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PROPHYLACTIC MEASURES ON DEEP VEIN THROMBOSIS AMONG POST-OPERATIVE PATIENT

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Abstract

Background of the study: Deep vein thrombosis (DVT) is formation of blood clot in a deep vein, commonly in the legs or pelvis. DVT can lead to post-thrombotic syndrome and pulmonary embolism. As per the WHO 1 per 1000 adult population annually had DVT in worldwide coverage. As a prophylactic measures; DVT stockings, Exercise and other measures are helpful in prevention of DVT.

Material and methods: A true experimental post-test only control group study was conducted to assess the effectiveness of prophylactic measures on deep vein thrombosis among post-operative patients of critical care unit with using simple random sampling technique. Samples were randomly allotted in experimental (n=15) and control group (n=15), demographic and clinical data were collected, modified Caprini risk assessment scale used to assess risk of DVT development; experimental group were provided with DVT stockings and leg-exercise whereas control group had positioning and foot elevation for four consecutive days, then modified Well's criteria used to assess DVT symptoms among samples. Inferential and descriptive statistics used with SPSS (version 20) software.

Result: Majority of experimental group (73.33%) and control group (60%) had high risk of developing DVT after surgery. Following prophylactic measures; majority 53.33% of experimental group had no symptoms and 26.67% had very low probability of developing DVT**.** Compare to experimental group; control group had 26.67% high probability of developing DVT. The age, gender, diet pattern, BMI, nature of surgery, mobility, swollen leg and duration of surgery are the associated variable in development of DVT at 0.05 level of significant. **Conclusion:** DVT stockings and leg exercise were very effective in preventing DVT among post-operative patients compare to positioning and foot elevation. Increasing age, male gender, high-BMI, diet pattern, impaired mobility were associated risk factor of developing DVT.

Key words: Prophylactic measures, deep vein thrombosis, post-operative patients.

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INTRODUCTION:

Deep vein thrombosis (DVT) is the condition; where formation of clot made up of blood in a deep vein, most commonly post-operative patients in the legs or pelvis.[1-2] Symptoms can include pain, swelling, redness, hot to touch and enlarged veins in the affected area.[3] The venous thromboembolism (VTE) consists; deep vein thrombosis (DVT) and pulmonary embolism (PE).[4] The other complication of deep vein thrombosis is Post-thrombotic syndrome (PTS) is a long-term complication.[5] According to World Health Organization approximately 1 per 1000 annually in adult populations over the worldwide coverage. The incidence slightly greater in men than women, about 67% of episodes manifest as DVT and 33% as PE with or without DVT.[6] India has reported a DVT incidence rate ranging from 9% to 20% in major lower limb surgery and malignancy has been reported as risk factor in 31% patients.[7] DVT can be cured with blood thinners and lifestyle changes. As prophylaxis measures, DVT stockings allows proper circulation and compression stocking helps in blood circulation and reduce swelling and pain.[8-9] In addition regular exercise beneficial, if legs swollen, red, hot to touch, these symptoms may reduce and improve. [10-11]

Objectives: Evaluate and compare the effectiveness of prophylactic measures on deep vein thrombosis among post-operative patients and find out the association between risk score of developing deep vein thrombosis with selected demographic and clinical variables.

Hypothesis:

H_1. There will be significant difference between experimental group and control group after providing prophylactic measure on deep vein thrombosis among post-operative patients of experimental group.

H_2- There will be significant association between risk of developing deep vein thrombosis among post-operative patients of experimental group with selected demographic and clinical variables.

METHODOLOGY:

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The quantitative research with true experimental post-test only control group design used in critical care unit of tertiary care super-speciality hospital. Samples were post-operative patients and selection was carried forward by simple random probability sampling technique. The sample size comprise of total 30 post-operative patients; randomly allotted in experimental group (n=15) and control group (n=15) with the slips of paper method of randomization. Patient who had a risk for developing DVT and aged above 41 year were included and samples who admitted with DVT, orthopaedic surgery, pregnancy, coagulation/vascular disorder, terminally ill and continuing anticoagulant therapy were excluded from the study. The study consists of demographic variable such as age, gender, occupation, family income, dietary pattern, personal habits, BMI and clinical variable includes Nature of surgery, mobility, co-morbidity, history of previous major surgery, previously documented DVT, family history of DVT, central venous catheter access, swollen leg and duration of surgery. In addition Modified Capirini DVT risk assessment scale was developed to assess risk of developing DVT with risk category namely low risk, moderate risk and high risk. After assessment the experimental group provided with knee length DVT stockings and leg exercise. And Modified Well's criteria for DVT designed to investigate effectiveness of prophylactic measures. The content validity was determined by experts and reliability ($r=0.81$ found reliable, $p<0.05$) was ensured through Cronbach's Alpha test. Ethical permission obtained from the Ethical committee SVIES. Inferential and descriptive statistics used with Excel and SPSS 20.

RESULT

I. Demographic-clinical data:

In experimental group majority of the post-operative patients were 6 (40%) age between 41-60 years, 8(53.33%) male, 8(53.33%) un-employed, 9(60%) earning between 3001-6000 /month, 11 (73.33%) non vegetarian, 3(20%) were using tobacco in their daily lives, 7(46.66%) were overweight, 9(60%) had elective surgery, 10(66.67%) very limited mobility, 3(20%) had hypertension, 2(13.33%) had diabetes mellitus, 3(20%) had central venous catheter access, 8(53.33%) had swollen legs and 7(46.66%) surgery duration was between 4hour 1 min to 5hour.

In control group majority of the post-operative patients were 8 (53.33%) age between 61-70 years, 9(60%) male, 8(53.33%) self-employed, 10(66.67%) were having income of 3001-6000 per month, 9(60%) non vegetarian, 4(26.66%) were using habit of tobacco chewing, 10(66.66%)

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were having healthy weight, 10(66.67%) had elective surgery, 11(73.33%) had very limited mobility, 2(13.33%) had hypertension and 3(20%) had diabetes mellitus, 6(40%) had central venous catheter, 6(40%) had swollen leg, 6(40%) surgery duration was 4 hour 1min to 5 hour.

II. Risk level of developing DVT

Table 1: Risk level of developing DVT among post-operative patients n=30

Sr. No.	Risk category	Experimental group (n=15)	Percentage (%)	Control group (n=15)	Percentage (%)
1	Low risk	0	0	0	0
2	Moderate risk	4	26.67%	6	40%
3	High risk	11	73.33%	9	60%
Total		15	100%	15	100%

Above table 1 data shows that; risk level of developing DVT was assessed by using Modified Caprini Risk Assessment Scale -in experimental group majority 11(73.33%) of post-operative patients had a high risk whereas in control group; majority 9(60%) of post-operative patients had a high risk of developing DVT.

III. Effectiveness of prophylactic measures on DVT and comparison of post-test in experimental group and control group

Table 2: Post-test score of DVT among post-operative patients n=30

S. No.	Level of probability symptoms	Experimental group (n=15)	%	Control group (n=15)	%	Chi square	't' value
1	No probability	8	53.33%	2	13.33%	χ^2=9.933 df= 4 p=0.04 significant (S)	t=3.777 p= 0.001**
2	Very low probability	4	26.67%	2	13.33%		
3	Low probability	2	13.33%	4	26.67%		
4	Moderate probability	1	6.67%	3	20%		
5	High probability	0	0	4	26.67%		
6	Very high probability	0	0	0	0		

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Total	15	100%	15	100%		

Above table 2 depicts that; in experimental group majority 8(53.33%) had no probability of developing DVT, whereas in control group; 4(26.67%) had high probability of developing DVT. The independent t-test was 3.777 greater than the table value which was significant level at 0.001.

Table 3: Mean, Standard Deviation of post-test score **n=30**

Group	Post-test DVT score	Mean difference
	Mean ± SD	
Experimental group (n=15)	1.13 ± 1.64	2.94
Control group (n=15)	4.07 ± 2.52	(29.4%)

Above mentioned table data depicts that; in the control group and experimental group mean was 4.07 and 1.13 respectively and standard deviation was 2.52 and 1.642 respectivley. The mean difference was 2.94.

IV. Association between risk score of developing DVT with selected demographic and clinical variables

Chi square analysis reveals that a selected demographic variables such as age ($\chi2$=8.182, df=2, p=0.017), gender ($\chi2$=6.234, df=1, p=0.026), diet pattern ($\chi2$=6.516, df=1, p=0.033) and BMI ($\chi2$=6.234, df=2, p=0.044) are significant variables to risk score of developing DVT and clinical variables such as; nature of surgery ($\chi2$=8.182, df=1, p=0.011), mobility ($\chi2$=10.909, df=1, p=0.004), swollen leg ($\chi2$=6.234, df=1, p=0.026) and duration of surgery ($\chi2$=11.165, df=3, p=0.011) are significant variables to risk score of developing DVT. Hence, for these demographic and clinical variables hypothesis (H_2) was accepted.

DISCUSSION

A similar research conducted by V. Balasaraswathy in Madurai (2017) on prophylactic measure of DVT, among 60 post-operative patients[12] in present study; 33.33% of samples of control group were in the age group between 41 and 60 years, which is almost similar to control group of supportive study (30%). In experimental group of present study 53.33% were un-employed and self-employers while in supportive study 60% were unemployed and self-employers. In the control group of current study; majority 73.33% of the post-operative patients had very limited

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mobility, in supportive study 76.7% had very limited mobility. In both studies all the 100% post-operative patients of experimental and control group had no any history of previously documented DVT. In experimental group of present article; majority 80% of the post-operative patients had no central venous catheter access while in supportive study 90% had no central venous catheter in situ. In both studies majority of the respondents in the experimental group were male.

In experimental group of current study; majority 73.33% of post-operative patients had a high risk of developing DVT while comparing to study of Madurai 53.3% had high risk. Whereas in control group of both study; 60% had a high risk and 40% had a moderate risk of developing DVT and none of the respondents had low risk of developing DVT. In present study, majority 53.33% of experimental group respondents had no symptoms of developing DVT, while in similar study; 46.7% had no symptoms of DVT. In both study 13.33% respondents had low probability.

A supporting article had 1.43 mean, 1.69 SD in experimental group varies in current article 1.13 mean, 1.64 SD in experimental group. When comparing the control group of both studies; 2.97 mean, 2.49 SD of supportive study varies 4.07 mean, 2.52 SD of current study.

In current research study t test value was 3.777 at 0.001 significant levels shows effectiveness of prophylactic measures (DVT stockings and leg exercise) given to experimental group, and also depicts that compare to control group intervention (positioning and foot elevation); experimental group intervention (DVT stockings and leg exercise) was more effective to minimize the probability level of occurring DVT among post-operative patients at critical care unit.

Current study reveals that a selected demographic variables such as age ($\chi 2=8.182$, df=2, p=0.017), nature of surgery ($\chi 2=8.182$, df=1, p=0.011), swollen leg ($\chi 2=6.234$, df=1, p=0.026) and duration of surgery ($\chi 2=11.165$, df=3, p=0.011) were significant to risk of developing DVT among experimental group. Contrast, in similar study; age ($\chi 2= 23.74$ P= 0.02) and the clinical variables such as duration of surgery ($\chi 2=20.45$ P=0.02) and swollen leg ($\chi 2=11.92$P=0.01) were significant to risk of developing DVT among experimental group.

A study held by S S.GAD and A Shiekh on prevention of deep vein thrombosis to evaluate effectiveness of leg exercises and positioning[13] more than half of respondents 53.3% were male,

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which is completely similar to present article, whereas in present study experimental group had very low probability of developing DVT symptoms than control group. Study findings of Andrew L. Muleledhu on prevalence and developing DVT among 82 patients who underwent major abdominal surgery, study reveals the risk associated in developing DVT were increasing age and obesity.[14] Current article also reveals that, increasing age and BMI were risk factors for developing DVT.

CONCLUSION

The prophylactic measures were effective in preventing development of deep vein thrombosis. The knee length DVT stockings and leg exercise found more effective than positioning and foot elevation. The age above 41 year, male patients, diet pattern, increased BMI, nature of surgery, immobility of person, swollen leg and long duration of surgery are the associated factors for development of DVT.

Conflict of interest: Author had no conflict of interest.

Source of funding: Self funded expenses and efforts.

Ethical consideration: Ethical clearance for this dissertation was taken from the institutional ethical committee (SVIEC) of Sumandeep Vidyapeeth Deemed to be University, Vadodara. There were no any harm to privacy, confidentiality and dignity to post-operative patients. Informed consent had been taken from all respondents and study has undertaken the all human rights.

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