Awareness & Knowledge of thrombotic prophylaxis among medical staff in a tertiary care hospital in Karachi, Pakistan.

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ABSTRACT:
Objective: To assess the knowledge, attitudes, and practices (KAP) of physicians regarding thrombotic prophylaxis in hospitalized patients at a tertiary care hospital in Karachi, Pakistan.
Methodology: For this cross-sectional study, Ethical approval from the Institutional Review Board of JPMC (NO.F.2-81/2024-GENL/66/JPMC) was sought. A questionnaire assessing demographics, Guideline Recommendations, Attitudes and Current Practices regarding venous thromboembolism (VTE) used to collect data during October 2024 to March 2025 from 172 physicians from either gender having varied designation.
Results: Participants were knowing that the Wells' Criteria is the most commonly used risk assessment tool (58.1%) and Enoxaparin was the preferred pharmacological agent (51.2%). Only 44.8% believed half of inpatients need prophylaxis, and 49.4% reported its use in less than 25% of patients. Residents were found to be well-versed with international guidelines as compared to consultants and medical officers. 57% doctors reported lack of formal thromboprophylaxis guidelines and hospital policies.
Conclusion: There are significant deficiencies and disparities in physicians' knowledge, attitude, and practice regarding VTE, emphasizing the importance of educational initiatives, as well as adherence to standard guidelines, if VTE prevention practice is to be optimized.

Key words: KAP, Vascular Diseases, Embolism and Thrombosis, Thromboembolism, Venous Thromboembolism, Guideline.

Introduction:

Thrombotic events are a common complication in hospitalized patients, leading to longer stays, higher mortality, and a greater financial burden. Venous thromboembolism (VTE) includes both deep vein thrombosis (DVT) and pulmonary embolism. VTE is a major issue in hospitals, with more than 60% of cases occurring during or after a stay.[1] According to studies, 25-30% of people hospitalized for a medical condition develop non-fatal VTE, while 70-80% develop lethal PE.[2] Clinical practice audits reveal that approximately 15-33% of hospitalized medical patients receive VTE prophylaxis, but 85-95% of surgical patients receive postoperative VTE prophylaxis.[3] The Virchow triad of hemostasis, hypercoagulability, and vascular injury describes the major contributing factors to VTE events, which occur almost exclusively in hospitalized immobile patients. Many prior studies have revealed a 6 to 11-fold increase in thrombotic events as a result of hospital admission.[4] The American College of Chest Physicians (ACCP) guidelines strongly suggest (Grade 1A) VTE prophylaxis to reduce the incidence of DVT in at-risk individuals. The Seventh ACCP Conference recommends low-dose unfractionated heparin (LDUH) or low molecular weight heparin (LMWH) for trauma patients, those with cancer, sepsis, or heart problems, the elderly, and bedridden individuals.[5] Following an investigation, it was discovered that annual expenditures for total, hospital-associated, preventable, and indirect VTE costs were 13-22% of additional expenditures in European countries, which could have been significantly reduced with better use of appropriate thromboprophylaxis, emphasizing VTE's economic impact.[6] Another risk is readmissions resulting from VTE, as a retrospective research conducted in AKUH, Karachi; 57 (16%) of the 360 cases in a year were readmitted, with 44% taking place in the first month, according to data from hospital records. Notably, 61% of these patients did not receive thromboprophylaxis while they were initially in the hospital.[7] A number of measures, including the Caprini score, Padua scale, and Well's score, have been developed to evaluate the risk of VTE and apply suitable prophylactic measures for its prevention. Additionally, NICE and the American College of Chest Physicians (ACCP) have provided a number of recommendations for better categorization and application.[8,9] Despite significant evidence supporting VTE prophylaxis, its use in hospitals is still insufficient probably due to the limited expertise of attending physician. Results of a study conducted at five teaching hospitals in Rawalpindi showed that although all doctors emphasized the need of DVT prevention, yet only 39.4% acknowledged to use it. Furthermore, only 10.3% of these doctors administered DVT prophylaxis on a regular basis, with the others using it inconsistently.[10] Despite global support for VTE prevention, only 52% of healthcare professionals in the United States considered that effective thromboprophylaxis was available.[11] Similarly, a retrospective cohort analysis found that roughly 17.4% of all VTE events may have been averted if the recommended thromboprophylaxis had been taken, particularly in instances involving stroke, surgery, or pneumonia. The authors referred to these as "lost chances," as lives could have been saved.[12]

The purpose of this study is to analyze healthcare professionals' knowledge, attitudes, and practices (KAP) about thromboprophylaxis identifying potential gaps in under-

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standing, misconceptions, and adherence to standard practice.

Objective:

To assess the knowledge, attitudes, and practices (KAP) of physicians regarding thrombotic prophylaxis in hospitalized patients at a tertiary care hospital in Karachi, Pakistan.

Methodology:

This This descriptive cross-sectional study was conducted at Jinnah Postgraduate Medical Centre (JPMC) during October 2024 to March 2025. Data was collected from 172 Physicians of either gender, aged between 25 and 80 years, working in inpatient internal medicine departments at JPMC, including house officers, medical officers, postgraduate residents, and consultants. Nursing and allied healthcare staff and doctors working in pediatric, radiology and surgical departments as well as participants unwilling to provide informed consent were excluded from the study. Ethical approval from the Institutional Review Board of JPMC (NO.F.2-81/2024-GENL/66/JPMC) was obtained. A validated questionnaire assessing Demographics, Guideline Recommendations, Attitudes and Current Practices and Institutional Policy Awareness were filled by participants after taking written informed consent. All responses were kept anonymous and used solely for research purposes. Data were stored and analyzed using IBM-SPSS version 23.0; Chi-square and Fischer exact test were employed to evaluate the significance of observed variables. P-values less than 0.05 were considered statistically significant. The sample size was calculated using Select Statistical Services [13] with 95% confidence level, 5% margin of error and an overall (all ages) anticipated population proportion of VTE prevalence of 12%.[14] get a sample size of 163, for expected refusal/drop out/incomplete questionnaire from participants we considered sample size of 172 for current study

Results:

The study results, stratified by physician designation (Consultants/House Officers/Medical Officers vs. Residents), revealed important differences in knowledge, attitudes, and practices regarding thrombotic prophylaxis. Among 172 participants, consultants were 3(1.7%), House officers (HO) were 50 (29.1%), Medical officers (MO) were 13 (7.6%), and Residents were 106 (61.6%).

Table 1 shows a statistically significant association between designation and confidence in thrombotic prophylaxis knowledge (p = 0.001). Among all participants, 63.4% reported being confident, while 10.5% were very confident and 26.2% were not confident. Notably, 39.4% of Consultants / House Officers / Medical Officers (CHO/MO) reported being not confident, compared to only 17.9% of residents. Conversely, a higher proportion of residents (15.1%) considered themselves very confident as compared to house officers and medical officers (3%).

Regarding the preferred method of thromboprophylaxis, although not statistically significant (p = 0.055), most respondents selected parenteral anticoagulants (48.3%) as the preferred method, with 56.6% of residents choosing this compared to 34.8% of CHOs/MOs. Compression stockings were the second most selected method overall (31.4%), more frequently chosen by CHOs/MOs (42.4%) than residents (24.5%). Oral anticoagulants were chosen by 18.6% of participants. 22.7% doctors recommended aspirin, 51.2% selected enoxaparin, 8.7% said rivaroxaban and 17.4% selected warfarin as their preferred method of pharmacological thromboprophylaxis. This was statistically significant with a p-value of 0.008.

Table No 1: Comparison of different strata of doctors regarding KAP.

Question / Response	Total (n, %)	Consultant / HO / MO (n, %)	Resident (n, %)	p-value
Confidence in knowledge on thrombotic prophylaxis				0.001*
Not Confident	45 (26.2%)	26 (39.4%)	19 (17.9%)	
Confident	109 (63.4%)	38 (57.6%)	71 (67.0%)	
Very Confident	18 (10.5%)	2 (3.0%)	16 (15.1%)	
Decision to administer thromboprophylaxis				0.053
Automatically for all admitted patients	11 (6.4%)	5 (7.6%)	6 (5.7%)	
Based on standardized risk assessment tool	76 (44.2%)	36 (54.5%)	40 (37.7%)	
Based on physician discretion (no formal guideline)	37 (21.5%)	14 (21.2%)	23 (21.7%)	
Only for high-risk patients identified at admission	48 (27.9%)	11 (16.7%)	37 (34.9%)	
Medication used for thromboprophylaxis				0.008*
Aspirin	39 (22.7%)	22 (33.3%)	17 (16.0%)	
Enoxaparin	88 (51.2%)	24 (36.4%)	64 (60.4%)	
Rivaroxaban	15 (8.7%)	5 (7.6%)	10 (9.4%)	
Warfarin	30 (17.4%)	15 (22.7%)	15 (14.2%)	

When asked how they generally make prophylaxis decisions, replies varied; nonetheless, the link was not statistically significant (p = 0.053). 44.2% of participants said they used a standardized risk assessment method, with Consultants/HOs/MOs utilizing it more (54.5%) than residents (37.7%). A total of 27.9% stated that prophylaxis was solely given to high-risk patients, with 34.9% of residents and 16.7% of CHOs/MOs reporting this strategy. A small percentage (21.5%) relied completely on physician discretion, whereas 6.4% automatically supplied prophylaxis to all hospitalized patients. These data indicate that residents have stronger trust and preference for evidence-based tools and parenteral anticoagulation, whereas CHOs/MOs prefer mechanical prophylaxis and depend more on structured decision tools.

We inquired about the use of scores to determine VTE risk in hospitalized patients. The Well's Score was the most popular tool, chosen by 74 (58.1%) physicians. This was followed by the Padua Scale (n= 30, 23.62%), Caprini Score (n=17,13.38%) and ACCP criteria (n=6, 4.72) indicating that formal guideline-based scoring systems are not

widely used. The Pearson Chi Square test revealed a significant correlation between patient type and the grading system employed for thrombotic prophylaxis and categorization (p value < 0.05).

Physicians' knowledge regarding medical conditions associated with procoagulant states and increased risk of thrombotic complications. Cancer was most frequently recognized as a thrombotic risk factor (n=92, 72.7%), whereas hyperthyroidism was the least recognized condition, with only 26 (20.47%) mentioned. The comparatively lower recognition of diabetes mellitus and hyperthyroidism as procoagulant states suggests inadequate information regarding prothrombotic conditions.

Table No 2: Most Common Procoagulant Conditions

Clinical condition	n	%
Carcinoma	92	72.4
Autoimmune Diseases	81	63.77
Chronic Kidney Diseases	70	56.45
Sepsis	70	56.45
Chronic Heart Diseases	68	53.54
Diabetes Mellitus	54	43.54
Hyperthyroidism	26	20.47

When evaluating physicians' attitudes and practices, it was discovered that 44.8% of them thought that 25-50% of patients should have it, whilst only 9.9% were in favor of using it in more than 75% of cases. This difference was statistically significant, with a p-value of 0.01. Only 25% of high-risk intensive care unit patients reported routine use, whereas 36% stated that each patient's decision is made separately. Just 33.7% of physicians said that they always kept patients and guests aware about the danger of thromboembolic events and the importance of thromboprophylaxis.

The majority of participants (62.8%) generally agreed that the thromboprophylaxis levels were not up to grade. Just 11% of physicians said they did not require additional training in giving proper prophylaxis, whereas 60.5% of them stated they needed more education and training in this area. According to 39.4% of CHOs/MOs, they have never updated their thromboprophylaxis guidelines information. On the other hand, just 12.3% of locals said the same. The difference was extremely statistically significant (p < 0.001), highlighting the serious need for non-residents to receive this kind of education. According to 57% of respondents, their department or hospital had not organized any formal institutional guidelines or seminars, nor had they provided any formal education.

Discussion:

The study's findings showed significant differences between residents and consultants/house officers/medical officers (CHOs/MOs), especially in terms of their decision-making processes, confidence levels, and choice of preventative measures. The thrombotic prophylactic confidence levels showed a statistically significant difference (p = 0.001). Compared to only 3% of CHOs/MOs, residents showed greater confidence, with 15.1% identifying as very confident. However, compared to just 17.9% of people, 39.4% of CHOs/MOs said they lacked confidence. Only 12.3% of residents responded similarly, whereas 39.4% of CHO/MOs were more likely to have never updated their knowledge (p < 0.001). The residents' more recent academic training and exposure to the most recent VTE prevention guidelines are probably the causes of this discrepancy. In a study of 52 intensive care units in China, 66% of physicians and 83.6% of nurses reported feeling confident in their understanding of VTE prevention; however, testing revealed that only 37.1% of physicians and 8.6% of nurses had sufficient knowledge.15

Although the difference in preferred thromboprophylaxis strategies was not statistically significant (p = 0.055), trends were visible. Residents preferred parenteral anticoagulants (56.6%) over CHOs/MOs (34.8%), who more often prescribed compression stockings. This implies that residents favor pharmaceutical anticoagulation, which is more in line with current recommendations. Although it was still underutilized, enoxaparin was the most popular anticoagulant (51.2%). The superiority of pharmaceutical anticoagulants 16 is highlighted by supporting findings from Ramacciotti et al which includes improved benefits even after discharge, particularly for COVID-19 patients.17

Standardized scoring methods were used in 44.2% of decisions, which was more common among CHOs/MOs (54.5%) than residents (37.7%), albeit this difference was not statistically significant (p = 0.053). Although the Padua or Caprini scores are preferable for risk stratification, 58.1% of respondents utilized the Well's Score, which is used to diagnose suspected VTE and cannot be used for thromboprophylaxis.18,19 Additionally, just 4.72% followed the ACCP requirements. According to a meta-analysis of 27 studies and more than 100,000 patients, the Padua and ACCP criteria are the preferred risk assessment scales, followed by the Caprini score.20,21 As a result, our doctors demonstrated significant knowledge gaps. This, however, is consistent with findings from national research. For instance, a recent study in KPK, Pakistan, revealed that consultants there had a similar contempt for employing a suitable grading system for VTE prevention.22

Despite the fact that 30 to 70% of all VTE cases are hospitalization-related, 49.4% of physicians stated that less than 25% of inpatients take prophylaxis, and less than 10% recommended use in more than 75% of instances.23 62.8% of respondents thought their department's prophylactic procedures fell short of expectations. These results are consistent with global research, which revealed that only 31 of 414 at-risk patients had undergone thromboprophylaxis.24 Similar worldwide limitations in the utilization of adequate thromboprophylaxis are also shown by a number of additional studies and meta-analyses.25,26

Furthermore, extremely low rates of hospital-issued recommendations were observed, with 57% reporting no formal thromboprophylaxis training. This is comparable to Nepal, where 30.8% lacked the necessary knowledge for VTE risk assessment and prevention, and only 47% reported having official guidelines.27 In order to improve VTE prevention through physician education, a Japanese study links hospital protocols.28 Thromboprophylaxis use increased from 49% to 71% in post-education audits, a trend that continued throughout the following eight audits, demonstrating how departmental policies enhance clinical practice and patient outcomes.29

When asked what will be most effective departmental interventions to enhance your knowledge and practices regarding VTE may be increased; 61.6% (p=0.003) respondent were in favor of organizing regular training and workshops. This was followed by access to updated guidelines and resources (57.6%), holding multidisciplinary meetings (54.7%) and 30.2% suggested conducting regular audits

and feedback sessions (P=0.03). Similar interventions have been suggested and implemented in various hospitals around the world with improved VTE prophylaxis coverage.30,31

In order to lessen variation across professional roles, our findings emphasize the necessity of targeted educational initiatives and uniform institutional procedures. Emphasizing the importance of structured postgraduate training, residents seemed more comfortable delivering evidence-based pharmacologic thromboprophylaxis and assessment procedures. However, the CHOs/MOs' varying answers highlight the significance of continual professional development via continuing medical education and consistent access to the most recent clinical protocols.

Conclusion:

Although healthcare professionals were generally aware of thrombotic prophylaxis, there are discernible differences in their knowledge, confidence, and implementation techniques across various clinical roles. The results of this study are consistent with a number of national and international studies evaluating the gaps in the knowledge and application of thromboprophylaxis. These results highlight the need for institutional efforts to standardize and reinforce evidence-based procedures addressing venous thromboembolism (VTE) prophylaxis and demonstrate a strong desire for systematic educational programs and systemic assistance. Improved and consistent thrombotic prophylactic procedures for hospitalized patients can result from closing these gaps through interdisciplinary cooperation, regular feedback, and institutional policy improvement.

Conflict of Interest:

The authors declare no conflict of interest related to this study. No financial or personal relationships influenced the conduct, analysis, or reporting of this research.

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Author's Declaration

• The authors have reviewed the final manuscript, provided their consent for its publication, and have accepted responsibility for the accuracy and integrity of all components of the work.

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