Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2014-005074
Article Type:	Research
Date Submitted by the Author:	17-Feb-2014
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Primary Subject Heading:	Haematology (incl blood transfusion)
Secondary Subject Heading:	Medical management, Qualitative research
Keywords:	Thromboembolism < CARDIOLOGY, Anticoagulation < HAEMATOLOGY, QUALITATIVE RESEARCH

Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

VTE: What's happening in Acute Trusts

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Word count

- **including quotations 5046**
- **Text 2990**
- **Transcript 2056**

Abstract

Objective To explore the current practice of venous thromboembolism (VTE) prevention in acute trusts.

Design A qualitative research design was used to explore the perceived current practice of thromboprophylaxis, and knowledge and experience of VTE prevention. Data were collected via interviews with personnel from acute trusts and other relevant organisations and charities. Constant comparison was used to generate themes grounded in the data.

Setting UK

Participants 17 participants, sampled due to their expertise and knowledge in the field of VTE, were interviewed for the study.

Results No one felt directly responsible for VTE risk assessment and treatment in acute trusts. There were concerns whether any action takes place based upon the risk assessment. Low levels of VTE knowledge existed throughout the system.

Conclusions Our study highlights the importance of continuous training to prevent VTE risk assessment being considered a tick box exercise and for clinicians to understand the significance of the procedure to ensure that VTE preventative measures are administered. It is essential that acute trust staff acknowledge that VTE prevention is the responsibility of everyone involved in a patient's care. Concerns remain around prophylaxis treatment, administration, and contra-indications.

Strengths and limitations of this study

- Participants have in-depth knowledge and experience of hospital VTE measures and may be in positions to identify areas of excellence in the process and also those areas that may fall short
- First study to explore this issue with this group of participants
- Participants from sites that provide leadership and promote best practice in VTE prevention
- Examples of poor practice in other less prestigious sites may have gone unexplored
- Snowball sampling has been criticised for selection bias which limits the validity of the sample.

Introduction

Venous thromboembolism (VTE) is a substantial health-care problem, resulting in mortality, morbidity, and economic cost .[1] In 2005 VTE was estimated by the Health Select Committee to cost the National Health Service (NHS) £640 million a year to manage.[2] Mortality due to VTE after hospital admission is greater than the combined total of deaths from breast cancer, AIDS, prostate cancer and road traffic incidents each year in the UK.[3] Most hospitalised patients have one or more risk factors for VTE and around 60% of people undergoing major orthopaedic surgery will suffer a deep vein thrombosis (DVT) without preventative treatment.[4] Acute medical patients have a 10 to 20% risk of developing a DVT.[5] VTE is one of the most common complications to occur in cancer patients [6] and is associated with a significant reduction in survival. [7] The risk of VTE can be reduced with the use of anticoagulants.[5]

In 2007 NICE published a clinical guideline offering best-practice advice for reducing the risk of VTE in in-patients undergoing surgery.[8 9] In 2010, NICE guidelines recommended VTE risk assessment be undertaken at admission (and repeated after 24 hours) and appropriate prophylaxis be provided where indicated.[10] Commissioning for Quality and Innovation (CQUIN) agreements were introduced in June 2010 requiring all acute trusts in the UK to risk assess for VTE at least 90% of patients to avoid financial penalties.

Alongside these initiatives, an All Parliamentary Thrombosis Group (APPTG) survey found that implementation of risk assessment was poor.[11] A follow-up survey found that 58 % of trusts carry out regular clinical audit of appropriate thromboprophylaxis and maintain audit data [12] The report states that risk assessment alone does not protect identified at-risk patients and failure by trusts to undertake VTE prevention duties has cost £110 million in negligence payments since 2005.[12] Similarly, root-cause analyses of all confirmed cases of hospital acquired VTE are required by local commissioners and survey responses indicate that just 59 % of trusts undertake this. The audit suggests that commissioners are not enforcing compliance with local contracting provisions on root-cause analysis to support the provision of appropriate resources and improve practice at the local level.[12] Despite this recent research has shown the CQUIN initiative to be associated with a significant overall reduction in mortality due to VTE in patients with hospital stays greater than 3 days.[13]

However, it is clear that there is not a true picture of current thromboprophylaxis practice, staff education and the budget implications within acute trusts. A study has been undertaken to try to answer these important questions.[14] This included interviews with experts in the field of VTE to explore the issues.

Methods and analysis

A qualitative research design was used with data collected via face-to-face and telephone interviews with personnel from acute trusts, relevant UK organisations and charities involved in the prevention of VTE. Key informants were identified to best represent the research focus, followed by snowball sampling[15 16] which involves asking key informants to recommend other appropriate people for interview. We aimed to reflect the diversity within a given population[17] in order to obtain a rich perspective of opinion. Our sample comprised

experts working in the field of VTE who would have knowledge and experience of VTE prevention.

Prior to the interview participants were emailed an information pack comprising a covering letter and a participant information sheet. They were asked to complete a consent form at the time of contact or provided verbal consent for telephone interviews. Face-to-face interviews lasted between 30 and 50 minutes and telephone interviews 12 and 15 minutes. All interviews were conducted by the same researcher (LM). Interviews examined the current practice and knowledge of thromboprophylaxis, interdisciplinary communication, perceived barriers to VTE management, training provision and future requirements. The semi-structured interview schedule covered the following topics: an examination of the regular and required provision of prophylaxis; concerns regarding prophylaxis treatment; an exploration of the education provided to patients and the training provision and future requirements for VTE prophylaxis management.

All interviews were digitally-recorded with the permission of each participant. Content of the recordings were transcribed verbatim and the resultant audiotapes/digital files stored in a password protected computer file. Transcripts were identified by code number only and participants were not identified in any written material resulting from the interviews. The recorded and transcribed semi-structured interview data were analysed using constant comparative methods[18] and data were managed using NVivo 9 software. LM independently reviewed all the transcripts and developed codes in an iterative process to identify emerging patterns in the data and an initial coding framework. Similarity and differences were identified within and across the transcripts. By comparing each part of the data, analytical categories were established and key concepts selected. Final themes were reviewed and agreed between SG, EM, and DF to enhance reliability.

Ethics approval: Ethics approval was granted by Oxfordshire REC B Research Ethics Committee on 05/05/2011 (reference: 11/H0605/5).

Results

Participants

Seventeen participants agreed to be interviewed for the study. 15 were face-to-face and 2 via telephone. They originated from 12 separate organisations including, a series of trusts ranging from small trusts with no VTE specialist to large trusts with specialist VTE teams. 4 of these organisations were National VTE Prevention Programme Exemplar sites, consisting of hospitals who have demonstrated excellence in their work to prevent VTE.

Participants were; 2 physicians, a consultant haematologist, a consultant VTE lead, a VTE nurse, a critical care charge nurse, a consultant nurse for anticoagulation, a nurse tutor / VTE committee member, a VTE prevention lead nurse, a VTE trainer, a clinical medicines management pharmacist, charity directors, (1 and 2), from two separate VTE charities, a primary care trust (PCT) commissioner, a scientific advisor for haematology, a specialist scientific lead for patient devices and a community pharmacist. Charity director 2 and the community pharmacist took part via telephone interview.

Four main themes regarding participants' perceptions of thromboprophylaxis practice in acute trusts emerged from the data and the results are presented under these themes:

- Current attitudes to risk assessment
- Staff education and training
- Specific training requirements in acute care, lack of skills, critical dose clarity
- Budget implications

Representative quotations that illustrate both typical responses and a range of views have been selected to reflect these themes.

Current attitudes to risk assessment

It was suggested that some junior doctors, although recognising the need for risk assessment and the provision of preventative treatment, do not feel it is their responsibility to carry it out. The advantages of having a champion to promote the issue in each establishment were highlighted.

> *There are still hospitals that are failing to do it. There are still a few hospitals who don't have a champion who is pushing it forward and it's still quite difficult to win the hearts and mind of certain groups and the junior doctors don't seem to feel, they can see the need, but they feel it's not their responsibility. (Charity director 1)*

Furthermore, it was suggested that risk assessment is regarded as little more than a tick box exercise, creating concerns that the results may not be acted upon.

> *There is very little awareness; there is little awareness amongst secondary care staff because many see this as a chore, as a tick box exercise. (Physician 2)*

There was a suggestion that the effectiveness of the process should be based on more than completion of the risk assessment form; a situation brought about by CQUIN payments. CQUIN payments are made according to the number of patients risk assessed with no regard as to whether treatment procedures have been put into place. A call for policing of the risk assessment procedure suggests that it may not always be carried out correctly.

> *One of the weaknesses of the current strategy is that the outcome that is being measured for the moment is the number of risk assessment forms completed. The focus needs to be on whether they have been completed correctly and clinicians have acted on that assessment. People seem to think that it is all about identifying whether a patient is at risk of thrombosis but a risk assessment tool is also there to identify whether a patient is at risk of complications of thromboprophylaxis and therefore it is essential that the information is used to guide practice. People are judged on completion of risk assessment forms, not necessarily the execution of the result of that form. (Consultant and VTE lead)*

> *... the government has taken a role there by setting the tool with CQUIN targets that's really pushed it to the forefront to everyone's minds but it wouldn't harm them if they actually fund some extra nursing staff to police the risk assessments that are being done and that they are being done correctly. (VTE trainer)*

There were concerns that risk assessment practice might slip if the incentives of CQUIN targets are removed. There was a perception that some trusts will think it unimportant. A VTE prevention lead felt that having staff dedicated to the role would help to maintain targets.

> *I like the CQUIN targets because although it's pretty hard for some trusts to meet, I think it probably does give incentive and if the CQUIN doesn't stay around I hope things won't slip. I do wonder if some trusts, where they haven't got as big a team as we have, they haven't got a person dedicated to the role, if when they don't have to collect the data for CQUIN it's going to come off radar a bit. I think it will affect some trusts more than others. Some trusts will just think it doesn't matter. (VTE prevention lead)*

Participants considered it necessary to establish that what is in place is actually working and suggest there is evidence that it is not. This partly stemmed from the perception that no one feels directly responsible and that there exist low levels of understanding.

> *From the hospitals point of view they need to understand that risk assessment and treatment of the patient is not just one person's responsibility. It becomes the responsibility of everyone who is involved in treating that person. (Charity director 2)*

A successful example of how to overcome the problem of diminished sense of responsibility is in establishing knowledge of where the responsibility falls within each individual member of the clinical team, along with a backup system to make sure risk assessment is being carried out.

> *All patients should be risk assessed the moment they are going to be admitted as a patient and the junior doctors know it is going to be their responsibility and in the absence of junior doctors the senior doctors know that it is someone's responsibility in the team and it might fall on them to do it. They are meant to do the risk assessment and prescribe the appropriate thromboprophylaxis. The nursing staff and the pharmacist staff remind or prompt the doctors if it is not being done and make sure that it is. It's sort of a three pronged attack. (VTE trainer)*

Participants suggested that having sight of outcome data, to confirm the belief that conducting risk assessment has reduced incidences of hospital acquired thrombosis, could incentivise staff and help to improve risk assessment for DVT.

> *Having outcome data that demonstrates conducting risk assessment has made a difference in reducing the incidence of hospital associated thrombosis. (Consultant Nurse for anticoagulation)*

Staff education and training

A consultant nurse called for the education of both clinicians and patients to improve the regular and required provision of prophylaxis.

Ensuring both clinicians and patients are educated on appropriate thromboprophylaxis and that the thromboprophylaxis resources are available. (Consultant Nurse for anticoagulation)

In addition, on-going training that will prevent the risk assessment becoming a tick box exercise and continued awareness promotion was deemed necessary to develop an understanding of why the exercise is so important.

It can just end up being another piece of paper another tick box exercise. I think that's where the importance of the training comes in because you need people to understand why it's so important. (Nurse tutor and VTE committee member)

There were examples of low levels of knowledge of VTE risk and prevention amongst staff in some acute trusts; even in orthopaedic hospitals where the majority of patients will be assessed at high risk. There was clearly a requirement for improved staff understanding without which there will remain an inability to pass on vital information to patients. Participants suggested that VTE prevention education be included as a complete module during medical training.

The major deficiencies are actually among health professionals and that we need to address those first before we start educating patients anymore. (Physician 1)

When I'm doing training.... it's only an awareness not high fluting -signs, symptoms, prevention, risk assessment, all the key things. It is improving now because we've done a lot of work but even the knowledge amongst people who work in hospitals, in an orthopaedic hospital where it's always been higher risk, is low. If it's low for that group then the patients themselves are unlikely to have a huge amount of knowledge and then things like on your medical training, nurse training there should be a whole module on VTE and the risks associated with it. (Nurse tutor, VTE committee member)

In the absence of specialist staff for VTE prevention individual trusts are developing their own literature for the education of both junior doctors and patients.

Bigger trusts have specific thrombosis teams or VTE nurses...we don't have that but we have just put together a document that is going through the approval process so hopefully that will help. (Nurse tutor, VTE committee member)

We have followed the NICE guidance and written our own local trust guidance and that's available on the intranet and available in a little booklet form that we give to the junior doctors when they start working here. (VTE trainer)

A considerable variation in VTE teaching for a range of medical staff was identified, and a charity director suggests improvements in education are needed.

I've been looking at education and its huge variability in the amount of teaching that medical students get in haematology where most of the VTE teaching is concerned so it varies from virtually nothing to eight weeks haematology teaching between the different medical schools and if one looks at the nursing syllabus –the midwives have nothing, there's no module at all on VTE and the nursing modules vary so there is a huge need for improvement in education. (Charity director 1)

Critical care staff, who see 1 or 2 incidences of VTE a month, felt they do not know enough about thromboprophylaxis.

> *I see 1 or 2 cases of VTE a month. I don't think I have enough knowledge or information about VTE and thromboprophylaxis. (Critical care charge nurse)*

Similarly, training to cover the management of VTEs may be inadequate.

> *Possibly the thing we don't cover so well at the moment is the management of suspected or actual VTEs... (Nurse tutor, VTE committee member)*

A consultant nurse suggested that clinicians should devote the time to complete a short training session to promote awareness that risk assessment is a continuous process should a patient's condition change.

> *It is a simple 2 minute process if done as part of the clerking procedure. It should also be thought about on the ward rounds and thereafter as the patient's condition changes. This requires clinicians to be VTE risk aware and that requires time to complete training on VTE prevention of about 15 to 30 minutes. (Consultant Nurse for anticoagulation)*

Even when there is a clear training programme in place, a nurse tutor suggested that attention can slip and compliance rates drop off.

> *You almost have to police it. You do things and you think, 'right they've got that now, they know that every patient needs to be risk assessed' but then something else will come along that takes their attention for a while and before you know it, it's starting to drop off again. (Nurse tutor, VTE committee member)*

However, that said, there were examples of excellence in staff commitment, responsibility and training. In several acute trusts training is now mandatory.

> *VTE training is mandatory in our organisation and this is a very useful driver. We provide slots on all induction programmes for new doctors and nurses, regular lunchtime teaching for pharmacists and an established link nurse/midwife network with study days and monthly lunchtime meetings incorporating teaching. Teaching of new FY1's who are involved with VTE trust wide audit. (Consultant Nurse for anticoagulation)*

> *In this Trust we ask everyone that has front line direct patient contact to complete the e-learning VTE learning module, which is mandatory and we also provide, for the nurses specifically, some VTE awareness sessions. (Clinical nurse tutor)*

> *I do a lot of teaching with the staff and I'm also trying to encourage- train the trainer. All of the adult wards have link nurses who have attended special training and we're encouraging them to teach the other nurses as well. We also do teaching with the doctors to hopefully get them to do things correctly in the first place. (VTE prevention lead nurse)*

Specific training requirements in acute care

Lack of skills

It was recognised that a document outlining the appropriate treatment is required in some hospitals because they do not have specialist teams to manage VTE. This was most evident in specialist orthopaedic hospitals where staff skills are appropriate to their specialist nature with little knowledge of other medical conditions that may have relevance to surgery and VTE risk factors. Explicitly, orthopaedic surgeons are knowledgeable with regard to risk factors related to surgery and anaesthetics but do not see cases of VTE because they are referred to a general hospital and they may be unfamiliar with risk factors associated with cancers and other co-morbidities.

> *For some patients there are other risk factors. It would be hard to have a form that covers every eventuality. Even though we are orthopaedic speciality only, within orthopaedics there are actually spinal, oncology patients, your hips and knees etc. So even within that small group there are lots of different risk factors and if you think about big trusts you might have medical neuro' as well. (Clinical nurse tutor)*

> *The thing we don't cover so well at the moment is the management of suspected or actual VTEs. Because, we are a specialist orthopaedic Trust so we don't have the input of, I mean a lot of bigger Trusts have specific thrombosis teams or VTE nurses or... Whereas in this Trust we don't have that but we have just put together a document that is going through the approval process so hopefully that will help. I'm not saying patients just don't get the appropriate treatment but I think maybe the actual process gets a bit blurred sometimes. (Orthopaedic nurse tutor)*

Critical dose clarity

Participants presented some specific examples where medical knowledge appears to be lacking with regard to VTE prevention and medication. One example was the apparent confusion around giving reduced dosage appropriate to age and renal function.

> *The concerns that I sometimes have is that, it's the definite guidelines for when you give a reduced dose, between forty and twenty. And I think a lot of the more junior clinical staff, junior doctors, don't quite understand when to go for forty versus twenty, when you're looking at age and renal function and things like that. And it's sort of a bit, it's a bit arbitrary. I would think it would be junior doctors needing the training in their medical, somewhere (Acute Trust Pharmacist)*

A pharmacist suggested that improved documentation would provide a useful checking system when a medication dose has been reduced so that the pharmacy can see the significance of a changed dosage.

> *Sometimes the consultants might reduce a patient's Enoxaparin dose to twenty, we're not always sure why. So maybe some documentation somewhere in the notes to understand why the VTE medication has been reduced because normally it's reduced if their renal function's poor, but sometimes it's reduced and their renal function's fine, or it can be reduced if a wound is oozing. But sometimes neither of*

those are there and we're left to, there's no information as to why the patient's dose has been reduced. (Medicines Management Pharmacist)

When asked whether there were any concerns regarding the required provision of thromboprophylaxis a critical care charge nurse enquired, *'if patient is on warfarin do we still give it?'* When asked if training was required the nurse asked, *'do we need TEDs and Enoxaparin?'* There is an apparent need for further training involving; exceptions to the rules, combining treatments, reducing doses according to co-morbidities and understanding the implications of a patient being on warfarin. Further, a participant inferred that a clinical barrier to the prevention of VTE may be caused by surgeons who think that prophylaxis causes bleeding on surgical wounds.

Some surgeons, particularly in orthopaedic surgery perceive that prophylaxis causes bleeds in the wound. (Charity director 2)

Immobility is a causal mechanism for VTE and there was some confusion regarding a patient's apparent mobility that requires clarification across the NHS. NICE guidelines regarding reduced mobility are defined as; ongoing reduced mobility relative to their normal state.[10] The following statement could indicate that some patients are not receiving appropriate thromboprophylaxis.

The risk assessment that we used is based on the Department of Health risk assessment tool. The main problem that we find causes confusion is with regard to the medical patients and the definition of mobility. We've done quite a lot of training on that recently and amended the risk assessment tool to add in the definition of mobility as defined by the NICE guidance. 'Cause we've found a lot of people were thinking if the patients not bed bound then they've got normal mobility. They're missing out on thromboprophylaxis. We've done a lot of work with that definition of mobility to try and increase awareness. I still feel that it's, a little bit confusing. (VTE prevention lead)

Budget implications

The NICE report recognises that VTE is hidden from the radar of surgical clinicians because patients are being discharged from hospital relatively quickly and a VTE develops after the patient has left hospital. [10] A consultant observes that, if a VTE event is prevented by the prescription paid for from the surgeons budget the saving has no direct effect or benefit to the surgeons department.

Talking to the orthopaedic surgeons the cost comes out of their direct budget and the guidelines have come in and the recommendations are made to them but they are not given any additional funds to deliver it. Likewise any financial savings on preventing hospital acquired thrombosis is not fed back to them. So they are being expected to spend more for a problem they don't perceive exists because they don't see it and by doing it they don't get any additional benefit. (Consultant, VTE lead)

Similarly, a nurse tutor suggested that the use of more expensive drugs may be cost effective because they would be easier to administer (oral, rather than self-injection that many patients cannot manage on their own) and would reduce district nursing costs.

> *...the cost of Rivaroxaban and things like that because if they were cheaper then you could move away from Clexane which would release up nursing time, you wouldn't need district nursing at all. (Nurse tutor, VTE committee member)*

Overall the prevention of VTE is considered to be cost effective for the NHS.

> *There should be no financial barriers as the prevention of VTE saves money in the long term for the NHS. (Charity director 2)*

Further budget implications which emerged included cost and time barriers relating to training staff to complete the risk assessment and complete it without errors and having the right facilities, in terms of sufficient numbers of staff, to carry that training out effectively. A VTE prevention lead invested considerable time in the motivation of staff to feel passionate about risk assessment so that they correctly complete the task.

> *Potential barriers are time, if areas are understaffed, training –if you haven't got the facilities to train people how to complete the risk assessment correctly then you might get errors and to a large extent staff awareness and motivation So we put a lot of time into trying engage with the staff to try and get them motivated to feel passionate about VTE and if we can do that we feel they're more likely to do the risk assessment forms. If they don't really care then it gets left so we do put quite a lot of investment in trying to get people feel passionate about it. I guess that is financial, having the staff to do that. (VTE prevention lead)*

Discussion

This study has highlighted a number of issues particularly confusion over responsibility for VTE risk assessment and treatment. Despite the belief of many participants in this study that VTE prophylaxis was well implemented in their hospital, participants from acute trusts, charities and organisations provided examples of low levels of knowledge of VTE risk and prevention and revealed examples of poor medical knowledge and understanding, including uncertainty over reduced mobility. These areas point to specific training requirements. While VTE nurses and trainers strive to motivate clinical staff to accept the task of risk assessment as a habitual part of daily clinical practice, our findings suggest that some junior doctors do not feel that it is their responsibility. Such a concern was raised in the Francis enquiry that found assumptions were made that important functions were being carried out by others.[19] Further, the report suggests that new doctors are vulnerable to being misled by poor practice and may not raise concerns.[19] (18.103 page 1225)

Similarly, the Francis Report identified a failure to communicate the knowledge of any concerns and in our study it is apparent that shortcomings in VTE prevention exist at an individual level, are identified at ward level and, currently, are not escalated. There is no guarantee that concerns regarding VTE management are raised and addressed appropriately. Our study alone has brought these issues to light.

Several participants highlight the importance of continuous training to prevent risk assessment becoming 'a tick box exercise' and for clinicians to understand the significance of the procedure to ensure follow on action. Despite government intervention, concerns remain around prophylaxis treatment, administration, and contraindications.

Having a dedicated VTE prophylaxis support position such as a nurse practitioner within a hospital has been demonstrated to improve prophylaxis rates by up to 48%.[20] A VTE trainer calls for additional funding for extra nursing staff to police the risk assessment process.

Strengths and limitations

A strength of our study is that it examines the opinions of healthcare professionals in acute trusts and relevant organisations who have in-depth knowledge and experience of hospital VTE measures and may be in positions to identify areas of excellence in the process and also those areas that may fall short. This is the first study to explore this issue with this group of participants.

Several participants came from institutions that belong to the National VTE Prevention Programme Exemplar Centre Network. These sites provide leadership and promote best practice in VTE prevention and are selected because of their existing track record of excellent VTE prevention and care. They carry a 'kite-mark' for good practice in VTE care and share clinical best practice, educational and audit material, provide advice regarding VTE care and collaborate on clinical research into VTE. As such these participants may have experienced a more proactive attitude to VTE prevention. This may be considered a strength to the study, particularly if they are able to identify a weakness within their exemplary status, but may equally be considered a limitation in that there may be cases of poor practice in other less prestigious sites that have gone unexplored.

Snowball sampling has been criticised for selection bias which limits the validity of the sample.[21 22] To minimise selection bias participants were sourced from an extensive base, ranging across acute trust personnel, commissioning bodies, individuals from the community and charities resulting in a wide range of participants from all areas of VTE prevention.

Conclusions

This study provides important insights into those aspects of VTE prevention that are perceived to continue to create concern in acute trusts. Even when dedicated VTE management support is available some healthcare professionals appear unsure of preventative measures.

In light of the suggestion that the teaching of VTE prevention varies widely across medical schools, training in VTE prevention would benefit from being fully addressed at this stage in a medical student's education. It is essential that all healthcare professionals recognise the importance of VTE risk assessment and appropriate preventative measures and be encouraged to acknowledge that the process does not end at risk assessment but is an

ongoing procedure throughout a patient's hospitalisation that becomes the responsibility of everyone involved in the patient's care.

Despite evidence of improved mortality rates associated with implementing VTE prophylaxis, this study demonstrates the need for on-going engagement with, and education of, acute trust personnel in order to ensure continuing quality improvement and the use of cost effective measures to reduce the burden of VTE after hospitalisation.

What is already known on this topic: Having a dedicated VTE prophylaxis support position within a hospital improves prophylaxis rates.

What this study adds: Despite government measures to reduce the number of deaths from hospital acquired VTE, low levels of knowledge of VTE risk and prevention persist in some acute trusts. VTE education should start in medical schools followed by continuous training to ensure that VTE prevention remains an unbroken chain of care throughout a patient's hospitalisation and that all healthcare professionals acknowledge their role in that care process.

Contributors: DF, EM, SG and AW had the original idea for the study and led the funding application. EM and AW wrote the study protocol. LM and SH contributed to the development of the protocol**.** LM conducted the interviews, led the qualitative analysis and drafted the paper. SG, EM, DF agreed the analysis and reviewed the draft versions. All authors approved the final version of the paper.

Funding: The research was funded by the National Institute for Health Research (NIHR; under its Programme Grants for Applied Research programme (RP-PG-0608-10073)) programme grant entitled 'Improving the prevention and treatment of venous thromboembolism in hospital and the community'. The views expressed in this paper are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

The authors declare that they have no competing interests. All authors have completed the ICMJE uniform disclosure form atwww.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted**.**

Data sharing: no additional data available.

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COREQ checklist for:

Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal characteristics		
1.	Interviewer/facilitator	Dr Lorraine McFarland conducted the interviews
2.	Credentials	PhD
3.	Occupation	Qualitative Research Fellow
4.	Gender	Female
5.	Experience and training	11 years experience. Participates in regular training to upgrade skills
Relationship with participants		
6.	Relationship established	As interviewer Relationship established by telephone prior to interview. Introduced by previous participants, recommended by study PI.
7.	Participant knowledge of the interviewer	Details and reasons for the study on participant information sheet. Knowledge of departmental goals and research interests
8.	Interviewer characteristics	Desire to reduce deaths from VTE
Domain 2: study design		
Theoretical framework		Constant comparison
9.	Methodological orientation and Theory	
Participant selection		
10.	Sampling	Purposive and snowball sampling
11.	Method of approach	Telephone and email
12.	Sample size	17 participants
13.	Non-participation	One participant was too busy but recommended others.
Setting		
14.	Setting of data collection	Workplace
15.	Presence of non-participants	No
16.	Description of sample	Experience of VTE
Data collection		
17.	Interview guide	Semi-structured interview agreed between all authors and the ethic committee.
18.	Repeat interviews	No
19.	Audio/visual recording	Audio recording
20.	Field notes	Sometimes
21.	Duration	After the interview
22.	Data saturation	Data saturation was considered

No	Item	Guide questions/description
23.	Transcripts returned	No
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	1 data coder
25.	Description of the coding tree	Codes discussed between 4 authors
26.	Derivation of themes	Themes were derived from the data
27.	Software	NVIVO
28.	Participant checking	No
Reporting		
29.	Quotations presented	Participant quotations are presented to illustrate the themes and each quotation identified according to participant role.
30.	Data and findings consistent	There is consistency between the data presented and the findings.
31.	Clarity of major themes	Major themes are clearly presented
32.	Clarity of minor themes	Minor themes were evolved into the main findings in consideration of word count

BMJ Open

Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2014-005074.R1
Article Type:	Research
Date Submitted by the Author:	28-May-2014
Complete List of Authors:	McFarland, Lorraine; University of Birmingham, Primary care and Clinical Sciences Murray, Ellen; University of Birmingham, Primary care and Clinical Sciences Harrison, Sian; Oxford University, Primary Health Care Heneghan, Carl; Oxford University, Primary Health Care Ward, Alison; University of Oxford, Nuffield Department of Primary Care Health Sciences Fitzmaurice, DA; University of Birmingham, Primary Care and General Practice Greenfield, Sheila; University of Birmingham, Primary Care and Clinical Sciences
Primary Subject Heading:	Haematology (incl blood transfusion)
Secondary Subject Heading:	Medical management, Qualitative research
Keywords:	Thromboembolism < CARDIOLOGY, Anticoagulation < HAEMATOLOGY, QUALITATIVE RESEARCH

Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

VTE: What's happening in Acute Trusts?

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Word count

- **including quotations 4927**
- **Text 2985**
- **Transcript 1942**

Abstract

Objective To explore the current practice of venous thromboembolism (VTE) prevention in acute trusts.

Design A qualitative research design was used to explore the perceived current practice of thromboprophylaxis, and knowledge and experience of VTE prevention. Data were collected via interviews with personnel from acute trusts and other relevant organisations and charities. Constant comparison was used to generate themes grounded in the data.

Setting UK

Participants 17 participants, sampled due to their expertise and knowledge in the field of VTE, were interviewed for the study.

Results No one felt directly responsible for VTE risk assessment and treatment in acute trusts. There were concerns whether any action takes place based upon the risk assessment. Low levels of VTE knowledge existed throughout the system.

Conclusions Our study highlights the importance of continuous training to prevent VTE risk assessment being considered a tick box exercise and for clinicians to understand the significance of the procedure to ensure that VTE preventative measures are administered. It is essential that acute trust staff acknowledge that VTE prevention is the responsibility of everyone involved in a patient's care. Concerns remain around prophylaxis treatment, administration, and contra-indications.

Strengths and limitations of this study

- Participants have in-depth knowledge and experience of hospital VTE measures and may be in positions to identify areas of excellence in the process and also those areas that may fall short
- First study to explore this issue with this group of participants
- Participants from sites that provide leadership and promote best practice in VTE prevention
- Examples of poor practice in other less prestigious sites may have gone unexplored
- Snowball sampling has been criticised for selection bias which limits the validity of the sample.

Introduction

Venous thromboembolism (VTE) is a substantial health-care problem, resulting in mortality, morbidity, and economic cost.[1] In 2005 VTE was estimated by the Health Select Committee to cost the National Health Service (NHS) £640 million a year to manage.[2] Mortality due to VTE after hospital admission is greater than the combined total of deaths from breast cancer, AIDS, prostate cancer and road traffic incidents each year in the UK.[3] Most hospitalised patients have one or more risk factors for VTE and around 60% of people undergoing major orthopaedic surgery will suffer a deep vein thrombosis (DVT) without preventative treatment.[4] Acute medical patients have a 10 to 20% risk of developing a DVT. [5] VTE is one of the most common complications to occur in cancer patients [6] and is associated with a significant reduction in survival. [7] The risk of VTE can be reduced with the use of anticoagulants.[5]

In 2007 NICE published a clinical guideline offering best-practice advice for reducing the risk of VTE in in-patients undergoing surgery.[8 9] In 2010, NICE guidelines recommended VTE risk assessment be undertaken at admission (and repeated after 24 hours) and appropriate prophylaxis be provided where indicated.[10] Commissioning for Quality and Innovation (CQUIN) agreements were introduced in June 2010 requiring all acute trusts in the UK to risk assess for VTE at least 90% of patients to avoid financial penalties. Acute trusts are responsible for the management of hospitals in England.[11]

Alongside these initiatives, an All Parliamentary Thrombosis Group (APPTG) survey found that implementation of risk assessment was poor.[12] A follow-up survey found that 58 % of trusts carry out regular clinical audit of appropriate thromboprophylaxis and maintain audit data [13] The report states that risk assessment alone does not protect identified at-risk patients and failure by trusts to undertake VTE prevention duties has cost £110 million in negligence payments since 2005.[13] Similarly, root-cause analyses of all confirmed cases of hospital acquired VTE are required by local commissioners and survey responses indicate that just 59 % of trusts undertake this. The audit suggests that commissioners are not enforcing compliance with local contracting provisions on root-cause analysis to support the provision of appropriate resources and improve practice at the local level.[13] Despite this recent research has shown the CQUIN initiative to be associated with a significant overall reduction in mortality due to VTE in patients with hospital stays greater than 3 days.[14]

However, it is clear that there is not a true picture of current thromboprophylaxis practice, staff education and the budget implications within acute trusts. A study has been undertaken to try to answer these important questions[15] this included interviews with experts in the field of VTE to explore the issues.

Methods and analysis

A qualitative research design was used with Data were collected via face-to-face and telephone interviews with an actively selected, purposive sample of personnel from acute trusts, relevant UK organisations and charities involved in the prevention of VTE. To achieve the most productive sample, key informants [16] were identified (by DF, an expert in VTE thromboprophylaxis) to best represent the research focus, followed by snowball sampling[17 18] which involves asking key informants to recommend other appropriate people for interview and is particularly appropriate for accessing the type of participants being sought.[19] Our sample was selected to reflect the diversity within a given population [20] in order to obtain a

rich perspective of opinion [21] and comprised experts working in the field of VTE who would have knowledge and experience of VTE prevention.

Prior to the interview participants were emailed an information pack comprising a covering letter and a participant information sheet. They were asked to complete a consent form at the time of contact or provided verbal consent for telephone interviews. Face-to-face interviews lasted between 30 and 50 minutes and telephone interviews 12 and 15 minutes. All interviews were conducted by the same researcher (LM). Interviews examined the current practice and knowledge of thromboprophylaxis, interdisciplinary communication, perceived barriers to VTE management, training provision and future requirements. The semi-structured interview schedule covered the following topics: an examination of the regular and required provision of prophylaxis; concerns regarding prophylaxis treatment; an exploration of the education provided to patients and the training provision and future requirements for VTE prophylaxis management.

All interviews were digitally-recorded with the permission of each participant. Content of the recordings were transcribed verbatim and the resultant audiotapes/digital files stored in a password protected computer file. Transcripts were identified by code number only and participants were not identified in any written material resulting from the interviews. The recorded and transcribed semi-structured interview data were analysed using constant comparative methods[22] and data were managed using NVivo 9 software. LM independently reviewed all the transcripts and developed codes in an iterative process to identify emerging patterns in the data and an initial coding framework. Similarity and differences were identified within and across the transcripts. By comparing each part of the data, analytical categories were established and key concepts selected. Final themes were reviewed and agreed between SG, EM, and DF to enhance reliability.

Ethics approval: Ethics approval was granted by Oxfordshire REC B Research Ethics Committee on 05/05/2011 (reference: 11/H0605/5).

Results

Participants

Seventeen participants agreed to be interviewed for the study. 15 were face-to-face and 2 via telephone. They originated from 12 separate organisations including, a series of trusts ranging from small trusts with no VTE specialist to large trusts with specialist VTE teams. 4 of these organisations were National VTE Prevention Programme Exemplar sites, consisting of hospitals who have demonstrated excellence in their work to prevent VTE.

Participants were; 2 physicians, a consultant haematologist, a consultant VTE lead, a VTE nurse, a critical care charge nurse, a consultant nurse for anticoagulation, a nurse tutor / VTE committee member, a VTE prevention lead nurse, a VTE trainer, a clinical medicines management pharmacist, charity directors, (1 and 2), from two separate VTE charities, a primary care trust (PCT) commissioner, a scientific advisor for haematology, a specialist scientific lead for patient devices and a community pharmacist. Charity director 2 and the community pharmacist took part via telephone interview.

Four main themes regarding participants' perceptions of thromboprophylaxis practice in acute trusts emerged from the data and the results are presented under these themes:

- Current attitudes to risk assessment
- Staff education and training
- Specific training requirements in acute care, lack of skills, critical dose clarity
- Budget implications

Representative quotations that illustrate both typical responses and a range of views have been selected to reflect these themes.

Current attitudes to risk assessment

It was suggested that some junior doctors, although recognising the need for risk assessment and the provision of preventative treatment, do not feel it is their responsibility to carry it out. The advantages of having a champion to promote the issue in each establishment were highlighted.

> There are still hospitals that are failing to do it, who don't have a champion pushing it forward. It's still quite difficult to win the hearts and mind of certain groups and the junior doctors don't seem to feel, they can see the need, but they feel it's not their responsibility. (Charity director 1)

Furthermore, it was suggested that risk assessment is regarded as little more than a tick box exercise, creating concerns that the results may not be acted upon.

> There is very little awareness; there is little awareness amongst secondary care staff because many see this as a chore, as a tick box exercise. (Physician 2)

There was a suggestion that the effectiveness of the process should be based on more than completion of the risk assessment form; a situation brought about by CQUIN payments. CQUIN payments are made according to the number of patients risk assessed with no regard as to whether treatment procedures have been put into place. A call for policing of the risk assessment procedure suggests that it may not always be carried out correctly.

> One of the weaknesses of the current strategy is that the outcome that is being measured is the number of risk assessment forms completed. The focus needs to be on whether they have been completed correctly and clinicians have acted on that assessment. People think that it is about identifying whether a patient is at risk of thrombosis but a risk assessment tool is also there to identify whether a patient is at risk of complications of thromboprophylaxis and therefore it is essential that the information is used to guide practice. People are judged on completion of risk assessment forms, not necessarily the execution of the result of that form. (Consultant and VTE lead)

> ... the government has taken a role with CQUIN targets that's really pushed it to the forefront to everyone's minds but it wouldn't harm them if they actually fund some extra nursing staff to police the risk assessments that are being done and that they are being done correctly. (VTE trainer)

There were concerns that risk assessment practice might slip if the incentives of CQUIN targets are removed. There was a perception that some trusts will think it unimportant. A VTE prevention lead felt that having staff dedicated to the role would help to maintain targets.

> I like the CQUIN targets because it does give incentive and if the CQUIN doesn't stay around I hope things won't slip. I wonder if some trusts, where they haven't got as big a team as we have, they haven't got a person dedicated to the role, if when they don't have to collect the data for CQUIN it's going to come off radar. I think it will affect some trusts more than others. Some trusts will just think it doesn't matter. (VTE prevention lead)

Participants considered it necessary to establish that what is in place is actually working and suggest there is evidence that it is not. This partly stemmed from the perception that no one feels directly responsible and that there exist low levels of understanding.

> From the hospitals point of view they need to understand that risk assessment and treatment of the patient is not just one person's responsibility. It becomes the responsibility of everyone who is involved in treating that person. (Charity director 2)

A successful example of how to overcome the problem of diminished sense of responsibility is in establishing knowledge of where the responsibility falls within each individual member of the clinical team, along with a backup system to make sure risk assessment is being carried out.

> All patients should be risk assessed the moment they are going to be admitted and the junior doctors know it is going to be their responsibility and in the absence of junior doctors the senior doctors know that it is someone's responsibility in the team and it might fall on them to do it. They are meant to do the risk assessment and prescribe the appropriate thromboprophylaxis. The nursing staff and the pharmacist staff remind or prompt the doctors if it is not being done and make sure that it is. It's sort of a three pronged attack. (VTE trainer)

Participants suggested that having sight of outcome data, to confirm the belief that conducting risk assessment has reduced incidences of hospital acquired thrombosis, could incentivise staff and help to improve risk assessment for DVT.

> Having outcome data that demonstrates conducting risk assessment has made a difference in reducing the incidence of hospital associated thrombosis. (Consultant Nurse for anticoagulation)

Staff education and training

A consultant nurse called for the education of both clinicians and patients to improve the regular and required provision of prophylaxis.

> Ensuring both clinicians and patients are educated on appropriate thromboprophylaxis and that the resources are available. (Consultant Nurse for anticoagulation)

In addition, on-going training that will prevent the risk assessment becoming a tick box exercise and continued awareness promotion was deemed necessary to develop an understanding of why the exercise is so important.

> It can just end up being another piece of paper, another tick box exercise. I think that's where the importance of the training comes in because you need people to understand why it's so important. (Nurse tutor and VTE committee member)

There were examples of low levels of knowledge of VTE risk and prevention amongst staff in some acute trusts; even in orthopaedic hospitals where the majority of patients will be assessed at high risk. There was clearly a requirement for improved staff understanding without which there will remain an inability to pass on vital information to patients. Participants suggested that VTE prevention education be included as a complete module during medical training.

> The major deficiencies are actually among health professionals and that we need to address those first before we start educating patients anymore. (Physician 1)

> When I'm doing training.... it's only an awareness not -signs, symptoms, prevention, risk assessment. It is improving now because we've done a lot of work but even the knowledge amongst people who work in hospitals, in an orthopaedic hospital where it's always been higher risk, is low. If it's low for that group then the patients themselves are unlikely to have a huge amount of knowledge. Your medical training, nurse training there should be a whole module on VTE and the risks. (Nurse tutor, VTE committee member)

In the absence of specialist staff for VTE prevention individual trusts are developing their own literature for the education of both junior doctors and patients.

> Bigger trusts have specific thrombosis teams or VTE nurses...we don't have that but we have just put together a document that is going through the approval process so hopefully that will help. (Nurse tutor, VTE committee member)

> We have followed the NICE guidance and written our own local trust guidance and that's available on the intranet and available in a little booklet form that we give to the junior doctors. (VTE trainer)

A considerable variation in VTE teaching for a range of medical staff was identified, and a charity director suggests improvements in education are needed.

> I've been looking at education and its huge variability in the amount of teaching that medical students get in haematology where most of the VTE teaching is concerned. So it varies from virtually nothing to eight weeks haematology teaching between the different medical schools and if one looks at the nursing syllabus –the midwives have nothing, there's no module at all on VTE and the nursing modules vary so there is a huge need for improvement in education. (Charity director 1)

Critical care staff who see 1 or 2 incidences of VTE a month, felt they do not know enough about thromboprophylaxis.

> I see 1 or 2 cases of VTE a month. I don't think I have enough knowledge or information about VTE and thromboprophylaxis. (Critical care charge nurse)

Similarly, training to cover the management of VTEs may be inadequate.

> The thing we don't cover so well at the moment is the management of suspected or actual VTEs... (Nurse tutor, VTE committee member)

A consultant nurse suggested that clinicians should devote the time to complete a short training session to promote awareness that risk assessment is a continuous process should a patient's condition change.

> It is a simple 2 minute process if done as part of the clerking procedure. It should also be thought about on the ward rounds and thereafter as the patient's condition changes. This requires clinicians to be VTE risk aware and that requires time to complete training on VTE prevention of about 15 to 30 minutes. (Consultant Nurse for anticoagulation)

Even when there is a clear training programme in place, a nurse tutor suggested that attention can slip and compliance rates drop off.

> You almost have to police it. You think, 'right they've got that now, they know that every patient needs to be risk assessed' but then something else will come along that takes their attention for a while and before you know it, it's starting to drop off again. (Nurse tutor, VTE committee member)

However, that said, there were examples of excellence in staff commitment, responsibility and training. In several acute trusts training is now mandatory.

> VTE training is mandatory in our organisation and this is a very useful driver. We provide slots on all induction programmes for new doctors and nurses, regular lunchtime teaching for pharmacists and an established link nurse/midwife network with study days and monthly lunchtime meetings incorporating teaching. Teaching of new FY1's who are involved with VTE trust wide audit. (Consultant Nurse for anticoagulation)

> We ask everyone that has direct patient contact to complete the e-learning VTE module, which is mandatory and we also provide, for the nurses specifically, some VTE awareness sessions. (Clinical nurse tutor)

> I do a lot of teaching with the staff and I'm also trying to encourage- train the trainer. All of the adult wards have link nurses who have attended special training and we're encouraging them to teach the other nurses as well. We also do teaching with the doctors to hopefully get them to do things correctly in the first place. (VTE prevention lead nurse)

Specific training requirements in acute care

Lack of skills

It was recognised that a document outlining the appropriate treatment is required in some hospitals because they do not have specialist teams to manage VTE. This was most evident in specialist orthopaedic hospitals where staff skills are appropriate to their specialist nature with little knowledge of other medical conditions that may have relevance to surgery and VTE risk factors. Explicitly, orthopaedic surgeons are knowledgeable with regard to risk factors related to surgery and anaesthetics but do not see cases of VTE because they are referred to a general hospital and they may be unfamiliar with risk factors associated with cancers and other co-morbidities.

> For some patients there are other risk factors. It would be hard to have a form that covers every eventuality. Even though we are orthopaedic speciality only, within orthopaedics there are actually spinal, oncology patients, hips and knees etc. Even within that small group there are lots of different risk factors. (Clinical nurse tutor)

> The thing we don't cover so well at the moment is the management of suspected or actual VTEs. Because, we are a specialist orthopaedic Trust so we don't have the input of, I mean a lot of bigger Trusts have specific thrombosis teams or VTE nurses...In this Trust we don't have that but we have just put together a document that is going through the approval process so hopefully that will help. I'm not saying patients just don't get the appropriate treatment but I think maybe the actual process gets a bit blurred sometimes. (Orthopaedic nurse tutor)

Critical dose clarity

Participants presented some specific examples where medical knowledge appears to be lacking with regard to VTE prevention and medication. One example was the apparent confusion around giving reduced dosage appropriate to age and renal function.

> The concerns that I have is that, it's the definite guidelines for when you give a reduced dose, between forty and twenty. And I think a lot of the more junior clinical staff, junior doctors, don't quite understand when to go for forty versus twenty, when you're looking at age and renal function and things like that. And it's sort of a bit, it's a bit arbitrary. I would think it would be junior doctors needing the training in their medical, somewhere (Acute Trust Pharmacist)

A pharmacist suggested that improved documentation would provide a useful checking system when a medication dose has been reduced so that the pharmacy can see the significance of a changed dosage.

> Sometimes the consultants might reduce a patient's Enoxaparin dose to twenty, we're not always sure why. So maybe some documentation somewhere in the notes to understand why the VTE medication has been reduced because normally it's reduced if their renal function's poor, but sometimes it's reduced and their renal function's fine, or it can be reduced if a wound is oozing. But sometimes neither of those are there and we're left to, there's no information as to why the patient's dose has been reduced. (Medicines Management Pharmacist)

When asked whether there were any concerns regarding the required provision of thromboprophylaxis a critical care charge nurse enquired, 'if patient is on warfarin do we still

give it?' When asked if training was required the nurse asked, 'do we need TEDs and Enoxaparin?' There is an apparent need for further training involving; exceptions to the rules, combining treatments, reducing doses according to co-morbidities and understanding the implications of a patient being on warfarin. Further, a participant inferred that a clinical barrier to the prevention of VTE may be caused by surgeons who think that prophylaxis causes bleeding on surgical wounds.

> Some surgeons, particularly in orthopaedic surgery perceive that prophylaxis causes bleeds in the wound. (Charity director 2)

Immobility is a causal mechanism for VTE and there was some confusion regarding a patient's apparent mobility that requires clarification across the NHS. NICE guidelines regarding reduced mobility are defined as; ongoing reduced mobility relative to their normal state.[10] The following statement could indicate that some patients are not receiving appropriate thromboprophylaxis.

> The main problem that causes confusion is with regard to the medical patients and the definition of mobility. We've done quite a lot of training on that recently and amended the risk assessment tool to add in the definition of mobility as defined by the NICE guidance. 'Cause we've found a lot of people were thinking if the patients not bed bound then they've got normal mobility. They're missing out on thromboprophylaxis. We've done a lot of work with that definition of mobility to try and increase awareness. I still feel that it's, a little bit confusing. (VTE prevention lead)

Budget implications

The NICE report recognises that VTE is hidden from the radar of surgical clinicians because patients are being discharged from hospital relatively quickly and a VTE develops after the patient has left hospital.[10] A consultant observes that, if a VTE event is prevented by the prescription paid for from the surgeons budget the saving has no direct effect or benefit to the surgeons department.

> The cost comes out of orthopaedic surgeons direct budget and the guidelines have come in and the recommendations are made to them but they are not given any additional funds to deliver it. Likewise any financial savings on preventing hospital acquired thrombosis is not fed back to them. So they are being expected to spend more for a problem they don't perceive exists because they don't see it and by doing it they don't get any additional benefit. (Consultant, VTE lead)

Similarly, a nurse tutor suggested that the use of more expensive drugs may be cost effective because they would be easier to administer (oral, rather than self-injection that many patients cannot manage on their own) and would reduce district nursing costs.

> ...the cost of Rivaroxaban and things like that because if they were cheaper then you could move away from Clexane which would release up nursing time, you wouldn't need district nursing at all. (Nurse tutor, VTE committee member)

Overall the prevention of VTE is considered to be cost effective for the NHS.

> There should be no financial barriers as the prevention of VTE saves money in the long term for the NHS. (Charity director 2)

Further budget implications which emerged included cost and time barriers relating to training staff to complete the risk assessment and complete it without errors and having the right facilities, in terms of sufficient numbers of staff, to carry that training out effectively. A VTE prevention lead invested considerable time in the motivation of staff to feel passionate about risk assessment so that they correctly complete the task.

> Potential barriers are time, if areas are understaffed, training –if you haven't got the facilities to train people how to complete the risk assessment correctly then you might get errors and to a large extent staff awareness and motivation we put a lot of time into trying engage with the staff to get them motivated to feel passionate about VTE and if we can do that we feel they're more likely to do the risk assessment forms. If they don't really care then it gets left so we put a lot of investment in trying to get people feel passionate about it. I guess that is financial, having the staff to do that. (VTE prevention lead)

Discussion

This study has highlighted a number of issues, particularly the confusion over responsibility for VTE risk assessment and treatment. Despite the belief of many participants in this study that VTE prophylaxis was well implemented in their hospital, participants from acute trusts, charities and organisations provided examples of low levels of knowledge of VTE risk and prevention and revealed examples of poor medical knowledge and understanding, including uncertainty over reduced mobility. These areas point to specific training requirements. While VTE nurses and trainers strive to motivate clinical staff to accept the task of risk assessment as a habitual part of daily clinical practice, our findings suggest that some junior doctors do not feel that it is their responsibility. Such a concern was raised in the Francis enquiry that found assumptions were made that important functions were being carried out by others.[23] Further, the report suggests that new doctors are vulnerable to being misled by poor practice and may not raise concerns.[23] (18.103 page 1225)

Similarly, the Francis Report identified a failure to communicate the knowledge of any concerns and in our study it is apparent that shortcomings in VTE prevention exist at an individual level, are identified at ward level and, currently, are not escalated. There is no guarantee that concerns regarding VTE management are raised and addressed appropriately. Our study alone has brought these issues to light.

Several participants highlight the suggested that importance of continuous training is important to prevent risk assessment becoming 'a tick box exercise' and for clinicians to understand the significance of the procedure to ensure follow on action. Despite government intervention, concerns remain around prophylaxis treatment, administration, and contraindications. The ENDORSE study found that less than 40% of at-risk hospitalised medical patients receive the recommended prophylaxis. The Endorse study reinforces the necessity to improve implementation of available guidelines for evaluating VTE risk and to implement measures that ensure that at-risk patients receive appropriate prophylaxis.[24, 25]

Having a dedicated VTE prophylaxis support position such as a nurse practitioner within a hospital has been demonstrated to improve prophylaxis rates by up to 48%.[26] A VTE trainer calls for additional funding for extra nursing staff to police the risk assessment process.

There is evidence of reduce mortality associated with improved prophylaxis rates in the UK.[14] However, studies suggest there is an overprescribing of prophylaxis in low-risk patients.[27] There remains a need for caution in terms of prescribing prophylaxis for patients at low risk of VTE.

Strengths and limitations

A strength of our study is that it examines the opinions of healthcare professionals in acute trusts and relevant organisations who have in-depth knowledge and experience of hospital VTE measures and may be in positions to identify areas of excellence in the process and also those areas that may fall short. This is the first study to explore this issue with this group of participants.

Several participants came from institutions that belong to the National VTE Prevention Programme Exemplar Centre Network. These sites provide leadership and promote best practice in VTE prevention and are selected because of their existing track record of excellent VTE prevention and care. They carry a 'kite-mark' for good practice in VTE care and share clinical best practice, educational and audit material, provide advice regarding VTE care and collaborate on clinical research into VTE. As such these participants may have experienced a more proactive attitude to VTE prevention. This may be considered a strength to the study, particularly if they are able to identify a weakness within their exemplary status, but may equally be considered a limitation in that there may be cases of poor practice in other less prestigious sites that have gone unexplored. This study sought healthcare professionals' opinions and it may be that an observational study of what actually happens in day to day clinical practice might highlight other issues.

Snowball sampling has been criticised for selection bias which limits the validity of the sample.[28, 29] To minimise selection bias participants were sourced from an extensive base, ranging across acute trust personnel, commissioning bodies, individuals from the community and charities resulting in a wide range of participants from all areas of VTE prevention. The sample size is within the range recommended to allow for data saturation to be reached.[20, 30]

Conclusions

This study provides important insights into those aspects of VTE prevention that are perceived to continue to create concern in acute trusts. Even when dedicated VTE management support is available some healthcare professionals appear unsure of preventative measures.

In light of the suggestion that the teaching of VTE prevention varies widely across medical schools, training in VTE prevention would benefit from being fully addressed at this stage in a medical student's education. It is essential that all healthcare professionals recognise the importance of VTE risk assessment and appropriate preventative measures and be encouraged to acknowledge that the process does not end at risk assessment but is an ongoing procedure throughout a patient's hospitalisation that becomes the responsibility of everyone involved in the patient's care.

Despite evidence of improved mortality rates associated with implementing VTE prophylaxis, this study demonstrates the need for on-going engagement with, and education of, acute trust personnel in order to ensure continuing quality improvement and the use of cost effective measures to reduce the burden of VTE after hospitalisation.

What is already known on this topic: Having a dedicated VTE prophylaxis support position within a hospital improves prophylaxis rates.

What this study adds: Despite government measures to reduce the number of deaths from hospital acquired VTE, low levels of knowledge of VTE risk and prevention persist in some acute trusts. VTE education should start in medical schools followed by continuous training to ensure that VTE prevention remains an unbroken chain of care throughout a patient's hospitalisation and that all healthcare professionals acknowledge their role in that care process.

Contributors: DF, EM, SG and AW had the original idea for the study and led the funding application. EM and AW wrote the study protocol. LM and SH contributed to the development of the protocol**.** LM conducted the interviews, led the qualitative analysis and drafted the paper. SG, EM, DF agreed the analysis and reviewed the draft versions. All authors approved the final version of the paper.

Funding: The research was funded by the National Institute for Health Research (NIHR; under its Programme Grants for Applied Research programme (RP-PG-0608-10073)) programme grant entitled 'Improving the prevention and treatment of venous thromboembolism in hospital and the community'. The views expressed in this paper are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

Competing interests: The authors declare that they have no competing interests. All authors have completed the ICMJE uniform disclosure form atwww.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted**.**

Data sharing: no additional data available.

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Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

VTE: What's happening in Acute Trusts?

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Word count

- **including quotations 4927**
- **Text 2985**
- **Transcript 1942**

Abstract

Objective To explore the current practice of venous thromboembolism (VTE) prevention in acute trusts.

Design A qualitative research design was used to explore the perceived current practice of thromboprophylaxis, and knowledge and experience of VTE prevention. Data were collected via interviews with personnel from acute trusts and other relevant organisations and charities. Constant comparison was used to generate themes grounded in the data.

Setting UK

Participants 17 participants, sampled due to their expertise and knowledge in the field of VTE, were interviewed for the study.

Results No one felt directly responsible for VTE risk assessment and treatment in acute trusts. There were concerns whether any action takes place based upon the risk assessment. Low levels of VTE knowledge existed throughout the system.

Conclusions Our study highlights the importance of continuous training to prevent VTE risk assessment being considered a tick box exercise and for clinicians to understand the significance of the procedure to ensure that VTE preventative measures are administered. It is essential that acute trust staff acknowledge that VTE prevention is the responsibility of everyone involved in a patient's care. Concerns remain around prophylaxis treatment, administration, and contra-indications.

Strengths and limitations of this study

- Participants have in-depth knowledge and experience of hospital VTE measures and may be in positions to identify areas of excellence in the process and also those areas that may fall short
- First study to explore this issue with this group of participants
- Participants from sites that provide leadership and promote best practice in VTE prevention
- Examples of poor practice in other less prestigious sites may have gone unexplored
- Snowball sampling has been criticised for selection bias which limits the validity of the sample.

Introduction

Venous thromboembolism (VTE) is a substantial health-care problem, resulting in mortality, morbidity, and economic cost.[1] In 2005 VTE was estimated by the Health Select Committee to cost the National Health Service (NHS) £640 million a year to manage.[2] Mortality due to VTE after hospital admission is greater than the combined total of deaths from breast cancer, AIDS, prostate cancer and road traffic incidents each year in the UK.[3] Most hospitalised patients have one or more risk factors for VTE and around 60% of people undergoing major orthopaedic surgery will suffer a deep vein thrombosis (DVT) without preventative treatment.[4] Acute medical patients have a 10 to 20% risk of developing a DVT. [5] VTE is one of the most common complications to occur in cancer patients [6] and is associated with a significant reduction in survival. [7] The risk of VTE can be reduced with the use of anticoagulants.[5]

In 2007 NICE published a clinical guideline offering best-practice advice for reducing the risk of VTE in in-patients undergoing surgery.[8 9] In 2010, NICE guidelines recommended VTE risk assessment be undertaken at admission (and repeated after 24 hours) and appropriate prophylaxis be provided where indicated.[10] Commissioning for Quality and Innovation (CQUIN) agreements were introduced in June 2010 requiring all acute trusts in the UK to risk assess for VTE at least 90% of patients to avoid financial penalties. Acute trusts are responsible for the management of hospitals in England.[11]

Alongside these initiatives, an All Parliamentary Thrombosis Group (APPTG) survey found that implementation of risk assessment was poor.[12] A follow-up survey found that 58 % of trusts carry out regular clinical audit of appropriate thromboprophylaxis and maintain audit data [13] The report states that risk assessment alone does not protect identified at-risk patients and failure by trusts to undertake VTE prevention duties has cost £110 million in negligence payments since 2005.[13] Similarly, root-cause analyses of all confirmed cases of hospital acquired VTE are required by local commissioners and survey responses indicate that just 59 % of trusts undertake this. The audit suggests that commissioners are not enforcing compliance with local contracting provisions on root-cause analysis to support the provision of appropriate resources and improve practice at the local level.[13] Despite this recent research has shown the CQUIN initiative to be associated with a significant overall reduction in mortality due to VTE in patients with hospital stays greater than 3 days.[14]

However, it is clear that there is not a true picture of current thromboprophylaxis practice, staff education and the budget implications within acute trusts. A study has been undertaken to try to answer these important questions[15] this included interviews with experts in the field of VTE to explore the issues.

Methods and analysis

~~A qualitative research design was used with~~ Data were collected via face-to-face and telephone interviews with an actively selected, purposive sample of personnel from acute trusts, relevant UK organisations and charities involved in the prevention of VTE. To achieve the most productive sample, key informants [16] were identified (by DF, an expert in VTE thromboprophylaxis) to best represent the research focus, followed by snowball sampling[17 18] which involves asking key informants to recommend other appropriate people for interview and is particularly appropriate for accessing the type of participants being sought.[19] Our sample was selected to reflect the diversity within a given population [20] in order to obtain a

rich perspective of opinion [21] and comprised experts working in the field of VTE who would have knowledge and experience of VTE prevention.

Prior to the interview participants were emailed an information pack comprising a covering letter and a participant information sheet. They were asked to complete a consent form at the time of contact or provided verbal consent for telephone interviews. Face-to-face interviews lasted between 30 and 50 minutes and telephone interviews 12 and 15 minutes. All interviews were conducted by the same researcher (LM). Interviews examined the current practice and knowledge of thromboprophylaxis, interdisciplinary communication, perceived barriers to VTE management, training provision and future requirements. The semi-structured interview schedule covered the following topics: an examination of the regular and required provision of prophylaxis; concerns regarding prophylaxis treatment; an exploration of the education provided to patients and the training provision and future requirements for VTE prophylaxis management.

All interviews were digitally-recorded with the permission of each participant. Content of the recordings were transcribed verbatim and the resultant audiotapes/digital files stored in a password protected computer file. Transcripts were identified by code number only and participants were not identified in any written material resulting from the interviews. The recorded and transcribed semi-structured interview data were analysed using constant comparative methods[22] and data were managed using NVivo 9 software. LM independently reviewed all the transcripts and developed codes in an iterative process to identify emerging patterns in the data and an initial coding framework. Similarity and differences were identified within and across the transcripts. By comparing each part of the data, analytical categories were established and key concepts selected. Final themes were reviewed and agreed between SG, EM, and DF to enhance reliability.

Ethics approval: Ethics approval was granted by Oxfordshire REC B Research Ethics Committee on 05/05/2011 (reference: 11/H0605/5).

Results

Participants

Seventeen participants agreed to be interviewed for the study. 15 were face-to-face and 2 via telephone. They originated from 12 separate organisations including, a series of trusts ranging from small trusts with no VTE specialist to large trusts with specialist VTE teams. 4 of these organisations were National VTE Prevention Programme Exemplar sites, consisting of hospitals who have demonstrated excellence in their work to prevent VTE.

Participants were; 2 physicians, a consultant haematologist, a consultant VTE lead, a VTE nurse, a critical care charge nurse, a consultant nurse for anticoagulation, a nurse tutor / VTE committee member, a VTE prevention lead nurse, a VTE trainer, a clinical medicines management pharmacist, charity directors, (1 and 2), from two separate VTE charities, a primary care trust (PCT) commissioner, a scientific advisor for haematology, a specialist scientific lead for patient devices and a community pharmacist. Charity director 2 and the community pharmacist took part via telephone interview.

Four main themes regarding participants' perceptions of thromboprophylaxis practice in acute trusts emerged from the data and the results are presented under these themes:

- Current attitudes to risk assessment
- Staff education and training
- Specific training requirements in acute care, lack of skills, critical dose clarity
- Budget implications

Representative quotations that illustrate both typical responses and a range of views have been selected to reflect these themes.

Current attitudes to risk assessment

It was suggested that some junior doctors, although recognising the need for risk assessment and the provision of preventative treatment, do not feel it is their responsibility to carry it out. The advantages of having a champion to promote the issue in each establishment were highlighted.

> *There are still hospitals that are failing to do it, who don't have a champion pushing it forward. It's still quite difficult to win the hearts and mind of certain groups and the junior doctors don't seem to feel, they can see the need, but they feel it's not their responsibility. (Charity director 1)*

Furthermore, it was suggested that risk assessment is regarded as little more than a tick box exercise, creating concerns that the results may not be acted upon.

> *There is very little awareness; there is little awareness amongst secondary care staff because many see this as a chore, as a tick box exercise. (Physician 2)*

There was a suggestion that the effectiveness of the process should be based on more than completion of the risk assessment form; a situation brought about by CQUIN payments. CQUIN payments are made according to the number of patients risk assessed with no regard as to whether treatment procedures have been put into place. A call for policing of the risk assessment procedure suggests that it may not always be carried out correctly.

> *One of the weaknesses of the current strategy is that the outcome that is being measured is the number of risk assessment forms completed. The focus needs to be on whether they have been completed correctly and clinicians have acted on that assessment. People think that it is about identifying whether a patient is at risk of thrombosis but a risk assessment tool is also there to identify whether a patient is at risk of complications of thromboprophylaxis and therefore it is essential that the information is used to guide practice. People are judged on completion of risk assessment forms, not necessarily the execution of the result of that form. (Consultant and VTE lead)*

> *... the government has taken a role with CQUIN targets that's really pushed it to the forefront to everyone's minds but it wouldn't harm them if they actually fund some extra nursing staff to police the risk assessments that are being done and that they are being done correctly. (VTE trainer)*

There were concerns that risk assessment practice might slip if the incentives of CQUIN targets are removed. There was a perception that some trusts will think it unimportant. A VTE prevention lead felt that having staff dedicated to the role would help to maintain targets.

> *I like the CQUIN targets because it does give incentive and if the CQUIN doesn't stay around I hope things won't slip. I wonder if some trusts, where they haven't got as big a team as we have, they haven't got a person dedicated to the role, if when they don't have to collect the data for CQUIN it's going to come off radar. I think it will affect some trusts more than others. Some trusts will just think it doesn't matter. (VTE prevention lead)*

Participants considered it necessary to establish that what is in place is actually working and suggest there is evidence that it is not. This partly stemmed from the perception that no one feels directly responsible and that there exist low levels of understanding.

> *From the hospitals point of view they need to understand that risk assessment and treatment of the patient is not just one person's responsibility. It becomes the responsibility of everyone who is involved in treating that person. (Charity director 2)*

A successful example of how to overcome the problem of diminished sense of responsibility is in establishing knowledge of where the responsibility falls within each individual member of the clinical team, along with a backup system to make sure risk assessment is being carried out.

> *All patients should be risk assessed the moment they are going to be admitted and the junior doctors know it is going to be their responsibility and in the absence of junior doctors the senior doctors know that it is someone's responsibility in the team and it might fall on them to do it. They are meant to do the risk assessment and prescribe the appropriate thromboprophylaxis. The nursing staff and the pharmacist staff remind or prompt the doctors if it is not being done and make sure that it is. It's sort of a three pronged attack. (VTE trainer)*

Participants suggested that having sight of outcome data, to confirm the belief that conducting risk assessment has reduced incidences of hospital acquired thrombosis, could incentivise staff and help to improve risk assessment for DVT.

> *Having outcome data that demonstrates conducting risk assessment has made a difference in reducing the incidence of hospital associated thrombosis. (Consultant Nurse for anticoagulation)*

Staff education and training

A consultant nurse called for the education of both clinicians and patients to improve the regular and required provision of prophylaxis.

> *Ensuring both clinicians and patients are educated on appropriate thromboprophylaxis and that the resources are available. (Consultant Nurse for anticoagulation)*

In addition, on-going training that will prevent the risk assessment becoming a tick box exercise and continued awareness promotion was deemed necessary to develop an understanding of why the exercise is so important.

> *It can just end up being another piece of paper, another tick box exercise. I think that's where the importance of the training comes in because you need people to understand why it's so important. (Nurse tutor and VTE committee member)*

There were examples of low levels of knowledge of VTE risk and prevention amongst staff in some acute trusts; even in orthopaedic hospitals where the majority of patients will be assessed at high risk. There was clearly a requirement for improved staff understanding without which there will remain an inability to pass on vital information to patients. Participants suggested that VTE prevention education be included as a complete module during medical training.

> *The major deficiencies are actually among health professionals and that we need to address those first before we start educating patients anymore. (Physician 1)*

> *When I'm doing training.... it's only an awareness not -signs, symptoms, prevention, risk assessment. It is improving now because we've done a lot of work but even the knowledge amongst people who work in hospitals, in an orthopaedic hospital where it's always been higher risk, is low. If it's low for that group then the patients themselves are unlikely to have a huge amount of knowledge. Your medical training, nurse training there should be a whole module on VTE and the risks. (Nurse tutor, VTE committee member)*

In the absence of specialist staff for VTE prevention individual trusts are developing their own literature for the education of both junior doctors and patients.

> *Bigger trusts have specific thrombosis teams or VTE nurses...we don't have that but we have just put together a document that is going through the approval process so hopefully that will help. (Nurse tutor, VTE committee member)*

> *We have followed the NICE guidance and written our own local trust guidance and that's available on the intranet and available in a little booklet form that we give to the junior doctors. (VTE trainer)*

A considerable variation in VTE teaching for a range of medical staff was identified, and a charity director suggests improvements in education are needed.

> *I've been looking at education and its huge variability in the amount of teaching that medical students get in haematology where most of the VTE teaching is concerned. So it varies from virtually nothing to eight weeks haematology teaching between the different medical schools and if one looks at the nursing syllabus –the midwives have nothing, there's no module at all on VTE and the nursing modules vary so there is a huge need for improvement in education. (Charity director 1)*

Critical care staff who see 1 or 2 incidences of VTE a month, felt they do not know enough about thromboprophylaxis.

I see 1 or 2 cases of VTE a month. I don't think I have enough knowledge or information about VTE and thromboprophylaxis. (Critical care charge nurse)

Similarly, training to cover the management of VTEs may be inadequate.

The thing we don't cover so well at the moment is the management of suspected or actual VTEs... (Nurse tutor, VTE committee member)

A consultant nurse suggested that clinicians should devote the time to complete a short training session to promote awareness that risk assessment is a continuous process should a patient's condition change.

It is a simple 2 minute process if done as part of the clerking procedure. It should also be thought about on the ward rounds and thereafter as the patient's condition changes. This requires clinicians to be VTE risk aware and that requires time to complete training on VTE prevention of about 15 to 30 minutes. (Consultant Nurse for anticoagulation)

Even when there is a clear training programme in place, a nurse tutor suggested that attention can slip and compliance rates drop off.

You almost have to police it. You think, 'right they've got that now, they know that every patient needs to be risk assessed' but then something else will come along that takes their attention for a while and before you know it, it's starting to drop off again. (Nurse tutor, VTE committee member)

However, that said, there were examples of excellence in staff commitment, responsibility and training. In several acute trusts training is now mandatory.

VTE training is mandatory in our organisation and this is a very useful driver. We provide slots on all induction programmes for new doctors and nurses, regular lunchtime teaching for pharmacists and an established link nurse/midwife network with study days and monthly lunchtime meetings incorporating teaching. Teaching of new FY1's who are involved with VTE trust wide audit. (Consultant Nurse for anticoagulation)

We ask everyone that has direct patient contact to complete the e-learning VTE module, which is mandatory and we also provide, for the nurses specifically, some VTE awareness sessions. (Clinical nurse tutor)

I do a lot of teaching with the staff and I'm also trying to encourage- train the trainer. All of the adult wards have link nurses who have attended special training and we're encouraging them to teach the other nurses as well. We also do teaching with the doctors to hopefully get them to do things correctly in the first place. (VTE prevention lead nurse)

Specific training requirements in acute care

Lack of skills

It was recognised that a document outlining the appropriate treatment is required in some hospitals because they do not have specialist teams to manage VTE. This was most evident in specialist orthopaedic hospitals where staff skills are appropriate to their specialist nature with little knowledge of other medical conditions that may have relevance to surgery and VTE risk factors. Explicitly, orthopaedic surgeons are knowledgeable with regard to risk factors related to surgery and anaesthetics but do not see cases of VTE because they are referred to a general hospital and they may be unfamiliar with risk factors associated with cancers and other co-morbidities.

> *For some patients there are other risk factors. It would be hard to have a form that covers every eventuality. Even though we are orthopaedic speciality only, within orthopaedics there are actually spinal, oncology patients, hips and knees etc. Even within that small group there are lots of different risk factors. (Clinical nurse tutor)*

> *The thing we don't cover so well at the moment is the management of suspected or actual VTEs. Because, we are a specialist orthopaedic Trust so we don't have the input of, I mean a lot of bigger Trusts have specific thrombosis teams or VTE nurses...In this Trust we don't have that but we have just put together a document that is going through the approval process so hopefully that will help. I'm not saying patients just don't get the appropriate treatment but I think maybe the actual process gets a bit blurred sometimes. (Orthopaedic nurse tutor)*

Critical dose clarity

Participants presented some specific examples where medical knowledge appears to be lacking with regard to VTE prevention and medication. One example was the apparent confusion around giving reduced dosage appropriate to age and renal function.

> *The concerns that I have is that, it's the definite guidelines for when you give a reduced dose, between forty and twenty. And I think a lot of the more junior clinical staff, junior doctors, don't quite understand when to go for forty versus twenty, when you're looking at age and renal function and things like that. And it's sort of a bit, it's a bit arbitrary. I would think it would be junior doctors needing the training in their medical, somewhere (Acute Trust Pharmacist)*

A pharmacist suggested that improved documentation would provide a useful checking system when a medication dose has been reduced so that the pharmacy can see the significance of a changed dosage.

> *Sometimes the consultants might reduce a patient's Enoxaparin dose to twenty, we're not always sure why. So maybe some documentation somewhere in the notes to understand why the VTE medication has been reduced because normally it's reduced if their renal function's poor, but sometimes it's reduced and their renal function's fine, or it can be reduced if a wound is oozing. But sometimes neither of those are there and we're left to, there's no information as to why the patient's dose has been reduced. (Medicines Management Pharmacist)*

When asked whether there were any concerns regarding the required provision of thromboprophylaxis a critical care charge nurse enquired, *'if patient is on warfarin do we still*

give it?' When asked if training was required the nurse asked*, 'do we need TEDs and Enoxaparin?'* There is an apparent need for further training involving; exceptions to the rules, combining treatments, reducing doses according to co-morbidities and understanding the implications of a patient being on warfarin. Further, a participant inferred that a clinical barrier to the prevention of VTE may be caused by surgeons who think that prophylaxis causes bleeding on surgical wounds.

> *Some surgeons, particularly in orthopaedic surgery perceive that prophylaxis causes bleeds in the wound. (Charity director 2)*

Immobility is a causal mechanism for VTE and there was some confusion regarding a patient's apparent mobility that requires clarification across the NHS. NICE guidelines regarding reduced mobility are defined as; ongoing reduced mobility relative to their normal state.[10] The following statement could indicate that some patients are not receiving appropriate thromboprophylaxis.

> *The main problem that causes confusion is with regard to the medical patients and the definition of mobility. We've done quite a lot of training on that recently and amended the risk assessment tool to add in the definition of mobility as defined by the NICE guidance. 'Cause we've found a lot of people were thinking if the patients not bed bound then they've got normal mobility. They're missing out on thromboprophylaxis. We've done a lot of work with that definition of mobility to try and increase awareness. I still feel that it's, a little bit confusing. (VTE prevention lead)*

Budget implications

The NICE report recognises that VTE is hidden from the radar of surgical clinicians because patients are being discharged from hospital relatively quickly and a VTE develops after the patient has left hospital.[10] A consultant observes that, if a VTE event is prevented by the prescription paid for from the surgeons budget the saving has no direct effect or benefit to the surgeons department.

> *The cost comes out of orthopaedic surgeons direct budget and the guidelines have come in and the recommendations are made to them but they are not given any additional funds to deliver it. Likewise any financial savings on preventing hospital acquired thrombosis is not fed back to them. So they are being expected to spend more for a problem they don't perceive exists because they don't see it and by doing it they don't get any additional benefit. (Consultant, VTE lead)*

Similarly, a nurse tutor suggested that the use of more expensive drugs may be cost effective because they would be easier to administer (oral, rather than self-injection that many patients cannot manage on their own) and would reduce district nursing costs.

> *...the cost of Rivaroxaban and things like that because if they were cheaper then you could move away from Clexane which would release up nursing time, you wouldn't need district nursing at all. (Nurse tutor, VTE committee member)*

Overall the prevention of VTE is considered to be cost effective for the NHS.

> *There should be no financial barriers as the prevention of VTE saves money in the long term for the NHS. (Charity director 2)*

Further budget implications which emerged included cost and time barriers relating to training staff to complete the risk assessment and complete it without errors and having the right facilities, in terms of sufficient numbers of staff, to carry that training out effectively. A VTE prevention lead invested considerable time in the motivation of staff to feel passionate about risk assessment so that they correctly complete the task.

> *Potential barriers are time, if areas are understaffed, training –if you haven't got the facilities to train people how to complete the risk assessment correctly then you might get errors and to a large extent staff awareness and motivation we put a lot of time into trying engage with the staff to get them motivated to feel passionate about VTE and if we can do that we feel they're more likely to do the risk assessment forms. If they don't really care then it gets left so we put a lot of investment in trying to get people feel passionate about it. I guess that is financial, having the staff to do that. (VTE prevention lead)*

Discussion

This study has highlighted a number of issues, particularly the confusion over responsibility for VTE risk assessment and treatment. Despite the belief of many participants in this study that VTE prophylaxis was well implemented in their hospital, participants from acute trusts, charities and organisations provided examples of low levels of knowledge of VTE risk and prevention and revealed examples of poor medical knowledge and understanding, including uncertainty over reduced mobility. These areas point to specific training requirements. While VTE nurses and trainers strive to motivate clinical staff to accept the task of risk assessment as a habitual part of daily clinical practice, our findings suggest that some junior doctors do not feel that it is their responsibility. Such a concern was raised in the Francis enquiry that found assumptions were made that important functions were being carried out by others.[23] Further, the report suggests that new doctors are vulnerable to being misled by poor practice and may not raise concerns.[23] (18.103 page 1225)

Similarly, the Francis Report identified a failure to communicate the knowledge of any concerns and in our study it is apparent that shortcomings in VTE prevention exist at an individual level, are identified at ward level and, currently, are not escalated. There is no guarantee that concerns regarding VTE management are raised and addressed appropriately. Our study alone has brought these issues to light.

Several participants ~~highlight the~~ suggested that ~~importance of~~ continuous training is important to prevent risk assessment becoming 'a tick box exercise' and for clinicians to understand the significance of the procedure to ensure follow on action. Despite government intervention, concerns remain around prophylaxis treatment, administration, and contraindications. The ENDORSE study found that less than 40% of at-risk hospitalised medical patients receive the recommended prophylaxis. The Endorse study reinforces the necessity to improve implementation of available guidelines for evaluating VTE risk and to implement measures that ensure that at-risk patients receive appropriate prophylaxis.[24, 25]

Having a dedicated VTE prophylaxis support position such as a nurse practitioner within a hospital has been demonstrated to improve prophylaxis rates by up to 48%.[26] A VTE trainer calls for additional funding for extra nursing staff to police the risk assessment process.

There is evidence of reduce mortality associated with improved prophylaxis rates in the UK.[14] However, studies suggest there is an overprescribing of prophylaxis in low-risk patients.[27] There remains a need for caution in terms of prescribing prophylaxis for patients at low risk of VTE.

Strengths and limitations

A strength of our study is that it examines the opinions of healthcare professionals in acute trusts and relevant organisations who have in-depth knowledge and experience of hospital VTE measures and may be in positions to identify areas of excellence in the process and also those areas that may fall short. This is the first study to explore this issue with this group of participants.

Several participants came from institutions that belong to the National VTE Prevention Programme Exemplar Centre Network. These sites provide leadership and promote best practice in VTE prevention and are selected because of their existing track record of excellent VTE prevention and care. They carry a 'kite-mark' for good practice in VTE care and share clinical best practice, educational and audit material, provide advice regarding VTE care and collaborate on clinical research into VTE. As such these participants may have experienced a more proactive attitude to VTE prevention. This may be considered a strength to the study, particularly if they are able to identify a weakness within their exemplary status, but may equally be considered a limitation in that there may be cases of poor practice in other less prestigious sites that have gone unexplored. This study sought healthcare professionals' opinions and it may be that an observational study of what actually happens in day to day clinical practice might highlight other issues.

Snowball sampling has been criticised for selection bias which limits the validity of the sample.[28, 29] To minimise selection bias participants were sourced from an extensive base, ranging across acute trust personnel, commissioning bodies, individuals from the community and charities resulting in a wide range of participants from all areas of VTE prevention. The sample size is within the range recommended to allow for data saturation to be reached.[20, 30]

Conclusions

This study provides important insights into those aspects of VTE prevention that are perceived to continue to create concern in acute trusts. Even when dedicated VTE management support is available some healthcare professionals appear unsure of preventative measures.

In light of the suggestion that the teaching of VTE prevention varies widely across medical schools, training in VTE prevention would benefit from being fully addressed at this stage in a medical student's education. It is essential that all healthcare professionals recognise the importance of VTE risk assessment and appropriate preventative measures and be encouraged to acknowledge that the process does not end at risk assessment but is an ongoing procedure throughout a patient's hospitalisation that becomes the responsibility of everyone involved in the patient's care.

Despite evidence of improved mortality rates associated with implementing VTE prophylaxis, this study demonstrates the need for on-going engagement with, and education of, acute trust personnel in order to ensure continuing quality improvement and the use of cost effective measures to reduce the burden of VTE after hospitalisation.

What is already known on this topic: Having a dedicated VTE prophylaxis support position within a hospital improves prophylaxis rates.

What this study adds: Despite government measures to reduce the number of deaths from hospital acquired VTE, low levels of knowledge of VTE risk and prevention persist in some acute trusts. VTE education should start in medical schools followed by continuous training to ensure that VTE prevention remains an unbroken chain of care throughout a patient's hospitalisation and that all healthcare professionals acknowledge their role in that care process.

Contributors: DF, EM, SG and AW had the original idea for the study and led the funding application. EM and AW wrote the study protocol. LM and SH contributed to the development of the protocol**.** LM conducted the interviews, led the qualitative analysis and drafted the paper. SG, EM, DF agreed the analysis and reviewed the draft versions. All authors approved the final version of the paper.

Funding: The research was funded by the National Institute for Health Research (NIHR; under its Programme Grants for Applied Research programme (RP-PG-0608-10073)) programme grant entitled 'Improving the prevention and treatment of venous thromboembolism in hospital and the community'. The views expressed in this paper are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

The authors declare that they have no competing interests. All authors have completed the ICMJE uniform disclosure form atwww.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted**.**

Data sharing: no additional data available.

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COREQ checklist for:

Current practice of venous thromboembolism prevention in Acute Trusts: A qualitative study

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal characteristics		
1.	Interviewer/facilitator	Dr Lorraine McFarland conducted the interviews
2.	Credentials	PhD
3.	Occupation	Qualitative Research Fellow
4.	Gender	Female
5.	Experience and training	11 years experience. Participates in regular training to upgrade skills
Relationship with participants		
6.	Relationship established	As interviewer Relationship established by telephone prior to interview. Introduced by previous participants, recommended by study PI.
7.	Participant knowledge of the interviewer	Details and reasons for the study on participant information sheet. Knowledge of departmental goals and research interests
8.	Interviewer characteristics	Desire to reduce deaths from VTE
Domain 2: study design		
Theoretical framework		Constant comparison
9.	Methodological orientation and Theory	
Participant selection		
10.	Sampling	Purposive and snowball sampling
11.	Method of approach	Telephone and email
12.	Sample size	17 participants
13.	Non-participation	One participant was too busy but recommended others.
Setting		
14.	Setting of data collection	Workplace
15.	Presence of non-participants	No
16.	Description of sample	Experience of VTE
Data collection		
17.	Interview guide	Semi-structured interview agreed between all authors and the ethic committee.
18.	Repeat interviews	No
19.	Audio/visual recording	Audio recording
20.	Field notes	Sometimes
21.	Duration	After the interview
22.	Data saturation	Data saturation was considered

No	Item	Guide questions/description
23.	Transcripts returned	No
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	1 data coder
25.	Description of the coding tree	Codes discussed between 4 authors
26.	Derivation of themes	Themes were derived from the data
27.	Software	NVIVO
28.	Participant checking	No
Reporting		
29.	Quotations presented	Participant quotations are presented to illustrate the themes and each quotation identified according to participant role.
30.	Data and findings consistent	There is consistency between the data presented and the findings.
31.	Clarity of major themes	Major themes are clearly presented
32.	Clarity of minor themes	Minor themes were evolved into the main findings in consideration of word count