

**NURSES' KNOWLEDGE ABOUT GIVING CHEMOTHERAPY
TO CANCER PATIENTS IN AL-DIWANIYAH TEACHING
HOSPITAL**

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NURSES' KNOWLEDGE ABOUT GIVING CHEMOTHERAPY TO CANCER PATIENTS IN AL-DIWANIYAH TEACHING HOSPITAL

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The Degree of Master of Science in Nursing

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ACCEPTANCE AND APPROVAL

ALİ AL-FATLAWİ, the graduate student of The Institute of Health Sciences with the student number of 208205236, has successfully presented her thesis entitled “Nurses' knowledge about giving chemotherapy to cancer patients in Al-Diwaniyah Teaching Hospital.” before the jury whose signatures are below, after fulfilling all of the requirements determined by the relevant regulations for the degree of Master of Science in Nursing .

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ETHICS STATEMENT

The thesis entitled “Nurses' Knowledge About Giving Chemotherapy to Cancer Patients in Al-Diwaniyah Teaching Hospital.” which was prepared and presented as a thesis, was written by myself and in accordance with the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to my supervisor and to me. The research pertaining to the thesis was conducted by myself and therefore, all of the used sentences and interpretations within the work belongs to me.

I declare the aforementioned issues to be correct.

29 July 2022

Ali AL-FATLAWI

ABSTRACT

NURSES' KNOWLEDGE ABOUT GIVING CHEMOTHERAPY TO CANCER PATIENTS IN AL-DIWANIYAH TEACHING HOSPITAL

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Master of Science in Nursing

Advisor: Dr. Öğr.Üyesi Yaşar KEMAL YAZGAN

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The nurse has played a significant part in the care of cancer patients and survivors throughout the course of human history. In addition to physical exams and treatment of the patient's symptoms, these treatments often included counseling and education on the disease's symptoms. Oncology nurses are responsible for giving chemotherapy to cancer patients. The study's goal is to evaluate the knowledge of oncology nurses in Al-Diwaniyah city on safe chemotherapy administration. Descriptive research was carried out from February 15th to May 15th of 2022. An outlandish case study (appropriate example). The sample was chosen by the use of sampling. One hundred and ten oncology nurses from Al-Diwaniyah city are included in the study. A questionnaire was devised for the study's purposes. In this study, participants self-administered the survey instruments. The data was gathered between the dates of February 15th, 2022, and March 1st, 2022 for this study. The SPSS program version was used to examine the data. The results showed that 49% of the participants were between the ages of 24 and 29; 56.9% were men; 65.1% had earned a nursing diploma; 37.6% had 1 to 6 years of experience; and 50.5% had no training sessions. According to the findings of the study, nurses' knowledge of safe chemotherapy delivery and general information on chemotherapy drugs was lacking. Nurses working in oncology centers should be subject to special safety and administration regulations when administering chemotherapy.

July 2022, 102 pages

Keywords: Knowledge, chemotherapy drug, safe chemotherapy administration, oncology.

ÖZET

AL-DİWANİYAH EĞİTİM HASTANESİNDE KANSER HASTALARINA KEMOTERAPİ VERİLMESİ KONUSUNDA HEMŞİRELERİN BİLGİSİ

Ali AL-FATLAWİ

Hemşirelik, Yüksek Lisans

Tez Danışmanı: Dr.Öğr.Üyesi Yaşar KEMAL YAZGAN
Temmuz 2022

Tarih boyunca hemşire, kanser hastalarının ve hayatta kalanların tedavisinde önemli bir rol oynamıştır. Bu hizmetler hastayı muayene etme, hastalığın semptomlarını tedavi etme, destekleyici bakım verme ve hastaya hastalığın semptomlarını öğretmeyi içeriyordu. Onkoloji birimlerinde hemşirelik sorumlulukları, hastalara kemoterapi verilmesini içerir. Çalışmanın amacı: Al-Diwaniyah şehrinde onkoloji merkezinde hemşirelerin güvenli kemoterapi uygulamasına ilişkin bilgilerini değerlendirmek.15 Şubat 2022 ile 15 Mayıs 2022 arasındaki dönemden betimsel bir çalışma yapılmıştır. Olasılık dışı bir örnek (uygun örnek). örneklem seçimi için örneklem kullanılmıştır. Çalışma, Al-Diwaniyah şehrinde onkoloji merkezinde çalışan (110) hemşireyi içermektedir. Araştırmanın amacına yönelik olarak yapılandırılmış bir anket tasarlanmıştır. Veriler, kendi kendine uygulama tekniği kullanılarak toplanmıştır. Veri toplama süreci 15 Şubat 2022 – 1 Mart 2022 tarihleri arasında toplanmıştır. Veriler uygulama SPSS program versiyonu üzerinden analiz edilmiştir. Sonuçlar, örneklemin en fazla 24-29 yaş grubu (%49), (%56.9) erkek, (%65.1) hemşirelik mezunu, (%37.6) (1-6) yaş grubu arasında olduğunu göstermiştir. Yılların tecrübesi ve (%50,5) Eğitim Seansı yapılmadı.Araştırmada hemşirelerin güvenli kemoterapi\uygulama bilgilerinin zayıf olduğu, kemoterapi\kemoterapi ilaçları ile ilgili genel bilgilerinin de yetersiz olduğu sonucuna varılmıştır. Onkoloji merkezinde çalışan hemşireler için kemoterapi güvenlik uygulama gereksinimleri uygulanmalıdır.

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Anahtar Kelimeler: Bilgi, Kemoterapi ilacı, Güvenli kemoterapi Uygulaması, onkoloji.

PREFACE AND ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

BSA	Body Surface Area
BSC	Biologic Safety Cabinet
C.C	Contingency Coefficients
C.S	Comparison Significant
CA	Cancer
CSF	Colony-Stimulating Factor
EPO	Erythropoietin
G/Dl	gram/deciliter
GM	Granulocyte-Macrophage
GMS	Grand Mean Of Score
HS	Highly Significant
I/M	Intra Muscular
I V	Intravenous
Kg	Kilograms
MCQ	Multiple Chose Questionnaire
Mg	Milligrams
P.	Probability Value
R. S	Relative Sufficiency
RBC	Red Blood Cell
RNA	Ribonucleic acid
SD	Stander Dvation
Sdev	Socio-Demographic Characteristic Variable
SQ	Subcutaneously
WBC	White blood cells
WHO	World Health Organization
WNH	The World National Statistical
α	Alpha Cronbach

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1. INTRODUCTION

Cancer has ranked first among the leading causes of mortality globally, accounting for around 8.2 million deaths in 2015, The most of these events took place in middle- and lower regions. Therefore, it is predicted that the global incidence of cancer would The number of cases has risen from 14.2 million in 2010 to 21.6 million in 2020. (WHO 2017)

It is anticipated that the worldwide cancer burden would increase by 47 percent between 2020 and 2040, By 2040, there would be 28.4 million instances.. (Sung *et al* 2021)

Chemotherapy is one of the most often-used cancer treatment strategies ,The majority of cancer patients get IV chemotherapy, while there is a trend toward using oral chemotherapy more frequently. (Foulon V2011).

Depending on the kind and stage of cancer, numerous treatment techniques such as chemotherapy, surgery, and radiation may be used following the confirmation of the diagnosis. (Wu,H.S., Davis, J. E., and Chen, L.2019)

The illness process and the intricacy of the treatment plan make managing oncologic patients a difficult task for nurses to do. It can be a difficult procedure to administer chemotherapy because of the thin safety margins associated with the cytotoxic drugs that are utilized in the treatment regimen. (Sharour 2019).

Nonetheless, most doctors prefer intravenous chemotherapy treatments because they can be confident that the correct quantity of pharmaceuticals will be administered. (Aisner J. 2007).

Chemotherapy may be used to help throughout the treatment of metastatic cancer or the prevention of cancer from spreading, depending on the kind of cancer being treated. Chemotherapy is a method of cell destruction. It is most effective against cells that are

rapidly developing. Chemotherapy is targeted specifically at cancer cells since they proliferate at a greater rate than normal cells. As soon as chemotherapy medications are absorbed into the bloodstream, the blood transports the chemicals to cancer cells located all over the body. (UPMC 2012).

Among the several therapeutic options, chemotherapy administration is the most fundamental and widely used. Every day, more than one million chemotherapy infusions were administered around the world. (Coyle *et al.* 2015) While patients undergoing chemotherapy treatment may be exposed to infectious complications, studies have found that approximately 60% of deaths in patients with solid organ tumors are caused by infections. Although no data are available on the mortality due to infection in patients with solid organ tumors, it is estimated that approximately 50% of these patients have an infection during the course of their treatment. . (Rebecca *et al.* 2017)

To treat cancer, chemotherapy medications have been produced, which have been referred to under several titles, including anti-cancer drugs, antineoplastic drugs, and cytotoxic pharmaceuticals. These medications include a variety of complex chemical components that interfere with the division of cancer cells, therefore killing them off. (Mohsen *et al.* 2013)

Chemistry can be thought of as a type of cancer treatment in which chemicals are employed to kill cancer cells. Chemotherapy is another term for this treatment. As the name implies, systemic therapy is used to treat cancer since the medication is absorbed by the bloodstream and travels throughout the body, killing cancer cells wherever they have established themselves. These treatments may, on rare circumstances, be intended to have a local effect; nevertheless, in the great majority of cases, the goal is to destroy cancer cells from any location in the body where they may be detected. It is thought that they function by delaying the growth of cancer cells, eventually leading them to be killed once they have reached them. The negative effects of cancer chemotherapy are depending on the type of medicine used, the dosage administered, the frequency with

which it is administered, and the length of time the patient is exposed to it. (Choenyi *et al.* 2016)

As a result, chemotherapy is a successful treatment for cancer patients. It can be used to cure cancer, prolong the patient's life, or provide palliative care, depending on the stage of the tumor's progression and the kind of cancer being treated. The cell cycle kinetics, biochemical and pharmacological variables of cancer cells must be taken into consideration while designing chemotherapy in order to diminish the signal transmission function of cancer cells. (Kerr *et al.* 2016)

Even if it has a substantial effect on chemotherapy treatment, it can induce a variety of side effects that can have an impact on the care plan, the prognosis, and the patient's reaction to the treatment, such as leakage caused by chemotherapy.. (Robinson *et al.* 2018)

Extravasation is defined as one of the negative effects linked with cytotoxic drugs, such as chemotherapy, and is considered to be one of the most dangerous. When a cytotoxic medicine is accidentally leaked into the subcutaneous tissue or the perivascular space, this is referred to as "accidental harm to subcutaneous tissue or perivascular space." (Somayaji *et al.* 2018).

There are a variety of indications and symptoms linked with chemotherapy extravasation, including redness, swelling, soreness, necrosis, burning sensation, and discomfort, among others. Extravasation may also be predicted by the presence of resistance to drug infusion, a slow infusion rate, and a reduction in blood return. (Agbessi *et al.* 2015)

Oncology nurses' continued education and training is the foundation of safe chemotherapy delivery, and it emphasizes the necessity of being proactive rather than reactive when it comes to side effects such as extravasation. (Le, A., and Patel, S. 2014).

The nurse who works in the oncology unit should be well-versed in high-quality nursing procedures, as well as having appropriate expertise in dealing with patients suffering from cancer. Moreover, these practices must be autonomous and collaborative in nature when working with physicians and other health-care professionals in order to provide better care for patients and to prevent cancer by early detection and diagnosis of the disease, as well as to work on cancer treatment with health follow-up in addition to palliative care.. (Cancer Care Ontario 2015)

Nurses caring for chemotherapy patients need particular knowledge in order to ensure the safety of each patient's life as well as their own safety while doing their responsibilities. As a result, even the smallest act of carelessness or error during chemotherapy treatment might have serious effects for patients. (Bertrand *et al.*2012)

Throughout history, the nurse has played an important role in the treatment of cancer patients and survivors. These services included examining the patient, treating the disease's symptoms, giving supportive care, and teaching the patient about the disease's symptoms. Nursing responsibilities in oncology units include administering chemotherapy to patients, ensuring that the medication is handled safely, calculating doses based on the surface area of the patient's body, inserting and infusing intravenous chemotherapy, and continuously monitoring the patient's condition as well as performing follow-up laboratory tests on a regular basis.. (Quinn *et al.* 2008)

On the other hand, the nurse's primary responsibility is to maintain the patient's life and keep him safe from complications that may arise as a result of chemotherapy administration, as well as to keep him safe from infection. This may be accomplished by effective execution of duties. For example, using sterile techniques, hand washing, and wearing personal protective equipment while performing invasive procedures such as peripheral or central venous cannula insertion and chemotherapy infusion will help to reduce the number of pathogens that cause infections while also keeping the patient's life as safe as possible.. (Faris *et al.*2016)

1.1. Importance

The purpose of chemotherapy is to either directly inhibit tumor cell growth and proliferation by rendering them unable to replicate themselves, or to artificially initiate the normal process of cell death known as "apoptosis," which is a form of cell death. Apoptosis is a process that occurs in normal organs that regulates the number of cells in our body at any one moment and alerts the body when new cells are required. In certain cases, cancer cells are resistant to apoptosis, or they proliferate at a rate greater than the number of cells dying, resulting in tumor development. (ABTA 2016).

The need for chemotherapy treatment is increasing, and chemotherapy regimens are getting increasingly sophisticated. Nurses are primarily responsible for ensuring that patients get chemotherapy safely and for providing the necessary assistance to enable patients to deal with their treatments on both a physical and psychological level. It is necessary for nurses to be confident in their knowledge, competence, and technical abilities in order to operate well in regard to this component of health-care delivery. Confidence grows as a result of clinical experience and educational opportunities. Even though oncology nurses appear to be embracing their roles in Europe, little research has been done to understand their perspectives on the chemotherapy delivery procedure, as well as their attitudes and sentiments toward the process. Aside from that, there is little information available regarding the educational requirements, needs, and competency of practitioners working in this field. (Summerhayes ,2003)

Nurses who care for chemotherapy patients require particular expertise in order to ensure the safety of both the patients' lives and their own safety while on the job. Many nurses have been sacked from their positions as a result of prescription mistakes. In the treatment of cancer, chemotherapy is one of the most widely recommended treatments. (Papa, D. Kampitsi ,2010)

Nursing is primarily responsible for chemotherapy administration, which is a delicate area of oncology nursing in which even a small amount of carelessness or error may

have serious effects for patients, staff, and the surrounding environment. (Considine, 2008)

The traditional focus of nursing education, both at the undergraduate and graduate levels, has been on cancer nursing care; as a result, younger nurses and advanced practitioners are frequently underprepared to care for cancer patients throughout the healthcare continuum. (Simmers 2014)

In the transmission of information to cancer survivors, which are defined as persons who are living with a cancer diagnosis, including those who have recovered from the disease (World Cancer Research Fund/American Institute for Cancer Research, 2007), oncology nurses play a critical role. Oncology nurses on a regular basis see breast cancer survivors from the time of diagnosis until the completion of treatment, and they have more time to devote to them than oncologists do. As a result, they have several possibilities to give information and advise, as well as to address issues that may emerge over the course of the treatment process. (Puhringer 2015)

As important members of the cancer care team, advanced practice nurses (APNs) in oncology have demonstrated positive patient outcomes in the areas of symptom management, functional status, and psychosocial adjustment. As a result, how well oncology APNs practice advanced care planning in a timely manner can have a significant impact on the When faced with the terrible road from cancer diagnosis to death, individuals and their families often struggle with their psychological experiences. The knowledge, attitudes, and practice practices of oncology advanced practice nurses in the area of advanced care planning are not known at this point in time. (Cunningham, 2004)

This is because cancer nursing not only focuses on the scientific and physiological components of cancer therapy, and also it focuses on the emotional aspects of cancer

care, nurses play a key role in the treatment of cancer patient's experiences. A thorough understanding of the patient is required in order to provide effective care. As issues relating to the patient as well as organizational aspects influence cancer treatment, nurses may encounter a variety of communication difficulties, which may result in patients being denied the opportunity to express their concerns to them. To put it another way the impact of the roles performed The role played as reported by patients and healthcare providers in affecting communication processes are both important issues to take into account. Additionally, nurses' It is explored how to improve communication skills and education programs to strengthen the nurse-patient connection.. Other factors listed include the insufficient skills in providing psychosocial components of patient care for those who are experiencing tough emotional situations patients who are seeking information and have taken an active role in their own care, and the fact that patients may not want to talk about their disease and treatment. (Tay 2011)

According to the findings of the study, 44 percent of medication mistakes in chemotherapy are prevalent. Incidence associated with a lack of particular understanding in the preparation and administration of chemotherapy. This lack of expertise and information on the part of the personnel results in deadly incidents such as overdosing of chemotherapy, inaccurate dose calculations, and inappropriate method of administration, all of which can end in the death of the patient. (Ulas *et al.* 2015).

Among those who die in the Eastern Mediterranean region, cancer is the fourth leading cause of death, and it is the second largest cause of death in Iraq., with the frequency of the disease rising quickly. Population aging, improved diagnosis and registration, and most significantly, increasing exposure to risk factors are all variables that have contributed to the reported increase in mortality rates. Cigarette smoking is the most significant of these risk factors. Other risk factors include an unhealthy diet, a lack of physical exercise, other behavioral changes in one's lifestyle, pollution, and increased exposure to carcinogens from industrial and agricultural sources, among others. Colorectal cancer is the tenth leading cause of death in Iraq, accounting for (5.3 percent)

of all fatalities. In 2013, the mortality rate for all cancer deaths in Iraq was (8341), with around (4301) male deaths and (4040) female deaths. (MOH 2013).

1.2. Aims of research

1. To assess the general knowledge of chemotherapeutic medications held by nursing staff members..
2. To determine the association between the nurses' demographic data and their nursing knowledge and skills..
3. To investigate the relationship between certain variables such as age, gender, educational attainment, years of experience, and participation in a training course and the knowledge of oncology nurses.

Exploratory Study of the Problem

Nurses' understanding of chemotherapy administration to cancer patients at Al-Diwaniyah Teaching Hospital

Key words: Nurse, knowledge, chemotherapy, cancer

1.3. Definition of terms

1- Nurse

A- Theoretical Definition:

An person who is responsible for the care of patients, who works independently or under the supervision of a specialist, and who has been trained to promote and maintain health. (Skal, B. M., and Ahmed, S. A 2021)

B- Operational Definition:

The care of patients is the responsibility of an individual who works independently or under the supervision of a specialist and who has been trained in the promotion and maintenance of good health..

2- Knowledge:

A- Theoretical Definition:

A piece of knowledge is information, cognition, or aptitude that has been gained by personal experience or formal education. Simply said, knowledge refers to the information that we have available to us at any given time. It relates to our present degree of awareness on a certain topic. As Samuel Johnson, the compiler of the first complete English dictionary, put it: "Knowledge may be separated into two categories: either we directly know a topic or we know where to get knowledge about it." (Verma 2014).

B- Operational Definition:

Insight. That is what provides you with the option to see what is now available to you. It has something to do with our present focus on a certain issue.

3- Chemotherapy

A- Theoretical Definition:

Drugs are the most commonly recommended treatment for cancer, which involves complex treatment regimens requiring the use of cutting-edge technology.. (Papa *et al.*2010).

B- Operational Definition:

A medical treatment for cancer sickness, chemotherapy is defined as a medication that seeks to eliminate cancer cells while also preventing them from multiplying and dividing.

4- Cancer

A- Theoretical Definition :

An aberrant cell development disorder that has the ability to infiltrate or expand to other sections of the body is classified as a category of disorders.(WHO 2018)

B- Operational Definition:

An aberrant multiplication of cells that tends to multiply in an unregulated manner and, in certain situations, becomes malignant

2. REVIEW OF LITERATURES

2.1. Historical background of chemotherapy

First utilized as a chemical weapon during World War I, chemotherapy is now considered to be the first medicine used for cancer treatment. (Hassan *et al.* 2015)

For infectious illness treatment in the early 1900s, Paul Ehrlich of Germany pioneered using chemotherapeutic agents. The word "chemotherapy" was coined by Ehrlich.

Chemotherapy, according to him, is the application of chemical agents to the treatment of disease. In addition, he was the first to document the usefulness of animal models in screening substances that may be useful in fighting infectious illnesses a feat that had significant significance for the development of arsenical cancer drugs. A key area of study for Ehrlich was the primordial alkylating chemicals in nature. (Devita, and Chu, 2008).

White blood cell levels in soldiers exposed to nitrogen mustard gas decreased dramatically in 1939, during World War 2. This example concerned the rapid damage of developing white blood cells, and doctors began to assume that cancer cells would be affected in the same way. In the 1940s, many patients with advanced lymphoid malignancies (cancers of specific white blood cells) were treated chemotherapy is administered intravenously rather than orally, which was proven to be irritative at that time. As a result, scientists began searching for other compounds with similar properties against cancer cells. (Qasim 2015)

As a result, surgery and radiation therapy influenced cancer treatment into the 1960s, when it became clear that cure rates after increasingly radical local treatments had plateaued at about (33 percent) resulted in the presence of previously unappreciated (micro metastases), and new data showed that chemotherapy was required to cure patients with a variety of advanced cancer cells. Adjuvant chemotherapy medications

were born as a result of the latter finding, which allowed drugs to be used treatment of (micro-metastases) in breast cancer patients in combination with surgery and/or radiation. (Issam 2016)

Since that time, scientists have discovered that the key advancements in anti-cancer medication combinations are much better, therefore combinational chemotherapy has been successful in curing a considerable number of lymphomas. More recently, medicines have been more tailored to be more successful and generate fewer negative effects. Additionally, over the years, the importance of medications that decrease or regulate side effects has grown. (Kumar *et al.*2012)

Only malignancies that were tiny enough and close enough to the body to be removed completely during surgery may be cured. In order to inhibit the growth of tumors that were not surgically excised, radiation treatment was utilized after the operation to treat the tumors. Small tumors from growths that had progressed beyond the reach of the surgeon and radiotherapist were finally eradicated with chemotherapy medications. Adjuvant therapy refers to the use of chemotherapy medications after surgery to eliminate any leftover cancer cells.

The efficacy of adjuvant therapy was initially demonstrated in the treatment of breast cancer. Afterwards, it was utilized in the treatment of tumors such as colon, testicular and prostate cancer. (Bang *et al.*2010)

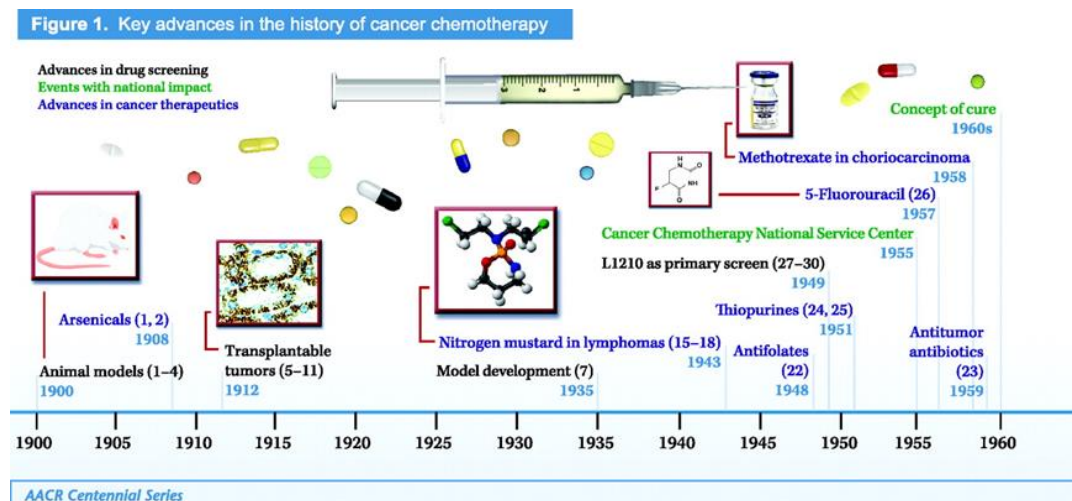


Figure 2.1 History of Chemotherapy (Devita, and Chu, 2008)

2.2. The Purposes of Chemotherapy

2.2.1. Cure

If the cancer can be cured using chemotherapy medications, it signifies that the cancer cells have been eradicated for good and will not reappear. The word "cure" is not used by doctors except in the context of a potential or intended outcome. There are times when treating cancer with the intention of curing it can be beneficial. Even though a cure may be the ultimate goal, it is not always possible. In addition, it can take a long time to determine whether a patient's cancer has been cured. (Brighton, and Wood, 2005)

2.2.2. Control

Aside from shrinking cancerous tumors and halting the disease's growth, proliferation, and spread, chemotherapy can also be used to control the cancer cells' aberrant behavior. This has the potential to improve a person's health and perhaps their life expectancy. As with hypertension and diabetes, cancer is often not entirely cured but is managed as a long-term condition. If the cancer appears to have disappeared for a period, it is expected to reappear at some point. (Wilkes, and Barton 2018).

2.2.3. Precautionary measures

At an advanced stage of the disease, chemotherapy can be utilized to make the sufferer feel better. In order to enhance the well-being of a patient, palliative therapy or palliation might be administered. (Hassan *et al* 2013)

2.2.4. Adjuvant chemotherapy

Even if a tumour has been surgically removed, some cancer cells may remain undetected. Chemotherapy as an adjuvant treatment is used to eliminate cancer cells that are not visible on the surface. An adjuvant procedure can also follow radiation to eliminate cancer, such as adjuvant hormone therapy for prostate cancer after radiation therapy. (Yeo *et al* 2004).

2.2.5. Neoadjuvant chemotherapy

Prior to the main cancer treatment, chemotherapy medications may be used (surgery or radiation). Chemotherapy can help decrease a huge tumor prior to surgery, making the operation easier. Radiation treatment is simplified when the tumor has shrunk in size.

It is possible that neoadjuvant chemotherapy will also kill cancer cells that are hidden from view on x-rays and scans. (Yeo *et al* 2004).

2.3. Chemotherapy mechanism of action

Because chemotherapy can target cancer cells at different stages in the process of creating new cancer cells, it is necessary to understand the normal life cycle in order to better understand how chemotherapy works. (Turkcan *et al.* 2012)

Compared to normal cells, cancer cells are better targets for chemotherapy because they produce new cells more quickly. (ACS 2018)

Cells in the human body can only be divided and multiplied a limited number of times. When the body needs to heal harm, it divides its cells. Two identical new cells were formed as a result of cell division. Because of this, there are now two cells in the same place where there was just one before. This is then divided into four equal halves, then eight, and so on. (Carter *et al.*2017)

The cells of cancer keep on dividing until they form a tumor. A tumor is a clump of cells that grows into a lump. Cell division was halted by a drug that damaged a component of the cell's control center. Cell division is disrupted by the medication's effect on chemical processes. A other form of chemotherapy can cause cells to split. In the process of copying all of the cell's genes, other medications can harm the cells.

Treatment with chemotherapy medications has a lower risk of causing harm to cells that are dormant, like the majority of healthy ones. Doctors have recently tried a cocktail of various chemotherapy drugs. Drugs that harm cells at various stages of cell division will be included in this category. As a result, there is a greater likelihood of destroying further cancer cells. (Carter *et al.* .2017)

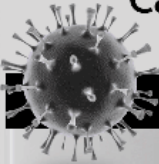
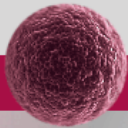
Cancer Cell & Normal Cell Characteristics	
Cancer Cell	Normal Cell
 Shape: Irregular Nucleus: Larger, darker Growth: Out of control Maturation: Immature - Doesn't mature Communication: Doesn't communicate Visibility: Invisible to immune cells Blood Supply: Tumor angiogenesis Oxygen: Doesn't like or require oxygen Glucose: Loves, craves glucose Energy Efficiency: Very low (5%) Amount of ATP: 2 units of ATP Cell Environment: Acidic Nutrient Preference: Glucose	 Shape: Regular Nucleus: Proportionate size Growth: In control, systematic Death: Mortal (Apoptosis) Maturation: Mature (Cell differentiation) Communication: Communicates Visibility: Visible to immune cells, with ID Blood Supply: Angiogenesis during repair Oxygen: Requires oxygen Glucose: Requires some glucose Energy Efficiency: Very high (95%) Amount of ATP: 36 units of ATP Cell Environment: Alkaline Nutrient Preference: Fat, Ketone, Glucose

Figure 2.2 The Different Between Normal and Cancer Division (National Cancer Institute, 2007)

2.4. Classification of chemotherapy drugs

Chemical structure, resemblance to other substances, derivation, and biochemical mechanism all play a role in classifying chemotherapy medications. Using the notion that cancer cells have different metabolic processes from healthy cells as a basis for treatment. As a result of mitotic inhibition and the induction of apoptosis, conventional chemotherapeutic drugs are used to treat cancer (cell death). Designer medications like monoclonal antibodies, cytokines, gene therapy vectors, anti-sense, and peptide compounds were only recently produced. No treatment affects the cancer-causing mutations at their root. (CC 2017)

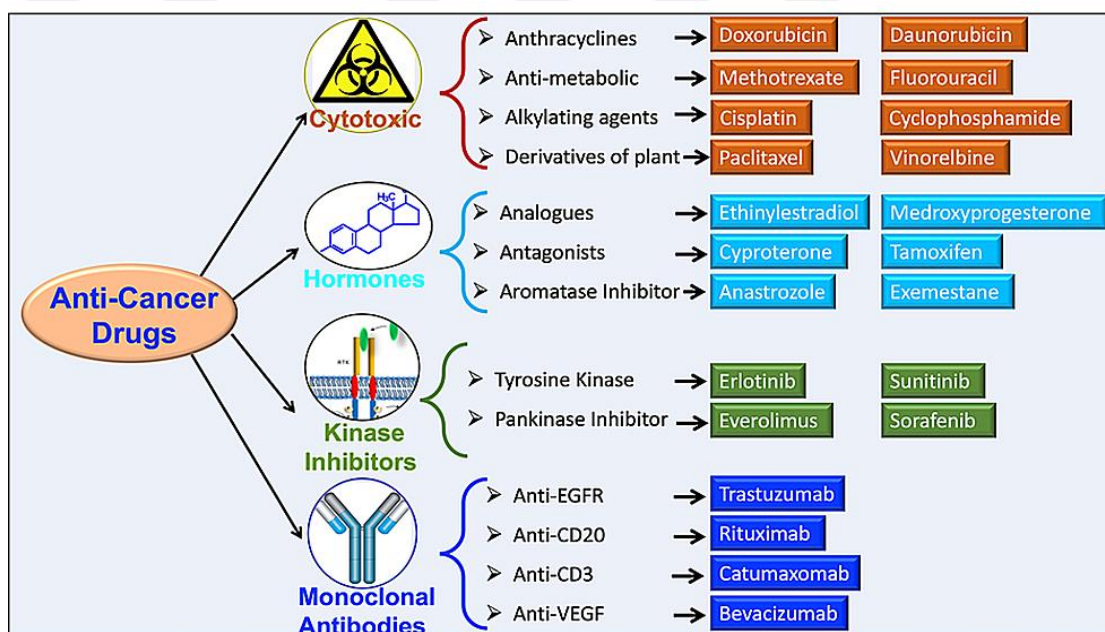


Figure 2.3 Type of Chemotherapy Agents (Care & Muriel, 2016)

2.4.1. Alkylating agents

One of the first kinds of Chemotherapy used to treat cancer was alkylating drugs. It's easier for cancer cells to be damaged by (DNA) damage. They work by interacting with proteins that join together to make DNA molecules, adding an alky one group to the proteins that bond together to form the highly fragile double helix shape. Proteins can't

connect up, which could lead to the destruction of (DNA) strands and cancer cell distraction. In essence, this is a genetic mutation that prevents cancer from proliferating. (CC. 2017).

- Nitrogen Mustards: like (Mechlorethamine) Chlorambucil, Cytosine, Ifosfamide, and Melphalan.

- Nitrosoureas: which include Streptozocin, and Lomustine.

- Alkyl Sulfonates: Busulfan. • Triazines: Dacarbazine, and Temozolomide.

- Ethylenimines: Thiotepa and Altretamine

- The platinum medication. Carboplatin and Oxaloplatin for the purpose of killing cancer cells in a fashion that is comparable to that of (alkylating agents). Leukemia is less likely to be caused by these medications than by alkylating agents (Low, *et al.*2009)

2.4.2. Anti-metabolites

A class of drugs that prevents the growth of (DNA) and (RNA) by replacing the normal synthesis of (RNA). Treatments for leukemia and other diseases include breast cancer, ovarian cancer, and intestinal tumors. Antimetabolites include 5-FU, capecitabine (Xeloda), 6-MP, methotrexate, etc. Chemotherapy regimens that include gemcitabine (Gemzar), fludarabine, and cytarabine (Cytarabine) (Relling, and Dervieux 2001)

2.4.3. Anti-tumor antibiotics

There are a variety of mechanisms by which antibiotics in chemotherapy medications work. Some are powerful DNA intercalators, whereas others are harmful. For example, research has shown that antibiotic cytotoxic medications such as Actinomycin drug, Adriamycin and Doxorubicin, as well as other pharmaceuticals, stimulate and rising of

existing host mechanisms of defense to affect its effects. For many of these chemotherapeutic medicines, DNA is an important molecular target that has been shown to be a non-specific target by the cytotoxic agents. DNA-targeted medications are showing improved efficacy, and as a result, it is expected that they will be even more targeted and successful in the future. However, DNA attackers therapy has limits since, despite the fact that they primarily impact cancer cells due to their rapid multiply rate and genomic instability, benign cells may also be harmed as a result of the procedure.. Because of DNA targeted treatments, normal cells can withstand low levels of DNA damage, but the repair mechanisms are sometimes too much for the cells to manage. Anticancer antibiotics include anthracyclines, bleomycins, actinomycin D, and mitomycins. (Tacar *et al* 2013)

2.4.4. Topoisomerase inhibitors

It has a negative impact on cancer cell proliferation and is destructive. In treating the same kinds of tumors, it is utilized, for example (CA-Testicular, Leukemia, and CA-lung). Using this medicine, the body's cancer cells are inhibited from proliferating. (Gaston *et al* 2014)

The use of topoisomerase II inhibitors in cancer treatment raises the possibility of developing a second malignancy (AML). Secondary leukemia can develop as early as two to three years after receiving this medicine. (Pabla, and Dong 2012).

2.4.5. Mitotic inhibitors

Natural goods are a source of plant alkaloids and other chemicals. Mitosis can be halted or enzymes can be inhibited, preventing cell proliferation. However, these drugs can kill cells in any phase of the cell cycle. A variety of cancers can be treated using them (breast, lung, myelomas, lymphomas, and leukemia). Patients should be aware that these drugs can induce nerve damage, which may limit their dosages.

2.4.5.1. Mitotic inhibitors include

- Taxanes: Taxolm
- Epothilones: Ixempra
- Vinca alkaloids: (vinblastine) and vincristine.
- Estramustine, (Tacar *et al* .2013)

2.4.5.2. Corticosteroids agent

These natural hormones and hormone-like medications known as corticosteroids can be used to treat a variety of disorders, including cancer. Chemotherapy is the term used to describe the use of these medications in the treatment of cancer.

Prednisone, Methylprednisolone (Solumedrol), and Dexamethasone are some examples of corticosteroids (Decadron)

They're also utilized to keep chemotherapy-induced nausea and vomiting at bay. Prior to chemotherapy, they utilized this method in order to avoid serious allergic reactions. (ACS 2018)

2.4.7. Miscellaneous chemotherapy

Chemotherapy medications like Lasparaginase, an enzyme, and bortezomib, a proteosome inhibitor, function in separate ways and cannot be used with other drugs. (Tacar *et al*. 2013).

2.5. Routs of chemotherapy administrations

Chemotherapy can be given either orally or intravenously, depending on the type of cancer being treated (directly into the vein). To be taken orally (swallowing tablets). Tablets will serve as the delivery vehicle for them. As long as the patient's health permits. However, regular trips to the hospital to monitor the patient's health and reaction to therapy will still be recommended. It is critical that the pills be taken at the exact time and date recommended. Any time a patient misses a dose, the medical team should be notified right away. Intravenous chemotherapy may be administered in the following ways:

- Intravenous injection.

An IV drip can be used for intravenous infusions.

- Using a drip or an infusion pump.

The patient should expect to be on an infusion pump for several weeks or months. Protracted venous infusion, ambulant infusion, or continuous infusion. Means the patient can go about their daily routine while taking the medication. (CCNS 2013)

The drug can be administered in a number of different ways. Among them:

- A cannula – An intravenous (IV) catheter is a thin, flexible tube that is placed into a vein, generally in the hand or lower arm.
- A drip (intravenous infusion) Injecting the drug into a bag can dilute it. A tube will be inserted into the patient's arm to deliver the solution from the bag into a vein (intravenous infusion). The procedure will make use of a cannula. Slowly, the solution enters the vein. A pump is typically used to force chemotherapy solution through a drip. The process isn't accelerated by the pump at all. This method ensures that the solution

enters the vein at a steady rate over a predetermined duration, which means that it will take longer to complete. One of the most common methods of administering intravenous fluids to a patient is via a long, flexible, plastic line (thin tube). At the center of your chest, this primary line enters your body, rising under your skin and entering a major vein around your collarbone. Only a short piece of line protrudes from the chest, and that's it. PICC line drip is an alternative to peripherally implanted central catheter line drip and is a long, thin, flexible tube that is normally inserted in the upper arm and travels to a big vein in the chest near the heart. Although it may be connected to the core line, it has a different input point. Small, soft, and flexible plastic tubes are used in portacaths (implantable ports). Under the skin of the breast or arm is a port (opening). The port contains a thin rubber disc through which specific needles can transfer medicines or draw blood.. ((Speciality & Versions, 2015; Neuss *et al.* 2016).

2.6. Chemotherapy drugs side effects

Cancer kind and Chemotherapy used have a significant impact on how a patient responds to these treatments, but each patient is unique in their response to these drugs. It's possible that newer chemotherapy treatments with greater cancer cell targeting will have fewer adverse effects. (Care and Muriel 2016)

2.6.1. Gastrointestinal system

2.6.1.1. Mouth and throat changes

As a result of chemotherapy, fast-growing cells are killed (mouth, throat, and lips). As a result, the patients' (teeth, gums, lining of the mouth, and the salivary glands). After chemotherapy is finished, most oral problems disappear within a few days. (Hogan 2009)

2.6.1.2. Nausea and vomiting

Vomiting may or may not follow a bout of nausea or a general feeling of unwellness. Headaches, dizziness, and weakness are all possible side effects. Is it possible to vomit as a result? (Navari *et al.* 2013).

Chemotherapy-induced nausea and vomiting can occur during or immediately after treatment, and the patient will usually feel better on days when chemotherapy is not administered. New medications are being developed to help treat and possibly prevent the symptoms of motion sickness. Antiemetic or antinausea medications are commonly referred to as such. These medications should be taken one hour prior to each chemotherapy treatment and for a few days thereafter as well as during the course of the treatment itself. It will depend on the sort of chemotherapy they are receiving and how well they respond to it. Acupuncture is an antiemetic treatment. (Feyer *et al.* 2011).

2.6.1.3. Appetite changes

It is possible for chemotherapy to alter a patient's appetite. There are a number of reasons why this can occur, including nausea, tongue and throat issues that make eating difficult, or medication that causes a loss of taste in food. Feeling melancholy can also cause these alterations. An appetite loss might endure from a few days to several weeks or months. Even if a patient is unable to eat, it is critical that they maintain a healthy diet. Eating and drinking foods that are high in vitamin C is one example of this (protein, vitamins, and calories). Consuming nutritious foods aids the body's ability to fight infection and repair tissue damage caused by chemotherapy medications. Weight loss, exhaustion, and weakness can result from a lack of appetite. (Care and Muriel 2016).

2.6.1.4. Constipation

In cases of constipation, the bowel movements become less frequent and the feces is firm and difficult to pass. Painful bowel movements and feelings of bloating or nausea are possible side effects of the illness. Belching, a lot of gas, and rectum pressure or cramps are all possible symptoms. Constipation is a side effect of chemotherapy and some pain medications. People who are less active or who spend a great deal of time sitting or lying down are also at risk. Constipation can also be caused by a lack of fiber in one's diet or by not drinking enough water. (Santucci and Mack, 2007).

2..1.f. Diarrhea

Frequent bowel movements that are either soft, loose, or watery are known as diarrhea. As a result of the loss of cells in the large and small intestines caused by chemotherapy, diarrhea might occur. Bowel movements could also be improved as a result. An illness or medication used to treat constipation could be the cause of diarrhea. (Pessi *et al.* 2014).

2.6.2. Circulation system

2.6.2.1. Anemia

Blood hemoglobin concentrations are lower than normal in this situation. However, anemia caused by surgery or malignancy, which is frequent with (colorectal malignancies), might make chemotherapy-induced anemia more worse. (Rodgers *et al.* 2016).

2.6.2.2. Thrombocytopenia

Means lower than normal platelet numbers (150,000 to 450,000 per cubic millimeter (mm³)), which is the usual range for platelet counts. Blood in the stool (melena, hematochezia) and urine (hematochezia) are possible symptoms of thrombocytopenia in patients. These include easy bruises, bleeding after minor cuts or scratches, bleeding gums or noses, and the development of petechia (small reddish-purple spots on skin) (hematuria). (Cancer Council 2016).

2.6.2.3. Leukopenia and risk of infection

Leukopenia is a condition in which the bone marrow is damaged, resulting in a decrease in the production of new white blood cells. A healthy immune system relies on white blood cells. Because chemotherapy reduces the amount of white blood cells, it is essential to avoid infections. (Cancer Care 2014).

2.6.2.4. Fatigue

When you're exhausted, you're suffering from fatigue. Chemotherapy patients often experience nausea and vomiting as one of the most common adverse effects. It's one of the most debilitating side effects, especially for persons with preexisting medical conditions. Cancer-related fatigue is distinct from the exhaustion that most people experience on a daily basis. Unrelated to physical activity, it does not improve with rest or sleep, and it does not get better with time off. Excessive tiredness has the potential to harm one's health and quality of life. (Care and Muriel 2016)

2.6.3. Nervous system

Indirectly or directly, chemotherapy drugs can affect the central nervous system (brain and spinal cord), the cranial nerves, or the peripheral nerves. For the mobility and feeling of the face and neck, cranial nerves play a critical role. The function of the

cranial nerves is equally vital (vision, hearing, taste, and smell). In addition to connecting the brain and other parts of the body, peripheral nerves allow some internal organs to be moved, sensed, and controlled.. (Winocur, *et al.* 2006)

2.6.4. Reproductive system

Modern anti-cancer drugs frequently cause gonadal toxicity in men and women. Infertility and hypogonadism can cause significant distress, despite the necessity of effective chemotherapy and, where possible, a cure. The gonadotoxic effects of radiation and earlier chemotherapy regimens are well documented. However, the widespread use of novel medicines and antibodies with untested gonadal harmful effects is increasingly commonplace. (Cancer Council 2016)

Having a child while undergoing chemotherapy is possible, however the toxicity of some medications may result in birth abnormalities. Therefore, if a man is sexually active and planning to undergo chemotherapy, it is recommended that he take care and utilize an effective method of birth control. (Kotronoulas, Papadopoulou, and Patiraki, 2009)

Chemotherapy can suppress the immune system. Reserving chemotherapy may cause flare-ups of genital herpes or genital wart infections in patients who have previously experienced such diseases. (Craft *et al.* 2014)

2.6.5. Integumentary system

The fast-growing cells in the skin and nails can be damaged by chemotherapy medicines. While some of these changes may be uncomfortable, the majority are not severe enough to necessitate medical attention. The vast majority of them will recover after completing their chemotherapy treatment. As a result, it is critical to address any significant skin changes as soon as possible.

1. Darker veins (chemotherapy administered by IV may make veins appear darker).
2. Sunlight sensitivity.

Nail problem (darkened or brittle and broken nails) (National Cancer Institute 2007).

Some chemotherapy medications have been shown to have an effect on hair follicle cells, which are rapidly dividing. Hair can become brittle and fall out of the follicle, or it might become brittle and break off at the scalp's surface. Many people's social and psychological well-being are affected, even if the event itself is not life-threatening. (Batchelor 2001).

2.7. Deciding which type of chemotherapy drugs to use

For each medicine, the ideal doses and regimens for administering it are well-known. The same treatment is recommended by oncologists. In other circumstances, the best technique to treat cancer patients may have been lost. Different doctors may use different prescription regimens and timetables in this case. When deciding on a chemotherapy treatment, a variety of factors must be taken into account, including:

1. cancer's kind
2. the cancer's current stage
3. The patient's age and general well-being
4. As well as a number of major health issues (such as heart, liver, or kidney diseases)
4. In the background, what kinds of chemotherapy have you used?

This knowledge, as well as information from medical publications and textbooks, is taken into consideration by doctors when deciding whether or not a patient should be given chemotherapy. A single medicine or a mix of drugs may be used in a chemotherapy treatment strategy. Most cancer patients are prescribed a cocktail of medications by their doctors. Because cancer cells can be treated in multiple ways, this is usually more effective than using a single medicine. Each medication's adverse effects and combinations with other medications must also be considered by doctors. (Chu, Devita 2008).

2.8. Planning drug doses and schedules

Some pharmaceuticals, particularly over-the-counter medications, have a broad spectrum of therapeutic effects. As a result, a wide variety of doses can be utilized efficiently and without risk. For a minor headache, the label on an aspirin bottle would say to take (2) tablets. However, many people will benefit from taking just one tablet (half the recommended dosage). There is a very small range of safe and effective doses for most chemotherapy medicines. It is impossible to adequately treat cancer with a low dose of a medicine, while taking a high amount of the same drug can result in potentially fatal side effects. Because of this, doctors must be extremely accurate when calculating chemotherapy doses. (Barton and Wilkes 2002)

Most chemotherapy has a very limited therapeutic window. As a result, precise dose calculations are required to achieve the desired impact while also avoiding harmful effects. There are various methods for determining the dosage of chemotherapy medications, depending on the drugs being administered. Chemotherapy is usually quantified in milligrams per milliliter (mg). A person's weight in kilos is occasionally used to calculate the total dose. An individual who weighs 110 pounds (50 kilograms) would be given 500 milligrams of the normal dose, which is 10 milligrams per kg (10 mg/kg) multiplied by the individual's weight. (Diedrich, and Plank 2003).

Depending on a patient's height and weight, doctors can decide the dose of chemotherapy medications based on (body surface area) (BSA). BSA is measured in

square meters (m²). Children and adults should be given different dosages, even after accounting for body surface area (BSA). Drugs are metabolized differently in children's bodies. They may have varying levels of susceptibility to certain medications. For the same reasons, patients who meet the following criteria may have their dosages of certain medications adjusted:

1.Elderly

2.Insufficient dietary intake

3.Obese

4.Currently using or have taken other medicines in the past.

5. Radiation therapy has already been completed or is presently being completed.

6. A decrease in the number of red blood cells in the bloodstream.

7.Diseases of the liver or kidneys (Chu, Devita 2008).

Chemotherapy medications are given in cycles or schedules, which are referred to as cycles. One dose of chemotherapy may be followed by a period of time without treatment for several days or weeks. To allow the body's natural cells enough time to recuperate from the drug's negative effects. For this reason, doses can be given every day or every other day for a few days, and then a break can be taken. For some drugs, it is ideal to administer them over a long period of time. To maximize its anticancer effects and limit adverse effects, each medicine is administered in a certain order. Treatment plans that include more than one drug will detail how often and exactly when each drug should be administered.. It's possible to fix the number of cycles a patient receives based on how the treatment impacts their cancer and overall health.(Turkcan *et al.* 2012).

2.9. Role of nurse during chemotherapy treatment

Patients with cancer benefit greatly from the expertise of oncology nurses. Oncology nurses are frequently the initial point of contact for patients and their families, and they aid in the coordination of a wide range of care during cancer treatment. (Kav *et al.* 2008)

2.9.1. Responsibility

Care must be taken to guarantee the safe and effective delivery of chemotherapy and co-medication to patients, as well as proper follow-up in a manner that ensures patient access and care.

It is important to provide patients and healthcare professionals with cancer-related information and guidance, including specific instructions on how to report difficulties and seek assistance outside of clinic hours.

For non-oncology healthcare practitioners, cancer management, care pathways, and patient support are also important topics of discussion.

- Provision of support for the patients' families
- Patient advocacy in local policy and decision-making processes. Providing a safe workplace for medical staff.
- Patient advocacy in local policy and decision-making processes.

Providing a safe workplace for medical staff.- Audit, monitoring, and review are all methods used to continuously evaluate the quality of the service. Constraints on patient care and financial resources In addition, the oncology nurse is in charge of ensuring the

service's long-term viability and safety. through training and mentoring of employees, as well as active participation in the planning phase of a business (Baxter, Leary 2011).

2.9.2. Skills required

Nurses working in oncology must have specialized training in cancer care, in addition to the general education required by their license. Board certification is an optional process that verifies an individual's expertise, credentials, and education in a particular field of study. Obtained oncology certification. It's common for advanced certification to require a master's degree in nursing, supervised clinical practice, and perhaps extra training." (PMCC 2015)

2.9.3. Chemotherapy administration

1- Examine the prescription for chemotherapeutic drugs that should have

- Name of drug

- Dosage

- Date and time that each agent to be administrated

- Route of administration

2- Accusatory identify the patient.

3- Drugs to be used in conjunction with chemotherapy e. g (antiemetic, sedatives etc.)

4- Evaluate the health of the client blood counts (hemoglobin, haemoglobin, haematocrit, white blood cells and platelets count) are included in this

i.e. infection, severe stomatitis, diminished deep tendon reflexes, or bleeding are all conditions that could exclude the use of chemotherapeutic agents.

- Physical condition
- Anxiety level
- Psychological condition

5- Take precautions in case of probable difficulties, including reviewing the policy and having medication and supplies on hand for urgent intervention in the event of extravasation and reviewing the process and having medication on hand for possible anaphylactic

6. Ensure that the agent's preparation is accurate.

-Accuracy in calculating dose.

-The drug's expiration date.

-A step-by-step guide to ensuring proper reconstitution.

-Recommendations for administrative procedures

7- Assess the patient's comprehension of the chemotherapeutic delivery process.
(Speciality and Versions, 2015)

2.9.4. Calculation of drug dosage

It is calculated based on body surface area

2.9.5 Drug reconstitution/preparation

The intravenous tubing under the biologic safety cabinet should be primed before any medications are reconstituted by the pharmacy staff (BSC). Reconstituting drugs may be necessary in some cases. Safe handling instructions should be prepared and reconstituted as follows:

All chemotherapeutic drugs should be prepared according to package insert in BSC.

- Aseptic technique should be followed
 - The disposable gloves, gown, and wrist cuffs that make up the PPE.
 - In the absence of a BSC, eye protection such as goggles should be worn to minimize exposure.
 - Washing hands before and after drug handling.
 - Limit access to drug preparation area.
 - Opening drug vials/ ampoules away from body.
 - Absorbent pad on the work area. Open the ampoule by wrapping an alcohol wipe around the ampoules neck.
 - Expelling the syringe's air by covering the needle's tip with a sterilizing gauge
 - Labeling all chemotherapeutic drugs

- Any spill should be cleaned up as soon as possible.

2.9.6. Drug administration

Chemotherapy administration route:-

2.9.6.1. Oral chemotherapy

- Advocating for patient compliance with their treatment plan. Meals should be taken with medications that have an emetic effect.
- Maintaining the proper storage conditions for chemotherapeutic agents (refrigerate, avoid exposure to direct lighted) (Speciality and Versions, 2015)

2.9.6.2. Intramuscular and subcutaneous

*Subcutaneous or intramuscular (I/M) delivery of chemotherapeutic drugs is rare. Lasparaginase, bleomycin, cyclophosphamide, and methotraxate are examples of nonvesicants. Pyta_ arabine and other hormonal drugs can be administered intramuscularly (IM) or subcutaneously, depending on the circumstances.

* Smallest needle possible for medication's viscosity is used.

* Changing the needle after withdrawing the agent from a vial or ampoule.

* Selecting a site with adequate muscle and/or SC tissue.

(Speciality and Versions 2015)

2.9.6.3. Intravenous

In the majority of cases, chemotherapy is administered by intravenous infusion. Peripheral or central venous catheters can be used to administer this medication. The process of absorption provides a more stable result. Vesicants must be administered by this method, which also decreases the need for repeated injections. As a result of the IV's direct connection to the circulatory system, a life-threatening infection or sepsis can occur. (Patrick 2010)

Nausea and vomiting can be effectively controlled by preventing it as soon as feasible. In order to prevent nausea and vomiting, the patient is given anti-emetic medications prior to receiving chemotherapy. The following rules apply to many medications:

- Check the solution container and tubing for signs of contaminant contamination.

in addition to any visible flaws such as specks, stains, discoloration, cloudiness, or breaks in the packaging

- Aseptic technique to be followed.
- Following the manufacturer's instructions when preparing medications choosing an appropriate vein Large forearm veins are preferred
- Use distal vein
- Before administering vesicants, peripheral locations should be replaced every day.
- Small lumen veins should be avoided in order to avoid harm from friction and reduced ability to dilute acidic medications and solutions. Infusions of varying lengths and intensities require different catheters with varying gauge sizes.

- Avoiding veins that have recently been exploited for venous access

- Use a central vein infusion to provide intravenous chemotherapy (Hickman Catheter). In order to access the heart's right atrium, a flexible polymeric silicon rubber catheter called a Hickman catheter is threaded through the cephalic vein and into the superior vena cava. Chemically inert and anti-thrombogenic, the silicone rubber material of the catheter prevents decomposition and works as an anatomic barrier to prevent infection-causing chemicals from entering. . (Speciality and Versions, 2015; Patrick, 2010).

2.9.6.4. Intra -peritoneal

2.9.7. Documentation and recording

- Dose, route, and time of chemotherapeutic medicines documented
- Infusions and other supplies utilized in a chemotherapy program include premedication, postmedication, prehydration, and others.
- Any complaints of discomfort or symptoms made by the patient prior to, during, or following a chemotherapy infusion (Speciality and Versions, 2015)

2.9.7. Management of chemotherapy spills

Cleaning up chemotherapy spills should be done as soon as possible by adequately shielded and qualified staff. A spill should be marked with a warning sign so that no one else is exposed to the hazardous material. (Martin and Larson 2003).

2.9.8. Management of intravenous chemotherapy complication

Thrombophlebitis and extravasation are the most prevalent consequences of intravenous chemotherapy treatment. Preventing these problems requires using proven techniques, such as using proper sterilization methods, performing the appropriate invasive procedure to avoid vein puncture during cannula placement, and paying close attention to the position of the cannula, which should be replaced after 48-72 hours to avoid the complication, especially in patients who are receiving chemotherapy for an extended period of time. (Wagland *et al.* 2015)

For the Non-DNA-binding vesicant agents, a dry warm compress and a dry cold compress are applied for 20 minutes four times a day for 1-2 days, and the affected limb is elevated and anesthesia is administered if necessary. Finally, the hematology and oncology team is informed and specific medical measures are taken. (Kreidieh, Moukadem, and El-Saghir 2016)

2.9.9. Staff education

Chemotherapy training should be required for everyone involved in patient care. Included are their knowledge of risk, applicable techniques and procedures for handling, the right use of protective equipment and materials, spill protocols, and medical policies for workers handling chemo agents. Disposable gloves and gowns must be used by anybody handling the blood, vomit, or excreta of chemotherapy patients so that they may be properly disposed of afterwards. (Pai, R. R., and Ongole, R. 2015)

2.9.10. Patient and family education

In addition to providing the patient with written teaching materials, you should confirm that the patient gave their consent. To address any lingering doubts or concerns, have the patient or family members fill out a form indicating their comprehension and desire to proceed with the treatment plan. (Harmsen, Bemsan, *et al.* 2008)

2.9.11. Extravasations Management

An I.V. site infection caused by a vesicant or irritating chemotherapeutic medication leakage that enters the bloodstream. These substances can cause blisters and tissue damage if they are used incorrectly. It is possible for a substance to cause venous discomfort over the vein's length without causing an inflammatory reaction if it is considered an irritant. Extravasation injuries include sloughing of tissue, infection, discomfort, and loss of movement of a limb " (Gonzalez 2013).

2.10. Nurses practices for chemotherapy administration

2.10.1. Hand hygiene

Nosocomial infections, a major source of morbidity and mortality in hospitals, are transmitted through direct or indirect contact with microorganisms. Oncology units, for example, have a high prevalence of healthcare-associated infections. Cancer patients, whose immune systems are compromised by the use of central or peripheral venous access devices, invasive procedures, and intravenous chemotherapy, are particularly vulnerable to infection. (Magnus *et al.* 2015)

Hand hygiene can help minimize healthcare-associated diseases by killing or restricting the quantity of germs that cause them and preventing their transmission among members of the healthcare team. Nurses throughout the world continue to struggle with a lack of proper hand hygiene procedures. Research and practical guidance have been developed over the past two decades to help members improve their hand hygiene. (Pires, D., and Pittet, D. 2017)

Health care facilities have "easily accessible" alcohol-based hands rubs that are more effective than soap and water for performing simple hygiene. To get rid of transitory bacteria existing in hands, the method of hand washing, rinsing, and drying thoroughly is more significant than the impact of alcohol, which inhibits the development of

microorganisms. Hands can be washed using water or soap-based hand rubs, and wet towels can be used to clean them. (Bolon, M. K..2016)

2.10.2 Using of antiseptic technique

Hospital-acquired infections can be prevented by using aseptic technique, one of the sanitation procedures that should be used in critical care units. Lack of precautions, lack of proper aseptic technique utilization, and improper patients all contribute to this situation. infectious diseases are kept at bay substances aid in the development of resistant types of microorganisms (jissir and hassan, 2017)

As a result of healthcare-related illnesses, intravenous chemotherapy requires proper preparation of chemo-medication at a hospital pharmacy or oncology ward prior to administering patients, which is a conflict. Because of this, it is critical that chemo-medications are prepared aseptically to prevent contamination and to reduce the risk of infection during their parenteral delivery. (Peltonen, Celikkayalar, Laaksonen, and Airaksinen, 2016).

Hospital-acquired infections (HAIS) impact cancer patients with weakened immune systems, necessitating infection-prevention efforts. Hand hygiene, aseptic procedures, environmental hygiene, antimicrobial stewardship, and transmission-prevention precautions for microorganisms are all examples of these programs, all of which are crucial for preventing infections. (Thom, Kleinberg, and Roghmann, 2013).

2.11. Wearing of personal protective equipment

Health care professionals in the United States are exposed to hazardous medication hazards every year, and 18 million chemotherapy doses are administered to individuals each year. Antineoplastic medications can induce skin rashes, nausea, and eye irritation in oncology nurses in charge of administering cytotoxic treatments, and long-term exposure might harm the reproductive system, leading to spontaneous abortion,

infertility, congenital abnormalities, and even the development of cancer. (He, B. Y, *et al.* 2017).

2.11.1. Safe cannulation

For the sake of patient safety, practitioners' nurses should follow practical instructions for nurse's cannulation to ensure that vascular catheters are inserted in a safe manner, especially for patients who require regular cannulation. Ultrasound and other imaging tools, as well as improved guiding tools for safe insertion and removal of vascular access devices, enable nurses locate a suitable vein for insertion. (Bodenham, *et al.* 2016).

A peripheral short intravenous cannula should be used to administer chemotherapy to cancer patients because it is safe, rapid, and easy to place, and it is suited for frequent sessions of I.V. chemotherapy. However, if the PIVC fails, the patient may have discomfort and the treatment process may be affected, thus it is necessary to continuously monitor for displacement, infiltration, and pain and discomfort in order to keep it working properly. (Bertoglio, *et al.* 2017).

For chemotherapy infusion, a central venous cannula or catheter is also routinely utilized. Regular periodic checks and infection-like problems and embolization of the catheter tip may prevent the occurrence of such issues on regular usage of central venous catheters. (Hoffman, *et al.* 2017)

Peripheral intravenous catheters lack the effectiveness of CVCs, which can protect the patient's peripheral veins from prolonged infusion of cytotoxic agents while also providing more advantages. In China's oncology units, CVCs come in three varieties: "implanted venous port, peripherally inserted central catheters (PICCS), and external non-intravenous catheters." (Fang, Yang, Song, Jiang, and Liu, 2017).

When administering high doses of chemotherapy to cancer patients, there are many factors that can affect intravenous chemotherapy succession, including cannula site, nature of the material used, type of drugs, solution, and treatment duration, as well as the use of sterile techniques, such as syringes and catheters. (Kapucu, *et al.* 2017).

2.12. Previous Studies

Choudhary, V. S. (2017) A research was completed in Punjab to assess the knowledge and attitudes of staff nurses on nursing care for cancer patients undergoing chemotherapy at selected cancer hospitals in Punjab.. Descriptive research methods were employed in this study. Staff nurses at cancer hospitals in Punjab were surveyed using a structured self-administered questionnaire and a devised 4 point likert scale to measure their expertise. The findings of the survey suggest that staff nurses have an average level of knowledge (14.94) and a good attitude (59.70). The chi square test was used to determine the link between their selected socio-demographic characteristics and knowledge and attitude and found no statistical significance ($p>0.05$). It was the goal of this study to examine the nurses' knowledge and attitudes on the nursing care of cancer patients who are currently receiving chemotherapy. Nursing care for cancer patients who are taking chemotherapy appears to be well-understood and well-received by nurses. Education or knowledge-updating programs should be held on a regular basis to keep employees' skills up-to-date.

Qasim A. (2015) Children with leukemia are the focus of this study, which attempts to see how well nurses are prepared to deal with the adverse effects of chemotherapy. A descriptive analytic (quasi experimental) design research was conducted out in Baghdad City from 2nd of October to 27th of June 2015. Nonprobability (purposive) sample of 35 male and female nurses with more than one year of experience was selected from the Oncology Wards at the Children Welfare, Child's Central and Baghdad Teaching Hospital, additionally pilot study was done in Al-Kadhmiya Teaching Hospital. There were two primary components to the study instruments. The first section focuses on the demographics of nurses, while the second section (which includes four areas) examines their understanding of chemotherapy side effects. The data were acquired by utilizing a

constructed questionnaire provided to nurses to fill before and after implementing the software in a manner of pre and post-test. Descriptive and inferential statistics were used in the analysis of the data. The study found that the nurses' general knowledge on the side effects of chemotherapy was 45.7 percent (Good) for the post-test as opposed to the pre-test which was 37.1 percent (Not acceptable) (Not acceptable). In conclusion, the study found that the educational program had a positive influence on the knowledge of nurses.

Khan, et al., (2012) At Pakistan, a research was conducted to evaluate the knowledge, competence, and attitude of oncology nurses in Pakistani tertiary hospitals in the administration of chemotherapy. Oncology facilities of a tertiary hospital in Rawalpindi were used in this investigation. Verity's tools were utilized in a pre-post test intervention research with 35 nurses. Results: The Cochran's Q test, which assessed the mean knowledge scores, revealed a substantial (p value 0.001) rise in knowledge scores with "educational instruction." There was no statistically significant difference in the nurses' attitudes in a repeated measures ANOVA study. Knowledge is the poorest component of oncology nurses' competence in administering chemotherapy, whereas attitude is the greatest.

Another goal of the research, conducted by Mohammed B. (2012), is to determine how well an Oriented Education program improves patient understanding. Chemotherapy is an option. From 1st October/2011 to 11th October/2011, a quantitative / quasi-experimental design was conducted in Sulaimani city. (40) clients were recruited for the study; (20) of these clients were chosen to participate in the study group, while another (20) of these clients were chosen to participate in the control group (control group). The Hiwa Hospital's Oncology Wards in Sulimani City chose those cancer patients who undergo frequent chemotherapy. In order to gather information for the study, a questionnaire was created. The validity of the questionnaire was tested in a pilot study that ran from the 1st of October 2011 to the 31st of October 2011. When the educational program was put into action between November 28 and December 29, 2011, the pre-and post-test method was used to assess the groups in both the study and the control group.

Analyses were carried out using both descriptive and inferential statistical data analysis methods (person correlation, t test). Data analysis showed that the study group participants benefited from the client's management program and that changes had occurred in their understanding of the program's components... The results of the study show that 75% of the women in the study sample are married, indicating that 90% of the women in the study sample are married. As a whole, this significant rise in the mean average between the study and control groups suggests that our training program has had a positive influence on the participants' knowledge.

Further research found that the study group's intonation improved as a result of the teaching program. In the light of the findings of this study, the researcher recommends that the Ministry of Health provide each cancer patient with a particular document or guideline that includes all of the directions for chemotherapy treatment. During chemotherapy treatment, the hospital should have an uninformatinal office to provide more information and support. Social and financial aid should be provided to other organizations, on the other hand.

Hayder, A. J., & Mohammed, S. J. (2018)-experimental study was conducted in Baghdad

From the 19th of October 2017 until the 20th of May 2018, teaching hospitals will be closed. The software and tools have been designed by the researcher for the study's goal. Purposive sampling of (70) Baghdad oncology nurses was conducted. The study group consisted of (30) nurses who were exposed to an educational program, while the control group consisted of (30) nurses who were not. First, the nurses' socio-demographic characteristics are examined, followed by a knowledge test consisting of thirty items (multiple choice) questionnaires divided into three main dimensions pertaining to the nurses' knowledge of chemotherapy side effects. The knowledge test is divided into these three dimensions as follows: The study instrument's validity and reliability were established using a panel of experts and the (test – retest) technique, respectively. In order to determine the differences between the study group and the control group, descriptive statistics and statistical inference are utilized to analyze the

data. Pre- and post-test differences in the study group were found to be very significant in terms of In conclusion, the study found that the educational program had a positive influence on the knowledge of nurses.



3. MATERIAL METHODS

Study design, administration, setting, sample, criteria for sample, instrument of study, validity of the questionnaires, performing a pilot research, instrument reliability, data collecting and analysis methodologies and study limits are all covered in this chapter.

3.1. Design of the study

Quantitative design was carried out using the descriptive approach of the current study of Assessment of nurses' knowledge regarding safe chemotherapy management of period From 15,February, 2022 to 15may, 2022, at the Oncology Center in Al-Diwaniyah

A non-probability sample (purposeful sample) was used, which included (110) nurses working in Al-Diwaniyah Teaching Hospital, Oncology Department.

3.2. Administrative arrangements

The administrative permissions are obtained from the following

1. I obtained the approval from Training and Development Department for the purpose of collecting samples on 9-12-2021 No. 690 (appendix 1)
2. I got approval from Ethics Committee Cankri Karatkin University On February 7, 2022 meeting No. 24(appendix 2)

3.3. Environment, of the study

The study has been completed. at Al-Diwaniyah Teaching Hospital, Oncology Unit

In the city of Diwaniyah

3.4. The sample of the study

An improbable example (appropriate example). Sample size calculation formula.

In addition to Cochran's formula, Yamane (1967) introduced another, simpler equation for measuring the sample size of a population.

According to him, the sample size for 95% confidence level and $p = 0.05$ should be:

(N) is the number of nurses (oncology center) in Diwaniyah Teaching Hospital and (e) is the level of accuracy. (Sarma et al., 2013).

A non- probability (purposive) sample of (110) nurses who work in Diwaniyah oncology Teaching hospital.

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{144}{1 + 144(0.05)^2}$$

$$n=110$$

3.4.1. Criteria of inclusion the sample

- Nurses who work in Al-Diwaniyah Teaching Hospital, Oncology Department
- All nurses with one year or more or less experience were included
- Nurses of both genders

- Nurses from all educational levels
- both the night and morning shifts of nurses
- Nurses working who have consented to engage in the research

3.4.2. Criteria of exclusion the sample

- The group that made up the experimental sample
- Nurses who refuse to participate in the study
- Nurses who did not answer all the questions

3.4.3. The study instrument construction

The researcher constructed questionnaire which is composition from (30) questions of chemotherapy and its side effect for administering interviews and which consists of three parts: (appendix 3)

Part one: the Socio- Demographic Characteristics of the Nurses

This part consists of (5) these include: nurses gender, age, education level, Number of years of service in health institutions and participated in training course

Part two: General Nurse's information regarding chemotherapy drugs

This part consist of (14) items, this section includes nurses' information about chemotherapy, the answer is by selecting the option (correct, incorrect)

Part three: Nurse's knowledge regarding safe chemotherapy administration

This part consist of (15) items, this section includes nurses' information about Nurse's knowledge regarding safe chemotherapy administration

Answer by choosing one of the four options in the question

3.5. Validity of the questionnaire

It is important to consider the questionnaire's content validity. is obtained by panel of (10) experts, They are (3 experts from Ministry of Health,) and (7 in different universities faculty at the Ministry of Higher Education) .They were requested to evaluate the program and its instruments for substance, clarity, relevancy, and sufficiency by specialists with a combined experience of more than ten (10) years in their field. The experts' comments and ideas are taken into consideration while making changes and modifications (appendix 4)

3.6. Pilot study

The teaching and study tools' reliability was tested in this pilot trial. (11) Registered Nurses Al-Diwaniyah Teaching Hospital's Oncology Department nursing candidates were chosen at random.

As with the original sample, the pilot research was conducted within this time period and adheres to the same set of standards (15,February, 2022 to 25,February, 2022)

Finally, the original Research did not include the pilot study sample.

3.6.1. The purpose of pilot study

- 1- To determine the average amount of time needed to collect data from each interviewee.
- 2- In order to figure out the best way to find out the nature of the issues that they could encounter
- 3- To assess the questionnaires' validity and reliability. Those findings in Table 3-1 also demonstrated that the pilot study's reliability coefficient was high and adequate for samples

3.6.2. Result of pilot study

The pilot study's findings indicated that the questionnaire was clear to the participants and the time required To answer it (20-25) minutes

3.7 Reliability of the questionnaire

The questionnaires reliability was utilized to assess the questionnaires accuracy.

A high degree of internal consistency was found in the research phenomena's language, as demonstrated by the findings. In order to compile the data for the survey, we used primary statistics. Parameter: Calculating Alpha Cronbach as given in Table (3-1) The findings of the questionnaire show that the design was successful. No matter when the study was conducted, the questionnaire used in the study entitled (Nurses' knowledge about delivering chemotherapy to cancer patients in Al-Diwaniyah Teaching Hospital) was valid on the premise of population study circumstances.

Table 3.1 Questionnaires reliability coefficient

The Questionnaire Alpha's Reliability Coefficient (Cronbach)	Standard lower bound	Actual values	Assessment
Internal Consistency	0.70	0.8238	v. good

3.8 Data collection

An Arabic questionnaire, previously used as a descriptive cross-sectional survey in Kirkuk, Iraq, was used to collect data (Abdullah, DAH, & Rasheed, O.H. 2018). During the period from February 15, 2022 to March 1, 2022

The approval was obtained by the Diwaniyah Health Department, the Training and Development Center. We went to Al-Diwaniyah Hospital and the questionnaire and the purpose of the study were explained. Then the questionnaires were handed over to the nurses and the answering mechanism was clarified. The response time took (20-25) minutes

The answers were subjective without the intervention of the researcher

3.9. Methods of statistic

Data from the study was analyzed using the SPSS (Statistical Package for the Social Sciences) version 20 and Microsoft Excel (2010).

3.9.1. Descriptive approach

A. Statistical tables "Frequencies and percent" which are:

$$\% = \frac{\text{Frequency}}{\text{Sample Size}} \times 100$$

B. Mean of scores "M.s".

The average score can be calculated by using the following:

$$M.S = \frac{\sum r_i = 1F_i \times S_i}{\sum r_i = 1F_i} \times 100$$

C. The test of standard deviation "S.d".

$$\text{Standard deviation} = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$$

D. It uses a correlational coefficient "Cronbach alpha" used in estimating the internal consistency of the study tool, which can be calculated by using the following:

$$\alpha = \frac{K}{K-1} \left[1 - \frac{\sum_{i=1}^K \sigma_{ii}}{\sum_{i=1}^K \sum_{j=1}^K \sigma_{ij}} \right]$$

"K is the items number questions"

" σ_{ij} is the investigate covariance between the items"

"i and j. Note the σ_{ii} is the variance not standard deviation of item I"

3.9.2. Inferential approach

1. t-test

❖ Independent t-test

To assess the significance difference between overall and demographic characteristics

2. One Way ANOVA

"Analysis of variance (ANOVA) for equality of Means (testing for coincidence when the mean's parameter is different)".

Source of variance	Sum of square	d.f	Mean square	F
Between Groups	$SS_B = \sum \frac{(\sum xPl)^2}{n} - \frac{(\sum xP)^2}{N}$	$df_B = K-1$	$\frac{MS_B}{MS_W}$	$\frac{MS_B}{MS_W}$
Within Groups	$SS_W = \sum \frac{(\sum xPl)^2}{N} - \frac{(\sum xP)^2}{N}$	$df_w = N-k$	$\frac{SS_W}{DF_W}$	
Total	$SS_T = \sum \frac{(\sum xPl)^2}{N} - \frac{(\sum xP)^2}{N}$	$df_t = N-1$		

The following are shortcuts for determining how significant a value is in relation to its level:

- (1) Insignificant at a probability value >0.05 .
- (2) S: At a probability-value level, significantly <0.05 .

3.10. Limitations of the Study

- 1-some nurses objected to taking part in the study.
- 2- Some nurses refuse to complete the questionnaire

4. RESULTS

This chapter extensively introduces the outcomes of the research in tables and these refer to the objectives of this study, which are as follows:

In table 4.1 The frequencies and percentages in this table indicate the descriptive statistics of the nurses' socio-demographic information. One hundred and ten of the study's nurses were between the ages of 24 and 29, making about fifty percent of the total. Male nurses comprised more over half of the workforce, while female nurses accounted for less than a third of the workforce (57.3 percent). A majority of the study participants were Nursing Diploma graduates, with 65.5% of the overall sample. Nursing professionals with six to ten years of experience comprise a sizable portion of the workforce (38%). Finally, the vast majority of those who took part in the research did not participate in any formal training programs, hence (50.5 percent).

Table 4.1 Descriptive statistic of socio-demographic characteristic of the study sample

Demographic Data	Groups	Freq.	%
Age in years	18-23	34	30.9
	24-29	55	50.0
	30-35	13	11.8
	36 and more	8	7.3
	Total	110	100.0
Gender	Male	63	57.3
	Female	47	42.7
	Total	110	100.0
educational level	Nursing school graduate	24	21.8
	Nursing Diploma graduate	72	65.5
	Nursing Bachelor graduate and more	14	12.7
	Total	110	100.0
Number of years of experience in nursing	Less than 1	17	15.5
	1-5	25	22.7
	6-10	42	38.2
	13-18	20	18.2
	19 and More than	6	5.5
	Total	110	100.0
Training Session	Not present	56	50.9
	present	54	49.1
	Total	110	100.0

(Freq.): Frequency, (%): percentage,

The frequencies and percentages in this table indicate the descriptive statistics of the nurses' socio-demographic information. One hundred and ten of the study's nurses were between the ages of 24 and 29, making about fifty percent of the total. Male nurses comprised more over half of the workforce, while female nurses accounted for less than a third of the workforce (57.3 percent). A majority of the study participants were Nursing Diploma graduates, with 65.5% of the overall sample. Nursing professionals with six to ten years of experience comprise a sizable portion of the workforce (38%). Finally, the vast majority of those who took part in the research did not participate in any formal training programs, hence (50.5 percent).

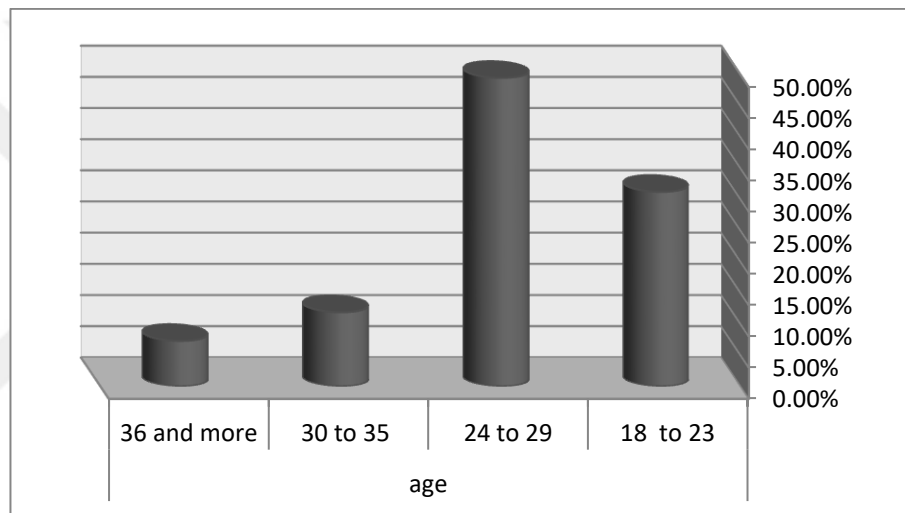


Figure 4.1 Distribution of study sample by their age

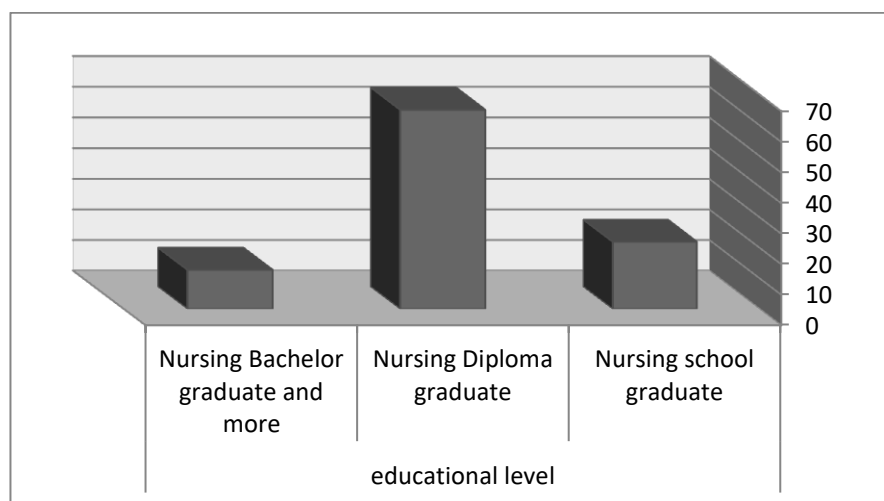


Figure 4.2 Distribution of study sample by their level of education

The table 4.2 show overall, the findings indicate that the (56.3 %) of nurses were fail in knowledge related to General Nurse's information regarding chemotherapy drugs, followed by those who are pass in knowledge (43.7 %).

Table 4.2 Nurses responses regarding overall general nurse's information regarding chemotherapy drugs

Items	Rating	Frequency	Percent	m.s	Std.
Physicians are the only person to dispense the chemotherapy.	False	6	5.5	1.94	.229
	True	104	94.5		
	Total	110	100.0		
The nurse can give chemotherapy by verbal order from the physician or pharmacist	False	91	82.7	1.17	.381
	True	19	17.3		
	Total	110	100.0		
Chemotherapy works to destroy cancer cells in some parts of the body.	False	16	14.5	1.85	.356
	True	94	85.5		
	Total	110	100.0		
Chemotherapy works to kill cancer cells by intervening to DNA synthesis	False	24	21.8	1.78	.416
	True	86	78.2		
	Total	110	100.0		
Cancer cells have resistance to chemotherapy.	False	53	48.2	1.51	.502
	True	57	51.8		
	Total	110	100.0		
Chemotherapy can give only in the hospital.	False	54	49.1	1.51	.502
	True	56	50.9		
	Total	110	100.0		
Chemotherapy works to destroy cancer cells and healthy cells in the body.	False	27	24.5	1.76	.428
	True	83	75.5		
	Total	110	100.0		
Chemotherapy can recognize between fast growing cancer cells and fast-growing healthy cells	False	40	36.4	1.63	.484
	True	70	63.6		
	Total	110	100.0		
Side effects of chemotherapy, vomiting and nausea	False	51	46.4	1.53	.501
	True	59	53.6		
	Total	110	100.0		
Chemotherapy leads to delayed wound healing	False	19	17.3	1.83	.381
	True	91	82.7		
	Total	110	100.0		
Analgesics can used before chemotherapy drug	False	65	59.1	1.41	.495
	True	45	40.9		
	Total	110	100.0		
Chemotherapy cannot be given with radiotherapy	False	19	17.3	1.83	.381
	True	91	82.7		
	Total	110	100.0		
Chemotherapy does not effect on vital signs of the patient.	False	56	50.9	1.49	.502
	True	54	49.1		
	Total	110	100.0		
The dose of chemotherapy is measured in grams (gr).	False	76	69.1	1.31	.465
	True	34	30.9		
	Total	110	100.0		

N (110), mean of score 1.5 more than 1.5 pass less than 1.5

Table 4.3 Overall, the findings indicate that the (56.9 %) of nurses were fail in

Items	Rating	Frequen cy	Percen t	m.s	Std.
Overall nurses assessment	False	62	56.3	1.44	.498
	True	48	43.7		
	Total	110	100.0		

N (110), mean of sore 1.5 more than 1.5 pass less than 1.5

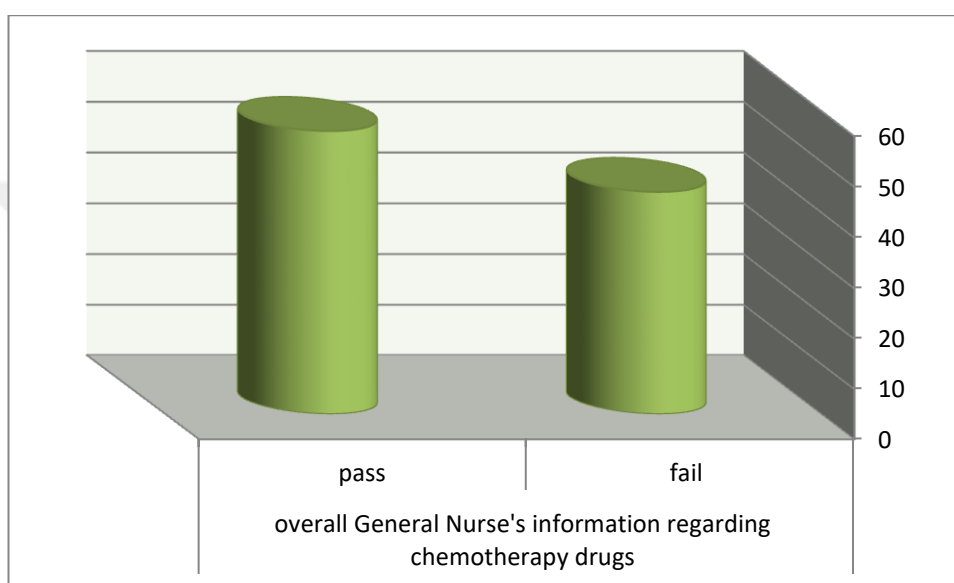


Figure 4.3 Distribution of Study Sample by their overall general nurse's information regarding chemotherapy drugs

Knowledge related to safe chemotherapy administration, followed by those who are pass in knowledge (43.1 %).

Table 4.4 Nurses responses regarding to safe chemotherapy administration

Items	Rating	Frequency	Percent	m.s	Std.
Before giving chemotherapy, wash hands with	False	98	89.1	1.11	.314
	True	12	10.9		
	Total	110	100.0		
Where is chemotherapy prepared (before giving to patient)?	False	69	62.7	1.37	.484
	True	41	37.3		
	Total	110	100.0		
When preparing chemotherapy:	False	59	53.6	1.46	.501
	True	51	46.4		
	Total	110	100.0		
the nurse monitors the patient's condition when receiving chemotherapy:	False	18	16.4	1.83	.373
	True	92	83.6		
	Total	110	100.0		
The role of the nurse when giving chemotherapy seen in:	False	31	28.2	1.72	.453
	True	79	71.8		
	Total	110	100.0		
Before giving chemotherapy, be sure to check:	False	72	65.5	1.34	.476
	True	38	34.5		
	Total	110	100.0		
What are the most dangerous types of intravenous leakage of chemotherapy?	False	71	64.5	1.35	.479
	True	39	35.5		
	Total	110	100.0		
Use an appropriate prophylactic combination when administering chemotherapy	False	38	34.5	1.65	.479
	True	72	65.5		
	Total	110	100.0		
Preferred number of nurses administering chemotherapy	False	28	25.5	1.74	.439
	True	82	74.5		
	Total	110	100.0		
Which of the following statements is correct about giving chemotherapy after surgery:	False	72	65.5	1.35	.479
	True	38	34.5		
	Total	110	100.0		
The person responsible for preparing the chemotherapy and giving it to the patient is -	False	25	22.7	1.77	.422
	True	85	77.3		
	Total	110	100.0		
To avoid pain caused by a cannula or needle:	False	57	51.8	1.49	.502
	True	53	48.2		
	Total	110	100.0		
Type of liquid used to mix chemotherapy:	False	21	19.1	1.81	.396
	True	89	80.9		
	Total	110	100.0		
The dose of chemotherapy depends on:	False	60	54.5	1.46	.501
	True	50	45.5		
	Total	110	100.0		
Signs of severe hypersensitivity to chemotherapy:	False	30	27.3	1.72	.449
	True	80	72.7		
	Total	110	100.0		

N (110), mean of score 1.5 more than 1.5 pass less than 1.5

Table 4.5 Nurses responses regarding to overall safe chemotherapy administration

Items	Rating	Frequency	Percent	m.s	Std.
Overall nurses assessment	False	62	56.3	1.43	.497
	True	48	43.7		
	Total	110	100.0		

N (110), mean of sore 1.5 more than 1.5 pass less than 1.5

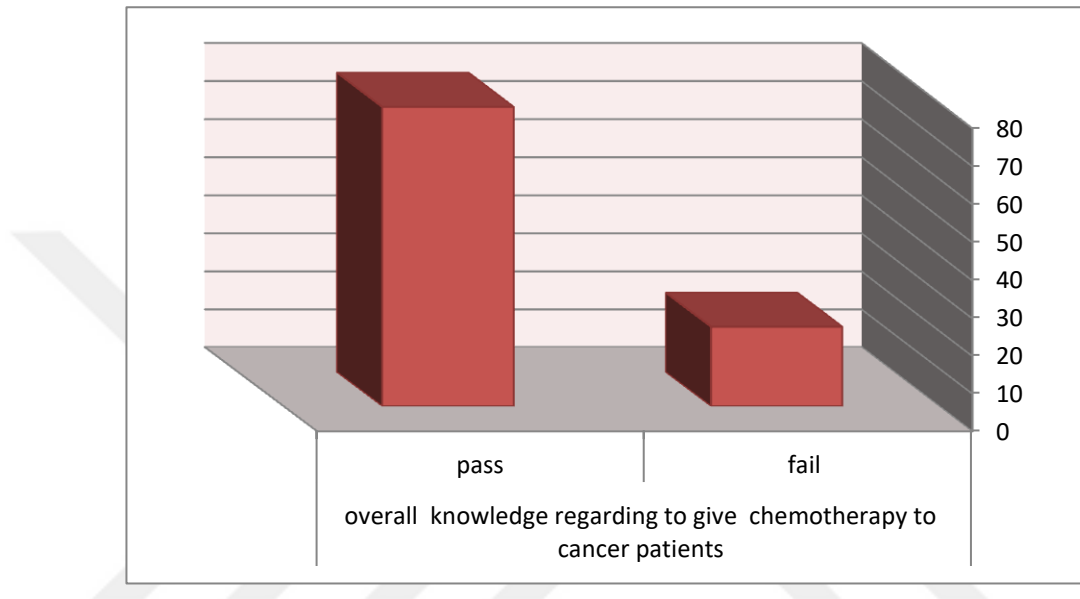


Figure 4.4 Distribution of Study Sample by their overall safe chemotherapy administration

Table 4.6 Nurses responses regarding to overall knowledge regarding to give chemotherapy to cancer patients

Total	Rating	Frequency	Percent	m.s	Std.
Overall nurses assessment	False	24	21.8	1.57	.0944
	True	86	78.2		
	Total	110	100.0		

N (110), mean of sore 1.5 more than 1.5 pass less than 1.5

Overall, the findings indicate that the (78.9 %) of nurses were pass in knowledge related to give chemotherapy to cancer patients, followed by those who are fail in knowledge (21.1 %).

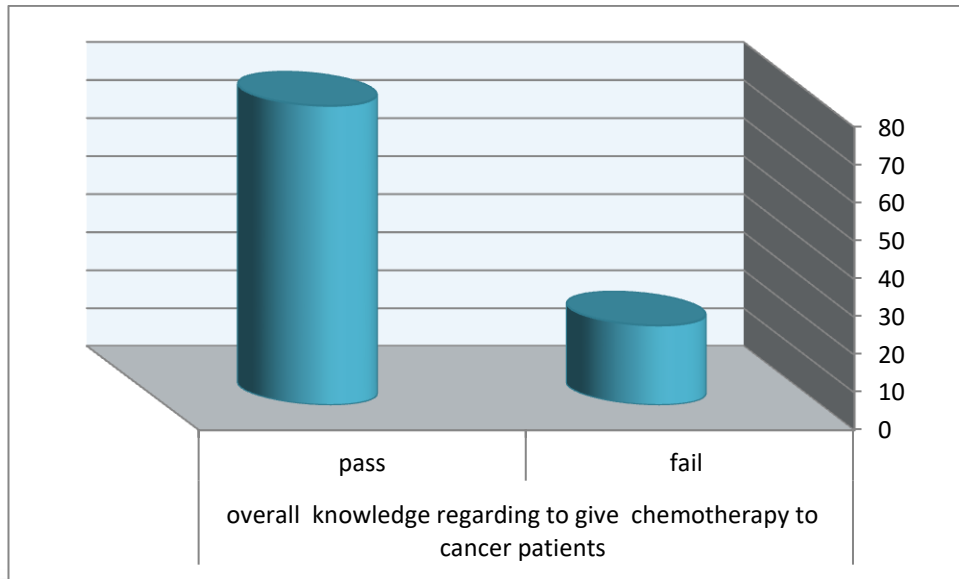


Figure 4.5 Distribution of study sample by their overall knowledge regarding to give chemotherapy to cancer patients

Table 4.4 show nurses' ages, number of years in the field, and overall appraisal of their expertise of chemotherapy are statistically significant at p values of less than 0.05. At p values of less than 0.05, the table reveals that there is no statistical significance between nurses' education level and their overall judgment of nurses' knowledge about chemotherapy.

Table 4.7 Relationship between the Nurses knowledge regarding to general information about chemotherapy drugs and their demographic characteristics

Demographic Data	Groups	Overall of General information regarding chemotherapy drugs		Chi-Square	df	P value
		false	true			
Age in years	18-23	17	17	9.521	3	.023
	24-29	34	21			
	30-35	10	3			
	36 and more	1	7			
	Total	62	48			
educational level	Nursing school graduate	13	11	2.970	2	.226
	Nursing Diploma graduate	42	28			
	Nursing Bachelor graduate and more	5	9			
	Total	62	48			
Number of years of experience in nursing	Less than 1	4	13	10.816	4	.029
	1-5	16	9			
	6-10	29	13			
	13-18	10	10			
	19 and More than	3	3			
	Total	62	48			

Table 4.8 Mean differences (t-test) between the overall nurses knowledge assessment regarding to general information about chemotherapy and nurses gender

gender		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment regarding general information	Male	63	1.6290	.10731	1.992	107	.046
	female	47	1.5897	.12143			

(N) number , (Std) stander deviation ,(Ns): Non-significant (S): significant , (T value) :independent t-test, (df): degree of freedom value)

This table shows that there is statistical significant between nurses gender and their overall assessment of nurses knowledge regarding General information about chemotherapy at p value equal or less than 0.05.

This table shows that there is no statistical significant between nurses participated in Training Session and their overall assessment of nurses knowledge regarding General information about chemotherapy at p value equal or less than 0.05.

Table 4.9 Mean differences (t-test) between the overall nurses knowledge assessment regarding to general information about chemotherapy and nurses participated in Training Session

TRAINING SESSION		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment regarding general information	Not present	56	1.6169	.12323	.441	107	.660
	present	54	1.6071	.10635			

(N) number , (Std) stander deviation ,(Ns): Non-significant (S): significant , (T value) :independent t-test, (df): degree of freedom value)

A p value of less than or equal to 0.05 reveals no statistical significance between the age of the nurses and the level of education they have, and the overall assessment of their knowledge of safe chemotherapy administration medications. There is a statistically significant relationship between nurses' years of experience as nurses and their knowledge of safe chemotherapy medication administration with a p value equal or less than 0.05, according to the table

Table 4.10 Relationship between the Nurses knowledge regarding to safe chemotherapy administration drugs and their Demographic Characteristics

Demographic Data	Groups	Over assessment regarding safe administration		Chi-Square	df	P value
		false	true			
Age in years	18-23	17	17	2.811	3	.422
	24-29	34	21			
	30-35	8	5			
	36 and more	3	5			
	Total	62	48			
educational level	Nursing school graduate	12	12	2.336	2	.311
	Nursing Diploma graduate	44	28			
	Nursing Bachelor graduate and more	6	8			
	Total	62	48			
Number of years of experience in nursing	Less than 1	1	16	23.433	4	.000
	1-5	15	10			
	6-10	26	16			
	13-18	16	4			
	19 and More than	4	2			
	Total	62	48			

Table 4.11 Mean differences (t-test) between the overall nurses knowledge assessment regarding to safe chemotherapy administration drugs and nurses gender

gender		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment regarding to safe admiration	Male	63	1.5290	.12994	-1.401-	107	.164
	female	47	1.5645	.13250			

(N) number , (Std) stander deviation ,(Ns): Non-significant (S): significant , (T value) :independent t-test, (df): degree of freedom value)

There is no statistical significance between the gender of nurses and their overall rating of nurses' knowledge of safe chemotherapy administration medications, as shown in this table at p value equal or less than 0.05

The table 4.5 shows that there is statistical significant between nurses participated in training session and their overall assessment of nurses knowledge regarding to safe chemotherapy administration drugs at p value equal or less than 0.05.

Table 4.12 Mean differences (t-test) between the overall nurses knowledge assessment regarding to safe chemotherapy administration drugs and nurses participated in training session

Training Session		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment regarding to safe admiration	Not present	56	1.5770	.13591	2.686	107	.008
	present	54	1.5111	.11940			

The table 4.6 shows that there is no statistical significant between nurses age, education level and years of experience in nursing with overall assessment of nurses knowledge regarding to give chemotherapy drugs to cancer patients at p value equal or less than 0.05

Table 4.13 Relationship between the nurses knowledge regarding to give chemotherapy drugs to cancer patients and their demographic characteristics

Demographic Data	Groups	Total assessment		Chi-Square	df	P value
		false	true			
Age in years	18-23	5	29	2.207	3	.531
	24-29	14	41			
	30-35	4	9			
	36 and more	1	7			
	Total	24	86			
educational level	Nursing school graduate	3	21	2.207	3	.531
	Nursing Diploma graduate	20	52			
	Nursing Bachelor graduate and more	1	13			
	Total	24	86			
years of experience in nursing	Less than 1	0	17	6.095	4	.192
	1-5	5	20			
	6-10	13	30			
	13-18	5	15			
	19 and More than	2	4			
	Total	24	86			

This table shows that there is no statistical significant between nurses gender and their overall assessment of nurses knowledge regarding to give chemotherapy drugs to cancer patients at p value equal or less than 0.05.

Table 4.14 Mean differences (t-test) between the overall nurses knowledge assessment regarding to give chemotherapy drugs to cancer patients and nurses gender

gender		N	Mean	Std. Deviation	t	df	Sig.
Overall assessment	Male	63	1.5790	.09290	.105	107	.916
	Female	47	1.5771	.09743			

This table shows that there is statistical significant between nurses participated in training session and their overall assessment of nurses knowledge regarding to give chemotherapy drugs to cancer patients at p value equal or less than 0.05.

Table 4.15 Mean differences (t-test) between the overall nurses knowledge assessment regarding to give chemotherapy drugs to cancer patients and nurses participated in training session

Training session		N	Mean	Std. Deviation	t	df	Sig.
Total assessment	Not present	56	1.5969	.09689	2.123	107	.036

5. DISCUSSION

This chapter presents a systematically organized interpretation and reasonably derived discussion of the results with the support of the available literatures and related studies.

Part-I: Discussion of Socio-Demographic Characteristic of Nurses

1. Age Groups

Table 1 displays the statistical distribution of the observed frequencies and percentages of socio-demographic characteristics variables observed in the current investigation. It is clear from the data that. The average age of the study's (110) nurses was 24 to 29 years old, with the majority (50.0 percent) falling in this age range. Fadhil, I., and Hassan, H. back up the current study's findings (2018) In contrast to a study conducted by Abdullah, D. A. H. & Rasheed (2018), which found that 40% of nurses were over the age of 40, the study that found that the bulk of the sample were in the 19-28 age range (18-23). Years

2. Gender

Male nurses comprise more than half of all nurses in the current study, according to data analyzed during the course of the current study's data analysis (57.3 percent). This finding is consistent with that of Jabar's (2014) study, which In contrast to Vioral (2014), which found that (97.9%) of the participants were female, this study found that (63,3 percent) of the study group and (56,7 percent) of the study group were made up entirely of men. Most oncology theories can explain these observations. Male nurses work at Al-Diwaniyah Hospital, which is a Muslim facility.

3. Educational Levels

The result of the current study showed that (65.5%) of the nursing diploma graduate And (22.0%) graduate of nursing school and (12.8%) graduate of Bachelor of Nursing and more The results may indicate that most of the oncology nursing staff have a diploma Certificate in Al-Diwaniyah Hospital

Additionally, this result is supported by (Kassa, 2014) who indicated that the highest percentage of nurses (51.2%) are nursing institution while disagrees with (Ulas et al., 2015) who indicated that the highest percentage of nurses (69.4 %) were graduated from nursing college

4. Years of Service in Health Institutions

In relation to years of service in health institutions, the results of the present study were (38.2%) in study group are (1-6) years, (22.7%) had (1-5) years of experience these findings confirm that most of oncology nursing staff are younger employees.

These results are in agreement with Khans et al. (2012) The study that reported that the highest percentage (51%) of the study sample had ≥ 10 years of service in health institutions And do not agree with Qasim (2015) who revealed that The highest percentage (77.14%) of the study sample has (1-5) years of service in health institutions. Study result

5. Training Session in Chemotherapy Treatment

The majority of the study participants were don't attend in training courses and constituted (50.5 percent).

Regarding participation in training courses in the field of Chemotherapy, (50.5%) in the study group and the control group did not have Participation in training courses, this may indicate a low level of the role Continuing Education Units in Hospital

This result agrees with Qasims (2015) point of view who presented that (62.9%) of nurses had no participation in training courses

While it disagrees with (Ulas et al., 2015) who revealed that the highest percent (60%) of study sample have training courses. In relation to the number of training courses inside or outside Iraq or both, (54.5%) in the study group had training courses inside Iraq, (27.3%) in the study group had training courses outside Iraq, and (18.2%) in the study and control group had both training courses inside and outside Iraq

This, may be indicated lacking of the role of continuing education units in hospitals under the study, by the other hand attending continuous nursing education courses and training programs have the benefits of maintenance nurses up-to-date and refining their knowledge in oncology (The researcher)

Part-II: Discussion Nurses responses regarding to General Nurse's information regarding chemotherapy drugs

Supporting people with cancer and their families involves specialized training in oncology nursing, which necessitates a higher level of clinical competency and understanding. (PMCC, 2015).

Table 4-2 shows the summary statistics of nurse's knowledge responses regarding to General Nurse's information regarding chemotherapy drugs

In the light of statistical analysis of mean score , the findings indicate that the (56.3 %) of nurses were fail in knowledge related to General Nurse's information regarding chemotherapy drugs , followed by those who are pass in knowledge (43.7 %).

This result agrees with Abdullah, D. A. H., & Rasheed, O. H. (2018). point of view who presented that (65%) of nurses The knowledge regarding chemotherapy was inadequate

In light of the statistical analysis of the average score in the table 4-3, this table shows the nurses' knowledge towards safe chemotherapy administration, Overall, the findings indicate that the (56.9%) of nurses were fail in knowledge related to safe chemotherapy administration, followed by those who are pass in knowledge (43.1%).

This result agrees with Abdullah, D. A. H., & Rasheed, O. H. (2018). point of view who presented that (65%) knowledge regarding safe chemotherapy administration was inadequate

Nurses' knowledge and training in chemotherapy were shown to have no significant association ($p > 0.05$), which is corroborated by Jabar's (2014) evaluation of the effectiveness of an educational program on nurses' knowledge. Regarding the radiation side effects at Baghdad's Al-Amal National Hospital for Cancer Treatment. After applying the educational program, it was determined that there was no statistical significance between nurses' knowledge and course participation at a p-value of 0.05.

Using a p-value equal to or less than 0.05, the relationship between nurses' knowledge of safe chemotherapy administration drugs and their gender schedule 4-5 shows that there is no statistical significance between nurses' gender and their overall assessment of nurses' knowledge of safe chemotherapy administration drugs.

6.1. Conculcion

1- The nurses' understanding of safe chemotherapy administration was inadequate. Moreover, nurses' knowledge of chemotherapeutic drugs was woefully lacking.

2- The association between general nurses information regarding chemotherapy drug and nurses (gender, years of experience, number of session) were statistically significant. Except in (age, educational level) were statistically not significant.

3- The association between nurses' knowledge regarding safe chemotherapy administration and nurses (gender, number of session) were statistically significant. Except in (age, educational level, years of experience) were statistically not significant

6.2. Recommendations

1. To ensure the safety of cancer center nurses, chemotherapeutic administration criteriamustbefollowed.

2. Emphasize on participating nurses in training session program specialized in chemotherapy administration inside and outside the country to increases the knowledge and competency of the nurse.

3. Nursing faculty should pay more attention for cancer disease and chemotherapy administration subject in the curriculum.

4. Establish postgraduate studies specialized in oncology nursing

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APPENDIX

APPENDIX 1. Ethical approval from Iraq

APPENDIX 2. Ethical approval from Çankiri Karatekin Üniversitesi

APPENDIX 3. Expert committee

APPENDIX 4. Questionnaire



APPENDIX 1 : Ethical approval from Iraq

Irak Cumhuriyeti
Sağlık Bakanlığı
AL-Diwaniyah Sağlık Dairesi
Eğitim ve İnsan Geliştirme Departmanı
Sayı: 690
Tarih: 09/12/2021

AL-Diwaniyah Birinci ve İkinci Bölgeye

Konu: Görevi kolaylaştırma

Saygılarımı sunarım,

Yüksek lisans öğrencisi (ALİ HUSSEIN JEBUR) tarafından sunulan araştırmasında görevini kolaylaştırmanıza ilgili yazılı talebe istinaden Türkiye Çankırı Üniversitesi / sağlık bilimleri enstitüsü/ AL-Diwaniyah Birinci ve İkinci Bölgelerine bağlı sağlık merkezlerindeki (NURSES KNOWLEDGE ABOUT GIVING CHEMOTHERAPY TO CANCER PATIENT IN AL-DIWANIYAH TEACHING HOSPITAL)
(AL-Diwaniyah Eğitim Hastanesinde kanser hastalarına kemoterapi verilmesi konusunda hemşirelerin bilgisi)
Araştırma bilgilerini yapmasında tarafımızdan bir mani olmadığını beyan ederiz. Kurumumuz araştırmayla ilgili maddi ve kanuni hiçbir sorumluluk kabul etmez.
Saygılarımızla...

Ekler:

Talep, Araştırma Bilgi Formu + Araştırma Beyanı

Uzman Doktor
Yahya Faleh Mohammed
Eğitim ve İnsan Geliştirme Departmanı Müdürü
09/12/2021
İmza /mühür

Bir Kopyası:
Eğitim ve İnsan Geliştirme Departmanı'na gönderilmiştir.

SÖZLEŞME
T.C. SAĞLIK BAKANLIĞI
AL-DIWANIYAH SAĞLIK DAİRESİ
EĞİTİM VE İNSAN GELİŞTİRME DEPARTMANI
09/12/2021
Sayı: 690

İyice Bilgiye Alınarak
Tercihlerinizi Gözetilerek
Taleplerden Birine Uygun
Çalışma Yerini Belirleyerek
Talep ve Araştırma
Çerçevesinde

İyice Bilgiye Alınarak
Taleplerden Birine Uygun
Çalışma Yerini Belirleyerek
Talep ve Araştırma
Çerçevesinde

APPENDIX 2: Ethical approval from Çankiri Karatekin Üniversitesi

T.C. ÇANKIRI KARATEKİN ÜNİVERSİTESİ ETİK KURUL DEĞERLENDİRME FORMU	
Toplantı No:	24
Araştırmanın Yürütücüsü:	ALİ HUSSEİN JEBUR AL-FATLAWİ
Araştırmanın Başlığı:	Al-Diwaniyah Eğitim Hastanesi'nde Kanser Hastalarına Kemoterapi Verilmesi Konusunda Hemşirelerin Bilgisi
Karar Tarihi:	07-02-2022
Kurul Görüşü:	Kabul Edilmiştir. Araştırmanın/Projenin uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur.

SONUÇ: Kabul Edilmiştir. Araştırmanın/Projenin uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur.

Başkan Prof. Dr. Hüseyin ODABAŞ İMZA	Başkan Yardımcısı Doç. Dr. Ela Özkan CANBOLAT İMZA
Üye Prof. Dr. Gülçihan YILDIRIM İMZA	Üye Doç. Dr. Hakan ÇOLAK İMZA
Üye Doç. Dr. Bilgehan TEKİN İMZA	Üye Doç. Dr. Emine ÇELİKSOY İMZA
Üye Dr. Öğr. Üyesi Serap Aslan COBUTOĞLU İMZA	Üye Dr. Öğr. Üyesi Haydar KOÇ İMZA
Üye Dr. Öğr. Üyesi Sühayla BOZKURT İMZA	Üye Avukat Mehmet ÇAKMAK İMZA

Mehmet GÜZEL
Bilgisayar İşletmeni
09.01.2022

APPENDIX 3 : Expert committee

WORKPLACE	YEARS OF SERVICE	SPECIALIZATION	THE SCIENTIFIC TITLE	NAME	NO
College Of Nursing / University Of Babylon	38	Community Health Nursing	Prof.	AMİN AJİL YASSER HADİ AL-YASİRİ	1
College Of Nursing / University Of Kufa	25	Community Health Nursing	Professor	FATIMA WANAS KHUDAIR AL- HASNAWI	2
University Of Kerbala \ College Of Nursing	25	Community Health Nursing	Assistant Professor	SELMAN HUSSAIN FARIS	3
Al Diwaniyah Teaching Hospital	12	General surgery and oncolgy surgery	specialist	Qassem Jabr Al- Naqib	4
Al Diwaniyah Teaching Hospital	13	Oncologist	specialist	Alaa Abdul Razzaq Al- Anbaki	5
Al Diwaniyah Teaching Hospital	11	Oncology board	specialist	Ahmed Abdul Ali Al-Mansoori	6
College Of Medicine / University Of Babylon	18	Community Medicine	Assistant Professor	AMIR KAZEM HUSSEIN AL- HUMAIRI	7
College Of Nursing / Warith AL-Anbiyaa	17	Community Health Nursing	Assistant Professor	MURTADHA KANİM ADEA	8
College of medicine / university of diwaniyah	10	Community Health	Assistant Professor	FATIMA KADHIM ALKHALDI	9
College Of Nursing / Baghdad University	25	Community Health Nursing	Assistant Professor	WİSSAM JABBAR QASSEM	10

APPENDIX 4 : Questionnaire

{QUESTIONNAIRE}

Part one : percent distribution of the nurses regarding to their demographical characteristic

AGE :-

18-23 () 24-29 () 30-35 () 36 and more ()

GENDER :-

Male () Female ()

LEVEL OF EDUCATION :-

Nursing school graduate () Nursing Diploma graduate.() Nursing Bachelor
graduate and more ()

YEARS OF SERVICE :-

Less than 1 () 1-5 () 6-10 () 13-18 () 19 and
More than ()

TRAINING SESSION :-

Not present () present ()

Part two: General Nurse's information regarding chemotherapy drugs

NO	ITEMS	CORRECT	INCORRECT
1	Physicians are the only person to dispense the chemotherapy.		
2	The nurse can give chemotherapy by verbal order from the physician or pharmacist		
3	Chemotherapy works to destroy cancer cells in some parts of the body.		
4	Chemotherapy works to kill cancer cells by intervening to DNA synthesis		
5	Cancer cells have resistance to chemotherapy.		
6	Chemotherapy can give only in the hospital.		
7	Chemotherapy works to destroy cancer cells and healthy cells in the body.		
8	Chemotherapy can recognize between fast growing cancer cells and fast-growing healthy cells		
9	Side effects of chemotherapy, vomiting and nausea		
10	Chemotherapy leads to delayed wound healing		
11	Analgesics can used before chemotherapy drug		
12	Chemotherapy cannot be given with radiotherapy		
13	Chemotherapy does not effect on vital signs of the patient.		
14	The dose of chemotherapy is measured in grams (gr).		

Part three: Nurse's knowledge regarding safe chemotherapy administration

1- Before giving chemotherapy, wash hands with:

- A-Water and soap
- B-Medical alcohol
- C-Iodine
- D-All the above

2- Where is chemotherapy prepared (before giving to patient)?

- A-beside the bed of patient
- B- chemotherapy is ready
- C-prepared in the pharmacy
- D-in the biosafety cabin (chemotherapy room)

3- When preparing chemotherapy:

- A-dilute with intravenous fluid
- B-do not dilute with intravenous fluid
- C-transferring with blood contents
- D-chemotherapy is giving directly to the vein

4- The nurse monitors the patient's condition when receiving chemotherapy:

- A-vital signs
- B-flow of venous fluid
- C-the presence or absence of a leak in chemotherapy
- D- all of above paragraphs

5-The role of the nurse when giving chemotherapy seen in:

- A-giving chemotherapy carefully
- B-teaching the patient the chemotherapy and educating him
- C-treatment of side effects of chemotherapy

D-all of the above *

6- Before giving chemotherapy, be sure to check:

A- The name and dosage of the medicine

B-rate and method of giving medicine

C- date of effectiveness of the medicine

D- all the above

7- What are the most dangerous types of intravenous leakage of chemotherapy?

A- Leakage over the skin

B- Leakage under the skin

C- Air embolism

D- all the above

8- Use an appropriate prophylactic combination when administering chemotherapy

A- Gloves

B- face mask

C- protective coat

D- all the above

9- Preferred number of nurses administering chemotherapy

A-one nurse for one patient undergoing chemotherapy

B- two nurses for one patient undergoing chemotherapy

C- one nurse for two patient

D- One nurse for three or more patients

10- Which of the following statements is correct about giving chemotherapy after surgery:

A- the chemotherapy is given one week after surgery

B -the chemotherapy is given two week after surgery

C- the chemotherapy is given six week after surgery

D- the chemotherapy is given six month after surgery

11- The person responsible for preparing the chemotherapy and giving it to the patient is -

A-nurse prepare the chemotherapy and gives it to the patient

B-the physician is prepare the chemotherapy and the nurse gives it to the patient

C- the pharmacist is prepare the chemotherapy and the nurse gives it to the patient

D- The pharmacist prepares the chemotherapy, the doctor gives it to the patient, and the nurse watches him

12- To avoid pain caused by a cannula or needle:

A- put cool compresses

B- put warm compresses

C- giving a drug like lidocaine

D- a massage for the place

13- Type of liquid used to mix chemotherapy:

A-normal saline

B-dextrose

C-ringer lactate

D-mannitol

14- The dose of chemotherapy depends on:

A-the patient weight and surface of the body area

B-the patient condition and progress of the disease

B- paragraph A+B

D-the dose depend on the physician

15-. Signs of severe hypersensitivity to chemotherapy:

A-rash and cramps

B-the redness of the area

C-fever

D-bronchospasm , drop in the blood pressure ,sever itching

CURRICULUM VITAE

Personal Information

Name and Surname : ALI HUSSEIN JEBUR AL-FATLAWI

Education : Bachelor of Nursing Sciences from Iraq

Undergraduate : A graduate student at Çankırı karatekin university
institute of health sciences department of nursing/ Turkey

Work Experience : worked in the Neurological Center for the treatment of stroke
and critical cases
worked in the oncology center and became familiar with various
cases

Year	Institution	Position
2022-Present	Çankırı Karatekin University,	Department of Nursing Research Asst.