Risk assessment for Deep Vein Thrombosis (DVT) among hospitalised patients admitted in NEIGRIHMS, Shillong, Meghalaya

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Abstract

Deep vein thrombosis (DVT) is one of the major health problems with possible serious outcomes. Many patients are at an unnecessary risk of developing venous thromboembolism (VTE) during hospitalisation. The risk of developing DVT among hospitalised patients is high with 10-20% among clinical patients and 80% or more in patients with critical conditions or spinal cord injury. Risk factors for DVT are multifactorial and the risk increases with an increase in the number of risk factors.

A descriptive cross sectional research study was conducted in NEIGRIHMS, Shillong, Meghalaya from the 1st till 27th March 2021. A total of 115 participants were selected using a non-probability purposive sampling technique. Data was collected by an interview method and observation using the JFK Medical Center DVT Assessment Tool and analysis was done using SPSS 25 version.

Findings showed the common risk factor identified were related to age between 40-65 years 58(80.55%), respiratory diseases 70(60.86%), cardiovascular diseases 51(44.34%). The less common risk factor was obesity 1(6.67%). The total DVT risk score showed that 55(47.8%) of participants had low risk (1-6), 54(47.0%) had moderate risk (7-12) and 6(5.2%) had high risk (>12) for DVT. Significant association was found between age and the total DVT risk score of the participants (p=0.013).

It was concluded that a proper DVT risk assessment is essential to identify the risk factors of DVT among hospitalised patients for timely intervention and prevention. Further studies can be conducted in different group of patients with larger sample size for better generalization.

Keywords: Risk Assessment, Deep Vein Thrombosis (DVT), Hospitalised Patients.

Introduction

Patients are admitted to the hospital for a variety of reasons, including scheduled tests, procedures, surgery, and emergency medical treatment, administration of medication or to stabilize or monitor an existing condition. Many complications can occur as a result of hospitalisation. Deep vein thrombosis (DVT) and pulmonary embolism (PE) are some of the common and

serious complications that may occur in hospitalised patients. The consequences of DVT are significant and incapacitating, which includes morbidity, mortality, disability, and diminished health-related quality of life among the affected individuals

Many patients are at an unnecessary risk of developing venous thromboembolism (VTE) during hospitalisation. The risk of developing DVT among hospitalised patients is high with 10-20% among clinical patients and 80% or more in patients with critical conditions or spinal cord injury. Critically ill patients have a high risk of DVT due to the presence of multiple risk factors. The risk for DVT increases with an increase in the number of risk factors.

It can be challenging to detect DVT for the reason that the common symptoms of DVT may be absent which may lead to a life-threatening pulmonary embolism. Therefore, DVT can only be prevented when the risk factors and level of DVT can be understood and identified.

Objectives

• To identify patients who are at risk for Deep Vein Thrombosis (DVT) among hospitalised patients.

• To determine the association between the risks for DVT (age ≥40 years, BMI≥30, venous disease, immobilization, surgery, other medical conditions, pregnant women/history of abortion/ oral contraceptives/hormone replacement therapy) with the selected demographic variables.

Materials and methods

A Descriptive, Cross sectional study design was adopted among hospitalised patients from General Medicine, General surgery, Orthopaedics, Cardiology, Neurology, CTVS, Urology, Obstetrics & Gynaecology and Intensive Care Units (ICUs) of NEIGRIHMS, Shillong, Meghalaya. Total of 115 patients were selected in the study using Purposive Sampling technique. The study was conducted from 1st March to 27th March 2021. The Research tools consisted of Socio-Demographic characteristics and the JFK Medical Center DVT Assessment Tool was used after suggestions were obtained from the experts. Purpose of the study was explained, confidentiality was assured, and informed consent was taken from the participants. Reliability of the tool was established by Cronbach's alpha formula. Pilot study was conducted and found to be feasible to be carried out in the main setting as proposed. Data was collected using an interview scheduled and observation. The data was analyzed using Descriptive (Frequency and percentage) and inferential statistics (Fisher exact test).

Results

Section I: Socio-Demographic characteristics of the participants

Out of the 115 participants, 25(21.74%) of the participants were in the age group of 31-40 years. The average age was 45.6 years (SD= 4.96). As per the gender distribution, 76 (66.1%) were male. Data on marital status shows that 101 (87.8%) of the participants were married. Related to the educational status, 42(36.5%) of the participants were at the primary level education. Regarding occupational status, 39 (33.9%) was unemployed.

Section II: Determination of DVT risk factors of the participants according to the JFK Medical Center DVT Assessment Tool

Table 1: Distribution of DVT risk factors of the participants related to the age criteria according to the JFK Medical Center DVT Assessment tool. n= 72

Age (in years)	Frequency (f)	Percentage (%)
40-65	58	80.55
66-70	6	8.33

over 70	8	11.12

Table 1. Depicts that 72 of the 115 participants had risk factor related to age above 40 years out of which 58(80.55%) had risk factor related to age between 40-65 years, 6(8.33%) related to age between 66-70 years and 8(11.12%) had risk factor related to age above 70 years of age.

Table 2: Distribution of DVT risk factors of the participants related to surgery according to the JFK Medical Center DVT Assessment tool. n= 57

Surgery	Frequency (f)	Percentage (%)
General anaesthesia	21	36.82
GI surgery, gynaecologic surgery	18	31.6
Orthopaedic surgery patient	10	17.53
Neurosurgery- Acute spinal injury with surgery	8	14.05

Table 2 Depicts that 57 of the 115 participants had surgical risk factor out of which 21(36.82%) had risk factor for general anaesthesia,18(31.6%) for GI surgery/ gynaecologic surgery, 10(17.53%) for orthopaedic surgery, and 8(14.05%) for neurosurgery- acute spinal injury with surgery. No participant had risk factor for burn.

Table 3: Distribution of DVT risk factors of the participants related to cancer according to the JFK Medical Center DVT Assessment tool. n=19

Cancer	Frequency (f)	Percentage (%)
Cancer surgery, tumor	13	68.42
Undergoing chemotherapy,	6	31.58

radiotherapy		

Table 3 Depicts that 19 of the 115 participants had risk factor related to cancer out of which 13(68.42%) had risk factor for cancer surgery/ tumor, and 6(31.58%) for chemotherapy/ radiotherapy.

Table 4: Distribution of DVT risk factors of the participants related to cardiovascular disease according to the JFK Medical Center DVT Assessment tool. n=51

Cardiovascular Disease	Frequency (f)	Percentage (%)
Acute MI, heart failure, valvular disease, chest pain	41	80.4
History of non-hemorrhagic stroke	5	9.8
History of varicose veins	3	5.88
Atrial fibrillation	2	3.92

Table 4 Depicts that 51 of the 115 participants had risk factor related to cardiovascular disease out of which 41(80.4%) had risk factor for acute MI, heart failure, valvular disease, chest pain, 5(9.8%) for history of non-hemorrhagic stroke, 3(5.88%) for history of varicose veins, and 2(3.92%) for atrial fibrillation.

Table 5: Distribution of DVT risk factors of the participants related to respiratory/renal disease according to the JFK Medical Center DVT Assessment tool. n=70

Respiratory/ Renal	Frequency (f)	Percentage (%)
Smoker (current/history of)	47	67.14
Renal failure/ hemodialysis	15	21.44

Moderate to severe pneumonia or COPD	5	7.14
Mechanical ventilation	3	4.28

Table 5 Depicts that 70 of the 115 participants had risk factor related to respiratory or renal disease out of which 47(67.14%) had risk factor for smoking (current/history of),15(21.44%) for renal failure/hemodialysis,5(7.14%) moderate to severe pneumonia/COPD, and 3(4.28%) mechanical ventilation. No participant had risk factor for nephrotic syndrome.

Table 6: Distribution of DVT risk factors of the participants related to infection, inflammation and immobility according to the JFK Medical Center DVT Assessment tool. n=94

Infection, Inflammation, and Immobility	Frequency (f)	Percentage (%)
Current immobility (bed rest, paralysis)	36	38.28
Decreased mobility	35	37.28
Leg ulcers or venous stasis	9	9.57
History of inflammatory diseases (inflammatory bowel disease, rheumatoid arthritis)	8	8.5
Cast/traction/splint/collar	6	6.37

Table 6 Depicts that 94 of the 115 participants had risk factor related to infection/ inflammation/ immobility out of which 36(38.28%) had risk factor for current immobility (bed rest/ paralysis), 35(37.28%) for decreased mobility, 9(9.57%) leg ulcers/venous stasis, 8(8.5%) for history of inflammatory diseases (inflammatory bowel disease, rheumatoid arthritis), and

6(6.37%) for cast/traction/splint/collar. No participant had risk factor for sepsis.

Table 7: Distribution of DVT risk factors of the participants related to trauma/ thromboembolism according to the JFK Medical Center DVT Assessment tool. n=11

Trauma, thrombophilia and thromboembolism	Frequency (f)	Percentage (%)
Long bone fracture	7	63.64
Multiple injuries and lower extremity or pelvic fractures	2	18.18
History of prior DVT or pulmonary embolism	2	18.18

Table 7 Depicts that 11 of the 115 participants had risk factor related to trauma/ thrombophilia/ throm Bo embolism out of which 7(63.64%) had risk factor for long bone fracture, 2(18.18%) for multiple injuries & lower extremity or pelvic fracture, and 2(18.18%) for history of prior DVT or pulmonary embolism. No participants had risk factor for family history of DVT or PE

Table 8: Distribution of DVT risk factors of the participants related to other according to the JFK Medical Center DVT Assessment tool. n=15

Other	Frequency (f)	Percentage (%)
Postpartum <1month or current pregnancy	8	53.33
All Central Venous Catheters/ PICC lines	6	40
Obese (BMI >30)	1	6.67

Table 8 Depicts that 15 of the 115 participants had risk factor related to others out of which 8(53.33%) had risk

factor for postpartum <1 month/ current pregnancy, and 6(40%) for all central venous catheters/PICC lines and 1(6.67%) for obesity (BMI>30). No participants had risk factor for taking birth control medications or hormone replacement therapy.

Table 9: Distribution of DVT risk factors of the participants related to the length of stay according to the JFK Medical Center DVT Assessment tool. N=115

Length of stay (in days)	Frequency (f)	Percentage (%)
1-10 days	77	66.95
11-20 days	17	14.79
21-30 days	4	3.48
>30 days	17	14.79

Table 9 Depicts that 77(66.95%) of the participants had a length of stay between 1-10 days, 17(14.79%) had a length of stay between 11-20 days, 4(3.48%) had a length of stay between 21-30 days and 17(14.79%) had a length of stay for more than 30 days.

It was found that, participants with the longer hospital stay of more than 30 days were related to surgery 7(6.08%), respiratory or renal diseases 6(5.21%), cancer 3(2.60%) and cardiovascular diseases 2(1.73%).

Section III: Findings related to the total DVT risk score of the participants.

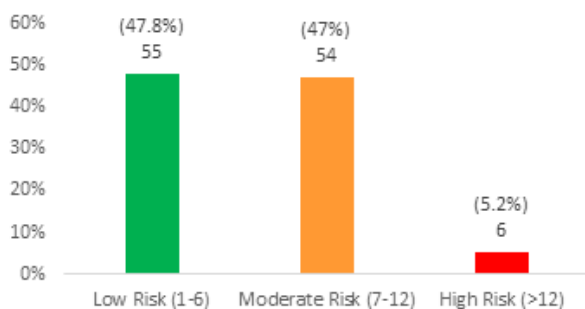Figure 1: Distribution on total DVT risk score of the participants. N=115

Figure 1 Represents that 55(47.8%) of the participants were having low risk, 54(47%) were having moderate risk and 6(5.2%) were having high risk for DVT.

Section IV: Findings related to the association between the total DVT risk score of the participants with the selected demographic variables.

In the present study, it was found that there was significant association between age and the total DVT risk score of the participants (p=0.013). There was no significant association between gender (p=0.263), marital status (p=0.08), educational status (p=0.515) and occupational status (0.338) with the total DVT risk score of the participants.

Discussion

Findings of the demographic characteristics of the participants

In the present study, the participant's ages ranged from 18 to 91 years. Out of the 115 participants, 25(21.74%) of the participants were between the age of 31-40 years. The average age was 45.6 years (SD= 4.96) which is similar to the study conducted by Mwandama CK et al. in Zambia (2015), in which the mean age of the patients was 42.12 years.

In the present study, 76 (66.1%) of the participants were male and 39(33.9%) were female which was similar to the study conducted by Bo H et al. in China (2016-2017), where 56.8% of the patients were male and 39.5% were female.

Out of the 115 participants, majority 101(87.8%) of the participants were married, 42(36.5%) had primary level education, and 39(33.9%) of the participants were unemployed.

Findings on DVT risk factors of the participants

In the present study, the most common risk factor identified was participants in the age group 40-65 years

which was 58(80.55%) and only 8(11.12%) were above 70 years of age which is partially supported by a study conducted by Bo H et at. (2017-2018) which shows that 39.5% of the patients were in the age group 41-60 years.

In the present study, 70(60.86%) participants had risk factor related to respiratory problem or diseases in which the commonly identified was related to smoking 47(67.14%), which was in variance with the study conducted by Elkhadir A et al. in Saudi Arabia (2013-2015), where the risk factor related to smoking was 0.19%.

In this study, risk factor related to cardiovascular diseases was 51(44.34%), which is partially supported with findings of the study conducted by Elkhadir A et al. in Saudi Arabia (2013-2015), where cardiovascular involvement was seen in 17.27% of the patients.

In this study, risk factor related current immobility (best rest, paralysis) was 36(38.28%) and decreased mobility 35(37.28%). The study finding correlates with the study conducted by Wang C et al. where the risk factor related to patients currently at bed rest was 47.4%.

The less common risk factor identified in the current study was obesity 1(6.67%), which is similar to the study conducted by Elkhadir A et al. in Saudi Arabia (2013-2015) where the risk factor related obesity was 2.87%.

In the present study, 77(66.95%) of the participants had a hospital stay of 1-10 days duration, in which the mean hospital stay was 13.5 days (SD 6.41) which was similar to the study conducted Mwandama et al. in Zambia (2015), which showed that the mean period of hospital admission was 11.91 (SD 7.77) days.

Findings on the total DVT risk score of the patients

In the present study, 55(47.8%) of the participants had low risk (1-6) for DVT, 54(47.0%) of the participants had moderate (7-12) risk for DVT and only few 6(5.2%) of the participants had high risk for DVT.

Findings on association between the total DVT risk score and the demographic variables

In the present study, it was found that there was significant association between age and the total DVT risk score of the participants (p=0.013). The present study conducted revealed that there was no significant association between gender (p=0.263), marital status (p=0.08), educational status (p=0.515) and occupational status (0.338) with the total DVT risk score of the participants. Similar findings have been observed in the study conducted by Yayan J et al. (2004-2012) in Saarland, Germany, where they reported that there was significant difference in the age of the patients and risk for DVT (p<0.001) and there was no significant difference in gender and risk for DVT (p=0.6053).

Conclusion

DVT was traditionally considered to be rare in Asia. This may be due to low awareness. In the present study, it was found that most of the patients were at risk of developing DVT. However, the occurrence of DVT can be reduced if effective preventive measures are adopted. The prerequisite of DVT prevention is to adopt an effective risk assessment model. Identification of the risk factors is therefore important for timely initiation of prophylactic measures to prevent the disease. In the present study, the risk factor related to age between 40-65 years as the most common risk factor. The study also shows that the total DVT risk score is significantly associated with age of the participants, thus indicating that the risk for DVT is dependent on age of the participants. Thus, it can be concluded that a proper DVT risk assessment is essential to identify the risk factors of DVT among hospitalised patients for timely intervention in prevention of DVT.

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