

Nurse's Performance Regarding Prevention of Deep Venous Thrombosis among intensive care patients

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Abstract

Background: The Nurses have very important role in preventing Complication through careful assessment of venous circulation of the lower extremities for early detection of deep venous thrombosis. **Aim of the study:** This study aimed to assess nurses performance regarding prevention of deep venous thrombosis among intensive care patients. **Design:** A descriptive design was utilized for the conduction of this study. **Setting the study** was carried out in Intensive Care Unit (ICU) at Beni-Suef University hospital. **Study subject:** A convenience subject of all available nurse's (N=50). **Data collection Tools:** I - self – administrating questionnaire which composed of nurses demographic characteristics' and nurses' knowledge, II nurses' practice observational checklists, which divided two parts include ,initial assessment as :wells score for predicting DVT and, clinical risk factors to assess the risk factors , venous clinical severity score to assess the severity of venous thrombosis for prevention of deep venous thrombosis. **Results:** Revealed that, two thirds of the studied nurse's had unsatisfactory level of knowledge about prevention of deep venous thrombosis, and less than half of them had satisfactory level of knowledge, more than half were adequate level of practices regarding prevention of deep venous thrombosis, and practice include wells score more than half adequate level of practice and clinical severity score two thirds in adequate level of practice clinical risk factors majority of nurses inadequate level of practice. **Conclusion:** More than two third of studied nurse's had un satisfactory level of knowledge and more than half of the studied nurse's had adequate level of practices regarding prevention of deep venous thrombosis. **Recommendations:** Further research is recommended to evaluate the effect of training program on nurse's performance regarding prevention of deep venous thrombosis.

Keywords: Nurses performance, prevention , Deep vein thrombosis ,Intensive care patients

Introduction

Deep vein thrombosis (DVT) occurs when a blood clot or thrombus forms in the deep vein, usually restricting blood flow. Deep venous thrombosis is a disease of hospitalized patient which can cause pulmonary embolism. The pulmonary embolism occurs if the thrombus dislodges and travels to the lungs. Venous thrombo-embolism (VTE) is considered to be the most common preventable cause of hospital related death (Grace, 2013).

Venous thrombo-embolism is associated with significant morbidity and mortality. The most common complication of DVT is post-

thrombotic syndrome.it can occure in more than one third of patients with DVT and can significantly affect. American public health association found that, 74% of U.S. adults knew little or nothing about DVT. This is an alarming number, considering every year 2million people get deep vein thrombosis and up to 200, 000 of them die from it. Deep vein thrombosis is a serious condition with potentially fatal consequences. Many patients in both hospital and the community are at increased risk of DVT, and it is therefore important for nurses to understand the condition and how to recognize it (khoon ,2014).

Deep Venous thrombosis is a major problem facing not only old patient but also younger patients having major surgery. It is estimated that approximately one third of all patients older than 40 years having major surgery acquired small thrombi in the deep calf vein within 24 hours post operatively patients with cerebrovascular accidents or hip fractures have a 50 % or greater charge of acquiring thrombi as result of immobilization from prescribed extended bed rest (**Protro Wski, Alexander & Jacobs, 2016**).

Deep venous thrombosis result from three factors: stasis of venous blood flow, damage to the endothelial lining of the vein wall and changes in the coagulation mechanism of the blood. These factors are still believed to be of primary importance in thrombus formation, and they contribute to the major predisposing risk factors of venous thromboembolism (**Shawky, 2013**).

Warning signs for DVT can evolve over several days or develop rapidly over a few hours. These may include: warmth, tenderness, redness and discoloration in the affected are, usually in one calf. The most serious complications of DVT are pulmonary embolism, Chronic venous insufficiency, venous obstruction and valvular destruction (**Brunner, 2016**).

Venous thrombosis is a major health problem and the primary prevention is an important goal of Nursing. The preventive measures include the application of elastic pressure stocking, intermittent pneumatic compression devices, special body positioning and exercise (**Black & Jacobs, 2016**).

Nursing are the front lines in terms of delivery of the therapeutic regimens of both prevention and treatment for DVT so, the nurse must follow standard of care and intervention to prevent this life threatening complications. The nurse's knowledge and practice lead to an improvement in the delivery of patient care. The teaching materials for DVT and its prophylaxis would have improved the existing practice (**Smeltzer, Bare, Hinkle & Cheever, 2016**).

Significance of the study

Deep venous thrombosis (DVT) is one of the most common preventable complications of major surgery and traumatic injuries. The prevention of DVT is more effective in promoting positive patient outcomes and is an important aspect of nursing care. The nurses should be knowledgeable about prevention of deep venous thrombosis. Nurses play important role in assessment, prevention & early recognition of deep venous thrombosis, relieve patient anxiety, help prevent complication and improve patients outcomes (**Collins & Morris, 2015**).

Aim of the Study

This study aims to assess nurse's performance regarding caring of patients with deep venous thrombosis through the following:

1. Assess nurse's knowledge regarding prevention of deep venous thrombosis among intensive care patients.

2. Assess nurse's practices regarding prevention of deep venous thrombosis among intensive care patients.

Research questions

The current study answered the following questions.

Questions will be formulated:

1. What is nurse's knowledge regarding prevention of deep venous thrombosis among intensive care patients?.

2. What is nurse's practices regarding prevention of deep venous thrombosis among intensive care patients?

Subjects and Methods

Research Design:

A descriptive design was utilized for the conduction of this study. An exploratory descriptive research design was adapted to fulfill the aim of the study and answer the research questions.

Setting of the Study: Research setting :

- The present study was conducted at the General Intensive Care Unit at Beni Suf university hospital it was consists of 19 beds is located at the third floor, 4halls each hall contains of 4beds, and one hall contain of 3 beds the total number of beds 19.

Subject: - The subjects of the present study included a convenience sample of all the available nurse's including (50 nurses) after obtaining their oral consent to participate in the study.

Data Collection tools

Data were collect The subjects of the present study included a convenience sample of all the available nurse's including (50 nurses) after obtaining their oral consent to participate in the study.

using the following tools:

Self-administered questionnaire

Was used to assess nurses level of knowledge regarding prevention of deep venous thrombosis intensive care units, it was developed by the investigator in a simple Arabic language based on recent and relevant literature it include the following (**Ignataavicus & Workman 2016**) included two parts:

A-The first part included the demographic characteristics of the nurses: as age, gender, level of education, years of experience, previous training courses. It included 5 closed ended questions.

B- The second part included the Nurse's knowledge regarding prevention of deep venous thrombosis, it involved five sections as follow: General information about deep venous thrombosis, how to use elastic stocking, Drugs uses for deep venous thrombosis, knowledge about complication & prevention of deep venous thrombosis. and knowledge about role of nurses to prevent deep venous thrombosis.

Scoring system: Scoring system :

The second part of the knowledge assessment consisted of 47 multiple choice questions (MCQ) and true or false (T&F) questions. One score was given for each correct answer and zero for the incorrect answer. The total scores of the knowledge were 47 scores distributed as follow :

Section I: general information about deep venous thrombosis 8 questions (MCQ) and 11 questions (T&F) questions these part was 19 scores .

Section II: knowledge about how to use the elastic stocking 6 (MCQ) questions. 6 score.

Section III: knowledge of nurses about how to use drugs for deep venous thrombosis 14 (MCQ) questions 14 score.

Section IV: Knowledge about complications of deep venous thrombosis it was included 2 complete questions 2score.

Section V: Role of nurses regarding prevention of deep venous thrombosis among intensive care patients it was included 6 (MCQ) questions .6 score.

The total scores for every part were summed and percentage was calculated.

The knowledge level was categorized into :

Satisfactory $\geq 80\%$ *

***Unsatisfactory $< 80\%$**

Nurses' practice Observational checklist: These checklists were used to assess nurse's practices regarding prevention of deep venous thrombosis among intensive care patients, which include the following :

Patient assessment: were used to assess the following two parts: initial assessment and nursing practices to prevent the deep venous thrombosis among intensive care patients this tool was written in English language .

Part I-Initial assessment: it included the following :

a) The Modified wells score: it is a clinical model used for predicting the probability of deep venous thrombosis it was adopted from **Wells, (2003)**. It was included 9 items as: Active cancer, paralysis, bedridden >3 days, localized tenderness, calf swelling >3 cm, pitting oedema, collateral superficial vein, previously documented DVT, diagnosis at least >2 probability. The investigator assess the nurse when applied the procedure on the patient high-probability group if Wells score > 2 , moderate-probability group if Wells score = 1-2, and low-probability group if Wells score < 1 .

b) Clinical risk factors for deep venous thrombosis: it was used to assess the risk factors (strong, moderate, & weak clinical risk factors and preexisting disease states. it was adopted from. **Nicholson, (2009)**, it was included 24 items. The first eight steps was strong factors, the second six steps (9-14) was moderate factors, the third five steps (15-19) was weak factors, and the final five step (20-24) was preexisting disease states .

C) Venous clinical severity scoring (VCSS): it used to assess the severity of venous thrombosis it was adapted from **Vasquez and Munschauer, (2008)** and modified by the

investigator it was included 9 items: pain, varicose vein, venous edema, skin pigmentation, inflammation, induration, severe cellulitis, active ulcer duration, active ulcer size.

Scoring system: for initial assessment: every step that was done correctly by the nurse was given one **score**. While that were not done or done incorrectly were given zero score.

The total score was calculated and changed into percentage. The level of practice was categorized into adequate or inadequate as follow :

80% < considered adequate level of practice.

80% > considered inadequate level of practice.

Part II-Nursing practices: toward prevention of deep venous thrombosis. It was used to assess nursing care toward preventive measures of DVT as (elastic compression stocking, and range of motion.it adopted from **Lynn, (2016)**.

Scoring system :

Nursing practices regarding elastic stocking, range of motion) it was included of 36steps. Every step that was done correctly by the nurse was given one score. While the steps that were not done or done incorrectly were given zero score. The total scores was calculated and changed into percentage. The level of practice was categorized into adequate or inadequate practices as follow :

>80% considered adequate level of practice.

< 80% considered inadequate level of practice .

Pilot study

A pilot study was carried out on 10 nurses from the study subjects to test the clarity, applicability, feasibility and relevance of the tools used and to determine the needed time for the application of the study tools. The nurses who were included in the pilot study were included to the study subjects because no modification was done after conducting pilot study.

Ethical considerations

The ethical research considerations in this study included the following:

1.The research approval of protocol was obtained from Scientific Research Ethical Committee in Faculty of Nursing at Ain Shams University before starting the study.

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

3.The researcher assured maintaining anonymity and confidentiality of the subjects data.

4.Nurses were informed that they allowed choosing to participate or not in the study and that they had the right to withdraw from the study at any time without giving any reasons.

5.Ethics, values, culture, and beliefs were respected.

Results

Table 1: reveals that mean age of the studied nurses were 26.56 ± 4.50 and 78% of the studied nurses were females. Regarding to educational level it was revealed that 42% of them had nursing diploma. In relation to years of experience, it was revealed that 58% of them had 5 years or less and 72% of them had training courses about prevention of deep venous thrombosis

Part II: Nurse's level of knowledge regarding prevention of deep venous thrombosis.

Figure 1: Shows that 62% of the nurses under study had unsatisfactory level of total knowledge regarding prevention of deep venous thrombosis among intensive care patients.

Table 2 shows that the nurses level of knowledge was unsatisfactory regarding to general information about deep venous thrombosis, drugs uses for DVT, role of the nurses to prevent DVT regarding how to use the elastic stocking & general guidelines to prevent the DVT and complications of DVT, 66%, 58%, 58%, 70%, 60% respectively.

Part III: Nurses level of practice regarding prevention of deep venous thrombosis.

Figure 2: Shows that, 56% of the nurses under the study had inadequate level of total practice regarding prevention of deep venous thrombosis among intensive care patients.

Table 3 shows that nurse's practices toward the clinical risk factors, venous clinical severity score and modified wells score were inadequate. 94%, 60%, 45%, meanwhile,

applying elastic stocking, range of motion were adequate, 86%,60%..

Table 4: Shows that, there was significant statistical relation between the nurses level of knowledge and their level of practice at (P value 0.03) regarding prevention of deep venous thrombosis among intensive care patients.

Table (1): Demographic characteristics of studied nurses.

Demographic characteristics	No	%
Age		
≥ 20	18	36%
20+	17	34
30+	15	30%
Mean±SD	26.56 ± 4.50	
Gender		
Male	11	22%
Female	39	78%
Educational Level		
Nursing diploma	21	42%
Technical Institute	18	36%
Bachelor nursing	11	22%
Years of Experience		
≥5 years	29	58%
<5 years	21	42%
Mean± SD	5.68 ± 4.92	
Training courses		
No	14	28%
Yes	36	72%

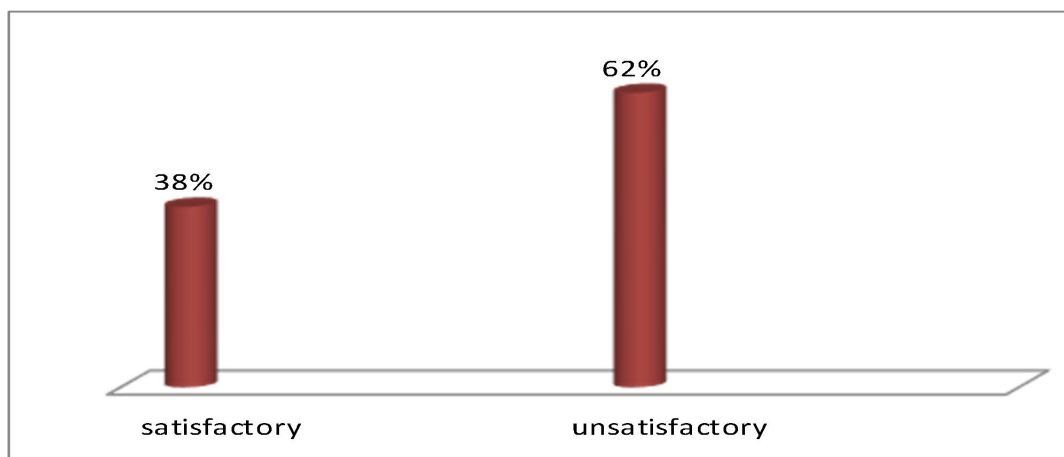
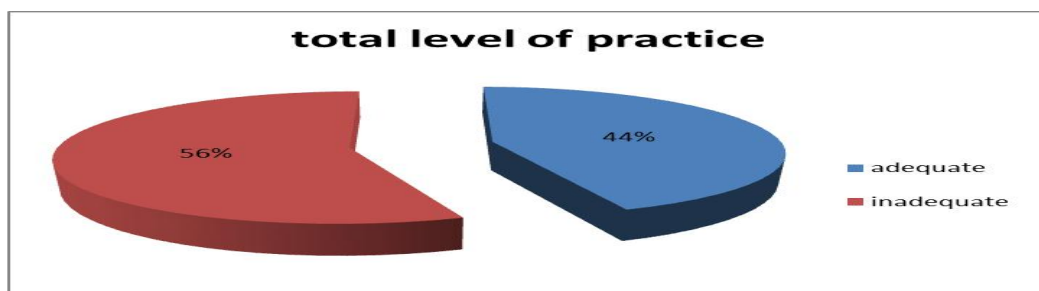


Figure 1: Total nurses level of knowledge regarding prevention of deep venous thrombosis (n=50)

Table 2 :Percentage distribution nurse's level of knowledge regarding prevention of deep venous thrombosis (n=50)

Items of knowledge	Satisfactory		Un Satisfactory	
	No.	%	No.	%
General information about DVT	17	34	33	66
Knowledge of nurses about drugs uses for DVT	21	42	29	58
Knowledge about role of the nurses to prevent DVT:				
*How to use the elastic stocking	21	42	29	58
* General guidelines to prevent the DVT	15	30	35	70
Knowledge about complications of DVT	20	40	30	60
Total Knowledge Scale	19	38	31	62

**Figure 2:** The total nurses practices regarding prevention of deep venous thrombosis(n=50)..**Table 3:** Distribution of studied nurses according to their level of practice regarding prevention of deep venous thrombosis

Part I initial assessment	Adequate	Inadequate
-modified wells score	54%	45%
Venous clinical severity score	40%	60%
Clinical risk factors	6%	94%
Part II Nursing practices		
Applying elastic stocking	86%	40%
Range of motion	60%	40%

Table 4: Relation between nurses level of knowledge regarding prevention of deep venous thrombosis among intensive care patients and their practice:

Knowledge	Practice		X ²	p-value
	Adequate	Inadequate		
Satisfactory n=19	N	%	5.4	0.03
Un satisfactory n=31	N	%		
	N	%		
	12	63.1	7	36.9
	10	32.2	21	67.8

p> 0.05 insignificant *≤ 0.05 significant **≤ 0.001 highly significant

Discussion

The DVT is a common and potentially lethal disease which leads to severe morbidity with poor quality of life and even sudden death related to PE. Prevention is more important and cost effective than treatment, because once DVT develops; it can only be cured at considerable expense. Since the diagnosis is

difficult and also the treatment is not always satisfactory, the prevention of DVT is obviously essential. Prevention of DVT is the effective approach to reduce death from PE and morbidity from DVT. Prevention decreases length of hospital stay, improves quality of life, decreases rehabilitation time and decreases economic burden (Khoon, 2014).

The current study was carried out to Assess Nurses Performance Regarding prevention of deep venous thrombosis. Discussion of the findings of this study will cover the main parts of the result.

Discussing the findings of the current study was categorized under five main parts. **The first part** The first part concerned with demographic characteristics of nurses included in the study. The second part concerned with nurse's level of knowledge regarding prevention of deep venous thrombosis among intensive care patient's. The third part discusses nurses' level of practice regarding prevention of deep venous thrombosis among intensive care patient's. The fourth part discusses relation between nurse's demographic characteristics knowledge, and practice .

Part 1:Demographic characteristics of the studied nurses.

Regarding the demographic characteristics of the nurses under the present study, the results revealed that the mean age of the nurse's were 26.56 ± 4.50 . This explains that most of those nurses were newly graduated, young and tolerate the nature of the work in the critical care units. This finding is consistent with **Said, (2016)**, who conducted study about "Effect of Nursing Care Standards for Preventing Deep Vein Thrombosis among Patients Undergoing Hip Surgery on Nurses' Performance and Patients' Outcome" and reported that the mean age of the nurse's under study 31.7 ± 8.7 .

The current study showed that, more than three quarters of studied nurses were females. From the investigator point of view it might be related to school nurses graduate large number of females than males, it could be also related to the studying of nursing in Egyptian universities that were exclusive for females only till soon few years ago. These findings were inconsistent with **Abdel Rahman et al. (2014)**, who conducted study about "Exploring Nurses' Knowledge and Perceived Barriers to Carry Out Pressure Ulcer Prevention and Treatment, Documentation, and Risk Assessment" which reported that most of their study group were

female that may be due to elevated number of nurses among female, female nurses in nursing institutes and faculty much more than men but the present study inconsistent with **Elauoty, (2013)**, who conducted study about "Assessment of Nurses' Performance Regarding Medication Administration Safely in Intensive Care Units" who found that most of their study group were male. And also, disagree with **Mersal, (2014)**, who study "Caregivers' Knowledge and Practice Regarding Prevention of Immobilization Complications in El-demerdash Hospital Cairo Egypt" which reported, that more than half of subjects were male.

According to the level of education of the studied nurse's the finding of the present study illustrated that, more than two fifth nurses had diploma in nursing education.. This finding disagreed with **Abdullah, Mohamed &, Ismail, (2014)** who conducted study about "Nurses Knowledge and Practice about Administration of Medications via nasogastric Tube among Critically ill patients " and founded that, the majority of studied nurses were Baccalaureate degree in nursing education.

Regarding years of experience in ICU, this study revealed that, more than half or equal of the nurses under study were having less than five years of experience. In investigator point of view this finding might be due to most of the nurses under study were recently graduated, able to tolerate the working load and work stress, severity of patients conditions, hours of work and occupational hazards that facing them in ICU,.This findings were in agreement with **Abdel Rahman et al. (2014)** which reported that, more than one third of the study subjects years of experience in ICU ranged between 1-5 years, and also, this study disagree with **Klobofski, (2013)** who conducted study about "A Descriptive Correlation Study Regarding the Effect of Nurses' Attitudes Toward Pressure Ulcer Risk and Care "which reported that, more than half of the study subjects were had more than five years of experience in ICU. Regarding to training courses for deep venous thrombosis this study revealed that, more than three quarter of participant nurses attended training courses. From the investigator point of view there were a

significant differences of practice between nurses who attend courses and not attend courses this result agree with **Abdel Ghani et al. (2010)** who conducted that "evidence based approach to decrease cardiovascular complication among pregnant woman with rheumatic disease" reported that the majority of the studied nurse's were attend training programe courses, and disagree with **Said, (2016)**, reported that, the majority of the study subjects had no previous training course's.

Part 2: Nurses' level of Knowledge Regarding Prevention of deep venous thrombosis.

Concerning nurses total level of knowledge, the present result showed that about two thirds of the nurses under the study had unsatisfactory level of knowledge regarding prevention of deep venous thrombosis. This result disagree with **Collin, et al. (2016)** who conducted study about " Venous Thromboembolism Prophylaxis: The role of the nurse in changing practice and saving lives" reported that, the majority of nurses had satisfactory level of knowledge, and agree with **Abin, (2016)**, who conducted study about "Assessment of Knowledge and Self-Reported Clinical Practice on Prevention of Deep Vein Thrombosis (DVT) Among Staff Nurses" and reported that, the majority of nurses had unsatisfactory level of knowledge regarding prevention of deep venous thrombosis Study highlights the importance of continuing nursing education which helps to maintain good knowledge and standards of care. This might be due to the lack of inservice education on DVT

Part 3: Nurses practices regarding prevention of deep venous thrombosis among intensive care patients. Concerning nurses total level of practice, the present result showed that more than half of the nurses under study had inadequate level of practices regarding prevention of deep venous thrombosis among intensive care patients this result disagree with **Said, (2016)**, who reported that, the majority of nurses had satisfactory level of practices regarding prevention of deep venous thrombosis and agree with **Lee et al. (2014)**, who conducted study about "evaluation of hospital

nurses perceived knowledge and practices of Venous thrombo embolism assessment and prevention " and reported that, the majority of nurses had unsatisfactory level of practices regarding prevention of deep venous thrombosis.

The present result showed that, more than half of nurses under study had adequate level of practice regarding initial patient assessment (modified wells score) this study agree with **Huizhenyin, (2015)** who conducted study about " The effect of nursing intervention based on Autar scale results to reduce deep venous thrombosis): incidence in orthopaedic surgery patients" reported that the application of modified wells score to predict and low of risk for deep venous thrombosis is adequate, and disagree with **Songwathana, (2015)** who conducted study about 'Evaluation of a clinical nursing practice guideline for preventing deep vein thrombosis in critically ill trauma patients" Who reported that the majority of nurses had adequate level of practice.

The present result revealed that about two thirds of nurses had inadequate level of practice regarding assessment of venous clinical severity score this study agree with **Abdel Hamid, (2017)** who conducted study about "Effect of Implementing Nursing Care Guidelines on the Occurrence of Deep Vein Thrombosis among Orthopedic Patient" reported that, majority of nurses had unsatisfactory level of practice.

Concerning the nurses' level of practices regarding assessment of venous clinical severity score as pain, it was showed that more than half of studied nurse's not assess pain. This study agree with **Attia, (2015)** who conducted study about "Deep venous thrombosis and its prevention in critically ill adult "reported that decrease pain when applicate the venous clinical severity score.

Part 4: Deals with relations between nurses' knowledge and practice:

The current study revealed that, there was highly statistical significant relation between nurse's level of knowledge and their age. This finding agrees with **Das, et al. (2014)**,

who conducted study about "Effectiveness of the Planned Teaching Program on Deep Vein Thrombosis among the Staff Nurses of selected hospital" reported that a high statistically significant relation between age, years of experience and knowledge.

Conclusion Based on findings of the current study, it can be concluded that:

Based on findings of the current study, it can be concluded that: about two thirds of the study nurses had unsatisfactory level of knowledge. Meanwhile, more than half of the studied nurses had inadequate level of practice regarding prevention of deep venous thrombosis. Moreover there were highly statistically significant relation between nurses age and their knowledge and there were highly statistical significant relation between nurses educational level and their practice. Also it was showed that a significant relation between nurse's level of knowledge and their level of practice regarding prevention of deep venous thrombosis

Recommendation

Based on the results of this study projected the following recommendations were suggested

1.Continuous evaluation of nurses' -1-knowledge and practice is essential to identify their needs in ICU about assessment and prevention of deep venous thrombosis

2.Designing nurses' educational program to improve nurses knowledge about prevention of deep venous thrombosis . in addition Procedure technique book should be available in ICU as a reference for all nurses.

3.Application of wells score tool to assess all admitted patient to intensive care unit and become as items of daily nursing assessment .

4.An orientation program should be helped to the newly appointment nurse's to revise, acquire and develop the knowledge and practice regarding assessment and prevention of deep venous thrombosis in ICU .

5.Further research is recommended to evaluate the effect of training program on nurse's performance regarding prevention of deep venous thrombosis among intensive care patient .

6.Health education booklet for preventing DVT should be available and distributed for all patients.

References

- Abdel Ghani, R., Atika, K., Albert, W., and Vanja, B. (2010):** AStructured Evidence-Based Approach To Decrease Cardiovascular Complication Among pregnant Woman With Rhumatic Disease: Apilot Rondamized controlled Trial, journal Of Medicine and Biomedical Science, Issn: 2078-0273, May 2010.
- Abdel Rahman, M.S., Abdel- Rahman, R.F., Al Assaf, R.M. and Saleh, M.Y.N. (2014):** Exploring nurses' knowledge and perceived barriers to carry out pressure ulcer prevention and treatment, documentation, and risk assessment. Articles at the American International Journal of Contemporary Research. Apr; 4 (4): 1129.
- Abdulla, M., Mohammed, W. and Ismail, M., (2014):** Nurses Knowlege and practices about Administration of medication via Nasogastric tube among critically ill patients, journal of Education and Practice; vol 5 (1): pp147-159.
- Abin, M. (2016):** Assessment of Knowledge and Self Reported Clinical Practice on Prevention of Deep Vein Thrombosis (DVT) Among Staff Nur IOSR Journal of Nursing and Health Science (IOSR-JNHS); 5 (1): 18-24.
- Attia, J. (2015):** Deep vein thrombosis and its prevention critically ill adults. American Medical Association Arch Internet Med/ Vol. 16/ Accessed on 21/4/017.
- Black J.M. and Jacobs E. M. (2016):** Luck man and Sorensen's Medical surgical Nursing: A psychological approach 4th Ed Philadelphia: W: B Saunders Company; p680
- Brunner (2016):** Medical Surgical Nursing Assessment and Management of clinical

- problem, 13th Ed., Mosby, W. B Saunders Company; p332.
- Collins, R. (2015):** Venous thromboembolism prophylaxis the role of the nurse in changing practice and saving lives, Australian journal of advanced nursing, Access on 20/3/2017 vol. (27) P3.
- Elauoty, R.M. (2013):** "Assessment of Nurses' Performance Regarding Medication Administration Safely in Intensive Care Units, Master degree in Medical-Surgical nursing". Faculty of Nursing, Ain Shams University.
- Grace, R. (2013):** Thrombosis prophylaxis, British Journal of Hospital medicine; 49 (10): p1.
- Hui-Zhen Yin A., Ci-Ming Shan, B., (2015):** The effect of nursing intervention based on Autar scale results to reduce deep venous thrombosis incidence in orthopaedic surgery patients Chinese Nursing Association. Production and hosting by Elsevier (Singapore) Pte Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>):
- Klobofski, A.C. (2013):** A Descriptive Correlation Study Regarding the Effect of Nurses' Attitudes Toward Pressure Ulcer Risk and Care; P 100.
- Khoon, W. (2014):** Deep vein thrombosis Risks and diagnosis. Journal venous surgery, Australian Family Physician; 39(7): 468-473.
- Lee, J., Grochow, D., Darke, D., Johnson, L. and Reed, P. (2014):** Evaluation of hospital nurses' perceived knowledge and practices of venous thrombo-embolism assessment and prevention. Journal of Vascular Nursing; 32 (1): 18-24.CE
- Lynn, P. (2016):** Taylor clinical nursing skills nursing process approach china walter health; pp243- 248
- Mersal, F.A. (2014):** Caregivers' Knowledge and Practice Regarding Prevention of Immobilization Complications in El Demerdash Hospital Cairo Egypt, American Journal of Research Communication; 2 (3): 90.
- Nicholson A (2009):** Nurses practioner – emergency service clinical practice guideline suspected lower limb DVT in the adult population. Joon Dalp Campus; vol (1)p9
- Proto Wski J.J., Alexander J.J. and Jacobs E.M. (2016):** Is Deep venous thrombosis surveillance warranted in high risk trauma patients. American Journal of surgery,. Access on 14/1/2017., 172 (2): p.210.
- Said, S (2016):** Effect of Nursing Care Standards for Preventing Deep Vein Thrombosis among Patients Undergoing Hip Surgery on Nurses' Performance and Patients' Outcome IOSR Journal of Nursing and Health Science (IOSR-JNHS) Volume 5, PP20, 23 www.iosrjournals.org accessed on 23-1-2019
- Shawky S (2013):** Effect of Mechanical Measures on Prevention of Deep Vein Thrombosis among General Surgical Patients Med. J. Cairo Univ., Vol. 81, No. 1, www.medicaljournalofcairouniversity Accessed on 3-2-2019.
- Smeltzer, S.C., Bare, B.G., Hinkle, J.L., and Cheever, K.H., (2016):** Brunner and Suddarth's Textbook of medical –surgical nursing, 12th Ed, Wolters Kluwer health /Lippincott Williams and Wilkins, China; p.p1223-1224.
- Songwathana, P., Kesorn, Kanitha Naka, RN, PhD (2015):** Evaluation of a clinical nursing practice guideline for preventing deep vein thrombosis in critically ill trauma patients, Department of Surgical Nursing, Faculty of Nursing, Prince of Songkla University, Hat Yai, Songkhla 90112, Thailand. pranced.s@psu.ac.th (P. Songwathana): kesorn.p183@gmail.com College of Emergency Nursing Australasia Ltd. Published by Elsevier.accessed on 12-3-2017.
- Vasquaze, A., and Mubschauer, N. (2008):** Nurses practioner –emergency service clinical practice guideline suspected lower limb DVT in the adult population. Joon Dalp Campus; vol (1)p8.
- Wells (2003):** Nurses practioner –emergency service clinical practice guideline suspected lower limb DVT in the adult population.joon dalp campus; vol (1)p10.
- Ignataivicius DD. And Workman ML. (2016):** Medical surgical nursing: patient centered collaborative care.2nd Ed.St. Louis, MO: Saunders Elsevier; 511-540.