

## Effect of Preventive Measures on Chemotherapy Induced Phlebitis among Patients with Cancer

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**Abstract:** Chemotherapy Induced Phlebitis (CIP) is an unpleasant side effect of peripheral intravenous therapy, particularly after chemotherapy. The nurses take precautions to avoid the development of (CIP). Using Sesame oil and cold compresses can play an important role in reducing CIP. **Purpose:** To examine the effect of preventive measures on chemotherapy induced phlebitis among patients with cancer. **Setting:** The study was conducted in the outpatient clinic and the Oncology department of Menoufia University Hospital. **Research design:** A quasi-experimental (study/control) research design was utilized. **Subjects:** A consecutive sample of 100 adult patients with cancer of both sexes who were receiving chemotherapy treatment was selected. **Instruments:** instrument (I): Structured Interview questionnaire: instrument (II): Vein Quality Assessment Tool (VAT), and instrument (III): Visual Infusion Phlebitis (VIP) scale. **Results:** There was a highly statistical significant difference between both groups related to Chemotherapy Induced phlebitis post intervention ( $p < 0.001$ ). **Conclusion:** applying Sesame oil and cold compress have positive significant effect on preventing chemotherapy induced phlebitis. **Recommendation:** Oncology patients should be educated about identifying and reporting any changes in their vein condition. Collaborating with other institutions to implement Sesame oil and cold compresses as a preventive measures to reduce the incidence of (CIP) among patients who were receiving chemotherapy.

**Key words:** *Chemotherapy Induced Phlebitis, patients with cancer, Preventive measures.*

### Introduction

Cancer is a life-threatening disease that develops over years as a series of pathological events that frequently vary throughout a number of stages (Tupere1 et al., 2020). Regarding to National Plan of Cancer Control, the worldwide cancer problem has doubled in the previous 30 years of the 20th century, nearly triple by 2030, and will have increased by three times by 2050 (National Cancer Control Plan of Egypt 2020)

The most popular form of cancer treatment is chemotherapy. Chemotherapy slow or stop the spread of the disease. Most chemotherapy

medications are given directly into a vein through peripheral venous catheter (Skeel & Khleif 2018). Intravenous cannulas permit fast administration of medication, likewise it is linked with severe side effects as phlebitis, extravasation, infection, and hyperpigmentation of the skin (Behnamfar et al., 2019& Harris et al., 2020 )

Phlebitis is an inflammatory response to intravenously chemotherapeutic medications, also it can be produced by PH of the solution, osmotic pressure of chemotherapy solution, venous diameter, size and type of the

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intravenous catheter and infusion periods. It may show signs of vein destruction associated with pain, erythema and swelling (El-seadi et al., 2020). Therefore when using intravenous infusion catheters for chemotherapy, nurse must take care of infusion principles such as skin antisepsis, safe maintenance of solutions, and prevention of complications such as air embolism, infection, catheter damage (Behnamfar et al., 2019).

The incidence of chemotherapy induced phlebitis in cancer patients ranged from 35% to 56%. CIP not merely induce complications for the patients, but also increases the difficulty of venipuncture from the nurses, which affects the vein during implementation of chemotherapy (Gao et al., 2016).

Nurses should be able to recognize the early sign of phlebitis. Caring for and safeguarding the intravenous injection site is of extreme importance for nurses. This complication can be decreased by choosing the best device and site for catheter insertion and continue observing vein access site following removal of catheter. Patients with peripheral IV catheter should be instructed about appropriate measures which contribute to the prevention of peripheral intravenous catheter complications (Ammar and Elderiny 2019).

Although there is no evidence or exact way to inhibit and treat chemotherapy-induced phlebitis, there are a number of available protective measures. These include quick injection and dilution of the chemotherapy, topical corticosteroids or anti-inflammatory medications, immediate catheter removal, application of cold wet compress on the site, and then redetecting the vein (Guihard et al., 2018 & Ammar and Elderiny 2019).

Sesame indicum has long been utilized in Iranian and other traditional medicines as a byproduct of the edible and medicinal sesame plant. Additionally some particular steroids and other soluble medications are usefully dissolved in it for usage in oil capsules. It functions as an anti-inflammatory, anti-rheumatic, and anti-bacterial properties. It contains organic antioxidants that prevent breast, prostate, and gastrointestinal cancers as well as prospective cancers in the body. Additionally the essential fatty acids Vitamins E and F included in sesamum indicum help to construct the skin's layers, shield skin cells from damage, and maintain the health of skin tissues. (Shamloo et al., 2016 & Mosayebi et al., 2017).

Ice application is a simple and low-cost non pharmacological therapy. It reduces the inflammatory reaction and spasm, also decreases pain through constricts local blood vessels and decreases tissue temperature (Ibraheem & El Mokadem 2016)

Because of the high incidence rate of CIP among patients receiving chemotherapy, there is a need to examine new approach to prevent and manage CIP. Several researches have been conducted to assess and compare the effects of injecting saline intermittently into intravenous catheter and applying local cold compress in maintaining an open venous catheter, reducing the incidence of phlebitis and decreasing manifestation of I.V cannulation induced thrombophlebitis i.e. pain, and erythema (Marsh et al., 2018).

In the light of the achieved results through the applicable implemented researches, it is clear that the constructive preventative effects of Sesamum indicum may enhance patient's tolerance during the treatment of chemotherapy process that can lead to a reinforcement of the chemotherapy

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effect (Daud and Mohamad 2021). Nearby there are many studies evaluated the effect of cold compresses, salt solution and sesame oil separately to study their effect on phlebitis inhibition, but in the current study the researchers used only two methods together to examine the effect and to notice the occurrence of chemotherapy induced phlebitis (CIP). So the purpose of this study was to examine preventive measure of chemotherapy related phlebitis among patients with cancer

### **Significance of the study:-**

The incidence of CIP is about 70% to 90% among patients receiving chemotherapeutic treatment. Catheter-related phlebitis, which affects more than half of patients, is fatal. It can cause pain, lead to incomplete follow-up and ineffective drugs that effect on patient's health status. Due to repeated IV cannulation exposure, the administration of chemotherapy might result in significant consequences like phlebitis, extravasation, infection, and hypersensitivity reactions. Therefore, in order to reduce complications, assist other patients to benefit from getting chemotherapy at complete dose on plan, and enhance treatment quality, the ability to identify the side effects of chemotherapy and deliver supportive care for these patients is required.

Concerning to the outcomes attained through the related achieved research, it can be decided that sesame oil, cold compress application and good assessment for vein before insertion of IV therapy may result in a better tolerance of patients throughout the treatment course that can lead to a strengthening of the chemotherapy effect.

Therefore it is vital to create nursing care practices to give oncology patients the possibility to get the necessary information and training for

administering chemotherapy Safely (El-seadi et al., 2020).

### **Purpose of the study**

To determine the effect of preventive measures on chemotherapy induced phlebitis among patients with cancer

### **Methods**

#### **Research hypotheses**

1. The patients who are receiving preventive measures (study group) will have less incidence of chemotherapy induced phlebitis compared to those who do not receive the preventive measures.
2. The patients who are receiving preventive measures (study group) will have good vein quality compared to the patients who do not receive the preventive measures

#### **Research design:**

The current study used a quasi-experimental (study/control) research design.

#### **Setting:**

The study was conducted in the outpatient clinic (which exist in the first floor of oncology institute) and the oncology department (which exist in the second floor of oncology institute, it consists of 2 department, one for female and the other for male) of the Menoufia University Hospital in Shebin El -Kom, Menofia Governorate, Egypt.

#### **Subjects**

A consecutive sample of 100 adult patients of both genders who were diagnosed with cancer and underwent chemotherapy treatment was selected. The sample was divided randomly into two equal groups (50 patients in each group). They were selected after performing power analysis.

**Sample size calculation:**

Sample size was calculated based on power analysis performed in a previous study which indicated that 45 subjects per group would be required a sufficient statistical power of 80% and Alpha level was set at 0 .05. 10 patients were added to compensate for the attrition rate in this population. So, the final sample became 100 patients.

- Study group (I): Exposed to the preventive measures in addition to standard hospital care.
- Control group (II): Exposed only to routine hospital care

**Inclusion criteria:**

- Adult conscious patients of both sexes.
- Patients receiving chemotherapy (alkylating agents, anti-metabolites, antitumor antibiotics and plant alkaloids)
- Patients receiving chemotherapy through peripheral IV cannula.

**Exclusion criteria:**

- Patients suffering from any peripheral vascular complications. Because these complications affecting results of the present research.

**Instruments of the study:**

- The data for this study was gathered using three instruments. These Instruments aimed to appraise the effect of preventive measures on chemotherapy related phlebitis, which include the following:

**Instrument (I): Structured Interview questionnaire:** It was developed by the researchers after reviewing of the related literatures ((Shamloo et al., 2016). To assess demographic, and medical data. It was divided into two parts:

- **Part (I):** demographic data of the patients; which included age, gender, marital status, educational

level, occupation and residence.

- **Part (II):** patients' medical data: it included cancer's type, type of chemotherapy and use of anti-inflammatory drug, catheter data (location and size of catheter, the administered infusion, methods of infusion) and presence of comorbidities.

**Instrument (II): Vein Quality Assessment:**

It was developed by Lenhardt (2002) to evaluate vein quality before and after applying peripheral intravenous catheter according to three categories and scoring system as following: Good vein quality that reflected vein was easily visible and/or easily palpate when tourniquet was applied.) . It took score of 3; fair vein quality which indicated veins were small, scarred or difficult to palpate). It took score of 2; and poor vein quality (vein unable to be seen or palpated). It took score of 1.

**Instrument (III): Visual Infusion Phlebitis scale (VIP Scale)**

It was developed by Jackson (1998) that representing the initial phase of phlebitis, once peripheral venous cannula was replaced. There were six grades on this scale, ranging from 0 to 5. Zero indicate no signs of phlebitis while score of 5 indicated advanced stage of thrombophlebitis.

**Validity: -**

A team of five professionals, including three oncologists & Nuclear Medicine and three Medical Surgical Nursing specialists, evaluated the content validity of the instruments to ensure their completeness and relevance. After that, adjustments were made as necessary.

**Reliability:**

It was measured by using a test- retest method and Pearson correlation coefficient to establish weight and reliability of the instruments to

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measure its items. The reliability of all instruments was tested by intra class reliability coefficient. It was 0.84 for instruments I and 0.81 and Cronbach's alpha above 0.80 for instrument II and the internal consistency of instrument III was 0.88 and test- retest was 0.91.

**Ethical consideration:**

An official permission was obtained from ethical and research committee of Faculty of Nursing .Menoufia University. Also written permission was obtained from the authorities of oncology department. Each patient was asked for their informed consent to participate in the study after being informed of its purpose. Regarding collected data, confidentiality was taken into account. The researchers accentuated that data would be confidentially preserved. Furthermore respondents' anonymity was certain by coding data.

**Pilot study:**

Ten patients participated in a pilot study to test the clarity, possibility for application of the instruments that had been created and to estimate the length of time required for data collection. The required modifications were made, and patients in the pilot study were excluded.

**Data collections:**

- Data was collected over a 5 month, from commencement of July to the termination of November, 2022.
- Patients who meet the inclusion criteria and decided to participate in the study were randomly and alternatively allocated into 2 equivalent groups. Fifty patients each group.
- Every participant in the two groups was interviewed individually immediately on his/ her admission to the department to assess demographic data using instrument

I part one. Patients' medical data of both groups was assembled from the patient's records using part two of instrument I.

**For study group**

- At chemotherapy station, once the oncology nurse inserted peripheral IV catheter, researchers used a finger with a sterile glove to apply 10 drops (3 mL) of sesame oil (100% pure sesame oil manufactured by the Yaru Egyptian Herbs & Oil Company, Egypt) in a circular motion for 5 min within 10 cm on the anterior forearm and then slowly spread around 10 cm toward the arm for study group to enhance absorption.
- Immediately after initiating infusion of chemotherapy, researchers applied ice pack (the ice pack was prepared by crushing small pieces of ice and wrapping it up in a piece of gauze) to study group on IV infusion site for 15 minutes to decrease inflammation and hematoma at the site.
- Chemotherapy was given according to the prescribed plans in the order of vesicant, irritant, non-irritant using skillful performance technique.
- After completing chemotherapy session, researchers applied 10 drops (3 mL) of sesame oil with gloved hand twice daily every 12 hours (in the morning and at night before sleeping) to study group during their hospitalization.
- The researcher conduct a teaching session to educate patients about proper technique of applying the Sesame Oil before patient's discharge, the researcher observed the patient through demonstration and re demonstration of the technique to make sure that they have the right skills to apply the oil at home.

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- Patients reported a minimum 2 signs of CIP (pain, erythema and swelling on the site) were referred to the phlebitis clinic for medical management.

### **Control group**

- Received the regular nursing care by choosing catheter size (20–22) and inserting it to them, administer chemotherapy as prescribed and applying cold packs only if in case of complication.
- All patients were carefully evaluated and followed up 3 times (pre intervention at 1st day, post intervention after 7days then follow up after 4 weeks) from the initiation of first dose of chemotherapy to one month. For both group the patients assessed through direct patients' observation, Whats App, and Video call through telephone.

### **Statistical analysis:**

The data collected were tabulated & analyzed by SPSS (statistical package for the social science software) statistical package version 20 on IBM compatible computer.

Two types of statistics were done:

- Descriptive statistics: were reported as number and percentage (No &%) for qualitative data or mean and standard deviation (X+SD) for quantitative data.
- Analytic statistics:
  1. Fisher's Exact Test & Pearson Chi-Square Test: was used to investigate the relationship between two qualitative variables.
  2. The Student t-test (parametric test) was used to compare two independent sets of quantitative variables that were normally distributed.
  3. Mann-Whitney test (non-parametric test) was used for comparison between two groups not normally distributed quantitative variables.

4. Repeated-Measures ANOVA was used for comparison between more than two related groups of normally distributed quantitative variables.
5. Kruskal-Wallis test (non-parametric test) was used for comparison between three independent groups not normally distributed quantitative variables.
6. Spearman correlation was used for quantitative variables that were not normally distributed or when one of the variables was qualitative.
7. Significance was approved at  $p < 0.05$  for interpretation of results of tests of significance.

### **Results**

**Table 1:-** illustrates that the mean age of both groups were  $49.40 \pm 9.54$ ;  $50.24 \pm 8.16$  years in the study and control group respectively. The majority of studied sample were female (78.0%, 82.0% in study and control group respectively). The majority (82.0%) of the study group was married and 72% of control group. About 28.0% and 34.0% of study and control group respectively were Illiterate. Concerning to job more than half of them did not have work (72.0% & 60.0%) in study and control group respectively. Regarding the sociodemographic data, there were no statistically significant differences between the two groups.

**Table 2:-** Clarifies medical data; about half of both studied group had breast cancer (54.0% & 50.0%) in study and control group respectively. Regarding to type of administered chemotherapy 50% of study group and 60.0% of control group had taken Plant alkaloids. 82.0% & 72.0% of study and control group respectively received anti-inflammatory drugs. Almost all of studied sample (98.0% and 100.0%) respectively had big catheter size. More than two third of the study group 68.0% and 48.0% of control group

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used intermittent methods of infusion. There were no statistical significant differences between both groups regarding to all medical data.

**Table 3:-** This table shows the minority of both groups had poor vein quality pre intervention ( 28% of study group verses 30% of control group) This percent was elevated to 36% and 40% in study group compared to 74% &82% among control group post intervention and follow up .There was highly statistical significant difference among studied groups post intervention (p <0.001 , &p <0.001 ) respectively .

**Table 4:-**displays that there was a highly statistical significant difference between both groups related to stage of phlebitis at first, second & third

measurement points (p<0.001) respectively.

**Figure 1:-** this figure shows that the mean score of visual infusion phlebitis slightly increases from 1.14 during first assessment to 1.32 during third assessment while there was a noticeable change in the mean visual infusion phlebitis in control group from 1.56 to 3.58 at pre and third assessment.

**Table 5:-** shows that there was no significant association between medical data and Visual Infusion Phlebitis among study group

**Figure 2:-** illustrates there was negative correlation between patients` vein quality and Visual stage of Phlebitis among the study group

**Table (1): Distribution of studied groups regarding socio-demographic characteristics N= 100**

Demographic characteristics	Studied groups				$\chi^2$
	Study group (n=50)		Control group (n=50)		
	No.	%	No.	%	
<b>Age (years):</b> Mean± SD Range	49.40 ± 9.54 25.0 – 60.0		50.24± 8.16 28.0– 60.0		<b>t- test</b> = 0.47
<b>Gender:</b> Male Female	11 39	22.0 78.0	9 41	18.0 82.0	0.25
<b>Marital status:</b> Single Married Divorced Widowed	5 41 0 4	10.0 82.0 0.0 8.0	3 36 3 8	6.0 72.0 6.0 16.0	5.15
<b>Residence:</b> Rural Urban	28 22	56.0 44.0	37 13	74.0 26.0	3.56
<b>Education level:</b> Illiterate Read & write Primary Secondary University	14 13 11 10 2	28.0 26.0 22.0 20.0 4.0	17 16 11 5 1	34.0 32.0 22.0 10.0 2.0	2.60
<b>Occupation:</b> Work Don` t work	14 36	28.0 72.0	20 30	40.0 60.0	1.60

$\chi^2$  = Pearson Chi-Square test

t= student t- test

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**Table (2): Distribution of studied groups according to medical data N= 100**

Medical data	Studied groups				$\chi^2$	P value
	Study group (N=50)		Control group (N=50)			
	No.	%	No.	%		
<b>Cancer diagnosed:</b>						
Breast	27	54.0	25	50.0	4.45	0.81
Ovary	4	8.0	2	4.0		
Endometrium	5	10.0	4	8.0		
Lung	6	12.0	6	12.0		
Leukemia	0	0.0	2	4.0		
Liver	2	4.0	3	6.0		
Pancreas	1	2.0	3	6.0		
Bladder Colo- rectum	2	4.0	3	6.0		
	3	6.0	2	4.0		
<b>Type of chemotherapy:</b>	5	10.0	11	22.0	6.92	0.07
Alkylating Antimetabolites	12	24.0	5	10.0		
Anti-tumor antibiotics	8	16.0	4	8.0		
Plant alkaloids	25	50.0	30	60.0		
<b>Use of anti-inflammatory drugs</b>					1.41	0.23
Yes	9	18.0	14	28.0		
No	41	82.0	36	72.0		
<b>Catheter location:</b>					2.61	0.27
Forearm	3	6.0	7	14.0		
Dorsum of hand	32	64.0	33	66.0		
Wrist	15	30.0	10	20.0		
<b>Catheter size:</b>					1.01	1.0*
Small G-24/26	1	2.0	0	0.0		
Big G- 20/22	49	98.0	50	100.0		
<b>Type of infusion</b>					NA	NA
Intravenous fluid + Medication	50	100.0	50	100.0		
<b>Methods of infusion</b>					4.11	0.12
Continuous Intermittent	14	28.0	23	46.0		
Continuous and Intermittent	34	68.0	24	48.0		
	2	4.0	3	6.0		
<b>Other comorbidities:</b>					0.21	0.64
Diabetes	10	20.0	11	22.0		
Hypertension	23	46.0	27	54.0	0.64	0.42
Chronic kidney disease	12	24.0	9	18.0	NA	NA
None	5	10.0	3	6.0		

Fisher`s Exact test

NA (Not Applicable)

HS: Highly Significant



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**Table (3): Distribution Vein Quality score among studied groups (pre- and post- intervention & at follow up ) No=100**

	Studied groups				$\chi^2$	P value
	Study group (N=50)		Control group (N=50)			
	No	%	No	%		
<b>Pre-intervention:</b>						
Good vein quality	16	32.0	7	14.0	4.89	0.08
Fair vein quality	20	40.0	28	56.0		
Poor vein quality	14	28.0	15	30.0		
<b>Post-intervention:</b>						
Good vein quality	13	26.0	3	6.0	15.60	<0.001 HS
Fair vein quality	19	38.0	10	20.0		
Poor vein quality	18	36.0	37	74.0		
<b>Follow up</b>						
Good vein quality	10	20.0	2	4.0	14.70	<0.001 HS
Fair vein quality	20	40.0	7	14.0		
Poor vein quality	20	40.0	41	82.0		
$\chi^2$	0.83		19.43			
<b>P value</b>	0.65		<0.001 HS			

HS: Highly Significant

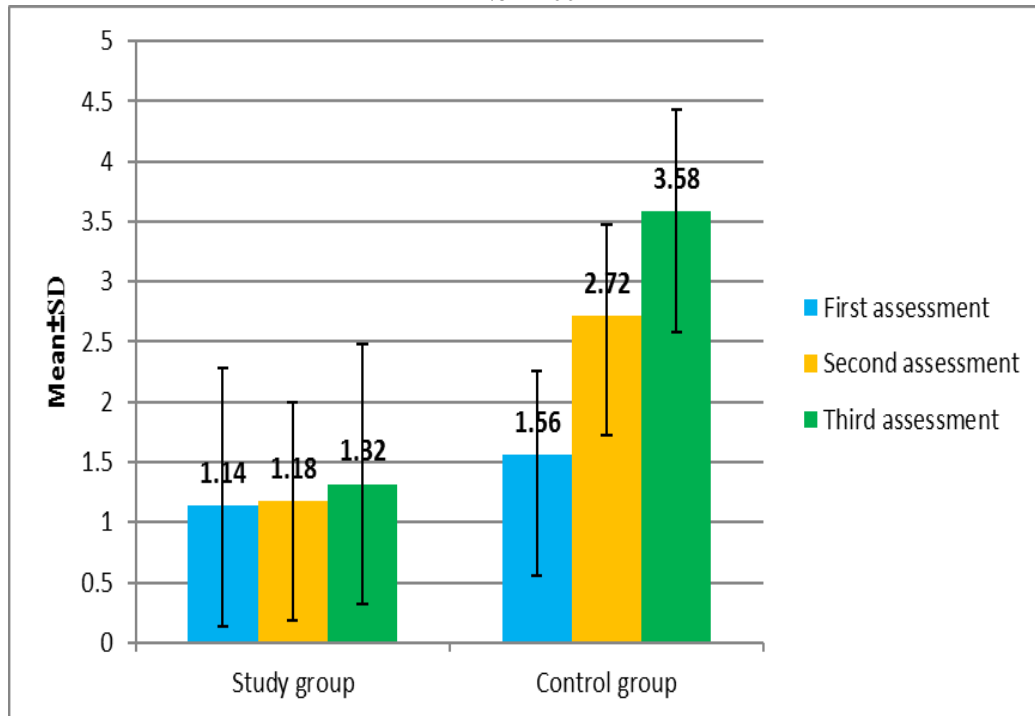
**Table (4): Distribution of stage of Phlebitis among studied groups (pre- and post- intervention & at follow up) No=100**

Stage of Phlebitis	Studied groups		Mann-whitneytest.	P value
	Study group (N=50)	Control group (N=50)		
	N (%)	N (%)		
<b>Pre-intervention:</b>				
- No signs of phlebitis	20 (40.0)	3 (6.0)	$\chi^2= 21.26$	<0.001 HS
- First signs of phlebitis	11 (22.0)	19 (38.0)		
- Early stage of phlebitis	12 (24.0)	25 (50.0)		
- Medium stage of phlebitis	6 (12.0)	3 (6.0)		
- Advanced stage of phlebitis	1 (2.0)	0 (0.0)		
<b>Post-intervention:</b>				
- No signs of phlebitis	10 (20.0)	0 (0.0)	$\chi^2= 51.57$	<0.001 HS
- First signs of phlebitis	24 (48.0)	3 (6.0)		
- Early stage of phlebitis	13 (26.0)	14 (28.0)		
- Medium stage of phlebitis	3 (6.0)	27 (54.0)		
- Advanced stage of phlebitis	0 (0.0)	6 (12.0)		
<b>Follow up</b>				
- No signs of phlebitis	12 (24.0)	0 (0.0)	$\chi^2= 60.02$	<0.001 HS
- First signs of phlebitis	22 (44.0)	0 (0.0)		
- Early stage of phlebitis	8 (16.0)	6 (12.0)		
- Medium stage of phlebitis	4 (8.0)	15 (30.0)		
- Advanced stage of phlebitis	4 (8.0)	23 (46.0)		
- Advanced stage of thrombophlebitis	0 (0.0)	6 (12.0)		
<b>Repeated measures ANOVA</b>	<b>0.64</b>	<b>161.17</b>		
<b>P value</b>	<b>0.46 NS</b>	<b>&lt;0.001 HS</b>		
	<b>P1: &lt;0.001 HS</b>			
	<b>P2: &lt;0.001 HS</b>			
	<b>P3: &lt;0.001 HS</b>			

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P1: Comparison first vs. second  
 P2: Comparison first vs. third  
 P3: Comparison second vs. third

**Figure (I) Mean score of Phlebitis stage among the study and control group  
 No = 100**

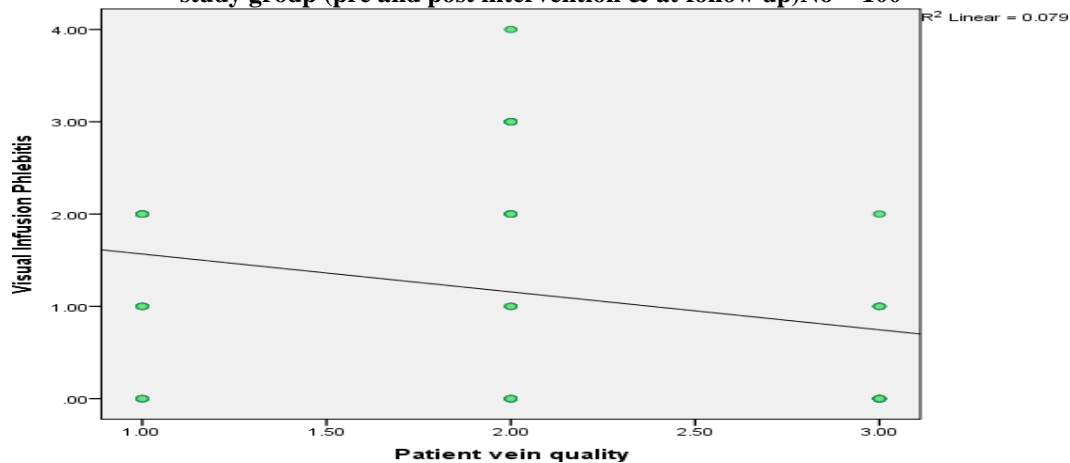


**Table (5): Association between medical data and Visual Infusion Phlebitis among study group**

Neonatal data	Study group (n=42)		Control group (n=44)		Statistical tests	p-value
	No.	%	No.	%		
<b>Gender</b>						
Male	27	64.3%	26	59.1%	$\chi^2 = .24$ NS	.620
Female	15	35.7%	18	40.9%		
<b>Type of birth</b>						
Vaginal delivery	11	26.2%	15	34.1%	$\chi^2 = .63$ NS	.425
Cesarean section	31	73.8%	29	65.9%		
<b>Number of gestations</b>						
Singleton gestation	39	92.9%	42	95.5%	$\chi^2 = .26$ NS	.607
Multiple gestation	3	7.1%	2	4.5%		
<b>Gestational age (weeks) (X ± SD)</b>	33.23 ± 1.52		33.20 ± 1.57		t- test = .100 NS	.921
<b>Apgar score at 5 minutes (X ± SD)</b>	5.92 ± 1.42		5.75 ± 1.33		t- test = .602 NS	.920

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Figure (2) Correlation between patients` vein quality Score and stage of Phlebitis score among the study group (pre and post intervention & at follow up) No = 100



### Discussion

Phlebitis is an acute and frequent issue that affects patients with the peripheral intravenous catheters insertion especially in those undergoing chemotherapeutic management and it had great impacts on treatment process, and can result in additional complications like CIP (Tupere et al., 2020).

Concerning demographic characteristics, the present study showed that, the mean age of both groups was ranging from 25- 60 years, more than three fourths of both groups were female and married. Also the current study illustrated that more than one fourth of both study groups was illiterate and more than half of both groups didn't have work and live in rural area. These results agree with Daud & Mohamad (2021) and El-seadi et al., ( 2020) who examined the patients Phlebitis-related characteristics. Nearly half of the patients investigated in both groups had only a secondary education, and around three-quarters of the patients in both groups had a similar mean age. More than half and a third of the study and control groups, respectively, were housewives in terms of their work and place of residence. Also Choenyi et al., (2016) who studied the effects of

chemotherapy and its home management among patients receiving chemotherapy. They noted that most of their cancer patients were from rural area. The finding can be explained by the fact that socio- demographic characteristics are very important and risk factors for phlebitis; as the age increase, the blood vessels become tenuous and it also influence renewal of cells and tissue. Moreover sex may predispose to phlebitis, especially male who smoke can irritate vein and also female who uses contraceptive are more liable to phlebitis.

Concerning medical data, the present study revealed that almost half of both studied groups had breast cancer, regarding type of chemotherapy about half of the study group received Plant alkaloids and minority of them used anti- inflammatory drugs. More than two thirds of study and about half of control group used intermittent methods of infusion. In the same line El-seadi et al., (2020) found that one third of their patients of both groups had breast cancer. Likewise Pearce et al., (2017) who studied incidence and severity of self-reported chemotherapy side effects reported that more than half of sample had breast cancer. However, El-Seadi et al., (2020)

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reported that all patients in both groups received antimetabolites treatment. This variation was related to the condition of the patient and the cancer's stage.

Regarding to total vein quality score of the sample, there was highly statistically significant difference between study group post intervention compared to pre intervention. This means that the preventive measures protected vein quality. This result correspond with El-seadi et al., (2020) who found significant enhancement concerning vein quality score among study group, where about two thirds of them had better venous quality pre intervention, but almost all of them had better venous quality at the 2nd month and at the end of treatment. Similarly, these findings were agreed with Simarpreet et al., (2018) who revealed that after implementation of preventive measure for chemotherapy patients the vein quality was improved.

In relation to stage of phlebitis among the studied groups at pre intervention, post intervention and at follow up the present study revealed that there was a highly statistical significant difference between both groups related to stage of phlebitis. These result agreed with Shamloo et al ., (2019) who stated that applying massage with sesame oil is effective in reducing the pain severity of patients with chemotherapy induced phlebitis and this pain reflect stage of phlebitis. Another results by Mosayebi et al., (2017) who studied the efficacy of sesame oil in preventing chemotherapy-induced phlebitis with acute leukemia, and showed that using of sesame oil can decrease the phlebitis incidence and improve vein quality. The relative risk of phlebitis incidence was two times in the control group more than the intervention group. Therefore these results displayed high and positive effectiveness of preventive measures as applying

sesame oil two times per day for seven days lead to decreased incidence of phlebitis as complication of chemotherapy infusion.

As regard to association between medical data and infusion Phlebitis score among study group, the present study showed that there was no significant association between medical data and Infusion Phlebitis score among study group. In contrast Daud & Mohamad (2021) showed that patients with chronic disease exhibited a significant association with the incidence of phlebitis. This study results validated another study by Enes et al., (2016) and Atay et al., (2018) who mentioned that patients with chronic diseases had a meaningfully greater risk of developing phlebitis. This means that the intervention of the current research had high effect and decreased the incidence of phlebitis among chronic patients contrary to other research results.

Regarding correlation between patients vein quality score and infusion phlebitis score among the study group, the present study clarified that there was a negative correlation between patients vein quality and infusion phlebitis score. At the same line with Nicole et al., (2016) who assessed inter-rater agreement on PIVC-associated phlebitis signs, symptoms and scales; they found that high vein quality lead to decreased incidence of phlebitis stage. So preservation of vein quality, good practice of insertion and application of Sesame oil twice daily and cold compress lead to decreased stage of phlebitis.

### **Conclusion:**

Based on results; implementation of Sesame oil and cold compress had positive effect on preventing chemotherapy induced phlebitis.

**Recommendation:**

- 1- Oncology patients should be educated about identifying and reporting any changes in their vein condition.
- 2- Application of Sesame oil as a routine hospital care for patients undergoing chemotherapy
- 3- Collaborating with other institutions to implement Sesame oil and cold compresses as preventive measures to reduce (CIP) among patients who are receiving chemotherapy.
- 4- A similar study can be replicated at diverse setting and on large probability sample to permit more generalization of the results.

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