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Preventing Deep Vein Thrombosis in Surgical Patients

Ariel D. Roberson
aroberson8@patriots.uttyler.edu

Preventing Deep Vein Thrombosis in Surgical Patients

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by Ariel Roberson

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Executive Summary

Deep vein thrombosis (DVT) is a significant medical issue that incurs by thrombi formation in the venous system which can result in major medical problems (Lee et al., 2015; Rosendaal, 2016). DVT's often occur because of complications after orthopedic surgery. Common risks factors for DVT are vein injury, slow blood movement, increase estrogen, and chronic medical illness (Centers for Disease Control and Prevention [CDC], 2018). As many as 900,000 individuals are impacted by DVT each year (CDC, 2020). Consequently, recent estimates show that 60,000 to 100,000 Americans die each year because of DVT. Even more alarming, 10 to 30% of individuals will die of DVT within a month of being diagnosed (CDC, 2020). There is numerous research available about the causes of DVT, its impact, and successful interventions when used properly. However, awareness of DVT is limited, and frontline workers have limited knowledge of its causes and risk factors (Rosendaal, 2016).

DVTs can be prevented if hospital staff are trained and have the tools necessary to provide the necessary care to patients. Health care leadership must do their part to ensure this does not impact their organization. This plan will provide the training and support that could reduce DVTs from occurring. The costs for this project are minimal; however, costs associated with poor patient care or medical negligence can be enormous. These costs are not just financial, the costs for families who lose their loved ones can be significant and could have long-lasting effects on their quality of life. Hospitals that are not prepared for this preventable issue can sacrifice patient confidence and trust and lose credibility with stakeholders and communities.

Preventing Deep Vein Thrombosis in Surgical Patients

As many as 900,000 individuals are impacted by deep vein thrombosis (DVT) each year (Centers for Disease Control and Prevention [CDC], 2020). Although there are numerous risk factors, DVT's can be prevented. According to Grabo et al. (2018), understanding preventive measures and risk factors are key to DVT prevention. Not only can understanding preventive measures reduce the number of DVT issues, but it can also reduce hospital stays, free up beds, and save lives.

Rationale for the Project

There is much content and research about the causes of DVT and the related interventions to decrease occurrences. However, DVT rates continue to rise in some domains. The rationale for this change project is to create more awareness of the common causes and related concerns about DVT and provide effective measures and best practices to reduce DVT incidents. According to the CDC (2020), most DVT occurrences are preventable. Thus, the PICOT question for this project: In newly admitted patients after surgery (P), how does additional awareness and training of nurses on DVTs (I) compared to no additional training and awareness on DVTs (C) affect DVT rates (O) within one month after the intervention (T)?

Evidence-based research about the causes of DVT is available and but current healthcare staff must have knowledge of the information. Lee et al. (2015) wrote that DVT's can easily occur because of blood clots triggered by limited or no movement. To remedy this, the CDC (2018) suggests that interventions for this should include frequent activities such as leg exercises, adjusted compression socks, and standing. Information is available to reduce DVT rates, but why do rates continue to rise? More lives can be saved if nurses and other front line staff are aware of

their role in DVT occurrences, have knowledge of up to date research and best practices, and know how to effectively apply the much needed knowledge in current care practices.

Project Goals

Although there is a lot of research on the topic, organizations still need measures on how to put the information available into practice (CDC, 2020). The goal of the change project is to provide a structured plan on how to ensure the information is assessable and put in place. The goal is to communicate and inform nurses and other healthcare professionals of the most effective and current practices. This change initiative provides a practical plan that healthcare organizations can use that is evidence-based and employs actionable interventions and preventive measures.

Detailed Discussion of the Literature

Deep Vein Thrombosis (DVT) is a medical condition characterized by the formation of blood clots (thrombosis) in the deep veins of the body, most commonly in the legs. DVT typically occurs in the larger veins located deep within the muscle. The formation of blood clots in deep veins can obstruct the flow of blood, leading to many complications. If a blood clot dislodges from its original location and travels to the lungs, it can cause a potentially life-threatening condition called pulmonary embolism (Grabo et al., 2018). The good news is that these conditions are preventable. However, numerous researchers have shown that nurses have inadequate knowledge about DVT and its related factors. More education and knowledge about DVTs and prevention methods can improve patient outcomes (Mosa et al., 2019; Yesuf et al., 2022; Yohannes et al., 2022).

The lack of nurses' knowledge about DVT was shown in wide geographical areas (Yesuf et al., 2021; Yohannes et al., 2022). In a study by Yesuf et al. (2021), more than 60.5% of the

nurses that participated had no knowledge of DVT. There were various reasons for this. Tenure was a major factor in nurses' DVT knowledge (Yesuf et al., 2021; Yohannes et al., 2022). Many new nurses (less than two years of experience) did not know that poor nursing practices can result in DVT occurrences. In fact, some of the nurses did not have any knowledge of the phenomenon Yohannes et al., 2022).

Other factors included minimal experience in clinical settings and limited time spent in academic settings on proper care of high risk patients. Tenured nurses were shown to have some knowledge about DVT but did not attend regular trainings that could be used as refreshers. Elkattan and Elderiny (2019) and Yan et al. (2021) noted that a lack of nurse knowledge of essential care guidelines for high risk DVT patients can be contributed to not attending regular service trainings.

The research showed there are numerous ways that practitioners can help reduce risks of DVT. Yan et al., (2020) showed that xueshuantong injections are effective in preventing the formation of lower extremity DVT after orthopedic surgery and antagonize the postoperative hypercoagulable state of blood, which has high clinical value. Medications such as enoxaparin and dabigatran at certain doses are shown to be effective in treating blood clots and in preventing new ones from forming in patients with DVT. Mirdamadi et al., (2014) showed that enoxaparin can be used in some dosage to prevent the formation of blood clots in lower leg or thigh veins.

Tools such as sequential compression devices (SCDs) were also shown to be effective in DVT prevention. SCD's can help improve blood flow in the legs. A study by Dhaka et al.(2019) showed that SCDs were associated with decreased VTE incidence during hospital stays when compared to control groups. Other measures like using testing for d-dimer, neutrophil and

platelet counts in standard prevention methods were also shown to be effective. The research by Liu et al. (2020) showed that levels testing was associated with better patient outcomes.

It is evident that training and implementation of common practices can improve patient safety and outcomes by reducing DVT rates (Elkattan & Elderiny, 2019; Mosa et al., 2019; Yesuf et al., 2022; Yohannes et al., 2022). The researched articles collectively recommended comprehensive teaching and training plans and structured educational programs so that nurses have knowledge of up-to-date practices.

Project Stakeholders

It is essential that healthcare organizations implementing change have continuous evaluation and feedback, therefore all relevant parties affected by the change must be involved (Nilsen et al., 2020). This includes the rationale behind the change, the benefits, and all associated processes (Nilsen et al., 2020). Clear, consistent communication is needed to reduce resistance and increase acceptance of change (Lowe et al., 2018).

Numerous individuals can be impacted by this project. For this reason, it is essential to engage all individuals directly and indirectly involved. This includes doctors, nurses, interdisciplinary organizations and professionals, hospital leaders and staff, board members, community organizations and resources, and all individuals that are vested in patient care within the local community. Additionally, plans must be made to ensure involvement and buy-in from leadership to frontline staff. Lowe et al. (2018) noted that including staff in the planning process and seeking their input can help them feel they are a part of the change.

The project includes tools that can help in this process such as incorporating regular meetings to ensure all parties are on the same page. Tools such as email, webinars, and virtual platforms will also be used for increased collaboration. The goal should be to ensure there is

constant communication, feedback, and evaluation of the change (Nilsen et al., 2020). The plan will also include surveys to monitor engagement, buy in, and effectiveness and before, during, and after the change implementation.

Implementation

The proposed plan is to create awareness and training on how to reduce DVT occurrences. To do this, an evaluation plan is included.

Plan Objectives

The first objective of the plan involves creating methods for training, awareness, and education. A PowerPoint will be created that explains the principles of DVT, and its causes. This will involve a pretest and a posttest. For example, the headings should include background, causes, best practices, and prevention techniques. Juthberg et al. (2019) showed that additional awareness of DVT interventions can help decrease DVT occurrences.

The second objective is to create a cheat sheet containing information about specific medications and their side-effects that could help reduce DVT's, specifically Xueshuantong injections, Enoxaparin, Atorvastatin, and Dabigatran. Yan et al. (2020) showed that xueshuantong injections are effective in preventing the formation of lower extremity DVT after orthopedic surgery and antagonize the postoperative hypercoagulable state of blood. According to research, this was shown to have high clinical value.

Both enoxaparin and dabigatran at certain doses are shown to be effective in treating blood clots or prevent new ones from forming in patients with DVT. Mirdamadi et al. (2014) showed that enoxaparin used in some dosage is highly effective in preventing the formation of blood clots in lower leg or thigh veins. The cheat sheet would contain information about the

medications and benefits of reducing DVT symptoms and occurrences. This will also involve pretest and posttest to test the effectiveness of this part of the plan.

The third objective involves clinical training on how to utilize tools and instruments in care for surgery patients. Trainings will include the use of intermittent pneumatic compression and compression socks. Dhaka et al. (2019) showed that compared to the control group, SCDs were associated with decreased VTE incidence during hospital stays. Trainings will also include testing for d-dimer, neutrophil and platelet counts in standard prevention methods. The primary objective of the third phase is to incorporate clinical components such as training and observation.

Timetable/Flowchart

Approval from the board and hospital leadership will be needed before the implementation of any process or tasks. Once approved, the major steps and timeline for project implementation and completions will begin within five days. The plan includes a step-by-step process centered on a SMART foundation. It will be specific, measurable, attainable, results driven, and time bound. Here are the steps:

Step 1: Research DVT occurrences in the last five years at the hospital (1 week).

Step 2: notify leaders and stakeholders of the project including the evaluation plan (3 months prior to implementation).

Step 3: Create a spreadsheet that shows specific data about common issue. For example, nurse tenure, nurse training and education, type of surgery, patient information (no names), and pertinent information pertaining to each occurrence (1 week).

Step 4: Create training materials and surveys (1 week).

Step 5: Initiate the marketing plan (1 week).

Step 6: Initiate the selection process for training participants (including selection criteria) (2 weeks).

Step 7: Work with nurse leaders and human resources for potential training dates (2days).

Step 8: Initiate pretest to selected nurses (1week).

Step 9: Initiate trainings for selected nurses (3 weeks).

Step 10: Initiate posttest procedures (1 week).

Step 11: Select specific nurses to track performance for a month after trainings (2 days).

Step 12: Analyze the findings and evaluate the project using the evaluation plan (1 week).

Step 13: Initiate statistical analyses and report the findings to hospital leadership (3 days after evaluation is completed).

Step 14: Analyze the results including the evaluation plan for effectiveness (6 weeks after implementation).

Step 15: If project is deemed successful, trainings will be administered in other locations (3 months after project and evaluation is completed).

The total time needed from project implementation to end results will be three months. A flowchart is provided - See Appendix A for a visual representation of the steps and timelines.

Data Collection Methods

A review of countless articles and studies were conducted to provide materials to support the need for this benchmark project. In addition, similar change projects were reviewed for their potential benefits and risks. Collection of data pertaining to patient records (if approved) will be used to access DVT occurrences and to find out if the project is successful after implementation. Only then will testing results be reported, which will also include recommendations for projects in other locations.

Evaluation Discussion

Although there is no official evaluation for the study at this time, pretests and posttests will be needed to reflect the training outcomes. Data from patient information will need to be collected for six weeks to determine the success of the change project. Data from previous DVT results will be compared to new information to evaluate the process of change. The goal is to have a 50% reduction in DVT cases. The results will be communicated to the board to determine if the process was successful and if the process will be continued in the future. A smaller scale project such as the creation of handouts could be enacted if the change project is not successful.

Cost/Benefit

Numerous resources are needed to enact the proposed changes. These resources will include the creation of training materials and software, training supplies, involvement from the human resource team, and financial assistance from the hospital. The human resource (HR) team's role will be significant. The HR team would be in charge of ensuring all participating nurses complete the training modules and assist in tracking the results. The costs for the change process will be minimal. The cost will include the creation of training materials such as the creation of a PowerPoint and printed materials. Projected costs will include:

Table 1

Project Costs

Expenses	Snacks	Printed Materials	Research	Training mediums	Nurse Trainings
	$500	$1,000	$2,000	$2,000	$4,500
Total Costs	$10,000				

Table 1

Detailed costs for this project include costs for snacks (candy, drinks, fruit, and water - $500), printed materials (surveys, pretests, posttests, and marketing - $1,000), Research

(assistance of librarian $25 an hour for 10 hours - $250, membership in journal associations - $500, and pay for research assistant at $25 an hour for 10 hours = $250), training mediums (SPCC software, training software, and computer updates), and nurse trainings (the costs to train 55 nurses at $40 an hour for two hours = $4,500). The nurses will undertake an hour training in the classroom and an hour training in clinical settings. Total costs for the project are $10,000.

The trainings will also be administered by the human resource team and will be included in new hire orientations. The materials will be updated and given to all nurses annually which will include an estimated additional annual cost of $5,000. The Director of Nursing (DON) will assist the project leader in the change process. The benefit vs risk/cost analysis over time would be enormous. Eliminating only DVT case would provide more benefit to patients, stakeholders, and hospital staff than the cost of ongoing DVT training.

Potential Benefits

The benefits of the program can outweigh potential costs. Increasing the awareness of materials relating to DVT can benefit countless individuals with life-threating medical issues and save healthcare costs for individuals and families. Understanding DVT preventive measures and risk factors can also benefit patients by improving mortality and morbidity rates, thus improving patient care.

Improving patient care and outcomes is not only beneficial for the patients themselves but also beneficial for hospitals (Agency for Healthcare Research and Quality [AHRQ], 2020). High-quality care can lead to better patient outcomes and increase patient satisfaction. Satisfied patients are more likely to refer the hospital to others, thus enhancing the hospital's reputation, which in turn can attract more patients.

Preventing DVT's can significantly reduce hospital readmission rates. Hospitals are often penalized by healthcare systems for high readmission rates (AHRQ, 2020). This is particularly interesting in DVT prevention because conditions after surgeries can lead to other issues within readmission timelines.

Better patient outcomes often mean shorter hospital stays and fewer complications, which can result in significant cost savings for patients and hospitals. Improved outcomes can also reduce the need for costly interventions down the line that would need additional staff support and services (AHRQ, 2020).

Better patient outcomes can reflect well on hospital performance metrics. In turn, these metrics are often tied to funding and accreditation (AHRQ, 2020). For example, healthcare organizations are rewarded for the quality of care they provide to individuals with Medicare. Hospitals are paid for inpatient acute care services based on the quality of care, not just the quantity of the services they provide.

Nurses and other hospital staff are also provided benefits in DVT prevention. Working in an environment where patients recover well and thrive can also improve staff morale, reduce burnout and could potentially improve staff engagement.

Discussion

Improving patient outcomes is the foundation for healthcare delivery services (AHRQ, 2020). Using the components of this plan such as evidence-based practices, continuous learning and improvement, investments education and training, and a strong focus on patient safety and patient-centered care are all critical in achieving this goal. Hospitals that demonstrate better patient outcomes can have a competitive advantage that could differentiate it from other

healthcare providers. In healthcare environments with staffing shortages, this can be beneficial in attracting and preserving talent, thus improving retention rates.

Conclusion/Recommendations

Clinical practice recommendations derived from this review are numerous. Understanding DVT preventive measures and risk factors can help in decreasing mortality and morbidity rates for patients who undergo major surgery. Kaur et al. (2012) showed that awareness or ignorance amongst staff personnel could impact DVT outcomes. Data is available on how to reduce DVT's, but it is up to the healthcare community to use the information.

The goal of the project is to reduce the number of DVT occurrences in the hospital. The project will involve three objectives and fifteen steps. The steps will include a pretest and a posttest to access the levels of knowledge after the training. The project will include inferential and descriptive statistics to evaluate the project and the trainings. To access the change, data, specifically DVT cases, will be monitored for a few months after the trainings to determine if patient outcomes improve.

After reviewing the research and materials about DVT causes and prevention, it is recommended that all healthcare organizations review awareness and training about DVT. For this particular organization, it is recommended that this project be implemented in this location, with further steps to include implementation in subordinate entities. Organizational leaders and colleagues should support the project and ensure staff understand the associated costs, potential benefits, and the probable benefits to patients.

It is also recommended that further research be conducted to access to role of academia in DVT prevention. Any methods of training that can improve patient outcomes should be researched and addressed.

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Appendix A

Process Flowchart