Risk Factors for Deep Venous Thrombosis among Patients Admitted to Vascular Unit.

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Abstract

Background: Deep venous thrombosis (DVT) is an a major public health concern and important cause of morbidity and mortality worldwide; with an estimated annual incidence in developed countries 1 to 2 per 1,000 people each year. **The study aimed** to assess risk factors for deep venous thrombosis among patients admitted to vascular unit through Assessing patients' demographic characteristics, patients' educational needs regarding DVT and risk factors that lead to developing of DVT. **Study design**: a descriptive exploratory design was be utilized. **Setting:** this study was conducted at vascular surgical unit of Sohag university hospitals. **Subjects**: A purposive sample of 75 Patients with DVT were be recruited in the study. **Tools of data collection:** (1) patient structured interview questionnaire & (2) DVT risk factor assessment Tool. **Results:** More than half of the studied patients had unsatisfactory level of knowledge towards risk factors for DVT. Major of the studied patients had immobility, fracture, obesity, stroke, malignancy and chemotherapy as risk factors for DVT. There was a significant relation between risk assessment scale for DVT with total knowledge, patients' habits, age, gender, past medical &surgical history and body mass index of the studied patients **Conclusion:** There were many risk factors for DVT incidence, the most common risk factors related to patients daily habits. While family history and activity of daily living related factors were the least common risk factors. It was concluded that taking oral contraceptive pills were considered significant risk factor for DVT among female studied patients. There was a significant positive correlation between educational level and patients' total knowledge regarding DVT .**Recommendation:** Designing educational program for patients with DVT to improve their knowledge regarding risk factors for deep vein thrombosis and its potential associated complications with submission of educational handouts, posters, booklets and brochures.

Keywords: Deep venous thrombosis, Risk factors, Vascular unit.

Introduction:

Deep vein thrombosis (DVT); refers to an obstruction of a deep vein by thrombus associated with inflammation of the vein, usually in the legs or pelvis but occasionally in the arms. DVT more likely to develop in the lower limbs in an estimated 60 per cent of cases; there is a higher incidence in the left leg than in the right. In the venous circuit of the lower limbs, the most likely site of a DVT is in the deep leg veins (60 per cent of cases), with other sites including the femoral veins (22 per cent) and popliteal veins (7.8 per cent) (***Kesieme,et al.,2018)***

There are several risk factors affect patient with venous disorders to develop DVT such as; physical factors include (age, gender, immobility, smoking) & medical factors involve (congestive heart failure, hormone replacement therapy, indwelling catheters, major trauma ,recent surgery, stroke, metastatic end-stage malignancy , inflammatory bowel disease and thrombophilias) genetics factors include family history other factors related to long-distance travel, obesity, pregnancy. **(Kearon , Ageno & Cannegieter,2016).**

Approximately one-half of those with a DVT never have recognizable symptoms. The most common symptom is leg pain and tenderness in the calf muscles. One may also observe swelling or a change in color of one leg to purple or blue. These signs and symptoms may appear suddenly or may steadily develop over a short period of time. Symptoms are quite different if the clot breaks loose and travels to the lungs, causing a pulmonary embolism (PE). The symptoms of PE include chest pain, shortness of breath, rapid pulse, or a cough. There may also be a feeling of apprehension, sweating, or fainting. (**Vascular Disease Foundation, EU, 2018**)

DVT possible complications include short term complication such as *pulmonary*

embolism (PE); it is the potentially life-threatening consequences of DVT. Thrombus formed in lower extremity can travel to the lungs to produce pulmonary embolism (PE), which occurs when the thrombus obstructs a pulmonary artery. This known as *venous thromboembolism* (VTE). *Post-thrombotic syndrome; PTS,* is the *late and important complication* of DVT.The symptoms include pain, edema, skin changes, and ulceration. Older studies, reported post-thrombotic manifestations in up to two-thirds of patients with acute lower extremity DVT. ***(Kesieme, et al., 2018).***

Depending upon the risk for DVT, different preventive measures are recommended; Walking, calf exercises and Anti-embolism stockings to reduce venous stasis, hence the previous mentioned measures contribute to enhance leg muscle contractions to compress the veins and pump blood up towards the heart. Also making changes to lifestyle can reduce risk of getting DVT such as avoid smoking, maintaining a healthy weight or losing weight if obesity present. **(Hecht, 2015)**

Nursing management for patients who suffering from DVT focus on providing these patients with health education regarding anticoagulant medications, physiotherapy exercises and the practical wear ability of anti-embolism stockings. Patients need to be actively involved in health promotion activities, including self-assessment as Orem theory, review and maintenance of lifestyle changes, medication regimens, dietary intake, smoking and alcohol consumption. **(*Pandey, et al., 2014).***

Significance of the study:

Deep vein thrombosis (DVT) is a major preventable cause of morbidity and mortality worldwide. Venous thromboembolism (VTE), which includes DVT and pulmonary embolism (PE), affects an estimated 1 per 1,000 people and contributes to 60,000–100,000 deaths annually. **(Stone, et al., 2017)**

About 2-5% of people experience deep-vein thrombosis (DVT) during their lives. Death, disease recurrence, post-thrombotic syndrome, and excessive bleeding due to coagulant medications are among the most important DVT complications**. (Farzamnia, et al., 2016)**

In Egypt, more than one-third of all patients hospitalized for surgery or acute medical conditions are at high risk for developing DVT. However, only a small fraction of these patients receive appropriate DVT prophylaxis**. (Goubran et al., 2015)**

Aim of the study:

This study aimed to assess risk factors for deep venous thrombosis among patients admitted to vascular unit.

Research Question:

What are the risk factors for deep venous thrombosis among patients admitted to vascular unit?

Subjects and Methods

Research Setting:

This study was conducted at vascular surgical unit of sohag University hospitals. The unit consists of 15 beds which distribute into 4 main rooms and each room divided into separate sections. The study subjects will be taken from the previous mentioned setting because it has high flow patients with DVT.

Research Subjects:

Based on retrospective statistical data, It was found that the number of the patients with DVT who admitted vascular surgical department at sohag university hospital at (2017) were more over (200) patients, Purposive sample of (75) Patients with Deep vein thrombosis , who admitted to previous mentioned setting were be included in the study. The sample size was calculated according to equation based on patients admission with power of 80%, $\alpha = 0.05$ *Inclusion criteria:* Adult, conscious patients from both genders who had been diagnosed definitely Deep Venous Thrombosis (DVT), with different educational levels, able to comprehend instructions and agrees to participate in the study were be included in the study.

Tools for data collection:

Two tools were used in this study as the following:

1- Patient structured interview Questionnaire: This Questionnaire was designed by the researcher and written in

simple Arabic language after reviewing the relevant literatures and it was composed of three parts:

Part 1:

This part used to assess socio demographic characteristics of the studied patients such as age, gender, level of education, marital status, occupation, type of work, residence place, nature of living, and monthly income; it composed of (9) closed ended questions.

Part 2:

This part was concerned with assessing patient's medical data and Present health status on admission. It included (4) MCQ questions dealing with the medical diagnosis on admission, the chief complaint with hospitalization, investigations performed, management and medications are currently taken. It was developed by the researcher based on the related literature **(Bungard and Semchuk, 2017)**.

Part 3:

This part was concerned with assessing patients' knowledge. It was developed by the researcher based on the related literature. **(Caprini, 2013) & (Shahin, et al .,2017).**It was composed of 52 closed end questions divided into two sections.

Section (A): It included 37 true and false questions regarding DVT (meaning, signs & symptoms, risk factors, treatment methods and complications) and distributed as the following including the following subtitles:(A) Meaning, signs and symptoms included (6) questions, (B) Risk factors included (21) questions, subdivided into (3) parts, first risk factors related to patients included (6) questions second, risk factors related to pathological factors included (10) questions and third risk factors for women only included (5) questions. (C)Complications & treatment methods included (10) questions.

Section (B): It concerned with precautions regarding prevention of DVT recurrence. It included 15 true and false questions. The answer of the patients was (Yes) for correct and (No) for incorrect answer which divided into five subtitles as the following: (A) Therapeutic drugs included (2) questions (B) Nutrition included (4) questions, (C) Activity included (2) questions, (D) Daily life style included (3) questions,(E) Periodic follow up included (4) questions.

Scoring system:

The total score of patients' knowledge was 52grades for female patients and 47 for male patients. One grade was given for correct answer and zero for incorrect answer. Regarding ***(Bo et al., 2020),*** it was considered as the following:

- ≥ 70 % was considered a satisfactory level of knowledge, when the total grades were ≥ 36 grades for female patients and were ≥ 33 grades for male patients.
- < 70 % was considered an unsatisfactory level of knowledge, when the total grades were < 36 grades for female patients and were < 33grades for male patients.

2- **Deep vein Thrombosis risk factor assessment Tool:**

This tool was adapted and modified by the researcher after reviewing the recent related literatures to assess risk factors for DVT among patients admitted to vascular unit based on. **(Autar ,2015) & (Modi et al.,2016).**

It was divided into the following three parts:

Part 1:

This part was adopted from Autar, 2015. It was used to assess risk factors for DVT.It composed of seven parts divided into age specific groups, mobility, trauma risk category, current high risk groups, body mass index, special risk category and surgical intervention. It is valid and reliable tool (reliability ranged between 85% and 98%).

Scoring system:

Scoring of Autar scale parts divided in to seven parts, the first part age specific groups was scored from zero to five scores every specific group of age take one score. The second part mobility, the score was from zero to four each level of mobility takes one score. Regarding the scoring of the third part trauma risk category scored from one to four score every type of trauma takes one score. Also for the fourth part, the current high disease scored from one to seven score each disease took one score. Regarding the fifth part, body mass index the score was from zero to four, but for the sixth part, specific risk category scored from one to four scores and for the seventh part, surgical intervention scored from one to four one for each.

Regarding Autar scale assessment protocol the score ≤ 10 is considered low risk category, while the score range between 11-14 considered moderate risk category and the score ≥15 considered high risk category.

Part 2:

This part concerned with assessing patient related factors, it included questions to assess (body mass index, patient's habits and activity of daily living: It included (19) questions which were grouped into (3) subtitles as the following: :(A) Weight and Height measurement. (BMI scale) included (1) question. (B)Daily habits included (7) questions, (C) Daily activity and exercise included (11) questions.

The total scoring of body mass index had been calculated by dividing between total body weights per double individual's length by meter. Consequently calculated as if BMI < 18 (underweight), from 19 to 24 (healthy weight), from 25 - 29 (over weight), from 30 - 39 (obesity) and > 40 (morbid obesity).

Part 3:

This part included (33) questions concerned with assessing patients' past medical history, family history previous surgical history among patients admitted to vascular unit. These statements distributed as the following (A) Past medical history. Included (28) questions, (B) family history included (2) questions, (C) Previous surgical history included (3) questions.

Past history included (28) questions about history of Cardiac diseases (3)questions ,vascular disorders (2) questions ,blood disorders (6) disorders , musculoskeletal disorders (3) questions ,respiratory disorders (1) question, digestive and metabolic disorders (2) question, neurological disorders (2) questions , risk factors for women only (5) questions and other risk factors (4) questions.

Scoring system:

Each question answered by the patient through using two options, which Yes was taken one point and No was taken zero. The total score of risk factors explain degree of severity that leads to incidence of DVT was equal (33) grades which distributed as the following: past medical history (28) grades, family history (2) grades and previous surgical history (3) grades .

Operational design:

The operational design included preparatory phase, content validity, pilot study and field work.

Preparatory phase:

It included reviewing of related literature, and theoretical knowledge of various aspects of the study using books, articles, internet, periodical and magazines to develop tools for data collection.

B-Tool validity and reliability:

Content validity

Content validity was conducted to determine whether the tools cover an appropriate and necessary content as well as its relevance to the aim of the tools and study.

Testing ***validity*** was ascertained by a group of 7 experts in medical surgical nursing specialist to determine whether the tools measure what supposed to measure. The expertise reviewed tools for clarity, relevance, applicability, comprehensiveness, simplicity and minor modifications were done. While, ***reliability*** of the study tools was done by Alpha Cronbach test. The reliability score for patients' knowledge, factors affecting DVT among patients' admitted to vascular unit was **0.859.** Consequently, this value indicates high internal consistency of the used tools.

Pilot study:

The pilot study was conducted on 8 patients (10% of the total study sample) to test clarity, feasibility, validity, reliability and applicability of the tools used in this study. The patients who were included in the pilot study were included to the sample because no modification was done after conducting pilot study.

Field Work:

The purpose of the study was simply explained to the patients' who agreed to participate in the study prior to any data collection. The actual work of this study started and completed within three months from the 1st day of October 2019 and was completed by the end of December 2019. Data were collected by the researcher during patients' interview three days per week (Saturday, Sunday and Monday), at the morning and afternoon shift from 9.00 Am to 2.00 pm in vascular unit at Sohag university hospitals.

The time needed for completing the tools was about one hour for every patient. The patients assured that the information collected would be treated confidentially and that it would be used only for the purpose of the study (verbal

consent was taken from the patients).

Firstly, the investigator collected data regarding patients' demographic characteristics and knowledge regarding DVT signs, symptoms, treatment and complications also precautions to prevent recurrence including (Therapeutic drugs, Nutrition, Activity, daily life style, and Periodic follow-up with the physician**.**

Then the investigator collected data regarding patients 'risk factors for DVT including (patient habits and lifestyle about the nutritional status, smoking and motor activity in relation to daily life, exercise and body mass index), patient's medical data (previous, family and surgical history), and current health status (medical diagnosis ,symptoms on admission , investigations performed and current medications actually taken.) for patients' admitted to vascular unit through patient structured interview questionnaire and deep vein thrombosis risk factors assessment tool.

Administrative design:

An official permission was obtained from the medical director of vascular unit at sohag University hospitals in which the study will be conducted**.**

Ethical consideration:

The ethical research considerations in this study include the following:-

1- The research approval was obtained from scientific research ethical committee in faculty of nursing at Sohag University before starting the study, the general director of Sohag university hospitals as well as the Director of vascular surgical department.

2- The researcher clarified the objective and aim of the study to the patients included in the study.

3- The researcher assured maintaining confidentiality of the subject data.

4- Patients informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time.

Statistical design:

The collected data were organized, tabulated, graphically and statistically analyzed using the Statistical Package for Social Science (SPSS). Descriptive statistics including frequency, distribution, mean median, standard deviation and inter- quartile range were used to describe different characteristics. The statistical analysis was done using percentage, range, chi square (x^2**)**, and Pearson correlation coefficient (r). Also; linear correlation conducted to show correlation between knowledge score, factors affecting DVT among patients' admitted to vascular unit.

Results:

Table (1): represents that 37.3% of the studied patients were aged above 60 years, while 53.3% were female and 34.7% of the studied patients had moderate qualification. Moreover, 68.0% were married. Also 52.0% of the studied patients weren't having work and for those who work 54.7% the nature of their work requires prolonged sitting and about 62.7% were coming from rural area as well as 94.7% of them were living with their family and 85.3% of them had monthly income not enough for treatment.

Figure (1): shows that 48.7% of the studied patients had a satisfactory level of knowledge and 51.3% of them had unsatisfactory level of knowledge regarding risk factors for deep venous thrombosis.

Table (2): clarifies that 33.3% of the studied patients were smokers and 46.7% of them ate high fatty foods. In addition, 68.0% of them didn't drink appropriate amounts of fluids. More over 90.7% didn't practice any activity continuously, 65.3% weren't always moving and didn't do physical exertion and 66.7% of them were sitting permanent for long periods.

Table *(3):* Shows that regarding risk factors related to past medical history related of cardiac diseases, 41.3% of the studied patients suffered from Hypertension. Regarding risk factors related to vascular disorders, 25.3% of them had varicose veins within legs. Moreover, regarding risk factors related to blood disorders 22.7 % and 16.0% % of them had iron deficiency anemia and blood genetic disorders. In addition, 21.34% and 42.7% of them had fracture of the pelvis or thigh within a month and excessive weight gain as risk factors related to musculoskeletal disorders.

Figure (2): reveals that 42.7 %, 49.3% and 50.7 % of the studied patients had cardiac diseases, blood and musculoskeletal disorders respectively as risk factors for DVT. In addition, 29.3%, 26.7 % and 26.7 % of them had vascular, neurological disorders and women related factors respectively**,** 24% and13% had respiratory and digestive &metabolic disorders as risk factors for DVT. More over 33.3% of them had other risk factors for DVT as malignancy

Table (4): Revealed that there was a significant positive correlation between educational level and patients' total knowledge regarding DVT risk factors with P value= 0.000.

Table (5): Reveals that there is a highly significant positive correlation between risk assessment scale with Patient habits with p value =0.001, and a significant relation between risk assessment scale with past medical & surgical history of the studied patients with p value =0.024 and 0.022 respectively. While there no significant relation between risk assessment scale with family history of the studied patients with p value =0.324.

Figure (3): Reveals risk categories of the studied patients according to Autar DVT scale, 32% had classified low risk, 44% were considered moderate risk and 24% were considered high risk.

Table 1: Percentage distribution of the studied patients' regarding demographic characteristics (n. =75).

Demographic characteristics		Studied patient	
		n.	%
Age	<30 years	12	16.0
	From 30 to 45 years	15	20.0
	From 46 to 60 years	20	26.7
	More than 60 years	**28**	**37.3**
Gender	Male	35	46.7
	Female	**40**	**53.3**
Educational Level	Illiterate	23	30.7
	Reads and writes	12	16.0
	Moderate qualification	**26**	**34.7**
	High qualification	14	18.7
Marital Status	**Married**	**51**	**68.0**
	Not Married	24	32.0
Occupation	works	36	48.0
	Not working	**39**	**52.0**
Nature of work	Requires physical exertion	34	45.3
	requires prolonged sitting	**41**	**54.7**
Residence Place	City (Urban)	28	37.3
	Village (Rural)	**47**	**62.7**
Nature of living	Live alone	4	5.3
	with family	**71**	**94.7**
Monthly income	Enough	11	14.7
	Not Enough	**64**	**85.3**

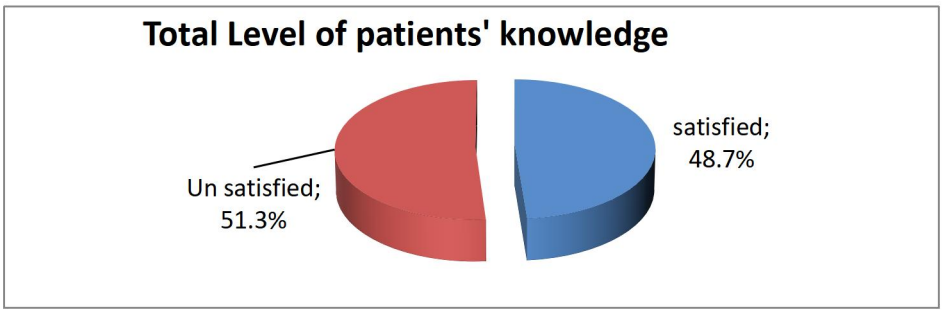

Figure (1): Total level of knowledge among the studied patients regarding DVT meaning, signs, symptoms, risk factors, treatment, complications and precautions to prevent recurrence. (n. =75).

Table (2): Percentage distribution of the studied patients' regarding their personal habits (n. =75).

Patient habits	Studied patients (n.=75)			
	(Yes)		(No)	
	N.	%	N.	%
Smoking.	**25**	**33.3**	50	66.7
Eating high fatty foods.	**35**	**46.7**	40	53.3
Drinking appropriate amounts of fluids.	24	32.0	**51**	**68.0**
Practicing any activity continuously.	7	9.3	**68**	**90.7**
Moving always and doing physical exertion.	26	34.7	**49**	**65.3**
Sitting permanently for long periods.	50	66.7	**25**	**33.3**

Table (3): Percentage distribution of the studied patients' regarding risk factors related to past medical history. (n. =75).

Past Medical History	Studied patients(n.=75)			
	Yes	%	No	%
D) Past Medical History: Do you suffer from history of:				
Cardiac diseases:				
1) Hypertension.	**31**	**41.3**	44	58.7
2) Chronic heart disease.	3	4.0	72	96.0
3) Recent myocardial infarction less than a month ago.	2	2.7	73	97.3
Vascular disorders:				
4) Previous deep vein thrombosis.	6	8.0	69	92.0
5) Varicose veins within legs.	**19**	**25.3**	56	74.7
Blood disorders:				
6) Iron deficiency anemia.	**17**	**22.7**	58	77.3
7) Polycythemia**.**	6	8.0	69	92.0
8) Thrombophilia.	8	10.7	67	89.3
9) Platelet disorders.	6	8.0	69	92.0.
10) Blood genetic disorders such as Positive Factor V Leiden.	**12**	**16.0**	63	84.0
11) Recent septicemia or infection within a month.	4	5.3	71	94.7
Musculoskeletal disorders:				
12) Presence of A splint on leg before DVT.	11	14.7	64	85.3
13) Fracture of the pelvis or thigh or leg within a month.	**16**	**21.34**	59	78.66
14) Excessive weight gain (obesity) before DVT.	**27**	**42.7**	43	57.3

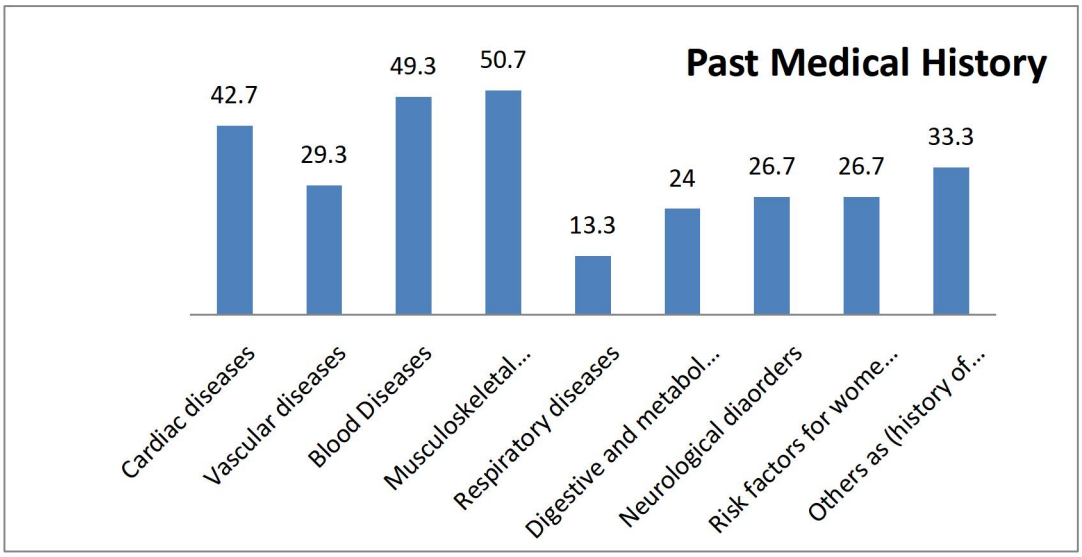

Figure (2): Percentage distribution of the studied patients' regarding risk factors related to past medical history. (n. =75).

Table (4): Correlation between educational level and patients' total level of knowledge (n. =75).

correlation		Total Knowledge		r	P. value
		Yes	No		
Education Level	Illiterate	4	15	0.683**	**0.000**
	Reads and writes	8	4		
	Intermediate qualification	6	24		
	High qualification	10	4		

**. Correlation is significant at the 0.01 level (2-tailed).

Table (5): Relation between risk assessment scale with Patient habits, past medical history, family history and surgical history of the studied patients.

Items		Risk assessment scale			
		mean± STD	T	r	P. value
Patient habits	No	10.8±2.79	2.317	2.037	**0.001**
	Yes	12.6±2.03			
Past medical history	No	10.9±2.67	1.185	0.237*	**0.024**
	Yes	10.4±1.59			
Family history	No	10.35±2.03	0.994	0.116	**0.324**
	Yes	10.83±2.14			
Surgical history	No	10.53±2.26	2.381	2.045	**0.022**
	Yes	12.75±1.24			

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

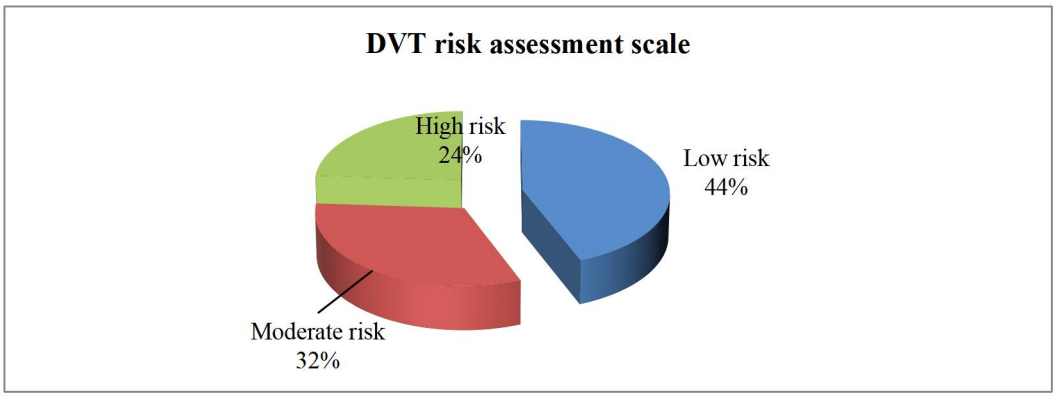

Figure (3): Percentage distribution of the studied patients according to Autor DVT risk assessment scale:

Discussion

The finding of the present study revealed that more than one third of the studied patients their age were more than 60 years, from the researcher point of view this result may be due to associated risk factors with old age supporting these findings by **White, 2018** who carried out study about *"the epidemiology of venous thromboembolism"*. Who reported that the incidences of DVT increase sharply with age. The incidence increased among patients 60 years of age or older was more than 4-times

that among patients younger than 50 years of age.

Regarding to ***gender,*** the present study indicated that majority of the studied patients were female, from the researcher point of view this result may be due to excessive consumption to contraceptive pills. This result goes in the same line with **Roach, et al, 2018,** Who carried out study about "Sex *difference in risk of second but not of first venous thrombosis: paradox explained*." And represented that Rates are slightly higher in women than men.

While, it is contradicted by **Crous-Bou, Harrington & Kabrhel, 2016,** who carried out study about" *Environmental and genetic risk factors associated with venous thromboemb*olism." And found that Incidence is about 18% higher in males more than in females**.**

The result of the present study indicated that majority of the studied patients were moderate qualification, from the researcher point of view this may be due to increase awareness for importance of education in our society. This result accepted with **Cook, et al, 2018,** who carried out study about *"Deep venous thrombosis in medical-surgical critically ill patients: prevalence, incidence, and risk factors"* and found that the majority of the studied patients were moderate education.

While it is contradicted with findings of **Delis, et al, 2018.** who stated that more than half of the studied patients were illiterate and ignorant about presence of DVT, in their study titled "*Incidence, natural history and risk factors of deep vein thrombosis in elective knee arthroscopy".*

The result of the present study showed that more than two third of the studied patients were married, it may be due to culture in our society that people married at young age so most studied cases still married as well as stressful events between partners predisposing to increase risk of DVT. This result agreed with **Wik, et al, 2018,** who carried out study about*" long-term quality of life after pregnancy-related deep vein thrombosis and the influence of socioeconomic factors and comorbidity"* and found that majority of the studied patients were married as a result of early time engagement of all studied patients.

Regarding to occupation, the present study revealed that half of the studied patients were not having work, from researcher point of view

this result may be due to presence of associated multiple risk factors for DVT, including aging; immobilization; surgery; trauma; stroke; or the patient's comorbid medical conditions, such as infection, inflammatory bowel disease, or cancer that hinder the patient's capability to work.

This result is supported with **Tsai, et al, 2018,** who carried out study about *"cardiovascular risk factors and venous thromboembolism incidence: the longitudinal investigation of thromboembolism etiology"* and found that majority of the studied patients were not working and did not exert any physical activity.

The result of the present study revealed that more than half of the studied patients their works required prolonged sitting, from researcher point of view this result may be due to hemostatic effect of reduced physical activity and Immobility on the blood flow in the blood vessels, supporting these findings by **Rosendaal, 2016,** who carried out study about *"Venous thrombosis: a multiclausal disease" ,* and found that majority of the studied patients their work did not require physical exertion and had prolonged sitting for long periods.

While it is contradicted with findings of **White, 2018** who carried out study about *"the epidemiology of venous thromboembolism"*. Who reported that the incidences of DVT didn't influence by physical activity, also the majority of the studied patients their work required physical exertion.

The result of the present study revealed that more than half of the studied patients had residence in rural area, from researcher point of view this result may be due to insufficient health care services, far distances to available hospitals also increase cost of transportation so there is a high risk of being vulnerable to chronic diseases. This result accepted with **Silverstein, et al, 2016.** Their own study title was *"Trends in the incidence of deep vein thrombosis and pulmonary embolism"*. Who represented that majority of the studied group admitted from rural area.

While it is contradicted with findings of ***Heit, et al, 2016,*** their own study title was *"The epidemiology of venous thromboembolism*" and found that more than half of the sample were living in urban area.

The result of the present study showed that majority of the studied patients lived with their families; from researcher point of view this result may be due to culture in our society that connected people with family and relatives from birth to death. This result is in agreement with **Beckman, et al, 2019,** their own study title was "*venous thromboembolism: a public health concern*".

While it is contradicted with findings of **McLendon & Attia, 2018,** who found that majority of the studied patients lived alone away from their families, in his study about *"deep venous thrombosis (DVT) risk factors"*

The result of the present study showed that majority of the studied patients were having monthly income not enough for treatment expenses, from researcher point of view this result may be due to low socioeconomic status of people in our society, expensive costs of therapy, increase cost of living and requirements for individuals and family.

This result is supported with ***Abdel-Aziz & Elfawwal, 2014.*** Who carried out study about *Incidence of deep venous thrombosis in stroke patients in medical intensive care unit zagazig university hospitals, Egypt*. Represented that more than three quarters of the studied sample hadn't insufficient income ,While, it is contradicted with findings of **Kahn, et al ,2018** who found that more than half of the studied patients had monthly income enough for treatment. In their study about *"Prospective evaluation of health-related quality of life in patients with deep venous thrombosis"*.

The result of the present study revealed that most of the studied patients had an unsatisfactory level of knowledge regarding deep vein thrombosis meaning, signs, symptoms, risk factors, treatments, complications and precautions to prevent recurrence. From researcher point of view; this result may be due to multiple factors such as: advanced age and low level of education of majority of the studied patients, low

socioeconomic status, lack of health care services and health education in society.

Contradiction to these findings, ***Ahmed, et al , 2020,*** who carried out study About "*Assessment of Nurses' Knowledge and Practice about Venous Thrombo Embolism for Cancer Surgery "Patients* found that majority of the studied patients had satisfactory level of knowledge regarding deep vein thrombosis and its prevention; and said that this result may be due to impact of DVT awareness campaigns organization by their DVT society in their developing countries **.**

The results of the present study revealed that majority of the studied patients were obese (BMI ≥30 kg m−2). From researcher point of view this result may be due to the majority of the studied patients didn't follow any regular physical exercise regimen and obesity has a strong correlation with increased risk of DVT. Also Obesity can interact with other environmental or genetic factors and pose a significantly greater risk of DVT.This result accepted with **Klovait, et al, and 2018**. Who represented that obesity, can influence DVT rate, severity and increase the risk of DVT recurrence, in their study title about *"Obesity as a causal risk factor for deep venous thrombosis* **".**

. While, it is contradicted with findings of **Davies, 2017,** who carried out study about *"Obesity and lower limb venous disease–The epidemic of phlebesity*" , and found that majority of the studied patients were overweight (BMI ≥25 kg m−2) **.**

The result of the present study showed that, more than one third of the studied patients were smokers, from researcher point of view this result may be due to diffuse of smoking habit between males in our society and lack of health education program for this bad health habit. This finding is supported by **Prescott et al, 2018,** who represented that smoking increase the risk of DVT among studied Patients. In their study about *"Smoking and risk factors in deep vein thrombosis".* While it isn't congruent with **Beckman, et al, 2019,** who carried out study about *"venous thromboembolism: a public health concern*." And found that majority of the studied patients were not smokers**.**

Regarding to, drinking appropriate amounts of fluids, the result of the present study showed that, more than half of the studied patients didn't drink appropriate amounts of fluids, from researcher point of view this result may be due to advanced age of patients, lack of knowledge about benefits of daily drinking appropriate amounts of fluids especially with aging and its effects on blood circulation and dehydration that considered an important risk factor for DVT. This result accepted with **Elias, et al, 2016,** who carried out study about *"Dehydration as a possible cause of monthly variation in the incidence of venous thromboembolism* " and represented that two third of the studied patients didn't drink appropriate amounts of fluids.

The result of the present study revealed that, the majority of studied patients weren't moving always or doing physical exertion, from researcher point of view this result may be due to inability to move as result of aging, trauma, disease, surgery or malignancy or lack of knowledge regarding benefits of daily movement or doing physical exertion. This result agreed with**, Wang, et al, 2016,** who carried out study about, *Active ankle movement, may prevent deep vein thrombosis in patients undergoing lower limb surgery.* And found that majority of the studied patients weren't moving always or doing physical exertion after surgery. While, it is contradicted with findings of **Thachil, 2016,** who carried out study about *"Deep vein thrombosis".* And found that majority of the DVT cases occurred in studied patients were moving.

The result of the present study revealed that, the majority of studied patients were Siting permanently for long periods, from researcher point of view this result may be due to aging or surgery; trauma; childbirth; stroke; or the patient's comorbid medical conditions, such as infection, inflammatory bowel disease, or cancer. This result goes in the same line with **Sartori, et al, 2021, who** carried out study about *"Relevance of immobility as a risk factor for symptomatic proximal and isolated distal deep vein thrombosis in acutely ill medical*

inpatients"**.** And found that majority of the studied patients were sitting or bedridden most of time**.**

While, it is contradicted with findings of **Samama & Sirius Study Group2016,** who carried out study about *"An epidemiologic study of risk factors for deep vein thrombosis in medical outpatients "* And found that majority of the studied patients were moving and had DVT but in presence of other risk factors **.**

Regarding to risk factors related to past medical history, it included ***cardiac diseases*****,** such as hypertension. In this study majority of the studied patients had hypertension as cardiac diseases. This result agreed with **Huang, Li & Jiang, and 2016,** who carried out study about *Association between hypertension and deep vein thrombosis after orthopedic surgery.* And found that most of the studied patients had hypertension and there was significant correlation between hypertension and DVT occurrence.

Regarding ***vascular disorders,*** risk factors of past medical history included presence of varicose veins within legs. In this study many of the studied patients had varicose veins within legs as risk factor for DVT. This result accepted with **Chang, et al, 2018,** who carried out study about *"Association of varicose veins with incident venous thromboembolism and peripheral artery disease".* And found that most of the studied patients had varicose veins with legs and there was significant correlation between varicose veins in legs and DVT incidence. .

Regarding risk factors related to ***blood disorders*** such as, anemia. In this study many of the studied patients had anemia as risk factor for DVT and the risk increased with presence of other associated risk factors as aging, surgery and immobility. This result accepted with **Feng, et al, 2020,** who carried out study about *"Preoperative anemia and total hospitalization time are the independent factors of preoperative deep venous thromboembolism in Chinese elderly undergoing hip surgery".* And found that most of the studied patients had anemia as an independent risk factor for DVT in elderly patients undergoing hip surgery.

While, it is contradicted with findings of **McLendon & Attia, 2018,** who carried out study about**"** who" *Deep venous thrombosis (DVT) risk factors* .And found that majority of the studied patients didn't have anemia.

Regarding risk factors related to ***musculoskeletal*** **disorders**, it included pelvis and thigh fracture within a month and excessive weight gain (obesity) before DVT. In this study more than one third of the studied patients had obesity as risk factor for DVT and the risk increased especially when combined with other risk factors, not moving for long periods of time such as when on bed rest in a nursing home or hospital setting, having a cast, or during a long flight can increase the risk This result accepted with **Klovaite, et al , 2018)** who carried out study about**,** *"Obesity as a causal risk factor for deep venous thrombosis",*and found that the majority of the studied patients had obesity as risk factor for DVT.

In this study, from the researcher point of view, *pelvis or leg fracture within a month*, represented significant risk factor for DVT, this agreed with **Fu, et al, 2020,** who carried study about "*Deep vein thrombosis in the lower extremities after femoral neck fracture: a retrospective observational study."* And found that fractures of the pelvis and lower extremities are considered significant risk factor for DVT.

The result of the present study revealed that there was a highly significant relation between patients' total level of knowledge regarding risk factors for DVT and their educational level. This result agreed with **Hofmann, et al., 2018,** who carried out study about *"Educational level, anticoagulation quality, and clinical outcomes in elderly patients with acute venous thromboembolism: a prospective cohort study".* And found that lower education levels were correlated with lower knowledge about risk factors for DVT especially among elderly patients and increase the rates of DVT occurrence and its fatal complications.

The result of the present study revealed that there was a significant positive correlation between risk assessment scale for DVT with patients habits of, from the researcher's point of view this result may be due to un healthy dietary habits as increased calorie consumption, fatty foods and decreased physical activity and water intake among studied that lead to increase BMI and obesity which considered prothrombic state and significant risk factor for DVT,this result accepted with, **Liu et al., 2020,** who carried out study about " *Risk Assessment of Deep-Vein Thrombosis After Acute Stroke: a Prospective Study Using Clinical Factors".* And found that there was a strong association between patients' habits and increasing risk assessment scale for DVT in the studied patients.

The result of the present study revealed that there was a significant relation between risk assessment scale for DVT with the surgical history of the studied patients, from the researcher point of view this may be due to endothelial Damage of the walls of the blood vessels following surgery that stimulates platelet activation and clot formation, this accepted with **Büyükyılmaz, et al., 2018**,who carried out a study about " Risk level analysis for deep vein thrombosis (DVT): A study of Turkish patients undergoing major orthopedic surgery. " and fount that surgical history increases the risk assessment scale for DVT.

The result of the present study revealed that there was no significant relation between risk assessment scale for DVT and family history of the studied patients, from the researcher point of view heredity plays weak role in DVT incidence as many of the studied patients didn't have family history for DVT. This result was accepted with **Bérard, et al., 2019,** who carried out a study about" Risk factors for the first-time development of venous ulcers of the lower limbs: the influence of heredity and physical activity." and found out that heredity plays less efficacy role in DVT incidence...

While, it is contradicted with the findings with **Mireva, 2020,** who carried out a study about "Heredity and the influence of style of life and bad habits on development of chronical venous disease." And found that heredity plays a significant role in increasing the risk scale of DVT incidence.

Conclusion:

Based up on the results of current study, it concluded that:

More than half of the studied patients who suffering from deep vein thrombosis had unsatisfactory level of knowledge regarding DVT meaning, signs and symptoms, risk factors, complications and precautions to prevent recurrence.

There were many risk factors for DVT incidence, the most common risk factors related to patients daily habits. While family history and activity of daily living related factors were the least common risk factors. Also it was concluded that taking oral contraceptive pills were considered significant risk factor for DVT among female studied patients. It was concluded that that there was a significant positive correlation between educational level and patients' total knowledge regarding DVT risk factors. ***Recommendations****:*

The results of this study projected the following recommendations:

Designing health educational program for patients with DVT to improve their knowledge regarding risk factors for DVT incidence, potential life threatening complications, importance of compliance, follow up and precautions to prevent DVT recurrence in the future.

Submission of educational handouts, posters, booklets and brochures regarding risk factors for DVT and its potential associated complications with submission of educational handouts, posters, booklets and brochures.

Further study is recommended to generalize the results of the current study

Establishing deep vein thrombosis counseling professional team to provide knowledge about DVT risk factors and its associated potential life threatening complications.

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