Original Article

Developing an Economic Case of Clinical Pharmacists' Interventions on Venous Thromboembolism Prophylaxis Through Service Evaluation

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Abstract

Objective: Venous thromboembolism (VTE) has become a huge health problem as well as a financial burden for the National Health Service. The objective of this study was to characterize current practice of VTE prophylaxis (VTEP) and evaluate the economic impact of clinical pharmacists' interventions (CPIs) on VTEP. **Methods:** A prospective service evaluation was conducted in a medical and surgical ward at a tertiary teaching hospital in London from 23 May to 08 June 2016. Appropriateness of risk assessment (RA) and VTEP and CPIs were categorized and assessed. Based on the results of the service evaluation, a pharmacoeconomic analysis was undertaken to estimate the cost savings by CPIs for inappropriate pharmacological VTEP. **Findings:** A total of 203 cases were analyzed. The rates of appropriateness for RA on admission, RA at 24 h and pharmacological VTEP were 58.6%, 39.7%, and 75.4%, respectively. In the medical ward, there was a significant difference of appropriate RAs between on admission and at 24 h (70.3% vs. 23.8%, respectively). Whereas, the rate of appropriate pharmacological VTEP accounted for 75.4% and the rate of appropriate prophylaxis was significantly higher in the medical ward than surgical ward (80.5% vs. 68.2%, $P = 0.045$). Of 50 cases of inappropriate pharmacological prophylaxis, 39 cases (78.0%) were corrected by clinical pharmacists. These CPIs resulted in £1,286.23 cost savings during the study and it was estimated to be £517,522/annum. **Conclusion:** CPIs had significant positive clinical and economic impacts on VTEP. There is more scope for the improvement of RA at 24 h through CPIs.

Keywords: *Clinical pharmacists' interventions, pharmacoeconomic analysis, venous thromboembolism prophylaxis*

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Introduction

Venous thromboembolism (VTE) refers to deep vein thrombosis (DVT) and pulmonary embolism (PE). This is a leading cause of mortality and morbidity in hospitalized patients.[1-3] Every year, over 25,000 people in England die from hospital-acquired VTE and it has become a huge health problem.[4,5] The total cost of managing VTE in the UK is approximately £640 million/year.[6] However, hospital-acquired thrombosis can be preventable with evidence-based pharmacological and/or mechanical prophylaxis.[3]

Therefore, the National Institute for Health and Care Excellence (NICE) guidelines recommend risk assessment (RA) and most clinically and cost-effective options for thromboprophylaxis for hospitalized patients. RA should be conducted for all patients on admission to identify those who are at increased risk of VTE. This is assessed based on whether to have ongoing reduced mobility for medical patients, VTE risk factors and bleeding risk factors for both medical and surgical patients. In addition, reassessment of the patients' VTE and bleeding risk factors within 24 h of admission and whenever the clinical situation changes are also recommended by the guidelines to ensure that the methods of thromboprophylaxis being used are suitable

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and that thromboprophylaxis is being used correctly and also to identify adverse events resulting from thromboprophylaxis.[5]

Despite explicit guidelines of thromboprophylaxis, underutilized and suboptimal thromboprophylaxis in hospitalized patients remains problematic.[7] Although evidence shows that clinical pharmacists' interventions (CPIs) on VTE prophylaxis (VTEP) can improve doctors' prescribing patterns and adherence of VTEP guidelines.[1,8] Furthermore, there were only a few studies[8,9] that investigated the economic impact of CPIs on VTEP. Therefore, this study aimed to characterize current practice of VTEP and evaluate the economic impact of CPIs on VTEP. Finally, it aimed to identify scope of the clinical and economic improvement through CPIs.

Methods

A pharmacoeconomic study based on a prospective service evaluation was conducted at a 993-bed tertiary teaching hospital in South London. This hospital has been putting continuous effort into improving VTEP. Finally, it became a National VTE Exemplar Centre in November 2015.

Study population for the service evaluation was all adults (aged ≥18) who were admitted to hospital at a medical and surgical ward as in-patients to be assessed risk of VTE and bleeding. The two wards selected were high turnover wards selected to achieve sufficient sample size during the study, as well as because the study focused on VTEP on admission and at 24 h. The ethical issues were reviewed and approved by University College London ethics approval process.

Data collection was from 23 May 2016 to 08 June 2016. A short study period was picked not only to rule out seasonal variation in compliance to VTEP but also to minimize the intrusion on the pharmacists' daily practice as they had fairly demanding roles in this prospective study setting. Ward pharmacists recorded patients' demographics, each of RA components (mobility, thrombosis, bleeding, signing, and reassessment at 24 h), VTEP prescription (drug, dose, frequency, and route) as well as their interventions on VTEP. In the medical ward, data were collected by pharmacists during morning and evening post-take ward rounds (PTWR).

The researcher had a responsibility to validate all data collected by pharmacists through comparing collected data to original drug charts. Incorrect or ambiguous data was dealt with by discussions with ward pharmacists. The researcher collected risk reassessment data at 24 h, when ward pharmacists did not record. Based on collected data, the researcher assessed appropriateness of VTEP and categorized as appropriate prophylaxis (AP) and inappropriate pharmacological VTEP Type I–IV [Figure 1].

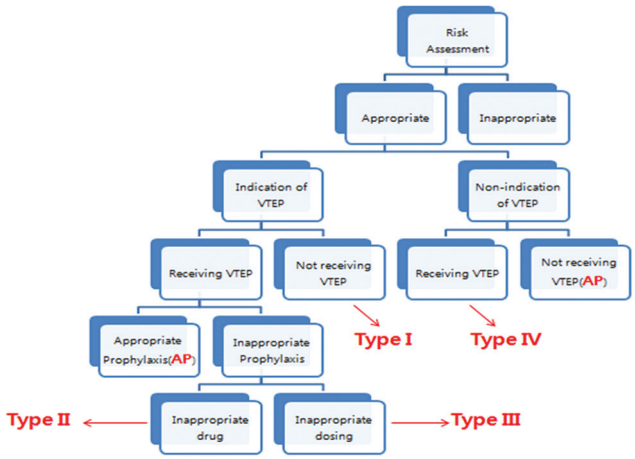

Figure 1: Flowchart to decide type of venous thromboembolism prophylaxis. VTEP: Venous thromboembolism prophylaxis, AP: Appropriate prophylaxis

Appropriate RA was defined as all components of RA were initially appropriately completed by doctors without CPIs. However, for reassessment at 24 h, appropriateness refers to completion regardless whether by a doctor or pharmacist at the time of follow-up, because a lot of this data were followed-up by the researcher. In this case, it was not recognized by the researcher whether CPIs involved in completion of reassessment at 24 h.

Appropriate VTEP was defined as a case prescribed the right choice of drug (e.g., unfractionated heparin [UFH] or dalteparin or fondaparinux), a right dose and a right frequency through a right route by doctors without CPIs. Inappropriate VTEP was defined as a case received any of the wrong choice of drug or a wrong dose or a frequency or a wrong route so CPIs were needed to complete AP. These outcomes were measured in each number of patients who received appropriate/inappropriate RA or VTEP.

- AP: Right indication and AP received, or no indication and no VTEP received
- Type I: Right indication but no VTEP received
- Type II: Right indication and VTEP received, but wrong drug
- Type III: Right indication and VTEP received, but incorrect dose or frequency
- Type IV: No indication but VTEP received.

Before commencing data analysis, all collected data were processed by data cleaning process to select the input errors or missing values. IBM SPSS Statistics for

Windows, Version 22.0. (Armonk, NY: IBM Corp.) and Microsoft Excel software 2010 were used in this data analysis. Descriptive analysis was used for patients' demographics, the rates of appropriate/inappropriate RA and VTEP, frequencies of CPIs. Inferential analysis (Chi-square test) was used for comparing appropriateness of RA and VTEP between the medical and surgical ward.

Based on the data analysis of the service evaluation, a cost-benefit analysis was conducted.

Due to the lack of evidence on indirect cost of CPIs and possibility of an increase of uncertainty, this study did not consider indirect costs throughout the cost-benefit analysis. The cost of CPIs was estimated based on a pharmacist's annual salary and time spent of CPIs on VTEP per patient. Time spent of CPIs on VTEP per patient was obtained from the actual average time (4 min) which was documented by pharmacists in the data collection tool. Pharmacist employment cost was based on band six mid-point as per the Agenda for Change 2016/17 (£30,357/year) plus an additional 10% of on-costs (£3036) was included as payments for overtime, shift work, national insurance, and superannuation.[10]

Cost of CPIs on VTEP = Total number of sample patients during the data collection period × Time spent of CPIs on VTEP per patient (min) × Pharmacist's cost per unit (min)

The benefit of CPIs only included the cost avoidance associated with inappropriate pharmacological VTEP, although CPIs frequently contributed to inappropriate RA. It is because information of the costs associated with inappropriate RA was not available, and these costs were likely to be offset by savings that could be achieved from VTE avoided as a consequence of VTEP.[4] The benefit of CPIs refers to the cost avoidance saved by preventing adverse drug events (ADEs) by CPIs, as CPIs can contribute to potentially avoiding the medical costs caused by inappropriate pharmacological VTEP. However, all medication errors relating to inappropriate pharmacological VTEP may not lead to ADEs,[11] thus the probability of ADEs should be considered in estimation of the number of patients who would avoid ADEs by CPIs. Therefore, the benefit of CPIs (cost avoidance) was estimated based on the number of patients who would avoid ADEs by CPIs and the cost for managing ADEs.

Benefit of CPIs (cost avoidance of ADEs caused by inappropriate VTEP) = Total number of patients who received inappropriate VTEP without CPIs during the data collection period × Probability of ADEs × Cost of managing ADEs

The previous studies found that ADEs associated with inappropriate VTEP were VTE or bleeding.[8,12,13] These probabilities of VTE and bleeding were corresponded to the basic probability setting of ADEs (0, 0.01, 0.1, 0.4, and 0.6) which were extrapolated from the previous studies.[11,14,15] To determine the probability of VTE (0.1 for the medical patients, 0.4 for the surgical patients) and bleeding (0.01) as ADEs caused by inappropriate VTEP was also based on previous studies and published reports.[1,3,9,16-18]

To estimate the cost managing ADEs associated with inappropriate VTEP, the figures from the previous study[19] were adjusted by HCHS index between 2007 and 2015 (293.1/257.0) to reflect the inflation rate. Inappropriate pharmacological VTEP Type I and Type III could develop VTE (DVT or PE) as ADEs in the absence of CPIs. This cost of managing VTE was matched with the calibrated cost of significant ADEs, which was £171. Inappropriate pharmacological VTEP Type II and Type IV could be associated with bleeding as ADEs, and these cases were considered more serious ADEs as patients were at an actual risk of bleeding due to the presence of concurrent renal impairment or the administration of oral anticoagulants (e.g., warfarin). Thus the cost of £813 was assigned to manage ADEs.

Based on estimating the cost avoidance associated with inappropriate VTEP and the cost of CPIs, a cost-benefit analysis was carried out as a pharmacoeconomic analysis. Apart from a cost-benefit ratio, a net benefit was calculated by the difference between the benefit of CPIs and the cost of CPIs.

To test the robustness of the results in the presence of uncertainty, a sensitivity analysis was conducted by changing time spent of CPIs on VTEP per patient and the costs of managing ADEs. To confirm a positive economic impact of CPIs under the worst case scenario, time

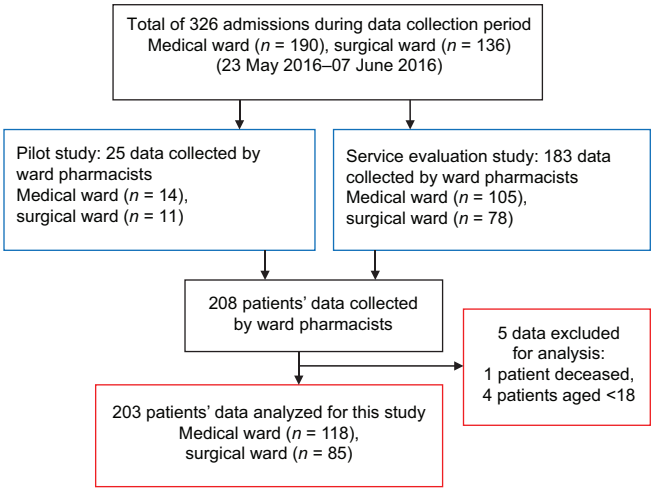

Figure 2: Flowchart of data collection

of CPIs increased by 100% and the costs of managing ADEs were set as minimum costs from the reference costs; hence, the result would have a minimum benefit.

Results

There were 327 admissions during the data collection in both the medical and surgical wards. Among these admissions, 203 patients' data were included for the final analysis and 25 of these were collected from the pilot study as there were no significant change of study settings between the pilot study and the actual study. Figure 2 displays the data collection flowchart. Table 1 summarizes the characteristics of the demographics.

Table 2 compares the appropriate rates for RA and pharmacological VTEP between the medical and surgical wards. The rates for RA on admission (70.3% vs. 42.4%, $P < 0.001$) and pharmacological VTEP (80.5% vs. 68.2%, $P = 0.045$) were significantly higher in the medical ward while the rate of RA at 24 h (23.8% vs. 60.3%, $P < 0.001$) was significantly higher in the surgical ward.

Figure 3 shows who completed the risk reassessment at 24 h, only 22 patients (10.8%) received appropriate risk reassessment within 24 h by doctors without CPIs. The risk reassessment at 24 h for more than half of the study population (108 patients, 53.2%) was not completed by neither doctor nor pharmacist.

Of fifty patients (24.6%) received inappropriate VTEP, which was initially incorrectly prescribed by doctors hence needing CPIs to complete AP, 12.8% were associated with inappropriate VTEP Type I, 3.0% with

Table 1: Demographic data of the study population

Variables	Total	Medical ward	Surgical ward
Number of patients	203 (100)	118 (58.1)	85 (41.9)
Age (years)			
Mean±SD	65±21.1	72±18.4	55±20.8
Range	18-99	20-99	18-92
Age >60*	128 (63.1)	92 (78.0)	36 (42.4)
Gender†			
Male	103 (50.7)	54 (45.8)	49 (57.6)
Female	100 (49.3)	64 (54.2)	36 (42.4)
Specialty‡			
Medical	129 (63.5)	118 (100.0)	0
Surgical	74 (36.5)	11 (12.9)	74 (87.1)
Renal impairment§	19 (9.4)	16 (13.6)	3 (3.5)

Data are reported as Number (%), or Mean ± SD. *The Chi-square test between medical and surgical ward, χ^2 (1)=26.900, P<0.001, †The Chi-square test between medical and surgical ward, χ^2 (1)=2.792, P=0.095, ‡The Chi-square test between medical and surgical ward, χ^2 (1)=161.659, P<0.001, §The Chi-square test between medical and surgical ward, χ^2 (1)=5.859, P=0.015. Specialty: According to the main cause of admission, patient needs to be categorized to the medical or surgical as specialty on venous thromboembolism risk assessment. It will determine the appropriate prophylaxis, e.g., pharmacological or mechanical prophylaxis, duration of the prophylaxis. SD=Standard deviation

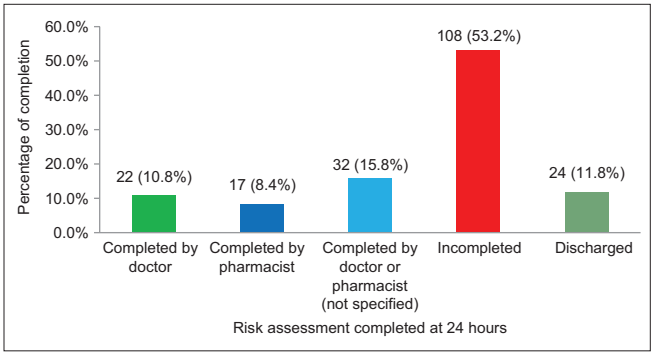

Figure 3: Characteristics of risk reassessment at 24 h (n = 203)

Table 2: Summary of results for risk assessment and pharmacological venous thromboembolism prophylaxis

Appropriateness	Medical ward (n=118)	Surgical ward (n=85)	Overall (n=203)	P
RA on admission (%)	83 (70.3)	36 (42.4)	119 (58.6)	<0.001
RA at 24 h (%)	24 (23.8)	47 (60.3)	71 (39.7)	<0.001
Pharmacological VTEP (%)	95 (80.5)	58 (68.2)	153 (75.4)	0.045

Data are reported as Number (%). RA=Risk assessment, VTEP=Venous thromboembolism prophylaxis

Table 3: Type and frequency of clinical pharmacists' interventions for inappropriate pharmacological venous thromboembolism prophylaxis

Type	Inappropriate pharmacological VTEP		CPIs	
	Description	Number of cases	Description	Number of CPIs (%)
I	Right indication but no VTEP received	26	Encourage doctors to prescribe VTEP	19 (48.7)
II	Right indication and VTEP received, but wrong drug	6	Recommend switching drugs	6 (15.4)
III	Right indication and VTEP received, but incorrect dose or frequency	13	Recommend correct dose or frequency	13 (33.3)
IV	No indication but VTEP received	5	Recommend discontinuing drugs	1 (2.6)
Total		50		39 (100)

VTEP=Venous thromboembolism prophylaxis, CPIs=Clinical pharmacists' interventions

Table 4: Estimation of cost parameters of clinical pharmacists' interventions

Parameters	Source/equation	Estimated costs
Pharmacist's annual cost	Annual salary £30,357/year + 10% of on-costs	£33,393/year
Pharmacists' cost/min (a)	£33,393 ÷ (52 weeks × 37.5 h × 60 min)	£0.29/min
Time spent of CPIs on VTEP per case (b)	Adjusted from actual pharmacist time spent	4 min
Cost of CPIs on VTEP per case (c)	(a) × (b)	£1.16/CPI
Number of cases seen by pharmacists during the time of the project (d)	Including all patients during the project	208
Total cost of CPIs during the period of data collection	(c) × (d) = £1.16/CPI × 208	£241.28

VTEP=Venous thromboembolism prophylaxis, CPIs=Clinical pharmacists' interventions

Table 5: Estimation of the benefit of clinical pharmacists' interventions (cost avoidance)

Type of inappropriate VTEP	Specialty	Number of CPIs (a)	Probability of ADEs (b)	Expected number of benefited patients (a) × (b)	Cost per 1 ADE (£) (c)	Total cost avoidance (£) (a) × (b) × (c)
Type I	Medical	10	0.1	1	£171	£171
	Surgical	9	0.4	3.6	£171	£615.6
Type II	Medical/surgical	6	0.01	0.06	£813	£48.78
Type III	Medical	4	0.1	0.4	£171	£68.4
	Surgical	9	0.4	3.6	£171	£615.6
Type IV	Medical/surgical	1	0.01	0.01	£813	£8.13
Total		39	-	8.67	-	£1527.51

VTEP=Venous thromboembolism prophylaxis, CPIs=Clinical pharmacists' interventions, ADEs=Adverse drug events

Type II, 6.4% with Type III and 2.5% with Type IV. Inappropriate Type II was associated with patients with renal impairment who needed to be prescribed UFH instead of dalteparin (four patients). The other two patients were prescribed pharmacological VTEP with a product name instead of a drug name, for example, "Fragmin" instead of "Dalteparin," which is against Trust Medicines Management Policy whereby generic names should be used unless substitution is clinically inappropriate. Type III included the cases of patients whose body weight was over 100 kg (11 patients). They needed to be given dalteparin 5000 units, twice a day instead of once a day. Furthermore, Type III was associated with inappropriate prescription with a wrong unit of dalteparin (two patients). Type IV was associated with patients who were at a high risk of bleeding.

Table 3 shows the type and frequency of CPIs for inappropriate pharmacological VTEP. Of 50 cases of inappropriate pharmacological VTEP, 11 cases (22.0%) remained inappropriate without CPIs. In seven cases (14.0%), pharmacists intervened in inappropriate doctors' prescriptions but doctors did not complete AP, and in four cases (8.0%), pharmacists did not attempt CPIs in inappropriate doctors' VTEP prescriptions.

For the holistic appropriate VTEP, which was defined as appropriate RA on admission and at 24 h and appropriate pharmacological VTEP, only 35 patients (17.2%) of the total study population were treated appropriately. There was no significant difference in the final appropriate VTEP between the medical and surgical ward (19.5% vs. 14.1%, $P = 0.317$).

In terms of the cost-benefit analysis, Table 4 explains how to estimate the cost of CPIs. The total cost of CPIs during the study period was £241.28. Table 5 shows how to estimate the benefit of CPIs (cost avoidance). £1527.51 was estimated as the cost avoidance of ADEs caused by inappropriate VTEP during the study. Therefore, a net benefit of CPIs on VTEP during the study was £1286.23, the cost-benefit ratio was 6.33 and the net cost-benefit ratio was 5.33. Considering that there were 326 admissions during the study period and 131,168 admissions in 2015/2016 at this hospital,[20] the annual net benefit of CPIs was estimated to be £517,522.

As stated above, of 50 cases of inappropriate pharmacological VTEP, 11 cases (22.0%) remained inappropriate without CPIs. If these 11 cases had appropriate CPIs, £357.42 would have been additionally saved during the study, which was equivalent to £143,810/year.

A sensitivity analysis was conducted by varying the time spent on CPIs on VTEP and the cost of managing ADEs. When the time increased by 100% (from 4 to 8 min), the cost of CPIs during the study period was doubled as £482.56. Nevertheless, the net benefit of CPIs was £1044.95, the cost-benefit ratio was 3.17 and the net cost-benefit ratio was 2.17. When the cost of ADEs was set as a minimum value (from £171 to £74), the benefit of CPIs (cost avoidance) decreased to £693.31. Nevertheless, the net benefit of CPIs was £452.03, the cost-benefit ratio was 2.88 and the net cost-benefit ratio was 1.88 [Appendix 1]. All those figures still demonstrate

the positive economic impact of CPIs on VTEP even in the worst scenarios.

Discussion

Through the findings from this study, the presence of clinical pharmacists in PTWR in the medical ward was highlighted as the result of better outcomes. The clear difference of the rates of appropriate RA in the medical ward between on admission (70.3%) and at 24 h (23.8%) may have been caused by attendance of clinical pharmacist in PTWR. In addition, the difference of the rates of pharmacological AP between the medical and surgical ward (80.5% and 68.2%, respectively) may have been as a result of the presence of clinical pharmacists in PTWR. This was supported by the previous study that showed more drastic improvement in AP (from 37% to 85%) was made when CPIs were made during the ward round.[21]

Above all, this study showed that CPIs had a substantial cost saving (£517,522/year), also an additional cost saving (£143,810/year) was expected if CPIs are improved in the area of failure of CPIs. Interestingly, a similar amount of cost saving by CPIs (1,027,500 USD/year) was estimated in another study by Mahmoudi *et al*. In this study, the reduction in direct cost was 56% after guideline implementation as CPIs.[22] A study by Khalili *et al*. also demonstrated the economic significance of CPIs in an infectious diseases ward that 39.0% of CPIs had moderate to major financial benefits and 3.8% of mean direct cost per patient decreased after CPIs.[23] It can be concluded that improvement of clinical practice of VTEP by CPIs could not only increase patients' safety by reducing ADEs but also save the costs.[4,13]

Nevertheless, the results of this study showed that that inappropriate RA and failure of CPIs on inappropriate VTEP remained problematic and it could have caused additional medical costs. In this context, this study suggests that inappropriate RA and failure of CPIs on inappropriate VTEP could be new areas for CPIs to be improved to develop an economic case of CPIs.

Therefore, the solution to improve VTEP seems to be clear. Spontaneous input of clinical pharmacist employments in practice would allow clinical pharmacists to join the daily ward round in many wards and it would be expected the positive clinical and economic benefits on VTEP.

This study could have comparable strengths to previous studies on VTEP. First, this study prospectively collected the data during daily practice in the ward, which can be a powerful technique for data collection as these data relates to real-practice scenarios, hence can be more accurate.[24] Second, this study aimed to assess the clinical and economic impact of CPIs on VTEP. Many of the studies[1,3,7-9,12,13,18,21,25,26] evaluated the clinical impact of CPIs but only few studies[8,9] extended their study objectives to the economic impact of CPIs. Even these two studies did not use precise method for economic analysis. Therefore, this pharmacoeconomic analysis based on the prospective method may have enabled this study to assess more accurate and precise clinical and economic impacts of CPIs.

Despite the meaningful findings, our study has some limitations. First, this study was designed to identify current practice on VTEP relating to CPIs; hence, this study was focused on medication errors in doctors' prescription. Thus, the actual incidence of VTE or bleeding as ADEs relating to medication errors on VTEP were not observed as it was beyond the scope of this study. Due to the lack of the actual clinical data, it may have some problems in the reliability of this study results. However, the safety and efficacy of pharmacologic VTEP in this specific population has been well proven in many studies.[21] Therefore, our study suggests that further study measures improvement of actual clinical outcomes by CPIs in the randomized-controlled study setting in order to precisely assess the impact of CPIs. Second, the scope of observation in this study was limited on admission and at 24 h after admission. NICE outlines seven quality measures on which a high quality VTEP services should focus and aim to achieve, including extended VTEP in accordance with NICE guidelines.[4] Extended VTEP would be especially more important for postoperative surgical patients. It may have a huge impact on patient's clinical status (such as mortality) as well as economic aspect because normally extended VTEP is associated with relatively long-term therapy thus it would affect the patient's adherence issues and healthcare costs.[13] Lastly, this pharmacoeconomic analysis model was developed by a researcher by extrapolating the costs parameters from previous study.[19] This model was very novel and no-one had ever used it before to assess CPIs on VTEP, even though a similar method was used in the other area of CPIs.[14] Therefore, the cost saving obtained from this study's results may be higher or lower in real practice. However, to tackle this issue, the model applied various methodological steps to make the economic impact robust and realistic, such as a sensitivity analysis. Apart from these major limitations, the short duration of the study and significant difference of age and rate of renal impairment between the medical and surgical wards could be the potential drawbacks of this study.

Our study successfully demonstrated that CPIs had considerably positive clinical and economic impact on

VTEP. Furthermore, this study found the areas which needed more improvement by CPIs. Above all, this study highlighted the value of clinical pharmacists' involvement in PTWR by showing the obviously different rates of appropriate RA between on admission with pharmacists and at 24 h without pharmacists. These findings will support the impact and value of CPIs on VTEP in practice, and provide important information for policy makers to improve VTEP.

Authors' Contribution

Eun Hee Lee contributed in concepts, design, definition of intellectual content, literature search, clinical studies, data acquisition, data analysis, statistical analysis, manuscript preparation, editing and review. Victoria Bray contributed in concepts, design, definition of intellectual content, clinical studies, manuscript preparation and editing and review. Robert Horne contributed in concepts, definition of intellectual content, data analysis, statistical analysis, manuscript editing and review.

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Conflicts of interest

There are no conflicts of interest.

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Appendix

Appendix 1: Summary of the sensitivity analysis

Variables	Base case	Worst case scenario 1: Varying the time spent of CPIs	Worst case scenario 2: Varying the cost of managing VTE
Time spent of CPIs (min)	4	8	4
Cost of managing VTE	£171	£171	£74
Cost of CPIs (a)	£241.28	£482.56	£241.28
Benefit of CPIs (cost avoidance) (b)	£1527.51	£1527.51	£693.31
Net benefit of CPIs during the study period (b)-(a)	£1286.23	£1044.95	£452.03
Cost-benefit ratio (b)/(a)	6.33	3.17	2.88
Net cost-benefit ratio ([b]-[a])/(a)	5.33	2.17	1.88

CPIs=Clinical pharmacists' interventions, VTE=Venous thromboembolism