

Quality Improvement Project (Audit Cycle)

Assessment And Enhancement Of Venous Thromboembolism Prophylaxis Protocols In Medical Unit Of Ayub Teaching Tertiary Care Government Hospital, KpK, Pakistan

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Abstract

Background: Venous thromboembolism (VTE) refers to the formation of blood clots within the venous system, a serious medical condition with potentially life-threatening consequences. The risk of developing VTE significantly increases during hospitalization due to factors such as reduced mobility and underlying illness. Therefore, it is crucial to perform timely risk assessments and implement appropriate prophylactic measures to prevent the occurrence of this preventable complication in hospitalized patients.

Aim and Objectives: In developing countries, data on VTE prophylaxis remains limited, and in Pakistan, VTE prevention is often overlooked in research and clinical practice. This clinical audit was undertaken to assess current practices in VTE risk assessment and prophylaxis, with a focus on identifying gaps and evaluating the impact of educational interventions. By enhancing awareness and adherence to standard protocols, the aim is to improve patient care and reduce the risk of preventable complications."

Methodology: We used the National Institute for Health and Care Excellence (NICE) guidelines for VTE prophylaxis as our audit standard. In Phase A, conducted from January 20 to February 30, 2024, Data was collected using a customized proforma by prospectively reviewing the medical records of 180 patients, admitted to the Medical Unit of Ayub Teaching Hospital. Following an educational intervention aimed at improving adherence to guidelines, Phase B was conducted from March 4 to April 10, 2024, reviewing an additional 150 patients to evaluate any changes in practice

Intervention: For the intervention phase, findings from Phase A were presented during the monthly ward meeting, which was attended by the Head of Department, consultants, registrars, postgraduate residents, interns, and nursing staff of the medical unit. The session focused on educating healthcare providers about the risk factors associated with VTE and the critical need for timely prophylaxis. Additionally, educational posters were strategically displayed throughout the ward to reinforce the importance of adhering to VTE prophylaxis protocols.

Results: In Phase A, of the 180 patients assessed, 27 (15%) underwent risk assessment for VTE. Among those eligible for prophylaxis, only 18 patients (22.2%) received the appropriate prescriptions. Following the educational intervention, Phase B included 150 patients, where significant improvements were observed: all 150 patients (100%) were risk assessed for VTE, and 112 patients (75%) received the prescribed prophylaxis. This indicates a substantial improvement in adherence to VTE prophylaxis protocols after the intervention.

Conclusion: The audit revealed a lack of adherence to standard VTE risk assessment and prophylaxis prescribing practices initially. However, the implementation of a targeted educational intervention significantly improved compliance, leading to enhanced patient care regarding VTE prevention. This outcome underscores the value of clinical audits as effective tools for improving clinical practices and promoting better patient outcomes.

Keywords: VTE prophylaxis, prevention, hospitalized patients, patient safety and quality improvement, venous thromboembolism, clinical audit process.

Citations:

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Introduction

Venous thromboembolism (VTE) involves the formation of blood clots in the veins^{1,2}, manifesting as conditions ranging from deep vein thrombosis, which can be less severe, to potentially fatal pulmonary embolism. Despite its significance, there is currently no published epidemiological data on the incidence of VTE in Pakistan^{3,4}. While anyone can be affected by VTE, the risk increases with factors such as, reduced mobility, a history of VTE, active cancer, age over 60, recent major surgery or trauma, chronic conditions like COPD or heart disease, those receiving hormonal therapy, family history, and certain inherited conditions⁵. Fortunately, the substantial morbidity and mortality associated with VTE can be minimized through timely interventions⁶. Risk assessment tools like the Padua, Improve, Kucher, and Intermountain scores are available to evaluate the risk in hospitalized patients, allowing for appropriate prophylactic measures, including the use of low molecular weight heparin, to be implemented. Despite these resources, research indicates that the implementation of VTE risk assessment and prophylaxis remains suboptimal in developing countries. This oversight not only compromises patient health but also imposes a financial strain on already challenged healthcare systems. To address this issue, we conducted a clinical audit to assess VTE risk assessment and prophylaxis practices within the medical unit and to evaluate adherence to established guidelines.⁷

Audit Criteria and Standard

This audit compares current practices against the National Institute for Health and Care Excellence (NICE) guidelines for VTE prophylaxis. According to these guidelines, all patients should receive a VTE and bleeding risk assessment at the time of admission, using the clinical risk assessment criteria outlined in the national tool. For this audit, the standard set was that at least 90% of patients should

undergo VTE risk assessment and receive prophylaxis as indicated.

Data Analysis

Data were analyzed using Microsoft Excel 2023 (Microsoft® Corp., Redmond, WA), and graphs were made using Microsoft Office Word 2023 and Microsoft Excel 2023. Grammar was checked on the Grammarly software application.

Materials and Methods

The closed-loop clinical audit was conducted in two phases at the Medical Unit of Ayub Teaching Tertiary Care Government Hospital, Abbottabad, Pakistan. Phase A took place from July 20 to August 30, 2024. VTE risk assessment was performed using the NICE-approved risk assessment tool, which includes key indications for thromboprophylaxis, such as age over 60, obesity (BMI > 30 kg/m²), history of VTE⁸, active cancer, thrombophilia, chronic cardiovascular, respiratory, or endocrine conditions, acute myocardial infarction, ischemic stroke, and expected immobility for more than three days. Contraindications to thromboprophylaxis, as outlined by NICE, include active bleeding, acute hemorrhagic stroke, severe uncontrolled hypertension (BP > 230/120 mmHg), bleeding disorders, and concurrent use of anticoagulants. Data was gathered prospectively by reviewing the medical records of all patients admitted during this phase. Results from each phase were shared at monthly ward meetings attended by doctors, interns, and nursing staff. The Head of the Department approved mandatory documentation of VTE risk assessment and prophylaxis prescriptions. To reinforce this, informational posters on VTE prophylaxis were displayed in various ward areas. To close the audit loop, Phase B was conducted from September 4 to October 10, 2024, in the same department. The impact of these measures was evaluated by reassessing VTE risk assessment and prophylaxis practices.

Table 1: Indications for Thromboprophylaxis (as per NICE guidelines)

Indication	Description
Age > 60 years	Older age is a significant risk factor
Obesity (BMI > 30 kg/m ²)	Increased body mass index
History of VTE	Prior incidence of venous thromboembolism
Active cancer	Current cancer treatment or metastatic

Indication	Description
Thrombophilia	Inherited or acquired blood clot disorder
Chronic cardiovascular disease	Heart failure or chronic heart conditions
Chronic respiratory disease	COPD or other chronic lung conditions
Endocrine conditions	Diabetes or other chronic endocrine issues
Acute MI or ischemic stroke	Recent myocardial infarction or stroke
Reduced mobility (> 3 days)	Due to any illness or injury

Table 2: Contraindications to Thromboprophylaxis (as per NICE guidelines)

Contraindication	Description
Active bleeding	Current bleeding or high risk of bleeding
Acute hemorrhagic stroke	Stroke caused by bleeding in the brain
Severe uncontrolled hypertension	Blood pressure > 230/120 mmHg
Bleeding disorders	Hemophilia, thrombocytopenia, etc.
Concurrent anticoagulant use	Use of warfarin, DOACs, or heparin

Results

Phase A

A total of 180 patients were included to evaluate current VTE risk assessment and prophylaxis practices. Among these patients, 111 (61.67%) were male, and 69 (38.33%) were female. Regarding age distribution, 63 (35%) were under 50 years, 48 (26.67%) were between 50 and 60 years, 51 (28.33%) were between 60 and 70 years, and 18 (10%) were over 70 years of age. Out of the 180 patients, VTE risk assessments were documented in only 27 (15%) cases, indicating a significant gap in adherence to risk assessment protocols. Of these patients, 90 (50%) had an indication for VTE prophylaxis, based on clinical risk factors. However, 9 (10% of those with an indication) had contraindications, primarily due to a high risk of bleeding. This left 81 patients requiring VTE prophylaxis. Despite this, only 18 (22.22%) of these eligible patients were prescribed prophylaxis. All patients who received prophylaxis were treated with appropriate doses as per standard practices.

Table 3: Patient Demographics and VTE Risk Assessment in Phase A

Category	Number of Patients	Percentage
Total Patients	180	100%
Male	111	61.67%
Female	69	38.33%
Age < 50 years	63	35%
Age 50-60 years	48	26.67%
Age 60-70 years	51	28.33%
Age > 70 years	18	10%
VTE Risk Assessed	27	15%
Indication for Prophylaxis	90	50%
Contraindications	9	10% (of those indicated)
Prophylaxis Prescribed	18	22.22%

Table 4: VTE Prophylaxis Eligibility and Prescription in Phase A

Eligibility Status	Number of Patients	Percentage
Indicated for Prophylaxis	90	50%
Eligible (No Contraindications)	81	90% (of those indicated)
Received Prophylaxis	18	22.22%

Phase B

In Phase B, clinical notes for 150 patients from the same medical ward were reviewed. This study group consisted of 80 (53.3%) females and 70 (46.67%) males. The age distribution of patients in Phase B, compared to Phase A, is illustrated in **Figure 1**.

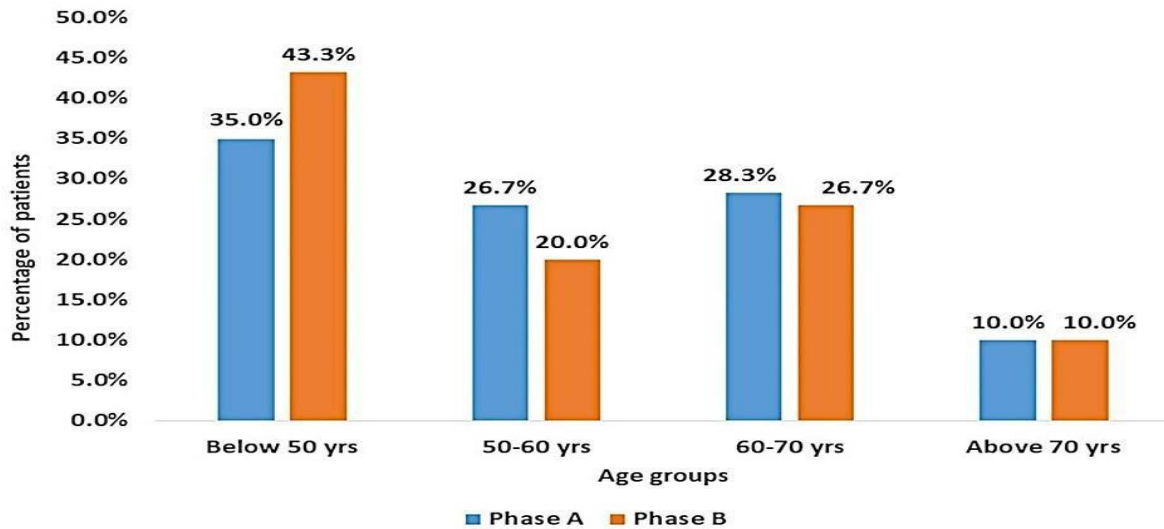


FIGURE 1: Age-wise distribution of patients in Phase A (audit) and Phase B (re-audit)

The evaluation of clinical notes in Phase B revealed that VTE risk assessments were conducted for all 150 patients, achieving a compliance rate of 100%. Among these patients, 40 (26.67%) had clinical indications for VTE prophylaxis. Out of these 40 patients, 5 (12.5%) had contraindications, which precluded the use of prophylaxis. Consequently, 35 (87.50%) of the indicated patients required VTE prophylaxis. Of those eligible for prophylaxis, 26 (75%) patients received the appropriate prophylactic treatment. It is noteworthy that 5 patients (12.5%) with a clinical indication did not receive prophylaxis, despite the absence of any contraindications. All patients who were prescribed prophylaxis received the appropriate medications and dosages according to standard practices.

Summary of Findings in Phase B

Category	Number of Patients	Percentage
Total Patients	150	100%
Risk Assessments Completed	150	100%
Patients with Indication for Prophylaxis	40	26.67%
Patients with Contraindications	5	12.5%

Category	Number of Patients	Percentage
Patients Requiring Prophylaxis	35	87.50%
Patients Who Received Prophylaxis	26	75%
Patients with Indication but No Prophylaxis	5	12.5%

Figure 2 illustrates the comparison between Phase A and Phase B audits, highlighting the percentage of patients receiving VTE risk assessments and the prescription of prophylaxis. This visual representation emphasizes the positive impact of the educational intervention implemented between the two phases of the audit. The findings indicate a significant improvement in compliance with VTE risk assessment and prophylaxis following the educational intervention, reflecting the effectiveness of the measures taken to enhance patient care in the medical unit.

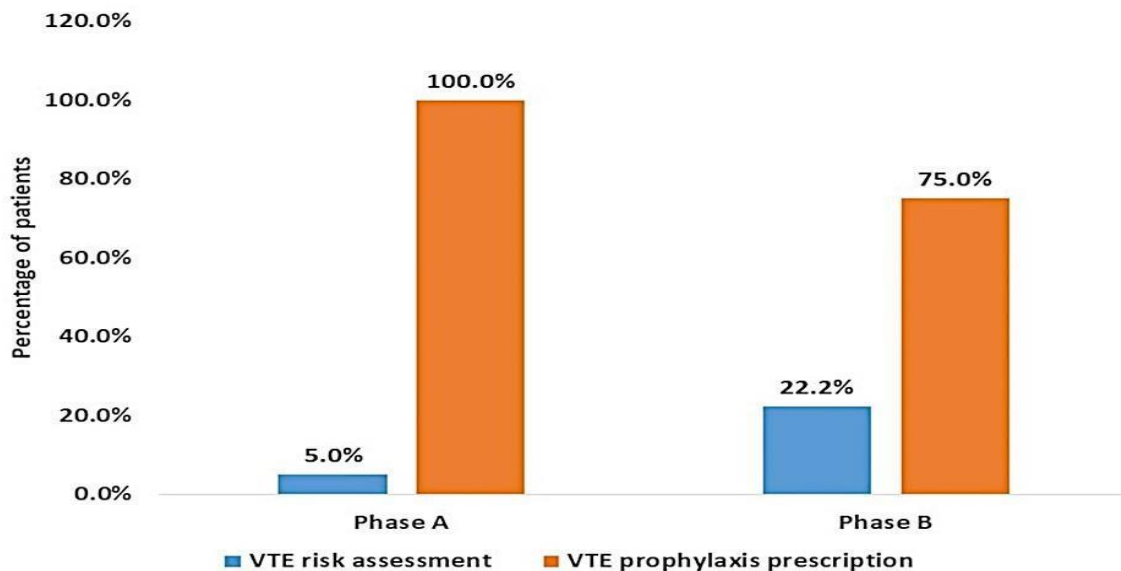


FIGURE 2: Comparison of VTE risk assessment and prophylaxis prescription between Phase A and Phase B

VTE: venous thromboembolism

Discussion

Venous thromboembolism (VTE) is a significant concern in hospitalized patients, frequently leading to adverse outcomes, including contributing to over 10% of hospital-related deaths. The global prevalence of hospital-acquired VTE ranges from 0.8% to 11%. Established and well-accepted guidelines exist for the risk assessment and prophylaxis of VTE in hospitalized patients⁹. However, data evaluating adherence to these standard guidelines in developing countries, including Pakistan, is notably limited. VTE remains a “neglected research agenda” in Pakistan, with no national epidemiological data available regarding its incidence or the implementation of prophylaxis measures^{8,9}. This

gap may stem from a combination of limited research interest and inadequate resources. This closed-loop clinical audit utilized a specifically designed proforma and revealed critical findings. In Phase A, adherence to VTE prophylaxis standards was alarmingly low, with only 15% of patients undergoing risk assessments for VTE. Among those eligible for prophylaxis, merely 22.2% received it. These results align with findings from a multicenter study conducted in Nepal, which also highlighted poor compliance with VTE prophylaxis. When comparing underdeveloped to developed countries, VTE prophylaxis implementation tends to be more robust in the latter. This discrepancy may be attributed to insufficient supervision and overwhelming workloads in low-income nations, compounded by the absence of standardized treatment guidelines and clinical documentation practices due to a lack of electronic medical records. Following the results from Phase A, the medical staff was educated on the importance of VTE risk assessment and prophylaxis. This was facilitated through an educational intervention and mandatory documentation practices. The effectiveness of these initiatives was evaluated in Phase B, which demonstrated significant improvements. In this phase, 100% of patients in the medical ward were assessed for VTE risk, and of those requiring prophylaxis, 75% received it. These results illustrate the vital role that clinical audits play in enhancing the quality of patient care. The notable improvement in VTE risk assessment and prophylaxis following the educational intervention underscores a primary strength of this audit.

Additionally, recommendations made to the Department of Medicine based on this audit will contribute to further advancements in patient care regarding VTE prophylaxis.

However, due to the limited sample size, the findings cannot be generalized. The true effectiveness of this intervention can be further assessed through a third audit cycle, allowing for a more comprehensive evaluation of its impact on clinical practice.

Conclusions

Venous thromboembolism (VTE) is a serious yet preventable condition that significantly endangers patients' lives while imposing additional financial strains on already struggling healthcare systems. The findings from Phase A revealed a concerning lack of adherence to established guidelines; however, the implementation of a straightforward educational intervention led to substantial improvements in the risk assessment and prophylaxis practices related to VTE. This underscores the critical role that clinical audits play in enhancing the quality of clinical practice and patient care^{7,9}. By fostering awareness and adherence to best practices, we can mitigate the risks associated with VTE and promote better health outcomes for patients.

Additional Information

Disclosures

Approval is hereby granted to Dr. Ahmad Zeb and his team, to collect data from ATH, for clinical audit cycle titled " *Assessment And Enhancement Of Venous Thromboembolism Prophylaxis Protocols In Medical Unit Of Ayub Teaching Tertiary Care Government Hospital, KpK, Pakistan: A Quality Improvement Project*. During this study, all personal information of subjects were kept confidential.

Conflicts of Interest: None

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Authors Contribution

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Critical Review; Hameed Ur Rahman², Usman Ali³

Final Approval of version; Ahmad Zeb¹

References

1. Bosaeed, M. S., Balubaid, R. N., Alharbi, A. R., Alhothali, O. S., Haji, A. K., Alkaabi, H. E., & Miyajan, R. A. (2022). Assessment of venous thromboembolism awareness among surgical ward patients in Makkah, Saudi Arabia: A cross-sectional study. *Cureus*, 14, e27897. <https://doi.org/10.7759/cureus.27897>
2. Awidi, A., Obeidat, N., Magablah, A., & Bsoul, N. (2009). Risk stratification for venous thromboembolism in hospitalized patients in a developing country: A prospective study. *Journal of Thrombosis and Thrombolysis*, 28, 309-313. <https://doi.org/10.1007/s11239-008-0291-1>
3. Balaji, A., Mercer, R., & Mainwaring, J. (2015). Venous thromboembolism: A role for weight-stratified thromboprophylaxis? *Clinical Medicine*, 15, 598-599. <https://doi.org/10.7861/clinmedicine.15-6-598a>
4. Centers for Disease Control and Prevention. (2018). What is venous thromboembolism? Retrieved August 21, 2022, from <https://www.cdc.gov/ncbddd/dvt/facts.html>
5. Khan, A. A., & Zafar, S. N. (2013). Venous thromboembolism in Pakistan: A neglected research agenda. *Journal of Thrombosis and Thrombolysis*, 35, 234-242. <https://doi.org/10.1007/s11239-012-0799-2>
6. Siegal, D. M., Eikelboom, J. W., Lee, S. F., et al. (2021). Variations in incidence of venous thromboembolism in low-, middle-, and high-income countries. *Cardiovascular Research*, 117, 576-584. <https://doi.org/10.1093/cvr/cvaa044>
7. Serhal, M., & Barnes, G. D. (2019). Venous thromboembolism: A clinician update. *Vascular Medicine*, 24, 122-131. <https://doi.org/10.1177/1358863X18821159>
8. Abuowda, Y., Alswerki, M., Alsheikh Ahmad, A., et al. (2019). Pharmacological prophylaxis of venous thromboembolism in adult medical and surgical wards in the Gaza

Strip: A multi-centre clinical audit.
The Lancet, 393, 1.
[https://doi.org/10.1016/S0140-6736\(19\)30587-2](https://doi.org/10.1016/S0140-6736(19)30587-2)

9. National Institute for Health and Care Excellence. (2010). Recommendations | Venous thromboembolism in over 16s: Reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism. Retrieved January 2, 2022, from.



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