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# How to Manage Venous Thromboembolism Risk in Hospitalized Medical Patients

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## Abstract:

**BACKGROUND:** Deep venous thrombosis causes morbidity and mortality for hospitalized patients. There are several risk factors for developing deep venous thrombosis including trauma, immobilization, and surgery. Complications of deep venous thrombosis result from the delay in diagnosis and treatment, so prophylaxis is the perfect option to avoid these serious complications, especially for those at risk.

**AIM:** The aim of this is to investigate the impact of DVT protocol on thromboprophylaxis in minimizing the disease burden of under-recognized and preventable pathology.

**MATERIALS AND METHODS:** This is a retrospective descriptive study which used DVT protocol through the Knowledge Translation Committee (KTC).

**RESULTS:** Suboptimal prophylaxis decreased from 47% in 2011 to 6% in 2017, whereas appropriate prophylaxis increased among patients from 45% in 2011 to 89% in 2017.

**CONCLUSION:** There was an increase in offering DVT prophylaxis for hospitalized medical patients as a result of the implementation of DVT protocol through KTC.

## Keywords:

DVT, DVT prophylaxis, Kingdom of Saudi Arabia, Knowledge Translation Committee

## Introduction

Venous thromboembolism (VTE) is a cardiovascular disorder that is in the third rank regarding prevalence.<sup>[1]</sup> VTE prevalence ranges from 10% to 33% among hospitalized patients, VTE including both deep venous thrombosis (DVT) and pulmonary embolism (PE).<sup>[2]</sup> Deep venous thrombosis (DVT) is one of the major causes of mortality and morbidity among hospitalized patients; however, it can be prevented.<sup>[3,4]</sup> DVT has been increased among hospitalized patients,<sup>[5]</sup> and it was stated that 450,000 hospitalized patients and 50,000 individuals die every year in the USA associated with DVT.<sup>[6]</sup> There are several risk factors for developing DVT including

older age, trauma, cancer, immobilization, surgery, and antiphospholipid syndrome.<sup>[7,8]</sup> A study from Saudi Arabia<sup>[9]</sup> showed that patients diagnosed with DVT were with a mean age of 44.16 years. Symptoms of DVT include swelling, pain, and discoloration.<sup>[10]</sup> However, patients with acute lower extremity DVT often do not show warmth, erythema, pain, swelling, or tenderness.<sup>[11]</sup> Delay in the diagnosis of DVT may return to the nonspecific nature of the clinical presentation of DVT and hence delay in therapy initiation, and this may lead to morbidity and mortality.<sup>[9]</sup> Complications of DVT range from postthrombotic syndrome which involves organic changes of the tissues and veins in the leg to PE with a mortality rate of 15% within 3 months.<sup>[10,12]</sup> Treatment strategies of DVT and PE have been changes through the past 2 decades and will continue to change in the coming

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years.<sup>[9]</sup> The American College of Chest Physicians guidelines on antithrombotic therapy recommended using anticoagulant prophylaxis as Grade 1A for at-risk medical patients in order to prevent DVT;<sup>[4]</sup> however, DVT prophylaxis is underutilization as there are only 16%–33% of medical patients at DVT risk who received prophylaxis.<sup>[13,14]</sup> Hence, in the current study, we aimed to investigate the influence of DVT protocol through the Knowledge Translation Committee (KTC) in King Abdulaziz Medical City (KAMC).

## Materials and Methods

This is a retrospective descriptive study which included 1073 patients who enrolled in 6 medical wards at KAMC using deep vein thrombosis (DVT) protocol through KTC between 2011 and 2017 which involves:

- Daily checking of the total patents on DVT prophylaxis dose, through patients' medical records in the best care system
- Scoring patients who are eligible for prophylactic therapy but not receiving the dose, based on DVT prophylaxis guidelines
- Contact the treating physicians to remind them to start giving the patient the recommended dose.

## Statistical analysis

Data obtained were summarized as percentage according to year and prophylaxis status.

## Results

The current study included 1073 patients in 6 medical wards at KMAC during 7 years, starting from 2011 and ending in 2017. During 2011, prophylaxis was not indicated for 2% of patients, 6% of patients were eligible but did not have prophylaxis, 45% received appropriate prophylaxis, and 47% get suboptimal prophylaxis [Table 1]. During 2012, 10% were eligible but did not receive prophylaxis, 73% received appropriate prophylaxis, 17% received suboptimal prophylaxis, and 2% did not receive prophylaxis at all [Table 1]. In 2013, there were 6% eligible for prophylaxis but did not receive it, 79% and 15% received appropriate and suboptimal prophylaxis, respectively, while 4% had no prophylaxis [Table 1]. During 2014, only 2% of patients were not indicated to receive prophylaxis, 5% did not receive prophylaxis although they were eligible, 82% and 13% received appropriate and suboptimal prophylaxis, respectively, and 5% received no prophylaxis [Table 2]. In 2015, the percentage of those who were not indicated to receive prophylaxis increased to 7% and the same percentage was found to be eligible but did not receive prophylaxis, whereas 86%, 8%, and 6% received appropriate, suboptimal, and no prophylaxis, respectively [Table 2]. In 2016,

**Table 1: Prophylaxis during 2011-2013**

Prophylaxis	Years		
	2011 (%)	2012 (%)	2013 (%)
Not indicated	2	0	0
Eligible but no prophylaxis	6	10	6
Appropriate	45	73	79
Suboptimal	47	17	15
No prophylaxis	0	2	4

**Table 2: Prophylaxis during 2014-2017**

Prophylaxis	Years			
	2014 (%)	2015 (%)	2016 (%)	2017 (%)
Not indicated	2	7	3	3
Eligible but no prophylaxis	5	7	6	5
Appropriate	82	86	86	89
Suboptimal	13	8	7	6
No prophylaxis	5	6	7	4

prophylaxis was not indicated for 3%, prophylaxis was not presented although patients were eligible for 6%, and 86%, 7%, and 7% received appropriate, suboptimal, and no prophylaxis, respectively [Table 2]. During 2017, 4% did not receive prophylaxis, 3% were not indicated to receive it, and 5%, 89%, and 6% were eligible but did not receive it, received appropriate prophylaxis, and received suboptimal prophylaxis, respectively [Table 2]. Prophylaxis during 2011–2017 is shown in Figure 1. There was an increase in receiving appropriate prophylaxis among patients [Figure 2], the appropriate prophylaxis increased from 45% to 89% during 2011–2017, while the suboptimal prophylaxis decreased from 47% in 2011 to 6% in 2017.

## Discussion

In the current study, DVT prophylaxis was investigated for patients at KAMC through 2011–2017. In 2011, it was found that suboptimal prophylaxis received was more than appropriate prophylaxis (47% vs. 45%, respectively) and only 6% were eligible for prophylaxis and received it. In agreement with our findings, a Saudi study published in 2011 reported that only small number of patients eligible to VTE prophylaxis received it.<sup>[15]</sup> Other studies<sup>[13,14]</sup> showed that DVT prophylaxis was admitted to 16%–33% of medical patients at risk. The reason for the low presentation of prophylaxis for medical patients comparing to surgical patients is unknown.<sup>[16-18]</sup> The use of DVT protocol KTC resulted in many advantages regarding prophylaxis. By analysis, it was found that the trend of patients eligible to prophylaxis but it was decreased through the past 4 years (2014–2017) than in 2011–2013. Furthermore, suboptimal prophylaxis decreased over the years from 47% in 2011 to 6% in 2017 with an increase in affording appropriate prophylaxis from 45% in 2011 to 89% in 2017. This increase in

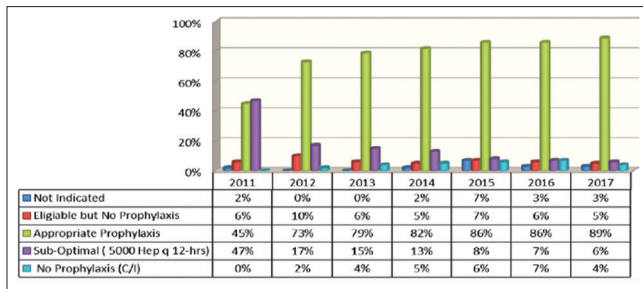


Figure 1: DVT statistics 2011–2017

presentation of appropriate prophylaxis and decrease in suboptimal prophylaxis show the effectiveness of DVT protocol and hence prevention of DVT and its associated mortalities and morbidities, especially because DVT was reported to be highly prevalent in some areas of Saudi Arabia. One study from Jeddah showed that DVT was highly prevalent in Jeddah and knowing risk factors was mandatory to predict patients who will develop it and then protect them.<sup>[19]</sup> Another study showed that proximal DVT was prevalent in 2%–4.9% of hospitalized medical patients.<sup>[20]</sup> In one meta-analysis,<sup>[10]</sup> it was found that anticoagulant prophylaxis for DVT in hospitalized medical patients reduced symptomatic DVT, but this reduction was insignificant. It was reported in a systemic review that anticoagulant prophylaxis resulted in reduction by 49% and 55% in the risk of proximal or distal asymptomatic DVT and in the risk for asymptomatic proximal DVT in hospitalized medical patients.<sup>[21]</sup> There is a lack in studies investigating the impact of prophylaxis on the prevalence of DVT as well as the influence of guideline and prophylaxis protocol application, so we could not find more results to compare with ours. There is another limitation in our study that we could not reach the type of prophylaxis applied to the hospitalized patients. Further studies are very recommended.

## Conclusion

The implementation of DVT protocol through KTC resulted in increasing DVT appropriate prophylaxis and a decrease in suboptimal prophylaxis; hence, KTC improved the use of DVT prophylaxis.

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## Conflicts of interest

There are no conflicts of interest.

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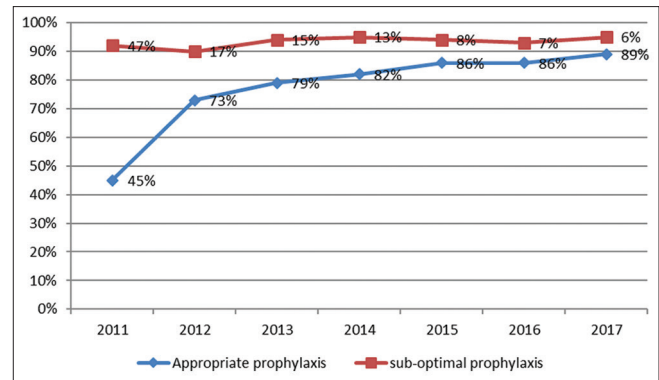


Figure 2: The percentage of patients received suboptimal and appropriate prophylaxis through 2011–2017

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