Lovenox Prophylaxis: Improving Lovenox Nurse Education in a Postpartum Unit

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Lovenox Prophylaxis: Improving Lovenox Nurse Education in a Postpartum Unit

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NURS 653: Quality Improvement Internship

Dr. Nicole Beamish, RN, DNP, FNP-C

December 12, 2023
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Abstract

**Problem:** This quality improvement project aimed to increase nurse education about Lovenox prophylaxis within the postpartum unit to reduce risks of pulmonary embolism among high-risk postpartum women in the postpartum unit.

**Context:** A microsystem assessment was completed by Clinical Nurse Leader (CNL) students in the postpartum unit at Hospital X located in the southern Bay Area. This unit accommodates 25 beds and provides care for postpartum mothers after both cesarean section and vaginal births.

**Intervention:** An anonymous pre-intervention survey was distributed to the registered nurses on the unit. Educational handouts were created and distributed to the nurses on the unit. After the education, an anonymous post-intervention survey was administered to assess its effectiveness.

**Measures:** After conducting a microsystem assessment, the students gathered data to assess the nurses' self-knowledge about Lovenox and its usage for pulmonary embolism. Out of the 72 registered nurses on the unit, only 25 participated in the study. Edible incentives were employed to encourage active participation and were provided for completing both the pre- and post-surveys, as well as after the education. The post-survey aimed to gauge the effectiveness of the educational material and determine if nurses would be receptive to having an annual refresher course on Lovenox.

**Results:** Analysis of the pre-intervention survey revealed that 60% (n=15) of nurses rated a *five* on a scale of 1-5, indicating they knew what Lovenox was and how it was being used on the unit. Additionally, 76% (n=19) of nurses, also rated a *five*, expressed comfort in administering Lovenox prophylactically and monitoring patients post-administration. Moreover, 40% (n=10) of nurses, rated a *five*, indicated knowledge of the signs and symptoms of pulmonary embolism. Qualitative data revealed that some nurses had not received a refresher course since nursing
school, others had not received one since starting on the unit, or it had been many years ago.
Following the distribution of the education material, the post-intervention results demonstrated an increase in nurse knowledge about Lovenox and its usage from 60% to 72% (n=18).
Additionally, there was an increase in awareness of the signs and symptoms of pulmonary embolism from 40% to 68% (n=17).

**Conclusion:** The pre-intervention survey identified inconsistencies in the timing of nurses' last education on Lovenox, indicating a lack of proper Lovenox protocol training. The intervention contributed to providing nurses with updated information and establishing a baseline knowledge. The post-intervention survey revealed the benefits of the re-education and supported the need for annual refresher course training on Lovenox. A recommendation was made to witness patient self-administration more than once before discharge, aiming to reduce the risk of pulmonary embolism by enhancing patient medication compliance and adherence. The continuation of this project, along with the implementation of increased training, is expected to improve nurse education and reduce the risks of pulmonary embolism in postpartum women post-discharge.

**Keywords:** lovenox, lovenox prophylaxis, pulmonary embolism, patient education, nurse education, medication compliance, postpartum women, cesarean section and vaginal delivery, venous thromboembolism
Introduction

A significant contributor to maternal mortality and morbidity is venous thromboembolism (VTE) (Middleton et al., 2021). Pregnancy and the early postpartum period increase the risk of VTE, particularly in women undergoing cesarean section, those with a family history of VTE, or those with thrombophilia. VTE is a condition characterized by the formation of blood clots in veins, potentially leading to deep vein thrombosis (DVT) and pulmonary embolism (PE) (Jacobson et al., 2020). While PE may not always be preceded by DVT, physiological changes during pregnancy predispose women to increased rates of DVT.

Anticoagulation therapy with low molecular weight heparin (LMWH), also known as Lovenox (Enoxaparin), is the most reliable and well-tolerated treatment, deemed safe for pregnant women as it does not cross the placenta (Lao, 2022; Kalaitzopoulos et al., 2022). LMWH is typically initiated before delivery, paused temporarily, and resumed shortly after delivery, continuing for a minimum of six weeks postpartum (Blondon et al., 2021). Nurses, as frontline caregivers, play a crucial role in patient care and need to be well-versed in Lovenox, PE, DVT, and VTE. Having accurate and up-to-date information enables nurses to provide precise information and effective teaching. Therefore, improving nurse education about Lovenox to reduce the risk of PE occurrence post-discharge is essential to ensure the health of postpartum women.

Problem Description

Hospital X, located in the southern Bay Area, is a medical center with a capacity of 731 beds, including a postpartum unit with 25 beds. In January 2022, stakeholders at Hospital X initiated a VTE Prophylaxis Protocol in the postpartum unit to reduce the risk of PE, DVT, and VTE. However, since then, two instances of PE were observed among postpartum women when they returned to the emergency department within six weeks post-discharge. The hospital
identified women with higher risks of PE occurrence based on symptoms such as a personal or familial history of VTE, BMI >40, thrombophilia, or prolonged immobility. In response, this quality improvement (QI) project aims to identify gaps in Lovenox education, with the goal of providing recommendations to enhance compliance and knowledge regarding the administration of Lovenox.

**PICOT Question**

A Patient, Intervention, Comparison, Outcome, and Time (PICOT) question was created to determine the scope and effectiveness of this QI project. The PICOT question was stated as follows: Does Lovenox prophylaxis education provided to Registered Nurses (RN) on the postpartum unit increase patient compliance in order to reduce PE, DVT, and VTE occurrence amongst vaginal and cesarean deliveries post-discharge, in comparison to nurses who did not receive Lovenox prophylaxis education in three months?

**Rationale**

Kurt Lewin’s change theory, encompassing unfreezing, moving or changing, and refreezing, was adopted as a model to drive change in this microsystem (Burnes, 2020). The unfreezing phase involved assessing the current situation, leading to the realization that change was necessary due to pulmonary embolism occurrences after the establishment of the Lovenox Prophylaxis Protocol in the microsystem. The moving or changing phase included developing a change implementation with input from key stakeholders. Questionnaires were administered to nurses to assess their current knowledge of Lovenox management and their views on potential Lovenox refresher courses. Based on their responses, educational material on Lovenox was created and delivered to the nursing staff. Post-surveys were then conducted to evaluate their knowledge and opinions on the recommendations. The refreezing stage aimed to establish the
change as an integral component of the microsystem and devise strategies to prevent it from reverting to the previous state. The project's goal is for microsystem leadership to implement the suggested changes and assess whether the change practice requires adjustments.

**Search Strategy**

A literature review spanning from September to November 2023 utilized PubMed and the Cumulative Index to Nursing and Allied Health (CINAHL) databases. Inclusion criteria for this search encompassed terms such as "lovenox," "lovenox prophylaxis," "pulmonary embolism," "patient education," "nurse education," "medication compliance," "postpartum women," "cesarean section and vaginal delivery," and "venous thromboembolism." To assess the quality of the studies, the Johns Hopkins Research Evidence Appraisal Tool was employed, assigning evidence levels ranging from Level I to V (Dang et al., 2022).

**Available Knowledge**

A thorough literature review of evidence-based research on Lovenox prophylaxis to reduce the risk of pulmonary embolism in postpartum women was conducted to support this study. The quality of evidence in the articles was assessed using the Johns Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals: Model and Guidelines (Dang et al., 2022). The reviewed studies highlighted the need for improved nurse education on Lovenox, VTE, DVT, and PE.

Research findings indicate that pregnant women face a 4-5 times higher risk of developing VTE compared to non-pregnant women. Approximately 1-2 per 1000 pregnancies are complicated by VTE, including DVT and PE (Wiegers & Middeldorp, 2020). Virchow's Triad, comprising hypercoagulability, venous stasis, and vascular damage, is crucial to understanding VTE risk (Unger et al., 2018). During pregnancy and immediately postpartum,
these components are altered, with venous stasis increasing as the uterus expands. The period following childbirth up to the first three weeks of the postpartum period poses a higher risk for VTE.

To mitigate the risk of VTE, low molecular weight heparin (LMWH), such as Lovenox, is employed as anticoagulation therapy due to its safety for pregnant women, reliability, and fewer adverse effects (Lao, 2022). Lovenox is initiated during pregnancy, paused 24 hours before delivery, and resumed 12-24 hours postpartum. The timing of restarting Lovenox post-delivery depends on factors such as the mode of delivery, ranging from 6-12 hours after a vaginal delivery to 24 hours after an epidural catheter removal for cesarean section (Kalaitzopoulos et al., 2022). Lovenox is typically continued until six weeks postpartum, with a minimum duration of three months (Wiegers & Middeldorp, 2020; Blondon et al., 2021).

Research indicates a high risk of postpartum PE even without antenatal VTE, emphasizing the importance of counseling at-risk women early on and starting a prophylactic regimen. In the postpartum unit, nurses play a vital role in educating patients on their medication regimen, including the administration of LMWH. Studies have shown that patient adherence to the LMWH course is influenced by factors such as the frequency of administration and whether self-injections are performed (Elmaghraby et al., 2022). Notably, nurse knowledge about medications is crucial for patient education and counseling.

Despite the increasing rates of maternal mortality and morbidity, a significant percentage of postpartum nurses were found to be unaware of this trend (Suplee & Bingham, 2019). Strengthening nurse education with current and comprehensive information is crucial to ensuring postpartum women are well-informed about maintaining their health. Regular annual nurse
education on important topics, coupled with proper patient education, can enhance awareness of potential risks and promote medication compliance among patients.

**Specific Aim Statement**

The primary objective of this study is to enhance nurse education on Lovenox prophylaxis, aiming to decrease the risk of post-discharge pulmonary emboli among postpartum women who have undergone both vaginal and cesarean deliveries. This will be achieved by introducing an annual nurse re-education course on the Lovenox prophylaxis policy and implementing a system mandating nurses to witness patient medication administration at least twice before discharge. The anticipated outcome is an 80% increase in patient medication adherence reported by postpartum nurses within three months. This initiative is also expected to boost employee knowledge and efficiency through improved comprehension of the policy and enhanced patient teaching methods resulting from the education and the implementation of a witnessing system for high-risk patients prior to discharge.

**Methods**

**Project Overview**

A Plan, Do, Study, Act (PDSA) cycle (see Appendix B), was utilized to structure the framework for this QI project. Hospital X nursing leadership provided internal data, enabling CNL students to formulate a PICOT question and specific aim statement. A comprehensive review of the literature on Lovenox education and compliance was conducted. The microsystem assessment utilized the 5 P Assessment and Root Cause Analysis (RCA) (see Appendix C). Additionally, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis (see Appendix D), was carried out. A pre-intervention questionnaire (see Appendix E) and post-intervention questionnaire (see Appendix F) was developed, and corresponding data
collection forms were produced and reviewed. Following data collection and analysis, recommendations for interventions were presented to the leadership team. A Cost-Benefit Analysis (RCA) (see Appendix G) demonstrated potential cost-saving benefits for Hospital X. A Gantt Chart (see Appendix H), visually depicted the project's timeline. Education material was created and distributed to the nursing unit (see Appendix I).

**Microsystem Assessment**

The 5 P assessment, encompassing purpose, patients, professionals, process, and patterns, was implemented to assess the workflow and performance of the unit. The study aimed to enhance nurse education on Lovenox prophylaxis and ultimately reduce the occurrence of post-discharge pulmonary embolism in postpartum women. The patients in the postpartum unit consisted of women who had given birth either vaginally or via cesarean section. The professionals providing care included RNs, physicians, nurse managers, staff developers and educators, unit secretaries, and hospital service assistants. To ensure effective Lovenox education, there was a need to re-educate RNs on Lovenox prophylaxis, medication administration, and patient education. Patterns contributing to a higher risk of PE, DVT, and VTE included patients not adhering to the postpartum Lovenox regimen post-discharge and/or having a poor understanding of the self-administration process due to insufficient teaching.

**Plan, Do, Study, Act (PDSA) Cycle**

The initial planning phase of the PDSA cycle involved collaborating with Hospital X leadership to identify current processes on the postpartum unit related to Lovenox management and understanding the necessity of this project due to the occurrence of pulmonary embolisms. A PICOT question and specific aim statement were created, followed by a study proposal that
included a pre-intervention questionnaire for the existing nursing staff. Once approved, the questionnaire was distributed across all nursing shifts.

The second phase of the PDSA cycle focused on implementation. The 5 P assessment was utilized to evaluate the microsystem, followed by an RCA to investigate the reasons behind postpartum women experiencing pulmonary embolisms after discharge. Data from the pre-intervention questionnaires were collected and analyzed, revealing a need for Lovenox education and its impact on PE, DVT, and VTE. Recommendations for improved nurse education on Lovenox included providing background information on its purpose, its functionality, and how patient teaching before discharge can mitigate the risks of PE, DVT, and VTE. A summary of the education was created as a handout, made available to nurses on the unit in both printed form and via email.

In the third phase of the PDSA cycle, a post-intervention questionnaire was developed and given to nurses after they received the educational material to assess their knowledge on Lovenox and its helpfulness. The intervention produced positive results, indicating that nurses found value in the additional education and expressed a desire to observe their patients administering Lovenox more than once before discharge, if time allows. The final phase of the PDSA cycle involved presenting evidence-based research recommendations and findings to the leadership team. The use of these recommendations, coupled with ongoing education, will aid the microsystem in reducing risks for postpartum women, with continuous monitoring for any necessary adjustments.

**Root Cause Analysis (RCA)**

Hospital X identified a concern with postpartum women experiencing pulmonary embolisms after discharge, prompting their return to the hospital emergency room. A fishbone
A diagram was constructed to assess the RCA. Potential explanations related to policies, procedures, and education included the absence of a Lovenox refresher course on the unit, the reliance on nurses' pre-existing knowledge, and the absence of a hospital policy outlining a protocol for teaching patients self-administration. The frequent documentation was noted as time-consuming, potentially adding to the nurses' workload. Some nurses might lack confidence in recognizing signs and symptoms of PE, while others may be unfamiliar with the prevalence of postpartum PE occurrences. Patients could contribute to this issue through a lack of medication adherence post-discharge, stemming from inadequate education or poor patient comprehension. Notably, the hospital experienced PE incidents not on the postpartum unit but rather post-discharge, up to six weeks postpartum.

**Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis**

A SWOT analysis was conducted to assess the organization's current knowledge of Lovenox management and its impact on PE, DVT, and VTE rates. Potential strengths arising from this QI project include enhancing nurse education on Lovenox by making educational resources available to the unit, instituting annual training requirements, and improving the effectiveness of nursing assessments. Identified weaknesses encompassed staff's lack of annual education on both Lovenox administration and PE, DVT, and VTE risks, ineffective patient teaching at discharge, and resistance to change among staff nurses. Opportunities for enhanced education aim to reduce post-discharge PE, DVT, and VTE rates through effective patient teaching, increased policy compliance, improved accuracy of patient assessments, and enhanced quality of patient care. Threats to this change include the allocation of time and costs for additional education training, staff resistance to adhering to new policies, and the potential for
documentation fatigue. While this SWOT analysis explored potential project outcomes, further improvements may emerge through the review of data and the reception of the current process.

**Cost Benefit Analysis (CBA)**

A CBA was conducted to assess the advantages of enhancing nursing education on Lovenox prophylaxis and its potential to offset the costs associated with additional training. The total annual estimated budget, covering the expenses for purchasing Lovenox management badge reference cards and hiring a staff developer/educator for Lovenox Refresher Courses, is approximately $188,532 per year. Hiring a staff developer ensures that any questions the nurses have can be addressed. This individual is also accessible to the unit as a resource and can contribute to the overall unit by providing support.

**Timeline**

A Gantt chart was created as a time management tool for the QI project, incorporating objectives from the PDSA cycle. It spanned the duration of the project, running from September 2023 to November 2023.

**Intervention**

After a thorough literature review and the administration of a pre-intervention survey to the nurses, an educational handout was developed. This material provided background information on Lovenox, explaining its purpose, usage, administration, and monitoring values to observe. The objective of this project was to assess the current state of Lovenox education provided to nurses. After presenting the educational material, a post-intervention questionnaire was distributed to gather feedback on the nurses' experience in receiving the information and their thoughts on future education. The survey was accessible through a QR code on a flyer or physical paper copies, and edible incentives were utilized as a reward for participants. Key
survey questions included their self-assessment of knowledge about Lovenox, understanding of its administration, and familiarity with the signs and symptoms of pulmonary embolism. The complete questionnaire can be found in Appendix F.

**Study of Intervention**

Following the implementation, a post-intervention questionnaire was conducted to assess nurses' self-evaluation of Lovenox management. The nursing leadership team will assess the effectiveness of the initial education and utilize this information to enhance subsequent education and training. The team will also evaluate patients' understanding of Lovenox administration after nurses have instructed them on how to administer the medication. By bolstering nurses' confidence in their understanding of Lovenox and what to monitor, they can more effectively convey this information to their patients. This approach aims to increase the likelihood that patients will adhere to the medication protocol once they are at home. Through improved nurse education and enhanced patient compliance, the risks of pulmonary embolism occurrences in postpartum women can be reduced.

**Measures**

Data from the questionnaire were gathered to assess the existing knowledge of Lovenox management at Hospital X. The survey captured both quantitative and qualitative responses. The quantitative section involved rating nurses' self-perceived knowledge and confidence regarding Lovenox and signs and symptoms of pulmonary embolism (PE). The qualitative data included information on when the nurses last received training on Lovenox. All survey responses were collected and documented anonymously. Following the presentation of the intervention, a post-intervention survey was conducted. These questions also encompassed quantitative
measures, evaluating nurses' self-perceived knowledge and confidence after reviewing the educational material.

**Ethical Considerations**

This project meets the guidelines for an evidence-based quality improvement project and does not meet the criteria for institutional review board approval.

**Results**

Out of the 72 registered nurses on the staff roster in this microsystem, 25 participated in this study. The results revealed that quantitative data were rated on a scale of 1 to 5, with 1 indicating no knowledge and 5 indicating a high level of knowledge. When asked about nurse self-knowledge on Lovenox and its purpose on the unit, 60% (n=15) of respondents rated it as a five, 36% (n=9) rated it four, and 4% (n=1) rated it three. In terms of nurse comfort with administering Lovenox prophylactically and monitoring post-administration, 76% (n=19) of respondents rated it as a five, 20% (n=5) rated it four, and 4% (n=1) rated it three. Regarding nurse self-knowledge of signs and symptoms of PE, 40% (n=10) of respondents rated it as a five, 52% (n=13) rated it four, 4% (n=1) rated it three, and 4% (n=1) rated it two. Nurses explained their ratings through an open-ended question about when they last received education or training on Lovenox as an anticoagulant therapy. Responses ranged from nurses claiming they "never had training," "saw it years ago," "seen in a recent email," to some who last encountered it while they were in nursing school.

The last survey question asked nurses to share anything related to Lovenox. One nurse noted that PEs do not occur on the unit. Another nurse suggested that if there is new evidence-based practice, then a refresher course would be great, but if Lovenox therapy were to be long-term, then a flowsheet in Epic might be better suited. 72% (n=18) of nurses think that
having a refresher course on Lovenox would be beneficial, while 56% (n=14) believe that they would benefit from a flowsheet in Epic.

**Discussion**

There is a well-known elevated risk of venous thromboembolism during pregnancy and the early postpartum period (Unger et al., 2018). It is crucial to utilize Lovenox therapeutically for at least 6 weeks postnatally to mitigate the risks of PE, DVT, and VTE. Hospital X has implemented a VTE Prophylaxis Protocol developed in January 2022, employing Lovenox to mitigate these risks. However, the hospital encountered two instances of PE in postpartum women after discharge. This QI project was initiated to conduct further research and explore updated information on the issue. A recommendation for increased nurse education and annual refresher courses was proposed to enhance nurse knowledge. Nurses with more accurate knowledge of Lovenox management can provide patients with better education and teaching, enabling patients to retain that information after discharge.

Elmaghraby et al. (2022) discovered that compliance with medication administration increased among postpartum women who self-administered it three times compared to two, and self-injection versus injection by a healthcare provider improved compliance rates. The current Hospital X policy on patient teaching requires watching patients self-administer Lovenox once. Research indicates that increasing the number of times a nurse observes a patient self-administering medication can enhance compliance after the patient is discharged.

**Limitations**

This study has several limitations. Instances of PE occurred outside the postpartum floor when postpartum women were brought back to the emergency room. While patients are on the unit, Lovenox can be administered, but adherence to the medication must continue after
discharge. As healthcare professionals, we are unable to monitor patients and ensure compliance with the medication regimen after discharge. Time constraints arose because we had only three months to research the problem, implement a change, educate the staff, and assess this project's effectiveness.

Summary

Hospital X's nursing leadership team identified two cases of PE occurring after discharge from the postpartum unit, following the implementation of a VTE Prophylaxis Protocol in January 2022. Seeking a thorough examination of evidence-based research, our group developed a PICOT question, conducted a comprehensive assessment of the microsystem, and designed a questionnaire to assess nurse self-assessment of Lovenox management. The initiation of the PDSA cycle led to recommendations for the re-education of nurses on Lovenox.

Utilizing evidence-based research, an educational handout was created, providing information and recommendations regarding Lovenox prophylaxis. According to the post-survey responses from 100% of participating nurses, the education was perceived as beneficial. This re-education highlighted the importance of an annual refresher course on Lovenox to enhance nurse education and keep them updated with current research. Improved nurse knowledge enables them to better educate their patients on medication self-administration, thereby increasing patient confidence. Research indicates that even witnessing patients administer medication at least twice before discharge can further solidify patient knowledge. However, due to time constraints, we were unable to implement additional changes and observe the effects of our project.
Conclusion

After the nursing leadership team identified the initial problem, we collaborated with them to gain insights into their findings and explore how we could build upon them. Through our research and the survey administered to the nurses, we identified a need for education for both nurses and patients. By implementing re-education for nurses, we aimed to ensure their knowledge remained current and up-to-date, enabling them to provide the best possible care. This improvement in nurse knowledge extended to patient education, as nurses gained the confidence to deliver accurate, clear, and precise information to patients.

This QI project provided an opportunity to examine evidence-based research, understand its practical application, identify instances where change is warranted, and recognize the importance of collaboration in effecting change. The recommendations made in this project are minor yet realistic. Through proper channels, the nursing leadership team could further enhance these changes by introducing an annual refresher course and training to ensure everyone stays updated with current research and practices.
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IMPROVING LOVENOX NURSE EDUCATION IN A POSTPARTUM UNIT

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https://doi.org/10.1016/j.bpobgyn.2022.06.003


https://doi.org/10.1016/j.ogrsm.2018.11.002


Appendix A

Statement of Determination

Student Project Approval: Statement of Determination

Title of Project:

Lovenox Prophylaxis: Improving Lovenox Education in a Postpartum Unit

Brief Description of Project:

The aim of this quality improvement project is to improve nurse education about Lovenox prophylaxis to reduce the risk of pulmonary emboli post-discharge amongst postpartum women who underwent vaginal and cesarean deliveries by providing an annual nurse re-education course about the Lovenox prophylaxis policy and implementing a system that requires the nurse to witness patient medication administration at least two times prior to discharge. Postpartum nurses will report an 80% increase in patient medication adherence in 3 months. Employee knowledge and efficiency will increase due to an improvement in their understanding of the policy and proper patient teaching methods as a result of the education and implementation of the witnessing system for high-risk patients prior to discharge.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:
(http://answers.hhs.gov/ohrp/categories/1569)
This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Students may proceed with implementation.

Comments:

Signature of Supervising Faculty ___________________________ (date) 12/6/23

Signature of Student ___________________________ (date) 09/24/23
Appendix B

Plan, Do, Study, Act (PDSA) Cycle

1. PLAN
   - Collaborated w/ SCVMC leadership team regarding PE/DVT/VTE occurrence in vaginal & cesarean deliveries post-discharge
   - Developed an aim statement
   - Created a PICO(T) question
   - Generated a proposal
   - Designed data collection questionnaires
   - Educated nurses about Lovenox prophylaxis
   - Created brochures for nurses to learn about Lovenox prophylaxis

2. DO
   - Microsystems assessment using 5 P’s
   - Conducted a SWOT analysis
   - Ran a root cause analysis
   - Collected data on the Family Baby Unit:
     - Pre-survey to assess RN’s knowledge
     - Post-survey to assess RN’s understanding post education

3. STUDY
   - Analyzed data gathered from pre & post-surveys
   - Reviewed results from surveys

4. ACT
   - Developed and presented evidence-based research recommendations to the SCVMC leadership team on October 31, 2023.
Appendix C

Root Cause Analysis (RCA)
Appendix D

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

SWOT ANALYSIS

STRENGTHS
- Lovenox re-education available as a resource annually on the unit
- Effective nursing assessment for patients receiving Lovenox
- Accessible information regarding Lovenox and PE/DVT/VTE

WEAKNESSES
- Staff have not received education on Lovenox administration
- Staff have not received education on PE/DVT/VTE
- Lack of annual Lovenox and PE re-education
- Ineffective patient teaching at discharge
- Resistance to change among staff nurses

OPPORTUNITIES
- Decreased rates of PE/DVT/VTE post-discharge
- Increased compliance with the policy
- Effective patient teaching at discharge
- Increased accuracy of patient assessments
- Increased quality of care

THREATS
- Time and cost allocated for re-education
- Staff resistance to policy adherence
- Documentation burden
Appendix E

Pre-Intervention Questionnaire

I know what Lovenox is and why it is used on our unit. *

1 2 3 4 5
Not at all ○ ○ ○ ○ ○ I know it like the back of my hand

I feel comfortable administering Lovenox prophylactically and monitoring post-administration.

1 2 3 4 5
I am not. ○ ○ ○ ○ ○ Totally!

I know the signs and symptoms of pulmonary embolism (PE). *

1 2 3 4 5
I can't remember. ○ ○ ○ ○ ○ Absolutely.

Based on your experience, have you seen a higher prevalence of Pulmonary Embolism (PE) in either C-Section or Vaginal deliveries? *

○ C-Section
○ Vaginal
○ Not sure.

When was the last time you were educated or had a class about anticoagulant therapy (Lovenox)? *

Your answer

Do you think you would benefit from a refresher course about anticoagulant therapy (Lovenox)? *

○ Yes
○ No
○ Maybe

Would you benefit from an anticoagulant (Lovenox) therapy flowsheet on EPIC? *

○ Yes
○ No
○ Maybe
## Appendix F

### Post-Intervention Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>I know what Lovenox is and why it is used on our unit.</td>
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<tr>
<td>Not at all</td>
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<tr>
<td>I know it like the back of my hand</td>
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<tr>
<td>I feel comfortable administering Lovenox prophylactically and monitoring post-administration.</td>
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<tr>
<td>I am not.</td>
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<tr>
<td>Totally!</td>
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<td>I know the signs and symptoms of pulmonary embolism (PE).</td>
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<td>I can't remember</td>
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<td>Absolutely</td>
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<tr>
<td>Do you plan on watching your patient administer Lovenox more than once, if possible?</td>
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<td>Yes</td>
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<td>Maybe</td>
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<tr>
<td>Did you benefit from this re-education about Lovenox?</td>
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<tr>
<td>Yes</td>
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<td>Maybe</td>
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Appendix G

Cost-Benefit Analysis (CBA)

Estimated Cost: Badge Reference Card

$288 per year

Estimated Cost: Staff Developer/Educator for Lovenox Refresher Course

$188,244 per year

Total Estimated Cost: $188,532 per year
## Appendix H

Gantt Chart

<table>
<thead>
<tr>
<th>QI Process</th>
<th>September</th>
<th>October</th>
<th>November</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Week 1</td>
<td>Week 2</td>
<td>Week 3</td>
</tr>
<tr>
<td>Project Initiation</td>
<td>Literature Review</td>
<td>Meeting with Leadership</td>
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</tr>
<tr>
<td>Project Planning</td>
<td>Create Timeline</td>
<td>Unit Needs Assessment</td>
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<tr>
<td>Project Implementation</td>
<td>Pre-Survey</td>
<td>Education</td>
<td></td>
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<tr>
<td>Project Evaluation &amp; Synthesis</td>
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<td>Post-Survey</td>
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</table>
GIVE LOVE WITH LOVENOX

The rate of pulmonary embolus in pregnant and postpartum women is increasing. Pregnancy-associated VTE & PE remains the leading cause of maternal death. VTE is a serious and life-threatening complication in pregnant and PP women, but the two main components are DVT and PE. In a UK study where c-sections are rarely done, they found that 70.9% of PP VTE events occurred after vaginal delivery and that 29.1% of events occurred after C-Section (Friedman et al., 2015). However, in the US, thromboprophylaxis is used on women with the highest risk of VTE. VTE is twice as common after c-section compared with vaginal deliveries. The primary treatment is anticoagulation therapy with low molecular weight heparin (Lovenox/Enoxaparin), which has greater reliability and fewer adverse effects (Lao, 2022).

What?
Lovenox is a low molecular weight heparin
Works as an anticoagulant that inhibits formation of fibrin clots, that could potentially lead to DVT & PE.

Fast acting, short-term therapy
It’s safe because it does not cross the placenta or enter the circulation of the baby in utero.

Recommended:
Given 6 & 12 hrs PP after Vaginal & Cesarean Delivery
Then for at least 6 weeks PP

Total Duration: 3 mo

Prevalence is around 1-2/1000 pregnancies

Why?
“Virchow’s Triad” of venous stasis, hyper coagulability, and vascular damage occur in the course of pregnancy and delivery
Pregnancy increases levels of coagulation factors in preparation for hemostatic challenge of delivery, whether it be vaginal or c-section, causing a degree of injury to pelvic vessels.

Women with a history of VTE are at risk for recurrence during pregnancy.

Without thromboprophylaxis, the risk of recurrent VTE is estimated b/w 2-10%.

PE caused 3% of maternal deaths

LMWH Prophylaxis is recommended to women with at least two of the following risk factors:
- Varicose veins
- At least three previous pregnancies
- Age over 35 yrs
- BMI >30 kg/m2

How?
LMWH is given subcutaneously into the lower abdomen (Love Handles) or IV - NEVER PO

Disinfect the area with an alcohol swab and let dry

Remove the cap and hold the syringe like a pencil.

With the other hand, pinch an inch of the cleansed area to make a fold in the skin.

Insert the needle straight down at a 90 degree angle and plunge the syringe.

Release the needle from the skin and properly dispose in a sharps container

After SQ injection, common to have bruising, irritation, & pain

DO NOT MASSAGE SITE AFTER

Antidote: Protamine sulfate

S/S & Monitoring
Want to monitor platelet count:
- Heparin induced thrombocytopenia (HIT)
  - Should check platelets while on LMWH
- Normal PLT count = 150,000-450,000
- Per SCVMC: Hold/Notify HCP if PLT <100,000
- Measured with aPTT (activated partial thromboplastin time): 47-70 seconds
- Therapeutic range: 1.5-2 times the normal value

Interpretation
- Too high = patient will die (inc bleed)
- Too low = clot(s will grow

S/S of PE:
- Shortness of breath
- Tachycardia
- Low blood pressure

Educate your patient on how to identify S/S of VTE, DVT, & PE at home.

Patient will need to self-administer at home to adhere to medication regiment.

The risk of VTE, DVT, & PE attribute to proper and effective teaching from the RNs.

Let’s Work Together!
Here are our resources: