854
The use of VTE prophylaxis (e.g., enoxaparin) increases the risk of bleeding when ambulating the patient	2.79	1.074

Regarding age, a significant difference was found in knowledge ( $F=5.665$ ;  $p<.004$ ), with the 31-35 years old group scoring higher ( $15.87\pm 4.39$ ), and in perception ( $F=13.401$ ;  $p<.000$ ), with the above 35 years old group scoring higher ( $4.16\pm 0.782$ ). However, no significant difference was found in age and barriers ( $1.109\pm p>.332$ ).

In terms of educational attainment, no significant difference was found in knowledge ( $F=2.139$ ;  $p>.120$ ), perception ( $F=1.485$ ;  $p>.228$ ), and barriers ( $F=0.502$ ;  $p>.606$ ). Additionally, work experience did not show a significant difference in knowledge ( $F=3.427$ ;  $p>.094$ ), perception ( $F=22.707$ ;  $p>.090$ ), or barriers ( $F=4.452$ ;  $p>.073$ ). Similarly, the position did not demonstrate significant differences in knowledge ( $F=2.925$ ;  $p>.055$ ), perception ( $F=0.849$ ;  $p>.429$ ), or barriers ( $F=1.543$ ;  $p>.216$ ).

Regarding the working area, a significant difference was found in knowledge ( $F=4.657$ ;  $p<.000$ ), with the Operating Room Department scoring higher ( $16.87\pm 3.27$ ), as well as in perception ( $F=4.347$ ;  $p<.001$ ), with the Artificial Kidney Unit scoring higher ( $3.72\pm 0.554$ ), and barriers ( $F=4.257$ ;  $p<.001$ ), with the Artificial Kidney Unit scoring higher ( $3.59\pm 0.706$ ).

#### 4. Discussion

The majority of nurses view VTE prevention in hospitalized patients as a critical concern, which shows that patient surveillance and risk assessment can result in early and prompt identification and treatment, reducing potentially fatal outcomes. Additionally, nurses believed that the anticoagulant tactics currently being utilized to prevent VTE in hospitalized patients were successful, which shows that nurses may be properly providing anticoagulant medications. According to [Bankanie et al. \(2021\)](#), the prevention of VTE may show how simple it is for nurses to provide factual knowledge. Nurses, however perceivably unsure of the safety of the current use of anticoagulant strategies for the prevention of VTE in hospitalized patients and that, they underutilized the current anticoagulant strategies. Such results suggest that nurses' lack of understanding of the problem of underutilization of

VTE prevention is due to hospital healthcare goals. As stated in [Gray's \(2016\)](#) study, this information gap could be a substantial barrier, especially as nurses are among the caregivers best equipped to assess patients' need for VTE prophylaxis on a regular basis. The management of acute medical problems is the main focus of hospitals. Hospital-related problems, such as VTE, are frequently a secondary concern. To identify opportunities for improvement, all clinician groups must be taught the problem of VTE prophylaxis underutilization ([Wang et al., 2020](#)). Overall, the results indicate the need to monitor nurses administering pharmacologic prophylaxis for VTE because of the numerous task that they have such as risk assessments, patient and family education, and anticoagulant treatment management as patients transfer from the hospital to other healthcare settings ([Barp et al., 2018](#)). As a result, discrepancies in nurses' self-perceived and objective knowledge, self-efficacy, and perceived impediments to risk assessment and VTE prevention may have a favorable or negative impact on their ability to perform these duties ([Oh et al., 2017](#)).

Nurses moderately perceived the lack of time to consider VTE prophylaxis in every patient, which implies that despite the fact that nurses may have numerous patient care obligations, VTE risk assessment is critical and should be given the attention and time it deserves. Consistent with those reported in several studies ([Alnaser et al., 2022](#); [Al-Mugheed and Bayraktar, 2018](#); [Lee et al., 2014](#); [Lloyd et al., 2012](#)) paying attention to these roadblocks could aid in the development of an intervention that bridges the gap between evidence and practice. VTE risk factors, prognosis, clinical signs of VTE, anticoagulants, and restrictions to pharmaceutical and physical prophylaxes should all be included in a complete VTE prophylaxis education program for nurse educators ([Alnaser et al., 2022](#)).

Moreover, it was identified in the current study that the clinician's concerns about increased bleeding risk from anticoagulant administration were a possible barrier, which implies that anticoagulants are a pharmaceutical safety priority because of their large prevalence among patients, as well as their considerable clinical advantages in

terms of lowering rates of stroke, embolism, and mortality, and their propensity for causing major harm (mainly fatal bleeding). A prior study found

that individuals who thought they were at low risk of stroke declined to take warfarin because of the risk of bleeding (Etxeandia-Ikobaltzeta et al., 2020).

**Table 5:** Differences between the demographic characteristics and knowledge, perception, and barriers to venous thrombosis embolism

Variables	Mean	SD	t/ F	df	Sig. (2-tailed)	
<b>Gender</b>						
Knowledge	Male	14.83	3.72	-2.841	261	.005
	Female	16.30	3.04			
Perception	Male	3.20	.514	-7.919	261	.000
	Female	3.85	.707			
Barriers	Male	3.18	.488	-4.661	261	.000
	Female	3.56	.745			
<b>Age</b>						
Knowledge	25-30 years old	14.38	2.34	5.665	260	.004
	31-35 years old	15.87	4.39			
	Above 35 years old	14.42	1.15			
Perception	25-30 years old	3.32	.611	13.401	260	.000
	31-35 years old	3.30	.569			
	Above 35 years old	4.16	.782			
Barriers	25-30 years old	3.26	.556	1.109	260	.332
	31-35 years old	3.26	.548			
	Above 35 years old	3.50	.978			
<b>Educational attainment</b>						
Knowledge	BSN	15.08	3.49	2.139	260	.120
	Diploma	17.15	5.52			
	Master's degree	14.00	.000			
Perception	BSN	3.34	.604	1.485	260	.228
	Diploma	3.61	.987			
	Master's degree	3.00	.000			
Barriers	BSN	3.27	.557	.502	260	.606
	Diploma	3.39	.972			
	Master's degree	3.00	.000			
<b>Experience</b>						
Knowledge	1-3 years of experience	3.18	.457	3.427	260	.094
	4-8 years of experience	3.32	.598			
	9 years of experience and above	4.01	.798			
Perception	1-3 years of experience	14.42	2.79	22.707	260	.090
	4-8 years of experience	15.68	4.18			
	9 years of experience and above	15.03	2.30			
Barriers	1-3 years of experience	3.20	.479	4.452	260	.073
	4-8 years of experience	3.26	.527			
	9 years of experience and above	3.56	.949			
<b>Position</b>						
Knowledge	Staff Nurse	15.39	3.81	2.925	260	.055
	Head Nurse	13.92	1.81			
	Nursing supervisor	13.77	1.34			
Perception	Staff Nurse	3.35	.598	.849	260	.429
	Head Nurse	3.51	.942			
	Nursing supervisor	3.23	.692			
Barriers	Staff Nurse	3.28	.577	1.543	260	.216
	Head Nurse	3.43	.858			
	Nursing supervisor	3.10	.331			
<b>Working area</b>						
Knowledge	Inpatient wards	13.96	1.83	4.657	260	.000
	ICU	15.75	4.91			
	Operating Room Department	16.87	3.27			
	Outpatient Department	15.57	2.27			
	Emergency Department	16.32	4.34			
Perception	Artificial Kidney Unit	16.27	2.71	4.347	260	.001
	Inpatient wards	3.31	.644			
	ICU	3.19	.486			
	Operating Room Department	3.34	.667			
	Outpatient Department	3.21	.508			
Barriers	Emergency Department	3.62	.728	4.257	260	.001
	Artificial Kidney Unit	3.72	.554			
	Inpatient wards	3.18	.524			
	ICU	3.14	.470			
Barriers	Operating Room Department	3.48	.544	4.257	260	.001
	Outpatient Department	3.37	.376			
	Emergency Department	3.53	.757			
	Artificial Kidney Unit	3.59	.706			

t= t-value; F= F-value; SD= Standard deviation; df= degrees of freedom

Nurses reported reservations about the anticoagulant's side effects, particularly the risk of bleeding (van der Meer et al., 1993). These results can contribute to healthcare workers' increased consideration of the difficulties such as adherence and the patient's diminished cognitive and functional capacity when making decisions rather than being extra careful and cautious about bleeding (Osasu et al., 2021).

The gender of the participants was found to have a significant difference in knowledge where females scored higher than their male counterparts. This implies that male nurses lack an understanding of VTE prophylaxis research and evidence. According to Yu-Fen et al. (2018), each special care unit should have particular written policies and procedures that must be available to all nursing employees and serve as a guide for each action. Furthermore, hospitals must continuously give proper VTE prophylactic protocols (Oh et al., 2017).

On age, there was found a significant difference in knowledge with 31-35 years old scored higher. This means that as the nurse ages, there is an understanding of VTE prophylaxis. As indicated in the study by Zhao et al. (2018), nurses gather information from routine clinical which comes with age and most nurses conduct self-study to obtain insight about VTE (Xu et al., 2018). Additionally, more experienced individuals who have obtained continuing education may have a greater understanding of VTE (Yu-Fen et al., 2018) owing to age. As to perception, there was found significant difference with above 35 years old scoring higher which means that as the nurse age, the perception could change. Knowledge and age were found to be major factors in nurses' perception in some research (Lok, 2013; Sharifirad et al., 2015). However, there was no found significant difference in age and barriers, which suggests that nurses who are newer, younger, and have less professional experience, have a more meaningful purpose to care for patients (Hebeshy, 2018). In other words, patient care barriers were not significantly related to age. These results can contribute to the necessity of nurses to participate in VTE prevention continuing education programs. Nurses with less education are more likely to have limited understanding despite higher clinical experience, which is mostly centered on mundane tasks and following medical orders.

Concerning educational attainment, work experience, and position of the participants, there was no found significant difference in knowledge, perception, and barriers. These results imply that regardless of the educational attainment, work experience, and position of the nurses, there is no change in the knowledge, perception, and barriers. The possible justification might be due to the well-organized work environment, which is backed up by training, fast internet connectivity, and well-equipped nurses. Several nurses reported they were confident that mechanical devices could help deter VTE, that they could motivate patients to conduct early mobilization and leg exercises, and that they

could teach their patients about oral anticoagulants (Lee et al., 2014). Differences in educational levels, inadequate resources, job discontent, lack of drive, and a smaller extent of higher training are some of the issues that play to barriers, as per Asemahagn (2014). Additionally, lack of enabling mechanisms, individual responsibility for implementation, lack of acceptance, perceived lack of necessity in particular therapeutic areas, lack of oversight or incentives, and contradicting guideline directions have all been noted as hurdles to guideline adherence (Worel, 2009).

A significant difference was observed in the knowledge level among different working areas, with the Operating Room (OR) Department scoring higher. This difference can be attributed to the fact that patients in the OR often present with severe symptoms and mobility limitations, requiring additional nursing attention. OR patients commonly exhibit risk factors for venous thromboembolism (VTE), such as mechanical ventilation, central venous catheter placement, immobility, infection, and postoperative status. The presence of these risk factors under the care of OR nurses enhances their knowledge and expertise in VTE prevention.

Similarly, a significant difference was found in perception, with the Artificial Kidney Unit scoring higher. This indicates that kidney patients have a significant risk of VTE due to factors such as surgical trauma and immobility. Nurses working in the vascular kidney department possess specialized knowledge and expertise in VTE, which contributes to their heightened awareness of the importance of VTE prevention in their daily practice (Yan et al., 2021). According to a review, inpatients' adherence to VTE treatments was heavily influenced by the nurse's health education (Bauer et al., 2019). Gibbs et al. (2011) found that nurses who are committed to VTE risk assessment and prophylaxis can significantly reduce VTE cases and their associated problems.

Many studies have found that the behaviors of nurses have a significant impact on the success of VTE treatments (MacLellan et al., 2015). Lastly, the barrier was found to have a significant difference where the Artificial Kidney unit scored higher. This means that there are substantial high-risk factors for prevention of VTE in Artificial Kidney Unit nurses such as renal replacement therapies. As suggested by Yu-Fen et al. (2018), a lack of understanding could lead to non-standard VTE prevention and poor patient care in this field. The findings suggest that the traditional idea that recommendations are preferable to educate in departments with high VTE risk factors may need to be reconsidered. Systematic training in all VTE-related departments must be strengthened to improve clinical nursing.

This study has an implication for nursing practice in that nurses are an important group of healthcare professionals that can identify and respond to VTE hazards. According to a Canadian study, nurses are the best candidates to undertake daily VTE prophylaxis assessments (Lloyd et al., 2012). Direct

care nurses, who are primarily responsible for patient advocacy, can assist in bridging the gap between patients' unique circumstances and physicians' understanding. A study in the United States found that thorough and consistent patient education by nurses could reduce morbidity and mortality rates (Lavall and Costello, 2015). Thus, it is important to assess the priorities of the staff nurses with regard to training (Pasay-an and Alsrour, 2022).

## 5. Conclusion

The prevention of VTE in hospitalized patients is perceived as an important issue by nurses, and they believe that current anticoagulant strategies are effective. However, nurses express some uncertainty about the safety of these strategies and acknowledge that they underutilize them. Generally, nurses possess good knowledge about VTE but moderately perceive a lack of time to consider VTE prophylaxis for every patient and have concerns about the increased bleeding risk associated with anticoagulant administration. Female participants exhibit significant differences in terms of knowledge, perception, and barriers. Significant differences were also found between age and knowledge/perception. However, no significant differences were observed based on position in terms of knowledge, perception, and barriers. The working area, specifically the operating room department, was found to significantly influence knowledge, while the artificial kidney unit significantly impacted perception and barriers. Thorough and consistent patient education provided by nurses can effectively reduce morbidity and mortality rates. Nurses play an essential role in VTE prevention by employing various techniques such as education, medical advice, pharmacological prophylaxis, and assisting with physiotherapy.

## Compliance with ethical standards

## Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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