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Venous Thromboembolism Prophylaxis Guidlines: Risk assessment and ICU Nurses' Knowledge, Practice, Facilitators and Barriers

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Dedication

To my dear father and mother for their support.

To my dear wife for supporting and encouraging.

To my dear children.

To my colleagues who have helped me in completing this study

To all who helped and encouraged me

To all of them I dedicate this study

Acknowledgment

First and foremost I am grateful to GOD for the good health and well-being that was necessary to complete this thesis.

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To everyone who gave me the moral support for the completion of this task, Thank you.

الإقرار

انا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Venous Thromboembolism Prophylaxis Guidlines: Risk Assessment And ICU Nurses Knowledge, Practice, Facilitators And Barriers

أقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء ما تم الإشارة إليه حيثما ورد، وان هذه الرسالة ككل آو اي جزء منها لم يقدم لنيل اي درجة او لقب علمي او بحثي لدى أي مؤسسة تعليمية او بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work and has not been submitted elsewhere for any other degree or qualification.

Student name: **الاسم:**

Signature: **التوقيع:**

Date: **التاريخ:**

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List of Abbreviations

VTE	Venous Thromboembolism
PE	Pulmonary Embolism
DVT	Deep Vein Thrombosis
ICU	Intensive Care Unit
CCU	Coronary Care Unit
RAM	Risk Assessment Model
NICE	National Institute for Health and Care Excellence
ACC P	American College of Chest Physicians
BMI	Body Mass Index
CT	Computed Tomography
V/Q Scan	Ventilation Perfusion Scan
IPC	Intermittent Pneumatic Compression
GCS	Graduated Compression Stocking
GLIA	Guideline Implementability Appraisal
IRB	Institutional Review Board

Venous Thromboembolism Prophylaxis Guidlines: Risk assessment And ICU Nurses' Knowledge, Practice, Facilitators and Barriers

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Abstract

Introduction:

Venous thromboembolism (VTE) is a constellation of deep vein thrombosis (DVT) and pulmonary embolism (PE). Millions of patients around the world are affected by VTE, which is responsible about thousands of hospitalizations. VTE could be preventable for patients who are hospitalized to decrease morbidity and mortality. Appropriate VTE prophylaxis for hospitalized medical and surgical patients is frequently omitted or delayed despite of the wide recognition of its importance. Possible explanations for delay can be explored in the context of situational awareness of nurses who represent the largest component of the health care team. Perform critical tasks like patient assessment, surveillance, and what they do or fail to do is directly related to patient outcomes

Aim:

The aim of the present study is to assess the level of knowledge of ICU nurses towards VTE guidelines among ICU nurses and to recognized facilitators and barriers for implementing guideline prophylaxis in addition to identify patients at risk for VTE using risk assessment model (RAM)

Method:

Quantitative Descriptive, cross sectional design was used in this study including two populations; nurses and patients. The numbers of participating nurses were 91 nurses working in ICU and CCU. Also, 101 patients were included in the study which carried out in four hospitals. Rafedia hospital, Nablus hospital, Arabic hospital and AL-estishary hospital. Questionnaires were distributed to nurses included five parts; the demographic data, questions related to VTE nurse's knowledge, questions related to VTE guidelines practice, questions related to VTE perceived facilitators and questions related to VTE perceived barrier for guidelines implementation among ICU nurses. RAM (Caprini score) was used to identify patients at risk of VTE admitted to ICU with length of stay more than 24 hours. Follow up had been done for these patients by telephone after three months by asking about any complication occurred such as DVT, PE or death.

Results:

Out of nurse's total sample, 69.2% of participants are male while 30.8% are female. Majority (67%) of nurses had less than 5 years' experience. Most of the participants have bachelor degree (72.53%). Regards previous educational courses about VTE, 64.8% of nurses had no previous course, and only 35.2% did have. According to nurses' level of knowledge regarding VTE, the study results revealed a statistically significance lower level than average (p value=0.003). Furthermore, the

regression test between the dependent variable (Total VTE knowledge score) and the independent variables (hospital, gender, age, the department, the education degree, years of experience and Previous VTE education course), revealed that all independent variables had no statistical significant except previous VTE education course (p value. = 0.001). According to ICU nurse adherence level to VTE practice, mean was 2.26 out of 3 ± 0.30. Nurses ranked "nurses reminders to physician about VTE prophylaxis" as the highest perceived facilitators to implement VTE prophylaxis guidelines, while "Lack of educational courses about VTE prophylaxis" as the highest perceived barrier to implement VTE prophylaxis.

Out of the total patients' sample, 58.4% are male, while 41.5% are female with average age 62.5 years .The average weight is 82.03 kg. According to question "does Caprini score detect complications?", the *p* value for gender and weight in relation to complication is not statistically significant. On the other side, age is statistically significant (*p* value=0.001) which mean that the person is 1.129 times more likely to have complications in each year difference. The levels of Caprini score in relation to complication has been found to be statistically significant (*p* value=0.004). 87 patients had no complication with 11.94 mean of Caprini score and 14 patients had complication with 19.35 mean of Caprini score.

Conclusion:

ICUs nurses are in need for continuous education and training regarding to VTE prophylaxis guidelines based on findings of the present study. Nurses'

knowledge was insufficient among ICU nurses about pulmonary embolism and deep vein thrombosis (VTE) and VTE prophylaxis guidelines, which is responsible for many hospitalization complications. Furthermore, there were lack of policies utilization regarding VTE guidelines in the selected hospitals which might be related to some barriers and raised the need for adoption of RAM in the ICUs. Finally, there was a positive relation between increasing in patient age and having more complication based on Caprini score

Chapter One
Introduction

1. Introduction

1.1 background

Venous thromboembolism (VTE) is a constellation of deep vein thrombosis (DVT) and pulmonary embolism (PE) (Tang, Sun, Yang, & Tong, 2015) . Millions of patients around world are affected of VTE which is responsible for thousands of hospitalizations(Majluf-Cruz et al., 2012) .Venous thromboembolism could be preventable for hospitalized patients to decrease morbidity and mortality (Muhammad, Isah, & Abdullahi, 2016) . VTE considered a second leading cause of hospitalized patients and it increases length stay and costs (Fernandez, Hogue, Preblick, & Kwong, 2015). VTE incidence is almost the same in Australia, North America,Southern Latin America and Western Europe with rate ranging from 0.75 to 2.69 per 1000 persons(Raskob et al., 2014). More than 50% of VTE cases are considered hospital- acquired; that occur during hospital stay or within three months after hospitalization(Raskob et al., 2016).

VTE risk factors for hospitalized patients included cancer and cancer therapy, acute medical illness, surgery, immobilization, trauma, old age, obesity, central venous catheter and previous history of VTE .Nearly all inpatient hospital had minimum one risk factor of VTE and about 40% have three or more risk factor (Dobromirski & Cohen, 2012).Critically ill patients that are admitted to intensive care unit(ICU) are more predisposed

to high risk VTE as they might need mechanical ventilation, central venous catheter or immobilization and might develop sepsis or post-operative condition(Tang et al., 2015).

VTE is considered one of the known complications in the ICU for critically ill patients, predominately thrombi in deep veins which is limited and asymptomatic(Cook & Donadini, 2010). Complications that are linked to VTE includes chronic thromboembolic pulmonary hypertension, recurrent VTE, anticoagulation side effect drugs and post- thrombotic syndrome(Grosse, Nelson, Nyarko, Richardson, & Raskob, 2016).

Risk assessment models (RAM) for VTE was developed for both surgical and medical patients. For post- operative patients ,many had been developed and one of these RAM is Caprini score that develop by Joseph Caprini in 1990 and updated on 2005 which is considered well validated and mostly used RAM(Obi et al., 2015). For medical patients, the use of Caprini risk assessment model is more efficient to predict VTE than others such as Padua risk assessment model(Liu, Liu, Chen, Wu, & Lu, 2016). Caprini risk assessment model is using several items for patient assessment to enumerate risk and recommended therapy(Caprini, 2005). Once the risks have been identified the score is calculated giving an overall risk score(Nutescu, 2007).

In the last few years, some countries had developed and updated clinical practice guidelines and recommended the use thromboprophylaxis for hospitalized patients with risk of VTE(NICE guideline, 2018)Risk factors of VTE according to the National Institute of Health and Care Excellence (NICE) are:

Active cancer or cancer treatment on age over 60 years, critical care admission, dehydration, known thrombophilia's, obesity (body mass index [BMI] over30kg/m2), one or more significant medical co- morbidities (for example: heart disease, metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions), personal history or first-degree relative with a history of VTE, use of hormone replacement therapy ,varicose veins with phlebitis and use of estrogen-containing contraceptive therapy(NICE guideline, 2018).

Using VTE prophylaxis treatment divided into pharmacological (anti-coagulant therapy) and mechanical as intermittent pneumatic compression devices or anti-embolism stockings(NICE guideline, 2018).Patients who are at risk for incidence of VTE should receive VTE prophylaxis using mechanical strategies or pharmaceutical prevention, or both according to guidelines (Elpern, Killeen, Patel, & Senecal, 2013). Many randomized, controlled studies show that using pharmacological VTE prophylaxis in hospitalized patients at risk for VTE is safe, effective, and cost efficient (Kahn, Morrison, Emed, Tagalakis, & Shrier, 2010). A study proposes that, when VTE prophylaxis is a routine protocol part of

admission and order sets, resulting in ordering prophylaxis for most patients, while nurses believed that the lack of need for the therapy; consequently they may not administer it (Elder et al., 2016).

1.2 Problem Statement and Significance

Venous thromboembolism is a significant cause of morbidity and mortality in hospitalized medical and surgical patients around world and considered as a common leading cause to increase length stay and cost in hospitalized patients(Fernandez et al., 2015). While, there is incontrovertible clinical evidence that thromboprophylaxis reduces the risk of DVT and PE, epidemiological studies and randomized-controlled trials explained that more than half of the patients who developed symptomatic VTE had medical risk factors rather than surgical ones(Ongen, Demir, Molinas, Ince, & Ongen, 2015).Many studies had been done to implement VTE guidelines, but few studies had been done to evaluate knowledge, and practice among nurses. Furthermore, in our country (Palestine), there are no similar studies found in our search through EBSCO, Science Direct, Hinari, Pub med ,CINAHL, Google Scholar, ELSEVIER.

Recurrent venous thromboembolism leads to increased morbidity and mortality. It has a high impact on patients' quality of life and imposes a great financial effect on society (Grosse et al., 2016).The administration of pharmacological VTE prophylaxis is a critical nursing task that can prevent serious consequences for patients if performed accurately (Geerts & Diamantouros, 2017). Appropriate VTE prophylaxis for hospitalized

medical and surgical patients is frequently omitted or delayed, despite wide recognition of its importance, possible explanations for this can be explored in the context of situational awareness nurses represent the largest component of the health care team and perform critical tasks like patient assessment and surveillance and what they do or fail to do is directly related to patient outcomes(Rochefort, Buckeridge, & Abrahamowicz, 2015). Attentiveness and monitoring are important to decision making, that also required, knowledge, and responsiveness that are elements of situational awareness which clearly identified and supported by the nurse. The importance of this study that hopefully the result will help health care practitioner, hospital administrator and policy maker to make adoption for specific measures to improve prevention of VTE in hospitalized patients that may lead to decrease morbidity and mortality.

1.3 Objectives of the Study

The study aims to achieve the following objectives:

1. Assessing level of knowledge among ICU nurses about VTE prophylaxis guidelines.

2. Identifying risky ICU patients to develop VTE by using Caprini score.

3. Recognizing VTE assessment practices among ICU nurses.

4. Identifying barriers for implementation VTE prophylaxis guidelines among ICU nurses.

5. Identifying facilitators to implement VTE prophylaxis guidelines among ICU nurses.

1.4 Research Questions

The study will answer the following questions:

1. What is the level of ICU nurses' knowledge about VTE prophylaxis guidelines?

2. a. Does Caprini score predict VTE risk among ICU patients?

b. What are the classifications of VTE risk among ICU patients based on Caprini score?

3. a. Do ICU's in Palestine had guidelines regarding VTE prophylaxis?

b. Does ICU nurse adhere to VTE guidelines practice?

4. What are the barriers of VTE prophylaxis guidelines implementation among ICU nurses in Palestine?

5. What are the facilitators for VTE prophylaxis guidelines implementation among ICU nurses in Palestine?

1.5 Conceptual Framework

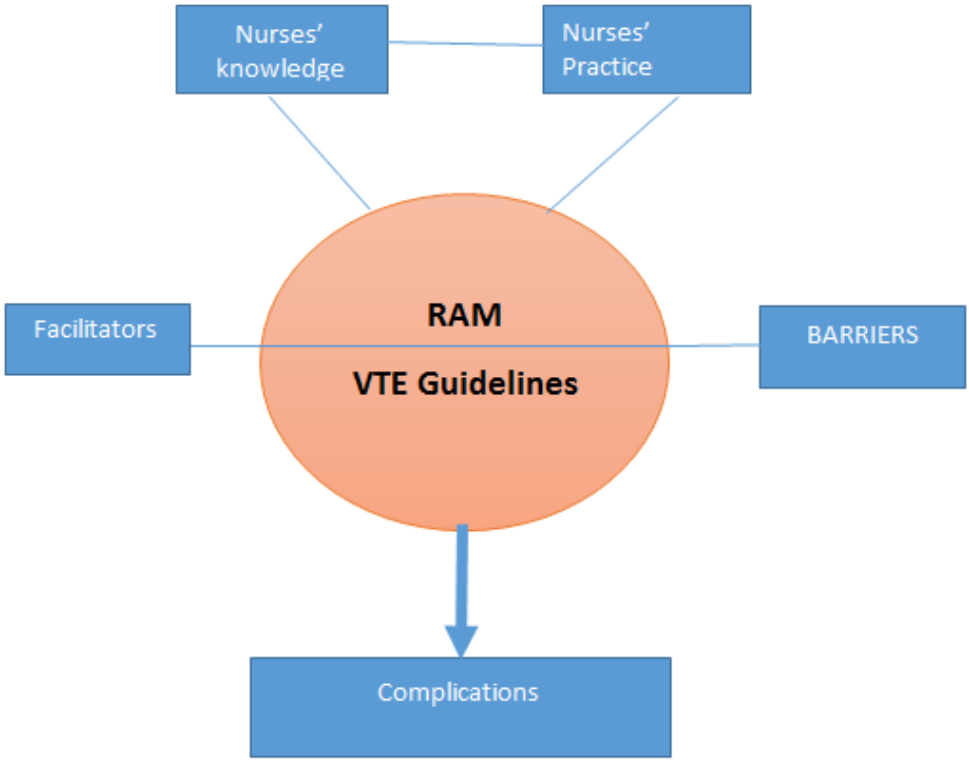

Figure 1: Conceptual Framework of main variables of the study.

1.5.1 Conceptual Definition

- **VTE**: venous thromboembolism is a collective name of deep vein thrombosis (DVT) and pulmonary embolism (PE).thrombus is taken from Greek language *thrombos* that can be defined as solid mass of blood ingredient forming within blood vessel (Findlay, Keogh, & Cooper, 2010).

- **Pulmonary embolism**: is a blockage of an artery in the lungs by a substance that has moved from elsewhere in the body through the bloodstream. Symptoms of a PE may include shortness of breath, chest

pain particularly upon breathing in, and coughing up blood(Findlay et al., 2010)

- **Guideline**: is a rule, principle or recommendation of good practice, which is often based on evidence obtained from research or from a broad body of experience from multiple contributors(Nursing: & Https://medical-dictionary.thefreedictionary.com/guideline, 2012) .

- **knowledge** : is the insights, understandings, and practical know-how that we all possessis the fundamental resource that allows us to function intelligently (Egiri, 2016)

1.5.2 Operational Definition

- **Guideline** :it is a tool of evidence-base that is develop of clinical practice guidelines that are designed systemically to support healthcare professionals to make informed choices in regards to patient care so that clinicians can provide evidence informed care for optimal patient outcomes, as well as providing effectiveness for the healthcare system(Nakayama, 2007)

- **Knowledge**: is measured by 16 item answered by yes or no included the questionnaire. The total ICU nurse VTE knowledge is equal the total correct answers to these 16 items which range from 0-16.

- **Practice**: will be operationally measured by 3- point Likertscale responded by disagree, neutral and agree on total 9 items.

- **Facilitator**: is measured by 4- points Likert scale answered by not facilitator, small facilitator, moderate facilitator and large facilitator on total 7 items

- **Barriers:** is measured by 4-point Likert scale answered by not barrier, small barrier, moderate barrier and large barrier on total 6 items.

Chapter Two

Review of Literature

Review of Literature

Reviewing the literature shows that many studies about venous thromboembolism prophylaxis guidelines have been conducted globally, but up to our knowledge, little locally. The literature review provides a solid background in order to achieve research paper. It can help in the study to inspire new research ideas. The early literature review provides readers with a back ground to understand current knowledge about the subject.

In 2001, Cook et al conducted a cross-sectional study for Canadian university related ICUs to assess Prevention of Venous Thromboembolism in Critically Ill Surgery. In this study, recording of VTE prophylaxis prescribed medications for surgical patients in the first week postoperative in ICU. The participated ICU represented 44 with 681 beds,VTE prophylaxis with unfractionated heparin, low molecular weight heparin, and intermittent pneumatic compression were used. Two methods of VTE prophylaxis were prescribed for 20 of 89 (22.5%) patients. Prophylaxis with unfractionated or low molecular weight heparin was significantly less likely to be prescribed for postoperative ICU patients. VTE prevention for surgical ICU patients within the first postoperative week appear to be individualized, and influenced by current and future risks of thrombosis and bleeding(Cook et al., 2001).

Another cross sectional study conducted in 2012 by Majluf-Cruz in Mexico in the largest internal medicine college in Latin America Awareness regarding venous thromboembolism among internal medicine practitioners in Mexico. In this study, 1220 questionnaire were sent and answered by mail from January 2010 to December 2010. The survey contained two parts. The first part was designed to assess the knowledge regarding the disease, risk factors and diagnosis. The second part was designed to explore the awareness to thromboprophylaxis. The final result showed that awareness of VTE risk factors and the degree of diagnostic skills among Mexican doctors were low (Majluf-Cruz et al., 2012)

Also, prospective multicenter survey carried out in2010 by Megan. et al., included 30 public hospital ICUs in Australia and New Zealand Venous thromboembolism prophylaxis in the critically ill. In this study, admission diagnosis, demographic data and information on VTE prophylaxis were collected for all patients in each ICU. Five hundred and two patients were included in the study, 431 of them received VTE prophylaxis, (276/431) received pharmacological prophylaxis and (345/431) received mechanical prophylaxis, with (190/431) receiving both. Contraindications to pharmacological prophylaxis were reported in 122 patients. The authors found in the results that potential risk of VTE in critically ill patients in Australia and New Zealand(Megan. et al., 2010).

Another cross sectional study survey conducted by Tang in 2015 in ICUs in North China on the Knowledge of Venous Thromboembolism Prophylaxis among the Medical Staff of Intensive Care Units. The author in this study collected data from September 2014 to January 2015 from 52 medical and surgical ICUs and the participants were nurses and physicians based on questionnaire to answer, the questionnaire consisted of four sections and 39 questions, demographic data , awareness of guidelines related VTE prophylaxis in critically ill patients in ICUs, the practice of VTE prophylaxis in the participant's ICU, and attention regarding pharmacological and mechanical modality during VTE prophylaxis. 1861 questionnaire were answered from 2500 that were sent ; response rate=74.4%.the result was limited knowledge of VTE prophylaxis among medical staff in ICUs(Tang et al., 2015).

Across sectional survey carried out by Muhammad et al., in 2016 at Usmanu Danfodiyo University Teaching Hospital in Nigeria between July to December 2015. Knowledge, attitude and practice of venous thromboembolism prophylaxis among medical practitioners, 200 questionnaire were administered to medical doctors with response rate= 80.5%, each questionnaire consists of 2 parts of multiple choice and close-end questions in relation to VTE prophylaxis knowledge; attitude and practice. In the results, the authors found that the most used VTE prophylaxis among the participants (40.4%) is low molecular heparin and also found that most of responders are knowledgeable about VTE, but

practice is suboptimal among participants and the need for guidelines toward VTE prophylaxis(Muhammad et al., 2016)

A study done by Oh, Boo, & Lee, in 2015 to evaluate the level of VTE knowledge among registered nurses in South Korea Clinical nurses' knowledge and practice of venous thromboembolism risk assessment and prevention using cross-sectional descriptive design. Two hospitals were participated, 500 questionnaire were distributed with response rate= 96.2%. The questionnaire covered items regard 1.self-perceived VTE knowledge according to Likert scale from poor to excellent 2.multiple choice questions regard VTE risk factors; signs, symptoms and prevention 3) self-reported VTE assessment performance 4) self-efficacy in practicing VTE prevention/ prophylaxis. The authors report in their findings that knowledge and self-efficacy in VTE prevention and practices of Korean registered nurses' were not highly rated and the need for more educational courses (Oh et al., 2017)

In 2017, a descriptive cross sectional study was conducted by Al-Mugheed in ahospital that related to university of Northern Cyprus located in Nicosia city Knowledge and practices of nurses on deep vein thrombosis risks and prophylaxis , a questionnaire were distributed to 165 nurses which consist of three parts ; first part regard demographic data, second part relevant to DVT knowledge risk and prevention and third part regard practice of nurses on DVT . The results show that knowledge on deep vein thrombosis risks, preventive measures, and practices are low ,

also results showed significant differences in educational level and experience of nurses according to DVT prevention, risk factors and practices (Al-Mugheed & Bayraktar, 2018)

A prospective cohort study carried by in 2014 by Hachey et al., at Boston Medical Center to implement and evaluation of Caprini risk assessment model (RAM) to prevent of post-operative VTE in thoracic surgical patients. The author in this study looked for implement RAM to evaluate practice, safety and VTE outcome, 126 patients were included in this study; patients with high score were given enoxaparin as prophylaxis for 30 days post-operative, moderate risk patients were given 10 days enoxaparin as prophylaxis post-operative. The results showed that 24 patient as high risk (19.2%). 60 patients as moderate risk (48.0%) and 42 patients score as low risk (32.8%).Post discharge enoxaparin prophylaxis was (97.2%).VTE rate was (2.3%) with no side effect of bleeding post discharge. According to this study, using and implement of RAM with prophylaxis in high risk patient is safe for thoracic surgical patients (Hachey et al., 2016).

Obi et al., carried out a retrospective cohort study from July 2007 to June 2012 in a surgical ICU contain 20 beds Validation of the Caprini Venous thromboembolism Risk Assessment Model in Critically Ill Surgical Patients.4844 patients were included in this study, calculate the risk score for all patients at the time of ICU admission. The results showed that low risk, 5.3%; moderate risk, 19.9%; high risk, 31.6%; highest risk, 25.4%;

and super high risk, 14.9%. The incidence of inpatient VTE was 7.5%and increased with risk level: 3.5% in low-risk patients, 5.5%in moderate-risk patients, 6.6%in high-risk patients, 8.6%in highest-risk patients, and 11.5%in super high-risk patients. Patients with Caprini score more than 8 are more likely to develop VTE than patients with score less than 8. So, Caprini score for VTE as risk assessment model is valid and supported to use in surgical critical patients(Obi et al., 2015).

A retrospective case-control study carried out by Zhou et al., in 2014 among unselected hospitalized patients with Validation of a Venous Thromboembolism Risk Assessment Model in Hospitalized Chinese Patients, A Caprini risk assessment model was used in 651 randomly selected patients to assess VTE . In the results, the average Caprini cumulative risk score in the patients was significantly higher than that observed in the controls (4.69±2.58 vs 3.16±1.82) high risk score related to Caprini RAM was associated with a 1.65 fold increased risk of VTE while the highest-risk was associated with a 4.84 fold increased risk of VTE. The researchers in this study suggest to use Caprini risk assessment model in Chinese hospitals for stratifying VTE risk categories based on individual risk factor(Zhou et al., 2014).

Another retrospective study carried out from 2011 to 2014 in Shanghai Changzheng Hospital by Liu et al., Comparing between Caprini and Padua risk assessment models for hospitalized medical patients at risk for venous thromboembolism . In this study, a review of 320 patient had

VTE and 320 patient had no VTE, upon demographic data and clinical finding Padua RAM and Caprini RAM were implemented. Individual scores of each risk factor were summarized to generate a cumulative risk score . The results found that there are significant differences in risk factors between VTE and non-VTE patients, More VTE patients were classified into the high–super high risk level by the Caprini RAM than the Padua RAM (70.9 vs 23.4%, $P < 0.01$). The sensitivity and positive and negative predictive values in the Caprini RAM were higher than those in the Padua RAM ($P < 0.05$). According to the results, using Caprini RAM is more effective than Padua RAM in detecting VTE in hospitalized medical patients who are at risk(Liu et al., 2016).

An observational, cross sectional study conducted from July 2007 to June 2008 by Ge, Li, Jin, & ZhouVenous about thromboembolism risk assessment and thromboprophylaxis among hospitalized acute medical patients in china. In this study, multi centers were selected with 1247 patients from 19 hospitals had inclusion criteria ;admitted to ICU and CCU, age ≥ 30 years old, had medical illness, had≥1 VTE risk factor, the authors used 2004 American College of Chest Physicians (ACCP) evidence-based guidelines to determine VTE risk and the frequency of recommended VTE prophylaxis. In the result of this study, 57.3% patients had >2 VTE risk factors. Only 20.2% received ACCP-recommended VTE prophylaxis (CCU patients: 22.7%, ICU patients: 16.9%).Number of patients that had received the recommended VTE prophylaxis are small and there is need for more

VTE appropriate prophylaxis guidelines to implement in china (Ge et al., 2010).

A retrospective cohort study carried out in seven major hospitals in Saudi Arabia from July 1, 2009, till June 30, 2010 by AL- Hameed et al., about Thromboprophylaxis and mortality among patients who developed venous thromboembolism. All medical and surgical patients with confirmed diagnosis of VTE were included in this study (total 1241patients). The diagnosis of DVT done by Doppler and PE done by chest computed tomography (CT) or ventilation perfusion (V/Q) scan, Caprini Risk Assessment Model was used. The researchers found that 21.7% were PE,58.3% of them were DVT only , 20% were both DVT and PE.21.4% were occurred in surgical patients and 78.6% in medical patients.40.9% of VTE cases received appropriate prophylaxis. Mortality was 13.5% for surgical patients and 14.5% for medical patients. The researchers also found that there is a gap between practice and guidelines regards to thromboprophylaxis and this gap is more in medical than surgical patients and more efforts is needed to improve using thromboprophylaxis in order to to reduce hospital acquired VTE to reduce mortality(Al-Hameed, Al-Dorzi1, Qadhi, Shaker, Al-Gahtani, Al-Jassir, Zahir, Al-Khuwaitir, Addar, Al-Hajjaj, Abdelaal, 2017).

Arabi et al., conducted a prospective, observational, cohort study in the adult medical-surgical ICU at King Abdulaziz Medical City in Riyadh about using intermittent pneumatic compression (IPC) and not graduated

compression stockings (GCS) is associated with lower incident VTE in critically ill patients. This study has been done to test the relation of IPC or GCS as mechanical prophylaxis with the risk of VTE and hospital mortality among critically ill medical- surgical patients. 798 patients were registered in this study with criteria: admission physiologic data, patient demographics, VTE risk factors, and mechanical thromboprophylaxis and pharmacologic thromboprophylaxis. The researchers found that VTE incidence happened in 7.1%. Also the results showed that using of IPC linked with lower VTE incidence compared with no mechanical thromboprophylaxis, GCS were not associated with decreased VTE incidence. No significant interaction was found between the mechanical thromboprophylaxis group and the type of prophylactic heparin used. So, using IPC not GCS had significant relation in lowering VTE risk , This relation was consistent regardless of the type of prophylactic heparin used and was not modified by trauma or surgical admission(Arabi et al., 2013).

In 2018 A comparison study carried out by Moesker et al., from the ‘Knowledge Institute of Medical Specialists’ in Netherlands for non-surgical patients Guidelines' risk assessment recommendations for venous thromboembolism prophylaxis: In a comparison and implementing ability appraisal, the researchers chose two guidelines to compare :risk assessment method and prophylactic recommendations. First guideline was from National Institute for Health and Care Excellence (NICE) published in 2010and the second was from the American College of Chest Physicians (ACCP) published in 2012. As a result of this study, 11 from 20 VTE risk

factor and 2 from 19 bleeding risk factor were presented in both guidelines .in addition, high bleeding risk or high VTE risk were acquaint in different way in both guidelines . Appraisal guidelines done by experts using Guideline Implement ability Appraisal (GLIA) instrument. GLIA recognize facilitator and barriers for guideline implementation. That is in final analysis at level of content barriers were recognized in recommendation of bleeding risk assessment, mechanical prophylaxis and critical care patients , in implement ability level barriers were recognized in flexibility, decidability, effect on process of care and computability dimensions(Moesker et al., 2018).

In 2013, a study published by (White, Gaston, & Misan) at University of South Australia addressed Venous Thromboembolism Risk Assessment and Prophylaxis Facilitators and Barriers to Compliance with Clinical Guidelines in Acute Care. In this study, a systemic review of twenty studies of both quantitative (18 study) and qualitative (2 study) from May 2003 to November 2011has been done to recognize barriers and facilitator in acute health care area and to test the adherence of VTE practice guidelines by healthcare professionals. Three main national guidelines were used in these studies: NICE, ACCP and Australian, New Zealand guideline, the level of adherence with VTE guidelines differ among studies that ranged from 6.25%- to 70.4% . At the study baseline, adherence ranged from 62.5% - to 78.1% post-test. Nine barriers and nine facilitator were identified in quantitative studies .Barriers (lack of attention, Lack of awareness, Patient factors, Knowledge, experiences, access to

computers and databases, Disputing evidence/guidelines, Lack of documentation and Staff factors). Facilitators are (Education, computer applications, audit and feedback, reminders, multiple interventions, dedicated person or clinician group, system support, management incorporation and pharmacy involvement). In qualitative studies, barriers are (costs and priority, Lack of role identification and Practice culture), facilitators are (Allocation of a person or clinician group, Audit and feedback and system development). (White et al., 2013).

Chapter Three
Method

3.1 Introduction

This chapter presents an overview of the research methodology used in this study. It includes study design, study setting, study population, study sample (size and sampling process), ethical consideration, data collection procedure, and data analysis plan.

3.2 Design

The research designs adopted for this study is quantitative descriptive, cross sectional conducted to measure and evaluate ICU nurses VTE knowledge, practice, perceived facilitator and barriers. Also, in this study, a risk assessment model (Caprini score) to identify VTE and patients in risk to VTE is used.

3.3 Settings

The present study conducted at four selected hospitals: Rafedia hospital, Nablus hospital, Arabic hospital and Al- estishary hospital. These hospitals contain, all together, three CCU’s, four ICU’s with total number of fifty beds.

3.4 Population and Sample

In the present study, there were two types of population; nurses and patient. The 1st population was nursing staff of all classifications including the following degrees; diploma, bachelor, master who were working in ICU's, CCU's at Rafedia hospital, Nablus hospital, Arabic hospital and Al- Estishary hospital were included in the study based on inclusion and exclusion criteria . The 2nd population was all patients that were admitted to ICU or CCU with length stay more than 24 hours.

3.4.1 Inclusion Criteria

Nurses of all classifications who are working morning, evening and night shift in CCU or ICU. All adult patients either medical or surgical.

3.4.2 Exclusion Criteria

Head nurses, nursing students, part time working nurses and pediatric patients.

Based on the above mentioned inclusion and exclusion criteria, the number of participant nurses was 91 nurses, and 101 patients.

3.5 Tool

In the present study, questionnaire and risk assessment tool were used.

1) Questionnaire:

Which include five parts; first part includes basic information form that contains questions about the demographic data .Second part contains questions related to VTE nurses knowledge.Third part questions related to VTE guidelines practice among ICU nurses using Likert scale. Fourth part questions related to VTE perceived facilitators for guidelines implementation among ICU nurses. Fifth part questions related to VTE perceivedbarrier for guidelines implementation among ICU nurses.

2) Risk assessment tool (Caprini score):

The risk levels of Caprini score are four levels :(0-1) low level, (2) moderate level, (3-4) high level, (≥ 5) highest level. This RAM contain 37 risk factors that are arranged score from 1-5 point each.

3.6 Study time and duration

Started time for the present study was from 1st of February until 1st of March, 2019; one month duration for RAM collection. Follow up for patients done after three months (1^{ST} of June).

3.7 Data Collection Procedure

Approvals from the Institutional Review Board Committee at An-Najah National University (IRB) and from the Palestinian Ministry of Health and from the administrations of all selected hospitals were obtained. The purpose of the study was clarified to the nurses, in addition to explanation how to fill the RAM sheet. Written informed consent was obtained from nurses. Assigned nurse in every hospital to supervise and follow up collecting the answered questionnaire from participants' nurses. Also, the assigned nurse followed up filling RAM sheet for every patient admitted to ICU or CCU for more than 24 hours. One hundred and one patients were included in RAM over one month followed up by telephone call after three months by asking them about any complication happened as DVT or PE or death.

3.8 Ethical consideration

The ethical principles followed are respectful, informed consent, charity, no harm done, truth and justice, explanation of research protocols to the patient and nurses, the study follows the World Medical Association Declaration of Helsinki Ethical Principles for Medical Research on humans (World Medical Association, 2013).

Prior to the beginning of data collection, approval for this study was obtained from the An-Najah University Institutional Review Board (IRB)and from the Palestinian Ministry Of Health

To minimize the bias and ensure confidentiality of all study participants, identification numbers were assigned to each patient and nurse to avoid using any patient or nurse information that would identify the patient/nurse.

The researcher explained that participation is voluntary. The purpose of the study, and the participant's role in the study, privacy concerns, refuse to participate and the right to withdrawal any time without revenge. Written consent forms were obtained from nurses after detailed explanation of the aim and objectives of the study.

3.9 Data Analysis Plan

Data was analyzed using SPSS version, and the results of patients who completed risk assessment model and nurses who completed the questionnaire were included. Descriptive part using Histogram, charts, frequency, percentage, mean and standard deviation were used to describe the participants. For the inferential part, Pearson Coefficients for relationship of demographic variable and outcome and significance considered if p value equal or less than 0.05

Chapter Four
Results

4.1 Introduction

This study includes two populations; nurses and patients. The sample of nurses consisted of 91 nurses, including 63 males recruited from four hospitals (Rafedia Hospital, Al-estishari Hospital, Nablus Hospital and Arabic Hospital). The sample of patients contains 101, patients are from the above mentioned four hospitals. The descriptive and inferential statistics were used and analyzed the study. Below, detailed of the samples characteristics and analysis of the results.

4.2Descriptive statistics

Table (1):the ICU nurses gender of participants

	Frequency	**Percent**
Female	28	30.8
Male	63	69.2
Total	**91**	**100.0**

Table (1) shows that the sample size was 91 nurses, 63 of them were male (69.2%) and the others were female.

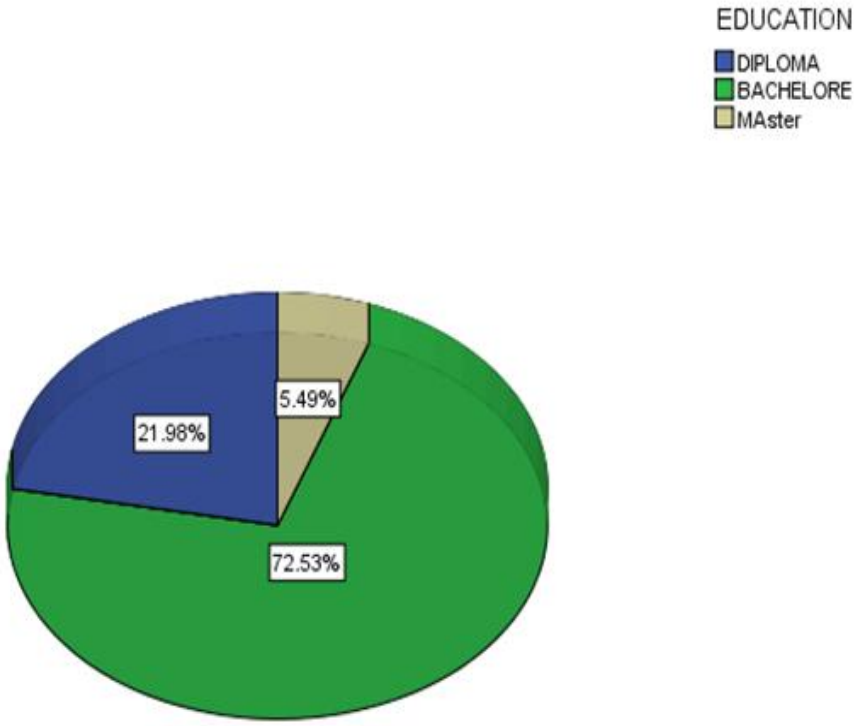

Figure (2): The Educational degree among ICU nurses.

The figure above shows the percentages of nurses' Educational background in the sample, we see that most of the sample had in nurses bachelor degree (72.53%)

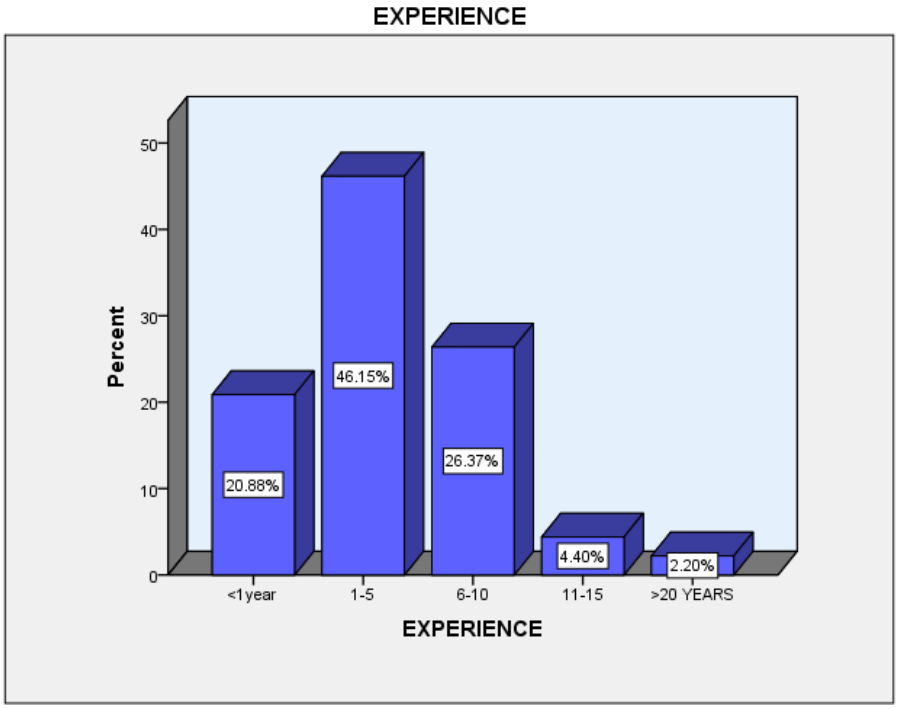

Figure (3): The years of experience for participated ICUs nurses

Table (2): Previous VTE education course or training among ICUs nurses

		Frequency	Percent
Previous VTE education course or training	NO	59	64.8
	YES	32	35.2
Total		**91**	**100.0**

4.3 Inferential statistics

1. What is the level of ICU nurses' knowledge about VTE prophylaxis guidelines?

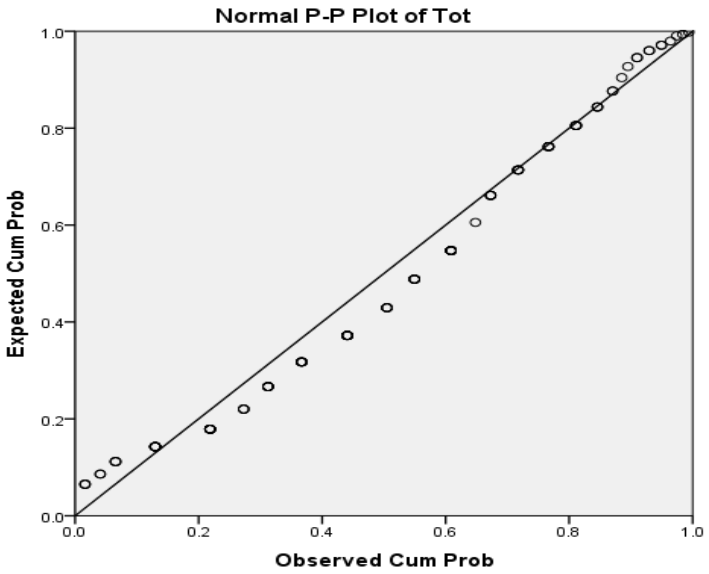

Figure (4): The p - p plot of the total score of nurse's knowledge

The P-P plot shows that the total scores of the nurses (knowledge) are distributed normally. So, data will be treated as tracking normal distribution.

H_0: The average score for the nurses is equal 14 (the pass score)

Table (3): One sample T Test

One-Sample Test

	Test Value = 14					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Tot1	-3.042-	90	.003	-1.09890-	-1.8167-	-.3811-

Table (3) shows that the sig. equals (0.003) which is less than ($\alpha = 0.05$) so H_0 hypothesis has been rejected ,that means the average score is different from the pass score (14) , but the mean difference is -1.0989 which is

means the average score is less than 14 .We conclude that there is insufficient knowledge among nurses about VTE prophylaxis guidelines.

Table (4): Regression analysis between the dependent variable (Total knowledge score) and the independent variables

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	11.724	2.532			
Gender	-.373-	.777	-.051-	-.479-	.633
Age	-.134-	.501	-.038-	-.267-	.790
Department	.560	.483	.125	1.160	.249
Education	1.002	.736	.148	1.363	.177
Experience	-.188-	.493	-.054-	-.382-	.703
Pre VET Education	-2.268-	.726	-.321-	-3.124-	.002
Hospital	-.304-	.339	-.103-	-.898-	.372

a. Dependent Variable: Total score

Table (4) shows that the regression analysis between the dependent variable (Total score) and the independent variables (hospital gender, age, the department, the education degree, years of experience and Previous VTE education course or training). From the table it is found that all variables are not significant at $\alpha = 0.05$ except previous VTE education course or training sig. = .001 < .05. But B = -2.577 which means that the relation is inverse relationship , i.e. the score of the nurse who takes Previous VTE education course or training is less than the others by 2.577

We can write the model as:

$$Total\ score = 13.346 - 2.577 PreVETeducation$$

3. A. Does ICU'S had guidelines regarding VTE prophylaxis?

Table (5): PQ1 the percentage of nurses opinion about their Hospitals or units if have a policy regarding VTE prophylaxis

			Hospital				Total
			RAFIDIA HOSPITAL	ESTISHARI HOSPITAL	NABLUS HOSPITAL	ARABI HOSPITAL	
PQ1	Yes	Count	7	22	4	11	44
		% within hospital	41.2%	59.5%	66.7%	35.5%	48.4%
		% of Total	7.7%	24.2%	4.4%	12.1%	48.4%
	No	Count	8	11	2	18	39
		% within hospital	47.1%	29.7%	33.3%	58.1%	42.9%
		% of Total	8.8%	12.1%	2.2%	19.8%	42.9%
	Don't know	Count	2	4	0	2	8
		% within hospital	11.8%	10.8%	0.0%	6.5%	8.8%
		% of Total	2.2%	4.4%	0.0%	2.2%	8.8%
Total		Count	17	37	6	31	91
		% within hospital	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	18.7%	40.7%	6.6%	34.1%	100.0%

PQ1: Does your hospital or unit have a policy regarding VTE prophylaxis?

Table (5) shows that the percentage of nurses opinion about their hospitals or units if have a policy regarding VTE prophylaxis, 66.7 % of Nablus Hospital nurses agree , while 35.5% Arabi Hospital nurses agree and 58.1% disagree , and 48.4% of all nurses agree while 42.9% disagree and 8.8% don't know. The following figure (4) shows the nurses opinions in each hospital.

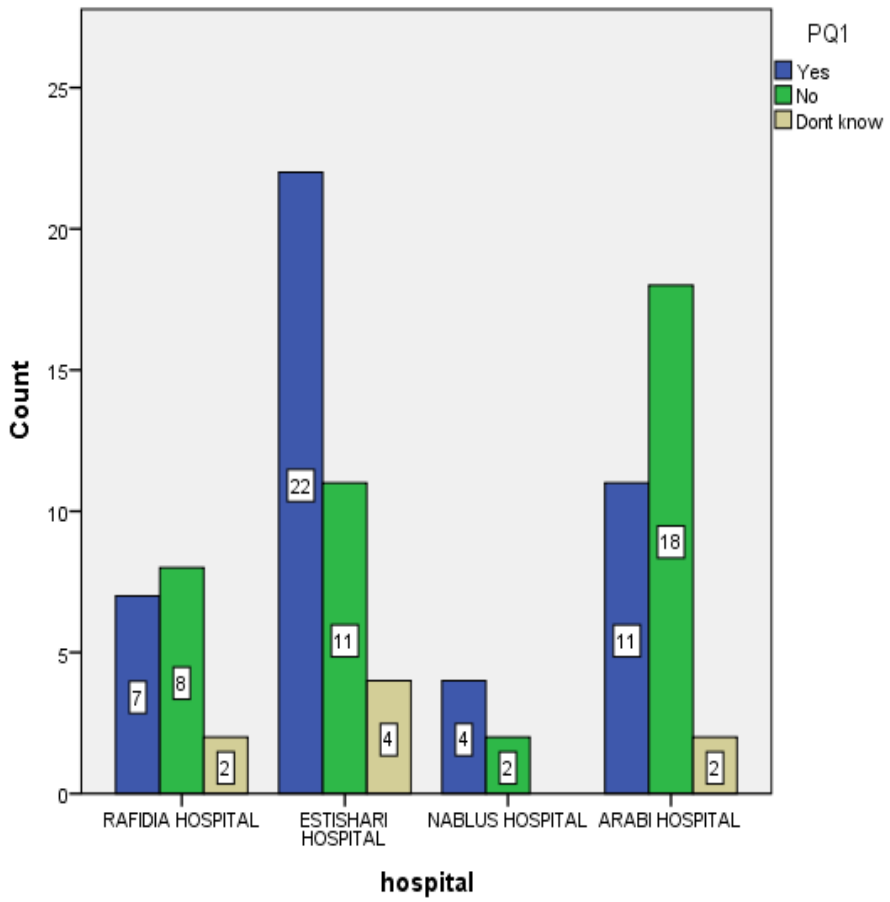

Figure (5): Nurses opinion about their Hospitals if have a policy regarding VTE prophylaxis

B. How ICU nurse adhere to VTE guidelines practice?

Table (6): 3 - Likert Scale points related to practice among ICU nurses

Likert Scale	Weighted Mean (Interval)	Attitude
1	1.00 - 1.66	**Disagree**
2	1.67 - 2.33	**Neutral**
3	2.34 - 3	**Agree**

Table (7): (VTE) guidelines related to practice among ICU nurses

Questions		Disagree	Neutral	Agree	Mean	Std. Deviation	Rank
Encouraging patients to do foot and leg exercises by themselves or relatives.	N	4	35	52	2.53	0.584	**1**
	%	4.4	38.5	57.1			
Encouraging early ambulation surgery of patients.	N	8	29	54	2.51	0.656	**2.5**
	%	8.8	31.9	59.3			
Assessing VTE risk of patients regularly	N	5	42	44	2.43	0.599	**5**
	%	5.5	46.2	48.4			
Monitoring the side effects of the anticoagulants	N	5	35	51	2.51	0.603	**2.5**
	%	5.5	38.5	56.0			
Encouraging patients to elevate their legs.	N	6	35	50	2.48	0.621	**4**
	%	6.6	38.5	54.9			
Use of graduated compression stocking (GCS).	N	16	48	27	2.12	0.680	**7**
	%	17.6	52.7	29.7			
Use of intermittent pneumatic compression (IPC).	N	30	34	27	1.97	0.795	**8**
	%	33.0	37.4	29.7			
Use of inferior vena cava filter.	N	48	34	9	1.57	0.669	**9**
	%	52.7	37.4	9.9			
Educate patients and their families about signs, symptoms, treatment and prevention of VTE.	N	10	43	38	2.31	0.662	**6**
	%	11.0	47.3	41.8			
Weighted Mean					**2.2686**		
Std. Deviation					**0.30589**		

Table (7) shows (Descriptive statistics(VTE) guidelines related to practice), from which it is found that the highest average awarded to the question 1: (Encouraging patients to do foot and leg exercises by themselves or relatives) which mean is 2.53 and std. deviation 0.584, followed by questions 2 and 4 (Encouraging early ambulation surgery of

patients. and Monitoring the side effects of the anticoagulants) which mean is 2.51 and std. deviations 0.656 and 0.603 respectively with agree (From table 6).

While the lowest average was awarded to the question 8 :(Using of inferior vena cava filter) with mean of 1.75 with std. deviation of 0.669 with disagree, followed by question 7: (Use of graduated compression stocking (GCS)) which mean is 2.12 and std. deviation of 0.680 with neutral.

The weighted average of this section was 2.2686 with std. deviation of 0.30589 which indicate that the trend of ((VTE) guidelines related to practice) is (Neutral).as a general trend according to 3- point Likert scale as shown in Table (6) since 2.2686 lie in the interval [2.34 - 3].

This results shown clearly in the below figure (5).

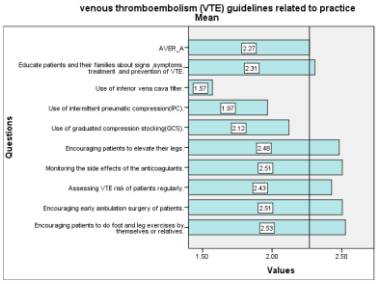

Figure (6): (VTE) guidelines related to practice among ICU nurses

4. What are the facilitators for VTE prophylaxis guidelines implementation among ICU nurses?

Table (8): The possible facilitators to implement VTE prophylaxis guidelines among ICU nurses

Questions		Not facilitator	Small facilitator	Moderate facilitator	Large facilitator	Mean	Std. Deviation	Rank
Educational courses for health care team for VTE prophylaxis	N	14	24	33	20	2.65	0.993	**2**
	%	15.4	26.4	36.3	22.0			
Poster in the unit to remind healthcare team about VTE prophylaxis	N	20	32	30	9	2.31	0.927	**6**
	%	22.0	35.2	33.0	9.9			

Pocket cards to remind healthcare team about VTE prophylaxis	N	23	32	28	8	2.23	0.932	**7**
	%	25.3	35.2	30.8	8.8			
Computerized reminders (alert) when opening patient medical record to do VTE risk assessment	N	21	21	34	15	2.47	1.026	**4**
	%	23.1	23.1	37.4	16.5			
Nurses reminders to physician about VTE prophylaxis	N	10	19	43	19	2.78	0.904	**1**
	%	11.0	20.9	47.3	20.9			
Risk assessment tool in admission order to create VTE prophylaxis	N	15	21	38	17	2.63	0.974	**3**
	%	16.5	23.1	41.8	18.7			
automated computer calculation of patient VTE risk	N	24	23	34	10	2.33	0.989	**5**
	%	26.4	25.3	37.4	11.0			
Weighted Mean						**2.4851**		
Std. Deviation						**0.69592**		

Table (8) shows (Descriptive statistics about the possible facilitators to increase VTE prophylaxis), from which it is founded that the highest average awarded to the question 5 : (Nurses reminders to physician about VTE prophylaxis) which mean 2.78 and std. deviation of 0.904, followed by questions 1 (Educational courses for health care team for VTE prophylaxis) which mean 2.65 and std. deviations 0.993, followed by questions 6 (Risk assessment tool in admission order to create VTE prophylaxis) which mean 2.63 and std. deviations 0.974 which indicate that the trend is Moderate facilitator(From table (9)).

While the lowest average was awarded to the question 3 :(Pocket cards to remind healthcare team about VTE prophylaxis) with mean 2.23 with std. deviation of 0.932 which indicates that the trend is small facilitator, followed by question 2: (Poster in the unit to remind healthcare team about VTE prophylaxis) which mean 2.31 and std. deviation 0.927 with Small facilitator.

The weighted average of this section was 2.4851 with std. deviation of 0.69592 which indicates that the trend of (the facilitators for VTE prophylaxis guidelines implementation among ICU nurses) is (Small facilitator). As a general trend according to 4- point Likert scale as shown in Table (9) since 2.2686 lie in the interval [1.76 - 2.50]

Table (9): 4 - Point Likert scale related to facilitator

Likert Scale	Weighted Mean (Interval)	Attitude
1	1.00 - 1.75	**Not facilitator**
2	1.76 - 2.50	**Small facilitator**
3	2.51 - 3.25	**Moderate facilitator**
4	3.26 - 4	**Large facilitator**

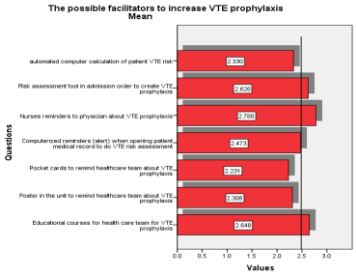

Figure (7): This result are shown clearly in the above

5. What are the barriers of VTE prophylaxis guidelines implementation among ICU nurses?

Table (10):Possible barrier to implement VTE prophylaxis guidelines among ICU nurses

Questions		Not A barrier	Small Barrier	Moderate Barrier	Large Barrier	Mean	Std. Deviation	Rank
Lack of time to consider VTE prophylaxis	N	19	31	32	9	2.34	0.922	**6**
	%	20.9	34.1	35.2	9.9			
Lack of awareness about effectiveness or VTE prophylaxis	N	15	26	34	16	2.56	0.968	**5**
	%	16.5	28.6	37.4	17.6			
Lack of physician agreement with current VTE prophylaxis guidelines	N	11	20	42	18	2.74	0.917	**2**
	%	12.1	22.0	46.2	19.8			
Lack of educational courses about VTE prophylaxis	N	8	20	28	35	2.99	0.983	**1**
	%	8.8	22.0	30.8	38.5			

Lack of clear indication for VTE prophylaxis(who should get prophylaxis)	N	7	30	43	11	2.64	0.796	**4**
	%	7.7	33.0	47.3	12.1			
Number of available staff in the unit	N	12	26	33	20	2.67	0.967	**3**
	%	13.2	28.6	36.3	22.0			
Weighted Mean						**2.6538**		
Std. Deviation						**0.60616**		

Table (10) shows (Descriptive statistics about possible system barrier to VTE prophylaxis), from which it is found that the highest average awarded to the question 4 : (Lack of educational courses about VTE prophylaxis) which mean 2.99 and std. deviation of 0.983, followed by questions 3 (Lack of physician agreement with current VTE prophylaxis guidelines) which mean 2.74 and std. deviations of 0.917, followed by questions 6 (Number of available staff in the unit) which mean 2.67 ± 0.967 which indicates that the trend is Moderate Barrier(From table 11).

While the lowest average was awarded to the question 1 :(Lack of time to consider VTE prophylaxis) with mean 2.34 with std. deviation of 0.922which indicates that the trend is Small Barrier, followed by question 2: (Lack of awareness about effectiveness or VTE prophylaxis) which mean 2.56 (Moderate Barrier) and std. deviation 0.968.

The weighted average of this section was 2.6538 with std. deviation 0.60616 which indicate that the trend of (the barriers of VTE prophylaxis guidelines implementation among ICU nurses) is (Moderate Barrier).as a general trend according to 4- point Likert scale as shown in Table (11) since 2.6538 lie in the interval [12.51 - 3.25].

This results shown clearly in the below figure (7)

Table (11): 4 - point Likert scale related to barrieramong ICU nurses

Likert Scale	Weighted Mean (Interval)	Attitude
1	1.00 - 1.75	**Not A Barrier**
2	1.76 - 2.50	**Small Barrier**
3	2.51 - 3.25	**Moderate Barrier**
4	3.26 - 4	**Large Barrier**

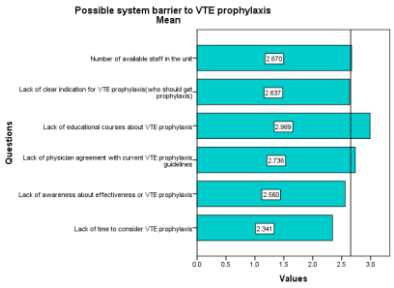

Figure (8): Risk Assessment Tool

4.4 Descriptive statistics

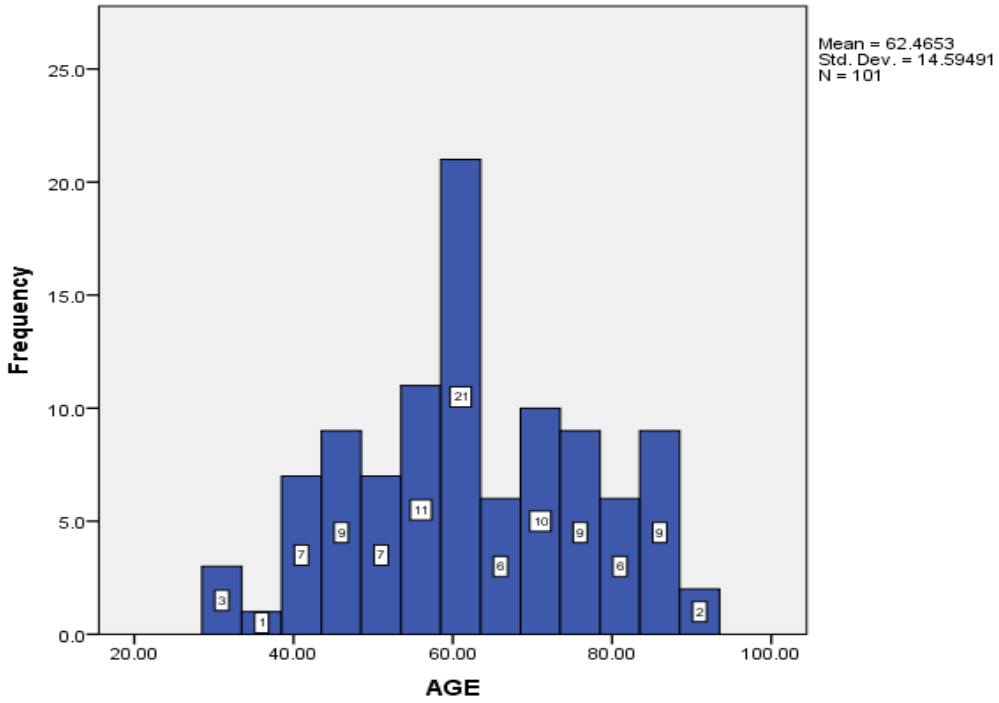

Figure (9): Age of patients

It is seen from the histogram (figure 8) that there are 101 patients and the average age about 62.5 years, and 2 more than 90 years.

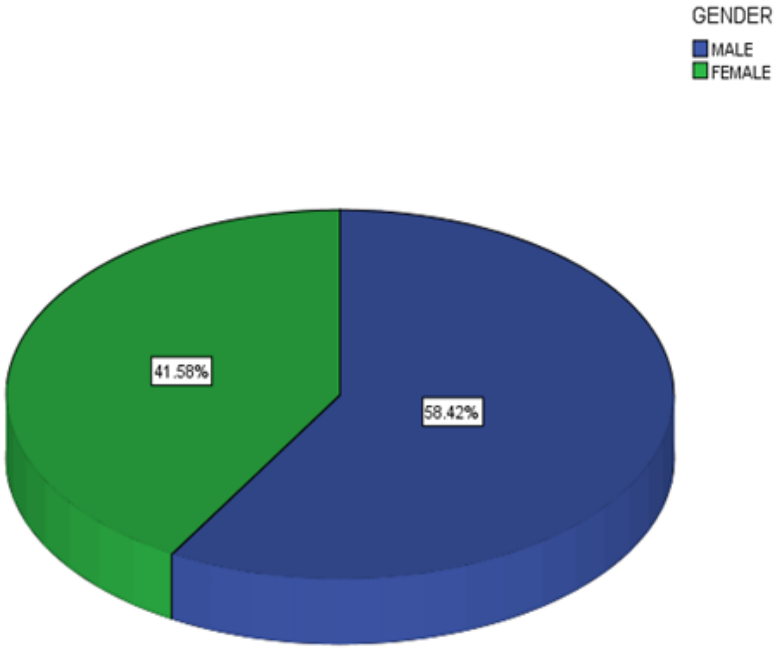

Figure (10): Gender of the patients

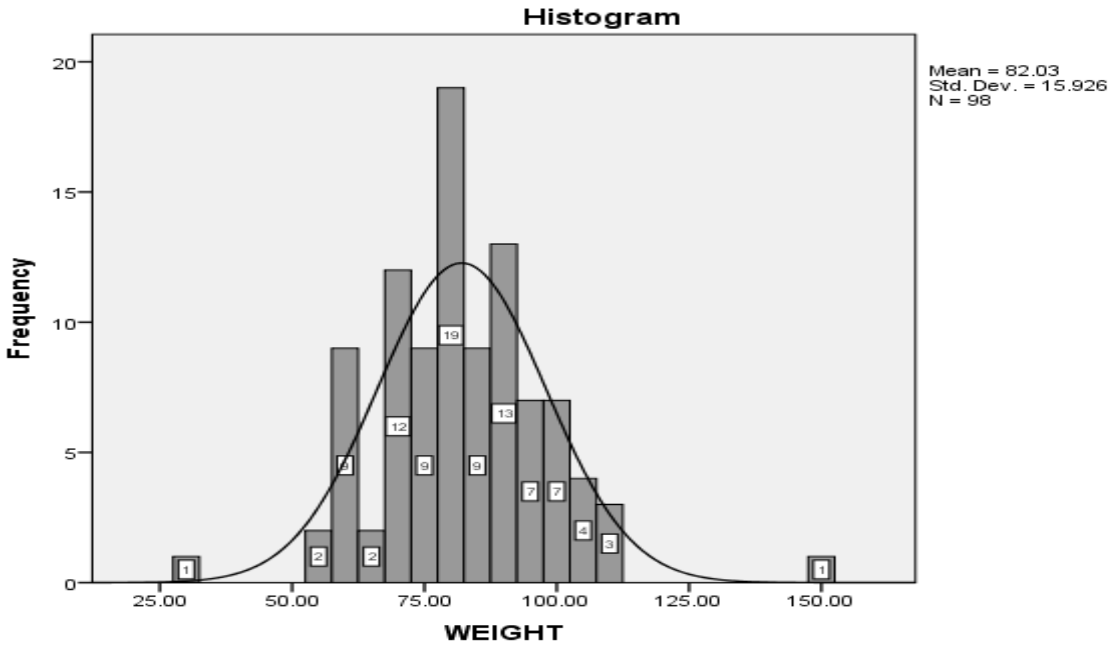

Figure (11): Weight of the patients

4.5 Inferential Statistics

5. A. Does Caprini score detect VTE among ICU patients?

Table (12): Model Summary

	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
	1	51.985[a]	.252	.449

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Form table (12) , it is shown that the model (which includes total, age, gender and weight) explains between 25.2 and 44.9% of the variation in complication.

Table (13): Variables (age, gender and weight) in relation to complication

	B	S.E	Wald	df	Sig.Exp(B)
	Step 1[a] Total.109	.059	3.433	1	.0641.115
	AGE.121	.038	10.117	1	.0011.129
	GENDER.101	.740	.018	1	.8921.106
	WEIGHT.016	.022	.548	1	.4591.017
	Constant-13.456	3.923	11.768	1	.001.000

a. Variable(s) entered on step 1: total, age, gender and weight.

Dependent variable: complication

The *p* values for total, gender and weight is given in the table (13) are (0.064, 0.892 and 0.459 respectively) which are greater than the conventional significance level of 0.05. Hence, it is concluded that the addition of these variables to the model is not statistically significant. In other words, these variables don't explain variations in complication.

The age coefficient is statistically significant. Exp (B) for age is 1.129, which means for each year different in age. The person is 1.129 times more likely to have complications.

The model is: logit (complication) = -13.456+0.121 age

B. What are the classification levels of Caprini score?

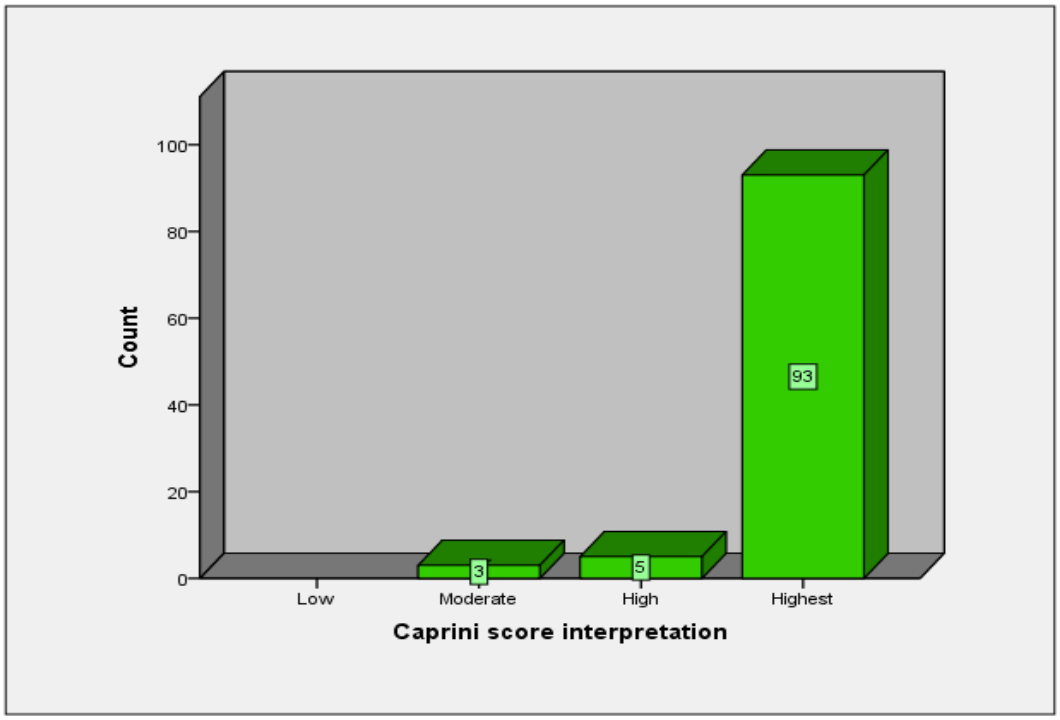

Figure (12): Classification level of Caprini score testing shows if there is a difference in the mean of Caprini score between the patients with complication and without.

Table (14): Group Statistics

	complication	N	Mean	Std. Deviation	Std. Error Mean
Total	no complication	87	11.9425	7.66046	.82129
	complication	14	19.3571	7.87017	2.10339

From table (14), it is found that 87 patient have no complication with 11.9425 mean of Cpriniscore, and the other 14 patients have complications with 19.3571 mean of Caprini score.

Table (15): Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% C.I of the Difference	
									Lower	Upper
Total	Equal variances assumed	.340	.561	-3.349	99	.001	-7.41461	2.214	-11.8	-3.02
	Equal variances not assumed			-3.284	17.206	.004	-7.41461	2.258	-12.17	-2.65

From table (15), it is shown that the *p* - value equals 0.004 which is less than 0.05 .So, it is concluded that there is a difference in the mean of Caprini scores between those who have complications and those who do not, and since the difference is negative (-7.4146), those who have complication have a higher Caprini score than those who do not.

Chapter Five
Discussion

5.1 Introduction

The main concentration of the this study is the inquiry of risk assessment, the knowledge, practices, facilitators, barriers of implementing VTE prophylaxis guidelines among nurses who are working in intensive care units.

This study is divided into two parts, the first was related to nurses and the second was related to patients. The sample of nurses consisted of 91 nurses, including 63 males. While the sample of patients contains 101 patients from four hospitals. The sample was taken from four hospitals (Rafedia Hospital, AL-estishari Hospital, Nablus Hospital and Arabic Hospital).

5.2 Demographic Characteristics of Nurses in the Study

Bachelor degree nurses holder in this study was the most and dominant degree among nurses compared with diploma and master degree. In comparison to the present results, other studies (Al-Mugheed & Bayraktar, 2018; Lee et al., 2014; Oh, Boo, & Lee, 2017) found that bachelor degree is the most dominant educational degree among nurses in ICUs. This was expected as most of graduated nurses in Palestine were involved in bachelor programs. Furthermore, the Ministry of Health in Palestine require a bachelor degree at least to be employed in the ICU.

According to gender of nurses in this study, most of participants were male nurses, and this results were expected as most of ICU nurses were male based on researcher experience that number of male nurses working in ICUs is more than female nurses, but when going back to web site of Ministry of Health, there were no any information or statistics regarding gender differences. In comparison with other studies (Majluf-Cruz et al., 2012; Muhammad, Isah, &Abdullahi, 2016) ,the number of male working in ICU were more than female, but in contrast to (Al-Mugheed & Bayraktar, 2018), female was more dominant.

According to the nurse's years' work experience in the present study, the nurses with less than five years were the majority of participants (67%) and this reflect a young generation of graduated nurses as most of nursing school newly evolved in Palestine.

According to VTE previous education, the majority of involving nurse (64.8%) in the present study had no previous courses or education regarding to venous thromboembolism and this may reflect that there is no attention about VTE prophylaxis in the targeted hospitals. This is congruent to other studies such as (Al-Mugheed & Bayraktar, 2018; Oh et al., 2017) which revealed insufficient VTE education among nurses.

5.3 Nurses' Knowledge about VTE Guidelines

Based on p-plot, the knowledge variable is distributed normally among ICU nurses. In this study the average score for the nurses equals 14 (the passing score).

Referring to table 3, the significance equals (0.003) with a mean difference of -1.09 which means that the average score is less than 14. So, the H0 which is (there are no differences) was rejected and nurses knowledge level about VTE was less than average meaning that nurses had inadequate knowledge level about VTE .Studies conducted by (Muhammad et al., 2016) in Nigeria, (Tang, Sun, Yang, & Tong, 2015) in North China and (Oh et al., 2017) in South Korea showed that nurses' knowledge of VTE prophylaxis guidelines are insufficient, which were all consistent with our study results. Conversely, a study conducted by (Lee et al., 2014) in California showed that knowledge among registered nurses toward VTE prophylaxis is between good and fair (44%. 28% respectively) among 221 participants.

5.4 Nurses' Knowledge about VTE Guidelines in Respect to Their Demographic Characteristics:

Regression test between the dependent variable (VTE knowledge Total score) and the independent variables(selected hospitals, nurses' gender, nurses' age, and working departments) revealed that there are no

significance differences between these nurses' demographic variables and their level of VTE knowledge

Regarding to hospitals, there were no significant differences in VTE knowledge between nurses working in the selected hospitals (p= 0.522) that congruence to a study by (Tang et al., 2015) in North China revealed no significant difference in knowledge between medical staff regard IPC and GCS.

Regarding nurses' gender, there were no significant differences (p= 0.743) in knowledge between male and female in selected hospitals. The results are consistent with a study conducted by (Hassan, Abd Rahman, & Intan Sharina Syed Abdullah, 2012) in Malaysia which showed no significant differences regards to practice , awareness and knowledge towards environment

Regarding to nurses' age, there were no significant differences (p= 0.908) in nurses' VTE knowledge regarding to young or old nurse.

Regarding to nurses' working departments, there were no significant difference (p= 0.325) in nurses' VTE knowledge between nurses working in ICU, CCU or surgical ICU.

Regarding to education degree, there were no significant relation (p= 0.117) between nurses' VTE knowledge and their education level either diploma, bachelor or master degree. On the contrary to (Al-Mugheed

& Bayraktar, 2018) found a significant difference in knowledge and practice between nurses that is higher in bachelor degree than diploma.

Regarding to nurses' working experience, there were no significant relation (*p*= 0.685) between nurses' VTE knowledge and working years. However (Al-Mugheed & Bayraktar, 2018) in their study regards to nurses' working experience which found that nurses with 6-10 years' experience had higher knowledge.

But the relation between previous VTE education course variable (nurses who took previous course on VTE and who not) and nurses' VTE knowledge level found to have a significant differences (*p* value= 0.001). Although there were statistically significant differences in nurses' VTE knowledge level between those who took previous VTE education course or not, the Coefficients was -2.577 which means that the relation is inverse relationship. This surprising result could be explained that nurses were actually attended the VTE courses just to have a certificate .So, they gain their VTE knowledge or the courses lack updating of continuous education policies and follow up the latest VTE guidelines. Other explanation, according to (Shahmoradi, Zahmatkeshan, & Karami, 2015) who stated that the gaining of information affected negatively by lots of factors such as lack of motivation leading to lack of interest, lack of resources and lack of sharing information regard knowledge among employee.

Literature revealed that gaining of knowledge by courses was limited (Blum et al., 2012), while in contrast, studies carried out by (Al-Dorzi et al., 2013; Gaston & White, 2013; Sahu, Menon, Anik, &Rai, 2017) found that improving in knowledge toward VTE prophylaxis post education lectures that considered fair and good.

5.5 Availability of Hospital or Unit Policy Regarding VTE Prophylaxis

There was lack of policies utilization regarding VTE according to nurses' opinion in the selected hospitals which was shown in the expressed percentage. Forty seven percent of nurses in Rafedia hospital, 58.1% of nurses in Arabic hospital, 29.7% of nurses in Al-Estishary hospital, and 33.3%of nurses in Nablus hospital believed that there were no policies regarding VTE.

This contradictories believes between nurses especially between those working at the same unit regarding the availability of guidelines are clearly revealed their lack of knowledge not only about VTE, but also about their understanding of policy as a concept and this raised the importance of evaluation of nurses not only about VTE, but also about quality standard medical protocols.

Furthermore, the lack of utilization of standardized policies regarding VTE in hospital as stated by nurses in the present study could be explained by the lack of attention and support from Ministry of Health in general, and other private hospitals' administration to utilize and implement these

policies. In comparison with a study carried out in North China (Tang et al., 2015) about VTE guidelines in ICU's, results showed that nearly 50% of team were unaware of VTE guidelines.

5.6 Venous Thromboembolism Guidelines Related to Nurses Perceived Practice

Based on descriptive statistics for venous thromboembolism guidelines related to nurses perceived practice, the nurses were between disagree to neutral according to 3-point Likert Scale with mean 2.26 out of 3. And with comparison to other studies related to VTE practice participation was moderate with mean 3 of 5(Oh et al., 2017) and was moderate to high with mean 3.9 of 5(Lee et al., 2014).

In the present study, results showed the highest average awarded to the statement "Encouraging patients to do foot and leg exercises by themselves or relatives" with mean 2.53 out of 3. This might explained by lack of staff and work overload (Ali & Farooqi, 2014). So, nurses try to improve the psychology of the patient and to rely on himself and by relatives in patient care. Contrary to what exists in the present study, a study carried out by(Al-Mugheed & Bayraktar, 2018)found that a small percentage of nurses support the same statement.

Nurses selected the Statements "Encouraging early ambulation surgery of patients" and "Monitoring the side effects of the anticoagulants "as the second and third with mean 2.51 out of 3. Respectively, which might

reflect their concern on the prevention of many complication as VTE, paralytic ileus and may decrease length stay in hospital (Kibler et al., 2012) .Monitoring the side effects of the anticoagulants by nurses themselves or by doing education for patients about possible side effects as bleeding from nose or rectum or bruises over skin (Holbrook et al., 2012) to prevent many complications that could be fatal.

While "Encouraging patients to elevate their legs" with mean 2.48 out of 3 in fourth place. Which can be explained leg elevation is always a great way to reduce swelling , reduce blood stasis, It will not prevent varicose veins from starting but will make your legs look and feel much better (Al-Mugheed & Bayraktar, 2018).

According to nurses' opinions, "Assessing VTE risk of patients regularly "with mean 2.43 out of 3. Ranked in fifth place could be explained by the importance of frequent physical assessment for patients. On the other hand, a study carried out by(Lees & McAuliffe, 2010)explained how it is important to regular assessing patients for VTE to detect any problem as early.

The statement "Educate patients and their families about signs, symptoms, treatment and prevention of VTE" with mean2.31 out of 3 come in the sixth place which need time and more staff, so nurses as already loaded and complain of staff shortage so they gave this statement little concern. Moreover, the need for financial resources and more support(Damian Everhart et al.,2017). On the contrary to other studies

carried out by (Lee et al., 2014,Oh, Boo, & Lee, 2017) using the same statements found moderate to high mean.

The statements “Use of graduated compression stocking (GCS)”with mean2.12 out of 3 came in late rank in the seventh place may be due to their complications like ulcers, compromised circulation, complaining of patients of feeling discomfort (Elpern et al., 2013).

According to many articles such as(Arabi et al., 2013,Elpern et al., 2013) which found the role IPC devices to decrease VTE occurrences. Unfortunately, these devices are not available in some hospitals because they are expensive, and the health care system gives little attention for VTE risk and the importance of these devices to prevent or minimize incidence of VTE, so nurses ranked the statements “Use of graduated compression stocking (GCS)” and “Use of intermittent pneumatic compression (IPC)”with mean 1.97 out of 3 at lower level of concern.

“Use of inferior vena cava filter” got the lowest average with mean 1.75 out of 3 according to nursing opinion that could be explained by the lack of availability and highly cost of device and lack of skillful doctors to insert this filter. Using inferior vena cava filter in the incidence of DVT and contraindication of using anticoagulants contribute to prevent farther complications as shown by(Megan .S. et al., 2010)

5.7 Facilitators to Increase Utilizing VTE Prophylaxis

In the present study, the possible facilitators to increase utilizing VTE prophylaxis according to 4-point Likert scale came with all mean 2.45 out of 4.

Nurses seems to prefer verbal message rather than documenting as they were usually busy, overloaded and complain of staff shortage, this could explain their priority in selecting the "Nurses reminders to physician about VTE prophylaxis" as the highest facilitator to increase utilizing VTE prophylactic with mean 2.75 out of 4. Furthermore, the relation between nurses and physician mentioned in many articles as a means to improve communication and working as integrated system (Felix et al., 2016 ,Wang, Wan, Lin, Zhou, & Shang, 2018).

In general, literature revealed the lack of knowledge in many aspect and specifically in VTE and this explained nurses answer "Educational courses for health care team for VTE prophylaxis" with mean 2.65 out of 4 come in second place which reflect their sense of need for more education and practice regarding VTE to improve their self-efficiency practice which mentioned in many articles like(Al-Mugheed & Bayraktar, 2018,Lee et al., 2014,Oh et al., 2017) . According to Herzberg's "Two Factors Theory" which stated the need of employee for motivation and development to improve his job satisfaction and achievement (Yusoff, Kian, & Idris, 2013), nurses voted toward statement two as they need more education to improve their outcome.

In order to Accelerates the treatment process, reducing risk and detecting any problem as early as possible. The statement “Risk assessment tool in admission order to create VTE prophylaxis” with mean 2.63 out of 4 come as third choice ,it is one important step to evaluate and increase the ratio for patients who will get prophylaxis either chemically or mechanically(Kahn et al., 2010) to avoid future complication.

Nurses chose” Computerized reminders (alert) when opening patient medical record to do VTE risk assessment” with mean 2.47out of 4 as fourth choice and “automated computer calculation of patient VTE risk” with mean 2.33 out of 4 as fifth choice respectively as facilitators because nowadays using computerized systems more common in order to ease the workload, to prevent files from being lost and shorten time for care. also,(Novis et al., 2010,Nutescu, 2007) studies, found that improving of outcome of patients number in giving prophylaxis can be achieved by using computerized reminder and automated calculation (Brenner et al., 2016).

The lowest average of facilitator was awarded to “Poster in the unit to remind healthcare team about VTE prophylaxis” with mean 2.31 out of 4 rank as sixth choice followed by “Pocket cards to remind healthcare team about VTE prophylaxis” with mean 2.23 out of 4 as seventh facilitator. These posters can be hang in the departments with instructions and educational materials regard VTE prophylaxis and cards in health team pockets contains a summary of prophylaxis guidelines ; Although nurses voted to these statements as lower percentage, but these statements are

linked as a means with education which can be connected to the second facilitator above . Studies conducted by (Al-Dorzi et al., 2013,Duff et al., 2011) emphasized these two facilitators in their articles as mean of education program.

5.8 Barriers of VTE Prophylaxis Guidelines Implementation among ICU Nurses

In this study, the answer of question: What are the barriers of VTE prophylaxis guidelines implementation among ICU nurses? And According to 4-point Likert Scale is with all mean 2.65.

Regarding nurses opinion for the highest average score barrier toward

"Lack of educational courses about VTE prophylaxis" with mean 2.99 out of 4 which could be explained lack of these courses may due to financial matter regard the agency and could be human resources development strategies lead to lack of these courses(Lloyd et al., 2012) . Nurses had voted toward promotion of educational courses considered as facilitator so this current barrier enhances what nurses did vote for. Lack of education could lead to decrease concentration and attention toward VTE and its complications.

The second important barrier in the present study is about the role and responsibility between nurses and doctors for prophylaxis guidelines "Lack of physician agreement with current VTE prophylaxis guidelines"

with mean 2.74 out of 4. There is a gab in care in daily assessment for patients who need prophylaxis or not. the solution should be from hospital policies to get roles for nurses and doctors clear(Lloyd et al., 2012).

According to nurses opinion the "Number of available staff in the unit" with mean 2.67 out of 4.that considered third barrier. Of course number of available nurses during the shift influence patients' care either positive or negative. The greater the number of nurses, the greater the proportion of patient care without any workload and pressure and this minimize errors and negligence (Rochefort et al., 2015).

Followed by "Lack of clear indication for VTE prophylaxis (who should get prophylaxis)" with mean 2.64 out of 4 rank as fourth. Unclear policies , non-existence of guidelines , risk assessment and concerning of bleeding risk put these things in the ranks of barriers (Lloyd et al., 2012).

"Lack of awareness about effectiveness or VTE prophylaxis" with mean 2.56 out of 4. Chosen as a fifth barrier by nurses in this study and could be connected to lack of education including lectures, posters, and courses. According (Duff, Walker, & Omari, 2011, Lloyd et al., 2012) mentioned lack of awareness of VTE prophylaxis as a barrier in their studies.

While the lowest average was awarded to:" Lack of time to consider VTE prophylaxis" with mean 2.34 out of 4 in the sixth choice and it may due to work overload or shortage of staff ,contrary to (Lee et al., 2014)who found

in his study “lack of time to consider VTE prophylaxis” was the highest average barrier(21%) among participants .

5.9 Caprini Score and Patients’ Demographic Variables

Caprini score is attributed to Joseph Caprini who develop this score since 1990 and updated in 2005, which is considered mostly validated RAM for surgical and medical patients (Obi et al., 2015).Caprini risk assessment model is using several items for patient assessment and calculate risk points in order giving prophylaxis therapy upon risk degree(Caprini, 2005)

In the present study the descriptive statistics for risk assessment model (Caprini score) on 101 patients who were taken from participating hospitals within a month during their admission in the intensive care units for more than 24 hours .

The average age for participated patients about 62.5 years ± 14.59 which was the same as in studies done by (Hachey et al., 2016) in Boston in implementation and evaluation of Caprini risk model and (Zhou et al., 2014) in China in validation of Caprini score at Chinese hospitals respectively showed average age of patients 59 years and 56.5 years .

According to gender in the present study, the majority (58.42%) were male patients and the other 41.58% were female patients similar to a study conducted by(Chandrakumar, Sajid, Suriyaprakash, & Ajmal, 2016)

in assessing prevalence of VTE using Caprini score that found dominant gender were male patient 63%.

In the current study, although the majority of patients were male (Table 14), gender had no significant relation (p value =0.892)with the dependent variable (complication) which is greater than the conventional significance level of .05.

Histogram (figure11) showed the average weight for 98 patients had been recorded and was 82.03 kg. Furthermore, weight revealed no relation (p value=0.459) with complications. contrary to (Kabrhel, Varraso, Goldhaber, Rimm, & Camargo, 2009) who found in their study that the body weight had strong relationship with complication.

Age with significance (0.001) revealed that it is statistically significant which means for each year different in age, the person is 1.129 times more likely to have complications. Astudy conducted by(Chandra Kumar et al., 2016) in India found that there is a linkage between age and increase complication presented by increasing risk of bleeding.

5.10 Caprini score Classifications Levels

For the second part of question “what are the classification level of Caprini score?”

The risk levels of Caprini score are in four levels :(0-1) low level, (2) moderate level, (3-4) high level, (≥ 5) highest level. This RAM contains 37 risk factors that are arranged score from 1-5 point each. Many studies have used Caprini score to calculate risk points (Grant et al., 2016, Hachey et al., 2016,Obi et al., 2015,Zhou et al., 2014) and up on total score, the decision for giving anticoagulant will be taken.

From table (15), it is shown that 87 patients have no complication with Caprini mean score 11.94, and the other 14 patients have complication with Caprini mean score 19.35. And according to table (16), the p - value equal 0.004 which is less than .005, so , with mean differences (-7.41), there is a negative difference in the mean of Caprini scores between those who have complications and those who did not, means that complication was higher among patients who had higher Caprini score than those who do not. This is similar to study done by(Zhou et al., 2014) that emphasized increasing in Caprini score points lead to increased risk of in hospital VTE.

Also a study conducted by Pannucci et al. (2011) in validation of Caprini risk assessment model for reconstructive plastic surgery showed high Caprini score more than 8 put patients at risk of having VTE.

5.11 Limitations

There are few limitations in the present study should be recognized:

First, there is not enough support and collaboration from the administration of selected hospitals to ease the work of researcher and little financial support. Second, the small number of patients' sample. Third, small sample size of the participated nurses as some of them refused participation. Fourth, validating scores of RAM need performing Doppler Ultrasound for lower limbs as screening was not available.

5.12 Recommendations

Recommendation include: for nurses, to work as team to combined efforts to reduce the occurrence of VTE. Support and cooperation with futures researcher to achieve his goals meduled.

For policy maker in hospitals, to increase awareness and knowledge regard VTE for health care team by doing frequent VTE education and training courses.

For Ministry of Health: to increase awareness of VTE prevention knowledge among health care provider and adopted guidelines to implement in our hospitals, and to do educational courses for VTE for all health practitioner include nurses, doctors, pharmacologist and physiotherapist.

Finally, consider further research regard VTE on larger sample on different setting.

5.13 Conclusion

ICUs nurses are in need for continuous education and training regarding VTE prophylaxis guidelines implementation as, based on finding in the present study, nurses knowledge was inadequate among ICU nurses about pulmonary embolism and deep vein thrombosis (VTE) and VTE prophylaxis guidelines, which may be accountable for having length stay and rehospitalized complications. Furthermore, there was lack of policies utilization regarding VTE guidelines in the selected hospitals which might be related to some barriers and raised the need for adoption of RAM in the ICUs. Finally, there was a positive relation between increasing in age and having more complication based on Caprini score.

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Appendix

عزيزي الممرض / الممرضة

شكرا" لاهتمامكم ورغبتكم بالمشاركة في هذا البحث العلمي

تهدف هذه الدراسة لقياس نسبة المعرفة والممارسة والميسرين والحواجز: تقييم المخاطر بين مجموعة من الممرضين/الممرضات في اقسام العناية المكثفة لتطبيق القواعد الارشادية في ما يخص الجلطة الوريدية العميقة والجلطة الرئوية

ستعامل البيانات جميعها بسرية تامه، ولا يحق لأي شخص الاطلاع على هذه البيانات باستثناء الباحثين. وستحفظ البيانات في اماكن خاصة لا يصل اليها الا الباحثون.

لا يتطلب الاشتراك في البحث ذكر اسمك او ما يدل عليه. ومهما كانت اجابتك او رأيك فان هذه الاجابات والآراء لن تؤثر بأي شكل كان عليك، ولك الحق بالاشتراك في الدراسة او رفضه حيث أن المشاركة في البحث طوعية وبمحض اختيارك.

يستغرق ملئ الاستبيانات حوالي "15 دقيقة " من الوقت كحد أعلى

يحق لك كمشارك في الدراسة الإستفسار من الباحث عن أي أمر يتعلق بالدراسة وكذلك يحق لك الحصول على نتائج البحث عند الانتهاء منه

توقيع المشارك_____

الباحث الرئيس

مازن شريف سلمان

الدراسات العليا/جامعة النجاح الوطنية

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Questionnaire

1) Please check(√) 0n the answer that describes you:

Gender	1. Male □ □ 2. Female □ □
Age	1. 24 years or younger□ 2. 25-29 years□ 3. 30-34 years□ 4. 35-39 years□ 4. 42 -44 years□ 5. 45 -49 years□ 6. above 60 years□
Department	1. Medical ICU □ □ 2. Surgical ICU □ □ 3. CCU □ □
Education level	1. Diploma □ □ 2. Bachelor □ □ 3. Master □ □
Year of experience	1. less than 1 year □ □ 2. 1-5 years □ □ 3. 6-10 years □ □ 4. 11-15 years □ □ 5. 15-20 years □ □ 6.More than 20 years□
Previous VTE education course or training	1. Yes □ □ 2. No □ □

2) Questions: Venous Thrombo Embolism (VTE) guidelines related to knowledge:

Please circle the correct answer :

1	What is the most important mechanism of VTE risk ?	a) Hypercoagulability b) Stasis c) Vascular injury d) A,b and c
2	Which one of this is not a risk factor for DVT ?	a) Acute respiratory infection b)Peripartum state c) Oral contraceptive pill d) Surgery duration of less than 30 minutes
3	Severity of pain correlate with the size of the thrombus	a) True b) False
4	Which of the following is a contraindication to mechanical VTE prophylaxis?	a)Varicose vein b)Superficial thrombo-phlebitis c)Obesity d) Severe peripheral arterial disease e)Previous history of PE
5	Signs and symptoms of PE include	a) shortness of breath, chest pain, hemoptysis b) Muscle spasm, ringing ears,vertigo c) Lower limbs swelling , warmth; tenderness d) All of above
6	Which of the following comprise VTE ?(circle more than one)	a) deep vein thrombosis b) Arterial stroke c) Myocardial infarction d) Pulmonary embolism e) Aneurysm
7	Hyperlipidemia is 1 of 3 causes of VTE formation	a) True b) False
8	Age is a risk factor for VTE	a) True b) False
9	Adequate hydration can prevent the occurrence of VTE	a) True b) false
10	Graduated compression stocking (GCS) can be removed at night to relax muscles, with no effect on VTE prevention	a) true b) false

11	What is the appropriate dose of prophylactic Clexane for a medical patient?	a) 20 mg OD b) 1 mg/kg BID c) 5000 u BID d) 40 mg OD
12	Check all that apply: Risk factors for PE include which of the following?	a) advanced age b) Young age c) Contraceptive pills d) Trauma to blood vessels e) Underweight f) Obesity g) Surgery h) Recent respiratory infection i) Chronic respiratory disease j) immobility
13	Which lab test for a fibrin degradation product?	a) ESR b) Doppler c) D-dimer d) INR
14	Which of the following is true regarding ultrasonography? Select all that apply.	a)non-invasive b)commonly used for DVT diagnosis c)not commonly used for DVTdiagnosis d)cannot detect small clot in distal veins e)can detect small clot in distal vein f) invasive
15	If a 38 year old patient with no risk factors has major surgery(2-3 hours), this patient is in what risk classification.	a) Low b) Moderate c) High d) highest
16	If a patient 42 year old patient has no risk factors and minor surgery, this patient is in what risk classification.	a) Low b) Moderate c) High d) highest

3)Questions: venous thromboembolism (VTE) guidelines related to practice:
Please circle the correct answer:

1	Does your hospital or unit have a policy regarding VTE prophylaxis?	a) Yes b) No c) Don't know
2	Which one is not applicable for DVT prophylaxis?	a) intermittent pneumatic compression b) Low dose heparin c) Warfarin with INR 2.5-3 d) Elastic stocking
3	Before the injection of pre-filled anticoagulant drugs .the air in the needle should be removed.	a) True b) false

		Never	sometimes	always
1	Encouraging patients to do foot and leg exercises by themselves or relatives.	☐	☐	☐
2	Encouraging early ambulation surgery of patients.	☐	☐	☐
3	Assessing VTE risk of patients regularly.	☐	☐	☐
4	Monitoring the side effects of the anticoagulants.	☐	☐	☐
5	Encouraging patients to elevate their legs.	☐	☐	☐
6	Use of graduated compression stocking(GCS).	☐	☐	☐
7	Use of intermittent pneumatic compression(IPC).	☐	☐	☐
8	Use of inferior vena cava filter.	☐	☐	☐
9	Educate patients and their families about signs ,symptoms,treatment and prevention of VTE.	☐	☐	☐

4) The next questions are about the possible facilitators to increase VTE prophylaxis:

Please read the options carefully and rate the following system facilitator:

		not facilitator	small facilitator	moderate facilitator	large facilitator
1	Educational courses for health care team for VTE prophylaxis	☐	☐	☐	☐
2	Poster in the unit to remind healthcare team about VTE prophylaxis	☐	☐	☐	☐
3	Pocket cards to remind healthcare team about VTE prophylaxis	☐	☐	☐	☐
4	Computerized reminders (alert) when opening patient medical record to do VTE risk assessment	☐	☐	☐	☐
5	Nurses reminders to physician about VTE prophylaxis	☐	☐	☐	☐
6	Risk assessment tool in admission order to create VTE prophylaxis	☐	☐	☐	☐
7	Automated computer calculation of patient VTE risk	☐	☐	☐	☐

5)The following questions are about possible system barrier to VTE prophylaxis; please rate the following system barriers in your hospital

		Not a Barrier	small barrier	moderate barrier	large barrier
1	Lack of time to consider VTE prophylaxis	☐	☐	☐	☐
2	Lack of awareness about effectiveness or VTE prophylaxis	☐	☐	☐	☐
3	Lack of physician agreement with current VTE prophylaxis guidelines	☐	☐	☐	☐
4	Lack of educational courses about VTE prophylaxis	☐	☐	☐	☐
5	Lack of clear indication for VTE prophylaxis(who should get prophylaxis)	☐	☐	☐	☐
6	Number of available staff in the unit	☐	☐	☐	☐

Kindly ,If you have any note or comment on the above mentioned parts , you can writehere----------
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Field observation ----------

Risk Assessment Tool

Patient name : _____ , Age : _____ , Sex : _____ , Wgt : _____kg

Please : (Choose All That Apply) :

Each Risk Factor Represents (1) Point :	
Age 41 – 59 years	( )
Minor Surgery Planned	( )
History Of Prior Major Surgery	( )
Varicose Veins	( )
History OF Inflammatory Bowel Disease	( )
Swollen Legs (Current)	( )
Obesity (BMI >30)	( )
Acute Myocardial Infarction (< 1 Month)	( )
Serious Lund Disease .Including Pneumonia (<1 month)	( )
Abnormal Pulmonary Function (COPD)	( )
Medical Patient Currently At Bed Rest	( )
Leg Plaster , Cast , Or Brace	( )
Central Venous Access	( )
Other Risk Factor _____	

Each Risk Factor Represents (2) Point :	
Age 60-74 Years	( )
Major Surgery (> 60 Minutes)	( )
Arthroscopic Surgery (> 60 Minutes)	( )
Laparascopic Surgery (> 60 Minutes)	( )
Previous Malignancy	( )
Morbid Obesity (BMI > 40)	( )

Each Risk Factor Represents (3) Points :	
Age 75 Years Or More	( )
Major Surgery Lasting 2-3 Hours	( )
BMI > 50 (Venous Stasis Syndrome)	( )
History Of SVT , DVT/PE	( )
Family History Of DVT/PE	( )
Present Cancer Or Chemotherapy	( )
Positive Factor V Leiden	( )
Positive Prothrombin 20210A	( )
Elevated Serum Homocystiene	( )
Positive Lupus Anticoagulant	( )
Elevated Anticardiolipin Antibodies	( )
Heparin Induced Thrombocytopenia (HIT)	( )
Other Thrombophilia Type _____	

Each Risk Factor Represents (5) Point :	
Elective Major Lower Extremity Arthroscopy	( )
Hip , Pelvis or Leg Fracture (< 1 month)	( )
Stroke (< 1 month)	( )
Multiple Trauma (< 1 month)	( )
Acute Spinal Cord Injury (Paralysis) , (< 1 month)	( )
Major Surgery Lasting Over 3 Hours	( )

1. Total Risk Factor Score : ( )

جامعة النجاح الوطنية

كلية الدارسات العليا

قياس نسبة المعرفة والميسريين والحواجز: تقييم المخاطر بين مجموعة من الممرضين/ الممرضات في أقسام العناية المكثفة لتطبيق القواعد الارشادية فيما يخص الجلطة الوريدية العميقة والانسداد الرئوي

إعداد

مازن شريف شفيق سلمان

إشراف

د. جمال القدومي

قدمت هذه الاطروحة استكمالاً لمتطلبات الحصول على درجة الماجستير في برنامج تمريض العناية المكثفة، بكلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس–فلسطين.

2020

قياس نسبة المعرفة والميسريين والحواجز: تقييم المخاطر بين مجموعة من الممرضين/ الممرضات في أقسام العناية المكثفة لتطبيق القواعد الارشادية فيما يخص الجلطة الوريدية العميقة والانسداد الرئوي

اعداد

مازن شريف شفيق سلمان

اشراف

د جمال قدومي

الملخص

المقدمة:

الجلطات الدموية الوريدية عبارة عن كوكبة من جلطات الأوردة العميقة والانسداد الرئوي. يتأثر ملايين المرضى حول العالم بهذه الجلطات والمسؤولة عن دخول الالاف المستشفيات. يمكن العمل للوقاية من هذه الجلطات للمرضى الذين يدخلون المستشفى وذلك لتقليل المراضة والوفيات. غالباً ما يتم حذف أو تأخير العلاج الوقائي المناسب للمرضى الطبيين والجراحيين في المستشفى على الرغم من الاعتراف الواسع بأهميته. يمكن استكشاف تفسيرات محتملة للتأخير في العلاج لتمريض التوعية الظرفية الذين يمثلون أكبر عنصر في فريق الرعاية الصحية ويقومون بمهام حرجة مثل تقييم المريض ومراقبته وما يفعله أو يفشل في القيام به يرتبط مباشرة بنتائج المريض.

الهدف:

الهدف من هذه الدراسة هو تقييم مستوى المعرفة تجاه إرشادات الجلطات الدموية الوريدية العميقة والانسداد الرئوي بين ممرضات وحدة العناية المركزة والميسّرين المعترف به والحواجز التي تحول دون تنفيذ الوقاية الإرشادية وتحديد المرضى المعرضين لخطر الإصابة بهذه الجلطات باستخدام نموذج تقييم المخاطر (RAM).

المنهج العلمي:

تم استخدام تصميم وصفي مقطعي في هذه الدراسة بما في ذلك مجموعتين؛ الممرضين والمرضى. كان عدد الممرضين المشاركين 91 ممرض يعملون في وحدة العناية المركزة ووحدة العناية القلبية. أيضا، تم تضمين 101 مريضاً في الدراسة التي أجريت في أربعة مستشفيات. مستشفى رفيديا ومستشفى نابلس والمستشفى العربي ومستشفى الاستشاري. تشمل الاستبيانات التي تم توزيعها على الممرضيين خمسة أجزاء؛ البيانات الديموغرافية والأسئلة المتعلقة بمعرفة الممرض الجلطات الدموية الوريدية العميقة والانسداد الرئوي والأسئلة المتعلقة بممارسة المبادئ التوجيهية والأسئلة المتعلقة بالميسرين المتصوَّلين من الجلطات الدموية الوريدية العميقة والانسداد الرئوي والأسئلة المتعلقة بحواجز الجلطات الدموية الوريدية العميقة والانسداد الرئوي لتنفيذ المبادئ التوجيهية بين ممرضين وحدة العناية المركزة. تم استخدام (Caprini score) لتحديد المرضى المعرضين لخطر الإصابة بالجلطات الدموية الوريدية العميقة والانسداد الرئوي الذين تم قبولهم في وحدة العناية المركزة مع مدة البقاء لأكثر من 24 ساعة. متابعة القيام بهؤلاء المرضى عن طريق الهاتف بعد ثلاثة أشهر عن طريق السؤال عن أي مضاعفات حدثت مثل الجلطات الدموية الوريدية العميقة والانسداد الرئوي أو الموت.

النتيجة:

من إجمالي عينة التمريض، 69.2 ٪ من المشاركين هم من الذكور و30.8 ٪ من الإناث. غالبية الممرضين (67٪) كانت لديهم خبرة أقل من 5 سنوات. معظم المشاركين لديهم درجة البكالوريوس (72.53 ٪). فيما يتعلق بالدورات التعليمية السابقة حول الجلطات الدموية الوريدية العميقة والانسداد الرئوي، لم يكن لدى 64.8 ٪ من الممرضات أي دورة سابقة، و35.2 ٪ فقط لديهم. وفقاً لمستوى المعرفة فيما يتعلق الممرضات الجلطات الدموية الوريدية العميقة والانسداد الرئوي، كشفت الدراسة عن مستوى إحصائي أقل أهمية من المتوسط (قيمة$p = 0.003$). علاوة على ذلك، وجد اختبار الانحدار بين المتغير التابع (درجة معرفة مجموع الجلطات الدموية الوريدية العميقة والانسداد الرئوي) والمتغيرات المستقلة (المستشفى

والجنس والعمر والقسم ودرجة التعليم وسنوات الخبرة والدورة التعليمية السابقة لـ الجلطات الدموية الوريدية العميقة والانسداد الرئوي) أن جميع المتغيرات المستقلة لم يكن لديها دلالة إحصائية باستثناء دورة التعليم للجلطات الدموية الوريدية العميقة والانسداد الرئوي السابقة (قيمة$p = 0.001$). وفقا لمستوى الالتزام ممرضين وحدة العناية المركزة لممارسة الجلطات الدموية الوريدية العميقة والانسداد الرئوي. كان المتوسط 2.26 من 3 ± 0.30. صنف الممرضين " تذكيرات الممرضين للطبيب حول الوقاية من الجلطات الدموية الوريدية العميقة والانسداد الرئوي " كأعلى الميسرين المتصورين لتنفيذ المبادئ التوجيهية للوقاية من الجلطات الدموية الوريدية العميقة والانسداد الرئوي، في حين أن "عدم وجود دورات تعليمية حول الوقاية الجلطات الدموية الوريدية العميقة والانسداد الرئوي " كأعلى حاجز محسوس لتنفيذ الوقاية الجلطات الدموية الوريدية العميقة والانسداد الرئوي.

من بين إجمالي عينة المرضى، 58.4 ٪ من الذكور، في حين أن 41.5 ٪ من الإناث مع متوسط العمر 62.5 سنة، ومتوسط الوزن هو 82.03 كجم. وفقًا للسؤال "هل تكشف نقاط Caprini عن المضاعفات؟"، فإن القيمة p للجنس والوزن بالنسبة إلى المضاعفات ليست ذات دلالة إحصائية. على الجانب الآخر، يكون العمر ذو دلالة إحصائية (قيمة $p = 0.001$) مما يعني أن الشخص يكون 1.129 مرة أكثر عرضة لمضاعفات في كل عام زيادة. مستويات درجة Caprini بالنسبة إلى المضاعفات التي تبين أنها ذات دلالة إحصائية (قيمة $p = 0.004$)، لم يكن لدى 87 مريض أي مضاعفات بمتوسط 11.94 من درجة Caprini وكان لدى 14 مريض مضاعفات بمعدل 19.35 من درجة Caprini.

الخلاصة:

ممرضين وحدة العناية المركزة في حاجة إلى التعليم المستمر والتدريب فيما يتعلق بتنفيذ مبادئ توجيهية الوقاية الجلطات الدموية الوريدية العميقة والانسداد الرئوي كما كانت المعرفة غير كافية بين الممرضين في وحدة العناية المركزة حول الانسداد الرئوي وتجلط الأوردة العميقة والمبادئ التوجيهية للوقاية، وهو المسؤول عن كثير من المضاعفات. علاوة على ذلك، كان هناك

نقص في استخدام السياسات المتعلقة بإرشادات الجلطات الدموية الوريدية العميقة والانسداد الرئوي في المستشفيات المختارة والتي قد تكون مرتبطة ببعض الحواجز وأثارت الحاجة إلى اعتماد نموذج تقييم المخاطر في وحدات العناية المركزة. أخيرًا، كانت هناك علاقة إيجابية بين الزيادة في سن المريض وزيادة المضاعفات بناءً على درجة Caprini.