

**University of Basra**  
**College of Nursing**



***Nurse's Knowledge Concerning Management of  
Extravasation of Vesicant Intravenous Chemotherapy  
Center in Basrah City Hospitals***

**A Research project**

Submitted to the Counsel of the College of Nursing at the  
University of Basra

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# **Supervisor's support**

I certify that this project of research

**Nurse's Knowledge Concerning Management Of  
Extravasation Of Vesicant Intravenous Chemotherapy  
Center In Basrah City Hospitals**

**Was prepared under my supervision at the College of  
Nursing, University of Basrah as partial fulfillment of the  
requirement for the degree of Bachelor in nursing**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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# اهداء

مرّت قاطرة البحث بكثير من العوائق، ومع ذلك حاولت أن أتخطأها بثبات بفضل من الله ومنه.

إلى أبويّ وأخوتي وأصدقائي، فلقد كانوا بمثابة العُضد والسند في سبيل استكمال البحث. ولا ينبغي أن أنسى أساتذتي ممن كان لهم الدور الأكبر في مُساندتي ومُدّي بالمعلومات القيّمة...  
أهدي لكم بحث تخرّجي.....

داعيًا المولى - عزّ وجلّ - أن يُطيل في أعماركم، ويرزقكم بالخيرات.  
إلى من وقف إلى جانبنا عندما ضلّلنا الطريق إلى من علمنا التفاؤل والمضي إلى الامام **الدكتور عادل علي حسين** ....

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إلى من سافقتهم ..... وأتمنى أن يفتقدوني...

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## ***Abstract:***

### ***Background :***

Extravasation occurs when IV medications, which can destroy tissue, seep out of veins and into the surrounding skin and muscle. Grade one is the least severe form of extravasation, and if a person receives treatment at this stage, the risk of permanent tissue damage is small. Grade four is the most severe form, and a person could lose limb function or the affected part of the limb itself if the medication has spread from the infusion site to other areas. As soon as a person experiences any pain or swelling at the infusion site, they should let their healthcare team know. The sooner a person receives treatment, the greater their chance of making a full recovery with no lasting tissue damage.

### ***Objectives:***

- 1- To assess nurses' knowledge about the management of intravenous extravasation of chemotherapy
- 2- Recognize the relationship between nurses' knowledge and specific demographic data

### ***methodology:***

The study was descriptive. The sample in this study was made of 29 participants and they agreed to participate in the study. The data collection process was used to collect data. The data was collected from December 8, 2021 to April 3, 2022.

### ***Conclusions:***

Based on the result obtained from the data analysis, the results of the study showed that the knowledge of nurses about the management of punctured venous leakage of chemotherapy is not good. And only showed a relationship between age groups

### ***6.2.Recommendation:***

1. Give nurses Training courses about chemotherapy extravasation
2. Holding interactive meetings between health staff to discuss more about venous extravasation.
3. The recommendation of the Ministry of Health to conduct training courses for nurses .
4. Design an educational program that can enhance nursing skills

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## List of Abbreviations

Abbreviation	Subjec
<b>DNA</b>	Deoxyribonuclic acid
IVC	Inferior vena Cave
LDA	Latent Dirichlet allocation
EMR	Electromagnetic radiation
CRP	Certified authorization professional
GP	<b>Global positioning</b>

# Chapter one

## Introduction

## **1.1.Introduction**

Extravasation refers to the leakage of injected drugs from blood vessels causing damage to the surrounding tissues. Common symptoms and signs of extravasation include pain, stinging or burning sensations, and edema around the intravenous (IV) injection site. In severe cases, extravasation may cause tissue dysfunction or physical defects, resulting in a delay of attempted treatment, patients' distrust, and numerous other issues. To prevent extravasation, a clinical specialist should perform the venipuncture or injection, who with relevant skills and management ability understands the properties of the injected drug. The primary purpose of these guidelines is to minimize the side-effects of IV injection, by suggesting proper and prompt emergency measures for extravasation and the appropriate treatments corresponding to the properties of the injected drug. The second purpose is to raise the medical team's awareness of extravasation in order to prevent extravasation with careful injection, recover patient trust, and increase patient satisfaction. These guidelines consist of following topics: basic knowledge about extravasation, extravasation management, and extravasation prevention. Antidotes, special drug management, drugs with high osmolarity, and drugs with pH are provided as supplement files . These contents are derived from authors' experiences and the references <sup>1</sup>

It is anticipated that these guidelines would help health professionals to prevent extravasation during IV and central vein injection and to promote patient safety should extravasation occur in any case. Extravasation is a term that describes a drug inadvertently or accidentally leaking into surrounding tissue or the subcutaneous space during IV infusions. The volume, contact time, and drug properties are all factors that have to be considered when assessing an extravasation event. Chemotherapeutic agents are at highest risk for

complications due to the nature of the agents and the potential to cause high cellular damage when extravasated. The severity of tissue damage can be limited by quick detection of extravasations and swift treatment.

A chemotherapeutic extravasation is considered an oncologic emergency. When assessing a chemotherapy extravasation, it is important to understand the classification of the chemotherapeutic agent in terms of its potential to cause cellular damage if extravasated. Chemotherapeutics can be classified into three categories: vesicants, irritants, and non-irritants<sup>2</sup>

Infiltration and extravasation are two well-known, distinct complications of IV infusion therapy. According to the Infusion Nurses Society and the Oncology Nursing Society, both complications involve the inadvertent leakage of an IV solution into surrounding tissue; however, the type of solution differs. Infiltration is the inadvertent administration of a nonvesicant or irritant solution or medication into the surrounding tissues<sup>4</sup>.

Nonvesicants are agents that rarely produce acute reactions or destroy the tissue when they infiltrate. Irritant agents can induce pain at the injection site or along the vein, with or without an inflammatory reaction, usually with no persistent tissue damage. However, irritants may cause soft tissue ulcers only if a large amount of concentrated drug solution is inadvertently extravasated to induce inflammatory reactions with no persistent tissue damage<sup>5</sup>

Intravenous infusion is the principal modality of administration of anti-cancer drugs for most types of malignant disorders with numbers exceeding 1 million infusions each day worldwide<sup>1</sup>.

Chemotherapy administration carries safety concerns to both patients and the medical team. These concerns include extravasation of chemotherapy, which is defined as the accidental infiltration of chemotherapy into the subcutaneous or sub-dermal tissue at the injection site[1-4], and can result in tissue necrosis<sup>3</sup>.

The exact incidence of chemotherapy extravasation varies greatly due to the general lack of reporting and absence of centralized registry of chemotherapy extravasation events. While center-based guidelines and policies attempt to minimize its risk, chemotherapy extravasation still has a prevalence that can range from 0.1% to 6% when administered through a peripheral intravenous access[3] and from 0.26% to 4.7% when administered through a central venous access device (CVAD)[6-8]. Institution-based guidelines should be based on evidence, where available, but they are often vague and non-specific, if present<sup>2,4</sup>

In order to avoid additional chemotherapy adverse effects, every effort should be made to minimize the complications of chemotherapy administration. All the oncology team members share responsibility to ensure the safe administration of chemotherapy.

Extravasation is the process by which any liquid (fluid or drug) accidentally leaks into the surrounding tissue. In terms of cancer therapy, extravasation refers to the inadvertent infiltration of chemotherapy into the subcutaneous or subdermal tissues surrounding the intravenous or intra-arterial administration site.

The extent of tissue damage depends on the ability of the chemotherapy agent to bind to DNA. DNA binding agents include anthracyclines, antitumor antibiotics, platinum analogs, and some alkylating agents. DNA-binding antitumors cause tissue damage by propagating lethal DNA crosslinking or strand breaks caused by free radicals, which lead to apoptosis. 13-17 Non-DNA-binding antitumors (eg, vinca alkaloids, taxanes, topoisomerase inhibitors) interfere with mitosis. Non-DNA-binding agents are more easily removed from the leak sites and cause less tissue damage than DNA-binding agents.

If the medication is a vesicant drug — meaning that it has the potential to cause tissue damage through blistering and ulceration — doctors call this complication extravasation. Vesicants include several Trusted Source chemotherapy drugs.

Extravasation may occur if the administration of the drug is too quick, the medication is very acidic or basic, or there is an obstruction in the intravenous (IV) line. The symptoms of extravasation include a painful stinging or burning sensation, swelling, and skin discoloration.

### **1.2. Importance of the study:**

For to know if the nurses have sufficient information about venous extravasation for chemotherapy and they have knowledge about extravasation and here is no need for training courses on this subject

### **1.3. statement of the study:**

Knowledge of nurses about venous leakage for chemotherapy

### **1.4. Objectives of the study:**

1- Nurses' knowledge about extravasation of chemotherapy

2. To identify the relationship between nurse knowledge with specific demographic data .

### **1.5. Definition of terms:**

Extravasation: is the leakage of a fluid out of its container into the surrounding area, especially blood or blood cells from vessels. In the case of inflammation, it refers to the movement of white blood cells from the capillaries to the tissues surrounding them (leukocyte extravasation, also known as diapedesis). In the case of malignant cancer metastasis it refers to cancer cells exiting the capillaries and entering organs (to form secondary tumors).



Risk factors: Something that increases the chance of developing a disease. Some examples of risk factors for cancer are age, a family history of certain cancers, use of tobacco products, being exposed to radiation or certain chemicals, infection with certain viruses or bacteria, and certain genetic changes.

Nursing interventions: are actions a nurse takes to implement their patient care plan, including any treatments, procedures,

or teaching moments intended to improve the patient's comfort and health.

# Chapter two

## Literature Review

## ***2.1. Definition of extravasation***

**Extravasation is the leakage of an injected drug out of the blood vessels, damaging the surrounding tissues. In terms of cancer therapy, extravasation refers to the inadvertent infiltration of chemotherapeutic drugs in the tissues surrounding the IV site. Extravasated drugs are classified according to their potential for causing damage as 'vesicant,' 'irritant,' and 'nonvesicant.' Vesicant drugs are also classified into 2 groups: DNA binding and non-DNA binding. Extravasation injury is defined as the damage caused by the efflux of solutions from a vessel into surrounding tissue spaces during intravenous infusion. The damage can extend to involve nerves, tendons, and joints and can continue for months after the initial insult. If treatment is delayed, surgical debridement, skin grafting, and even amputation may be the unfortunate consequences of such an injury <sup>1</sup>**

## ***2.2. Incidence***

**The frequency of extravasation in adults is reported to be between 0.1% and 6%. Some data suggest that the incidence is decreasing probably due to improvements in the infusion procedure, early recognition of the drug leakage, and training in management techniques.<sup>3</sup>**

## ***2.3. Risk factors***

**Risk factors can be classified under patient-related, procedure-related, and product or product-related factors. <sup>4,7,8</sup>**

### ***Patient-related factors***

- Small and fragile veins in infants, children, or elderly patients**
- Vessels that may burst easily**
- Cancer patients with hardened and thickened vessels due to frequent venipuncture**
- Patients with vessels that move easily during venipuncture attempts**

- Patients with excised lymph nodes, limb amputation, or closed vena cava

- Obesity in which peripheral venous access is more difficult

- Patients who move around a lot

#### **Procedure-related factors**

- Untrained or inexperienced staff

- Multiple attempts at cannulation

- High flow pressure

#### **Product or product-related factors**

- Inadequate choice of equipment (peripheral catheter choice, size, or steel needle)

- Inadequate dressings

- Poor cannula fixation

#### **2.4.causes**

**Extravasation has many possible causes, including<sup>10</sup>**

- repeatedly using the same veins for cannulation

- fragile veins

- drugs with a pH less than 5 or greater than 9

- drugs that cause the vein to constrict or spasm

- differences in osmotic pressure

- poor injection or cannula technique

- obstruction in the IV line

### ***What causes extravasation?*** <sup>12,13</sup>

**The IV catheter may push through the side of your vein.**

**The IV catheter may move from where it is inserted.**

**Fluid may leak through the area where the catheter enters the vein.**

**The vein may be fragile and may tear with the IV fluid.**

**Fluid may leak through the side of your vein.**

**A blockage may cause the medicine or fluid to build up.**

### ***2.5. Signs and symptoms*** <sup>11,18,17</sup>

**It is important that the person receiving the medication or their medical team notice the signs and symptoms of extravasation early to prevent permanent tissue and limb damage.**

**Some general signs and symptoms of extravasation include:**

**increased swelling**

**blistering**

**open sores**

**skin discoloration**

**fever**

**Skin that starts to discolor significantly and becomes cold to the touch indicates severe tissue damage.**

### ***2.6. Diagnosis*** <sup>13,14,17,20</sup>

**Patients must be informed to report any changes in sensation, signs or symptoms during the i.v. administration of any chemotherapy drug and to alert the healthcare professional to early signs of extravasation. Particular information must be given when a vesicant drug is administered.**

**Extravasation must be suspected if any of the specific signs or symptoms are present. Initially, among the most common symptoms Are Feelings Of Tingling, Burning, Discomfort/Pain Or Swelling, And Redness At The Injection Site. Later Symptoms May Include Blistering, Necrosis And Ulceration.**

**Doctors Use Four Grades To Indicate The Severity Of Extravasation.**

### **Grade One**

**Grade One Is A Mild Case Of Extravasation, And The Symptoms Include:  
Discomfort Or Pain Around The Needle Site**

**Medication Not Passing Through The Cannula As Easily**

**A Minimal Amount Of Swelling Without Skin Discoloration**

### **Grade Two**

**Grade Two Is More Serious Than Grade One And Involves Additional Symptoms, Such As:**

**Slightly More Pain Around The Needle Site**

**Medication Flowing More Slowly Through The Cannula**

**Mild Swelling**

**Slight Redness**

### **Grade Three**

**If A Person Is Showing Signs Of Grade Three Extravasation, They Should Call A Doctor Or Nurse Immediately.**

**Symptoms Include:**

**Strong Pain Around The Needle Site**

**Blocked Canula**

**Swelling**

**Skin Paler Or More Gray Than Usual, With Or Without Nearby Discoloration**

**Pallor can be difficult to detect in dark skin, so healthcare professionals may check the eyes, palms, and nail beds for signs of discoloration.**

#### **Grade four**

**A person should alert the medical team immediately if they notice the following symptoms:**

**intense pain around the injection or needle site**

**prominent swelling**

**patches of paler skin that are cool to the touch, possibly with areas of darker-than-usual skin nearby**

**blistering**

**At this stage, a person could also show signs of tissue death and loss.**

**Patients must be informed to report any changes in sensation, signs or symptoms during the i.v. administration of any chemotherapy drug and to alert the healthcare professional to early signs of extravasation. Particular information must be given when a vesicant drug is administered.**

**Extravasation must be suspected if any of the specific signs or symptoms are present. Initially, among the most common symptoms are feelings of tingling, burning, discomfort/pain or swelling, and redness at the injection site. Later symptoms may include blistering, necrosis and ulceration.**

**In the case of peripheral IV catheter**

- Possibly no initial symptoms of extravasation**
- Redness, pruritus, and edema around the injection site**
- Fluid injection rate slows down or stops**

- Blood backflow does not work well or there is leakage of medication around the needle
- A complaint of discomfort or pain and occasional expression of searing pain or numbness
- Initial physical symptoms usually appear immediately but also might appear several days or weeks later.

**In the case of central venous catheter - Often causes stinging pain**

- Edema around the port insertion or in the chest, or medication leakage around the catheter insertion
- Redness in the chest, collarbone, or neck where a central venous catheter is inserted
- No blood backflow
- Symptoms may appear early or late.

### ***Differential diagnosis***

**Flare reaction** Spots or solid lines with blisters can be suddenly felt along the vessels injected with drugs. Pain, edema, and ulcer do not appear, and symptoms disappear within 30 to 90 minutes.

**Vessel irritation** Pain, tightening, and skin discoloration tend to worsen. Blood backflow works well, and edema or ulcer do not occur. Pain or tightening occurs along the vein, and it is caused mainly by drugs such as vinorelbine and dacarbazine. Hot fomentations can be applied to the dilated veins to mitigate the symptoms.

**Venous shock** Occurs due to contraction of the vessel wall and usually happens as soon as the fluid injection begins. For the most part, blood does not backflow. Discoloration and edema do not occur. Venous shock can occur when injecting very cold medication or when medication is injected at a rapid pace. Hot fomentations can dilate the veins and mitigate the symptoms.

### ***2.7.Extravasation injuries*** <sup>15,16</sup>



While the injury is usually minor and resolves spontaneously, some cases result in serious complications, including full-thickness skin loss and muscle and tendon necrosis requiring reconstructive surgery or even amputation, leading to longer hospital stays, increased morbidity, and increased costs.

**Pain** Narcotic analgesics may be required to reduce severe pain around widespread extensive necrosis.

**Physical defects** Patients may be unable to work for some time; quality of life must be compensated for if a patient's occupation requires full physical mobility, and exposure of the disfigurement in public can cause a psychological impact.

**Medical expense** Depending on the situation, patients will bear the cost of hospitalization and medical expenses for cosmetic surgeries, and secondary medical problems might occur if the condition worsens.

**Disease control** Treatment suspension wastes time and other problems can occur due to delayed treatment. If bone marrow function decreases, anticancer treatments may be delayed due to infection caused by leukopenia.

**Time** The patient's normal activities, such as at home, work, school, etc., may be disrupted until the patient is fully recovered.

**Psychological impact on the nurse and the patient** Therapists will always feel nervous during the medical team-patient communication because of guilt. Communication and trust between patients and nurses can be interfered due to extravasation.

## **2.8.Assessment** <sup>21'22'21'23'24'25</sup>

### **Symptoms and signs**

Assess IVC or CVAD site throughout administration of chemotherapy. Extravasation should be suspected if the following occurs:

- patient complains of burning, stinging, pain or discomfort

- patient complains of thoracic pain
- evidence of swelling, oedema, erythema, leakage at the site
- absence of free flow of infusion
- change in infusion flow i.e. slow or sluggish
- loss of blood return or change in blood flow
- increase in resistance when administering IV bolus drugs.
- Late symptoms of an extravasation injury include inflammation, induration and/or blistering.

### 2.8.1.Initial Acute assessment

A site assessment should be conducted every hour when there are fluids or medications running through the line. If nothing is being infused, the site should be assessed before accessing the line and at least every eight hours.

<b>Grade 1</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>
<b>pain at infusion site</b>	<b>pain at infusion site</b>	<b>pain at infusion site</b>	<b>Pain at infusion site</b>
<b>Difficulty flushing cannula</b>	<b>Difficulty flushing cannula</b>	<b>Difficulty/ inability to flush cannula</b>	<b>marked swelling</b>
<b>Minimal swelling</b>	<b>Mild swelling</b>	<b>Swelling</b>	<b>Skin blanching</b>
<b>Nil redness</b>	<b>No skin blanching</b>	<b>Skin blanching +/- redness at the site</b>	<b>Cool blanched area</b>
	<b>Minimal redness</b>	<b>Sluggish capillary refill time</b>	<b>Reduced capillary refill time</b>
	<b>Normal capillary refill time</b>	<b>Normal / decreased perfusion</b>	<b>Decreased perfusion</b>
	<b>Normal perfusion</b>		<b>+ / - Arterial occlusion</b>

**Note:** In the event of a grade 3 or 4 injury in a community setting, notify the medical team immediately. The patient is required to return to RCH for a medical review as soon as possible and ensure treatment if needed, is commenced within 1 - 2 hours for the best results.

Follow acute management instructions below until the patient has been reviewed by medical staff.

### **2.8.2.Ongoing Assessment**

Continue to observe affected area post extravasation injury for 24 hours to ensure no signs of infection or further complications.

If there are signs of infection/complications, the site should continue to be observed until the signs and symptoms resolve.

Any signs of infection must be reported to the treating medical team to determine the need for antibiotic treatment.

### **2.8.3.Investigations**

In the event of an extravasation or infiltration injury, important assessment parameters include:

- drug extravasated, dose, volume
- position and size of injury
- amount and type of exudate
- presence of swelling, oedema
- extent and spread of erythema
- pain.

Assessment should be ongoing to allow for the early detection and management of skin changes such as ulceration and necrosis.

## **2.9.Management of extravasation**

### **2.9.1.Acute management**

**Stop infusion immediately**

**Medical staff of the treating team should be informed immediately of any extravasation injury**

**Most extravasation injuries are Grades 1 & 2 and do not require extensive intervention to prevent long-term skin and soft tissue damage**

**Grade 3 & 4 injuries have a greater potential for skin necrosis, compartment syndrome and the potential need for plastic surgery involvement, depending on the type and volume of solution extravasated. Once the treating team is informed the decision can be made to refer to the Plastics team for further input and/or management.**

<b>Grade 1</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>
<b>Stop infusion</b>	<b>Stop infusion</b>	<b>Stop infusion</b>	<b>Stop infusion</b>
<b>Remove cannula and tapes</b>	<b>Remove cannula and tapes</b>	<b>Remove constricting tapes</b>	<b>Remove constricting tape</b>
<b>Elevate limb</b>	<b>Elevate limb</b>	<b>Leave cannula insitu until reviewed by a doctor (treating team)</b>	<b>Leave cannula insitu until reviewed by a doctor (treating team)</b>
		<b>Photograph injury if this will not delay treatment</b>	<b>Photograph injury if this will not delay treatment</b>
		<b>Doctor to commence irrigation procedure within 1 hour of extravasation by irrigating affected area using</b>	<b>Doctor to commence irrigation procedure within 1 hour of extravasation by irrigating affected area using</b>

		<b>hylauronidase and saline 0.9% or saline 0.9% irrigation alone Give appropriate pain relief prior to beginning procedure*</b>	<b>hylauronidase and saline 0.9% or saline 0.9% irrigation alone Give appropriate pain relief prior to beginning procedure*</b>
		<b>Apply non occlusive dressing as advised by treating medical team or plastics</b>	<b>Apply non occlusive dressing as advised by treating medical team or plastics</b>
		<b>Elevate limb</b>	<b>Elevate limb</b>
		<b>+/- Refer to plastics team</b>	<b>Refer to plastics team</b>

### ***2.9.2.Ongoing Management***

**Document the site, extent and management of the injury in the patient's medical recor**

**Create an extravasation LDA in the patients EMR for grade 3 and 4 extravasations to monitor the injury, hourly for the first 24hours and then once a shift unless indicated otherwise**

**Keep limb elevated until swelling reduces**

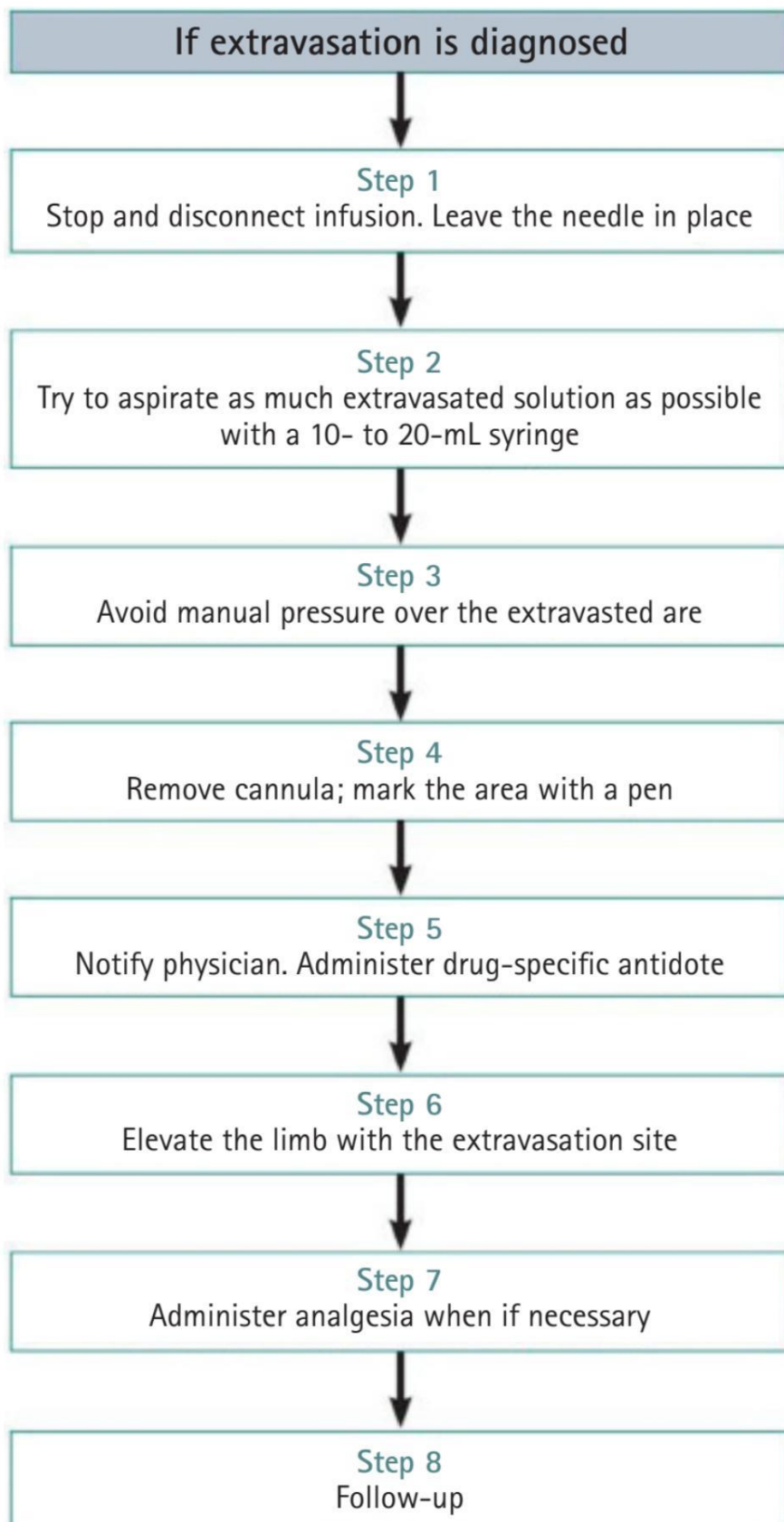
**Administer pain relief as appropriate for grade 3 and 4 injurie**

**If, at any time, the wound appears infected, a wound swab, full blood count, CRP and blood cultures should be taken and the patient commenced on appropriate antibiotics**

## ***2.10.Nursing interventions*** <sup>20121</sup>

**At the first sign of extravasation, the following steps are recommended:**

- (1) stop administration of IV fluids immediately, (2) disconnect the IV tube from the cannula, (3) aspirate any residual drug from the cannula, (4) administer a drug-specific antidote, and (5) notify the physician (Fig. 1).**



**Fig. 1.** Steps to be taken of the extravasation.

## **2.11.Prevention** 22123124125

**The most effective approach to extravasation injury is prevention. It is important that a multidisciplinary approach is taken to mitigate risks of extravasation. The risk of extravasation can be reduced by taking the following preventative measures:**

### **Patient education**

**identify high risk patients**

**ensure there are no barriers to effective communication for the purpose of assuring immobility and compliance during IVC insertion, and cooperation during drug infusion**

**educate patients and carers to monitor and immediately report symptoms such as pain, burning, stinging, swelling, or erythema during and after administration of cytotoxic drugs.**

### **Clinician training**

**do not inject against resistance**

**administration and management of anti-cancer drugs by trained and accredited health professionals**

**insertion, access and management of CVADs and IVCs by trained and accredited health professionals**

**ensure knowledge and access to current literature in extravasation management and international guidelines.**

### **Appropriate vascular access**

**identify most appropriate site for IVC insertion**

**large veins in the forearm are recommended for insertion of an IVC**

**avoid insertion of an IVC over joints, the inner wrist, lower extremities, antecubital fossa or where lymphoedema is present**



**avoid multiple punctures**

**do not insert an IVC distal to a previous venepuncture site**

**infusion sites should be selected in the following order of preference:  
forearm (basilica, cephalic, and median antebrachial), dorsum of hand,  
wrist, antecubital fossae**

**avoid sites with sclerosis, thrombosis, scar formation or previously  
irradiated areas**

**if venous access via an IVC proves difficult, or inadequate, consider a  
CVAD.**

### **Safety procedures**

**when accessing and before drug administration, ensure patency of the  
CVAD or IVC by checking**

**for blood return**

**no resistance is felt when flushing with 0.9% sodium chloride or other  
compatible fluid**

**intravenous infusion flows freely**

**monitor the patient and CVAD or IVC site regularly for the appearance of  
symptoms such as swelling, pain, erythema or a change in the infusion rate**

**flush with 10 to 20 mL of sodium chloride 0.9% or other compatible fluid  
between different drug infusions, checking for signs of extravasation.**

### **Device selection**

**do not use winged steel infusion devices for cannulation (“butterfly”  
needles), flexible cannulas should be used**

**use the smallest adequate and appropriate size cannula in the largest  
available vein**

**ensure the CVAD or IVC is stabilised and secure with a transparent  
dressing to allow the site to be visualised**

**if unable to confirm patency of CVAD, do not proceed without a full review of the CVAD and radiologic confirmation of patency**

**if unable to confirm patency of IVC, insert a new IVC.**

## **2.12. Treatment** 219120125

**In the event of a mixed drug extravasation it is recommended to act in accordance with the drug that has the most harmful properties. Early initiation of treatment is important to minimise damage and prevent additional drug from being injected into the area.**

**It is recommended that an extravasation kit containing instructions, materials and antidotes, is kept in each patient care area where chemotherapy is administered.**

**In the event of an extravasation, regardless of the nature of the drug, the initial steps are as follows:**

**STOP** the injection or intravenous infusion immediately.

**LEAVE** the venous access device (VAD) in place.

**ASPIRATE** any residual drug from the VAD using a sterile syringe.

**PLAN**

**CALL** for assistance - notify medical officer, pharmacist and/or a senior nurse.

**COLLECT** the extravasation kit.

**ASSESS** the affected area for the presence of symptoms e.g. erythema, swelling, burning, pain and **TRACE** the affected area with a marker pen.

**PHOTOGRAPH** the area.

**REMOVE** the IV device or port needle. Do not apply pressure. If a central line is in situ this should remain in position - refer to a medical officer for further instructions.

**ELEVATE** the limb if it provides comfort to a patient

**Initiate appropriate drug specific management measures as per protocol.**

**Administer pain relief if indicated.**

**Refer to a plastic surgeon or other specialist surgeon (according to individual case and site of extravasation) if clinically indicated.**

**avoid applying direct pressure to the extravasation site.**

### **Cold and warm compresses**

#### **Cold compresses <sup>25,27</sup>**

**The topical application of cold compresses is recommended for the management of extravasation of drugs classed as vesicants, or irritants with vesicant properties, with the exception of the vinca alkaloids (vinblastine, vincristine, vindesine, vinorelbine, vinflunine) and oxaliplatin. In the case of an oxaliplatin extravasation, the use of a cold compress may exacerbate sensory neuropathy. The use of cold compresses for irritant extravasation is recommended in this document for comfort measures only.**

**Intermittent cooling is thought to:**

**cause vasoconstriction, localising the extravasation**

**reduce local inflammation and pain**

**decrease cellular uptake of drug.**

**Instructions for use:**

**cover a cold pack with a waterproof covering and place over the affected area**

**leave for 15 to 20 minutes (no moisture should come in contact with the patients skin)**

**apply every 6 hours for 48 hours.**

#### **Warm compresses <sup>28</sup>**

**Topical application of warm compresses is recommended for use in vinca alkaloid (vinblastine, vincristine, vindesine, vinorelbine, vinflunine) extravasations because:**

**the application of warmth may decrease local drug concentration, increasing the blood flow which results in enhanced resolution of pain and reabsorption of local swelling**

**the application of cold has been shown in animal models to increase the risk of tissue damage**

**the application of warmth has been reported to be synergistic with hyaluronidase.**

**There is an absence of documented benefit for the application of local warmth in all other types of extravasations. Studies in the animal model indicate that warmth may increase cellular uptake of drug increasing the risk of cell damage.**

**Instructions for use:**

**cover a warm pack with a waterproof covering and place over the affected area**

**leave for 15 to 20 minutes (no moisture should come in contact with the patient's skin)**

**apply every 6 hours for 48 hours**

**refer to your local institutional guidelines on using warm packs.**

### **2.13. *Follow up care* <sup>28</sup>**

**Patient to monitor the affected area daily for any skin changes or breakdown, and to notify medical team immediately of any changes.**

**Careful monitoring by a healthcare professional is recommended; the length of monitoring should be at the advice of the medical officer, and will depend on the cytotoxic drug extravasated and the clinical course of the injury. Consider daily or second daily review for the first week, and then weekly until complete resolution of symptoms.**

**It is important to note that early vesicant extravasation signs or symptoms can be subtle, and not always evident until several days or weeks later. Regular patient review is recommended.**

**Patients should be informed about the follow-up policy before leaving the treatment area.**

**Take photographs at follow up appointments.**

**Community nurse or GP referral may be required for follow up care.**

#### **2.14. *Documentation of Events* <sup>27128</sup>**

**Each incident of extravasation must be thoroughly documented and reported. Documentation serves several purposes, including providing an accurate account of what happened, protecting the health care professionals involved, gathering information on extravasations, and highlighting deficits in practice.<sup>23</sup> Documentation and reporting to the appropriate entities of adverse drug reactions and medication errors is another way pharmacists can help prevent future events. Data gathered from the reported adverse drug reactions and medication errors could be used as learning tools to examine systemically the means by which these events occur. Local procedures and protocols are paramount to the timely recognition and management of extravasation and the prevention of serious tissue damage. Collaborative efforts should be made to ensure timely multidisciplinary attempts to educate all members of the health care team involved in the management of these patients once the event has occurred. Additional efforts should be made to initiate policies that would prevent further events. If policies are in place, they should be made readily available and updated regularly to reflect current pract**

**chapter three**  
**Methodology**

### **1.1. Design of the Study:**

A descriptive study design was conducted to provide nurses with information about extravasation of vesicant Intravenous chemotherapy at oncology center basra city hospital. The study started from 8 December 2021 to 3 April 2022.

### **3.2 Consent Arrangements:**

After the study project was approved by the College of Nursing, the formal letter group began. Prior to data collection, permissions were obtained to conduct the study. Another approval was obtained from the Development and Development Department in Basra. Then permission was obtained from the hospital and the center itself

### **3.3. Ethical Consideration**

Subject consent according to the study criteria were obtained from hospital administration and study sample

### **3.4. The Study Setting:**

The study conducted was oncology nurses on their knowledge of the management of intravenous leakage of chemotherapy, the number of nurses participating in the study (39) participants through a comfortable selection sample.

### **3.5. The Study Sample:**

Samples were randomly collected from 39 nurses

### **3.6. The Study Instrument:**

The tool of the study is the questionnaire which has been constructed and design for the purpose of the study after extensive reviews of available literature and related studies. The study instrument consists of three parts. The first part

includes participants' demographic characteristics of the study sample, the second part include nurses knowledge about extravasation, and the three part include nurses management about extravasation

### **Part I: Demographic Characteristics of the Study Sample**

This part related to the socio-demographic characteristics of the nurses consists of (6) items,

Age:

Sex :

education level:

Accommodation:

Number of years of experience:

Number of courses on how to give chemotherapy:

### **Part II: nurses knowledge about extravasation**

This part include (10) items , for general definition and knowledge about extravasation , signs and symptoms , causes and risk factor and complication.

### **Part III: nurses management about extravasation**

This part include (10) items , for Interventions, prevention and treatment of extravasation

### **3.7. Data Collecting:**

Data is collected through a questionnaire developed by the researcher itself. Data collection was implemented from February 21, 2022 to 26 February 2022 minutes (10-20) in the minutes spent by all the corresponding nurses and fill out the format of the questionnaire



### 3.8. Statistical Data Analysis:

The data of the present study were analyzed through the use of Statistical Package of Social Sciences (SPSS) version 20. The following statistical data analysis approaches were used in order to analyze and evaluate the results of the study:

#### 3.8.1.. Descriptive Data Analysis:

a-Statistical tables (Frequencies and percent).

b-Arithmetic mean and standard deviation.

Mean: The mean was computed through the using of the following:

$$\bar{X} = \frac{\sum x}{n}$$

$\sum xi$  = sum of the (3x always + 2x sometimes + 1x never) for items.

Standard deviation (SD) was computed through the using the following formula:

$$S.D = \sqrt{\frac{\sum (xi-x)^2 fi}{\sum fi}}$$

c-Mean of score (MS) and Relative sufficiency (R.S)

Mean of score (MS): A mean of score equal to (1.67-2.33) was considered moderate MS, greater than (2.34) was considered high MS, less than (1.66) was considered low MS. The mean of score was computed through the use of the following formula:

$$\sum_{r_i=1} F_i \times S_i$$

$$M.S = \frac{\quad}{\quad}$$

$$\sum_{r_i=1} F_i$$

Suggested Sign's Score of assessment by the "Relative sufficiency

### **3.8.2. Inferential Data Analysis:**

a-Chi-Square – for testing the difference between several categories    Nominal scales.

### **3.9. Limitation of the study**

1-Lack of cooperation from some participants, and some fee shy to give more information.

2-The small samples per day due to the small number of nurses

**Chapter Four**  
**Results of the Study**

## Chapter four

### Result of the study

This chapter deals with analysis of the data through statistical procedure

**Table (1) Descriptive Statistics for Sample's Age, Gender, Qualifications, Address, Experience, Number of Participation in Programs and Training Courses**

<b>Variables</b>	<b>Statistics</b>	<b>Frequency</b>	<b>%</b>
<b>Age</b>	20-25 Years	15	38.5
	26-30 Years	10	25.6
	31-35 Years	5	12.8
	36-40 Years	4	10.3
	41 and above	5	12.8
<b>Gender</b>	Male	15	38.5
	Female	24	61.5
<b>Qualifications</b>	High school	13	33.3
	Diploma	22	56.4
	Bachelor	4	10.3
<b>Address</b>	Urban	29	74.4
	Rural	10	25.6
<b>Years of Experience</b>	Less than 1 years	7	17.9
	1-5 years	13	33.3
	6 >years	19	48.7
<b>Number of Participation in programs and training courses</b>	1-2 program	18	46.2
	3-5 program	7	17.9
	5 and above	14	35.9

Table (1) about social information where the number of participants is 20 to 25 around 38.5% and the number of participants 26 to 30 in the rate of 25.6% , of the 31- 35 participants 12.8% of the age of 36 to 40, 10.3% and the number of participants 41 And above 12.8%, the number of males was 15, 38.5 and the number of females 24, 61.5% ‘As well as Qualifications where the number of bachelor's number of 10.3% and graduates of the Institute are 22.3.4 and the preparatory graduates 13 33.3 and also address and number of years experience

**Table (2) Sample's Knowledge nurses extravasation**

<b>Statistics</b>	<b>Knowledge Concerning Signs &amp; Symptoms of Venous Leakage</b>	<b>Knowledge Concerning Management</b>	<b>Overall Knowledge</b>
<b>Total Sample</b>	39	39	39
<b>Mean of Score</b>	<b>40.51</b>	<b>40</b>	<b>40.25</b>
<b>Mode</b>	30.00 <sup>a</sup>	50.00	40.00
<b>Std. Deviation</b>	17.76287	17.16790	15.08523
<b>Range</b>	60.00	60.00	55.00
<b>Minimum</b>	10.00	10.00	10.00
<b>Maximum</b>	70.00	70.00	65.00

Table(2) : About the knowledge of the sample, as it shows the level of knowledge, the number of samples and the rate of responses. Right answer given 5 score, false answer given zero score in assessment of Overall Score for Knowledge while Right answer given 10 score, false answer given zero score in assessment of Signs & symptoms score &

### Table (3) nursing management

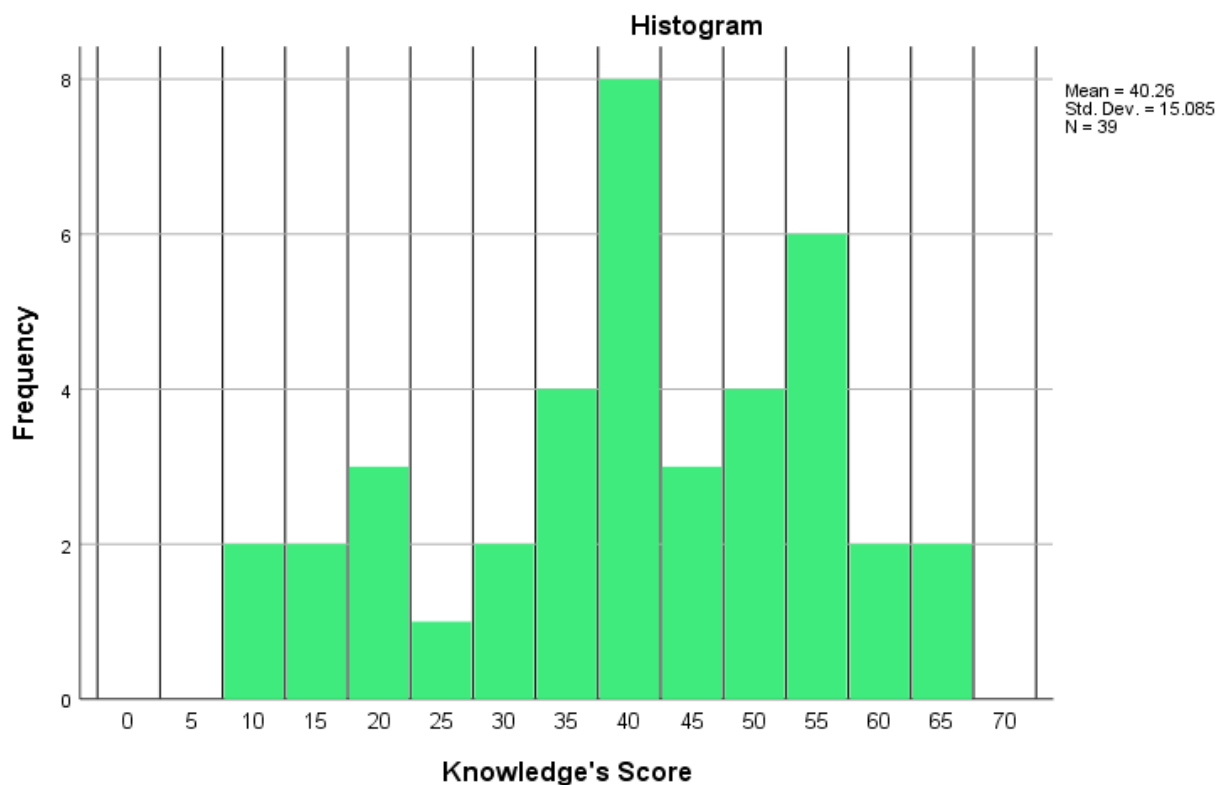
Paragraph	Statistics	F	%
1- It causes extravasation in	True	26	66.7%
	False	13	33.3%
2- Common symptoms and signs of extravasation include:	True	26	66.7%
	False	13	33.3%
3- extravasation may occur if it is	True	26	66.7%
	False	13	33.3%
4- Patients at increased risk of extravasation	True	23	59.0%
	False	16	41.0%
5- Peripheral intravenous catheterization	True	20	51.3%
	False	19	48.7%
6- In the case of a central venous catheter	True	28	71.8%
	False	11	28.2%
7- Venous shock is caused by	True	21	53.8%
	False	18	46.2%
8- One of the causes of extravasation	True	25	64.15
	False	14	35.9%
9- One of the factors that lead to extravasation	True	12	30.8%
	False	27	69.25
10- The severity of extravasation depends on	True	25	64.1%
	False	14	35.9%
11- At the first sign of extravasation, the following measures must be taken	True	29	74.4%
	False	10	25.6%
12- We use local heat treatments	True	26	66.75%
	False	13	33.3%
13- When using local warming, the filling should be placed for a period of time	True	32	82.1%
	False	7	17.9%
14- In the event of a first-degree extravasation,	True	20	51.3%
	False	19	48.7%
15- In the case of using local cooling, cold cream should be applied for a period of time	True	0	0%
	False	39	100%
16- In the event of an extravasation it must be reported	True	15	38.5%
	False	24	61.5%
17- In the event of extravasation, the nurse must	True	20	51.3%
	False	19	48.7%
18 - Treatment methods used to manage extravasation include:	True	25	64.1%
	False	14	35.9%
19- Once the extravasation occurs, the nurse must take the following measures	True	16	41.0%
	False	23	59.0%
20- When a extravasation occurs in the central access device	True	26	66.7%
	False	13	33.3%

Table (3) :The number of correct answers and the number of erroneous answers to each question appears and the correct and erroneous answers to each questions

**Table (4) The Nurse's Pass in Overall Knowledge**

Variable	Frequency	%	Mean of Score	P-value	Results
Non-Pass	25	64.1	31.60	0.00	Significant
Pass	14	35.9	55.71		

The table(4) shows the final knowledge of each nurse, where 25 of them did not pass the test and 14 did pass the test



This is a graphic showing the final knowledge as the vertical represents the number of repetitions and the horizontal represents the level of knowledge as it shows the degree of final knowledge from 100 to 20 points for each one, where 2 of them take 10 out of 100, three of them take 20 degrees, 8 of them take 40 and 6 of them take 55, 4 of them took 50, 2 of them took 60, 2 of them took 65

**Table (5) Compare Sample's Age, Gender, Qualifications, Address, Experience, Number of Participation in Programs and Training Courses in Score of Overall Knowledge**

<b>Variables</b>	<b>Statistics</b>	<b>Mean Score</b>	<b>P-value</b>	<b>Results</b>
<b>Age</b>	20-25 Years	43.66	0.006	Significant
	26-30 Years	46.5		
	31-35 Years	38		
	36-40 Years	16.25		
	41 and above	39		
<b>Gender</b>	Male	34.66	0.067	Insignificant
	Female	43.75		
<b>Qualifications</b>	High school	38.46	0.866	Insignificant
	Diploma	41.36		
	Bachelor	40		
<b>Address</b>	Urban	40.34	0.951	Insignificant
	Rural	40		
<b>Years of Experience</b>	Less than 1 years	42.14	0.081	Insignificant
	1-5 years	46.92		
	6 >years	35		
<b>Participation in programs and training courses</b>	1-2 program	37.77	0.327	Insignificant
	3-5 program	47.85		
	5 and above	39.64		

Table 5 contains comparison among categories where the statistical study showed a difference only between age groups and for the abundance of reading books or learning and did not show any other differences in terms of sex, Qualifications or Address or number of years experience



**Chapter Five**  
**Discussion of the Results**

## ***Part I: Discussion of the Socio-Demographic***

**Characteristics of the study sample:** The total number (39) of oncology nurses: 38.5% of them ranged in age (20-25) The statistical study showed that the number of females was more than males, and this is consistent with the study of Hussein .et al . 2020, and the educational level represents , 56.4% of the diploma and they we re more knowledgeable than other levels, and this does not correspond to the study, Hussein . et.al. 2020<sup>30</sup>. Among them, their experience in the oncology unit is 6 years or more, 48.7%, and there are statistically significant differences between the groups age

## ***Part II***

Oncology nurses know the definition of chemotherapy

With regard to leakage and the signs and symptoms were unsatisfactory, when assessing knowledge about the definition of extravasation . signs, symptoms and risk factors using ten questions in general, the results showed that few participants had the correct definition of leakage, and most participants did not have the correct information related to the signs and symptoms. Symptoms specifically 'This study is inconsistent with the study of Louay Abu Shroor 2020, the oncology nurses' knowledge of the definition of chemotherapy and the signs and symptoms of extravasation was satisfactory. However, knowledge about risk factors was limited. Overall, the results showed that a high percentage of the participants had correct information regarding the area of the procedure. However, a lack of knowledge regarding the insertion site, and cannula properties has been reported. The results showed a lack of knowledge among the participants regarding all specific therapeutic practices

## ***Part III***

Nurses play an important role during the administration of chemotherapy including evaluation before and after administration and prevention and minimization of expected complications. Patient safety is the ultimate goal and part of daily nursing practice in order to have a safe environment and practice safely 'It is important that nurses have an adequate level of knowledge and practice within modern evidence-based guidelines<sup>31</sup>' The results of the study showed that the nurses did not have good knowledge management of dropout as this study is consistent with the GozzoTdO study. Santos L.A.P.d 2017<sup>31</sup>. The results of the study showed that there is a lack of knowledge among the participants regarding all nursing practices. Finally, the results showed that their information about other public actions is limited.

The results after examining the samples showed no correlation between nurses' demographic information about venous leakage of chemotherapy.

**Chapter Six**  
**Conclusions and Recommendations**

### **6.1. Conclusions:**

1- Based on the result obtained from the data analysis, the results of the study showed that the knowledge of nurses about the management of punctured venous leakage of chemotherapy is not good.

2- showed a relationship between age groups

### **6.2.Recommendation:**

1. Give nurses Training courses about chemotherapy extravasation which also includes information about extravasation in general.

2. Holding interactive meetings between health staff to discuss more about venous leakage, especially when chemotherapy is given.

3. The recommendation of the Ministry of Health to conduct training courses for nurses every certain period in order to develop the skills of the nursing staff

4. Design an educational program that can enhance nursing skills

# References

1. Drug information: Clinical Computerized Information System: vol. 113. Englewood (CO): Micromedex Inc; [date unknown] . Coyle, Griffie Czaplewski . Eliminating extravasation events: a multidisciplinary approach. Infus Nurs. 2014, Pérez ,García Fabregat A, et al. Chemotherapy Drop Management: ESMO-EONS Clinical Practice Guidelines. Ann Oncol 2012;
2. Seoul: BIT Druginfo; 2020. BIT Druginfo website [Internet] [cited 2020 Jul 10] . Hadaway . Infiltration and extravasation. Am J Nurs. 2007
3. [place unknown]: The National Extravasation Information Service; 2020. The National Extravasation Information Service website [Internet] [cited 2020 Jul 10]. Cassagnol , McBride . Management of Chemotherapy Extravasations. US Pharm, 2009: 3-11
4. [publisher unknown]; 2018. Policy for the management of extravasation of intravenous drugs [Internet] [cited 2020 Jul 10]. Ener Meglathery , Styler .Extravasation of systemic hemato-oncological therapies. Ann Oncol. 2004
5. Lacy , American Pharmaceutical Association . Drug information handbook. 8th ed. Hudson (OH): Lexi-Comp Inc; 2000. Infusion Nurses Society. Infusion nursing standards of practice. Infus Nurs. 2006
6. Barton-Burke ,Wilkes , Ingwersen ,Bean , Berg , Cancer chemotherapy: a nursing process approach. Sudbury (MA): Jones and Bartlett Publishers; 1996. Kelleher ,Chemotherapy and Biotherapy Guidelines and Recommendations for Practice. Pittsburgh Oncology Nursing Society; 2005.
7. Finley Concepts in oncology therapeutics: a self-instructional course. Bethesda (MD): American Society of Hospital Pharmacists; 1991.
8. Hadaway Extravasation: Issues and Controversies. Proceedings of the Infusion Nurses Society Annual Meeting; 1997 May; Salt Lake City, USA. Norwood (MA). 1997. Docetaxel extravasation results in significantly delayed and relapsed skin injury: A case report. Oncol Lett. 2014
9. Nursing Department, Asan Medical Center . Nursing standard for intravenous injection of Asan Medical Center. Seoul: Asan Medical Center; 2007. El-Saghir , Otrock , Mufarrij , Abou-Mourad , Salem ,Shamseddine , Abbas ,Dexrazoxane for anthracycline extravasation and GM-CSF for skin ulceration and wound healing. Lancet Oncol. 2004
10. Yarbro , Wujcik , Gobel Cancer symptom management. 4th Burlington Jones & Bartlett Learning; 2013.
11. Bragalone DL. Drug information handbook for oncology: a complete guide to combination chemotherapy regimens. 12th ed. Hudson (OH): Lexi-Comp Inc; 2014.
12. Reynolds PM, MacLaren ,Mueller , Management of extravasation injuries: a focused evaluation of noncytotoxic medications. Pharmacotherapy. 2014

13. Waltham : UpToDate Inc; 2020. Common non-antineoplastic drugs that can act as vesicants or irritants [[cited 2020 Jul 10].
14. University of Illinois College of Pharmacy . Chicago (IL): University of Illinois College of Pharmac; 2020. Drug Information Group [Internet] [cited 2020 Jul 10].
15. Patel , Extravasation of noncytotoxic drugs: a review of the literature.
16. Manchester: The Christie NHS Foundation 2014. Management of extravasation policy: [cited 2020 Jul 10]. Kreidieh, **et al.** (2016). Overview, prevention and management of chemotherapy extravasation.
17. De Wit M, Ortner , Lipp HP, Sehouli , Untch , Ruhnke , Mayer-Steinacker , Bokemeyer , Jordan , Management of cytotoxic extravasation: ASORS expert opinion for diagnosis, prevention and treatment. Onkologie. 2013
18. Perez Fidalgo , Garcia Fabregat , Cervantes , Margulies ,Vidall , Roila , ESMO Guidelines Working Group Management of chemotherapy extravasation: clinical practice guidelines. Eur J Oncol Nurs. 2012
19. Guideline for the management of extravasation of a cytotoxic agent or a monoclonal antibody used in the treatment of malignant disease: Worcester: Worcestershire Acute Hospitals 2015.
20. Sauerland , Engelking , Wickham , Corbi , Vesicant extravasation part I: mechanisms, pathogenesis, and nursing care to reduce risk.
21. Alexander, (2020). Extravasation injuries: A trivial injury often overlooked with disastrous consequences. Ughasoro, **et al.** (2016). Clinical anaemia detection in children of varied skin complexion: A community-based study in southeast, Nigeria. Amjad, Murphy, Nylander-Housholder and Ranft, (2011) A New Approach to Management of Intravenous Infiltration in Pediatric Patients: Pathophysiology, Classification, and Treatment. Journal of Infusion Nursing,
22. Ching and Milroy, (2014) Paediatric extravasation injuries: A review of 69 consecutive patients. International Journal of Surgery
- 23- Kretzschmar,Pink, Thuss- patience, et al. 2003 ( Extravasation of oxaliplatin)
- 24- Langer, Thougard, sehested, et al. 2006, ( Treatment of anthracycline extravasation in mice with dexrazoxane or without DMSO and hydrocortisone, ( cancer chemother pharmac col 57)
- 25- pharmacia & Vpjohn CO. Division of Pfizer Inc (USA) Zinecard. ( dexrazoxane for injection) US product information. Revised: Oct 2016



26- European Oncology Nursing Society. 2007 ` Extravasation Guidelines

27- Bertelli, Gozza, forno, et al . 1995. `Topical dimethylsulfoxide, for the prevention of soft tissue injury after extravasation of vesicant cytotoxic drugs: a prospective. clinical study

28 - Schulmeister, 2011 ( The MASCC Textbook of cancer supportive care and survivorship

29- SHAROUR, Loai Abu. Oncology nurses' knowledge about exploring chemotherapy related- Extravasation care: A cross-sectional study. *Clinical Epidemiology and Global Health*, 2020, 8.3: 780-784.

30- HUSSIN, Batool Kadham; RAZAQ AHMED, Wrood Abdul. Nurses knowledge about Management Extravasation Intravenous Cytotoxic Medication At Amal National Hospital in Baghdad City. *Indian Journal of Forensic Medicine & Toxicology*, 2020, 14.3.

31-Gibson ,Shipway .Aldiss .et al.**Exploring the work of nurses who administer chemotherapy to children and young people.***Eur Oncol Nurs.* 2013; 17: 59-69

# Appendix

**Appendix [A]**

***NURSE'S KNOWLEDGE CONCERNING MANAGEMENT OF  
EXTRAVASATION OF VESICANT LNTRAVENUS CHEMOTHERAPY AT  
ONCOLOGY CENTER IN BASRAH CITY HOSPITAS)***

**First Axis Demographic Information:**

**Age:**

**Sex: Male**

**Female**

**education level:** **High school**

**Diploma**

**Bachelor**

**Accommodation:** **center**

**Parties**

**Number of years of experience:** **Less than 1 year**

**1- 5 years**

**6 and above**

**Number of courses on how to give chemotherapy:**

**The second axis: signs and symptoms of venous leakage :**

**1 - It causes extravasation in**

- surrounding tissue stiffness
- rupture of surrounding tissue
- surrounding tissue damage
- All of the above

**2- Common symptoms and signs of extravasation include:**

- Pain, tingling or burning
- Pain and edema around the IV injection site
- Tissue defects or physical defects
- All of the above

**3- extravasation may occur if it is**

- Take the medicine too quickly
- The drug is very acidic
- There is a blockage in the IV line
- All of the above

**4- Patients at increased risk of extravasation**

- Patients who have large and thick veins
- Patients without vascular sclerosis

- Obesity in which access to the peripheral vein is more difficult
- Patients with blood vessels that do not move easily during venipuncture attempts

#### 5- Peripheral intravenous catheterization

- Redness, itching and edema around the injection site
- Fluid rate slows or stops
- The first physical symptoms usually appear immediately, but they may also appear after several days or weeks
- All of the above

#### 6- In the case of a central venous catheter

- Often does not cause stinging pain
- return blood
- Edema around the catheter insertion hole or in the chest
- Do not spill medication around the insertion of the catheter

#### 7- Venous shock is caused by

- Back blood
- Occurs when very hot drugs are injected
- This is due to constriction of the vessel wall, which usually occurs once the fluid is injected
- When injecting the drug at a slow pace

**8- One of the causes of extravasation**

- Low injection or cannula technique
- Medicines with a pH less than 5 or greater than 9
- Medicines that cause vein constriction or spasm
- All of the above

**9- One of the factors that lead to extravasation**

- Well trained staff
- Multiple cannulation attempts
- Improper selection of equipment (peripheral catheter, volume, or steel needle)
- Both choose 2 and 3

**10- The severity of extravasation depends on**

- On the amount of drug that entered the surrounding tissues
- patient's age
- medicine type
- All of the above

**Axis III: Management of intravenous leakage of chemotherapy:**

**11- At the first sign of extravasation, the following measures must be taken**

- Stop giving IV fluids immediately
- The intravenous tube should not be separated from the cannula

Aspirate any remaining medicine from the cannula

Both Choose 1 and 3

12- We use local heat treatments

To increase the interaction of the site and absorb the infiltration

To reduce site interaction and infiltration absorption

Helps quickly clear leaking medicinal fluids from the leak site

All of the above

13- When using local warming, the filling should be placed for a period of time

20 to 30 minutes 4 to 6 times a day

10 to 15 minutes 3 to 7 times a day

40 to 50 minutes 2 to 5 times a day

30 to 40 minutes 4 to 8 times a day

14- In the event of a first-degree extravasation

Leave the internal cannula until the doctor (the treating team) reviews it

Give an appropriate pain reliever before starting the procedure

Remove the cannula and straps

Apply non-occlusive dressings as advised by the medical team

**15- In the case of using local cooling, cold cream should be applied for a period of time**

- 20 to 25 minutes 4 to 6 times a day**
- 10 to 15 minutes 4 to 6 times a day**
- 15 to 20 minutes 5 to 8 times a day**
- 15 to 20 minutes 4 to 6 times a day**

**16- In the event of a extravasation, it must be reported**

- Hematology team**
- Oncology team**
- Head Chemotherapy Nurse**
- All of the above**

**17- In the event of extravasation, the nurse must**

- Leave the cannula in place**
- Cannula removal**
- Avoid manual pressure over overflow**
- All of the above**

**18 - Treatment methods used to manage extravasation include:**

- Site cooling**
- Immediate discontinuation of treatment**
- Site heating**



Both choose 1 and 2

19- Once the extravasation occurs, the nurse must take the following measures

Remove as much of the medicine as possible using a 10-20ml syringe

Take out the cannula and mark the affected area with a pen

Monitor the area for infection or further progression of tissue injury

All of the above

20- When a extravasation occurs in the central access device

Do not leave the central venous access device in place

Do not suction the leaked solution

Avoid putting pressure on the surrounding area

pressure on the surrounding area

## Appendix [B]

### ***NURSE'S KNOWLEDGE CONCERNING MANAGEMENT OF EXTRAVASATION OF VESICANT INTRAVENOUS CHEMOTHERAPY AT ONCOLOGY CENTER IN BASRAH CITY HOSPITALS)***

*(معارف الممرضين حول إدارة التسرب الوريدي المنقط للعلاج الكيميائي في مراكز الأورام في البصرة*

(

المحور الأول معلومات الديموغرافية :

- العمر:
- الجنس : ذكر  أنثى
- المستوى التعليمي : اعدادية  معهد  بكالوريوس
- السكن : مركز  أطراف
- عدد سنوات الخبرة : اقل من سنة  ١ - ٥ سنوات  ٦ و ما فوق
- عدد الدورات حول كيفية إعطاء العلاج الكيماوي :

المحور الثاني : علامات و اعراض التسرب الوريدي

١ - يسبب التسرب في

- تصلب الأنسجة المحيطة
- تمزق الأنسجة المحيطة
- تلف الأنسجة المحيطة
- كل ما سبق

٢- تشمل الأعراض و العلامات الشائعة للتسرب هي

- الألم و الشعور بالوخز أو الحرق
- الألم و وذمة حول موقع الحقن في الوريد IV
- حدوث خلل في الأنسجة أو عيوب جسدية
- كل ما سبق

٣- قد يحدث التسرب اذا كان

- تناول الدواء سريعا جدا

الدواء شديد الحمضية

هناك انسداد في الخط الوريدي IV

كل ما سبق

٤- المرضى المعرضين أكثر للإصابة بالتسرب

المرضى الذين لديهم أوردة كبيرة و سميكة

المرضى الذين لا يعانون من تصلب الأوعية السميكة

السمنة التي يكون فيها الوصول إلى الوريد المحيطي أكثر صعوبة

مرضى الأوعية الدموية التي لا تتحرك بسهولة أثناء محاولات بزل الوريدية

٥- تسبب القسطرة الوريدية المحيطية

احمرار و حكة و وذمة حول مكان الحقن

يتباطأ معدل السوائل أو يتوقف

عادة ما تظهر الأعراض الجسدية الأولية على الفور و لكنها قد تظهر أيضا بعد عدة ايام

كل ما سبق

٦- في حالة القسطرة الوريدية المركزية

غالبا لا تسبب ألما لاذعا

رجوع الدم

وذمة حول فتحة إدخال القسطرة أو في الصدر

لا تسرب الدواء حول إدخال القسطرة

٧- تحدث الصدمة الوريدية بسبب

عودة الدم إلى الوراء

يحدث عند حقن أدوية شديدة الحرارة

بسبب تقلص جدار الوعاء الدموي و يحدث عادة بمجرد بدء حقن السوائل

عند حقن الدواء بوتيرة بطيئة

٨- من أسباب حدوث التسرب

تقنية الحقن أو القنية الضعيفة

الأدوية ذات الالاس الهيدروجيني أقل من ٥ أو أكبر من ٩

الأدوية التي تسبب انقباض أو تشنج الوريد

كل ما سبق

٩ - من العوامل التي تؤدي إلى حدوث التسرب

موظفين مدربين جيدا

محاولات متعددة في إدخال القنية

الاختيار غير المناسب للمعدات ( القسطرة المحيطية أو الحجم أو الإبرة الفولاذية)

كل من اختيار ٢ و ٣

١٠- تعتمد شدة التسرب على

على كمية الدواء التي دخلت الأنسجة المحيطة

عمر المريض

نوع الدواء

كل ما سبق

المحور الثالث : إدارة التسرب الوريدي للعلاج الكيماوي

١١ - في أول علامة على التسرب يجب اتخاذ الإجراءات التالية

التوقف عن إعطاء السوائل الوريدية على الفور

لا يجب فصل الأنبوب الوريدي عن القنية

نضح اي دواء متبقي من القنية

كل من اختيار ١ و ٣

١٢ - نستخدم المعالجات الحرارية المحلية

لزيادة تفاعل الموقع و امتصاص الارتشاح

لتقليل تفاعل الموقع و امتصاص الارتشاح

يساعد على تنقية السوائل الطبية المتسربة بسرعة من موقع التسرب

كل ما سبق

١٣ - عند استخدام الاحترار المحلي يجب وضع الحشوة لمدة

من ٢٠ إلى ٣٠ دقيقة من أربع إلى ٦ مرات في اليوم

من ١٠ إلى ١٥ دقيقة من ثلاث إلى ٧ مرات في اليوم

من ٤٠ إلى ٥٠ دقيقة من ٢ إلى ٥ مرات في اليوم

من ٣٠ إلى ٤٠ دقيقة من ٤ إلى ٨ مرات في اليوم

١٤ - في حالة حدوث تسرب من الدرجة الأولى يجب

ترك القنية الداخلية حتى يراجعها الطبيب (الفريق المعالج)

إعطاء مسكن مناسب للألم قبل بدء الإجراء

قم بإزالة الكانيولا و الأشرطة

ضع ضمادات غير انسداد كما نصح الفريق الطبي

١٥ - في حال استخدام التبريد المحلي يجب وضع دهنا باردا لمدة

- من ٢٠ إلى ٢٥ دقيقة من ٤ إلى ٦ مرات يوميا
- من ١٠ إلى ١٥ دقيقة من ٤ إلى ٦ مرات يوميا
- من ١٥ إلى ٢٠ دقيقة من ٥ إلى ٨ مرات يوميا
- من ١٥ إلى ٢٠ دقيقة من ٤ إلى ٦ مرات يوميا

١٦- في حال حدوث التسرب يجب إبلاغ

- فريق أمراض الدم
- فريق الأورام
- ممرضة العلاج الكيميائي الرئيسية
- كل ما سبق

١٧- في حالة حدوث التسرب يجب على الممرض

- ترك الإبرة في مكانها
- إزالة القنية
- تجنب الضغط اليدوي على الفانض
- كل ما سبق

١٨- تشمل طرق العلاج المستخدمة لإدارة التسرب هي

- تبريد الموقع
- التوقف الفوري عن العلاج
- تسخين الموقع
- كل من اختيار ١ و ٢

١٩- بمجرد حدوث التسرب يجب على الممرض اتخاذ الإجراءات التالية

قم بإزالة أكبر قدر ممكن من الدواء باستخدام حقنة ١٠ مل

اخرج القنية و وضع علامة على المنطقة المصابة بقلم

راقب المنطقة بحثا عن العدوى أو المزيد من تقدم إصابة الأنسجة

كل ما سبق

٢٠ - عند حدوث تسرب في جهاز الوصول المركزي

عدم ترك جهاز الوصول الوريدي المركزي في مكانه

لا تشفط المحلول المسرب

تجنب الضغط على المنطقة المحيطة

الضغط على المنطقة المحيطة

## Appendix [C]

### الملخص :

يحدث التسرب عندما تتسرب الأدوية الوريدية ، التي يمكن أن تدمر الأنسجة ، من الأوردة إلى الجلد والعضلات المحيطة. الدرجة الأولى هي أقل أشكال التسرب شدة ، وإذا تلقى الشخص العلاج في هذه المرحلة ، فإن خطر تلف الأنسجة الدائم يكون ضئيلاً. الدرجة الرابعة هي الأكثر خطورة ، ويمكن أن يفقد الشخص وظيفة الطرف أو الجزء المصاب من الطرف نفسه إذا انتشر الدواء

### الأهداف:

تقييم معرفة الممرضات حول إدارة التسرب الوريدية للعلاج الكيميائي.

التعرف على العلاقة بين المعرفة الممرضات والبيانات الديموغرافية المحددة

### المنهجية:

كانت الدراسة وصفي. كانت العينة في هذه الدراسة مصنوعة من 29 مشاركا ووافقوا على المشاركة في الدراسة. تم استخدام عملية جمع البيانات لجمع البيانات. تم جمع البيانات من 8 ديسمبر 2021 إلى 3 أبريل 2022 و ذلك من خلال استبيان مكون من ثلاثة أقسام.

### الاستنتاجات:

بناءً على النتيجة التي تم الحصول عليها من تحليل البيانات ، أظهرت نتائج الدراسة أن معرفة الممرضات حول إدارة التسرب الوريدي المثقوب للعلاج الكيميائي ليست جيدة. وأظهرت فقط علاقة بين الفئات العمرية

### التوصية:

1. إعطاء الممرضات دورات تدريبية حول التسرب الكيميائي .
2. عقد اجتماعات تفاعلية بين العاملين الصحيين لمناقشة المزيد عن التسرب الوريدي .
3. توصية وزارة الصحة بإجراء دورات تدريبية للممرضات كل فترة معينة .
4. تصميم برنامج تعليمي من شأنه تعزيز مهارات التمريض.





**University of Basra**  
**College of Nursing**

المعرفة الممرضين حول إدارة مركز التسرب الوريدي المنقط للعلاج  
الكيميائي في مراكز الاورام في مستشفيات مدينة البصرة

مشروع بحثي قدم إلى مجلس كلية التمريض في جامعة البصرة قدمها

زهراء عبد الزهر حسن

زنب عبد الهادر حسن

بإشراف

د. عادل علي حسين

٢٠٢١ - ٢٠٢٢