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# Testing the effect of a targeted intervention on nurses' compliance with best practice mechanical venous thromboembolism prevention

# ABSTRACT

**Aim** To examine whether educational outreach visits improve nurses' compliance with applying best practice mechanical venous thromboembolism prophylaxis.

**Design** Pre-test/post-test study with a 7-week follow-up.

Setting A mixed medical/surgical unit in a 250 bed private hospital in Sydney, Australia.

**Target population** Twenty five medical/surgical nurses.

Intervention Educational outreach visits (EOVs).

**Main Outcome Measures** Change in percentage between baseline and endpoint of: eligible patients receiving mechanical VTE prophylaxis and all patients having VTE risk documented in their medication charts. Nurses' feedback on how supportive and useful they found EOVs.

**Results** There was an overall, but not significant increase (p = 0.201) in the percentage of patients who received mechanical VTE prophylaxis (59.4% baseline to 75% endpoint). There was a significant increase in the percentage of patients having VTE risk status documented in the medication chart (0% - 28%) (p = 0.002). Improvements in compliance were more likely for surgical than medical patients (95% and 35% respectively) and risk documentation (47% and 6% respectively). Most nurses reported that the EOVs supported them in implementing best practice VTE mechanical prophylaxis.

**Conclusion** Improvements in compliance with best practice VTE prevention can be achieved using EOVs which were easily conducted and well-received in a busy unit setting. More work is needed to increase the compliance rate with medical patients.

# INTRODUCTION

#### Background

Venous thromboembolism (VTE) can reduce quality of life and cause long-term complications (1). On average in Australia, VTE accounts for over 2000 deaths and multiple hospital admissions every year (2). There is a significant financial burden arising from VTE. In Australia in 2008, \$1.72 billion was expended treating VTE (1). Many VTE cases however, are preventable. Consequently, VTE prevention has become one of Australia's major health quality and safety priorities (1, 2).

Current VTE prevention consists of two interventions: chemical prophylaxis and mechanical prophylaxis. VTE mechanical prophylaxis consists of early and regular ambulation, hydration, graduated compression stockings (GCS), intermittent pneumatic compression (IPC), foot impulse devices and electrical stimulation. Chemical VTE prophylaxis includes low-dose unfractionated heparin, low molecular weight heparin and the pentasaccharide fondaparinux (2-5).

Research studies and clinical audits have demonstrated that health care professionals are under-using and inconsistently applying the available prophylactic options to prevent VTE (2). Despite the substantial evidence base, low compliance with VTE prevention guidelines remains an issue (4).

There have been many strategies developed to improve health professionals' compliance with clinical guidelines. One way to improve how health care professionals practice is to provide educational outreach visits, also called educational detailing, academic detailing, and educational visiting. This intervention uses trained people to visit clinicians where they practice and provide them with information on how to improve their practice. The information given may include feedback about their performance, or may be based on overcoming obstacles to change (6).

A Cochrane systematic review on EOVs (7) found that the median adjusted risk difference in compliance with desired practice was 5.6% (inter-quartile range 3.0% to 9.0%). The adjusted risk differences was found to be highly consistent for prescribing (median 4.8%, inter-quartile range 3.0% to 6.5%), but varied for other types of professional performance (median 6.0%, inter-quartile range 3.6% to 16.0%). The review concluded that EOVs alone or in combination with other interventions were consistently effective on prescribing practices and had varied effect on other types of professional performance (7).

A systematic review by Tooher et al (8) included thirty studies to assess the effectiveness of various interventions for increasing VTE prevention practice in hospital inpatients. Of the 36 studies included in the review none used EOVs as an improvement strategy. Tooher's review included studies prior to 2005. Two more recent studies (9, 10) have used

EOVs as a strategy to increase compliance with VTE prevention guidelines among doctors in the hospital setting. Roberts and Adams's study (9) showed an increase of 14.2% (p=0.004) in guideline adherence for medical patients from a baseline of 52.8%. Grupper *et al* (10) reported a 21% (p<0.001) increase in VTE guideline compliance for surgical patients using EOVs. These results are significantly better than those achieved by other interventions such as reminder systems.

There are no published studies which have solely targeted nurses in the clinical setting in improving VTE prevention. On the basis of the literature reported above, we chose to evaluate the impact of EOVs on clinical nursing staff's compliance with best mechanical VTE prevention practice in a mixed medical/surgical ward at a large metropolitan private hospital.

## Setting

The study was conducted from April to August 2009 on a mixed surgical/medical unit in a 250 bed metropolitan private hospital in Sydney, Australia. The unit has 36 beds and specializes in oncology, neurology, neurosurgery, head and neck surgery, and plastic surgery.

#### Aim

- 1. Examine whether educational outreach visits (EOVs) improve compliance with best practice mechanical VTE prevention amongst nurses on a mixed medical/surgical unit.
- 2. Assess the acceptability of this type of behavioral change intervention to acute care nursing staff.

# Ethics

Ethics committee approval for this research was obtained from St Vincent's Hospital Human Research Ethics Committee.

#### **METHOD**

#### Design

A pre-test/post-test study design was used to evaluate the impact of the intervention. A brief post intervention survey containing open-ended and closed questions was used to assess the acceptability of the intervention.

#### **Target population**

The intervention was targeted at nurses of all classifications including degree, diploma and certificate trained staff. Nursing staff were chosen because they are fundamental to the provision and maintenance of mechanical prophylaxis measure and in the hospital studied in this research there was a nurse initiated mechanical prophylaxis policy in force.

# Inclusion/ exclusion criteria

Nursing staff of all classifications who worked on the study ward who were rostered onto morning or evening shifts during weekdays were included in the study. Staff who only worked on weekends or night duty were excluded because the intervention was only delivered during weekdays. Casual and agency staff were also excluded as they would not have been able to receive all cycles of the intervention.

Figure 1 shows the numbers of nurses recruited for the study and reasons for nonparticipation. All nurses who attended the first EOV also attended the second EOV. Two nurses were lost to follow-up for feedback survey.



Figure 1: Study recruitment process for nurses to attend the EOVs

# Intervention

The design and content of the EOVs was developed in consultation with content experts and was based on the best available evidence (2-5, 7). The intervention proceeded by holding a formal unit meeting with staff to inform them of the objectives of the research; the time period over which the research would be conducted; the format of the EOVs and that audits would be undertaken to measure compliance rates with mechanical VTE prevention practice.

Educational outreach visits consisted of mutually negotiated, intimate (one-on-two or three nurses) brief (15 minute) educational sessions with nurses on the study unit. Each nurse received two EOVs within the study period (12 weeks). The objective of these sessions was to brief nurses on VTE risk factors; the criteria used for ascertaining risk level; and to inform them about the evidence base for and the importance of applying mechanical VTE prevention measures in eligible patients.

Use of both the VTE risk documentation system and the risk assessment tool, which was developed by the National Institute of Clinical Studies (NICS), was emphasized as part of the first EOV session along with building knowledge of VTE risk and prevention. A handout was provided to each participant as part of the first EOV. This contained an overview of the study objectives and key messages related to the importance of best mechanical VTE prevention practice and VTE risk assessment.

#### Measures

The project collected VTE process measures pre and post the EVO intervention. These measures were chosen because they have previously been used in national and international studies (11). The primary outcome measure was the percentage of patients who received appropriate mechanical VTE prophylaxis. The secondary outcome measure was the percentage of patients who had a documented VTE risk assessment.

# **Data collection**

Process measures were collected in a pre and post intervention ward census. On the day of the census all patients had their mechanical prophylaxis therapy audited against the Australian and New Zealand Best Practice VTE Prevention Guidelines (5). The audit tool used was developed by the National Institute of Clinical Studies and has been used in previous VTE prevention projects (11). The researcher observed each patient to see whether mechanical prophylaxis had been applied and whether a VTE risk assessment had been documented. The patients VTE risk status and contraindications to mechanical therapies were considered in deciding appropriateness of the treatment. The auditor was a registered nurse who underwent training in the use of the audit tool.

**Table 1:** Number of patients audited and their admitting specialties (baseline and endpoint audit).

Specialty	Baseline % (n)	Endpoint % (n)
Neurosurgery/neurology	54.5 (18)	44.4 (16)
Ear, nose & throat /head+neck surgery	12.1 (4)	16.7 (6)
Radiation oncology/medical oncology/oncology surgery	9.1 (3)	13.9 (5)
Plastics/reconstructive surgery	6.1 (2)	8.3 (2)
Gynaecology	3.0 (1)	11.1 (1)
Other	15.2 (5)	5.6 (2)
Total	100 (33)	100 (36)

# Nurse Feedback Survey

At the last EOV session staff were asked to complete a short standardized questionnaire of five open-ended and closed questions to survey their views on the usefulness of EOVs in supporting them to implement best practice VTE mechanical prevention.

# Analysis

Using SPSS V 17 software, two-sided chi-square analyses for independent samples were used to ascertain whether there was a significant difference in the percentage of patients receiving VTE mechanical prophylaxis and the percentage of patients having VTE risk documentation before (as measured at baseline audit) and after the final EOV had been conducted. The level of significance was set at 0.05. Descriptive statistics were obtained for the results from the nurse feedback survey and for patient characteristics.

# **Compliance with Best Practice VTE Mechanical Prevention**

As shown in Table 2, there was a non- significant increase in the percentage of patients receiving VTE mechanical prophylaxis from baseline (59.4 %) to endpoint (75%) (p = 0.201).

**Table 2:** Changes in percentages of mechanical VTE prevention compliance rates between two time points ( $X^2 \square = 1.890$ ; df = 1; p = 0.201).

Appropriate mechanical VTE prophylaxis	Time of audit		
	% (n) Baseline	% (n) Endpoint	Total
Yes	59.4% (19)	75.0% (27)	46
No	40.6% (13)	25.0% (9)	22
Total	32	36	68

In terms of surgical or medical designation, only one of the 13 (8%) medical patients had received prophylaxis at baseline audit. At endpoint, six out of 17 (35%) medical patients had received prophylaxis. In the surgical group 17 out of 19 (89%) had prophylaxis at baseline and 18 out of 19 (95%) at endpoint.

#### **Documentation of VTE Status**

As shown in Table 3, there was a significant change between baseline and endpoint in the percentage of patients having their VTE risk status documented in the medication chart (p = 0.001). The percentage of patients with VTE documentation between baseline and endpoint significantly increased from 0% to 28%.

**Table 3:** Changes in percentages in VTE risk documentation between two time points ( $X^2$ =

Documented VTE risk status	Time of audit		
	% (n) Baseline	% (n) Endpoint	Total
Yes	0.0% (0)	27.8% (10)	10
No	100.0% (32)	72.2% (26)	58
Total	32	36	68

10.421; df = 1; p = 0.001).

At baseline, none of the at-risk medical group had VTE risk status documented in the medication chart. At follow-up, only one high risk medical patient had their VTE risk status documented and no VTE risk documentation was found in the low risk medical group. Significance testing was not carried out because of the minimal changes in numbers before and after the intervention.

Of the 19 surgical patients audited at baseline, none had VTE risk documented. At followup, VTE risk documentation improved by 47% with seven out of 16 high risk patients and two out of three low risk patients having had their VTE risk documented.

#### **Feedback Survey**

Table 4 shows the results of the survey. Twenty-three nurses out of twenty-four EOV participants completed the survey. One nurse was not able to complete the survey due to workload. Eighteen out of twenty-three nurses reported that the EOVs provided a personalized approach in which they could freely ask questions and clarify issues. Twenty-

two nurses reported that the EOVs helped to support them to implement best practice VTE mechanical prevention. Seventy-eight percent liked the fact that the EOVs were held on the wards (rather than in another location). Only one nurse preferred EOVs to be held out of working hours and one participant favored learning in a big group over small EOV sessions. Ninety-six percent of participants reported that EOVs would be a useful method for other clinical topics such as policy updates (13/23 in favor), medication updates (15/23 in favor) and treatment updates (14/23 in favor). All nurses felt the duration of the EOVs and the amount of content covered in the EOVs were appropriate.

Question	% (n) Yes	% (n) No	Total
Found EOVs helpful in supporting application of best practice mechanical VTE prevention	95.7 (22)	4.3 (1)	23
Liked personalised approach	78.3 (18)	21.7 (5)	23
Found timing of EVOs was suitable	60.9 (14)	39.1 (9)	23
Liked location of EOVs (on ward)	78.3 (18)	21.7 (5)	23

Table 4: Staff feedback on EOV

### DISCUSSION

This study tested the effect of EOVs on compliance with applying mechanical prophylaxis in a mixed medical/surgical unit. The results showed a non-significant improvement in the number of eligible patients receiving mechanical prophylaxis and a significant change in VTE documentation. One explanation for these results might be that the endpoint audit took place one week after the last of the EOVs was completed and that consequently there was insufficient time for the effect of the interventions to make a significant impact on clinician behavior. Despite these improvements, compliance rates in VTE risk documentation and VTE mechanical prophylaxis application particularly for medical patients need to be addressed.

The increased compliance with mechanical prophylaxis application and documentation of VTE risk amongst the surgical patients as compared to medical patients may have been due to the study unit being primarily designated as surgical and nurses were thus more aware of VTE risk in surgical patients. Tooher et al (8) revealed a paucity of research reporting on VTE prophylaxis on medical patients with only three studies to ever have focused on medical patients and to report results separately from surgical patients. Thus further investigation on ways to improve compliance in best practice VTE mechanical prophylaxis in medical patients is warranted.

The presence or absence of chemical prophylaxis may have also influenced nurses' decision to provide mechanical VTE prevention measures. Although not a project measure chemical prophylaxis was recorded during the audits and appropriate prophylaxis was noted in 50% (16 out of 32) of patients at baseline and 61% (22 out of 36) at endpoint.

Overall, the EOVs were well received by staff who participated in the project and this was shown in the feedback they provided in the staff survey. Therefore, researchers should consider EOVs as useful intervention for promoting evidence-based practice.

#### **Study Limitations and Strengths**

This study's main limitation is that it was conducted on one unit and the sample size was therefore small. However, the results suggest that replication using a larger sample size might be beneficial. The study strengths include focusing on nurses' compliance with applying VTE mechanical prophylaxis which is little discussed in the literature. Another strength is that the study included medical patients. This group has been understudied in relation to VTE prevention compared to surgical patients.

#### CONCLUSIONS

The educational outreach visits improved, in a limited way, adherence to best practice VTE mechanical prevention and were relatively easily implemented in a unit setting. However, further investigation would be required to assess the long-term impact of this intervention. The study shows that compliance with best practice VTE mechanical prevention can be improved through the use of a relatively simple strategy. However, more work is needed to increase compliance rates overall, especially amongst nurses working with medical patients. Also further research is necessary to determine the means that would assist in sustaining evidence-based VTE prevention practice.

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