MEDICAL SCIENCE

Knowledge, attitudes and practice toward venous thromboembolism prophylaxis among students of Health Colleges, Al-Baha University, Saudi Arabia

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ABSTRACT

Background: The incidence of venous thromboembolism (VTE) is rising gradually in emerging nations and is a global public health concern. This research aims to assess knowledge, attitude and practice (KAP) towards venous thromboembolism prophylaxis among students at health colleges, Al-Baha University, Al-Baha, Saudi Arabia. *Methods:* This is a cross-sectional study, conducted in the period between August and September 2022 and involved 298 students enrolled at health colleges at Al-Baha University, Al-Baha, Saudi. Each participant received a pre-designed self-administered questionnaire. *Results:* Four cases were questioned whether they needed VTE prophylaxis and what kind. Cases 1 and 3 need unfractionated heparin, 2 requires LMWH, while 4 requires no prophylaxis. Cases 1 (82, 27.5%), 2 (107, 35.9%), 3 (107, 35.9%) and 4 (131, 44%) did not require VTE prophylaxis. Most participants chose low molecular weight heparin (LMWH) for all cases: Case 1 (78, 26.2%), case 2 (74, 24.8%), case 3 (57, 19.1%) and case 4 (42, 14.1%). Faculty of Medicine students had the best VTE prophylactic knowledge and behaviors (P< 0.001). Interns from all health schools practiced better than other years (P= 0.034). *Conclusion:* Health college students showed an acceptable attitude toward VTE prevention, although knowledge was limited and the number of positive procedure responses was low. These results advise colleges to boost VTE prevention training programs, with a higher focus on early-career doctors with less formal training.

Keywords: venous thromboembolism prophylaxis; Saudi; medical students

1. INTRODUCTION

The prevalence of venous thromboembolism (VTE), which is another term for a blood clot that forms in the veins, is gradually increasing in emerging countries making it a significant worldwide public health concern (Schulman et al., 2017; Zhang et al., 2019). This is because VTE can lead to blood clots that can travel to other parts of the body and cause serious complications. The creation of a blood clot in the veins may lead to a condition known as VTE, which is one of the leading causes of death. Patients who are admitted to the hospital often exhibit symptoms of venous thromboembolism (Zhang et al., 2019; Zhai et al., 2019). Hospitalized individuals have an increased risk of developing VTE from 3.2 to 17.5 per 100,000 populations (Zhang et al., 2019).

On the other hand, it is believed that the risk of developing VTE may be reduced to an almost negligible level by using the most efficient preventative methods (Zhang et al., 2019). The two most common forms of VTE are deep vein thrombosis (also known as DVT) and pulmonary embolism (often known as PE). Age 40, obesity, a family history of VTE, major surgery, a diagnosis of cancer, a diagnosis of congestive heart failure, estrogen replacement treatment, a stroke or a heart attack are all risk factors for developing VTE (Zhai et al., 2019; Lee et al., 2017).

Another risk factor is having a family member who has developed VTE. One of the risk factors for getting VTE is having a family history of the condition. VTE is third on the list of worldwide causes of death related to cardiovascular disease (Schulman et al., 2017). There have been several suggestions for the prevention of VTEs and the research field that focuses on the creation of strategies that are effective in the prevention of VTEs is increasing (Zhang et al., 2019; Lee et al., 2017; Zhou et al., 2019; Farge et al., 2019; Schunemann et al., 2018; Lyman et al., 2018). The findings of many research come to the same conclusion: There is a significant knowledge gap between the evidence-based standards of the West and the current understanding of healthcare practitioners (Grosse et al., 2016; Ageno et al., 2019; Schunemann et al., 2018; Wendelboe et al., 2015; Goldhaber et al., 2010).

Because of this knowledge vacuum, efforts to avoid VTEs using strategies that are shown to be successful are hampered. One of the many aspects that must be taken into consideration to effectively prevent VTE is an accurate assessment of the challenges that must be conquered to carry out VTE prophylaxis. This is just one of the many factors that must be taken into account. This is one of the many factors that have to be taken into consideration in VTE. However, there is a shortage of information that might be used to identify these possible roadblocks in China's efforts to reduce VTEs.

The assessment of the potential for VTE and the provision of appropriate preventative medication in cases when such treatments are required are two of the most important functions performed by medical experts in VTE. In many regions of the world, VTE is a primary cause of sickness and death, as well as a significant economic burden. If patients at risk for VTE get appropriate thromboprophylaxis, it is possible to prevent VTE-related morbidity and death. Initially, attempts to prevent VTE were concentrated on hospitalized patients deemed to be at high risk.

In recent years, however, these efforts have evolved to include educating the general public about the disease, promoting healthy lifestyle choices and developing prevention measures. For future initiatives aimed at prevention, it is crucial to have access to pertinent data on the degree of knowledge and awareness among the general community (Lyman et al., 2018; Grosse et al., 2016; Ageno et al., 2019; Schunemann et al., 2018; Wendelboe et al., 2015; Goldhaber et al., 2010; Spyropoulos et al., 2012). Regarding the topic of preventing VTE, very little research has been done on the knowledge, attitudes and actions of medical professionals in VTE. This is the case even if members of the medical staff play an essential part in the process of preventing VTE in hospitalized patients; despite this, however, the situation remains the same.

The purpose of this study was to investigate the level of knowledge, attitudes and practices (KAP) on venous thromboembolism prophylaxis held by students attending health colleges affiliated with Al-Baha University in Saudi Arabia. Specifically, the researchers were interested in finding out how well these students were able to prevent venous thromboembolism. This study aims to evaluate knowledge, attitude and practice toward VTE prophylaxis among students of health colleges of Al-Baha University.

2. METHODS

A cross-sectional survey was conducted among students at health colleges of Al-Baha University aimed to evaluate knowledge, attitude and practice toward venous thromboembolism prophylaxis from August 1, 2022, to September 1, 2022. Participants were randomly selected. The minimum required sample size was 282 (with an error margin of 5% and a confidence interval of 95%). Participants who volunteered to participate in this survey study were invited to complete an online questionnaire if they demonstrated the ability to comprehend it. Students who were not willing to participate were excluded from the study. All participants provided informed consent.

Participants were offered the option to participate in this study and they were assured that their personal information would be kept anonymous and confidential. This study was approved by the Scientific Research and Ethics Committee of the Faculty of

Medicine, Al-Baha University. REF: (REC/MED/BU.FM/2022/39). We used Google Forms to distribute the online questionnaire to gather the required data using an anonymous self-administered, reliable and validated modified questionnaire (Spyropoulos et al., 2012). There were four different parts: clinical vignettes, awareness of clinical guidelines, practice and preferences and personal beliefs.

The clinical vignettes, it has four cases each case has a yes/no question and what type of prophylaxis will be given. The answers for these cases was prophylaxis needed in case 1 and 3 is Unfractionated heparin, in case 2 the prophylaxis needed is LMWH while no need for prophylaxis in case 4, according to Recommendations for VTE Prophylaxis in Medically Ill Patients research paper publish on 2020 Mar 25.

To assess the awareness and compliance of students with clinical guidelines for venous thromboembolism (VTE) prophylaxis, the study presented participants with five questions related to their familiarity with and adherence to current guidelines. Additionally, participants were asked to indicate their preferred VTE prophylaxis regimen for various situations and complications, which were evaluated across five items. Two additional items were included to assess participants' personal beliefs regarding VTE prevention and adherence to quality measures.

3. RESULTS

Socio-demographic Characteristics

The study included 298 students from different health colleges at Al-Baha University. The mean age among study participants was 22.82 + 3.67 years. Among the study participants, there were 156 females (52.3%) and 142 males (47.7%). There were 119 students from the Faculty of Medicine (39.9%). The distribution of students according to faculty is in (Figure 1).

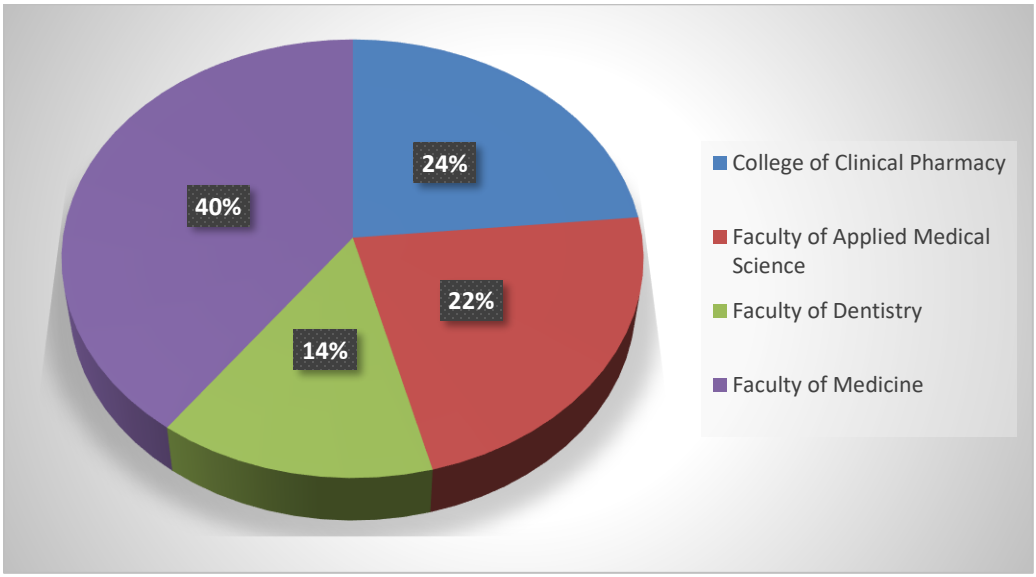

Figure 1 Distribution of participants by faculties

The academic year varied among study participants with a quarter of them being in their internship year (n= 75, 25.2%). Figure 2 presents the distribution of study participants according to their faculty and academic year. Analysis indicates that participants from medical college significantly showed a higher percentage in identifying correct action must be taken with case one compared to other students from different collages with p value 0.008, whilst comparison of all participants' responses from different collages to cases 2, 3 and 4, did not vary significantly.

Clinical Vignettes

Participants were asked about 4 cases whether they need VTE prophylaxis or not and the appropriate prophylaxis to be given. Participants' answers are in (Table 1). Some of the participants reported that the case does not need VTE prophylaxis as follows: Case 1 (82, 27.5%), case 2 (107, 35.9%), case 3 (107, 35.9%) and case 4 (131, 44%). It is noticed from the table that most of the participants answered low molecular weight heparin (LMWH) as a prophylaxis for all cases.

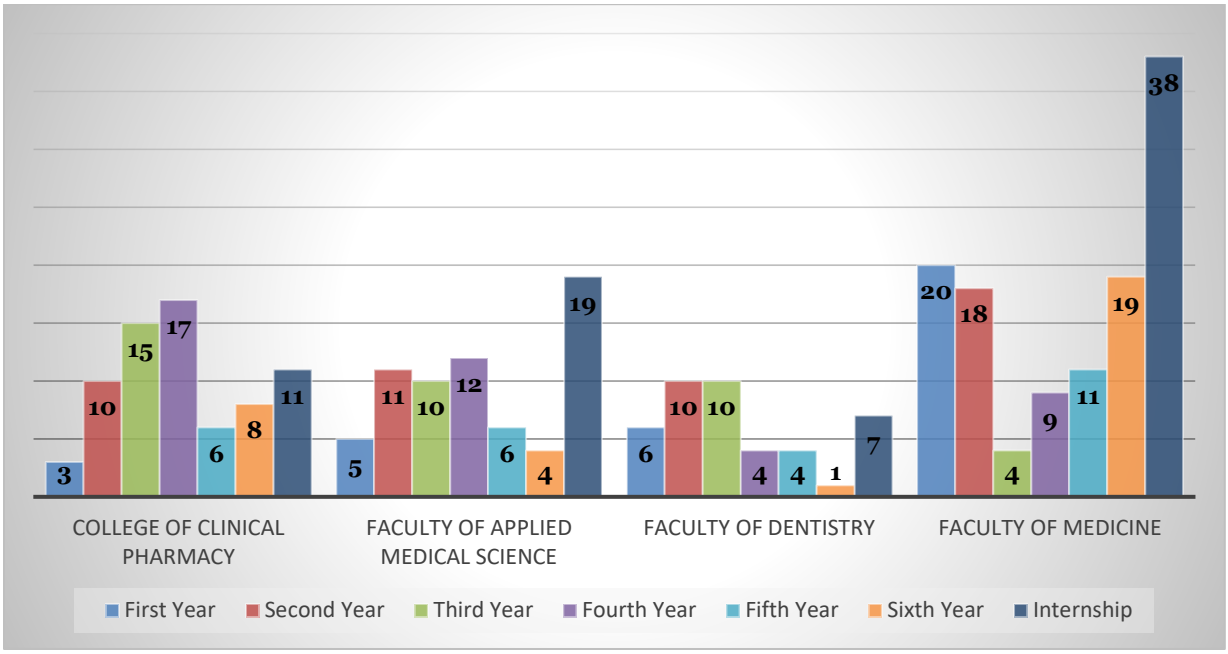

Figure 2 Distribution of participants according to the faculty and academic year

Table 1 Participants' answers to clinical vignettes cases

Case*	VTE prophylaxis need		Type of prophylaxis				
	Yes	No	Fondaparinux	High dose aspirin	LMWH	Mechanical Prophylaxis	Unfractionated heparin
Case 1	216 (72.5%)	82 (27.5%)	28 (9.4%)	33 (11.1%)	78 (26.2%)	22 (7.4%)	55 (18.5%)
Case 2	191 (64.1%)	107 (35.9%)	34 (11.4%)	27 (9.1%)	74 (24.8%)	20 (6.7%)	36 (12.1%)
Case 3	191 (64.1%)	107 (35.9%)	27 (9.1%)	34 (11.4%)	57 (19.1%)	30 (10.1%)	43 (14.4%)
Case 4	167 (56%)	131 (44%)	38 (12.8%)	38 (12.8%)	42 (14.1%)	24 (8.1%)	25 (8.4%)

LMWH: Low Molecular Weight Heparin; *Cases are presented in the Appendix

Awareness Assessment

Participants' awareness regarding VTE prophylaxis was assessed using a 5-question scale. Participants' responses to awareness questions are in (Table 2). Awareness results showed that more than half of the study participants are aware of formal VTE prophylaxis guidelines (n= 170, 57%). Moreover, about a third of participants are updated concerning VTE prophylaxis guidelines (n= 107, 35.9%). Finally, most of the participants reported that severe respiratory distress is a topic not included in the American College of Chest Physician VTE guideline (n= 111, 37.2%). Faculty of Medicine students were most aware of VTE prophylaxis guidelines (P< 0.001).

Table 2 Awareness level of VTE prophylaxis among study participants

Scale item	Response	Frequency	Percentage
Are you aware of formal guidelines from medical societies regarding VTE prophylaxis in medical patients?	Yes	170	57%
	No	128	43%
How would you grade your knowledge of the clinical guidelines?	None	89	29.9%
	Moderate	156	52.3%
	Good	53	17.8%
When was the last time you were updated through formal teaching with these guidelines?	< 3 months	58	19.5%
	3-12 months	133	44.6%
	Over 12 months	107	35.9%
When was the last time you were updated through self-directed learning with these guidelines?	< 3 months	75	25.2%
	3-12 months	107	35.9%

	Over 12 months	116	38.9%
Which of the following medical conditions is NOT included in the recommendations for VTE prophylaxis from the American College of Chest Physicians?	Congestive heart failure	72	24.2%
	Severe respiratory distress	111	37.2%
	Confined to bed	66	22.1%
	Has one or more additional VTE risk factors	49	16.4%

Practice Assessment

Participants' practice regarding VTE prophylaxis was assessed using a 5-question scale. Participants' responses to practice questions are in (Table 3). The Table presents 3 questions with a single answer. On the other hand, participants were allowed to choose more than one answer for the first question which was about their reasons to defer treatment. The most common reason was the risk of bleeding (n= 40, 13.4%) followed by patient preference and lack of guidelines (n= 19, 6.4%). Faculty of Medicine students had best practices about VTE prophylaxis guidelines (P< 0.001). In addition, internship participants had better practice than other years (P= 0.034).

Table 3 Practice assessment responses among study participants

Scale item	Response	Frequency	Percentage
I usually advise on treatment with: Choose only one answer	Low molecular weight heparin	108	36.2%
	Unfractionated heparin	44	14.8%
	High dose aspirin	57	19.1%
	Fondaparinux	37	12.4%
	Mechanical prophylaxis	52	17.4%
For patients with creatinine clearance < 30, I usually advise on: Choose only one answer	Defer treatment	73	24.5%
	Low molecular weight heparin	65	21.8%
	Unfractionated heparin	63	21.1%
	High dose aspirin	32	10.7%
	Fondaparinux	29	9.7%
	Mechanical prophylaxis	36	12.1%
For patients with a history of Major bleeding (bleeding that causes hemodynamic instability or warranting blood transfusion), I usually advise on: Choose only one answer	Defer treatment	87	29.2%
	Low molecular weight heparin	47	15.8%
	Unfractionated heparin	36	12.1%
	High dose aspirin	36	12.1%
	Fondaparinux	29	9.7%
	Mechanical prophylaxis	63	21.1%
For patients with a history of Minor bleeding, I usually advise on: Choose only one answer	Defer treatment	62	20.8%
	Low molecular weight heparin	60	20.1%
	Unfractionated heparin	37	12.4%
	High dose aspirin	49	16.4%
	Fondaparinux	32	10.7%
	Mechanical prophylaxis	58	19.5%

Beliefs about VTE Prophylaxis

Regarding personal belief in VTE prevention. "*I strongly believe in this intervention as a preventive measure for morbidity and mortality*" was the most frequent belief (n= 129, 43.3%). While "*I moderately believe in this intervention as a preventive measure for morbidity and mortality*" came next with a frequency of 125 participants (41.9%). By contrast, the belief "*I don't believe in this intervention as a preventive measure for morbidity and mortality*" was the last one and prevalent among 44 participants (14.8%).

4. DISCUSSION

The following patterns emerged from the results of our survey of the health colleges students at Al-Baha University: 1) An adequate level of awareness of VTE prophylaxis; 2) a generally favorable attitude towards VTE prophylaxis and 3) a low incidence of affirmative replies regarding practices, as a way of better preparing patients, respondents to the poll suggested both patient self-study and further training for medical professionals on the prevention of VTE. An inadequate understanding of how to avoid VTE among medical workers may be to blame for the lack of standardization and the higher risk of VTE among hospitalized patients (Anderson et al., 2019; Al-Dorzi et al., 2013; Mc-Farland et al., 2013; Tang et al., 2015).

Our survey found that the majority of medical professionals' adequate level of awareness of how to avoid VTE. This might be the result of several factors, the most significant of which are the young age of the respondents, their lack of experience with VTE administration, their lack of formal education and their unwillingness to learn about the issue on their initiative. When compared to physicians, the nurses in the research tended to be younger (Anderson et al., 2019), have a lower level of experience, have a lower level of education and be at the beginning of their professions. All of these factors might explain why nurses had a lower level of awareness about the prevention of VTEs (Anderson et al., 2019).

Research lends credence to the notion that medical professional, especially those who are just starting in their professions and who have had a lower level of formal education, should be encouraged to learn more about the prevention of venous thromboembolism VTE (Anderson et al., 2019). The survey participants viewed the prevention of VTEs favourably as a whole (Anderson et al., 2019). In 2017, the hospital started the process of implementing substantial changes to lower the risk of VTE, such as improving the frequency and depth of training for all staff members and extending access to educational tools that were already available (Anderson et al., 2019).

The positive view that the medical personnel has about the prevention of VTEs gives us optimism that efforts are paying off (Anderson et al., 2019). According to the findings of the recent study, it is obvious that medical personnel are concerned about the possibility of being held liable for monetary damages if a patient is unable to get VTE prophylaxis (Anderson et al., 2019). This demonstrates that the hospital's system for reviewing the work of its medical staff is functioning well. If the potential risk of VTE for hospitalized patients is not assessed, the responsible medical professionals will be subject to a fine under this method.

In the survey that was carried out with registered nurses, several concerns were brought up. These concerns included a growing workload, rising healthcare expenses, longer hospital stays and deteriorating doctor-patient conflicts. According to these data, it would seem that the nurses working at this establishment do not yet have a full comprehension of the relevance of the prevention of VTEs. It has been shown that VTE prophylaxis increases patient satisfaction with medical care and decreases the chance of conflicts between doctors and their patients (Anderson et al., 2019).

During practice, a relatively low proportion of questions were answered correctly. This may have to do with how poorly the medical team understands the situation (Ma et al., 2018; Xu et al., 2019; Ebrahimpur et al., 2016). VTE prophylaxis is a necessary inquiry on the nurse's queue on admission and daily assessment of the patient, but it is not a mandatory queue for doctors. This difference may help to explain why the percentage of positive responses from nurses about practices was higher than that of clinicians. The potential for the difficulties associated with VTE prevention to have an effect on their practice as a whole was the greatest source of worry for medical professionals. Based on literature findings, doctors and other medical workers should be urged to provide VTE prophylaxis despite their worries about the complexity of the treatment (Anderson et al., 2019).

This is because VTE prophylaxis has been shown to reduce the risk of blood clots (Feng et al., 2021; Farge et al., 2019; Tang et al., 2015; Ruff et al., 2019; Oh et al., 2017). The majority of the suggestions for preventing VTE offered by the respondents were on increasing the bar for the education of workers and promoting greater autonomous study. The value of obtaining a solid education is shown once again by these results. Because accurate information is the cornerstone of effective VTE prophylaxis (Anderson et al., 2019; Feng et al., 2021), medical institutions must expand the training possibilities available to employees and medical professionals ought to engage in self-study to acquire further knowledge on VTE prophylaxis.

Respondents to the study also suggested adding measures, such as the implementation of an electronic warning system, to the existing initiatives already underway to reduce the risk of VTEs (Sun et al., 2018; Xu et al., 2018). This study has limitations since the majors of medical science college were not detailed. For this reason, measuring the knowledge of each major is not possible. For future surveys, each major should be on its own.

5. CONCLUSION

In general, we observed that Health College students included in this study had a favourable attitude toward VTE prevention; nonetheless, information was restricted and the number of individuals who provided positive responses to questions concerning

procedures was low. Based on these findings, we strongly suggest that colleges increase their training for the prevention of VTEs. In addition, early-career medical practitioners who have had less formal training should be encouraged to enhance their expertise in the prevention of VTE.

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Ethical approval

This research was approved by the faculty review board (REC/MED/BU.FM/2022/39) after revision of research proposal.

Informed consent

Authors explained study objectives at the beginning of google form prior to the acceptance of participation in the study. Participants were asked voluntarily to participate.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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