Effect of Nursing led Intervention Regarding Prevention of Venous Thromboembolism among Women with Gynaecological Tumour Undergoing Major Abdomino-Pelvic Surgery

[1]Ayat M. Omar Masoud, [2]Monira Samir Abdelhady, [3]Shaimaa Gomah Yousef, & [4]Amal Abdelaziz Ahmed.
[1] Maternal and Neonatal Health Nursing, Faculty of Nursing, Fayoum University, Egypt
[2] Medical Surgical Nursing, Faculty of Nursing, Fayoum University, Egypt
[3] Medical Surgical Nursing, Faculty of Nursing, Damanhour University, Egypt
[4] Maternal and Neonatal Health Nursing, Faculty of Nursing, Assiut University, Egypt

Abstract

Background: Venous thromboembolism, which involves deep vein thrombosis and pulmonary embolism, is a serious complication that doubles the risk of morbidity and mortality after major abdominal and pelvic surgery. **Aim:** To evaluate the effect of Nursing led intervention regarding prevention of Venous Thromboembolism among women with gynaecological tumour undergoing major abdomino-pelvic surgery. **Design:** This study utilized a quasi-experimental design. **Setting:** This study conducted at the gynecological department and outpatient clinic at Fayoum University Hospital and General Hospital Fayoum, Egypt. **Sample:** A purposive sample of 100 women divided randomly into two groups, 50 women for each groups. **Tools of data collection**: Three tools were utilized in this study including an interview scheduled questionnaire, Deep vein thrombosis risk factors assessment sheet, and deep vein thrombosis assessment sheet. **Results:** the percentage of good knowledge regarding VTE were significantly increased in post- test than pre -test among study group (2.0% pretest vs. 100.0% posttest) compared to control group (0.0% pretest vs. 4.0% posttest) p= 0.000., also after the implementation of the program the percentage of good compliance level   with VTE preventive measures were significantly improved by all of the study group (100.0%) who attained a good level of compliance compared to control group (40.0%) (p=0.000). In addition; there were one new case of PE among the control group and 2 cases with DVT compared to no cases reported in study group with a highly statistical significant difference P= 0.000. **Conclusion:** Women with gynaecological tumor who undergoing major abdomino-pelvic surgery who exposed to nurse led intervention program were not exposed to deep vein thrombosis than those who exposed to routine hospital only. **Recommendations:** Nursing led intervention should be added as an essential part of routine perioperative care for all major gynaecological operation.

Introduction:

The most common type of tumour is a gynaecologic tumour. Female gynaecologic neoplasm refers to any tumour that begins in a woman's reproductive organs or in various areas of female pelvis; it includes a wide variety of tumors with various epidemiological characteristics either malignant or benign. A cancerous one, given that it is a leading cause of morbidity and mortality in

women around the world. Surgery is usually the appropriate main option for more advanced conditions **(Abd El-Aziz, 2014)**. Venous thromboembolism (VTE), which includes deep venous thrombosis (DVT) and pulmonary embolism (PE), is a severe complication that raises the risk of morbidity and mortality after major abdominal and pelvic surgery by twofold. It is the second leading cause of death among cancer patients **(Harrington , 2013)**.

The risk of VTE in surgical patients is determined by a combination of individual predisposing factors as well as the type of surgery performed **(Guyatt, et al., 2012)**. It has been linked to a number of pathological conditions that raise the risk of VTE and other life-threatening illnesses.

Venous thromboembolism is four to seven times more likely in cancer patients than in the general population, it affects about 20% of cancer patients in terms of absolute numbers , and its risk varies depending on the type of cancer and the burden of the tumour **(Timp, 2013)**.

Women with gynaecological tumours and undergoing gynaecological surgery are at increased risk for developing DVT, not just because of the tumour and the subsequent abdomino-pelvic procedure, but also because of additional risk factors such as advanced age, a high body mass index (BMI), comorbidities, immobility, hormone therapy, venous obstruction, thrombin development, and treatment methods(e.g. long operative time, chemotherapy, and targeted therapy) **(Instin, et al., 2021)**.

Furthermore, anaesthesia during surgery may induce venous distension, and a long period of bed rest following surgery may have a deleterious impact on the patients' hemodynamic, exacerbating blood flow stagnation. Blood hyper-coagulation is a detrimental side effect of surgery, and gynaecologic surgery contributes to DVT development **(Tang, 2013)**.

Risk of VTE was reported to be 14-fold higher in patients with gynaecological cancer than in those without cancer in a previous study, with DVT and PE rates ranging from 17 % to 40% and 1 % to 2.6 %, respectively, after the first VTE event, the 28-day case fatality rate was 11%, and survivors had a lower quality of life despite treatment. As a result, in these patients, VTE prevention should be a top priority **(Van, et al., 2013 & Instin, et al., 2021)**.

The American Society of Clinical Oncology (ASCO) , stated that, incidence of VTE can be decreased by 50–70% when prophylactic intervention are started prior to gynecological procedures, as all cancer patients are considered high-risk **(Hopikins , et al., 2012)**.

The National Comprehensive Cancer Network (NCCN), recommend that all cancer patients undergoing major surgical operation receive thromboprophylaxis with either pharmacological and non-pharmacological. These precautions should be taken prior to surgery and should last at least 7–10 days or more, being recommended in high-risk patients. Despite the fact that using perioperative low molecular weight heparin (LMWH) in patients undergoing gynecological surgery absolutely eliminated DVT and PE, DVT still develops after the surgery. In addition, clinical DVT diagnosis is incredibly inaccurate, with just 50% of cases being identified based on manifestations. **(Key, et al., 2020)**.

Approach of VTE prevention is an effective way to lower the mortality rate from PE and the morbidity associated with DVT. Prevention cuts down on hospital stays, costs, and improves quality of life **(Rahn, et al., 2011).**

The first step in prevention, like diagnosis, is to be aware with the problem. Patients' awareness of VTE prevention can enhance patient engagement in safety by promoting participation in required preventive measures. It can also assisting the patients self-assessment and self-report VTE symptoms not only while being in the hospital but also following discharge, helping them to get timely medical help. This is especially critical given the current trend of shorter hospital stays **(Harrington, 2013).**

Nurses are on the front lines of the thrombosis prevention. Professional nursing intervention can save lives by assisting with diagnosis and risk assessment, implementing prompt preventative measures, and providing critical educational and psychological assistance to patients with venous thromboembolism **(Shahin , 2017).**

Numerous previous studies have endorsed the value of the nursing position in disease prevention, such as **(Mohamed, et al., 2017),** who recommended that, for DVT prevention, the patient should be mobilized as soon as possible, which promotes adherence to pharmacological thrombo-prophylaxis, as well as patients who did not understand the purpose of their medications adherence often refused anticoagulant injections, avoiding high-fat and high-sugar foods, avoid wearing tight clothes, particularly leggings, and keeping warm at all times., avoid sitting for long periods of time or lying with their legs down, and raising their leg. While ensuring independent or assisted active or passive performance of

movements such as flexing, relaxing, and foot rotation **(El-Sayed, et al., 2017).**

Study significance

Venous thromboembolism (VTE) is a contributing factor leading to increase mortality and morbidity in women following gynecologic surgery. Without prophylaxis, the relative risk of DVT is about 10% to 40% in medical or general surgical patients. Meanwhile; the postoperative incidence of VTE in women with gynecological disease was 1.14 %, 0.3 % in women undergoing gynecological surgery, and 4% in gynecological cancer patients, respectively, after prophylaxis **(Ikeda, and Kan-no, 2014).**

In Egypt, gynecological cancers accounted for 44.9 percent of all female cancers **(Abd El-Aziz, etal., 2014)** In Al-Fayoum, Egypt, where the population in the 2014 census was around 6% of all cancer cases, approximately 510 cases of gynecological cancers seeking for care at Al-Fayoum University Hospital's Oncology Gynecological Clinic each year **(Sayed, and Omar, 2018).**

In fact, since approximately half of DVT patients remained silent, the true incidence of postoperative DVT could be higher than stated. In a previous pilot prospective study, the postoperative incidence of DVT was discovered to be as high as 15.6%. Asymptomatic DVT had been shown to raise the risk of post-thrombotic syndrome (PTS) **(Qu, et al., 2015).** Therefore, the preventions and treatments of DVT are on the top research agenda of current studies**.** So it critically to provide a thorough understanding of all aspects of VTE in order to provide the best nursing care to patients with gynecological tumour, undergoing

surgery in attempt to optimize their outcomes, reduce the frequency, and possibly life-threatening complications of DVT **(Beuyeukyılmaz, and Endir, 2014).**

The aim of the study

This study aimed to evaluate the effect of nursing led intervention regarding prevention of venous thromboembolism among women with gynaecological tumour undergoing major abdomino-pelvic surgery through the following objectives:

• Assess the effect of nursing led intervention regarding VTE and its preventive measures on women's level of knowledge and compliance.
• Evaluate the effect of nursing led intervention regarding VTE and its preventive measures on reduction and prevention of the occurrence of VTE and its manifestations.

Operational definition:

Nursing- led intervention : Patients are educated and trained by nurses about post-operative self-care practices to prevent VTE, such as checking for symptoms, getting out of bed early, lifting legs above level of the heart, changing positions in bed, practising deep breathing exercises, foot and leg exercises in bed, wearing elastic stocking, and assessing foot pulsation after surgery.

Research hypothesis: In order to achieve the study's aim, the following research hypothesis is proposed:

H (1): Study group who receive the program will exhibit a higher score of knowledge and compliance about VTE & its prevention than control group

H (2): Study group who comply the preventive measures will have a significant reduction in the occurrence of DVT and its manifestations than those who do not.

Subjects and Methods

Research Design: A quasi-experimental (intervention and control group) research design used in this study. This design seeks to create a cause-and-effect relationship between an independent and dependent variable, much as a true experiment does. A quasi-experiment, however, does not rely on random assignment, unlike a true experiment. Subjects are divided into classes based on parameters that are not random.

Setting: The study was conducted at the gynecological department and outpatient clinic (for post-operative follow-up) at Fayoum University Hospital that is a teaching hospital and ElNabawy El Mohandes General Hospital that affiliated to the Ministry of Health, Fayoum, Egypt.

Sample size: A total sample size was 100 women divided randomly into two groups (50 for each group calculated by(Epi-info ™ [7]) with (α) 0.05, 0.95 % power to detect a 10% difference in the proportion of participants completed the intervention program and estimating a 10% failure to follow up rate using a two-sided chi-square (χ2) test.

Subjects: A purposive sample of 100 women with gynaecological tumour undergoing major abdomino-pelvic surgery were recruited for this study according to the **following inclusion criteria**: women who diagnosed with

different types of tumours in genital organ (vulvar, cervix, uterus, vagina & ovary), had assigned to major abdomino-pelvic surgery, agreed to participate in the study. Whoever; women who had a minor gynaecological operation, or assigned to pelvic-abdominal surgery for any other indications rather than gynaecological tumour and refused to involved in the study were excluded. All the included women were randomly assigned into two main groups, 50 women in each.

Group 1: Those who received the nursing led intervention program about VTE prevention (Intervention group)

Group 2: Those who received the routine hospital care (Control group).

Time enrollment: women were invited to participate in the study after admission to inpatient gynecological department in day before operation, during the period from the first of March, 2019 to the end of February, 2020.

Tool for data collection: Three tools were used to collect data as follow:

Tool 1: An interview scheduled questionnaire:

It was designed by researchers based on various international and local literatures which contained 3 parts:

Part 1: which included data related to: demographic characteristics as age, educational status and occupation, and residence

Part 2: included data related to: women medical history, type of operation, duration of operation, complications of operation.

Part 3: Assessment of women's knowledge about VTE**:** This part was developed by the researcher based on current, national and international literature. It aimed to assess exact women's' knowledge regarding venous thromboembolism (VTE) e.g. Definition, risk factors, signs and symptoms, diagnosis, and prevention. this part used pre and post the nursing led intervention application. It consisted of a reliable and valid questionnaire. Cronbach's Alpha was 0.892, so a reliability test was conducted.

Scoring systems: The total score of knowledge was 10 degrees. Each correct answer had (1) mark while the incorrect one had (zero). These scores were converted into a percentage score.

The total score was divided into three categories as follows:

Poor : when the score percentage < 50%, Fair: when the score percentage > 50%-70%, and Good :when the score percentage > 70%.

Part 4: Women's compliance with the VTE preventive measures:

This tool developed by the researchers based on the international literatures **(Bouchard-Fortier, 2014)** which included 8 statements. It was used to assess women's compliance with DVT prevention measures. They focused on early ambulation, positioning and turning, leg exercise, deep-breathing exercises, elastic stock use, hydration, food intake, and anticoagulant preventive measures. The tool used pre and immediately post the nursing led intervention. Cronbach's Alpha was 0.992 and 0.952, respectively, in the reliability test.

Scoring system: The responses will be based on a three point likert scale;

never scored (0), sometimes scored (1), and always scored (2).

Total score: the total score categorized as Good compliance >70% , and Poor compliance <70%.

Tool 2: Deep vein thrombosis risk factors assessment sheet .

It was adopted from **Autar, (1996)** and utilized by the researcher to identify patient at risk and classified them into groups according to predisposing factors. The scale consisting of seven distinct categories identified as age, mobility, body mass index, special risk, trauma risk, surgical intervention and high-risk diseases.

Scoring system: A score of < 10 indicate low risk, while a score ranged from 11-14 indicated moderate risk and a score of ≥ 15 indicate high risk

Tool 3: Deep vein thrombosis assessment sheet :

It was adopted from **Hirsh and Lee, (2002)** used to evaluate the patient's sign and symptoms of DVT. It was comprised of 3 parts:

Part one: **Clinical assessment**. It comprised of items to examine the patient's manifestations of DVT as presented by: Calf pain, Leg edema, cyanosis, warmness , localized redness, and tenderness, Can't feel pulse (dorsalis pedis pulse).

Part two: **Homan's test**: It is an active and subjective test in which the patient asked to dorsiflex his or her foot. If pain in the calf, it was indicative of positive result and presence of deep vein thrombosis, negative human's test did not exclude DVT.

Part three: **Duplex ultrasound**: Presence of clot it was indicative of positive result and presence of DVT, while absence of clot it was indicative of negative result and absence of deep vein thrombosis.

Pilot Study:

A pilot study was carried out before starting data collection on 10% of study subject (both groups) to evaluate the tentative developed tools for clarity and applicability and to estimate the time needed to collect data then necessary modification were carried out before actual study. Data obtained from pilot study were excluded from the study.

Validity:

The tools were tested for face and content validity through (7) experts ; (2 experts from Gynecological nursing, Faculty of Nursing, Ain Shames University; 2 experts from Medical Surgical Nursing, Faculty of Nursing, Fayoum University and in addition to three experts physicians in surgical field from Fayoum University . They were requested to give their opinion regarding the tool's content, accuracy, relevancy and appropriateness to the research objective. Finally minimal modifications were done to meet the jury opinion.

Reliability

Reliability test was conducted by using Cronbach's Alpha that was 0.952 & 0.892 respectively for tool 1(part 1 and 4) while tool 2 adopted from Autar (1996) and tool 3 adopted from Harish (2002) and also were tested for ascertain it's reliability by Cronbach's Alpha test .

Ethical consideration:

The dean of the Faculty of Nursing,

as well as the directors of Fayoum University and the Health Insurance Hospitals, all gave their official permission and approval prior to the study's conduct. The researcher obtained a verbal consent for participation in the study from all participants, explaining the purpose of the study, and assuring that the confidentiality would be maintained throughout the study. All study participants were informed that the information they provided would be kept private and used only for research purposes, and their participation in the study was entirely voluntary and that they could opt out at any time.

Fieldwork: The current study was carried out through four consecutive phases:

Preparatory, assessment, intervention and evaluation phase.

Preparatory phase: It was enacted after obtaining permission from the director and head department of the previously stated sittings to collect data. The objectives of the study and the main procedure were explained in the letter. After a thorough analysis of the relevant literature, the tools for data collection as well as the content of the training program were developed. Furthermore, the development of a coloured guide booklet based on related literature. It included coloured illustrated pictures of preventative measures, and prophylactic exercises. The guide booklet was evaluated by specialised professors at the Faculty of gynaecology Medicine and, medical surgical Nursing, Fayoum University.

Assessment phase: Participants in both groups were interviewed individually on admission to an inpatient gynaecological department in the previously mentioned setting while the

researchers attended it three days / week, after which the intent and scope of the research were clarified, participant women who met the inclusion criteria were randomly divided into two equal groups, study group (I) and control group (II), each with 50 patients.

- In which tool (1) part one and two used to collect demographic and clinical characteristics then pre-test knowledge assessment tool were done for each participant individually. The time needed for completing the questionnaire was ranged from 10 - 15 minutes for each woman.

- Moreover; tool (2) regarding deep vein thrombosis risk factors assessment sheet (scale) utilized to identify patient at risk and classified them.

• **Intervention phase**: in which

Patients of the control group (1) were exposed to routine hospital care.

- Meanwhile; patients of the study group (2) were exposed to routine hospital care and to intervention program as following :

- Intervention program was given to each patient in the study group individually before surgery by the researcher. it was executed in 2 sessions:

- One session on VTE knowledge , lasting 20 minutes / day

- The second session for preventive measures included instructions regarding early ambulation, adequate hydration as prescribed, Correct application of elastic stockings,

compliance with anticoagulant therapy, exercise that must be followed included;

o Turning and positioning at least every 1 to 2 hours

o Leg exercise: lie in semi-fowler's position then bend the knee and raise the foot, hold it for few seconds, then extend the leg and lower it to the bed. Do this five times with one leg, and then repeat with the other leg.

o Foot exercise: Trace circles with the feet by bending them down, in toward each other, up and then out. Repeat these five times.

o Turning to the side: Turn on one side with the uppermost leg flexed and supported on a pillow. Grasp the side rail. Practice diaphragmatic breathing and coughing while on your side.

o Getting out of bed: turn on one side. Push up with one hand as swing the legs out of bed.

o Deep breathing and coughing exercise: Breathe in deeply and slowly through the nose, expanding your lower rib cage, and letting your abdomen move forward. Hold for a count of 3 to 5. Breathe out slowly and completely through pursed lips. Don't force the breath out. Rest and repeat 10 times every hour.

o Coughing exercise: Breathe in deeply and cough firmly.

o Elevate the lower limb above the level of the heart periodically.

o To accomplish this phase the researchers using demonstration and re-demonstration until acknowledge patient understanding. Furthermore; a booklet was distributed among patients of the study group for reinforcement.

o This second session lasted from 45 minutes to 1 hour accordingly.

• **The evaluation phase**: This phase was implemented 2 weeks after surgery in the outpatient post-operative clinic of the two previously mentioned sittings emphasizing on estimating the effect of the intervention on women's level of knowledge, and degree of compliance with VTE preventive measures using tool 1 part 3 as (post- test) and 4, for both groups while assessment of VTE occurrence of and its manifestations were assessed by using tool 3 for both groups.

Statistical analysis:

The collected data were scored; tabulated and analysed using (SPSS) version 20.The collected data were presented in tables and graphs using the actual numbers and percentages. Appropriate statistical tests were used to analyze the data as, chi-square test (X^2), independent sample t-test. The level of significance was set at $p < 0.05$.

Results:

Table1. Demonstrated that the Mean age ± SD of study group was (50.760± 9.444) compared to 47.120 ± 9.815 for control group with no statistical difference (p= 0.262). Nearly half and more of studied participants could read and write and had a primary education (50.0 % study group vs. 54.0% control

group) p= 0.500. Moreover; The majority of both groups were rural housewives (80.0 % in control group vs. 82.0% in study group) respectively with no significant statistical difference (p=0.262).

Current clinical characteristics among both groups reveals that main medical diagnosis among both groups was uterine cancer (40.0% vs. 36.0%) followed by ovarian cancer (24.0% & 28.0%). As regards to types of operation; Hysterectomy was the main operation done among both groups (60.0% vs. 54.0%) respectively with no statistical difference (p= 0.6924). Meanwhile; nearly two thirds (60%) of study group spent from 2-3 hours in operation compared to nearly more than one third in control group (38.0%) with a high statistical significant difference p= 0 .008. **Table 2**.

Table 3: Showed that the most of studied women in both groups (84.0% & 86.0% were at moderate risk to develop DVT and nearly equal percentage of both groups were at high risk to develop DVT. (16.0% & 14.0%). But with no statistical significant difference. P= 0.500

Regards, level of knowledge (pretest and post-test) among both groups about VTE in terms, VTE definition, causes, predisposing factors, signs and symptoms, complications, and its preventive measures. This study reveals that there was a highly statistical significant difference p= 0.000 among study group as the mean score of knowledge were significantly increased in post- test than pre -test 0.622 ± 1.104 vs. 6 ± 1.00 . Meanwhile; in control group there was no statistical difference p=0.228 either in pretest or post-test in this regards 0.511 ± 0.122 vs. $0.601+ 0.331$.

Figure 1: Cleared up that there were no statistical difference among both groups regarding total score of pre- test knowledge about VTE (p= 0.225), as the great majority of both groups were had poor level of knowledge (96.0% study group vs. 90.0% control group). Meanwhile; in post-test these percentage significantly improved by the entire study group (100.0%) attained a good level of knowledge compared to only 4.0% in control group (p=0.000).

Regards, compliance level for VTE preventive measures among study group this study revealed that there a high statistical significant difference (p=0.000) was identified in pre and post intervention evaluation , as it was obvious that a large proportion of participants in the study group were between never and somewhat compliant with many of VTE preventive measures in term of hydration , leg exercise, dietary intake , and cough and breathing exercise prior to receiving the program while their compliance was significantly improved after receiving the program to be total sample(100%) were always compliant with all VTE preventive measures. Meanwhile; in control group there was no statistical significant difference in pre and post intervention for the same items of VTE preventive measures(p= 0.645). As it was obvious that only 2 preventive measures (stocking and compliant to anticoagulant) that were somewhat to always compliant with the majority of them (58.0% and 85.0%). Whenever the remaining items of preventive measures were never compliant. In terms of ambulation, positioning and turning, leg exercise, coughing and breathing exercise, dietary intake and compliance with anticoagulant,

Figure 2: Illustrated that there was no statistical difference among both groups in pre intervention total score of

VTE preventive measures compliance (p= 0.394), as nearly more than two thirds of both groups were had poor level of compliance (70.0% study group vs. 64.0% control group). Meanwhile; after the implementation of program percentage significantly improved by all of the study group (100.0%) who attained a good level of compliance compared to control group (40.0) (p=0.000).

Table 4. Demonstrated the clinical manifestations of DVT that reported among both groups before intervention (on admission) as evidenced by the minority of both groups were suffered from calf pain, leg cramp, warmness and redness (8% vs. 6%, 6%vs. 6%,4%vs.4% and 4.% vs. 4%) respectively . With no statistical difference (p=0.163, 0.163, o.613, and 0.159). Meanwhile; after intervention (after 2 weeks) the percentage of these previously mentioned manifestation were decreased and disappeared among study group and somewhat increased and appeared beside another manifestations such as leg edema (leg cyanosis 4% , can't feel leg pulse (4%) among control group with a statistical significant difference (P= 0.05, 0.05, 0.06, and 0.028) respectively.

Table 5: Illustrated that all the study group (100%) had a negative sign of Homan's test and Doppler result on follow up (after 2 weeks), while (4.0%) of control group had positive sign of Homan's test and Doppler result. With a statistical significant difference (p= 0.001&0.028)

Table 6: Highlighted the effect of intervention program on the occurrence of VTE. As evidenced by that there were one new case of PE among the control group and 2 cases with DVT compared to no cases reported in intervention group with a highly statistical significant difference P= 0.000.

Table 1 : distribution of demographic characteristic among both groups (N.100)

Items	Study group (N.50)		Control group (N.50)		Significance test
	No	%	No	%	
Age					
• 20 : < 30 yrs	2	4.0	2	4.0	
• 31 : < 40 yrs	5	10.0	12	24.0	p= 0.247
• 41 : < 50 yrs	16	32.0	19	38.0	X^2 = 5.422
• 51 : ≤ 60 yrs	21	42.0	13	26.0	
• + 60 yrs	6	12.0	4	8.0	
Mean age ± SD	50.760 ± 9.444		47.120 ± 9.815		p= 0.262 t=1.889
Educational level					
• Illiterate	5	10.0	3	6.0	
• Read and write	10	20.0	11	22.0	p= 0.500
• Primary	15	30.0	16	32.0	X^2 = 0.075
• Secondary	12	24.0	14	28.0	
• University	8	16.0	6	12.0	
Occupation					
• House wife	40	80.0	41	82	p= 0.500
• Employed	10	20.0	9	18	X^2 = 0.065
Residence					p= 0.398
• Rural	40	80.0	42	84	X^2 = 0.271
• Urban	10	20	8	16	

Table2:   Distribution of current clinical characteristics   among both groups (N.100)

Items	Sdy group (N.50)		Control group (N.50)		Significance test
	No	%	No	%	
Diagnosis					
▪ Uterine cancer	20	40.0	18	36.0	p= 0.165
▪ Cervical cancer	10	20.0	9	18.0	X² = 5.099
▪ Ovarian cancer	12	24.0	14	28.0	
▪ Uterine fibroids	8	16.0	9	18.0	
Type of gynecological operation	30	60.0	27	54.0	
▪ Hysterctomy	12	24.0	14	28.0	p= 0.116
▪ Salpingo-oophorectomy	8	16.0	9	18.0	X² = 6.924
▪ Myomectomy					
Operation duration					
▪ One hr	4	8.0	16	32.0	
▪ 2 to 3 hrs	30	60.0	19	38.0	p= 0.008*
▪ More 3 hrs	16	32.0	15	30.0	X² = 9.702

Table 3 : Distribution of risk factors of DVT for both groups (N.100)

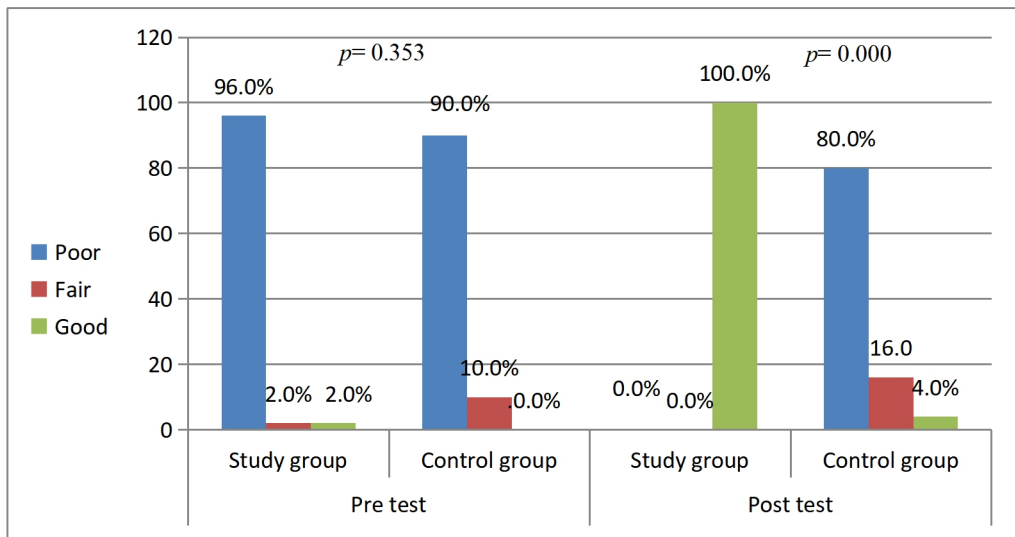|	Study group(N.50)		Control group(N.50)		Significance test	
	No	%	No	%	P	X²
▪ Moderate risk	42	84.0	43	86.0		
▪ High risk	8	16.0	7	14.0	0.500	0.078

Figure 1: Distribution of total score of knowledge regarding VTE among both groups (N.100)
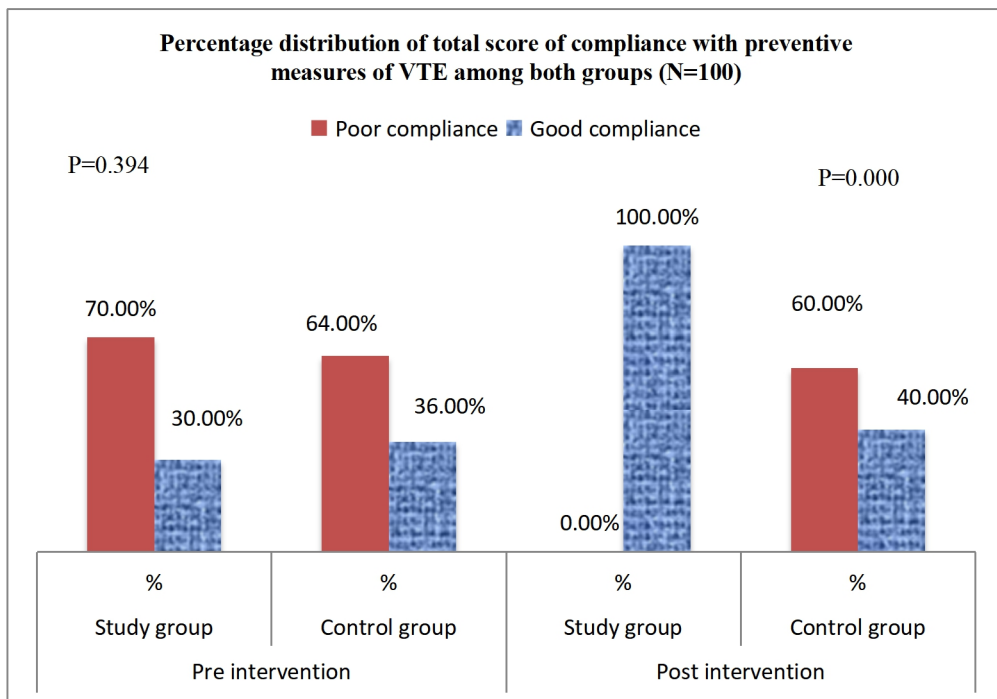

Figure 2: Distribution of total score of compliance with VTE preventive measures among both groups (N.100).

Table 4: Comparisons between both groups regarding clinical manifestation of DVT at two different intervals (on admission & follow-up after 2 weeks)

Items	Pre intervention (on admission)								Post intervention (follow up after 2weeks)							
	Study group				Control group				Study group				Control group			
	Present		Absent		Present		Absent		Present		Absent		Present		Absent	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Calf pain	4	8.0	46	92.0	3	6.0	47	94.0	1	2.0	49	98.0	5	10.0	45	90.0
Significance test	p= 0.163 X²=1.507								p= 0.05* X²=3.473							
Leg edema	2	4.0	48	96.0	8	16.0	42	84.0	0	0.0	50	100.0	8	16.0	42	84.0
Significance test	p= 0.163 X²=1.507								p= 0.05* X²=3.473							
Leg cyanosis	0	0.0	50	100.0	0	0.0	50	100.0	0	0.0	50	100.0	2	4.0	48	96.0
Significance test	p= 0 X²=0								p= 0.247 X²= 2.041							
Warm leg	2	4.0	48	96.0	3	6.0	47	94.0	2	4.0	48	96.0	5	10.0	45	90.0
Significance test	p=0.613 X²= 0.000								p= 0.026* X²=5.005							
Leg redness	2	4.0	48	96.0	3	6.0	47	94.0	0	0.0	50	96.0	7	14.0	43	86.0
Significance test	p= 0.159 X²=1.778								p= 0.080 X²=3.053							
Can't feel pulse	0	0.0	50	100.0	0	0.0	50	100.0	0	0.0	50	100.0	2	4.0	48	96.0
Significance test	p= 0 X²=0								p= 0.028* X²= 5.263							
Tenderness	0	0.0	50	100.0	0	0.0	50	100.0	0	0.0	50	100.0	2	4.0	48	96.0
Significance test	p= 0 X²=0								p= 0.500 X²= 1.010							
Cramps	3	6.0	47	94.0	3	6.0	47	94.0	2	4.0	48	96.0	7	14.0	43	96.0
Significance test	p= 0.162 X²=1.506								p= 0.028* X²=5.263							

(*): Statistical significant difference p < 0.05

Table 5 : Results of Homan's test and Doppler ultrasound as presented by both groups during follow up (after 2weeks postoperative).

Items	Post intervention (after 2 weeks)				Significance test	
	Study group		Control group			
	No	%	No	%		
Homan test						
▪ Negative	50	100.0	43	96.0	p= 0.001*	X²=0.890
▪ Positive	0	0.0	2	4.0		
Referral duplex						
▪ Present DVT	0	0.0	2	4.0	p= 0.028*	X²=5.263
▪ Absent DVT	50	100.0	48	96.0		

(*): Statistical significant difference p < 0.05

Table 6: Percentage distribution of VTE cases encountered among women among both groups (N.100.)

Items	Post intervention (after 2 weeks)				Significance test
	Study group		Control group		
	No	%	No	%	
PE	0	0.0	1	2.0%	
DVT	0	0.0	2	4.0%	p= 0.001*

(*): Statistical significant difference p < 0.05

Discussion

Deep vein thrombosis (DVT) and its associated PE present with major problems in the field of surgery, which remains a significant cause of postoperative mortality and morbidity **(Kumar, etal., 2013).** Gynaecological surgical patients, since they undergo hypercoagulable states, immobility, and vascular injuries during their procedures, they have a high risk of developing VTE. The prevention of VTE is more effective than treatment and is a vital part of patient care before, during, and after surgery. **(Cancer-Associated Venous Thromboembolic Disease , 2020).**

Few previous studies had looked at the impact of non-pharmacological and physical interventions in preventing VTE in patients undergoing surgical procedures **Rahn, et al. (2011)** as well as the other related previous studies on the topic were merely descriptive; didn't address the effect the preventive approach for those high risk group regarding VTE. So it was beneficial to conduct such study that tried to evaluate the effect of Nursing led intervention on knowledge and compliance of women with gynaecological tumour undergoing major abdomino-pelvic surgery regarding prevention of Venous Thromboembolism as a preventive approach of care

The current study revealed that the most of the women in both groups were at a moderate risk of developing DVT, and a roughly equal proportion of both groups were at a high risk of developing DVT, However, there was no statistically significant difference. This may be due to the fact that a significant proportion of both groups were elderly, with an average age of 40-60 years. The entire sample had gynecological tumors, and the vast majority of them had been diagnosed with cancerous disease. They also previously used contraceptive pills, as measured by the Autar DVT risk assessment scale.

In line with this findings **Gad and Alsheikh (2013)** who study effect of mechanical preventive measures of Deep Vein Thrombosis among general surgical patients found that about two thirds of both study and control group had moderate risk for deep vein thrombosis.

While findings of **Ramadan, Amr, and Ashour, (2019)** revealed that less than one-tenth of the control and the study groups were low risk for the incident of DVT while they tried to evaluate the effect of calf muscle exercise and preventive measures among a postpartum caesarean section.

Concerning, level of knowledge (pretest and post-test) among both groups about VTE in terms, VTE definition, causes, predisposing factors, signs and symptoms, complications, and its preventive measures. Thee current study cleared up that there were no statistical difference regarding total score of pre-test knowledge about VTE among both groups as the great majority of both groups were had poor level of knowledge. Whoever; there were a statistical significant improvement in score of level of knowledge about VTE among intervention group as evidenced the great majority of women were attained good level of knowledge in post- test compared to control group that hence the efficacy of the intervention program. This improvement reflects not just the efficacy of the program but also reflects the extent of women's interest in the importance of the subject and the seriousness of the disease as well as the majority of them was educated. This findings support the first study hypothesis as the

These findings also supported by **Ramadan, Amr, and Ashour, (2019)** who stated that none of the two groups had knowledge with no statistical significant difference, while after the intervention there was improvement in knowledge score towards DVT and its manifestations with highly statistically significant difference between them.

Similarly; **Green and Bernhofer (2018)** who revealed that, a higher level of knowledge scores in the experimental group, with the percentage of the participants in the experimental group answering all questions correctly rising from less than two fifths correct to less than three quarters correct. While they studied the effectiveness of a patient education plan on knowledge of postoperative venous thromboembolism

Study conducted by **Serpici and Gürsoy (2018)** who stated that the patients who received nurse led patient training had improvement of deep vein thrombosis knowledge and self-care practices. In their study. Also, **Youness, et al., (2016)** announced that during the pre-test process, the intervention group's insufficient level of awareness of VTE increased dramatically after the intervention, from less than one tenth to the majority of participants.

Ays and Ayla (2018) who studied the impact of the nurse-led patient training on the DVT knowledge and self-care practices, reported a significant increase in the average total score of DVT knowledge among their studied participants after training than before.

In relation to VTE preventive measures compliance level among study group this study revealed that there a high statistical significant difference (p=0.000) was identified in pre and post intervention evaluation. Prior to receiving the program, it was obvious that a large proportion of participants in the study group were never or somewhat compliant with many of the VTE preventive measures in terms of hydration,

leg exercise, dietary intake, cough and breathing exercise, although their compliance was significantly improved after receiving the program, and the total sample were always compliant with all VTE preventive measures. Consequently, the all of them attained a good level of compliance compared to control group after receiving program. This may be due to the improvement they attained in the level of knowledge for the VTE that reflect the efficacy of the program. Meanwhile, there was no statistically significant difference in pre and post intervention for the same VTE preventive measures in the control group. As it was cleared that only two preventive measures (stocking and anticoagulant compliance) were consistently followed by the majority of them . Whenever the rest of the preventive measures were never adhered to. In terms of ambulation, positioning, and turning, leg exercise, coughing, and breathing exercises, food consumption, and anticoagulant adherence. The explanation may be due to their ignorance of the topic and the seriousness of the disease before the program implementation. This findings also supported the first study hypothesis.

Consistent with this study findings others studies conducted **Aggarwal, Fullam, and Brownstein, (2015):, Lavall and Costello, 2015; Ays and Ayla 2018)** who reported that before the training all studied participants did not know the self-care practices to prevent DVT formation. However after training using the guide book, most practices were identified and practiced by the patients

In terms of clinical manifestations of DVT identified by both groups prior to intervention (on admission), this current study findings noticed that calf pain, leg cramps, warmth, and redness were encountered by a minority of both groups. with no statistically significant difference

Meanwhile, following intervention (after 2 weeks), the percentage of these previously reported manifestations decreased and disappeared in the study group, this due to their good compliance with the VTE preventive measures. While marginally rising and appearing alongside other manifestations such as leg edema in the control group, with a statistically significant difference. This may due to their poor compliance with the same measures that lead to experience with the disease.

Gad and Alsheikh (2013) supported these findings by reporting that after intervention the study group clinical assessment improved as evident by absences of warm leg and tenderness in the leg than patients of control group who follow the routine care only.

Lastly; concerning the effect of the nursing led intervention program on VTE prevention and reduction in women with gynaecological tumour and undergoing major abdomino-pelvic surgery. Our findings shown that the study group, which received the intervention program and complied with the nursing guidance, had no evidence of VTE, while the control group had one case of PE and two cases of DVT, with a highly statistically significant difference. That supports the second study hypothesis.

Additionally these affected cases; the first case involved a DVT woman who had been diagnosed with ovarian cancer and was listed as high risk on the Autar scale because she was obese, diabetic, over 50 years old, and had a history of varicose veins. And delivered previously 3 times by C.s. Moreover she admitted to the ICU for one week after surgery due to bleeding. Then transferred to the inpatient department. The second case of DVT was diagnosed with advanced uterine fibroid; she was also

high risk according to Autar scale, a 48 years old, with a history of breast cancer, diabetes mellitus, and more than ten years of oral contraceptive use previous 2 C.s. delivery, her operation duration lasting more than 2 hours so the surgery was complicated by bleeding, necessitating a 10-day stay in the ICU. Furthermore, the third case, PE, was diagnosed with endometrial cancer, was 60 years old, had a history of breast cancer, hypertension, obesity, and was used an oral contraceptive pills for more than 20 years. Their operation lasted more than 3 hours and was complicated by respiratory distress, bleeding, so they were admitted to the ICU for more than two weeks.

So, this may be attributed to multifactorial issues one of it the majority of control group was had poor level of knowledge and nearly half of them were never compliant with the many VTE preventive measures except for stocking and anticoagulant medications preventive measures that routinely compliant with it. Also those were categorized as high risk and lasting long duration more than 3hours in the operation.

Ramadan, Amr, and Ashour, (2019) & Gad and El sheikh (2013) studies found that the study group who received intervention did not have DVT relative to the control group who received routine treatment. Only one tenth of the control group had DVT and its manifestations during the four week after surgery, while none of the study group either had DVT or its manifestations.

According to **Youness, et al., (2016)**, the intervention group, which obtained the intervention program and followed the nursing instructions, had just one case of DVT out of the total sample, while the control group had three cases of VTE, two cases of DVT, and one case of

PE, with a highly statistically significant difference between the two groups.

Conclusion:

Findings of this study proved that women with gynaecological tumour who undergoing major abdomino-pelvic surgery who subjected to nurse led intervention program were significantly benefit from the intervention program that appeared in attaining a high level of knowledge and compliance regarding VTE and its preventive measures and did not experience a venous thromboembolism comparable to group who assigned to hospital routine care only were reported two cases with DVT and one PE. This indicated that the two research hypotheses had been accepted.

Recommendations: -

- This study calls attention to the importance of nurses' roles in patient education about VTE, as well as the need for improved services to assist gynaecological nurses in educating their patients about VTE
- Nursing led intervention should be added as an essential part of the routine perioperative care for all major gynaecological operation
- A guided booklet should be available and distributed for all women undergoing major gynaecological operation.
- Further study recommended with large sample size and with extended follow up duration
- Further study recommended clarifying risk stratification for patients undergoing gynaecological surgery for developing VTE.

Acknowledgement

Conflict of interest

No

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