



*Research Paper*

**NURSES KNOWLEDGE AND PRACTICES REGARDING RISK FACTORS  
AND PREVENTION OF PATIENTS DIAGNOSED WITH DEEP VEIN  
THROMBOSIS**

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**Abstract**

In this era of advance technology, many changes are occurring in health care sector regarding the delivery of quality care to patients and prevention of disease. The role of nurse is imperative for the prevention and management of diseases as well as provision of best quality care to the patients. The role of nurse changed from just bedside to greater responsibility of identification of risks and prevention of patients from different diseases. Among preventive diseases, thrombotic disorders are the one and leading cause of high mortality and morbidity throughout the world. The most serious and dangerous vascular diseases among patients are deep vein thrombosis and venous thromboembolism. These considered to be third main vascular diagnosis after stroke and heart attack Deep vein thrombosis is one of the vascular disease that affect the ambulatory as well as hospitalized patients. The study design was cross sectional descriptive in nature. The study was conducted at a hospital where no protocol on deep vein thrombosis identification and prevention present. The sample size was 130 and convenient sampling technique used to collect data. The result of current study about general knowledge of nurses regarding deep vein thrombosis indicated that majority nurses had satisfactory/adequate level of general knowledge on DVT. Moreover, low level of nurses' knowledge about the risk factors of deep vein thrombosis. The present study scores of nurses' knowledge on the prevention of deep vein thrombosis indicated that majority nurses were give wrong answer to the questions about the prevention of DVT. The statistics of present study about nurse's practices on the prevention of deep vein thrombosis depicted that most of the nurses replied with the choice "never" to the most of statements given in the questionnaire of nurses practices about prevention of DVT. The questions scored more on never choice were as: "Use of the graduated compression stockings." (79.5%), "Educating the patients to avoid injury" (76.8%), "Administering anticoagulants as preventive measure in clinic" (75.3%) etc. The findings of present study concluded that majority nurses have low level of knowledge on risk factors and prevention of deep vein

thrombosis and poor or unsatisfactory practices of nurses about the preventive measures of deep vein thrombosis. The reason behind these findings might be lack of clinical practice guidelines and inadequate training at in service level in the hospital.

Key words: Nurses, Practice, Risk Factors, Prevention, Deep Vein Thrombosis etc.

## INTRODUCTION

In this era of advance technology, many changes are occurring in health care sector regarding the delivery of quality care to patients and prevention of disease. The role of nurse is imperative for the prevention and management of diseases as well as provision of best quality care to the patients. The role of nurse changed from just bedside to greater responsibility of identification of risks and prevention of patients from different diseases (Blout, Rose, Suessmann, Coleman, & Selekman, 2012; Lazarou & Kouta, 2010). Among preventive diseases, thrombotic disorders are the one and leading cause of high mortality and morbidity throughout the world (Korubo, Ekeke, & Omuakwe, 2015).

The report of World Health Organization depicted high mortality rate from non-communicable diseases globally. Heart attacks, stroke and hepatitis accounts majority deaths in underdeveloped countries (Al-Mugheed & Bayraktar, 2018). The most serious and dangerous vascular diseases among patients are deep vein thrombosis and venous thromboembolism. These considered to be third main vascular diagnosis after stroke and heart attack (Kraus et al., 2015). Deep vein thrombosis is one of the vascular disease that affect the ambulatory as well as hospitalized patients. The occurrence of deep vein thrombosis is 48/100,000 to 160/100,000 according to various reports of incidences (Theerakulpisut, Wongsurawat, & Somboonporn, 2018).

The consequences of this disease is fatal and need a through efforts to identify the causes, prevention and main reasons of huge mortality and morbidity (Kesieme, Kesieme, Jebbin, Irekpita, & Dongo, 2011). According to the Center for Disease Control and Prevention (CDC) report annually 60,000–100,000 mortality approximately related to venous thromboembolism (VTE). The patient die within one month after diagnosis of venous thromboembolism (Ekwere, Ino-Ekanem, & Ekanem, 2015). Moreover, of the estimated 370,012 venous thromboembolism -related deaths predicted per annum, 93% resulted from either a sudden fatal pulmonary embolism or an undiagnosed, untreated venous thromboembolism. (Bevis & Smith, 2016; Blann & Lip, 2006; Cohen et al., 2007).

Deep vein thrombosis is the presence of blood clot in one or more deep vein of the body usually in the leg. It is asymptomatic and majority lead to long term complication. Most of the time the DVT cases remain undiagnosed and considered as a silent killer (Blann & Lip, 2006). One of the life threatening complication of deep vein thrombosis is the venous thromboembolism which lead to pulmonary embolism and eventual death among patients. Pulmonary embolism is the third leading cause of death among adults. Moreover, the chronic complications are post thrombotic syndrome and recurrent deep vein thrombosis. This put significant burden on the patients both socially and economically (Organization, 2017). In spite of massive advancement in medical diagnosis and treatment, the diagnosed case rate is less than the actual occurrences of pulmonary embolism (Agharezaei, Bahaadinbeigy, Tofighi, Agharezaei, & Nemati, 2014).

There are multiple risk factors that predispose the patient to deep vein thrombosis. One of them is the Virchow's triad resulted from stasis of blood, altered blood coagulation and vessel wall injury. Moreover, prolong immobilization, indwelling intravenous devices, obesity, lowered body mass index, old age, family history of DVT, major surgeries, history of varicose veins, trauma, smoking, alcohol, cardiac diseases, inflammation, use of hormonal replacement therapy, ischemic stroke, cancer treatment etc. are the risk factors of deep vein thrombosis (Kearon et al., 2012).

Among all of these risk factors the stasis of blood and vessel wall injuries are the important reasons of deep vein thrombosis after trauma or surgery, whereas altered blood coagulation is accountable for majority spontaneous DVT cases (Agharezaei, Bahaadinbeigy, Tofighi, Agharezaei, & Nemati, 2014). Additionally, obesity is one of the major cause of metabolic disorders likely diabetes mellitus which predispose the persons for the development of deep vein thrombosis leading venous thromboembolism (Tapson et al., 2007). Therefore, the prevention and management of deep vein thrombosis is imperative to avoid negative adverse events by early identification of risk factors and use of appropriate methods of preventions by health care providers. It is imperative to assess the risk of venous thromboembolism VTE in 24 hours after admission of the patient to hospital to identify the severity of clinical condition as recommended by National Institute for Health and Care Excellence (Centre, 2014).

Many ways of prevention of deep vein thrombosis utilized in the hospital to minimize the adverse consequences of it. The mechanical method of deep vein thrombosis include the use of compression devices namely, intermittent pneumatic compression, elastic stockings, and foot compression devices may prevent the development of deep vein thrombosis. Moreover, anticoagulating therapy in the form of low molecular weight heparin or simple heparin is the pharmacological approach to prevent the deep vein thrombosis development cases (Agharezaei, Bahaadinbeigy, Tofghi, Agharezaei, & Nemati, 2014). Additionally, early ambulation after surgery may prevent deep vein thrombosis and bed rest is important element for prevention of deep vein thrombosis after surgery. Nurses need to do interventions that help to prevent the deep vein thrombosis preoperatively. Therefore, education of nurses regarding early identification and prevention of deep vein thrombosis play an important role in management of it (Cooray & Lake, 2015).

Range of motion exercises likely foot and leg exercises, leg elevation, assessment of risk factors and formulation and implementation of interventions to reduce the venous thromboembolism is the main goal of nursing interventions in hospitalized patients. Nurses play an important role to assess a patient's awareness and to administering prophylaxis for venous thromboembolism (Geerts et al., 2001). Nurses give education and practice based information to the patients regarding the administration of subcutaneous low molecular weight heparin (Lim & Davies, 2014).

Nurses need to instruct patients about dealing and managing prophylaxis venous thromboembolism. They also do play a vital role, acting as an advocate for patients by guiding them to access information relevant to their condition at its best (Doyle et al., 2013). It is a well-known fact that nurses form the largest professional group involved in direct clinical care within a health-care system. Nurses with expert knowledge and strong leadership skills can have a prominent role in influencing and implementing changes to health-care practices (Collins, MacLellan, Gibbs, MacLellan, & Fletcher, 2010; Schober, 2007).

There is a need to increase the knowledge and awareness of nurses on DVT risks and prevention to avoid complications. Determination of knowledge and practices of nurses on DVT risks and prevention may be useful in improving their awareness and preventing this important public health problem. However, a review of the current

literature in the Turkish Republic of North Northern Cyprus has revealed that no research is available about this subject

**AIM OF THE STUDY:** The aim of the study is to determine the nurse's knowledge and practices regarding risk factors and prevention of patients diagnosed with deep vein thrombosis

### **OBJECTIVES**

- To assess the knowledge of nurses about the risk factors and prevention of deep vein thrombosis.
- To determine the practices of nurses about risk factors and prevention of deep vein thrombosis.

### **OPERATIONAL DEFINITIONS**

#### **Knowledge**

The understanding of nurses regarding the risk factors and prevention of deep vein thrombosis.

There are 34 questions regarding knowledge of nurses on deep vein thrombosis DVT risks and prevention with 3 choices (true, false, and do not know).

#### **Practices**

The course of action nurses utilize to minimize the risks and prevention the patients from different adverse consequences of deep vein thrombosis. Almost 13 questions concerning the practices of nurses on deep vein thrombosis DVT prevention with 3 choices (always, sometimes, and never) used.

#### **Deep vein thrombosis**

The presence of blood clot in one or more deep vein of the body usually in the leg.

### **HYPOTHESIS**

#### **Null Hypothesis**

- There is no difference in the knowledge level of nurses about the risk factors and prevention of deep vein thrombosis.
- There is no difference in the practices of nurses about risk factors and prevention of deep vein thrombosis.

#### **Alternative Hypothesis**

- There is a difference in the knowledge level of nurses about the risk factors and prevention of deep vein thrombosis.

- There is a difference in the practices of nurses about risk factors and prevention of deep vein thrombosis.

## **MATERIAL AND METHODS**

**Study Design:** The study design was cross sectional descriptive in nature

**Settings:** The study was conducted at a hospital where no protocol on deep vein thrombosis identification and prevention present.

**Sample Size:** Using a 95% confidence interval (two sided),  $\alpha=0.05$  margin of error and 10% is also added to compensate for non-response rate and other contingencies. Since no previous study was found, 0.5 prevalence was used. Sample size is 130

**SAMPLING TECHNIQUE:** For this study, convenient sampling technique was used.

**Inclusion Criteria:** All nurses from all shifts at medical wards of hospital. All nurses with an experience of more than one year & above included.

**Exclusion Criteria:** Nurses with seriously ill during the time of data collection excluded. All nurses who are unwilling to participate were excluded. All nurses having less than 1-year work experience were excluded.

## **DATA COLLECTION PROCEDURE**

Firstly, study participants were informed about the purpose and objective of the study. The researcher visited the wards and handed over the questionnaire with consent form to the nurses of each department individually for the enhancement of response rate. Participants were informed about the voluntary participation, right of withdraw at any stage of data collection and their identity should keep confidential. The questionnaires were delivered immediately to the researcher after completion to avoid any biasness resulted from interaction of nurses with each other. The conveniently selected nurses were invited to fill the questionnaire sheet comprising of 3 sections, demographics of study participant section and nurses knowledge related question about the risk factors and prevention of deep vein thrombosis and nurses practice related question about the risk factors and prevention of deep vein thrombosis. This whole procedure take maximum 20 minutes of the study participants.

## **DATA COLLECTION TOOL**

The tool used in this study was adopted from an article titled “Knowledge and Practices of Nurses on Deep Vein Thrombosis (DVT) Risks and Prophylaxis” (Al-Mugheed & Bayraktar, 2018). This questionnaire consisted on three sections which used for data collection in this study

**Section-I:** Socio-demographic variables: The nurses demographic characteristics were determined through 6 questions comprises on gender, age, marital status, qualification, and employment status etc.

**Section-II:** The second section assess the knowledge level of nurses regarding the risk factors and prevention of deep vein thrombosis. There are 34 questions regarding knowledge of nurses on deep vein thrombosis DVT risks and prevention with 3 choices (true, false, and do not know).

**Section-III:** Practices are the course of action nurses utilize to minimize the risks and prevent the patients from different adverse consequences of deep vein thrombosis. Almost 13 questions concerning the practices of nurses on deep vein thrombosis prevention with 3 choices (always, sometimes, and never) used.

Expert opinion was obtained as regards content of the questionnaire. Two surgical nursing professors specialized in the subject of the study reviewed and confirmed the content of the questionnaire, and a language specialist approved the clarity in terms of language.

### **Reliability of the tools**

Reliability of tools is already tested where the knowledge tool has reliability 0.82, the reliability of practice tool is 0.86.

### **DATA ANALYSIS PROCEDURE**

The aim of the present study is to assess nurse's knowledge and practices regarding risk factors and prevention of patients diagnosed with deep vein thrombosis. Participants were informed about the purpose of study and their identity should have kept confidential. The research should examined the questionnaire for completeness of response and carefully assign code to each of the questionnaire. The data were entered to the computer and analyzed by SPSS Version-21.0. The questionnaire sheet comprising of 3 sections, likely demographics of study participant section and nurses knowledge and practice related question about the risk factors and prevention of deep vein thrombosis and ranked according to the order of importance. The descriptive statistics for instance, frequencies, mean, percentages, and standard deviation for each item were calculated. For the correlation among each item for each section were calculated.

## RESULTS

### Demographic Characteristics

**Table 1.** Demographic characteristics of the study participants (n=130).

S. No	Variables	Frequency n	Percentage %	
1	Gender			
	<ul style="list-style-type: none"> <li>• Male</li> <li>• Female</li> </ul>	10 120	8 92	
2	Age			
	<ul style="list-style-type: none"> <li>• 20-29 years</li> <li>• 30-39 years</li> <li>• 40-49 years</li> <li>• 50 years and above</li> </ul>	70 39 14 7	54 30 11 5	
	3	Qualification		
		<ul style="list-style-type: none"> <li>• Diploma</li> <li>• Bachelor degree in nursing</li> <li>• Master degree in nursing</li> </ul>	99 27 4	76 21 3
4		Working unit		
	<ul style="list-style-type: none"> <li>• Surgical unit</li> <li>• Medical unit</li> </ul>	55 75	42 58	
5	Experience			
	<ul style="list-style-type: none"> <li>• &lt;5 Years</li> <li>• 5-10 Years.</li> <li>• &gt;10 Years</li> </ul>	31 70 29	24 54 22	

The questionnaire was filled out from 130 staff nurses from different wards of a public sector hospital. The response rate was 100% because all of them return the questionnaire while 2 questionnaires not completely filled. The results of demographic characteristics were prepared by using descriptive statistics. The demographics of participants in Table 1 consisted on gender, age, qualification, working unit and experience. Ninety-two percent (92%) of the study respondents were female as government sector has recruited more female staff nurses than the male (8%) in Pakistan. Majority participants (54%) belong to age brackets 20-29 years, while most of them (30%) reported between 30-39 years and 11% belong to age group of 40-49 years while remaining in the age brackets of 50 and above 50 years (5%). Nearly 76 % study participants are diploma holders, 21 % participants had BSN degree and nearly 3%



study participants were held master's degrees. Majority of the participants (58%) had been working in medical ward while remaining participants from surgical ward. Most of the study participants 54% having experience between 5-10 Years. While other respondents (24%) had work experience less than 5 Year and 22% had experience greater than 10 years.

### NURSES' GENERAL KNOWLEDGE ON DVT

**Table 2.** Scores of general knowledge of nurses about deep vein thrombosis DVT (N= 130).

S#	Statements on DVT	True/ False	<u>Correct</u> <u>Answer</u> %	<u>Wrong/ I Don't</u> <u>Know Answer</u> %
1	DVT occurs as a result of stasis of blood (venous stasis), vessel wall injury, and altered blood coagulation.	T	80.5	19.5
2	Venous thromboembolism (VTE) is a fatal complication of DVT.	T	70.1	29.9
3	VTE is a major cause of sudden death in hospitalized patients.	T	65.4	34.6
4	Surgical patients are more prone to DVT/VTE than the patients who receive nonsurgical treatment	T	70.5	29.5
5	DVT occurs most frequently in the veins of the lower extremities.	T	85.3	14.7
6	Deep vein thrombosis also occurs frequently in the upper limbs.	F	40.9	59.1

**Key:** T= True statement, F=False statement

The aim of the study is to determine the nurse’s knowledge and practices regarding risk factors and prevention of patients diagnosed with deep vein thrombosis. Knowledge of nurses is the understanding of nurses regarding the risk factors and prevention of deep vein thrombosis. In the current study the nurses’ knowledge about deep vein thrombosis was described through three set of questionnaire as nurses general knowledge about DVT (Table 2), knowledge about DVT risk factors (Table 3), and prevention knowledge of DVT (Table 4). The responses of the nurses were categorized on 3 choices (true, false, and do not know).

The table 2 depicted the percentage of nurses’ general knowledge about deep vein thrombosis. The results showed that 70 to 80 percent nurses give correct answer to the questions asked regarding the DVT general knowledge. Majority nurses gave correct answers to the questions “DVT occurs as a result of stasis of blood (venous stasis), vessel wall injury, and altered blood coagulation” (80.5%), “DVT occurs most frequently in the veins of the lower extremities” (85.3%), “Venous thromboembolism (VTE) is a fatal complication of DVT” (70.1) and “Surgical patients are more prone to DVT/VTE than the patients who receive nonsurgical treatment” (70.5%). Conversely, the nurses who gave wrong answer to the question “Deep vein thrombosis also occurs frequently in the upper limbs” were 59.1%.

**NURSES’ KNOWLEDGE ON RISK FACTORS OF DEEP VEIN THROMBOSIS (DVT)**

**Table 3.** Scores of knowledge of nurses on deep vein thrombosis risk factors (N= 130).

S#	Statements on DVT Risk Factors	True/False	Correct Answer %	Wrong/ I Don't Know Answer %
1	Prolonged immobilization predisposes to DVT in hospitalized patients.	T	65.8	34.2
2	Indwelling intravenous devices such as central venous catheters may predispose to DVT.	T	45.4	54.6
3	Paralysis, paresis, or recent	T	69.6	30.4

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	plaster cast on lower extremities may predispose to DVT.			
4	Obesity may predispose to DVT.	T	63.1	36.9
5	Low body mass index may predispose to DVT.	F	55.4	44.6
6	Advancing age may predispose to DVT.	T	59.1	40.9
7	Previous DVT/VTE history may predispose to DVT.	T	65.7	34.3
8	No relationship exists between cancer or cancer treatment and DVT/VTE.	F	45.3	54.7
9	Major surgery may predispose to DVT.	T	32.5	67.5
10	Varicose veins may predispose to DVT.	T	38.3	61.7
11	Exercises may predispose to DVT.	F	30.1	69.9
12	Trauma may predispose to DVT.	T	31.7	68.3
13	Smoking may predispose to DVT.	T	30.9	69.1
14	Alcohol may predispose to DVT.	F	25.6	74.4
15	Cardiac diseases may predispose to DVT.	T	29.4	70.6
16	No relationship exists between respiratory diseases and DVT.	F	30.2	69.8
17	Infections or inflammations may predispose to DVT.	T	27.8	72.2
18	Pregnancy or postpartum may	T	35.9	64.1

	predispose to DVT.				
19	Oral contraceptives or hormone replacement therapy may predispose to DVT.	T	32.3	67.7	
20	There is no relationship between family history of DVT/VTE and DVT.	F	75.9	24.1	

**Key:** T= True statement, F=False statement

Table 3 depicted the results of knowledge of nurses on risk factors of deep vein thrombosis. The statistics in this table revealed that majority nurses have low knowledge regarding the risk factors of DVT. The rate of wrong answers was found to be higher in questions “Major surgery may predispose to DVT.” (67.5%), “Exercises may predispose to DVT” (69.9%), “Trauma may predispose to DVT” (68.3%), “Smoking may predispose to DVT” (69.1%), “Alcohol may predispose to DVT” (74.4%), “Cardiac diseases may predispose to DVT” (70.6%), and “No relationship exists between respiratory diseases and DVT” (69.8%) and Oral contraceptives or hormone replacement therapy may predispose to DVT (67.7%) etc. However, the items of the questionnaire with correct answer percentage were “There is no relationship between family history of DVT/VTE and DVT” (75.9%); “Paralysis, paresis, or recent plaster cast on lower extremities may predispose to DVT” (69.6%); “Previous DVT/VTE history may predispose to DVT” (65.7%); “Obesity may predispose to DVT” (63.1%) and Advancing age may predispose to DVT (59.1%) etc.

#### NURSES’ KNOWLEDGE ON PREVENTION OF DVT

**Table 4.** Scores of knowledge of nurses on the prevention of deep vein thrombosis (N= 130).

S#	Statements on DVT Prevention	True/ False	<u>Correct Answer</u> %	<u>Wrong/ I Don’t Know Answer</u> %
1	Foot and leg exercises may prevent DVT.	T	25.3	74.7
2	Elevating legs is necessary to	T	30.6	69.4

	prevent DVT/VTE.			
3	Early ambulation after surgery may prevent DVT development.	T	15.9	84.1
4	Bed rest is necessary after major surgery to prevent DVT.	F	7.8	92.2
5	Heparin or low-molecular-weight heparin (LMWH) may prevent DVT development.	T	42.6	57.4
6	Fluid restriction is necessary to prevent DVT.	F	89.2	10.8
7	Elastic compression stockings may prevent DVT development.	T	22.9	77.1
8	The use of intermittent pneumatic compression devices may prevent DVT development.	T	15.6	84.4

**Key:** T= True statement, F=False statement

Table 4 showed the scores of nurses' knowledge on the prevention of deep vein thrombosis. Majority nurses were give wrong answer to the questions about the prevention of DVT. The items with wrong or don't know answer were "Bed rest is necessary after major surgery to prevent DVT" (92.2%), "The use of intermittent pneumatic compression devices may prevent DVT development" (84.4%), "Early ambulation after surgery may prevent DVT development (84.1%)", "Elastic compression stockings may prevent DVT development." (77.1%), "Foot and leg exercises may prevent DVT" (74.7) "Elevating legs is necessary to prevent DVT/VTE" (69.4%), While the scores of correct answer were on items were "Fluid restriction is necessary to prevent DVT" (89.2%) and Heparin or low-molecular-weight heparin (LMWH) may prevent DVT development (42.6%).

### PRACTICES OF NURSES ON DVT PREVENTION

**Table 5.** Scores of practices of nurses on the prevention of deep vein thrombosis (N= 130).

S#	Statements on Practices of DVT Prevention	Always %	Sometimes %	Never %

1	Providing information to patients and/or relatives about risks and prevention of DVT.	10.2	20.9	68.9
2	Encouraging patients to do foot and leg exercises by themselves or relatives to help if patients are unable to do so.	17.6	19.1	63.3
3	Encouraging early ambulation surgery of patients.	10.9	25.3	63.8
4	Assessing the DVT risks of patients regularly.	27.4	25.5	47.1
5	Administering anticoagulants as preventive measure in clinic.	9.6	15.1	75.3
6	Monitoring the side effects of the anticoagulants.	17.8	10.4	71.8
7	Educating the patients on anticoagulants.	20.3	14.8	64.9
8	Educating the patients to avoid injury.	9.7	13.5	76.8
9	Encouraging patients to elevate their legs.	18.2	25.5	56.3
10	Educating the patients on sufficient fluid intake.	15.9	19.4	64.7
11	Use of the graduated compression stockings.	9.2	11.3	79.5
12	Teaching the patients about proper use of graduated compression stockings.	16.8	20.1	63.1
13	Assessing the patients regularly for signs and symptoms of DVT/ VTE.	28.7	26.1	45.2

Table 5 showed the result of nurses practices on the prevention of deep vein thrombosis. The statistics depicted that most of the nurses replied with the choice “never” to the most of statements given in the questionnaire of nurses practices about prevention of DVT. The questions scored more on never choice were as: “Use of the graduated compression stockings.” (79.5%), “Educating the patients to avoid injury” (76.8%), “Administering anticoagulants as preventive measure in clinic” (75.3%), “Monitoring the side effects of the anticoagulants” (71.8%), “Providing information to patients and/or relatives about risks and prevention of DVT” (68.9%), “Educating the patients on anticoagulants” (64.9%), and “Educating the patients on sufficient fluid intake” (64.7%), “Encouraging early ambulation surgery of patients” (64%),

“Encouraging patients to do foot and leg exercises by themselves or relatives to help if patients are unable to do so” (63.3%), “Teaching the patients about proper use of graduated compression stockings” (63.1%) while the items on questionnaire who ranked lower on never choice to perform the practices about the DVT prevention were two as “Assessing the patients regularly for signs and symptoms of DVT/ VTE Assessing the DVT risks of patients regularly” (47.1%), and “Assessing the DVT risks of patients regularly” (45%).

## DISCUSSION

The purpose of the study is to determine the nurse’s knowledge and practices regarding risk factors and prevention of patients diagnosed with deep vein thrombosis. Nurses are imperative for the prevention and management of diseases. The role of nurse changed from just bedside to greater responsibility of identification of risks and prevention of patients from different diseases like deep vein thrombosis. The findings of this study indicated that majority of the study respondents working in the departments like medical, surgical where the identification and prevention of DVT is immediate concern. The result of current study about general knowledge of nurses regarding deep vein thrombosis indicated that majority nurses had satisfactory/adequate level of general knowledge on DVT. Majority nurses gave correct answers to the questions “DVT occurs as a result of stasis of blood (venous stasis), vessel wall injury, and altered blood coagulation” (80.5%), “DVT occurs most frequently in the veins of the lower extremities” (85.3%), “Venous thromboembolism (VTE) is a fatal complication of DVT” (70.1) and “Surgical patients are more prone to DVT/VTE than the patients who receive nonsurgical treatment” (70.5%). The findings of present study are consistent with the study conducted in 2011 which indicate nurses give correct response to the question that surgical patients are prone to DVT than non-surgical patients (B<sup>a</sup> et al.,2011). Moreover, current study findings were also supported by previous study results of VTE is a major cause of sudden death in hospitalized patients (Buesing et al., 2015). However, nurses’ responses about the question “Deep vein thrombosis also occurs frequently in the upper limbs” were unsatisfactory as only 40.3% nurses give correct response to it. This is supported by findings of DVT annual incidence where the proportion of deep vein thrombosis of the upper extremity is around 4%–10% (Cote et al.,2016; Encke,2016).

The result of present study showed low level of nurses' knowledge about the risk factors of deep vein thrombosis. The statistics of present study revealed that majority nurses have low knowledge regarding the risk factors of DVT. The rate of wrong answers was found to be higher in questions "Major surgery may predispose to DVT." (67.5%), "Exercises may predispose to DVT" (69.9%), "Trauma may predispose to DVT" (68.3%), "Smoking may predispose to DVT" (69.1%), "Alcohol may predispose to DVT" (74.4%), "Cardiac diseases may predispose to DVT" (70.6%). These results are supported by the Lee,2014 study results which was about assessing the nurses' perception about knowledge and practice to assess and prevent the DVT. The findings of Lee study depicted poor to average knowledge of nurses about the DVT assessment and prevention (Lee et al.,2014).

However, the items of the questionnaire with correct answer percentage were "There is no relationship between family history of DVT/VTE and DVT" (75.9%); "Paralysis, paresis, or recent plaster cast on lower extremities may predispose to DVT" (69.6%); "Previous DVT/VTE history may predispose to DVT" (65.7%); "Obesity may predispose to DVT" (63.1%) and Advancing age may predispose to DVT (59.1%) etc. All these cited factors were considered the most important causative factors of DVT in the literature. For instance, immobilization among elderly has been considered as a foremost important risk factor of deep vein thrombosis and VTE (Engbers et al., 2015). The findings of another previous study depicted that plastic surgery patients had a risk of DVT therefore caution is required for their survival. Moreover, the result of many studies are consistent with the present study findings as there are multiple risk factors that predispose the patient to deep vein thrombosis. One of them is the Virchow's triad resulted from stasis of blood, altered blood coagulation and vessel wall injury. Moreover, prolong immobilization, indwelling intravenous devices, obesity, lowered body mass index, old age, family history of DVT, major surgeries, history of varicose veins, trauma, smoking, alcohol, cardiac diseases, inflammation, use of hormonal replacement therapy, ischemic stroke, cancer treatment etc. are the risk factors of deep vein thrombosis (Kearon et al., 2012).

The present study scores of nurses' knowledge on the prevention of deep vein thrombosis indicated that majority nurses were give wrong answer to the questions about the prevention of DVT. The items with wrong or don't know answer were "Bed rest is necessary after major surgery to prevent DVT" (92.2%), "The use of intermittent



pneumatic compression devices may prevent DVT development” (84.4%), “Early ambulation after surgery may prevent DVT development (84.1%)”, “Elastic compression stockings may prevent DVT development.” (77.1%), “Foot and leg exercises may prevent DVT” (74.7) “Elevating legs is necessary to prevent DVT/VTE” (69.4%). Therefore, majority nurse knowledge regarding prevention of DVT had low in the current study which is supported by the findings of a quantitative study conducted among staff nurses. The findings of this previous study indicated that most of the nurses had poor knowledge on the DVT prevention (Abin et al.,2016).

Many ways of prevention of deep vein thrombosis utilized in the hospital to minimize the adverse consequences of it. The mechanical method of deep vein thrombosis includes the use of compression devices namely, intermittent pneumatic compression, elastic stockings, and foot compression devices may prevent the development of deep vein thrombosis. Moreover, anticoagulating therapy in the form of low molecular weight heparin or simple heparin is the pharmacological approach to prevent the deep vein thrombosis development cases (Agharezaei, Bahaadinbeigy, Tofighi, Agharezaei, & Nemati, 2014). Additionally, early ambulation after surgery may prevent deep vein thrombosis and bed rest is important element for prevention of deep vein thrombosis after surgery (Cooray & Lake, 2015). The results of present study depicted nursing knowledge at unsatisfactory level regarding DVT prevention.

The statistics of present study about nurse’s practices on the prevention of deep vein thrombosis depicted that most of the nurses replied with the choice “never” to the most of statements given in the questionnaire of nurses practices about prevention of DVT. The questions scored more on never choice were as: “Use of the graduated compression stockings.” (79.5%), “Educating the patients to avoid injury” (76.8%), “Administering anticoagulants as preventive measure in clinic” (75.3%), “Monitoring the side effects of the anticoagulants” (71.8%), “Providing information to patients and/or relatives about risks and prevention of DVT” (68.9%), “Educating the patients on anticoagulants” (64.9%), and “Educating the patients on sufficient fluid intake” (64.7%), “Encouraging early ambulation surgery of patients” (64%), “Encouraging patients to do foot and leg exercises by themselves or relatives to help if patients are unable to do so” (63.3%), “Teaching the patients about proper use of graduated compression stockings” (63.1%). These high level of unsatisfying findings due to lack of practice guidelines at clinical setting and low level of DVT knowledge on risk factors and prevention. It is a well-

known fact that nurses form the largest professional group involved in direct clinical care within a health-care system. Nurses with expert knowledge and strong leadership skills can have a prominent role in influencing and implementing changes to health-care practices (Collins, MacLellan, Gibbs, MacLellan, & Fletcher, 2010; Schober, 2007). Moreover, one more previous study supported the practice findings of the present study by revealing that majority nurses had not follow the basic practices necessary for prevention of DVT (Songwathana et al.,2011)

## **CONCLUSION**

The aim of the study is to determine the nurse's knowledge and practices regarding risk factors and prevention of deep vein thrombosis. In this era of advance technology, many changes are occurring in health care sector regarding the delivery of quality care to patients and prevention of disease. The role of nurse is imperative for the prevention and management of diseases. The role of nurse changed from just bedside to greater responsibility of identification of risks and prevention of patients from different diseases. Among preventive diseases, thrombotic disorders are the one and leading cause of high mortality and morbidity throughout the world.

The findings of present study indicated low level of nurses' knowledge on risk factors and prevention of deep vein thrombosis and poor or unsatisfactory practices of nurses about the preventive measures of deep vein thrombosis. The reason behind these findings might be lack of clinical practice guidelines and inadequate training at in service level in the hospital.

## **STRENGTHS OF THE STUDY**

- Self-administered questionnaire is considered as convenient method of data collection
- This study suggests staff nurses' evaluation on periodic basis and it is necessary to incorporate unused behaviors, into their practice regarding the prevention of DVT.
- The findings of present study help the administration to organize continual professional education including updating theoretical knowledge about DVT prevention is necessary to improve the practices of the nurses.

## LIMITATIONS OF THE STUDY

- There is a small sample size so the results of present study are limited to only hospital.
- Data was collected from medical and surgical nurses in only one public sector hospital therefore result cannot be generalized to other nursing populations.
- Nurses participated in the present study have not yet received any training so nurses had poor knowledge and skills

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