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Impact of Structured Teaching Program on Management of Common Chemotherapy Side Effects Among Cancer Patients in Elmak Nimer University Hospital

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By: ***Sara Awad Elkareem Abdelrhman***

B.Sc Nursing – Shendi University

M.Sc Shendi University

Supervised by /

Dr .Zahir Yasin Mohmaed Ahmed

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(وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ)

(الشعراء80)

Dedication

To the sole of my father
To my lovely mother
To my husband Ahmed and my children
(Othman ,Reem , Raheeg and Omer)
To all the patients who participated in the study

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Abstract

Chemotherapy is designed to kill fast-growing cancer cells, but it can also affect healthy cells that grow quickly. These include cells that line the mouth and intestines, bone marrow cells and hair cells. Chemotherapy causes side effects when it harms these healthy cells.

This study was quasi-experimental type, designed in three steps: pre-program, program intervention and post program the tools which used was questionnaire developed by researcher . It was conducted in oncology unit in Elmak Nimer Hospital from December2012 to June 2015 , to assess the effect of planned education given to patients receiving chemotherapy on their symptom control and, thus, increases the self care of the patients. A total convenient sample of 60 patients participated in this study .

The result showed that nausea ,vomiting ,alopecia and diarrhea were the most frequently reported side effects . The frequencies of side effects were significantly decreased after the educational program especially nausea, vomiting, diarrhea and fatigue . Self care practice was improved, which affects positively the attitude and practice of patients. There was no relation between level of education and knowledge of patients regarding side effects **.**

Type of cancers most frequently reported in this study were breast cancer followed by lymphoma ,colorectal carcinoma and leukemia.

The commonest drug regimens used in this study were the (FAC), (Taxol , Carbo and Ac) and (FOLFOX4) , FEC and ABVDA regimens.

The recommendation pointed on developing a research which focuses on sequencing teaching information on side effects that are experienced in the initial phase of treatment and add information to patients as side effects are expected, to encourage the patients and family members to attend health education and counseling program about chemotherapy related side effects and to increase the number of qualified nurses at the chemotherapy in and outpatient clinics to provide the patients and family members with the necessary information.

ملخص البحث

يعمل العلاج الكيميائي علي قتل الخلايا السرطانية سريعة النمو، ولكنه يمكن أن يؤثر أيضا على الخلايا السليمة التي تنمو بسرعة. وتشمل هذه الخلايا التي تبطن الفم والأمعاء , خلايا نخاع العظم و خلايا الشعر. العلاج الكيميائي يسبب آثار جانبية عندما يؤذي هذه الخلايا السليمة.هذه الدراسة شبه التجريبية التي تم تصميمها في ثلاث خطوات: مرحلة ما قبل البرنامج، ومرحلة تدخل البرنامج ومرحلة بعدا لبرنامج لتقييم أثرا لبرنامج التعليمي حيث كانت اداة الدراسه استبيان تم تطوريه بواسطة الباحث. أجريت الدراسة في وحدة الأورام في مستشفى الملك نمرفي الفترة من ديسمبر2012 إلى يونيو 2015، لتقييم تأثير التعليم المخطط له للمرضى الذين يتلقون العلاج الكيميائي في التحكم و معالجةالاثار الجانبيه للعلاج الكيميائي ، وبالتالي يزيد من الرعاية الذاتية للمرضى. شملت عينة الدراسة 60 مريضاً.

أظهرت الدراسة أن الغثيان، التقيؤ، تساقط الشعر والإسهال هم أكثر الآثار الجانبية تكرارا .انخفضت نسبة حدوث الآثار الجانبية بشكل كبير بعد البرنامج التعليمي خصوصا الغثيان ,التقيؤ، الإسهال والتعب.وقد تحسنت ممارسة الرعاية الذاتية للمرضى مما يؤثر إيجابا على سلوك المرضى. كذلك اثبتت الدراسه انه ليس هناك علاقة بين مستوى التعليم و معرفة المرضى بالآثار الجانبية. أكثر أنواع السرطانات التي وجدت في هذه الدراسة هوسرطان الثدي يليه سرطان الغدد الليمفاوية وسرطان القولون والمستقيم وسرطان الدم. الأدوية الأكثر شيوعا في النظم العلاجية التي استخدمت في هذه الدراسة هي (FAC)، (تاكسول، كاربو وAC), (FEC , FOLFOX4 وABVDA.

أشارت التوصية على تطوير الأبحاث التي تركز على المعلومات عن الآثار الجانبية التي حدثت في المرحلة الأولى من العلاج وإضافة معلومات للمرضى عن الآثار الجانبية المتوقع حدوثها ، تشجيع المرضي وأفراد العائلة لحضور التثقيف الصحي وبرنامج المناصحة عن العلاج الكيميائي المتعلق بالآثار الجانبية وزيادة عدد الممرضين المؤهلين في العلاج الكيميائي في العيادات الخارجية وتزويد المرضي وأفراد العائلة بالمعلومات اللازمة.

List of abbreviations

PICC : Peripherally inserted central catheter

G-CSF: Granulocyte –colony stimulating factor

BMT : Bone marrow transplantation

CT : Computed tomography

DNA: Deoxyribonucleic acid

RNA: Ribonucleic acid

AML: Acute myeloid leukemia

CIN: Cervical intraepithelial neoplasia

SIP : Sphingosine-1-phosphate

GnRH: Gonadotropin Releasing Hormone

ECOG: Eastern Cooperative Oncology Group

BSA: Body surface area

BCG : Bacille Calmette-Guerin

FDA: Food and Drug Administration

SOS: Safe our souls(in case of emergency)

BID: Bis in die (twice daily)

TDS: Ter die sumendum (three times a day)

Hb: Hemoglobin level

WBC: White blood cell

1.Introduction

Cancer is one of the leading causes of morbidity and mortality in developed and developing countries. More than 11 million new cases of cancer are diagnosed each year and that number is expected to rise to 16 million by 2020. Cancer is responsible for 7 million or 12.5% of all deaths worldwide. The global burden of diseases is shifting from communicable diseases to non communicable diseases [(1)].

The health burden from preventable non communicable diseases, such as cardio vascular diseases, cancer, diabetics and chronic respiratory diseases, is increasing significantly throughout the world. The non communicable diseases are increasingly recognized as a major cause of morbidity and mortality i.e. accounts for about 60% of deaths worldwide. In the developed countries the cancer is the second leading cause and in developed countries cancer ranks third as a cause of death [(2)].

The word cancer derived from the Latin word crab, probably because of the way a cancer adheres to any part that it seizes upon in an obstinate manner like the crab. It is a popular, generic term because the actual medical term for cancer is neoplasia which, from the Greek, means new formation. Cancers are new growths of the cells in the human bodies. Malignant neoplasm refer to the fact that the new growth has virulent or adverse properties that it may display in the body. Through expression of these properties, it can cause destruction of major organs, and in some cases, life threatening disturbances in body function [(3)].

The most important effect of chemotherapy is that it kills cancer cells. However, chemotherapy can also affect normal cells and this may cause side

effects which vary greatly. Some people will have no side effects, others will experience a few. Reactions vary from person to person, according to the type of drugs used, and from one treatment period to the next. Side effects usually start during the first few weeks of treatment. Fortunately, most are temporary and can be managed during treatment [(4)].

Methods of treating client with cancer are surgery, radiation therapy, chemotherapy, biotherapy and bone marrow transplantation. The choice of therapy depends on the type of tumor, extent of disease, client's co morbid conditions, performance status and wishes. Radiation therapy is the use of high energy ionizing radiation to treat a variety of cancers [(4)].

In chemotherapy, anti neoplastic agents are used in an attempt to destroy tumor cells by interfering with cellular functions and reproduction [(5)]. The chemotherapy leads to side effects which generally depend on the type of therapy being offered. Most chemotherapy side effects cease after treatment. Although uncommon, some treatments may produce long-term effects [(6)]. The most common side effects of chemotherapy are anemia , diarrhea , constipation, fatigue, fertility issues, hair changes, infection, memory loss, menopause and menopausal symptoms, mouth and throat sores, nail changes, neuropathy, bleeding, pain, nausea and vomiting, weight changes, osteoporosis, heart problems, vision problems, flu-like symptoms and fluid retention[(7)].

The nurse has three main roles in the chemotherapy administration process to educate patients, administer and manage side effects. It is also identified that nurses must provide emotional support to patients and their relatives [(8)].

Rationale

- Cancer is one of the leading causes of morbidity and mortality in developed and developing countries.
- More than 11 million new cases of cancer are diagnosed each year and that number is expected to rise to 16 million by 2020. Cancer is responsible for 7 million or 12.5% of all deaths worldwide.
- Nurses are in a strategic position to lead efforts at changing attitudes and behaviors about cancer by providing adequate knowledge.
- The uncertainty about how to cope with the life threatening situations such as cancer, treatment, and resulting stress can be decreased by providing information about the treatment and side effects.
- Structured educational program proves to be beneficial in improving the knowledge of patients with cancer. From the clinical experience it was found that patients lack adequate knowledge related to their treatment and self care activities which motivated the investigator to take up the study.
- Knowledge acquired by patients will enable them to adapt measures to relieve discomforts caused by the side-effects of chemotherapy.

Objectives

General objective:

- To assess the impact of structured teaching program on management of common chemotherapy side effects among cancer patients.

Specific objectives:

- To assess patients knowledge regarding side effects of chemotherapy and coping strategies before and after teaching.
- To evaluate the impact of nursing intervention on self care practice of patients receiving chemotherapy.
- To design educational program about management of side effect and implement new strategies for decreasing cancer therapy burden in Sudan.
- To find out an association between pretest knowledge scores of patients admitted in cancer units and their selected demographic variables.

2. Literature Review

2.1. Cancer definition

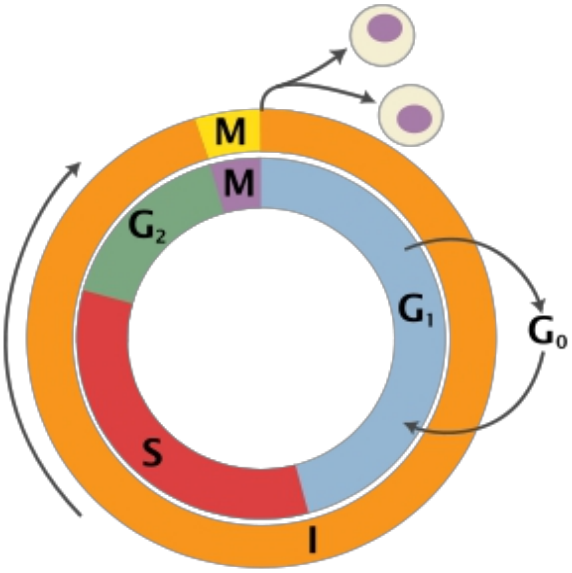
A malignant tumor or malignant neoplasm, is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. Not all tumors are cancerous; benign tumors do not spread to other parts of the body [8,9].

Possible signs and symptoms include a new lump, abnormal bleeding, a prolonged cough, unexplained weight loss, and a change in bowel movements, among others. While these symptoms may indicate cancer they may also occur due to other issues. There are over 100 different known cancers that affect humans [9, 10].

2.2. Scientific background

Cell cycle

The cell cycle, or cell-division cycle, is the series of events that take place in a cell leading to its division and duplication (replication) that produces two daughter cells. In cells without a nucleus (prokaryotic), the cell cycle occurs via a process termed binary fission. In cells with a nucleus (eukaryotes), the cell cycle can be divided in three periods: interphase, the mitotic (M) phase, and cytokinesis. During interphase the cell grows, accumulating nutrients needed for mitosis preparing it for cell division and duplicating its DNA. During the mitotic phase the cell splits itself into two distinct cells, often called 'daughter cells'. During the final stage, cytokinesis, the new cell is completely divided. The cell-division cycle is a vital process by which a single-celled fertilized egg develops into a mature organism, as well as the process by which hair, skin, blood cells, and some internal organs are renewed [11].



Schematic of the cell cycle. outer ring: I = Interphase, M = Mitosis; inner ring: M = Mitosis, G_1 = Gap 1, G_2 = Gap 2, S = Synthesis; not in ring: G_0 = Gap 0/Resting [11].

2.3. Epidemiology

In 2008, approximately 12.7 million cancers were diagnosed (excluding non-melanoma skin cancers and other non-invasive cancers) [12], and in 2010 nearly 7.98 million people died [13]. Cancers as a group account for approximately 13% of all deaths each year with the most common being: lung cancer (1.4 million deaths), stomach cancer (740,000 deaths), liver cancer (700,000 deaths), colorectal cancer (610,000 deaths), and breast cancer (460,000 deaths) [14]. This makes invasive cancer the leading cause of death in the developed world and the second leading cause of death in the developing world. Over half of cases occur in the developing world.[12]

Deaths from cancer were 5.8 million in 1990 and rates have been increasing primarily due to an aging population and lifestyle changes in the developing world [12] .The most significant risk factor for developing cancer is old age[15] . Although it is possible for cancer to strike at any age, most people who are diagnosed with invasive cancer are over the age of 65[16] . According to cancer researcher Robert A. Weinberg, "If we lived long enough, sooner or later we all would get cancer"[16] . Some of the association between aging and cancer is attributed to immunosenescence,[17] errors accumulated in DNA over a lifetime,[18] and age-related changes in the endocrine system[19] . The effect of aging on cancer is complicated with a number of factors such as DNA damage and inflammation promoting it and a number of factors such as vascular aging and endocrine changes inhibiting it [20] .

Some slow-growing cancers are particularly common. Autopsy studies in Europe and Asia have shown that up to 36% of people have undiagnosed and apparently harmless thyroid cancer at the time of their deaths, and that 80% of men develop prostate cancer by age 80As these cancers did not cause the person's death, identifying them would have represented over diagnosis rather than useful medical care[21,22].

The three most common childhood cancers are leukemia (34%), brain tumors (23%), and lymphomas (12%) [23]. In the United States cancer affects about 1 in 285 children [24]. Rates of childhood cancer have increased by 0.6% per year between 1975 to 2002 in the United States [25] and by 1.1% per year between 1978 and 1997 in Europe [23] Death from childhood cancer have decreased by half since 1975 in the United States [24] .

2.4 Risk factors

In the developing world nearly 20% of cancers are due to infections such as hepatitis B, hepatitis C, and human papilloma virus[8].

These factors act, at least partly; by changing the genes of a cell typically many such genetic changes are required before cancer develops [25]. Approximately 5–10% of cancers are due to genetic defects inherited from a person's parents [26].

Tobacco use is the cause of about 22% of cancer deaths another 10%is due to obesity, a poor diet, lack of physical activity, and drinking alcohol . Other factors include certain infections, exposure to ionizing radiation, and environmental pollutants [27].

2.5. Management of cancer

It mainly deals with over all cancer control which includes prevention, screening and early detection in addition to diagnosis and treatment.

Many treatment options for cancer exist, with the primary ones including surgery, chemotherapy, radiation therapy, hormonal therapy, targeted therapy and palliative care. Which treatments are used depends upon the type, location, and grade of the cancer as well as the person's health and wishes. The treatment intent may be radical or palliative.

Treatment strategies

There are a number of strategies in the administration of chemotherapeutic drugs used today.

Chemotherapy may be given with a curative intent or it may aim to prolong life or to palliate symptoms.

- Combined modality chemotherapy is the use of drugs with other cancer treatments, such as radiation therapy, surgery and/or hyperthermia therapy.
- Induction chemotherapy is the first line treatment of cancer with a chemotherapeutic drug. This type of chemotherapy is used for curative intent [28] .
- Consolidation chemotherapy is given after remission in order to prolong the overall disease-free time and improve overall survival. The drug that is administered is the same as the drug that achieved remission [29].
- Intensification chemotherapy is identical to consolidation chemotherapy but a different drug than the induction chemotherapy is used [29].
- Combination chemotherapy involves treating a patient with a number of different drugs simultaneously. The drugs differ in their mechanism and side-effects. The biggest advantage is minimizing the chances of resistance developing to any one agent. Also, the drugs can often be used at lower doses, reducing toxicity [29, 30].
- Neoadjuvant chemotherapy is given prior to a local treatment such as surgery, and is designed to shrink the primary tumor [28]. It is also given to cancers with a high risk of micrometastatic disease [31] .
- Adjuvant chemotherapy is given after a local treatment (radiotherapy or surgery). It can be used when there is little evidence of cancer present, but there is risk of recurrence [28]. It is also useful in killing any cancerous cells that have spread to other parts of the body. These micrometastases can be treated with adjuvant chemotherapy and can reduce relapse rates caused by these disseminated cells [32] .
- Maintenance chemotherapy is a repeated low-dose treatment to prolong remission [29] .

- Salvage chemotherapy or palliative chemotherapy is given without curative intent, but simply to decrease tumor load and increase life expectancy. For these regimens, in general, a better toxicity profile is expected [29] .

` All chemotherapy regimens require that the patient be capable of undergoing the treatment. Performance status is often used as a measure to determine whether a patient can receive chemotherapy, or whether dose reduction is required. Because only a fraction of the cells in a tumor die with each treatment (fractional kill), repeated doses must be administered to continue to reduce the size of the tumor [32] .Current chemotherapy regimens apply drug treatment in cycles, with the frequency and duration of treatments limited by toxicity to the patient[34] .

2.5.1. Chemotherapy:

Chemotherapy is the treatment of cancer with one or more cytotoxic anti-neoplastic drugs (chemotherapeutic agents) as part of a standardized regimen. The term encompasses any of a large variety of different anticancer drugs, which are divided into broad Traditional chemotherapeutic agents act by killing cells that divide rapidly, one of the main properties of most cancer cells.

2.5.1.1. Types of chemotherapy drugs

Chemotherapy drugs can be divided into several groups based on factors such as how they work, their chemical structure, and their relationship to another drug. Because some drugs act in more than one way, they may belong to more than one group.

Knowing how the drug works is important in predicting side effects. This helps oncologists decide which drugs are likely to work well together. If more than one drug will be used, this information also helps them plan exactly when each of the drugs should be given (in which order and how often) [31].

a) Alkylating agents

Alkylating agents directly damage DNA to prevent the cancer cell from reproducing. As a class of drugs, these agents are not phase-specific; in other words, they work in all phases of the cell cycle. Alkylating agents are used to treat many different cancers, including leukemia, lymphoma, Hodgkin disease, multiple myeloma, and sarcoma, as well as cancers of the lung, breast, and ovary.

Because these drugs damage DNA, they can cause long-term damage to the bone marrow. In rare cases, this can eventually lead to acute leukemia. The risk of leukemia from alkylating agents is "dose-dependent," meaning that the risk is small with lower doses, but goes up as the total amount of the drug used gets higher. The risk of leukemia after getting alkylating agents is highest about 5 to 10 years after treatment [31].

There are different classes of alkylating agents, including:

- Nitrogen mustards: such as mechlorethamine (nitrogen mustard), chlorambucil, cyclophosphamide (Cytoxan®), ifosfamide, and melphalan
- Nitrosoureas: which include streptozocin, carmustine (BCNU), and lomustine
- Alkyl sulfonates: busulfan
- Triazines: dacarbazine (DTIC) and temozolomide (Temodar®)
- Ethylenimines: thiotepa and altretamine (hexamethylmelamine)

b) Platinum agents

The platinum drugs (cisplatin, carboplatin, and oxalaplatin) are sometimes grouped with alkylating agents because they kill cells in a similar way. These drugs are less likely than the alkylating agents to cause leukemia later on [32].

c) Antimetabolites

Antimetabolites are a class of drugs that interfere with DNA and RNA growth by substituting for the normal building blocks of RNA and DNA. These agents damage cells during the S phase. They are commonly used to treat leukemias, cancers of the breast, ovary, and the intestinal tract, as well as other types of cancer [33].

Examples of antimetabolites include:

- 5-fluorouracil (5-FU)
- 6-mercaptopurine (6-MP)
- Capecitabine (Xeloda®)
- Cladribine
- Clofarabine
- Cytarabine (Ara-C®)
- Floxuridine
- Fludarabine
- Gemcitabine (Gemzar®)
- Hydroxyurea
- Methotrexate
- Pemetrexed (Alimta®)
- Pentostatin
- Thioguanine

d) Anti-tumor antibiotics

*** Anthracyclines**

Anthracyclines are anti-tumor antibiotics that interfere with enzymes involved in DNA replication. These drugs work in all phases of the cell cycle, they are widely used for a variety of cancers. A major consideration when giving these drugs is that they can permanently damage the heart if given in high doses. For this reason, lifetime dose limits are often placed on these drugs.

Examples of anthracyclines include:

- Daunorubicin
- Doxorubicin (Adriamycin®)
- Epirubicin
- Idarubicin

*** Other anti-tumor antibiotics**

e) Anti-tumor antibiotics that are not anthracyclines include:

- Actinomycin-D
- Bleomycin
- Mitomycin-C

Mitoxantrone is an anti-tumor antibiotic that is similar to doxorubicin in many ways, including the potential for damaging the heart. This drug also acts as a topoisomerase II inhibitor, and can lead to treatment-related leukemia. Mitoxantrone is used to treat prostate cancer, breast cancer, lymphoma, and leukemia [(34)].

f) Topoisomerase inhibitors

These drugs interfere with enzymes called topoisomerases, which help separate the strands of DNA so they can be copied. They are used to treat certain leukemias, as well as lung, ovarian, gastrointestinal, and other cancers.

Examples of topoisomerase I inhibitors include topotecan and irinotecan (CPT-11).

Examples of topoisomerase II inhibitors include etoposide (VP-16) and teniposide. Mitoxantrone also inhibits topoisomerase II.

Treatment with topoisomerase II inhibitors increases the risk of a second cancer — acute myelogen Sous leukemia (AML). With this type of drug, a secondary leukemia can be seen as early as 2 to 3 years after the drug is given [35].

g) Mitotic inhibitors

Mitotic inhibitors are often plant alkaloids and other compounds derived from natural products. They can stop mitosis or inhibit enzymes from making proteins needed for cell reproduction.

These drugs work during the M phase of the cell cycle but can damage cells in all phases. They are used to treat many different types of cancer including breast, lung, myelomas, lymphomas, and leukemia's. These drugs are known for their potential to cause peripheral nerve damage, which can be a dose-limiting side effect [36].

Examples of mitotic inhibitors include:

- Taxanes: paclitaxel (Taxol®) and docetaxel (Taxotere®)
- Epothilones: ixabepilone (Ixempra®)
- Vinca alkaloids: vinblastine (Velban®), vincristine (Oncovin®), and vinorelbine (Navelbine®)
- Estramustine (Emcyt®)

h) Corticosteroids

Steroids are natural hormones and hormone-like drugs that are useful in treating some types of cancer (lymphoma, leukemia's, and multiple myeloma), as well as other illnesses. When these drugs are used to kill cancer cells or slow their growth, they are considered chemotherapy drugs.

Corticosteroids are also commonly used as *anti-emetics* to help prevent nausea and vomiting caused by chemotherapy. They are used before chemotherapy to help prevent severe allergic reactions (hypersensitivity reactions), too. When a corticosteroid is used to prevent vomiting or allergic reactions, it's not considered chemotherapy.

Examples include prednisone, methylprednisolone (Solumedrol), and dexamethasone (Decadron) [36].

i) Miscellaneous chemotherapy drugs

Some chemotherapy drugs act in slightly different ways and do not fit well into any of the other categories.

Examples include drugs like L-asparaginase, which is an enzyme, and the proteosome inhibitor bortezomib (Velcade®).

j) Differentiating agents

These drugs act on the cancer cells to make them mature into normal cells. Examples include the retinoids, tretinoin (ATRA or Atralin) and bexarotene (Targretin), as well as arsenic trioxide (Arsenox)[37].

2.5.1.2. Deciding which chemotherapy drugs to use

In some cases, the best choice of doses and schedules for giving each drug are clear, and most oncologists would recommend the same treatment. In other cases, less may be

- Known about the single best way to treat people with certain types and stages of cancer.
- In these situations different cancer doctors might choose different drug combinations
- With different schedules.
- Factors to consider in choosing which drugs to use for a chemotherapy regimen include:
- The type of cancer
- The stage of the cancer (how far it has spread)
- The patient's age
- The patient's general state of health
- Other serious health problems (such as heart, liver, or kidney diseases)
- Types of cancer treatments given in the past.

2.5.1.3. Chemotherapy regimens

Chemotherapy regimens are regimens for chemotherapy that combine several chemotherapy drugs. These drugs are natural, semisynthetic, or synthetic substances with selective inhibitory effects against biological pathogenic agents (microorganisms) of humans and animals and against atypical (cancerous) cells. The majority of chemotherapeutic drugs can be divided into antifungal agents, antiprotozoal, antimicrobial, antitubercular, antileprotic, antihelmintic, antiviral, cytostatic, and other agents[38].

- A fundamental philosophy of medical oncology, including combination chemotherapy, is that different drugs work through different mechanisms, and that the results of using multiple drugs will be synergistic to some extent. Because they have different dose-limiting adverse effects, they can be given together at full doses in chemotherapy regimens [39].
- The first successful combination chemotherapy was MOPP introduced in 1963 for lymphomas.
- The term "induction regimen" refers to a chemotherapy regimen used for the initial treatment of a disease. A "maintenance regimen" refers to the ongoing use of chemotherapy to reduce the chances of a cancer recurring or to prevent an existing cancer from continuing to grow [40].
- Chemotherapy regimens are often identified by acronyms, identifying the agents used in the drug combination. However, the letters used are not consistent across regimens, and in some cases - for example, "BEACOPP" - the same letter combination is used to represent two different treatments.
- There is no widely accepted naming convention or standard for the nomenclature of chemotherapy regimens. For example, either generic or

brand names may be used for acronyms. This page merely lists commonly used conventions [41].list of regimen[42-43]in appendix.

2.5.1.4. Dosage

Dosage of chemotherapy can be difficult: If the dose is too low, it will be ineffective against the tumor, whereas, at excessive doses, the toxicity (side-effects) will be intolerable to the patient [44]. The standard method of determining chemotherapy dosage is based on calculated body surface area (BSA). The BSA is usually calculated with a mathematical formula or a nomogram, using a patient's weight and height, rather than by direct measurement of body mass. This formula was originally derived in a 1916 study and attempted to translate medicinal doses established with laboratory animals to equivalent doses for humans [45] . The study only included 9 human subjects. When chemotherapy was introduced in the 1950s, the BSA formula was adopted as the official standard for chemotherapy dosing for lack of a better option [45,46].

Recently, the validity of this method in calculating uniform doses has been questioned. The reason for this is that the formula only takes into accounts the individual's weight and height. Drug absorption and clearance are influenced by multiple factors, including age, gender, metabolism, disease state, organ function, drug-to-drug interactions, genetics, and obesity, which has a major impact on the actual concentration of the drug in the patient's bloodstream [47]. As a result, there is high variability in the systemic chemotherapy drug concentration among patients dosed by BSA, and this variability has been demonstrated to be more than 10-fold for many drugs[47] In other words, if two patients receive the same dose of a given drug based on BSA, the concentration of that drug in the bloodstream of one patient may be 10 times higher or lower compared to that of the other

patient[49] . This variability is typical with many chemotherapy drugs dosed by BSA, and, as shown below, was demonstrated in a study of 14 common chemotherapy drugs [50] .

The result of this pharmacokinetic variability among patients is that many patients do not receive the right dose to achieve optimal treatment effectiveness with minimized toxic side effects. Some patients are overdosed while others are under dosed [51]. For example, in a randomized clinical trial, investigators found 85% of metastatic colorectal cancer patients treated with 5-fluorouracil (5-FU) did not receive the optimal therapeutic dose when dosed by the BSA standard—68% were under dosed and 17% were overdosed[52].

There has been recent controversy over the use of BSA to calculate chemotherapy doses for obese patients [53] . Because of their higher BSA, clinicians often arbitrarily reduce the dose prescribed by the BSA formula for fear of overdosing. In many cases, this can result in sub-optimal treatment [54].

2.5.1.5. Administration

Most chemotherapy is delivered intravenously, although a number of agents can be administered orally (e.g., melphalan, busulfan, capecitabine).

There are many intravenous methods of drug delivery, known as vascular access devices. These include the winged infusion device, peripheral cannula, midline catheter, peripherally inserted central catheter (PICC), central venous catheter and implantable port. The devices have different applications regarding duration of chemotherapy treatment, method of delivery and types of chemotherapeutic agent [55].

Depending on the patient, the cancer, the stage of cancer, the type of chemotherapy, and the dosage, intravenous chemotherapy may be given on either an inpatient or an outpatient basis. For continuous, frequent or prolonged intravenous chemotherapy administration, various systems may be surgically inserted into the vasculature to maintain access. Commonly used systems are the Hickman line, the Port-a-Cath, and the PICC line. These have a lower infection risk, are much less prone to phlebitis or extravasations, and eliminate the need for repeated insertion of peripheral cannula [56].

Isolated limb perfusion (often used in melanoma), [57] or isolated infusion of chemotherapy into the liver [58] or the lung have been used to treat some tumors. The main purpose of these approaches is to deliver a very high dose of chemotherapy to tumor sites without causing overwhelming systemic damage [59]. These approaches can help control solitary or limited metastases, but they are by definition not systemic, and, therefore, do not treat distributed metastases or micrometastases.

Topical chemotherapies, such as 5-fluorouracil, are used to treat some cases of non-melanoma skin cancer [60].

If the cancer has central nervous system involvement, or with meningeal disease, intrathecal chemotherapy may be administered [43].

2.5.1.6. Chemotherapy side effects

Chemotherapeutic techniques have a range of side-effects that depend on the type of medications used. The most common medications affect mainly the fast-dividing cells of the body, such as blood cells and the cells lining the mouth, stomach, and intestines. Chemotherapy related toxicities can occur acutely after administration, within hours or days, or chronically, from weeks to years [61].

a) Immunosuppression and myelosuppression

Virtually all chemotherapeutic regimens can cause depression of the immune system, often by paralysing the bone marrow and leading to a decrease of white blood cells, red blood cells, and platelets. Anemia and thrombocytopenia, when they occur, are improved with blood transfusion. Neutropenia (a decrease of the neutrophil granulocyte count below 0.5 x 10^9/litre) can be improved with synthetic G-CSF (granulocyte-colony-stimulating factor, e.g., filgrastim, lenograstim).

- In very severe myelosuppression, which occurs in some regimens, almost all the bone marrow stem cells (cells that produce white and red blood cells) are destroyed, meaning allogenic or autologous bone marrow cell transplants are necessary. (In autologous BMTs, cells are removed from the patient before the treatment, multiplied and then re-injected afterward; in allogenic BMTs, the source is a donor.) However, some patients still develop diseases because of this interference with bone marrow.

Although patients are encouraged to wash their hands, avoid sick people, and take other infection-reducing steps, about 85% of infections are due to naturally occurring microorganisms in the patient's own gastrointestinal tract (including oral cavity) and skin[62]. This may manifest as systemic infections, such as sepsis, or as localized outbreaks, such as Herpes simplex, shingles, or other members of the Herpesviridea[63] . Sometimes, chemotherapy treatments are postponed because the immune system is suppressed to a critically low level.

In Japan, the government has approved the use of some medicinal mushrooms like Trametes versicolor, to counteract depression of the immune system in patients undergoing chemotherapy[64].

b) Typhlitis

Due to immune system suppression, typhlitis is a "life-threatening gastrointestinal complication of chemotherapy." Typhlitis is an intestinal infection which may manifest itself through symptoms including nausea, vomiting, diarrhea, a distended abdomen, fever, chills, or abdominal pain and tenderness[65].

Typhlitis is a medical emergency. It has a very poor prognosis and is often fatal unless promptly recognized and aggressively treated. Successful treatment hinges on early diagnosis provided by a high index of suspicion and the use of CT scanning, nonoperative treatment for uncomplicated cases, and sometimes elective right hemicolectomy to prevent recurrence [66].

c) Gastrointestinal distress

Nausea, vomiting, anorexia, diarrhea, abdominal cramps, and constipation are common side-effects of chemotherapeutic medications that kill fast-dividing cells. Malnutrition and dehydration can result when the patient does not eat or drink enough, or when the patient vomits frequently, because of gastrointestinal damage. This can result in rapid weight loss, or occasionally in weight gain, if the patient eats too much in an effort to allay nausea or heartburn. Weight gain can also be caused by some steroid medications. These side-effects can frequently be reduced or eliminated with antiemetic drugs. Self-care measures, such as eating frequent small meals and drinking clear liquids or ginger tea, are often recommended. In general, this is a temporary effect, and frequently

resolves within a week of finishing treatment. However, a high index of suspicion is appropriate, since diarrhea and bloating are also symptoms of typhlitis, a very serious and potentially life-threatening medical emergency that requires immediate treatment[67].

d) Anemia and bleeding

Anemia in cancer patients can be a combined outcome caused by myelosuppressive chemotherapy, and possible cancer-related causes such as bleeding, blood cell destruction (hemolysis), hereditary disease, kidney dysfunction, nutritional deficiencies and/or anemia of chronic disease. Treatments to mitigate anemia include hormones to boost blood production (erythropoietin), iron supplements, and blood transfusions. Myelosuppressive therapy can cause a tendency to bleed easily, leading to anemia. Medications that kill rapidly dividing cells or blood cells can reduce the number of platelets in the blood, which can result in bruises and bleeding. Extremely low platelet counts may be temporarily boosted through platelet transfusions and new drugs to increase platelet counts during chemotherapy are being developed[68,69]. Sometimes, chemotherapy treatments are postponed to allow platelet counts to recover [70, 71, 72].

e) Fatigue

Fatigue may be a consequence of the cancer or its treatment, and can last for months to years after treatment. One physiological cause of fatigue is anemia, which can be caused by chemotherapy, surgery, radiotherapy, primary and metastatic disease and/or nutritional depletion[73][74]. Anaerobic exercise has been found to be beneficial in reducing fatigue in people with solid tumors [75] .

f) Nausea and vomiting

Nausea and vomiting are two of the most feared cancer treatment-related side-effects for cancer patients and their families. In 1983, Coates et al. found that patients receiving chemotherapy ranked nausea and vomiting as the first and second most severe side-effects, respectively. Up to 20% of patients receiving highly emetogenic agents in this era postponed, or even refused, potentially curative treatments. Chemotherapy-induced nausea and vomiting (CINV) are common with many treatments and some forms of cancer. Since the 1990s, several novel classes of antiemetic have been developed and commercialized, becoming a nearly universal standard in chemotherapy regimens, and helping to successfully manage these symptoms in a large portion of patients. Effective mediation of these unpleasant and sometimes-crippling symptoms results in increased quality of life for the patient and more efficient treatment cycles, due to less stoppage of treatment due to better tolerance by the patient, and due to better overall health of the patient [(76)].

g) Hair loss

Hair loss (Alopecia) can be caused by chemotherapy that kills rapidly dividing cells; other medications may cause hair to thin. These are most often temporary effects: hair usually starts to regrow a few weeks after the last session, and sometimes can change colour, texture, thickness and style. Sometimes hair has a tendency to curl after regrowth, resulting in "chemo curls." Severe hair loss occurs most often with drugs such as doxorubicin, daunorubicin, paclitaxel, docetaxel, cyclophosphamide, ifosfamide and etoposide. Permanent thinning or hair loss can result from some standard chemotherapy regimens.

Chemotherapy induced hair loss occurs by a non-androgenic mechanism, and can manifests as alopecia totalis, telogen effluvium, or less often alopecia areata[77].

It is usually associated with systemic treatment due to the high mitotic rate of hair follicles, and more reversible than androgenic hair loss, [78 ,79] although permanent cases can occur[80]. Chemotherapy induces hair loss in women more often than men [81].

Scalp cooling offers a means of preventing both permanent and temporary hair loss, however concerns for this method have been raised [82, 83] .

h) Secondary neoplasm

Development of secondary neoplasia after successful chemotherapy and/or radiotherapy treatment can occur. The most common secondary neoplasm is secondary acute myeloid leukemia, which develops primarily after treatment with alkylating agents or topoisomerase inhibitors[84] .

Survivors of childhood cancer are more than 13 times as likely to get a secondary neoplasm during the 30 years after treatment than the general population. Not all of this increase can be attributed to chemotherapy[85].

i) Infertility

Some types of chemotherapy are gonadotoxic and may cause infertility . Chemotherapies with high risk include procarbazine and other alkylating drugs such as cyclophosphamide, ifosfamide, busulfan, melphalan, chlorambucil, and chlormethine. Drugs with medium risk include doxorubicin and platinum analogs such as cisplatin and carboplatin. On the other hand,

therapies with low risk of gonadotoxicity include plant derivatives such as vincristine and vinblastine, antibiotics such as bleomycin and dactinomycin, and antimetabolites such as methotrexate, mercaptopurine, and 5-fluorouracil[86] .

Female infertility by chemotherapy appears to be secondary to premature ovarian failure by loss of primordial follicles [94] . This loss is not necessarily a direct effect of the chemotherapeutic agents, but could be due to an increased rate of growth initiation to replace damaged developing follicles[87].

- Patients may choose between several methods of fertility preservation prior to chemotherapy, including cryopreservation of semen, ovarian tissue, oocytes, or embryos [88].
- As more than half of cancer patients are elderly, this adverse effect is only relevant for a minority of patients. A study in France between 1999 and 2011 came to the result that embryo freezing before administration of gonadotoxic agents to females caused a delay of treatment in 34% of cases, and a live birth in 27% of surviving cases who wanted to become pregnant, with the follow-up time varying between 1 and 13 years [89].

Potential protective or attenuating agents include GnRH analogs, where several studies have shown a protective effect in vivo in humans, but some studies show no such effect. Sphingosine-1-phosphate (S1P) has shown similar effect, but its mechanism of inhibiting the sphingomyelin apoptotic pathway may also interfere with the apoptosis action of chemotherapy drugs [90].

In chemotherapy as a conditioning regimen in hematopoietic stem cell transplantation, a study of patients conditioned with cyclophosphamide

alone for severe a plastic anemia came to the result that ovarian recovery occurred in all women younger than 26 years at time of transplantation, but only in five of 16 women older than 26 years[91].

j) Teratogenicity

Chemotherapy is potentially teratogenic during pregnancy, especially during the first trimester, to the extent that abortion usually is recommended if pregnancy in this period is found during chemotherapy. Second- and third-trimester exposure does not usually increase the teratogenic risk and adverse effects on cognitive development, but it may increase the risk of various complications of pregnancy and fetal myelosuppression[92].

Pregnancy criteria index

Pregnancy Category B. No evidence of risk in pregnancy.

Controlled studies in animals have shown that the drug poses a risk to the fetus. However, studies in pregnant women have failed to show such a risk. Controlled studies in animals do not show evidence of impaired fertility or harm to the fetus. However, similar studies have not been performed in humans. Because animal studies are not entirely predictive of human response, the drug should be used during pregnancy only if clearly needed [92].

Pregnancy Category C. Risk in pregnancy cannot be ruled out.

Controlled studies either have not been conducted in animals or show that the drug is teratogenic or has an embryocidal effect and /or other adverse effect in animals. However, there are no adequate and well-controlled studies in pregnant women . The drug should be used during

pregnancy only if the potential benefit justifies the potential risk to the fetus. The drug can cause fetal harm when administered to a pregnant women. If the drug is used during pregnancy, or if a patient becomes pregnant while taking this drug, the patient should be informed of the potential hazard to the fetus. However, the potential benefits of treatment may outweigh any potential risk.

Pregnancy Category D. Clear evidence of risk in pregnancy.

The drug has been shown to cause fetal harm when administered to a pregnant woman. The drug is absolutely contraindicated in women who are or who may become pregnant. If this drug is used during pregnancy or if a patient becomes pregnant while taking this drug, the patient should be informed of the potential hazard to the fetus. The potential risk, in the case, outweighs any potential benefit from treatment [(92)].

Pregnancy Category X. Absolutely contraindicated in pregnancy.

The drug has been shown to cause fetal harm when administered to a pregnant woman. The drug is absolutely contraindicated in women who are or who may become pregnant. If this drug is used during pregnancy or if a patient becomes pregnant while taking this drug, the patient should be informed of the potential hazard to the fetus. The potential risk, in the case, outweighs any potential benefit from treatment.

In males previously having undergone chemotherapy or radiotherapy, there appears to be no increase in genetic defects or congenital malformations in their children conceived after therapy. The use of assisted reproductive technologies and micromanipulation techniques might increase this risk. In females previously having undergone chemotherapy, miscarriage and congenital malformations are not increased in subsequent

conceptions. However, when in vitro fertilization and embryo cryopreservationis practised between or shortly after treatment, possible genetic risks to the growing oocytes exist, and hence it has been recommended that the babies be screened[93].

In males previously having undergone chemotherapy or radiotherapy, there appears to be no increase in genetic defects or congenital malformations in their children conceived after therapy. The use of assisted reproductive technologies and micromanipulation techniques might increase this risk. In females previously having undergone chemotherapy, miscarriage and congenital malformations are not increased in subsequent conceptions. However, when in vitro fertilization and embryo cryopreservationis practised between or shortly after treatment, possible genetic risks to the growing oocytes exist, and hence it has been recommended that the babies be screened[93].

k) Peripheral neuropathy

Between 30 and 40 percent of patients undergoing chemotherapy experience chemotherapy-induced peripheral neuropathy (CIPN), a progressive, enduring, and often irreversible condition, causing pain, tingling, numbness and sensitivity to cold, beginning in the hands and feet and sometimes progressing to the arms and legs[93].

Chemotherapy drugs associated with CIPN include thalidomide, epothilones, vinca alkaloids, taxanes, proteasome inhibitors, and the platinum-based drugs [93 ,94,95].

Whether CIPN arises, and to what degree, is determined by the choice of drug, duration of use, the total amount consumed and whether the patient

already has peripheral neuropathy. Though the symptoms are mainly sensory, in some cases motor nerves and the autonomic nervous system are affected[96].

CIPN often follows the first chemotherapy dose and increases in severity as treatment continues, but this progression usually levels off at completion of treatment. The platinum-based drugs are the exception; with these drugs, sensation may continue to deteriorate for several months after the end of treatment. Some CIPN appears to be irreversible [97].

Pain can often be managed with drug or other treatment but the numbness is usually resistant to treatment [98] .

l) Cognitive impairment

Some patients report fatigue or non-specific neurocognitive problems, such as an inability to concentrate; this is sometimes called post-chemotherapy cognitive impairment, referred to as "chemo brain" by patients' groups[99] .

m) Tumor lysis syndrome

In particularly large tumors and cancers with high white cell counts, such as lymphomas, teratomas, and some leukemias, some patients develop tumor lysis syndrome. The rapid breakdown of cancer cells causes the release of chemicals from the inside of the cells.

Following this, high levels of uric acid, potassium and phosphate are found in the blood. High levels of phosphate induce secondary hypoparathyroidism, resulting in low levels of calcium in the blood. This causes kidney damage and the high levels of potassium can cause cardiac arrhythmia. Although prophylaxis is available and is often initiated in patients

with large tumors, this is a dangerous side-effect that can lead to death if left untreated [100] .

n) Organ damage

Cardiotoxicity (heart damage) is especially prominent with the use of anthracycline drugs (doxorubicin, epirubicin, idarubicin, and liposomal doxorubicin). The cause of this is most likely due to the production of free radicals in the cell and subsequent DNA damage. Other chemotherapeutic agents that cause cardiotoxicity, but at a lower incidence, are cyclophosphamide, docetaxel and clofarabine [101] .

Hepatotoxicity (liver damage) can be caused by many cytotoxic drugs. The susceptibility of an individual to liver damage can be altered by other factors such as the cancer itself, viral hepatitis, immunosuppression and nutritional deficiency. The liver damage can consist of damage to liver cells, hepatic sinusoidal syndrome (obstruction of the veins in the liver), cholestasis (where bile does not flow from the liver to the intestine) and liver fibrosis[102.103] .

Nephrotoxicity (kidney damage) can be caused by tumor lysis syndrome and also due direct effects of drug clearance by the kidneys. Different drugs will affect different parts of the kidney and the toxicity may be asymptomatic (only seen on blood or urine tests) or may cause acute renal failure [104,105] .

Ototoxicity (damage to the inner ear) is a common side effect of platinum based drugs that can produce symptoms such as dizziness and vertigo [106 ,107] .

o) Other side-effects

Less common side-effects include red skin (erythema), dry skin, damaged fingernails, a dry mouth (xerostomia), water retention, and sexual impotence. Some medications can trigger allergic or pseudoallergic reactions.

Specific chemotherapeutic agents are associated with organ-specific toxicities, including cardiovascular disease(e.g., doxorubicin), interstitial lung disease (e.g., bleomycin) and occasionally secondary neoplasm (e.g., MOPP therapy for Hodgkin's disease[).]

2.5.2.Radiation

Radiation therapy involves the use of ionizing radiation in an attempt to either cure or improve the symptoms of cancer. It works by damaging the DNA of cancerous tissue leading to cellular death. To spare normal tissues (such as skin or organs which radiation must pass through to treat the tumor), shaped radiation beams are aimed from several angles of exposure to intersect at the tumor, providing a much larger absorbed dose than in the surrounding, healthy tissue. As with chemotherapy, different cancers respond differently to radiation therapy [(108 ,109,110)] .

Radiation therapy is used in about half of all cases and the radiation can be from either internal sources in the form of brachytherapy or external sources. Radiation is typically used in addition to surgery and or chemotherapy but for certain types of cancer, such as early head and neck cancer, may be used alone. For painful bone metastasis, it has been found to be effective in about 70% of people [(111)].

2.5.3. Surgery

Surgery is the primary method of treatment of most isolated solid cancers and may play a role in palliation and prolongation of survival. It is typically an important part of making the definitive diagnosis and staging the tumor as biopsies are usually required. In localized cancer surgery typically attempts to remove the entire mass along with, in certain cases, the lymph nodes in the area. For some types of cancer this is all that is needed to eliminate the cancer [(111)].

3.5.4.Palliative care

Palliative care refers to treatment which attempts to make the person feel better and may or may not be combined with an attempt to treat the cancer. Palliative care includes action to reduce the physical, emotional, spiritual, and psycho-social distress experienced by people with cancer. Unlike treatment that is aimed at directly killing cancer cells, the primary goal of palliative care is to improve the person's quality of life.

People at all stages of cancer treatment should have some kind of palliative care to provide comfort. In some cases, medical specialty professional organizations recommend that people and physicians respond to cancer only with palliative care and not with cure-directed therapy. This includes [(112)] .

1. people with low performance status, corresponding with limited ability to care for themselves[(112)].
2. people who received no benefit from prior evidence-based treatments[(112)].
3. people who are not eligible to participate in any appropriate clinical trial .

4. People for whom the physician sees no strong evidence that treatment would be effective [112].

Palliative care is often confused with hospice and therefore only involved when people approach end of life. Like hospice care, palliative care attempts to help the person cope with the immediate needs and to increase the person's comfort. Unlike hospice care, palliative care does not require people to stop treatment aimed at prolonging their lives or curing the cancer.

Multiple national medical guidelines recommend early palliative care for people whose cancer has produced distressing symptoms (pain, shortness of breath, fatigue, nausea) or who need help coping with their illness. In people who have metastatic disease when first diagnosed, oncologists should consider a palliative care consult immediately. Additionally, an oncologist should consider a palliative care consult in any person they feel has less than 12 months of life even if continuing aggressive treatment[113,114,115] .

2.5.5. Cryotherapy (Cryoablation)

Cryotherapy or cryoablation (Cryo is from the Greek for frost or extreme cold. Ablation refers to removal or elimination.) is the use of extreme cold to kill tumor cells. A probe containing an extremely cold fluid is placed inside/on the area to be treated and the tumor (or abnormal growth) is frozen. Cryotherapy can be performed during an open (fully invasive) surgery or the probes can be inserted through the skin in a minimally invasive procedure [115].

Cryotherapy is used to treat several different pre-cancerous and cancerous conditions, including: kidney cancer lung cancer, esophageal cancer, liver cancer , cervical intraepitheal neoplasia (CIN), prostate cancer, retinoblastoma and skin neoplasms[117].

2.5.6. Targeted Therapy

Specially targeted delivery vehicles aim to increase in effective levels of chemotherapy for tumor cells while reducing effective levels for other cells. This should result in an increased tumor kill and/or reduced toxicity [118]

.

2.5.7. Hormone therapy

Drugs in this category are sex hormones, or hormone-like drugs, that change the action or production of female or male hormones. They are used to slow the growth of breast, prostate, and endometrial (uterine) cancers, which normally grow in response to natural hormones in the body. These cancer treatment hormones do not work in the same ways as standard chemotherapy drugs, but rather by preventing the cancer cell from using the hormone it needs to grow, or by preventing the body from making the hormones [119].

Examples include:

The anti-estrogens: fulvestrant (Faslodex®), tamoxifen, and toremifene (Fareston®)

Aromatase inhibitors: anastrozole (Arimidex®), exemestane (Aromasin®), and letrozole (Femara®)

Progestins:megestrol acetate (Megace®)

Estrogens

Anti-androgens: bicalutamide (Casodex®), flutamide (Eulexin®), and nilutamide (Nilandron®)

1. Gonadotropin-releasing hormone (GnRH), also known as luteinizing hormone-releasing hormone (LHRH) agonists or analogs: leuprolide (Lupron®) and goserelin (Zoladex®)

2.5.8.Immunotherapy

Some drugs are given to people with cancer to stimulate their natural immune systems to recognize and attack cancer cells. These drugs offer a unique method of treatment, and are often considered to be separate from chemotherapy. Compared with other forms of cancer treatment such as surgery, radiation therapy, or chemotherapy, immunotherapy is still fairly new.

There are different types of immunotherapy. Active immunotherapies stimulate the body's own immune system to fight the disease. Passive immunotherazpies do not rely on the body to attack the disease; instead, they use immune system components (such as antibodies) created outside the body [119].

Types of immunotherapies and some examples include:

- Monoclonal antibody therapy (passive immunotherapies), such as rituximab (Rituxan®) and alemtuzumab (Campath®)
- Non-specific immunotherapies and adjuvants (other substances or cells that boost the immune response), such as BCG, interleukin-2 (IL-2), and interferon-alfa
- Immunomodulating drugs, for instance, thalidomide and lenalidomide (Revlimid®)
- Cancer vaccines (active specific immunotherapies). In 2010, the FDA approved the first vaccine to treat cancer (the Provenge® vaccine for

advanced prostate cancer); other vaccines for many different types of cancer are being studied.

2.5.9.Alternative medicine

Complementary and alternative cancer treatments are a diverse group of health care systems, practices, and products that are not part of conventional medicine[120] . "Complementary medicine" refers to methods and substances used along with conventional medicine, while "alternative medicine" refers to compounds used instead of conventional medicine [121] . Most complementary and alternative medicines for cancer have not been rigorously studied or tested. Some alternative treatments have been investigated and shown to be ineffective but still continue to be marketed and promoted. Cancer researcher Andrew J. Vickers has stated: "The label 'unproven' is inappropriate for such therapies; it is time to assert that many alternative cancer therapies have been 'disproven'"[122] .

2.5.10. Performance status

Performance status is an attempt to quantify cancer patients' general well-being and activities of daily life. This measure is used to determine whether they can receive chemotherapy, whether dose adjustment is necessary, and as a measure for the required intensity of palliative care. It is also used in oncological randomized controlled trials as a measure of quality of life [123].

3.5.10.1.Scoring systems

There are various scoring systems. The most generally used are the Karnofsky score and the Zubrod score, the latter being used in publications by the WHO. For children, the Lansky score is used. Another common system is the Eastern Cooperative Oncology Group (ECOG) system [124].

2.5.10.2. ECOG/WHO/Zubrod score [123]

The Eastern Cooperative Oncology Group (ECOG) score (published by Oken *et al.* in 1982), also called the WHO or Zubrod score (after C. Gordon Zubrod), runs from 0 to 5, with 0 denoting perfect health and 5 death: Its advantage over the Karnofsky scale lies in its simplicity[124].

- 0 – Asymptomatic (Fully active, able to carry on all predisease activities without restriction)

1 – Symptomatic but completely ambulatory (Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature. For example, light housework, office work)

2 – Symptomatic, <50% in bed during the day (Ambulatory and capable of all self care but unable to carry out any work activities. Up and about more than 50% of waking hours)

3 – Symptomatic, >50% in bed, but not bedbound (Capable of only limited self-care, confined to bed or chair 50% or more of waking hours)

4 – Bedbound (Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair)

5 – Death

2.5.11. The role and responsibilities of the nurse

Where once chemotherapy administration was the domain of doctors it has been the nurse in the last two decades who is responsible for ensuring that patients receive their treatments safely. During this time there have been

significant changes in the number of patients undergoing chemotherapy treatments and the way it is administered. The nurse has three main roles in the chemotherapy administration process (to educate patients, administer and manage side effects). It is also identified that nurses must provide emotional support to patients and their relatives and act as a facilitator of learning and a role model to less experienced staff [124].

Other nursing responsibilities include taking all necessary actions to ensure that the environment and the nurse themselves are safe, e.g. disposing of waste safely and wearing protective clothing. Nurses therefore have a legal and professional responsibility to feel competent in this role and follow all of the procedures laid down by the organization within which they work, to ensure the safe handling, delivery and disposal of cytotoxic drugs [125].

3. Materials & Methods

3.1. Study design

This study was Quasi experimental, hospital based research. A quasi study was designed in three steps: pre-program, program intervention and post program for assessing the effect of the teaching program. The intervention tackled the three main areas: knowledge, attitude and practice of the subjects regarding management of common chemotherapy side effects.

3.2 Study duration

Period from October 2012 to June 2015 (30/12).

3.3. Study area

Shendi locality is one of the localities of the River Nile State. It is bounded by Khartoum state in south, Elddamer locality in the north, River Nile to the west and Gadarif state to the east. The total area of the locality is about 14596 Km2. Geographically it lies between line 36 east to 31 west longitudinal and line 19 north to line 15 south latitudinal in the arid zone of Sudan.

3.4. Setting:

This study was carried out at oncology unit at Elmeck Nimer University hospital. This hospital was established since 2002. It's the second university hospital in the Sudan. The hospital provides most types of medical services (medicine. Surgery. Obs/Gyne and pediatric). Beside these there are cardiac, renal, and oncology centers). In the hospital there is a theater complex in which most type of general operations can be done (caesarean section, GIT surgery and orthopedic surgery …ect).The oncology unit included early detection of ca breast unit, Iodine therapy unit and

chemotherapy unit which started at 2009 the total number of patient seen in chemotherapy unit about one thousand patients since establishment .

3.5. Study population and sample:-

A total convenient sample of all cancer patients in the study period (sixty) fulfilling the inclusion criteria were included in the study.

Inclusion Criteria:

- All patients were 18 years or older
- Received chemotherapy at Elmak Nimer hospital during study period.
- Patient accepted to participate in the study after explaining the purpose of study.
- Patient received at least one cycle of chemotherapy.

Exclusion Criteria:

- Patients received chemotherapy but associated with severe illness (performance status less than three).
- Receiving concomitant chemo-radiotherapy.
- Death of patients who participated in the pre study and received the teaching program before participation in post test.

3.6. Tools:-

Questionnaire

Data was collected by interviewing the patients using structured questionnaire developed by the researcher including the following parts.

Part I

Questions about demographic data (age, gender, educational level, occupation, area of residence, tribe and marital status.

Part II

Self care practice of patient regarding Infection:-

Questions about occurrence of infection during periods of treatment, seeking with doctors when taking drugs and knowledge and attitude regarding protection from infection.

Part III

Attitude and knowledge of patient regarding anemia and fatigue:-

Frequency of signs and symptoms of fatigability and anemia, knowledge of patients about causes of fatigability, time of fatigability, action done after feeling tired and knowledge of patients regarding fluid intake and dietary plan .

Part IV

Knowledge& self care practice of patient about bleeding problems:-

Occurrence of bleeding with chemotherapy, signs of skin bleeding, Knowledge about site of bleeding, attitude of patients regarding protection and bleeding management.

Part V:-

Attitude and knowledge of patient regarding management of diarrhea:-

Occurrence of diarrhea, knowledge of patients about causes of diarrhea and the type of fluids or foods which is needed to be increased decreased or avoided during diarrhea.

Part VI:-

Knowledge of patient and attitude about nausea & vomiting:-

Feeling of nausea and vomiting development, compliance to antiemetic drugs, number of meals during this period, attitude of patients regarding non pharmacological management of nausea and vomiting.

Part VII:-

Knowledge and self care practice of patient about occurrences of hair loss (alopecia):-

This section include knowledge about the cause of hair loss, time of hair loss after starting chemotherapy, time of hair grow ,type of cleaners used to wash hair loss areas and action done after hair loss started.

Part VIII:-

Knowledge & self care practice of patients regarding constipation:-

This includes knowledge of patient about, definition of constipation, frequency of defecation, food and fluids help to manage constipation and duration of exercise during the day.

Part IX:-

Knowledge & practice about nerve changes: -

The section includes questions about occurrence of signs and symptoms of nerve change and the periods of nerve change after received chemotherapy.

Part X:-

Self care practice of patients regarding pain management:-

This section include questions about, feeling of pain, site of pain, frequency of analgesic drugs use, response of pain to drugs and characteristic of pain .

Part X1:-

Nursing assessment:-

In this section the researcher evaluated the performance status of the patients before starting interview ,also check the patient weight, HB,WBC, before and after program .Also checked the diagnosis, drugs regimen and cycle number taking .

3.7. Validity and reliability of the tools:

The questionnaire in its initial form has been presented to the supervisor who gave his opinion by adding, excluding or amending some of the statements of the questionnaire.

After the verification of the validity of the questionnaire, then it was distributed to 7 patients who were not included later in the study sample as pilot study.

It was conducted during January 2013 in order to test applicability of the tools of data collection, and to estimate the time required for filling the required forms. The reliability of the questionnaire was (0, 78).

3.8. Score system:

Knowledge: For the knowledge items, a correct response was scored (1) and the incorrect (zero). For each area of knowledge, the scores of the items were sum med-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score.

Knowledge was considered good if the percent score was 75% or more, satisfy if the percentage score between 40%-75% and poor if the percentage less than 40%.

3.9. Data collection technique:

Three tools were used to collect data: a sociodemograph characteristics data form, knowledge about common chemotherapy side effect and attitude of patients regarding management of developing side effect.

- Pretest: -

  This was done on the day of dose administration to assess the knowledge and attitude of patient regarding chemotherapy side effects.

- Post test**:** -

  The same questionnaire was done in post test to evaluate the effect of the program.

- Periods of pre and post test took 1year and 3months.The evaluation was done every 3 weeks depending on availability of patients.

3.10. Health educational program:-

An educational program intervention was developed in small book in simple Arabic language included image to facilitate learning to the patients, to increase patients' knowledge and encourage self care by changing patient attitude regarding chemotherapy side effect and their management.

Implementation of the program

The program was designed to satisfy the actual educational need of the study subjects, to increase the knowledge and change the attitude regarding common side effect of chemotherapy and self care practice of the patients.

The time of meeting with study group was weekly in the hot day (the day of administration of doses) in the oncology department in Elmak Nimer hospital .After pre test which filled by researcher , implantation of the program was started .initially when number of patients was large , the program was introduced as lecture ,which took one hours interrupted by comedy videos to change the mode and increase the attention to the program .The program include definition of chemotherapy and way of

management of common side effects supported with images to facilitate the teaching (the group composed of 3-8 patients and total number of lectures were 10) . Then with reduction of number of patients the program was conducted individually, this way was very affective because the patient had more concentration and attention.

The researcher supplied the patients involved in the program with small gifts used in management of side effects like (soft brush, electrical shaver, anti septic soap…etc).

3.11. Modules:

Real objects (soft brushes, anti septic swap, electric razor, shampoo and masks) to aid learning of patients were given to them and also hand out of the program with high quality well colored and supported with image to facilitated education of patients if they were illiterate.

The researcher had used different media as charts, animation, colored pictures showing the common side effects and their management.

3.12. Ethical considerations

The study was approved by ethical committee of the colleuge and the institute research board of the university.

Before conducting the study permission was taken from hospital general manager.

The purpose of study was explained to each one of responders, and the researcher assured them that the data collected from the questionnaire will remain confidential and it's not allowed for any person to identify it. Responders were informed that they could refuse to participate in the study, and withdraw from it at any time.

3.13. Data analysis:

After the data was collected, it was coded and SPSS (version 16) was used for analysis and Pearson Chi square test for statistical significance

(P.value).

The following statistical measures were used:

1. Descriptive measures include count, percentage, and arithmetic mean, standard deviation, minimum and maximum.
2. statistical test include : Chi square test , T test was used for quantitative variables
3. Graphical presentation includes Bar graph, Pie graph.
4. The level of significance selected for this study was P. value equal to or less than 0.05.

3.13. Limitations of the study:

The researchers were faced with many logistic problems and spent much effort to convince and explain the objectives of the study. They were faced with refusals from patients due to, cancer related fears and wrong beliefs. Also the turn off of patients by escaping before post test and death of patients this affected the total number of study group after exclusion.

4. Results

Part I	Personal data (gender, age, tribe, residence Occupation marital status and education)
Part II	Self care practice of patient regarding Infection
Part III	Attitude& knowledge of patient regarding anemia & Fatigue
Part IV	Knowledge& self care practice of patient about bleeding disorder
Part V	Attitude and knowledge of patient regarding management of diarrhea
Part VI	Knowledge of patient and attitude about nausea & vomiting
Part VII	Knowledge and self care practice of patient about occurrences of hair loss (alopecia)
Part VIII	Knowledge & self care practice of patients regarding constipation
Part IX	knowledge &practice about nerve changes
Part X	Self care practice of patients regarding pain management
Part XI	Nursing assessment

4.1. Table (1-2):-characteristic of study group

The study included 60 patients sex of study group (23.3%) male while female (76.7%) with female predominance. Age distribution age group 18-25 years were (13. 3%),36-45 years were (20%) ,46-55were (33.3%) ,56-65years were (20%) and above 75years were(10%) .Regarding tribes (76.7%) were Galeen , (3,3%) were Shagia ,(16.7%) other type of tribes .Level of education of group was(33,3%) were illiterate (28.3%) primary education (26.7%) were secondary education and (8.3%) were university education .About occupation of group (68.3%) were not employ ,(13,3%)were employ and (15%) were free worker . Regarding marital status (76.7 %) was married .

4.2 Infection

Regarding occurrence of infection (45%) in pre versus (21%) in post developed infection ,(55%) in pre(78%)in post not developed with P.value of (0.012) . Doctor advise when taking any drugs was (40%) in pre versus (95%)in post ,(60%)in pre (5%) in post were not advised witch it P=(0.000) . as shown in table (3) .

About time of hand washing (28.3%) in pre versus (96.7%) in post had good practice and (28.3%) in pre versus (1.7%) in post had poor practice with P.value (0.000) .

Regarding avoidance of infected people (28.3%) in pre (93.3%) in post were avoided,(4%) in pre (6.7%) in post were not avoided with P-value(0.000) .Avoidance of crowdedness was (36.7%) in pre (96.7%) in post ,while(63.3%) in pre (3.3%) in post not avoided crowdedness. with P.value of (0.000) as shown in table (4) .

Regarding prevention of infection washing of fruit or vegetables (85%) were washed in pre versus (98.7%) in post with P.value 0,027.Habit of un

cooked meet (56.7%) in pre eaten versus (43%) not eaten (98.3%) not eaten versus (1.7%) in post P=0.000.and time of tooth brush and type of brush which is shown in table (5) .

4.3. Anemia and fatigue:-

Table (6) showed symptoms of anemia .Regarding feeling of dizziness or faint in pre (33.3%) sometimes have feeling ,(63.3%) had no feeling compare to(8.3%)in post had sometimes feeling (90%) had no feeling .P.value (0.001).

Feeling of fatigability(18.3%) were always have fatigue versus (5%) in post (66.7%) were sometimes develop fatigue in pre versus (38.3%) in post and (15%) had no feeling of fatigue in pre versus (56.7%) in post with P.value (0.000).About shortness of breathing (81,7%) normal breathing in pre compare to (93.3%) in post .P=value (0.019).

Fatigability (causes and times) was shown in table (7) .Regarding knowledge of the group about cause of fatigue (45%)in pre versus (86%) their knowledge was good ,(43.3%) in pre (11.7%) in post their knowledge was poor. with P.value 0.000.Times of feeling fatigability of group(25%)in pre versus (11.7%) in post were develop fatigue at rest,

(43.3%) in pre (6.7%) in post were develop at mild activity with (41. 7%) in post free from feeling of fatigue .P.value (0.000).

Action done after feeling fatigue (10%) in pre versus (73,3%) their action was good(, 73.3%) in pre versus (11%) in post their action was poor

P= (0.000).Duration of sleeping of group restrict in 4-8 hours during day (53,3%) in pre versus (13.3%) in post witch(45%)in pre (85%) in post were sleeping more than 8 hours with P.value (0.000)Action done before getting up(31.7%)in pre (88.3%) in post sit for moment before stand and (63.3%) in

pre versus (11.7%) in post were stand directly= (0.000).this is shown in table (8).

Table (9) show anemia nutritional patterns. Regarding amount of fluids taking during day (23.3%) took >1liters in pre versus(5%) in post (33.3%) took1->3litrs in pre (16.7%) in post ,(43.3%)took 3litrs& above in pre versus(78.3%) in post for with P.value (0.001).Regarding meal number (26.7%)have 2meal,(46.7%)have 3 meals ,and(26.7%) 4-6 meals in pre .In post(13.3%)have 2meals,(28.3%)have 3meals and (58.3%)have 4-6 meals P.value 0.000.Compilance to iron pills (51.7%) took it regularly and (18.3%) not taken in pre. In post (55%) taken regularly and (8.3%) not taken P.value is (0.775).

4.4Bleeding :-

Table (10) shows the bleeding occurrence, site of it and knowledge about the other site of bleeding. For bleeding (11.7%) in pre(8.7%) in post had bleeding ,(88.3%) in pre compare to(91.8%) in post not having bleeding .P.value =0.568.Regarding skin bleeding (90%) in pre versus (95%) in post not having skin bleeding with P.value (0.181).

Knowledge about site of bleeding was good in (28.3%) in pre versus (88.3%) in post and (50%) in pre (10%) in post had poor knowledge .P.value (0.000).

Regarding protection from bleeding which is shown in table (11) (78.6%) in pre versus (21.4%) in post used razor while electric Shafer were(21,4%) in pre (78.6%) in post with P.value(0.000).About wearing of shoes (75%) in pre versus (96.7%) in post wearing shoes all the times and (25%)in pre (3.3%) in post wearing shoes sometimes P=(0.001). Regarding blowing of nose gently ,(16.7%) in pre (96.7%) in post blowing their nose gently and (83.3%) in pre (3.3%) in post were not gently with P.value0.000 .Uses of dental floss or

toothpicks about(63.3%) in pre (8.3%) in post used it while (36.7%) in pre versus (91%) in post used it with P.value (0.000).

About telling for doctor or nurse when developed constipation about (11.7%) in pre(6.7%) in post were talking some times ,witch(26.7%) in pre (91.7%) in post were talking all the times, and (61.7%)in pre versus

(1.7%) in post don't tell about occurrence of constipation P=0.000.Regarding bleeding management knowledge of group was good in pre (8.3%) versus (73.3%) in post, which (71.7%) in pre (6.7%) in post their knowledge was poor P.value (0.000). It shown in table (12)

4.5 Diarrheas

Table (13) show knowledge regarding cause and present of diarrhea. For cause of diarrhea (33.3%) in pre (83.3%) in post had good knowledge but (63.3%) in pre (13.3%) in post had poor knowledge with P.value 0.000 .Regarding present of diarrhea (73%) in pre which reduced to (25%) in post (P=0.000).

Fluid taking and avoided during diarrhea period table (14) show (66.7%)in pre (91.7%) in post increase fluids intake ,compare to (33.3%) in pre (8.3%) in post decrease fluids intake with P.value 0.001.About (55%) in pre (13.3%) in post were taken caffeine, cola and chocolate ,while (45%) in pre versus (86.7%)in post were not taken .P= (0.000).

Knowledge about food increase diarrhea and food avoidance shown in table (15). About (28.3%) in pre (88.3%) in post their knowledge was good about food witch increase diarrhea, while (48.3%) in pre versus (6.7%) in post had poor knowledge about the cause. with P.value 0.000.Regarding knowledge about food causes gases (1.7%) in pre (66.7%) in post had good

knowledge , while(76.7%)in pre (21.7%) in post had poor knowledge.(P.value 0.000).

About consultation for doctor for occurrence of hemorrhoid or bleeding (13.%0 in pre (95%) in post consult while (68.3%) in pre versus (5%) in post didn't consult with (P.value 0.000) .It shown in table (16).

4.6 Nausea and vomiting

Table (17) show occurrence nausea and vomiting and., compliance to antiemetic drugs and times of it. Regarding occurrence of nausea and vomiting (86.8%) in pre(58.3%) in post were developed nausea and vomiting while (13,3%)I n post (41.7%) in post were not developed P=0.000.About (65%) in pre versus (98.3%0 in post taking antiemetic regularly and(23%) in pre (1.7%) in post irregular taken. With P.value (0.000).Times of taken antiemetic drug was (90%) in pre versus (98.3%) in post in post taken it before meal P.value (0.046).

Regarding number of meal during periods of nausea and vomiting were (65%) in pre versus (36.7%) in post decease it while (30%) in pre versus (61.7%) in post test their meal number not change .with P.value (0.000).

About drinking of water after meal (53.3%) in pre versus (11.7%) not drink it ,while (46.7%) in pre (88.53%) in post not drink it (P.value 0.000). Regarding lying down (46.7%) in pre (10%) in post test lied sometimes witch (38.3%) in pre versus (46.7%) in post test always lied down (P = 0.000) which was shown table (18).

Figure (1) show knowledge of group about management of nausea and vomiting (6.7%) in pre versus (65%) had good knowledge while (90%) in pre versus (25%) in post has poor knowledge with P.value (0.000).

4.7 hair loss

Regarding cause of hair loss and time of loss. Table (19) knowledge of group about cause (86.7%) in pre (88.3%) in post know the related cause it to chemotherapy while (13.3%) in pre versus (11.7%) had no hair loss. P.value (0.709).

About the time of starting hair loss (78.8%) in pre (90.6%) in post started with in 2-3 weeks while (5.8%) in pre versus (9.4%) in post start within 4-5 weeks. (P=0.007).

Table (20) types of cleaners used for loss area and head protection. About (15.4 %) in pre versus (92.5%) in post used shampoo, while (75%) in pre (3.8%) in post used soap .with P.value 0.000. Regarding protection of head from sun and cold (65.4%) in pre (98.1 %) in post was protected with P.value (0.000).

About the time of hair grosses (23.1 %) in pre versus (73.6%) started 2-3 month, (5.7%) in pre (71.2 %) in post were not known the time of loss . P.value 0.000.This is shown in figure (2).

4.8 Constipation

Table (21) shows knowledge about type of food; fluid and exercise help to manage constipation. Regarding types of food mange constipation (16.7%) in pre (68.3%) in post had good knowledge while(70%) in pre (10%) in post their knowledge was poor .P=(0.000).About type of fluids (31.7%) in pre (1.7%) in post choosing the cold fluids while(56.7%) in pre versus (98.3%) in post choosing hot fluids ,and (11.7%)in pre not known with P.value 0.033.Duration of exercises during the day (16,7%) in pre (6.7%) in post were 10-15 mints ,(46,7%) in pre versus (71,7%) in post those having duration more than 30mints P=(0.004).

Table **(**22) shows the type of stool and number of defecation. About type of stool (73.3%) in pre versus (80%) in post had soft stool while (26.7%) in pre (20%) in post had hard stool. With P.value 0.396.Number of defecation was (21.7%) in pre (81.7%) in post for passing every day ,(11.7%) in pre (10%) in post for day after day passing and (16,7%) for (8.3%) for passing stool after more than three days (P=0.132).

Regarding checking with doctor or nurse before used fiber supplement or laxative in figure (3) there were (28.3%) in pre versus(95%) in post always check with their doctors an nurse while (65%) in pre (1.7%) in post don't check. with P.value (0.000).

4.9 Nerve change

Symptoms of nerve change .burning, numbness, hearing, status and abdominal pain shown in table (23).About feeling of tingling or burning sensation there was (28.3%) in pre versus (16.7%) in post there was sensation some times, and (66.6%) in pre versus(76.7%) in post there was no sensation .P=0.079.Regarding numbness in hand or feet(35%) in pre (23.7 %)in post feel it sometimes while (51%) in pre (66.7%) in post there had no numbness P.value 0.055.About change in hearing status there was (16.7%) in pre (10%) in post their hearing was decrease but (83.3%) in pre (90%) in post have normal hearing .with(P.value 0.010).

Regarding present of abdominal pain (35%) in pre versus (16.7%) in post having abdominal pain ,and (65%) in pre (68.3%) in post have no abdominal pain(P=0.010).

Period of nerve change which is shown in table (25) .2-3 weeks in pre (31%) in post(13.3%) ,4-8 weeks (5%) in pre (6.7%) in post and (48,3%) in pre versus (68.3 %) started to feel a sensate of nerve change at 8 weeks after dose with (P.value 0.003).

4.10 Pain

Table (25) show the presence of pain , site and characteristic of pain**.**

Regarding presence of pain there were (38%) in pre (25%) in post have pain and(61.7%) in pre versus (75%) in post no pain present P=0.045 .About site of pain (73.9%) in pre (80%) in post it was localized and (26.1%) in pre (20%) in post it was generalized with P.value 0.676.Characteristic of pain in table (25) ,(39.1%) in pre versus(40%) have slight pain, while (26.1%) in pre only have pain make it hard to sleep and (8.7%) in pre (26.7%) in post have moderate pain P.=0.871

Regarding frequency of analgesic drugs (39.1%) in pre (46.7%) in pre choosing S.O.S,(17.4%) in pre (26.7%) in post choosing T.D.S. and other percentage in pre and post for uses B.D and once per day with P.value 0.779 .about response of drugs(73.9%) in post (53,3%) have it is reduction of pain and (26.1%) in pre versus(33.3%) in post the pain was relived with P.value 1.000 .Which is shown in table (26).

4.11 Nursing assessment:

Regarding performance status of group which is shown in table (27).

There was (80%) in pre versus (81.7%) score(0) ,(16.7%) in pre (11.7%) in post score (1) ,(3.3%) in pre (5%) in post score (2) and (1.7%) in post score (3) P=0.735. Figure(5) show the type of cancer of group study the cancer which more frequent was ca breast. Table (28) show frequency of cycle before and after intervention. Table (29) show frequency and percentage of drugs regimen.

4.12Statistical relation between variable of the study

Table (30) showed the relation between level of education and knowledge of patient regarding time of washing hands in pre test with P. value (0,189).

Table (31) showed the relation between level of education and knowledge of patient regarding time of washing hands in post test with P.value (0.488).

Table (32) showed the relation between level of education and knowledge of patient regarding washing of fruits and vegetables in pretest t with P.value (0.432).

Table (33) showed the relation between level of education and knowledge of patient regarding washing of fruits and vegetables in posttest with P.value (0.432)

4.1. Table (1-2):-characteristic of study group

Table (1): Personal characteristic (gender, age, tribe, residence)

Gender	**Frequency**	**Percent %**
Male	14	23.3
Female	46	76.7
Total	60	100
Age	**Frequency**	**Percent %**
18-25 years	8	13.3
26-35 years	2	3.3
36-45years	12	20.0
46-55 years	20	33.3
56-65 years	12	20.0
above 65 years	6	10.0
Total	60	100.0
Tribe	**Frequency**	**Percent %**
Galeen	46	76.7
Danagla	1	1.7
Shygia	2	3.3
Noba	1	1.7
Others	10	16.7
Total	60	100.0
Residence	**Frequency**	**Percent %**
Shendi town	19	31.7
Village of north Shendi	15	25

Residence	Frequency	Percent %
Village of south Shendi	11	18.3
Village of west of Shendi River Nile	9	15
Khartoum	2	3.3
Port Sudan	2	3.3
Atbara	1	1.7
Elepeedia	1	1.7
Total	60	100

Table (2): Personal characteristic (Occupation marital status and education)

Employments	Male		Female		Total F	Total %
	F	%	F	%		
Un employed	3	5	38	63.3	41	68.3
Employed	4	6.6	4	6.7	8	13.3
Laborer	1	1.7	0	0	1	1.7
Professional	0	0	1	1.7	1	1.7
Free worker	6	10	3	5	9	15.0
Total	14	23.4	46	76.7	60	100.0
Marital Status	**F**	**%**	**F**	**%**	**Frequency**	**percent**
Married	12	20	34	56.7	46	76.7
Single	1	1.7	12	20	13	21.7
Divorced	0	0	1	1.7	1	1.7
Total	13	21.7	47	78.3	60	100.0
Educational level	**F**	**%**	**F**	**%**	**Frequency**	**percent**
Illiterate	5	8.3	15	25	20	33.3
Khalwa	1	1.7	1	1.7	2	3.3
Primary	4	6.7	13	21.7	17	28.3
Secondary	4	6.7	12	20	16	26.7
University	1	1.7	4	6.7	5	8.3
Total	15	25	45	75	6o	100.0

4.2. Infection

Table (3): Infection development and doctor advice

Occurrence of infection	Before intervention		After intervention		P-value
	F	P	F	P	
Occurred	27	45.0	13	21.7	0.012
Not occurred	33	55.0	47	78.3	
Total	60	100.0	60	100.0	
Seeking doctor advice when taking drugs	**After intervention**		**After intervention**		**P-value**
	F	P	F	P	
Seeking	24	40.0	57	95.0	0.000
Not seeking	36	60.0	3	5.0	
Total	60	100.0	60	100.0	

Table (4): Self care practice of patient regarding Infection

Time of hand washing	Before intervention		After intervention		P-value
	F	%	F	%	
Good	17	28.3	58	96.7	0.000
Satisfy	26	43.3	1	1.7	
Poor	17	28.3	1	1.7	
Total	60	100.0	60	100.0	
Avoidance of infected people & vaccinated child	**Before intervention**		**After intervention**		**P-value**
	F	**%**	**F**	**%**	
Avoided	17	28.3	56	93.3	0.000
not avoided	43	71.7	4	6.7	
Total	60	100.0	60	100.0	
Avoidance of crowdedness	**Before intervention**		**After intervention**		**P-value**
	F	**%**	**F**	**%**	
Avoided	22	36.7	56	96.7	0.000
not avoided	38	63.3	4	3.3	
Total	60	100.0	60	100.0	

Table (5) : Prevention of infection (washing fruits, eating uncooked meat, tooth brushing).

Washing of fruits or vegetables	Before intervention		After intervention		P-value
	F	%	F	%	
Washed	51	85.0	59	98.3	0.027
Some times	5	8.3	0	0	
Not washed	4	6.7	1	1.7	
Total	60	100.0	60	100.0	
Habit of eating un cooked meat					
Eaten	34	56.7	1	1.7	0.000
Not eaten	26	43.3	59	98.3	
Total	60	100.0	60	100.0	
Time of tooth brushing					
Morning	39	65.0	3	5.0	0.000
Night	2	3.3	57	0	
At both	19	31.7	60	95.0	
Total	60	100.0	3	100.0	
Type of tooth brush					
Smooth	9	15.0	58	96.7	0.000
Medium	41	68.3	1	1.7	
Hard	10	16.7	1	1.7	
Total	60	100.0	60	100.0	

4.3. Anemia and fatigue:-

Table (6): Presence of symptoms of anemia (dizziness- fatigability- shortness of breathing)

Feeling of dizziness or faint	Before intervention		After intervention		P-value
	F	%	F	%	
Always	2	3.3	1	1.7	0.001
Some times	20	33.3	5	8.3	
No feeling	38	63.3	54	90.0	
Total	60	100.0	60	100.0	
Feeling of fatigability					
Always	11	18.3	3	5.0	0.000
Sometimes	40	66.7	23	38.3	
No feeling	9	15.0	34	56.7	
Total	60	100.0	60	100.0	
Sense of shortness of breathing					
Always	2	3.3	0	0	0.019
Some times	9	15.0	4	6.7	
No shortness of breathing	49	81.7	56	93.3	
Total	60	100.0	60	100.0	

Table (7): Fatigability (causes and times)

knowledge of patient about causes of fatigability	Before intervention		After intervention		P-value
	F	%	F	%	
Good	27	45.0	52	86.7	0.000
Satisfy	7	11.7	1	1.7	
Poor	26	43.3	7	11.7	
Total	60	100.0	60	100.0	
Time of feeling fatigue					
At rest	15	25.0	7	11.7	0.000
At mild activities	26	43.3	15	25.0	
At moderate activities	5	8.3	4	6.7	
At severe activates	9	15.0	9	15.0	
No feeling	5	8.3	25	41.7	
Total	60	100.0	60	100.0	

Table (8): Self care practice for fatigability

Action done after feeling fatigue	Before intervention		After intervention		P-value
	F	%	F	%	
Good	6	10.0	44	73.3	0.000
Satisfy	10	16.7	7	11.7	
Poor	44	73.3	9	15.0	
Total	60	100.0	60	1000	
Duration of sleeping in the day					
2-3houres	1	1.7	1	1.7	0.000
4-8houres	32	53.3	8	13.3	
More than 8houres	27	45.0	51	85.0	
Total	60	100.0	60	100.0	
Action taken when getting up					
Sit for a moment before standing	19	31.7	53	88.3	0.000
Stand up directly	41	68.3	7	11.7	
Total	60	100.0	60	100.0	

Table (9): Anemia nutritional patterns

Number of meals during the day	Before intervention		After intervention		P-value
	F	%	F	%	
2meals	16	26.7	8	13.3	0.000
3meals	28	46.7	17	28.3	
4-6 meals	16	26.7	35	58.3	
Total	60	100.0	60	100.0	
Amount of fluids taken during day					
>1liters	14	23.3	3	5.0	0.001
1- >3litrs	20	33.3	10	16.7	
3litrs &above	26	43.3	47	78.3	
Total	60	100.0	60	100.0	
Compliance to iron pills					
Regular	31	51.7	33	55.0	0.755
Irregular	6	10.0	4	6.7	
not taken	11	18.3	5	8.3	
not prescribed	12	20.0	18	30.0	
Total	60	100.0	60	100.0	

4.4. Bleeding:-

Table (10): Bleeding occurrence, site of it and knowledge about the other sites of bleeding.

Occurrence of bleeding with chemo therapy	Before intervention		After intervention		P-value
	F	%	F	%	
Occurred	7	11.7	5	8.3	0.568
Not occurred	53	88.3	55	91.7	
Total	60	100.0	60	100.0	
Type of skin bleeding that occurred					
Red, pinpoint spots on skin	5	8.3	2	3.3	0.181
Ecchymosis	1	1.7	1	1.7	
No skin bleeding	54	90.0	57	95.0	
Total	60	100.0	60	100.0	
Knowledge about site of bleeding					
Good	17	28.3	53	88.3	0.000
Satisfy	13	21.7	1	1.7	
Poor	30	50.0	6	10.0	
Total	60	100.0	60	100.0	

Table (11): Self care practice regarding protection from bleeding

Types of shaver used	Before intervention		After intervention		P-value
	F	%	F	%	
Razor	11	78.6	3	21.4	0.001
Electric shaver	3	21.4	11	78.6	
Total	14	100.0	14	100.0	
Times of wearing shoes					
All the time	45	75.0	58	96.7	0.001
Some times	15	25.0	2	3.3	
Total	60	100.0	60	100.0	
Blowing nose gently					
Gently	10	16.7	58	96.7	0.000
Not gently	50	83.3	2	3.3	
Total	60	100.0	60	100.0	
Use of dental floss or toothpicks					
Used	38	63.3	5	8.3	0.000
Not used	22	36.7	55	91.7	
Total	60	100.0	60	100.0	

Table (12): Action done after bleeding or constipation

Telling doctor or nurse after getting constipation	Before intervention		After intervention		P-value
	F	%	F	%	
Some times	7	11.7	4	6.7	0.000
Always	16	26.7	55	91.7	
Don't tell	37	61.7	1	1.7	
Total	60	100.0	60	100.0	
Action done when you have cut wound					
Good	5	8.3	44	73.3	0.000
Satisfy	12	20.0	12	20.0	
Poor	43	71.7	4	6.7	
Total	60	100.0	60	100.0	

4.5. Diarrhea:-

Table (13): Presence of diarrhea and knowledge about it causes

Cause of diarrhea	Before intervention		After intervention		P-value
	F	%	F	%	
Good	20	33.3	50	83.3	0.000
Satisfy	2	3.3	2	3.3	
Poor	38	63.3	8	13.3	
Total	60	100.0	60	100.0	
Occurrence of diarrhea					
Occurred	44	73.3	15	25.0	0.000
Not occurred	16	26.7	45	75.0	
Total	60	100.0	60	100.0	

Table (14): Self care practice during period of diarrhea.

Amount of fluid you take during diarrhea	Before intervention		After intervention		p-value
	F	%	F	%	
Increased	40	66.7	55	91.7	0.001
Deceased	20	33.3	5	8.3	
Total	60	100.0	60	100.0	
Taking of caffeine or cola					
Taken	33	55.0	8	13.3	0.000
Not taken	27	45.0	52	86.7	
Total	60	100.0	60	100.0	

Table (15): Knowledge about food during diarrhea

Type of food that increase diarrhea	Before intervention		After intervention		P-value
	F	%	F	%	
Good	17	28.3	53	88.3	0.000
Satisfy	14	23.3	3	5.0	
Poor	29	48.3	4	6.7	
Total	60	100.0	60	100.0	
Type of food avoided					
Good	1	1.7	40	66.7	0.000
Satisfy	13	21.7	7	11.7	
Poor	46	76.7	13	21.7	
Total	60	100.0	60	100.0	

Table (16): Consultation after occurrence of hemorrhoid or bleeding

Calling of doctor or nurse	Before intervention		After intervention		P-value
	F	%	F	%	
Yes	19	31.7	57	95.0	0.000
No	41	68.3	3	5.0	
Total	60	100.0	60	100.0	

4.6. Nausea and vomiting

Table (17): Occurrence of nausea and vomiting and compliance to antiemetic drugs and their time of use.

Nausea and vomiting	Before intervention		After intervention		P-value
	F	%	F	%	
Occurred	52	86.7	35	58.3	0.000
Not occurred	8	13.3	25	41.7	
Total	60	100.0	60	100.0	
Compliance to anti emetic drugs					
Taken regularly	39	65.0	59	98.3	0.000
Irregular taken	14	23.3	1	1.7	
Not taken	7	11.7	0	0	
Total	60	100.0	60	100.0	
Time of taking antiemetic drugs					
Before meal	54	90.0	59	98.3	0.046
After meal	3	5.0	1	1.7	
Not taken	3	5.0	0	0	
Total	60	100.0	60	100.0	

Table (18): Self care practice during periods of nausea and vomiting

Number of meals	Before intervention		After intervention		P-value
	F	%	F	%	
Increased	3	5.0	1	1.7	0.000
Decreased	39	65.0	22	36.7	
Not changed	18	30.0	37	61.7	
Total	60	100.0	60	100.0	
Drinking of water direct after meal					
Yes	32	53.3	7	11.7	0.000
No	28	46.7	53	88.3	
Total	60	100.0	60	100.0	
Lying down					
Some times	28	46.7	6	10.0	0.000
Always	23	38.3	28	46.7	
No	9	15.0	26	43.3	
Total	60	100.0	60	100.0	

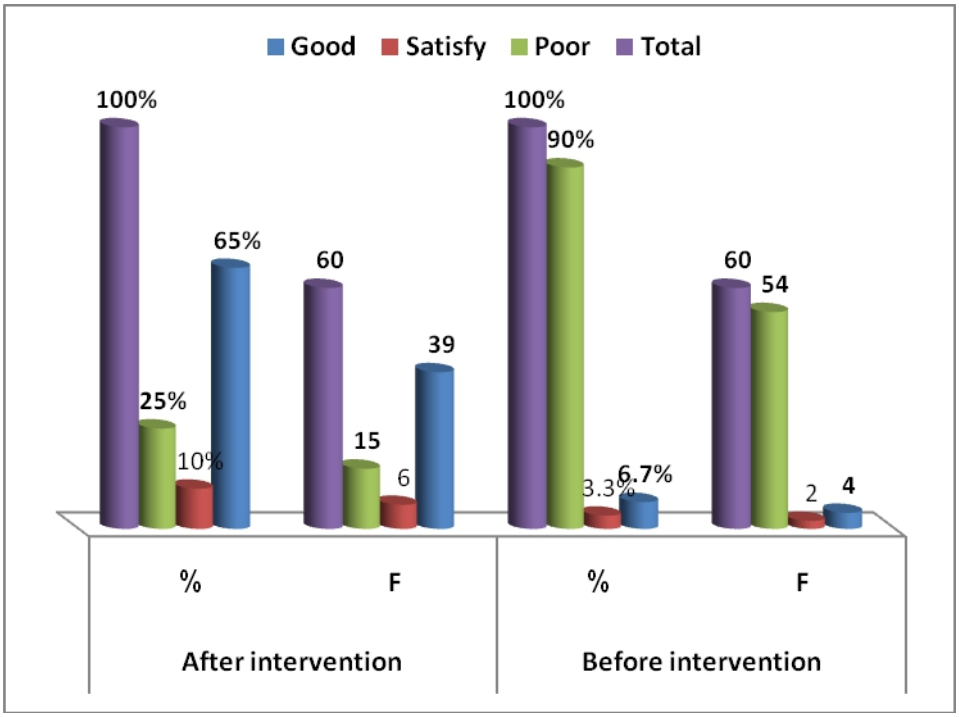


Figure (1): Management of nausea and vomiting before and after

4.7. Hair loss

Table (19): Causes of hair loss and time of loss.

Cause of hair loss	Before intervention		After intervention		P-value
	F	%	F	%	
Chemotherapy	52	86.7	53	88.3	0.709
No hair loss	8	13.3	7	11.7	
Total	60	100.0	60	100.0	
Time of hair loss					
2-3 weeks	41	78.8	48	90.6	0.007
4-5 weeks	3	5.8	5	9.4	
Don’t know	8	15.4	0	0	
Total	52	100.0	53	100.0	

Table (20): Self care practice regarding alopecia

Type of cleaner	Before intervention		After intervention		P-value
	F	%	F	%	
Shampoo	8	15.4	49	92.5	0.000
Soap	39	75.0	2	3.8	
Water	5	9.6	2	3.8	
Total	52	100.0	53	100.0	
Protection for head					
Protected	34	65.4	52	98.1	0.000
Sometimes	5	9.6	0	0	
No protection	13	25.0	1	1.9	
Total	52	100.0	53	100.0	
Action done after hair loss					
Cut your short hair	6	11.5	3	5.6	0.290
Sheaved your head	6	11.5	8	14.8	
Get wing	1	1.9	1	1.9	
None of the above	39	75.0	41	77.8	
Total	52	100.0	53	100.0	

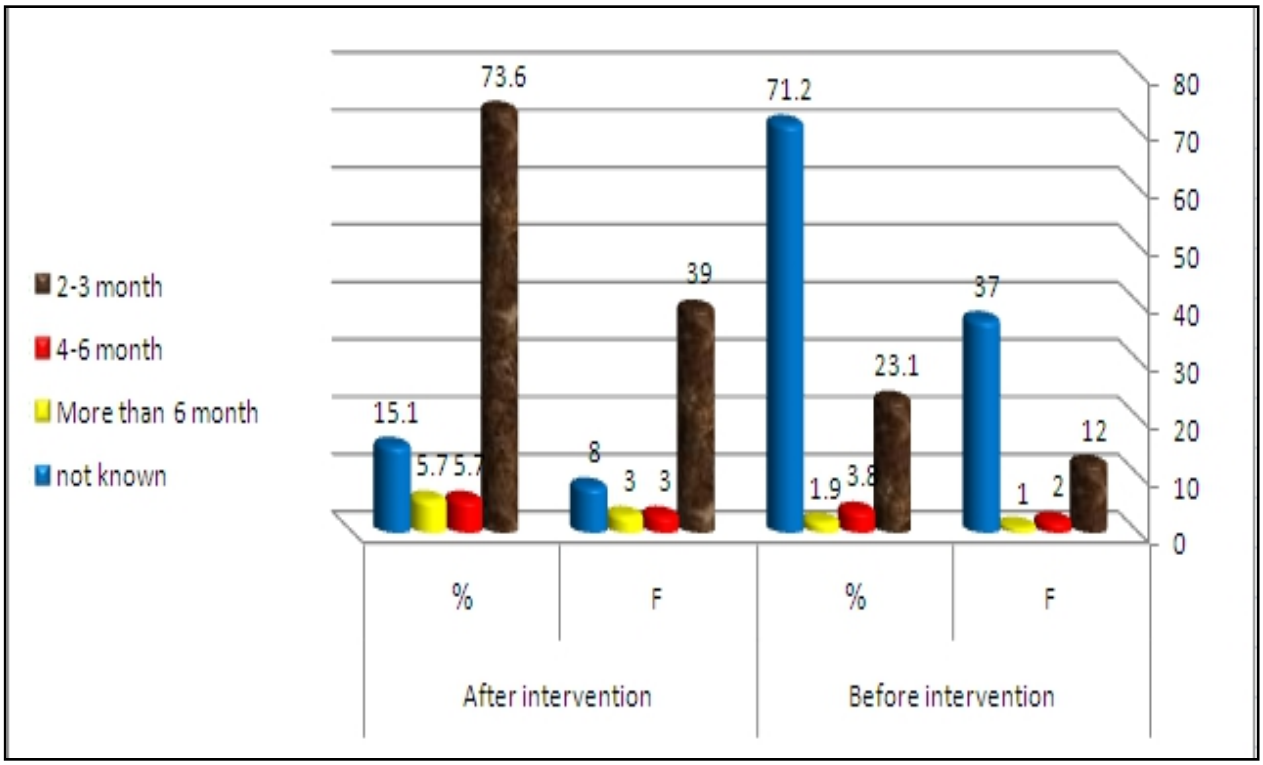


Figure (2): Time of hair growth

4.8. Constipation

Table (21): Knowledge about type of food, fluid and exercise that help to manage constipation

Knowledge of patients about type of food help to mange constipation	Before intervention		After intervention		P-value
	F	%	F	%	
Good	10	16.7	41	68.3	0.000
Satisfy	8	13.3	13	21.7	
Poor	42	70.0	6	10.0	
Total	60	100.0	60	100.0	
Type of fluid					
Cold fluids	19	31.7	1	1.7	0.003
hot fluids	34	56.7	59	98.3	
Not known	7	11.7	0	0	
Total	60	100.0	60	100.0	
Duration of exercise					
10-15 mints	10	16.7	4	6.7	0.004
15-30 mints	16	26.7	12	20.0	
no exercise done	6	10.0	1	1.7	
More than 30 mints	28	46.7	43	71.7	
Total	60	100.0	60	100.0	

Table (22): frequency of defection defecation

Frequency of defecation	Before intervention		After intervention		P-value
	F	%	F	%	
Every day	43	71.7	49	81.7	.132
Day after day	7	11.7	6	10.0	
More than three day	10	16.7	5	8.3	
Total	60	100.0	60	100.0	

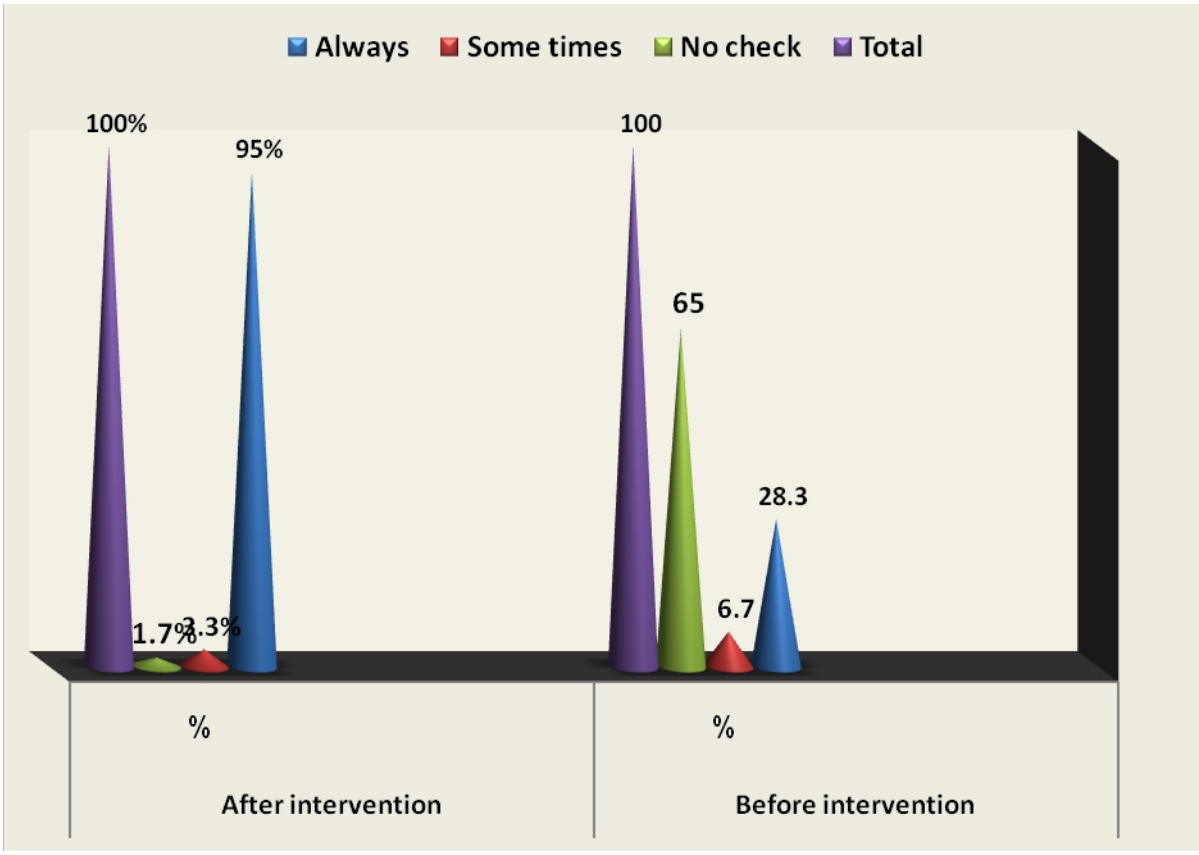


Figure (3): Checking with doctor or nurse before use of fiber supplement or laxatives pre and post intervention.

4.9. Nerve change

Table (23): Symptoms of nerve change (Burning, numbness, hearing, status and abdominal pain).

Sensation of tingling or burning	Before intervention		After intervention		P-value
	F	%	F	%	
Some times	17	28.3	10	16.7	0.079
All the times	3	5	4	6.7	
No sensation	40	66.7	46	76.7	
Total	60	100.0	60	100.0	
Sensation of numbness					
Some times	21	35.0	14	23.3	0.055
All the times	8	13.3	6	10.0	
No sensation	31	51.7	40	66.7	
Total	60	100.0	60	100.0	
Hearing status					
Decrease of hearing	10	16.7	6	10.0	0.252
Normal hearing	50	83.3	54	90.0	
Total	60	100.0	60	100.0	
Presence of abdominal pain					
Present	21	35.0	10	16.7	0.010
Not present	39	65.0	50	83.3	
Total	60	100.0	60	100.0	

Table (24): Period of nerve change

Period of nerve change	Before intervention		After intervention		P-value
	F	%	F	%	
2-3weeks	19	31.7	8	13.3	0.003
4-8weeks	9	15.0	7	11.7	
More than 8weeks	3	5.0	4	6.7	
No nerve change	29	48.3	41	68.3	
Total	60	100.0	60	100.0	

4.10. Pain:-

Table (25): Presence, site and characteristic of pain

Feeling of pain	Before intervention		After intervention		P-value
	F	%	F	%	
Present	23	38.3	15	25.0	0.045
Not present	37	61.7	45	75.0	
Total	60	100.0	60	100.0	
Site of pain					
In one part of your body	17	73.9	12	80.0	0.676
All over the body	6	26.1	3	20.0	
Total	23	100.0	15	100.0	
Characteristic of pain					
Slight pain	9	39.1	6	40.0	0.871
Makes it hard to sleep	6	26.1	o	o	
Make it hard to work	2	8.7	4	26.7	
Moderate pain	6	26.1	5	33.3	
Total	23	100.0	15	100.0	

Table (26): Analgesic drugs frequency and response

Frequency of analgesic	Before intervention		After intervention		P-value
	F	%	F	%	
S.O.S	9	39.1	7	46.7	0.779
T.D.S	4	17.4	4	26.7	
B.D	3	13.0	3	20.0	
O.D	7	30.4	1	6.7	
Total	23	100.0	15	100.0	
Response to drugs					
No response	0	0	2	13.3	1.000
Reduced	17	73.9	8	53.3	
Relived	6	26.1	5	33.3	
Total	23	100.0	15	100.0	

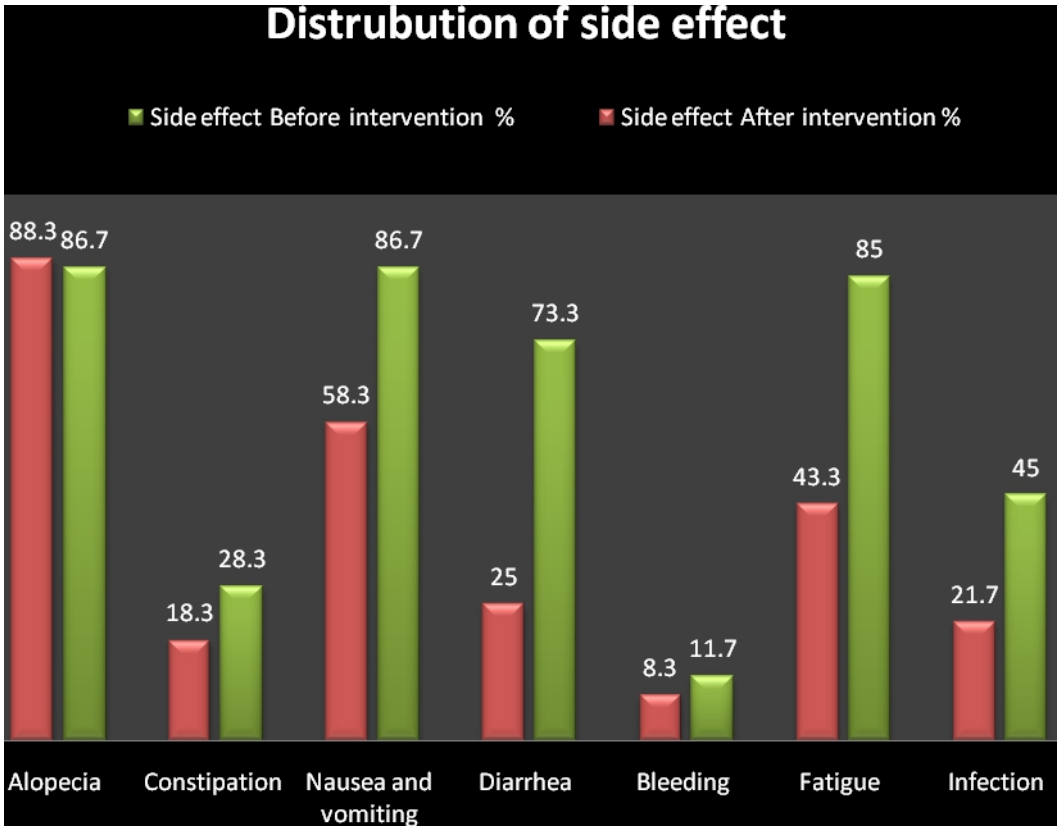


Figure (4): Distribution of side effect pre and post test

4.11. Nursing assessment:

Table (27): Performance status of study group

Score	Before intervention		After intervention		p-value
	F	%	F	%	
0	48	80.0	49	81.7	0.735
1	10	16.7	7	11.7	
2	2	3.3	3	5.0	
3	0	0	1	1.7	
Total	60	100.0	60	100.0	

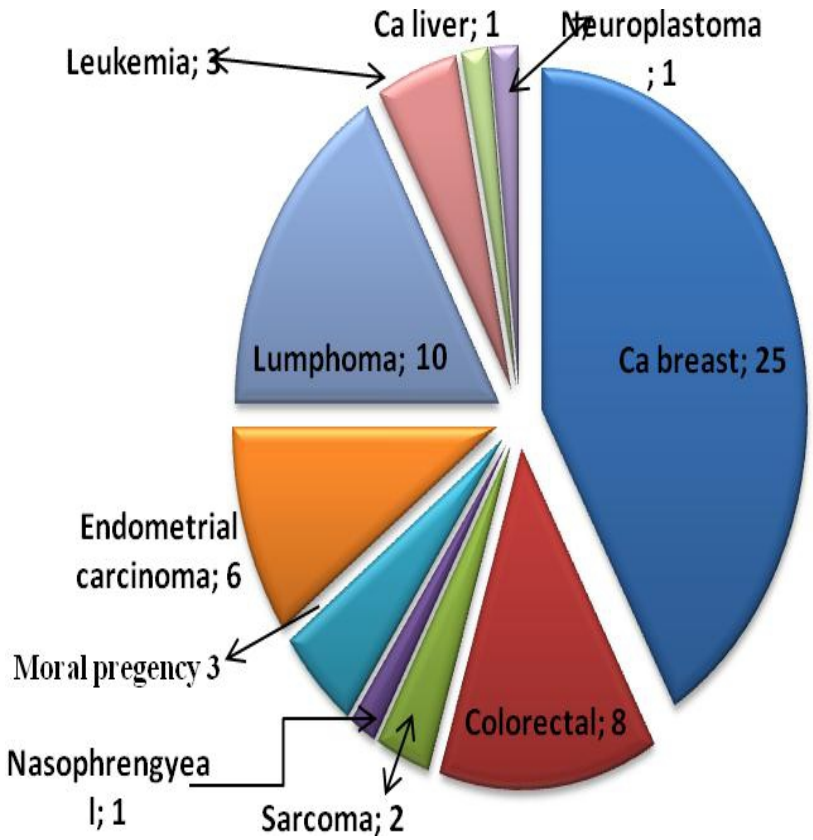


Figure (5): Type of cancer

Table (28): Frequency of cycle before and after intervention

Before intervention		After intervention	
cycle	**F**	**cycle**	**F**
C2	20	C3	12
C3	19	C4	15
C4	14	C5	14
C5	7	C6	19
Total	60	Total	60

Table (29): Frequency and percentage of regimens

Regimens	Frequency	%
FEC	3	5.0
FAC	7	11.7
EC	3	5.0
AC	6	10.0
TC	1	1.7
FOLFOX4	5	8.3
XELOX	2	3.3
EMACO	2	3.3
CVP	2	3.3
CHOP	3	5.0
ABVD	3	5.0
IECAV	1	1.7
TaxolandCarbo	7	11.7
CISandADR	2	3.3
DAUNORUBICIN	1	1.7
RETIXUMAB	1	1.7
TAXOL	3	5.0
TAXOTEandCARBO	2	3.3
TAXOTER	2	3.3
METHOTRXATE	2	3.3
CYCLOPHASPHAMIDE	2	3.3
CARBOandGEMZAR	1	1.7
AVASTIN	1	1.7
IFOandADR	1	1.7
FOLFIRI	1	1.7
CISand5fuandtaxoter	1	1.7

4.12. Statistical relation between variable of the study

Table (30): Relation between level of education of patients and knowledge regarding washing of hands in pre test.

Education of patient	Time of hands washing			Total
	Good	Satisfy	Poor	
Illiterate	4	7	9	20
	20.0%	35.0%	45.0%	100.0%
Khalwa	2	0	0	2
	100.0%	.0%	.0%	100.0%
Primary	5	8	4	17
	29.4%	47.1%	23.5%	100.0%
Secondary	5	7	4	16
	31.2%	43.8%	25.0%	100.0%
University	1	4	0	5
	20.0%	80.0%	.0%	100.0%
Total	17	26	17	60
	28.3%	43.3%	28.3%	100.0%
P.value	0.189			

Table (31): Relation between level of education of patients and knowledge regarding washing of hands in post intervention

Education of patient	Time of hands washing			Total
	Good	Satisfy	Poor	
Illiterate	18	1	1	20
	31.0%	100.0%	100.0%	33.3%
Khalwa	2	0	0	2
	3.4%	.0%	.0%	3.3%
Primary	17	0	0	17
	29.3%	.0%	.0%	28.3%
M	16	0	0	16
	27.6%	.0%	.0%	26.7%
University	5	0	0	5
	8.6%	.0%	.0%	8.3%
Total	58	1	1	60
	100.0%	100.0%	100.0%	100.0%
P.value	0.844			

Table (32): Relation between level of education of patients and attitude regarding washing of fruits and vegetables

Education of patient	Washing of fruits or vegetables before taking it			Total
	Washed	Sometimes	Not washed	
Illiterate	15	2	3	20
	75.0%	10.0%	15.0%	100.0%
Khalwa	2	0	0	2
	100.0%	.0%	.0%	100.0%
Primary	14	3	0	17
	82.4%	17.6%	.0%	100.0%
Secondary	15	0	1	16
	93.8%	.0%	6.2%	100.0%
University	5	0	0	5
	100.0%	.0%	.0%	100.0%
Total	51	5	4	60
	85.0%	8.3%	6.7%	100.0%
P.vaue	0.432			

Table (33) :Relation between level of education of patients and attitude regarding washing of fruits and vegetables in post intervention

Education of patient	Washing of fruits or vegetables before taking it		
	washed	Not washed	Total
Illiterate	19	1	20
	32.2%	100.0%	33.3%
Khalwa	2	0	2
	3.4%	.0%	3.3%
Primary	17	0	17
	28.8%	.0%	28.3%
Secondary	16	0	16
	27.1%	.0%	26.7%
University	5	0	5
	8.5%	.0%	8.3%
Total	59	1	60
	100.0%	100.0%	100.0%
P.value	0.730		

5. Discussion:

The role of nursing intervention is to improve health and to increase self care practice. All persons require self-care in some manner in order to maintain an optimal level of health and well being."In relation to oncology patients receiving outpatient chemotherapy treatments, side effect management is the self-care process that patients perform in order to maintain well being [125].

In this study 60 patients received structure educational program on management of side effects of chemotherapy to increase their knowledge and skills related to managing the side effects of chemotherapy. Nursing research has documented that patient's benefit from education about their disease, treatment and specific chemotherapy instruction [125].

The characteristic of the study group showed that both sexes were included in the study with female predominance (76.3%). This correlates with the first National Population-based Cancer Registry in Sudan, 6771 new cancer cases were registered. Of those, (53.8%) were women and (46.2%) were men [126].The commonest (33.3%) age range was (46-55) years which the midlife age [127]. This was agreed with White MC1.et al. who reported that midlife is a period of life when the prevalence of multiple cancer risk factors is high and incidence rates begin to increase for many types of cancer. Because the number of adults reaching older ages is increasing rapidly, the number of new cancer cases will also increase if current incidence rates remain unchanged [128].

Regarding tribes of the group Galeen were (76.7%). Professor,Aun El Sharif stated that the main tribes in Sudan are Galeen, Dangla ,Shaygia,Dinka,Four and Nuba[129]. This may also be related to the residence because most Galeen tribes come from Shendi, Matmma and the surrounding

villages .Their residence was mainly Shendi town (31.7%). Most (76.7%) of the patients in this study were married.

Education was ranged from illiterate to university graduation but third of them were illiterate (33.3%) and most of them were unemployed (68 %). This correlated with Eid. M .et al who found that most of the patients had no work, this may be due to many factors, among them age, disabilities caused by the disease itself, its treatment schedule or the side -effects of the drugs [(130)].

The side effects most frequently reported in this study were hair loss (86.7%), nausea/vomiting (86.3%), diarrhea (73%) and infection (45%). Other side effects were reported with less frequently which include bleeding, pain, nerve change and anemia. In contrast to Guswiler, Kelly A. Who found the most frequent side effects nausea/vomiting, diarrhea, mouth sore, and hair loss. Other side effects that were reported less frequently were bleeding, decreased appetite, and acne/skin rash. Anemia, infection and abdominal pain were reported by one subject) [(131)]. While the study done in USA revealed the commonest side effect was fatigability (79%) Other side effects include pain (48%), nausea and/or vomiting (48%), anxiety (47%), alopecia (47%), insomnia (44%), and diarrhea (42%) [(132)].

People receiving chemotherapy are at risk for developing an infection when their white blood cell count is low [(133)].

In this study the incidence of infection was reduced in post test from (45.0%) in pre test to (21.7%) in post. Also the attitude of patients regarding protection from infection by proper hand washing, avoidance of infected people and crowdedness was improved with significant difference P=0.000. This agrees with the Division of Cancer Prevention and Control Centers who reported that 10% of cancer patients undergoing chemotherapy treatment end up hospitalized due to infection. Because of the nature of their illness, great

attention to infection prevention is warranted in the care of cancer patients. Preventing infections in cancer patients is a comprehensive program focused on providing information, action steps, and tools to help reduce the risk of developing potentially life-threatening infections during chemotherapy treatment [133].

Anemia can lead to numerous health problems including chronic fatigue, tachycardia, cognitive impairment, shortness of breath, depression and dizziness. Lucas D found that cancer patients who develop anemia have a 65 percent increased risk of death compared with cancer patients without anemia [133].

Symptoms of anemia and fatigability were decreased after the program with P.value 0.000 .Henry D etal studied cancer patient's experience of fatigue and found it the most common side effect of cancer therapy, reported by 79% of respondents. Almost two out of three patients rated their fatigue to be debilitating, and one in three patients considered a reduction in fatigue to be very important [132].

Knowledge about causes of fatigability was poor in (45.3%) of patients in pretest reduced to only (11.7%) after the program .Fatigability has multiple causes, including anemia, tumor burden, antitumor treatment, and depression. Fatigue was mostly related by Henry DH, to treatment, as significantly worse levels of fatigue were reported by those undergoing current therapy [132] In this regard Ibrahim R ,stated that fatigue and lethargy were noted to be the two most frequent and significant problems associated with chemotherapy. This could be due to anemia, pain, trouble sleeping, trouble breathing, appetite changes and infection [134].

Self care practice after feeling fatigue was good in (10%)of patients in pre versus (73,3%) in post by getting rest , scheduled work , sleeping for more than eight hours and letting others to help with P=0.000 .this goes

with the practice found by(Dean D and Ferrel B) for fatigue that the majority of patients were limited their daily home activities and routine work consequently for few days after chemotherapy[135].

Cancer-related anemia adversely affects quality of life and is associated with reduced overall survival. The correction of anemia in cancer patients has the potential to improve treatment efficacy and increase survival [136] .The attitude of patients regarding nutritional pattern was changed in post test that the proper amount of fluids during the day which is≥ 3 liters was increased from (43.3%) to (78.3%) with P.value 0.001.The patients accepted to change their number of meals to 4-6 /day (P = 0.000) and their compliance to iron pills was improved.

Bleeding occurs in up to 10% of patients with advanced cancer. It can presents clinically in many different ways, from chronic, low-volume bleeding to acute episodes of major hemorrhage [137].

The occurrence of bleeding in the study group was low and the knowledge about site of bleeding was improved after the program. The good knowledge was increased from (28.3%) in pre versus (88.3%) in post.

The program was succeeded in changing the self care practice regarding protection from bleeding that the use of electric razor was increased to(78.6%), wearing of shoes increased to (96.7%) and use of dental flosses was decreased to (8.3%) in post with P.value 0.000

Regarding bleeding management practice of the group was good in only (8.3%) before the program which was improved to (73.3%) after the program. The results indicate that the pre- and post-implementation audits are an effective method in improvement of assessment, documentation and evidence-based nursing implementation for cancer symptom management [138].

Majority of patients (73%) were complaining of diarrhea before the program which was reduced to (25%) in post program with P.value 0.000

There was significant change regarding knowledge of patients about the causes of diarrhea which improved after teaching program that correlated with Eid M .et al who revealed on study done in Egypt that most of the patients have incorrect knowledge on risk factors, warning signs and symptoms, medication management and follow up treatment schedule. This might be due to the lack of patient health education by nurses prior to treatment in the form of patient conference and group discussion [(139)].

About attitude of group regarding management of diarrhea majority of them were changing their attitude towards correct direction by increasing intake of fluid (91.7%) in post test so taking of caffeine and food which increased diarrhea were reduced significantly .This agreed with an Evaluating an education and support program for cancer patients and their significant others done by Grahn G and Danielson M . They found that the provision of information was merged into the field of education to facilitate efforts to cope with the cancer experience. A patient education program entitled Learning to live with cancer was developed (part I) and evaluated (part II) [(140)].

Knowledge about doctor consultation when having hemorrhoid or bleeding was improved from (13%) in pre to (95%) in post with P.value 0.000.

Chemotherapy-induced nausea and vomiting is the commonest side-effect for patients undergoing cancer treatment with chemotherapy. These symptoms can lead to nutritional deficiencies, dehydration and electrolyte imbalance, and negative impacts on quality of life [(141)].

Majority of the patients (86.8%) experienced vomiting before the program which was still present but reduced to (58.3%) after the program

(P=0.000). El-Shatby MA and Saad Ead AY revealed that that (80%, 78%) of the studied patients experienced nausea, vomiting, following the first cycle abeer[142] .These results were correlated with Bajano who found that the majority of his studied patients post chemotherapy were always or sometimes experiencing a lot of stressors as nausea, vomiting, dryness of mouth, taste alteration, constipation, stomatitis, diarrhea, abdominal pain and loss of appetite[143].

As regard to self-care practices to relieve nausea and vomiting, (65%) of patients before the program reported they took the prescribed antiemetic drugs before chemotherapy which increased to near all (98.3%) after the program .Otherwise the knowledge of patient regarding the best times of taking anti emetic drugs was slightly improved (P =0.046).These results were inconsistent with Ibrahim (2001) who found that the majority of patients reported avoiding sight, smell, foods and fluids intake immediately prior to chemotherapy[136] . Instead of taking antiemetic drugs.

Knowledge and attitude of study group about management of nausea and vomiting was improved in post test significantly with P.value0.000 This could be attributed to the patient belief that medical measures may alleviate or control their symptoms which agree with (Antoni et al) that cognitive behavioral interventions (CBIs) by using a multimodal approach toward symptom management are particularly effective in decreasing symptom severity for patients with cancer [144].

Changing Patient Perceptions of the Side Effects of cancer Chemotherapy was studied by Carelle N et al were men ranked hair loss lower than women, suggesting that men may tolerate this side effect better; however,25% of male patients suffered from digestive carcinomas, which often treated with chemotherapeutic agents that cause little hair loss[145].

In the current study the knowledge of group regarding the cause of hair loss was adequate because the majority (86.7%) of them know the cause before teaching the P.value 0.709.

As regard to the protection of the loss area the attitude of study group was significantly improved, the use of shampoo was increased from (15.4%) to (92.5%), also the protection from sun and cold was improved to (98.1 %) in post test, but self care for loss area was not changed with P=0.290. Zanninl L et al have implemented a program for chemotherapy induced alopecia in breast cancer patients .He concluded that aesthetic care/wig program can help women affected by alopecia to cope with cancer 'stigma', specially in those rural contexts psychosocial program are not frequently embraced by patients due to environmental and cultural barriers where [146].

After the programs (71.2 %) of the patients know the time of hair grow that may be help to reduce the stress of alopecia with P.value 0.000. Cancer patients need information promoting their understanding of events throughout the illness, and support in mobilizing coping strategies when they consider the situational demands to exceed their personal resources, provision of information was merged into the field of education and combined with emotional support to facilitate efforts to cope with the cancer experience [146].

In the current study the occurrence of constipation was minimum compared to other side effects.

As regarding management of constipation by changed the type of food taken and choosing the type of fluids this attitude of was significantly improved to the right way (P=0.000).Also the duration of exercise during the day was increased, so that the number of bowel movement increased after program so that the patients passing stool daily was changed from (21.7%) in pre to (81.7%) in post test. This result was correlated with A S. Zümrüt and E. Seher they said that there was statistically significant decreases in the frequencies of the following symptoms: nausea, vomiting, feeling

distressed/anxious, and feeling pessimistic and unhappy, unusual fatigue and difficulty sleeping. Also, there were statistically significant decreases in the severity of the 11 symptoms and on the discomfort levels of these symptoms. In the study, the planned education provided by the health-care providers had a positive effect on the symptom control of patients receiving chemotherapy [147].

Neuropathy is the most common symptoms in people over age 55, with a prevalence of 3% to 4%. Among the general population, about a third of cases are caused by diabetes, while another third is termed idiopathic (cause unknown).

Neuropathy can also result from a variety of factors, including medications (such as chemotherapeutic agents), genetics, autoimmune disorders, infections, nutritional deficiencies, and metabolic imbalances.

Neuropathy is a common complication of cancer and its treatment that can lead to serious of clinical consequences for the patient. This report presents the views of the NCCN Task Force on the assessment and management of neuropathy in cancer patients as discussed at the meeting in January [148].

Symptoms of nerve changes experienced in some of the patients were burning, numbness, hearing affection and abdominal pain. This depends on the type of drugs regimen used in current study were FOLFIRI (1.7%) CIS and ADR (3.3%). This result correlated with Walker M who said that the majority of participated patients experienced neuropathies in form of numbness in extremities, hands and feet cramp, drowsiness and loss of balance following the first cycle. These results are supported by The American cancer society stated that chemotherapy can interfere with certain central nervous system functions causing tiredness, confusion, sleep troubles

and blurred vision that 5-Flurouracil and Oxaliplatin and cisplatine affect large diameter fiber of the neural tissue, resulting in sensory changes [149].

The occurrence of pain was in (38%) in pre which was reduced to (25%) in post (P=0.045) .The severity of pain was ranging from slight pain to severe enough that it prevents sleep. Mollaoğlu Ma and Erdoğan G found statistically significant decreases in the frequencies of pain and other side effects of chemotherapy structured information given to patients receiving chemotherapy[150].

About the type of cancer in the study group the most frequently reported cancer was breast cancer (41%) followed by lymphoma (16%), colorectal (13.3%) and leukemia (5%). This result correlated with cancer registry in Sudan which reported the most commonly diagnosed cancer among women was breast followed by leukemia, cervix, and ovary, and among men it was prostate cancer followed by leukemia, lymphoma, oral, colorectal, and liver[127]. While Nade´ge Carelle, etal in a survey done in Paris found the most common malignancies in the surveyed group were breast carcinoma (40women), gastrointestinal carcinoma (19 patients), lung carcinoma (7 patients), and ovarian carcinoma (9 women)[151].

The Karnofsky (ECOG) performance status scale identified the patient's performance on a scale of 0-4., it was used to qualify subjects' functional ability at the time when the chemotherapy was initiated .In the study (80%) of group in pre and post had score of 0 indicating that the patients were able to carry a normal activity and work with no special care or assistance required.

Robinson and Phipps et al ,stated that chemotherapeutic drugs are most frequently given in a combined form that enhances the effect of drugs on tumor cell, lead to cell killing, minimize drug resistance and increases

survival[152]. The most drugs regimen used in this study were the (FAC), (Taxol , Carbo and Ac) and (FOLFOX4) , FEC and ABVDA regimen.

Regarding the association between level of education and knowledge of patients example prevention of infection, there was no significant relation in. time of hand washing (P= 0.189) before the program and after(P=0.844) the program, washing of fruit and vegetables(P=0.432)in pre(P=0.730). This relation was insignificant in pre and post test that means the level of education was not affected the taking of information which that the knowledge and attitude of study group was improved.

Conclusion

- Female were predominant and third of group study were illiterate.
- Alopecia, nausea vomiting and diarrhea were the commonest side effects reported in the study.
- Knowledge of the group before the program was poor regarding management of chemotherapy side effects with significant improvement in post program.
- Self-care practice to relive nausea and vomiting was slightly improved.
- Knowledge of study group about time of hair growth following alopecia was significantly increased.
- The severity and occurrence of symptoms was reduced in post test after the teaching program.
- Self care practice was changed significantly which affects positively the attitude and practice of patients.
- There was no significant relation between the knowledge and level of educations.

Recommendations

The chemotherapy side effects are very common and affect the health then delay continuity of treatment, therefore the recommendation of study are:

- Education of patients is very important to mange treatment side effect specially in chemotherapy drugs to facilitate health promotion.
- Patient self care is first line of treatment, if encouraged the treatment will be very effective and less harmful or anxious to the patient.
- A manual booklet of side effects of chemotherapy and how to manage it written in simple words and using attractive pictures should be given to the patients and their families. (Used in this study).
- Encourage the patient and family members to attend health education and counseling program about chemotherapy related side effects and how to deal and cope with these side effects.
- Encourage the oncology nurse to attend and participate in educational programs, workshops and reviewing up-date-oncology research.

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University of Shendi
Postgraduate collage

Questionnaire

TO

***Impact of Structured Teaching Programe on Management of Common Side Effects of Chemotherapy among Cancer Patients in Elmak* Nimer Hospital**

Pt.name:……..
Residence:……..

Sex : a)Male ☐ b)female ☐

Age: a) 18-25years ☐ b) 26-35years ☐ c) 36-45years ☐

d) 46-55 years ☐ e) 56-65 years f) Above 65years

Mobile. NO:……

Tribe:-…….

Level of education:

a**)** Illiterate ☐ b) Primary ☐

d) Secondary ☐ e) University ☐ f) Post graduate ☐

Marital status:

a) Married ☐ b) Not married ☐ d) Divorced ☐

occupation:

a)Not employed ☐ b)Employed ☐ c)laborer ☐ e) Professional ☐
f) Free worker ☐

Self care of patient regarding Infection

1. **Occurrence of infection during periods of treatment.**

a) Occurred ☐ b) Not occurred ☐

2. Seeking for advice when taking drugs :

a) Advised ☐ b) Not advised ☐

3. Time of hands washing and way of wash

a) Before cooking or eating ☐ b) After using the bath room ☐

c) After being in public place ☐ f) All of the above ☐

4. Avoidance of people who are infected :

a) Avoided ☐ c) Not avoided ☐

5. Avoidance of crowdedness

a) Avoided ☐ b) Not avoided ☐

6. Washing of fruits or vegetables before taking it

a) Washed ☐ b) Sometimes ☐ c) Not washed ☐

7. . Habit of eating un cooked meat .

a) Eaten ☐ b) Not eaten ☐

8. Type of tooth brush used

a) Smooth ☐ b) Medium ☐ c) Hard ☐

9. Time of tooth brushing:

a) At morning ☐

b) At night ☐

c) At morning and night ☐

<u>Attitude& knowledge of patient regarding anemia & fatigue</u>

10. .Feeling of dizziness or faint

a) Always ☐ b) Sometimes ☐ c) No feeling ☐

11. .Feeling of fatigability.

a) Sometimes ☐ b) Always ☐ c) No feeling ☐

12. Sense of shortness of breathing.

a) Sometimes ☐ b) Always ☐ c) No S.O.B ☐

13. Fatigue can be caused by:

a) Anemia ☐ b) Pain ☐ c) Medications ☐

d) Appetite changes ☐ e) All of the above ☐ Others ☐

14. Time of feeling fatigability.

a) At rest ☐ b) At mild activities ☐ c)At moderate ☐ activities

d) At severe activities ☐ e) No feeling ☐

15. Action done after feeling fatigue

a) Get rest ☐ b) Sleep at least 8hours ☐

c) Let others to help ☐ d) Plan schedule to your work ☐

d) No action taken ☐

16. . Action taken when getting up

a) Sit for a moment and stand with bowing ☐ B) Stand up directly ☐

17. Duration of sleeping in the day

a) 2-3houres ☐ b) 4-8houres ☐ c) More than 8houres ☐

18. Amount of fluids taking during the day.

A) >1 liters ☐ b) 1-> 3literst ☐ c) 3lterst and above ☐

19. 10.Number of meals during the day.

a) 2meal ☐ b) 3meal ☐ c) 4-6 snacks ☐

20. Compliance to iron pills.

a) Regular ☐ b) Irregular ☐ c) Not prescribed ☐

<u>Knowledge& attitude of patient about Bleeding Problems</u>

21. Occurrence of bleeding with chemo therapy

a) Occurred ☐ b) Not occurred ☐

22. skin changes due to bleeding

a) Bruises ☐ b) Red, pinpoint spots on your skin ☐

c) No skin bleeding ☐

23. Knowledge about site of bleeding.

b) From your mouth or nose ☐

c) From your vagina when you are not having your period (menstruation) ☐

d) During your Menstrual Period that is heavier or lasts longer than normal ☐

e) Blood in your urine ☐

f) Black or bloody stools ☐

24. Type of shaver used ?

a) Razor ☐ b) Electric shaver ☐

25. Time of wearing shoes.

a) All the time ☐ b) Some times ☐

26. Blowing your nose gently.

a) Gently ☐ b) Not gently ☐

27. .Use of dental floss or toothpicks.

a) Used ☐ b) Not used ☐

28. When you get constipated you tell your tell your or nurse:

a) Sometimes ☐ b) Always ☐ c) Don't tell ☐

29. Action done when you have cut wound.

a) Press down firmly on the area with a clean cloth ☐

b) Put the ice or cold back if bruise on the area about 20 minute ☐

c) None of the above ☐

Attitude and knowledge of patient regarding management of Diarrhea

30. Causes of diarrhea are

a) Chemotherapy ☐ b) Infection ☐ c) Drugs help to treat constipation ☐

d) All of the above ☐ e) Other ☐

31. Occurrence of diarrhea

a) Occurred ☐ b) Not occurred ☐

32. Amount of fluid take during diarrhea

a) Increased ☐ b) Decreased ☐

33. Type of food which increase diarrhea.

a) Milk ☐ b) Cheese ☐ c) Spicy food ☐

d) All of the above ☐ e) None of the above ☐

34. Type of food you need to avoid during periods of diarrhea

a) Foods cause gases ☐ b) Foods are high in fiber ☐

c) No avoidance to any type of food ☐ d)A-B ☐

35. Foods or drinks with caffeine, cola, and chocolate during diarrhea periods

a) Avoided ☐ b) Taken ☐

36. When you have rectal bleeding or hemorrhoids, you tell your doctor or nurse.

a) Yes ☐ b) No ☐

Knowledge of patient and attitude about Nausea & vomiting:

37. Feeling of nausea and vomiting development

a) Occurred ☐ b) Not occurred ☐

38. Compliance to anti emetic drugs:

a) Taken regularly ☐ b) Irregularly taken ☐ c) Not taken ☐

39. The best time to take anti emetic drugs.

a) Before meal ☐ b) During meal ☐ c) After meal ☐

40. Number of meals during this period.

a) Increased ☐ b) Decreased ☐ c) Not changed ☐

41. You drink a lot of water after meal

a) Yes ☐ b) No

42. You lie down after you meal.

a) Always ☐ b)Some times ☐

43. Action done when you feel nauseated or need to vomit.

a) Breathe deeply and slowly ☐ b) Get fresh air. ☐

c) Distract yourself by chatting with friends or family ☐

d) Listening to Quran, or watching TV. ☐

e) None of the above ☐

<u>Knowledge n attitude of a patient about occurrences of Hair loss (alopecia):</u>

44. Presences of loss hair loss

a) Present ☐ b) Not present ☐

45. Time of occuraance of hair loss after starting the chemotherapy. ☐ ☐ ☐

1. 2-3 weeks b) 4 – 5 weeks c) I don't know

46. Type of cleaners used to wash hair loss areas.

a) Shampoo ☐ b) Soaps c) Water d) other ☐

47. Action done after hair loss started.

a) Cut your hair short ☐ b) Shave your hear ☐

c) Get wing ☐ e) None of the above ☐

48. Knowledge about time needed for hair growth.

a) 2-3 months ☐ b) 4-6 months ☐ c) More than 6 months ☐

Knowledge &attitude of patient about occurrences of constipation

49. Food helps to manage constipation.

a) Whole grain breads and cereals ☐

b) Fruits and vegetables ☐

c) Nuts and seeds ☐

d) All of the above ☐

50. Type of liquids help to decrease constipation .

a) Cold fluid ☐ b) Hot fluids ☐

51. Duration of exercise during the day

a) 10 – 15 mints ☐ b) 15 – 30 mints ☐

c) No exercise done ☐ e).>30 mint ☐

52. Frequency of defecation.

a) Every day ☐ b) Day after day ☐ c) More than 3 days ☐

53. Checking with your doctor or nurse before using fiber supplements, laxatives, stool softeners, or enemas.

a) Always ☐ b) Sometimes ☐ c) No check ☐

Knowledge &practice about nerve changes:

54. Sensation of tingling or burning

a) Sometimes ☐ b) All the times ☐ c) No sensation ☐

55. Sensation of numbness in your hands or feet

a) Sometimes ☐ b) All the times ☐ c) No sensation ☐

56. Feeling of pain during walking

a) Sometimes ☐ b) All the times ☐ c) No sensation ☐

57. Hearing status

a) Decrease of hearing ☐ b) normal hearing ☐

58. Present of abdominal pain

a) Present ☐ b) Not present ☐

59. Periods of nerve change after chemotherapy.

a) 2 – 3 weeks ☐ b) 4 – 8 weeks ☐ c) More than week ☐

Attitude of patient regarding Pain management :

60. Feeling of pain

a) Present ☐ b) Not present ☐

61. Site of pain

a) In one part of your body ☐ b) All over the body ☐

62. Characteristic of pain?

a) Slight pain ☐ b) Moderate pain ☐

c) Make hard to work ☐ d) Inter feel with eating or sleeping ☐

63. Frequency of analgesic drugs taking.

a) S. O. S ☐ b) T. D. S ☐ c) B. D ☐ d) One/ day ☐

64. Response of pain to the drugs?

a) No response ☐ b) Reduced ☐ c) Relived ☐

Nursing assessment

65. Zubrod Scale (performance status)

a) 0 ☐ b) ☐ c) 2 ☐ d) 3 ☐ e) 4 ☐

66. Diagnosis

……

67. Drugsregimens

……

68. Cycle NO :

a) 2 ☐ **b) 3** ☐ **c) 4** ☐ **d) 5** ☐ **e) 6** ☐

OPERATIONAL DEFINITIONS

1. **Evaluate**: refers to statistical analysis of knowledge scores of patients regarding side effects of chemotherapy and its coping strategies among the patients admitted in cancer units as included in structured interview schedule.
2. **Effectiveness**: refers to the extent to which the planned teaching programme has achieved the desired outcome as measured by gain in knowledge scores.
3. **Planned teaching programme**: refers to the written/verbal materials on side effects of chemotherapy and its coping strategies, developed by investigator and validated by the experts.
4. **Knowledge**: refers to the appropriate response by the cancer patients on knowledge regarding side effects of chemotherapy and its copping strategies through structured interview schedule.
5. **Chemotherapy**: Chemotherapy is the specific treatment of cancer by the administration of chemotherapeutic agents administered by the oral, intramuscular and intravenous routes occasionally directly into a body cavity, used to arrest the progress of or eradicate a specific pathological condition in the body without causing irreversible harm to healthy tissue.
6. **Side effects:** refers to any result of a drug or therapy that occurs in addition

   to the intended effect, regardless of weather it is beneficial or undesirable.
7. **Cancer patients:** refers to the patients admitted in cancer units for chemotherapy

8. **Coping strategies:** refers to the various strategies or methods used by the cancer patients to manage and adjust with the side effects of chemotherapy to decreases/ eliminate the side effects.
9. **Demographic variables:** refers to the variables like age, gender, religion, education, occupation, income, dietary pattern, area of residence, type of family, source of information, frequency and duration of chemotherapy.

List of chemotherapy regimens [42]

Name	Components	Example of uses, and other notes
ABVD	doxorubicin (Adriamycin), bleomycin, vinblastine, dacarbazine	Hodgkin's lymphoma
AC	doxorubicin (Adriamycin), cyclophosphamide	breast cancer
BACOD	bleomycin, doxorubicin (Adriamycin), cyclophosphamide, vincristine (Oncovin), dexamethasone	
BEACOPP	bleomycin, etoposide, doxorubicin (Adriamycin), cyclophosphamide, vincristine (Oncovin), procarbazine, prednisone	Hodgkin's lymphoma
BEP	bleomycin, etoposide, platinum agent	testicular cancer, germ cell tumors
CA	cyclophosphamide, doxorubicin (Adriamycin) (same as AC)	breast cancer
CAF	cyclophosphamide, doxorubicin (Adriamycin), fluorouracil (5-FU)	breast cancer
CAPOX or XELOX	capecitabine and oxaliplatin	colorectal cancer
CAV	cyclophosphamide, doxorubicin (Adriamycin), vincristine	lung cancer

CBV	cyclophosphamide, BCNU (carmustine), VP-16 (etoposide)	lymphoma
CHEOP	cyclophosphamide, hydroxydaunorubicin (doxorubicin), etoposide, vincristine (Oncovin), prednisone	
ChlVPP/EVA	chlorambucil, vincristine (Oncovin), procarbazine, prednisone, etoposide, vinblastine, doxorubicin (Adriamycin)	Hodgkin's lymphoma
CHOP	cyclophosphamide, hydroxydaunorubicin (doxorubicin), vincristine (Oncovin), prednisone	non-Hodgkin lymphoma
CHOP-R or R-CHOP	CHOP + rituximab	B cell non-Hodgkin lymphoma
ClaPD	clarithromycin, pomalidomide, dexamethasone	
CMF	cyclophosphamide, methotrexate, fluorouracil (5-FU)	breast cancer
COP or CVP	cyclophosphamide, Oncovin (vincristine), prednisone	non-Hodgkin lymphoma in patients with history of cardiovascular disease
COPP	cyclophosphamide, Oncovin	non-Hodgkin

	(vincristine), procarbazine, prednisone	lymphoma
CTD	cyclophosphamide, thalidomide, dexamethasone	AL amyloidosis
CVAD and Hyper-CVAD	Hyper-CVAD cyclophosphamide, vincristine, doxorubicin (Adriamycin), dexamethasone	aggressive non-Hodgkin lymphoma, lymphoblastic lymphoma, some forms of leukemia
DCEP	dexamethasone, cyclophosphamide, etoposide, platinum agent	
DHAP	dexamethasone (a steroid hormone), cytarabine (ara-C), platinum agent	
DICE	dexamethasone, ifosfamide, cisplatin, etoposide (VP-16)	aggressive relapsed lymphomas, progressive neuroblastoma
DT-PACE	dexamethasone, thalidomide, platinum agent, doxorubicin (Adriamycin), cyclophosphamide, etoposide	multiple myeloma
EC	epirubicin, cyclophosphamide	breast cancer
ECF	epirubicin, cisplatin, fluorouracil (5-FU)	gastric cancer and esophageal cancer
EOX	epirubicin, oxaliplatin, capecitabine	

EP	etoposide, platinum agent	testicular cancer, germ cell tumors
EPOCH	etoposide, prednisone, vincristine (Oncovin), cyclophosphamide, and hydroxydaunorubicin	lymphomas
ESHAP	etoposide, methylprednisolone (a steroid hormone), cytarabine (ara-C), platinum agent	
FCM	fludarabine, cyclophosphamide, mitoxantrone	B cell non-Hodgkin lymphoma
FL (also known as Mayo	fluorouracil (5-FU), leucovorin (folinic acid)	colorectal cancer
FLAMSA	fludarabine, cytarabine, amsacrine	myelodysplastic syndrome, acute myeloid leukemia
FLAMSA-BU	fludarabine, cytarabine, amsacrine, busulfan	myelodysplastic syndrome, acute myeloid leukemia
FLAMSA-MEL	fludarabine, cytarabine, amsacrine, melphalan	myelodysplastic syndrome, acute myeloid leukemia
FOLFIRI	fluorouracil (5-FU), leucovorin (folinic acid), irinotecan	colorectal cancer
FOLFIRINOX	fluorouracil (5-FU), leucovorin (folinic acid), irinotecan, oxaliplatin	pancreatic cancer

FOLFOX	fluorouracil (5-FU), leucovorin (folinic acid), oxaliplatin	colorectal cancer
GC	gemcitabine, cisplatin	
ICE	ifosfamide, carboplatin, etoposide (VP-16)	aggressive lymphomas, progressive neuroblastoma
ICE-R	ICE + rituximab	high-risk progressive or recurrent lymphomas
IFL	irinotecan, leucovorin (folinic acid), fluorouracil	colorectal cancer
m-BACOD	methotrexate, bleomycin, doxorubicin (Adriamycin), cyclophosphamide, vincristine (Oncovin), dexamethasone	non-Hodgkin lymphoma
MACOP-B	methotrexate, leucovorin (folinic acid), doxorubicin (Adriamycin), cyclophosphamide, vincristine (Oncovin), prednisone, bleomycin	non-Hodgkin lymphoma
MMM	mitomycin, methotrexate, mitoxantrone	
MOPP	mechlorethamine, vincristine (Oncovin), procarbazine, prednisone	Hodgkin's lymphoma
MVAC	methotrexate, vinblastine, adriamycin, cisplatin	advanced bladder cancer[4]

MVP	mitomycin, vindesine, cisplatin	
NP	cisplatin, vinorelbine	
PACE	platinum agent, doxorubicin (Adriamycin), cyclophosphamide, etoposide	
PCV	Procarbazine, CCNU (lomustine), vincristine	brain tumors
PEB	cisplatin, etoposide, bleomycin	
PEI	cisplatin, etoposide, ifosfamide	
POMP	6-mercaptopurine (Purinethol), vincristine (Oncovin), methotrexate, and prednisone	acute adult leukemia[5]
ProMACE-MOPP	methotrexate, doxorubicin (Adriamycin), cyclophosphamide, etoposide + MOPP	non-Hodgkin lymphoma
ProMACE-CytaBOM	prednisone, doxorubicin (Adriamycin), cyclophosphamide, etoposide, cytarabine, bleomycin, vincristine (Oncovin), methotrexate, leucovorin	non-Hodgkin lymphoma
	RdC	lenalidomide (Revlimid), dexamethasone, cyclophosphamide
R-DHAP	rituximab + DHAP; that is, rituximab, dexamethasone (a	

	steroid hormone), cytarabine (ara-C), platinum agent	
R-FCM	rituximab + FCM; that is, rituximab, fludarabine, cyclophosphamide, mitoxantrone	B cell non-Hodgkin lymphoma
R-ICE	rituximab + ICE; that is, rituximab, ifosfamide, carboplatin, etoposide	high-risk progressive or recurrent lymphomas
RVD	lenalidomide (Revlimid), bortezomib, dexamethasone	
Stan ford V	doxorubicin (Adriamycin), mechlorethamine, bleomycin, vinblastine, vincristine, etoposide, prednisone	Hodgkin lymphoma
TAC	docetaxel (Taxotere), doxorubicin (Adriamycin), cyclophosphamide	
TCH	paclitaxel (Taxol), carboplatin, trastuzumab (Herceptin)	breast cancer
Thal/Dex	thalidomide, dexamethasone	multiple myeloma
TIP	paclitaxel, ifosfamide, platinum agent cisplatin (Platinol)	testicular cancer, germ cell tumors in salvage therapy
EE-4A	vincristine, actinomycin[6]	Wilms' tumor[6]
DD-4A	vincristine, actinomycin, doxorubicin (Adriamycin)[6]	Wilms' tumor[6]
VAC	vincristine, actinomycin, cyclophosphamide	rhabdomyosarcoma

VAD	vincristine, doxorubicin (Adriamycin), dexamethasone	multiple myeloma
VAMP	one of 3 combinations of vincristine and others	Hodgkin's lymphoma, leukemia, multiple myeloma
Regimen I	vincristine, doxorubicin (Adriamycin), etoposide, cyclophosphamide	Wilms' tumor
VAPEC-B	vincristine, doxorubicin (Adriamycin), prednisone, etoposide, cyclophosphamide, bleomycin	Hodgkin's lymphoma
VD-PACE	bortezomib, dexamethasone plus platinum agent, doxorubicin (Adriamycin), cyclophosphamide, etoposid	
VIFUP	vinorelbine, cisplatin, fluorouracil	
VIP	vinblastine, ifosfamide, platinum agent	testicular cancer, germ cell tumors
VTD-PACE	bortezomib (Velcade), thalidomide, dexamethasone plus platinum agent, doxorubicin (Adriamycin), cyclophosphamide, etoposide	

Common combination chemotherapy regimens [(43)]

Cancer type	Drugs	Acronym
Breast cancer	Cyclophosphamide, methotrexate, 5-fluorouracil	CMF
	Doxorubicin, cyclophosphamide	AC
Hodgkin's disease	Mustine, vincristine, procarbazine, prednisolone	MOPP
	Doxorubicin, bleomycin, vinblastine, dacarbazine	ABVD
Non-Hodgkin's lymphoma	Cyclophosphamide, doxorubicin, vincristine, prednisolone	CHOP
Germ cell tumor	Bleomycin, etoposide, cisplatin	BEP
Stomach	Epirubicin, cisplatin, 5-fluorouracil	ECF
Cancer	Epirubicin, cisplatin, capecitabine	ECX
Bladder cancer	Methotrexate, vincristine, doxorubicin, cisplatin	MVAC
Lung cancer	Cyclophosphamide, doxorubicin, vincristine,	CAV

Colorectal cancer	5-fluorouracil, folinic acid, oxaliplatin	FOLFOX

كيف تفرش أسنانك ؟

- يساعد إتباع الطريقة الصحيحة لتنظيف الأسنان بالفرشاة في الحد من خطورة الإصابة بالتسوس و أمراض اللثة و ما يؤديانه من آلام و بالتالي فقدان الأسنان.
- تتطلب عملية تفريش الأسنان الصحيحة إتباع خمسة خطوات:

1. استخدام فرشة أسنان ناعمة.
2. استخدام معجون أسنان يحتوي على الفلورايد.
3. تفريش الأسنان مرتين في اليوم على الأقل.
4. تفريش جميع أسطح الأسنان.
5. معرفة الزاوية الصحيحة التي تلمس بها الفرشاه الأسنان.

Infection measurement

Symptoms :-

Each infectious disease has its own specific signs and symptoms. General signs and symptoms common to a number of infectious diseases include:

- Fever a) Yes ☐ b) No ☐
- Diarrhea a) Yes ☐ b) No ☐
- Fatigue a) Yes ☐ b) No ☐
- Muscle aches a)Yes ☐ b) No ☐
- Throat pain a)Yes ☐ b) No ☐
- Ear pain a)Yes ☐ b) No ☐
- Sinuses pain a)Yes ☐ b)No ☐
- Are having trouble breathing a)Yes ☐ b) No ☐
- Have been coughing for more than a week

  a)Yes ☐ b) No ☐
- Have severe headache with fever

  a)Yes ☐ b) No ☐
- Experience a rash or swelling a)Yes ☐ b) No ☐
- Have sudden vision problems a)Yes ☐ b)No ☐

Shoso

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اليوم العالمي لغسل اليدين

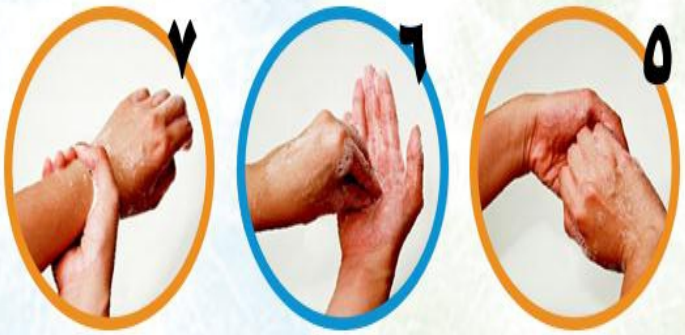
الطريقة الفعّالة لغسل اليدين بالماء و الصابون

١ باطن اليد بباطن اليد الأخرى

٢ باطن اليد بباطن اليد الأخرى مع تداخل الأصابع

٣ باطن اليد اليمنى بظهر اليد اليسرى مع تداخل الأصابع

٤ الدعك الدائري للإبهام الأيسر ثم الأيمن



٥ ظهر الأصابع بباطن اليد الأخرى و الأصابع مضمومة

٦ الدعك الدائري بأصابع اليد اليسرى لباطن اليد اليمنى و العكس

٧ غسل المعصم لكلا اليدين في النهاية

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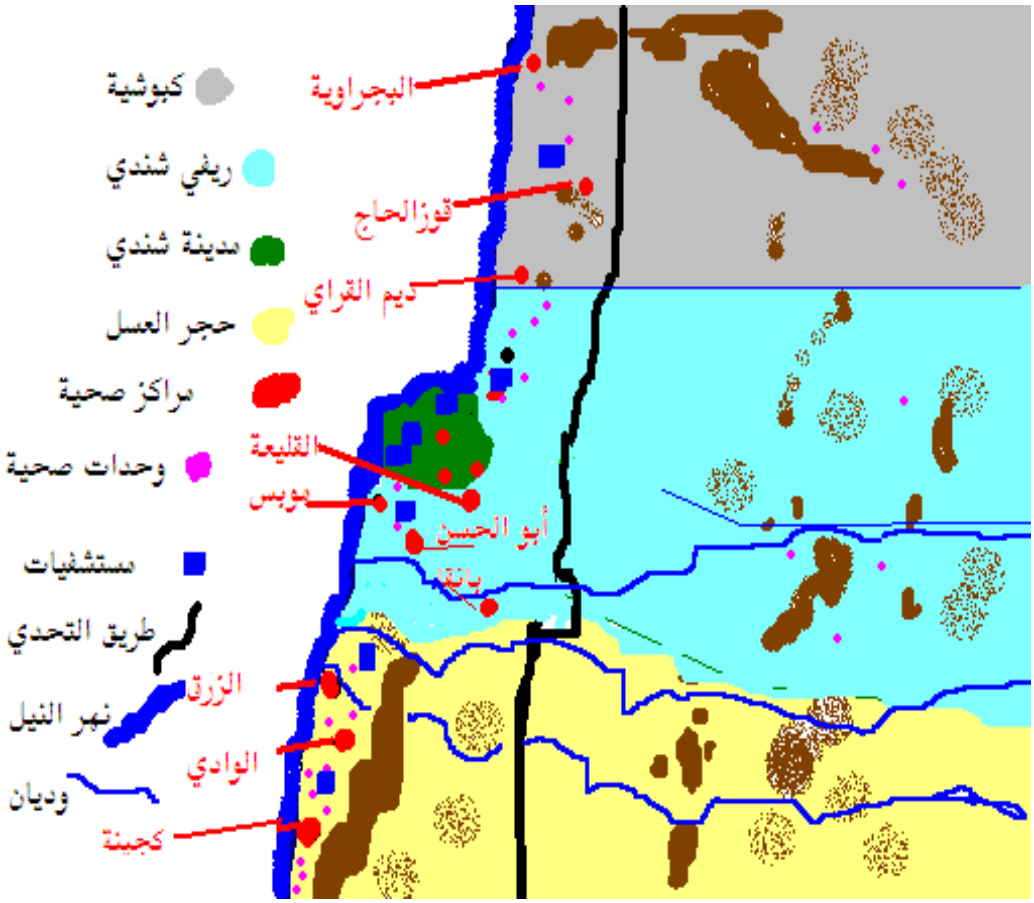
6.2.5- Map of Shendi locality (study area):



برنامج حول معالجه الآثار الجانبية الشائعة

للعلاج الكيميائي لنيل درجة الدكتوراه

إعداد:

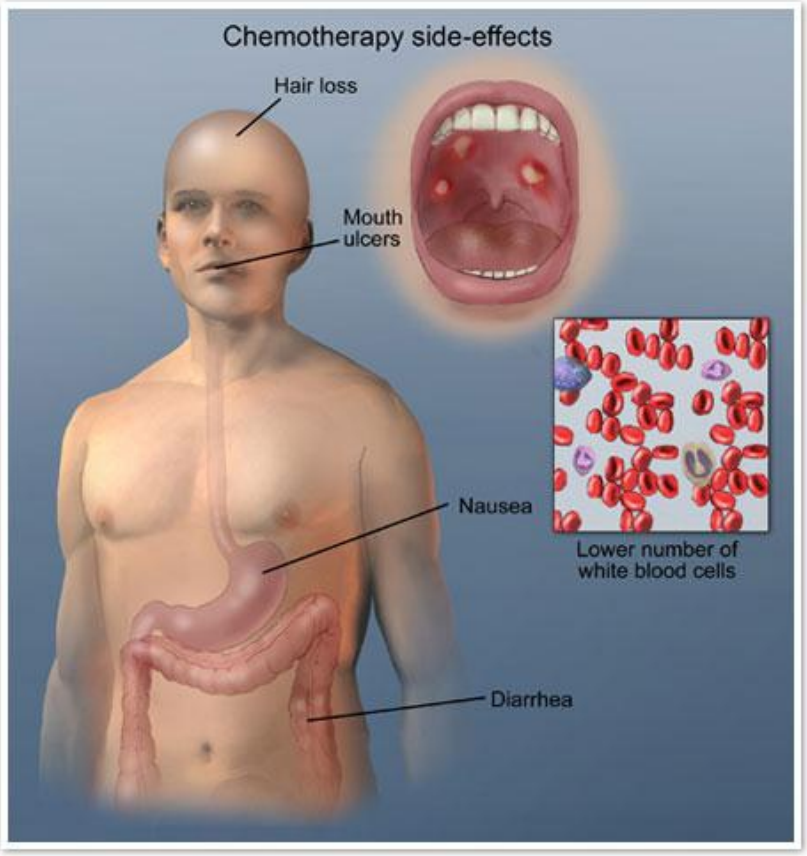
سارة عوض الكريم عبد الرحمن الحسن

اختصاصي تمريض باطني جراحي

اشراف:

د.زاهر يس محمد احمد

إستشارى الغدد والأورام بالمركز القومى للعلاج بالأشعة والطب النووى



بسم الله الرحمن الرحيم

(وَ إِذَ ا مَرِضْتُ فَهُوَ
يَشْفِينِ (80))

صدق الله العظيم
الآية من سورة الشعراء

العلاج الكيميائي

ما هو العلاج الكيميائي؟

العلاج الكيميائي هو نوع من الأدوية يستخدم لتدمير الخلايا السرطانية ويوجد أكثر من 100 نوع ويستخدم غالبا في شكل جرعات بمعدل جرعه كل 3اسابيع والجرعة مكونه في اغلب الأحيان من عدد من الادويه.

كيف يعمل العلاج الكيميائي؟

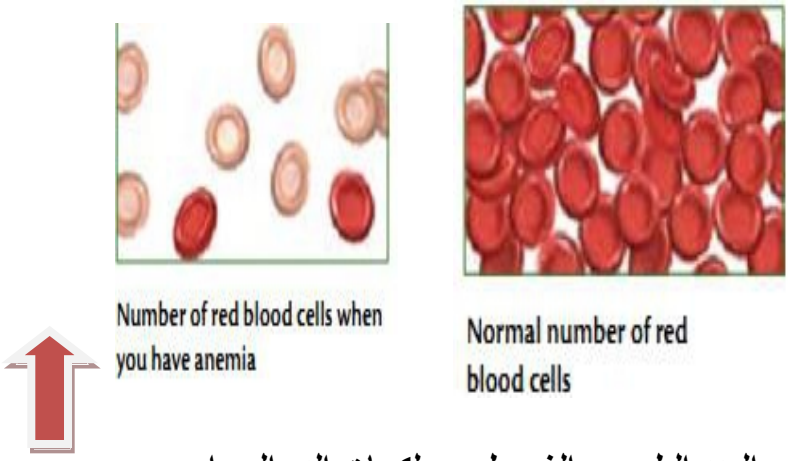
- **العلاج الكيميائي يعمل من خلال وقف أو إبطاء نمو الخلايا السرطانية، والتي تنمو وتنقسم بسرعة. ولكنه يمكن أن يضر أيضا الخلايا السليمة مثل تلك التي تبطن الفم والأمعاء أو الخلايا التي تجعل شعرك ينمو.**
- **الأضرار التي لحقت الخلايا السليمة قد تتسبب في آثار جانبية. في كثير من الأحيان، والآثار الجانبية تتحسن أو تزول بعد انتهاء العلاج الكيميائي.**

الآثار الجانبية الشائعة:-

1. **الأنيميا**
2. **الشعور بالإعياء والإجهاد**
3. **النزيف**
4. **الإمساك**
5. **الإسهال**
6. **الالتهابات**
7. **الطمام والاستفراغ**
8. **تساقط الشعر**
9. **الألم**
10. **خدر الأعصاب**

الأنيميـــــــا

- **وهي تعنى "نقص الدم" هي انخفاض في العدد الطبيعي لخلايا الدم الحمراء أو نقص الهيموجلوبين.**
- **و حيث أن الهيموجلوبين (الذي يوجد داخل خلايا الدم الحمراء) هو الذي يحمل الأكسجين من الرئتين إلى الأنسجة فان فقر الدم يؤدي إلى نقص الأكسجين في أجهزة الجسم. وبما أن جميع الخلايا البشرية تعتمد على الأكسجين للبقاء على قيد الحياة، فان الدرجات المتفاوتة من فقر الدم يمكن أن يصاحبها العديد من المشاكل الصحية.**

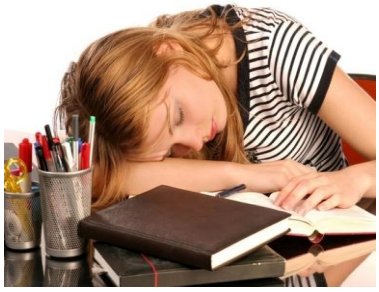


الشكل (1)

الشكل أعلاه يوضح العدد الطبيعي والغير طبيعي لكريات الدم الحمراء

الأعراض والعلامات

1. **معظم الأشخاص الذين يعانون من فقر الدم يشتكون من أعراض غير محددة مثل:**
   1. **الشعور بالضعف.**
   2. **الإرهاق أو التعب العام.**
   3. **أحيانا ضعف التركيز.**
   4. **وربما ضيق في التنفس، أو التعب عند بذل أي مجهود.**



الشكل (2)

2. في حالات فقر الدم الشديد، قد يقوم الجسم بتعويض النقص في الأكسجين في الدم عن طريق زيادة مردود القلب. وقد يعانى المريض من أعراض مرتبطة بذلك، مثل:-
   1. خفقان القلب
   2. والذبحة الصدرية (إذا كان هناك أمراض سابقة بالقلب)
   3. تقلصات دورية في الساقين
   4. وأعراض فشل في وظائف القلب.

<u>طريقة العلاج</u>

1. الحصول على الكثير من الراحة.
2. محاولة النوم 8 ساعات على الأقل كل ليلة.
3. قد يحتاج أيضا أن يأخذ 1-2 قيلولة قصيرة (1 ساعة أو أقل) خلال النهار.
4. الحد من الأنشطة الخاصة بك.

   وهذا يعني القيام فقط بالنشاطات التي هي الأكثر أهمية بالنسبة لك.
5. قبول المساعدة من الأهل والأصدقاء.

الشكل (3)

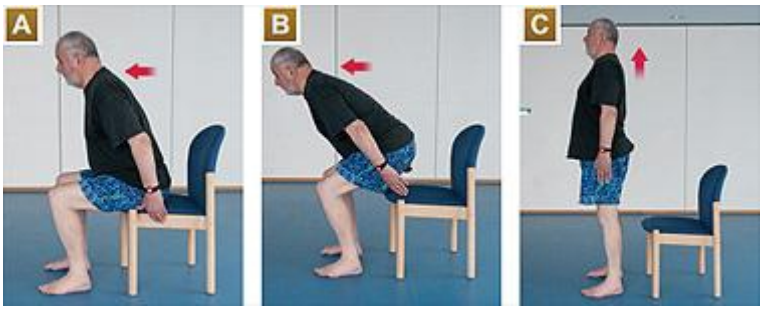
6. تناول نظام غذائي متوازن. يحتوي على جميع السعرات الحرارية والبروتين التي يحتاجها جسمك.

الشكل (4)

7. وسوف تساعد على الحفاظ على توازن السعرات الحرارية الخاصة بك، والبروتين الإضافي يمكن أن يساعد في إصلاح الأنسجة التي تضررت من علاج السرطان.(قائمه بأسماء الأطعمة التي يمكن تناولها في حالة الأنيميا)

8. التحدث مع طبيبك، عن النظام الغذائي الذي يجب عليك إتباعه.

9. الوقوف بالتدريج. قد تشعر بالدوار إذا كان الوقوف بسرعة كبيرة.



الشكل (5)

10. اتصلي بطبيبك أو ممرضتك عند الشعور بالتعب الزائد أو الإحساس بالدوار(لفة الرأس) أو الشعور بالإغماء

11. تناول الأطعمة التي تحتوي على الحديد مثل اللحوم الحمراء، والخضرالورقية (مثل الكرنب والسبانخ)، والفاصوليا المجففة المطبوخة والإكثار من شرب الماء والعصاير .

الشكل (6)

12. تناول حبوب الحديد اليومية بعد الإفطار.

الشعور بالإعياء والإجهاد

الأسباب الأخرى غير الكيمائي:-

1. **فقر الدم**
2. **فقدان الشهية**
3. **أمراض الجهاز التنفسي**
4. **الالتهابات والأمراض المختلفة**

طريقة علاج الإعياء

1. **اخذ قسط من الراحة.**

الشكل(7)

2. **الاهتمام بالصلاة وأدائها بخشوع فهي تساعد علي الاسترخاء.**

الشكل (8)

3. **تناول 5-6 وجبات صغيره الطعام بدلا من 3 وجبات كبيرة.**

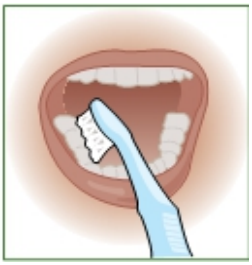
4. **تناول 3 لتر من السوائل علي الأقل يوميا.**
5. **وضع خطة زمنية للراحة.**
6. **اخذ قيلولة (حوالي ساعة خلال النهار).**

7. **التخطيط ووضع جدول للعمل.**
8. **السماح للآخرين بمساعدتك.**
9. **التعلم من الآخرين الذين لديهم سرطان.**
10. **الحفاظ على مذكرات تعبر فيها عن شعورك كل يوم.**

التحدث مع طبيبك أو ممرضتك عن كل ما تشعر به حتى لا يحدث لك إغماء مثل هذا

النزيف

يعني بالنزيف خروج الدم من أي جانب من الجسم من الأنف أو الفم أو الجلد أو المستقيم أو زيادة في كمية الطمث.



طريقة العلاج

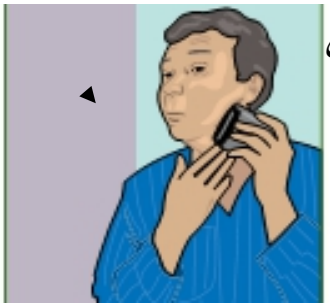
1. **استخدام فرشاة أسنان ناعمة جدا**
2. **تنظيف الفرشاة بمياه الحنفية الدافئة قبل الاستخدام.**

الشكل (13)

3. **عند نظافة الأنف يجب الضغط عليها برفق لابقوه.مثل هذا**

الشكل (14)

4. **كن حذرا عند استخدام مقص، سكاكين، أو غيرها من الأشياء الحادة.**
5. **استخدام ماكينة حلاقة كهربائية بدلا من الحلاقة بالموس**



الشكل (15)

6. **ارتداء أحذية في كل وقت، حتى داخل المنزل أو في المستشفى.** **الشكل (16)**

تحذيرات

1. **تجنب استخدام خيط تنظيف الأسنان أو المسواك .**
2. **عدم ممارسة الرياضة أو القيام بأي أنشطة أخرى إذا كان لديك أي جرح.**
3. **عدم استخدام سدادات قطنية(منظف الأذنين القطني)، والحقن الشرجية والتحاميل، أو موازين الحرارة بالمستقيم .**
4. **عدم ارتداء الملابس ذات اللياقات الضيقة، المعصمين، أو الأحزمة.**

عند حدوث النزيف

إذا كنت بدأت تنزف: –

الشكل (17)

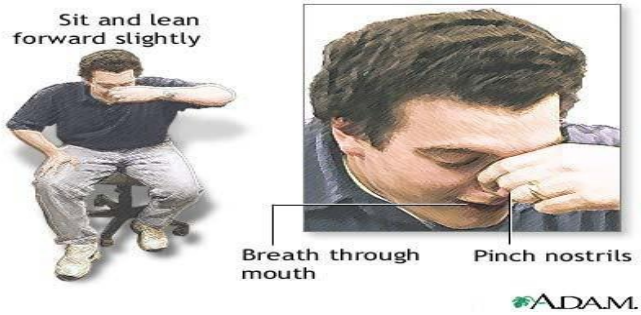
1. **اضغط لأسفل بشدة على المنطقة بقطعة قماش نظيفة**
2. **الحفاظ على الضغط حتى يتوقف النزيف.**

إذا كانت كدمة:

ضع الثلج على المنطقة لمدة 20 دقيقة.

الشكل(18)

عند حدوث الرعاف يجب اتخاذ الوضعية أدناه



الشكل(19)

تحقق من الطبيب أو الممرضة قبل:-

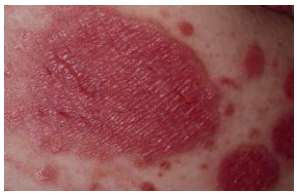
- **تناول الفيتامينات، والأعشاب والمعادن والمكملات الغذائية، والأسبرين، أو الأدوية الأخرى أكثر من دون وصفة طبية.**

بعض هذه المنتجات بأمكانهاأن تغير في كيفية عمل العلاج الكيميائي.

- ***استدعاء الطبيب أو الممرضة إذا كان لديك أي من هذه الأعراض:***
- **الكدمات، خاصة إذا كنت لم تصطدم أي شيء**

الشكل(20)

- **بقع حمراء صغيرة على الجلد الخاص بك**

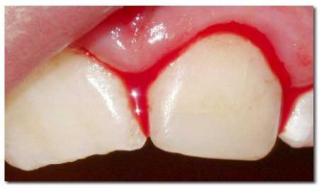


الشكل(21)

- **لون البول أحمر أو وردي**

الشكل (22)

- **لون البراز أسود أو دموي**
- **نزيف اللثة أو من الأنف**

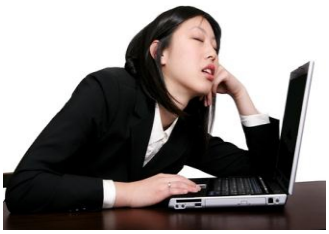


الشكل (23)

- **نزيف حاد أثناء الدورة الشهرية أو لفترة طويلة**
- **النزيف المهبلي غير الناجم من الدورة الشهرية**

الشكل (24)

- شعور بالصداع أو تغييرات في الرؤيا
- شعور بالنعاس الشديد أو الخلط



الإمساك

ما سبب حدوث الإمساك مع العلاج الكيميائي؟

الشكل (25)

- عادة هناك حركة طبيعية للأمعاء تشبه حركة الامواج (حركة موجية) تسمى Peristalsis Movement حيث تتحرك الأمعاء باستمرار لتحرك البراز من الأمعاء إلى خارج الجسم والعلاج الكيميائي يؤدى إلى ابطاء هذه الحركة الطبيعية للأمعاء مما يؤدى إلى أن يصبح البراز صلبا.
- و تزداد خطورة الإمساك إضافة إلى الألم و الإرهاق ومشاكل المعدة إلى إمكانية حدوث نزف بالمستقيم والشرج ويعاني كل المرضى من مشاكل الإمساك وينبغي إبلاغ الطبيب المعالج إن كان التبرز اقل من 3 مرات أسبوعيا.

أسباب الإمساك:-

- الأدوية مثل العلاج الكيميائي وأدوية الألم يمكن أن تسبب الإمساك.
- يكون أيضا بسبب تناول الأطعمة التي هي منخفضة في الألياف أو عدم شرب ما يكفي من السوائل.

الشكل (26)

طريقة العلاج:-

- **الاحتفاظ بسجل لحركات أمعائك. اعرض هذا السجل علي طبيبك أو ممرضتك والتحد ث عن ما هو طبيعي بالنسبة لك. هذا يجعل من الأسهل معرفة ما إذا كان لديك إمساك. اخذ كميه كافيه من الماء**
- **تناول السوائل الدافئة أو الساخنة، مثل القهوة والشاي، يساعد على علاج الإمساك. عصائر الفاكهة، مثل عصير الخوخ، قد يكون مفيدة أيضا.**
- **عند تناول المزيد من الألياف، يجب التأكد من شرب المزيد من السوائل.**
- **كن نشيطا كل يوم. يمكنك أن تكون نشطا عن طريق المشي، ركوب الدراجة**

الشكل (27)

أو القيام بالرياضة إذا كنت لا تستطيع المشي، أسأل عن التمارين التي يمكن القيام به على كرسي أو سرير.

- **تحقق مع الطبيب أو الممرضة قبل استخدام مكملات الألياف، الملينات، أو الحقن الشرجية. أطعمة عالية الألياف الشكل 35.**
- **وتشمل مصادر الألياف الجيدة الخبز والحبوب والفاصوليا المجففة والبازلاء والخضار النيئة والفواكه الطازجة والمجففة، والمكسرات، والبذور، والفشار.**

الشكل (28)

- **لا تستخدم العلاجات من دون التحقق أولا مع طبيبك أو ممرضتك.**

الشكل (29)

الإسهال

الإسهال هو زيادة في حركة الأمعاء (زيادة عدد مرات الإخراج) التي قد تكون لينة، فضفاضة، أو مائية.

- **العلاج الكيميائي يمكن أن يسبب الإسهال لأنه يضر بالخلايا السليمة التي تغطي جدار الأمعاء الكبيرة والصغيرة.**

كما قد يؤدي ذلك لتسريع أمعائك. ويمكن أيضا أن يكون سبب الإسهال عن طريق العدوى أو الأدوية المستخدمة.

طريقة العلاج:-

- **أكل 5 أو 6 وجبات صغيرة والوجبات الخفيفة كل يوم بدلا من 3 وجبات كبيرة.**
- **شرب 8 إلى 12 أكواب (3-5لتر) من السوائل كل يوم وتشمل هذه المياه، الشوربات، أملاح التروية، أو المشروبات الرياضية مثل جاتوريد.**
- **الشراب ببطء، واختيار المشروبات التي هي في درجة حرارة الغرفة. تفريغ الغاز من المشروبات الغازية قبل شربها.**
- **إضافة الماء إلي المشروبات التي تجعلك تشعر بالعطش أو بالغثيان.**

الشكل (30)

- **تناول الأطعمة منخفضة الألياف. يمكن للأطعمة التي تحتوي على نسبة عالية من الألياف أن تجعل الإسهال أسوأ. تشمل الأطعمة منخفضة الألياف الموز والأرز الأبيض.**

الشكل (31)

- والخبز المحمص الأبيض، واللبن الزبادي العادي أو الفانيليا. وغيرها من الأطعمة قليلة الألياف.
- السماح لطبيبك أو ممرضتك معرفة ما إذا كان الإسهال عندك يستمر لأكثر من 24 ساعة أو إذا كان لديك ألم والتشنج جنبا إلى جنب مع الإسهال. قد يصف لك الطبيب دواء للسيطرة على الإسهال.

الشكل (32)

- أيضا قد تحتاج للسوائل الوريدية لتحل محل المياه والمواد الغذائية التي فقدت. لا تأخذ أي دواء للإسهال دون أن يطلب أولا الطبيب أو الممرضة منك.

الشكل (32)

- أن تكون لطيف عند غسل نفسك بعد حركة الأمعاء(الإخراج). اخبر طبيبك أو ممرضتك إذا كانت منطقة المستقيم بها قرحة أو نزيف أو إذا كان لديك البواسير.
- اسأل طبيبك عن نظام غذائي واضح يعتمد علي السوائل–هذا يمكنك من أن تعطي وقت للأمعاء للراحة. معظم الناس يفضل البقاء على هذا النوع من النظام الغذائي لمدة 5 أيام أو أقل.

- الابتعاد عن المشروبات الساخنة جدا أو باردة جدا وغيرها من أنواع الكحول و الحليب أو منتجات الألبان، مثل الآيس كريم، الحليب المخفوق، القشدة الحامضة، والجبن الأطعمة الغنية بالتوابل، مثل الصلصة الحارة، الفلفل الحار والأطعمة الدهنية والمقلية، مثل البطاطا المقلية والهامبرغر.

الشكل (34)

- الابتعاد عن الأطعمة أو المشروبات التي تحتوي على الكافيين، مثل القهوة العادية، الشاي الأسود، الكولا، والشوكولاتة

الشكل (35)

- **كذلك الأطعمة أو المشروبات التي تسبب الغازات، مثل الفاصوليا المجففة المطبوخة، والملفوف، والقرنبيط، وحليب الصويا ومنتجات الصويا الأخرى.**

- **الأطعمة التي تحتوي على نسبة عالية من الألياف، مثل الفاصوليا المطبوخة المجففة والفواكه والخضار النيئة، المكسرات، والخبز القمح الكامل والحبوب.**

تساقط الشعر

يحدث تساقط الشعر في أي مكان بالجسم:الرأس، الوجه والذراعين والساقين والإبطين، العانة. وهو من الآثار الجانبية الشائعة لبعض الأدوية الكيمائية .

الشكل (36)

- **كثير من الناس يستاءون بسبب فقدان شعرهم وتجد أنه الجزء الأكثر صعوبة في العلاج الكيميائي.**
- **فقدان الشعر غالبا ما يبدأ بعد 2–3 أسابيع بعد العلاج الكيميائي الشعر غالبا ما ينمو مرة أخرى 2–3 أشهر بعد العلاج الكيميائي وقد ينمو أحسن من الأول.**

قبل تساقط الشعر:

الشكل (37)

- **اختصر شعرك أو احلق رأسك.**
- **أفضل وقت لاختيار شعر مستعار خاص بك هو قبل أن يبدأ العلاج الكيميائي.**
- **أن تكون لطيف عند غسل شعرك. استخدم الشامبو بدلا من الصابون**
- **لا تستخدم الأدوات التي يمكن أن تؤذي فروة رأسك.**

الشكل (38)

وتشمل هذه:

الشكل (39)

- ❖ **الاستقامة أو المكواة**
- ❖ **بكرات الفرشاة أو اللور.**
- ❖ **مجففات الشعر الكهربائية**

- العصابات الشعر والمقاطع
- مثبتات الشعر صبغات الشعر

بعد تساقط الشعر:

- **حماية فروة رأسك.**
- **حمايته من خلال ارتداء قبعة، أو وشاح عندما تكون في الخارج.**

الشكل (40)

- **محاولة تجنب الأماكن التي تكون حارة جدا أو باردة جدا.**
- **ارتداء قبعة، وعمامة، وشاح، أو شعر مستعار لمساعدتك على البقاء دافئا.**

الشكل (41)

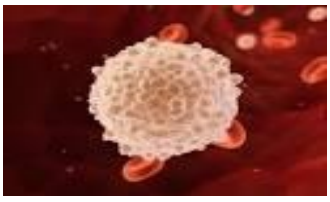
- **النوم على وسادة من السيتان. الحرير لا يخلق احتكاك مثل القطن عند النوم عليه.**
- **التحدث عن مشاعرك. كثير من الناس يشعرون بالغضب، والاكتئاب، أو يشعرو بالحرج حول فقدان الشعر. إذا كنت قلقا جدا أو تشعر بالضيق، قد ترغب في الحديث عن هذه المشاعر مع طبيبك أو ممرضتك أو أحد أفراد العائلة أو صديق مقرب أو شخص حدث له فقدان الشعر بسبب علاج السرطان.**

العدوى

ما هي ولماذا تحدث:

بعض أنواع العلاج الكيميائي يجعل من الصعب على نخاع العظم إنتاج كريات بيضاء جديدة (خلايا الدم الأبيض).

خلايا الدم البيضاء تساعد الجسم على مكافحة العدوى. ولذلك، فمن المهم أن نتجنب الالتهابات، وخصوصا أن العلاج الكيميائي يقلل من عدد خلايا الدم البيضاء الخاصة بك.



خلية دم بيضاء

الشكل (42)

إنتبه!!!

يجب استدعاء الطبيب

أو الممرضة على الفور إذا كان لديك

حمى من 100.5 درجة فهرنهايت أو أعلى(من 38 فما فوق).

الشكل (43)

طريقة العلاج:

- **طبيبك سوف يتحقق من عدد خلايا الدم البيضاء على مدار العلاج.**
- **غسل اليدين في كثير من الأحيان مع الصابون والماء.**

- **استخدام مناديل التعقيم لتنظيف الأسطح والأدوات التي تلمس.**
- **أن تكون لطيف ودقيق عند نظافة نفسك بعد حركة الأمعاء**

الشكل (44)

(النظافة بلطف بعد الإخراج)

- **البقاء بعيدا عن الناس الذين يعانون من المرض. وهذا يشمل المصابون بنزلات البرد والأنفلونزا، والحصبة، أو الجدري. تحتاج أيضا إلى البقاء بعيدا عن الأطفال الذين آخذو "الفيروس الحي" لقاح للجدري أو شلل الأطفال.**

- **البقاء بعيدا عن الحشود.**

الشكل (45)

- الحرص عند استخدام الآلات الحادة.
- استخدام ماكينة حلاقة كهربائية بدلا من الحلاقة بالموس. وتكون أكثر حذرا عند استخدام مقص، والإبر، أو السكاكين.


الشكل (46)

ملاحظة علامات الالتهاب في القسطرة إذا كان لديك قسطرة .

- وتشمل علامات الالتهاب، احمرار، تورم، أو الم حول فتحة البول بالإضافة لي تغير لون البول حيث يصبح عكر وارتفاع درجة حرارة الجسم.
- اسمح لطبيبك أو ممرضتك بالتعرف علي أي تغييرات لاحظتها بالقسطرة الخاص بك.
- الحفاظ على رعاية الفم الجيدة. فرش أسنانك بعد الوجبات وقبل أن تذهب إلى السرير.
- استخدام فرشاة أسنان ناعمة جدا.
- استشارة الطبيب أو الممرضة قبل الذهاب إلى طبيب الأسنان.
- الرعاية الجيدة لبشرتك وذلك باستخدام الماء الدافئ والصابون.
- لا تحصل على لقاح الأنفلونزا أو أي نوع آخر من اللقاحات دون أن يطلب منك الطبيب أو ممرضتك. بعض اللقاحات تحتوي على الفيروس الحي، الذي قد ينشط في حالة يكون الجسم ضعيف غير قادر علي المقاومة .
- غسل الخضار النيئة والفواكه جيدا قبل تناولها.

- لا تأكل الأسماك النيئة أو غير المطبوخة جيدا، والمأكولات البحرية، واللحوم، والدجاج، أو البيض قبل طهوها. فيمكن أن تكون بها البكتيريا التي يمكن أن تسبب العدوى.

إنتبه!!!!!!

- لا تأخذ الأدوية التي تقلل من الحمى دون التحدث مع طبيبك أو الممرضة.

- **الذهاب إلي الطبيب على الفور (وحتى في عطلة نهاية الأسبوع أو في منتصف الليل) إذا كنت تعتقد أن لديك عدوى. 1ذذذذذذ**
- **الذهاب إلي الطبيب إذا كان لديك حمى من 100.5 درجة فهرنهايت أو أعلى، أو عندما يكون لديك قشعريرة أو تعرق.**
- **لا تأخذ الأسبرين، الأسيتامينوفين (مثل تايلينول ®)، ومنتجات الإيبوبروفين، أو أي أدوية أخرى تقلل من الحمى دون التحدث مع طبيبك أو ممرضتك.**

علامات أخرى من العدوى وتشمل:

احمرار، وتورم، والطفح الجلدي، وقشعريرة، سعال، ووجع الأذن، والصداع، تصلب الرقبة، البول الدموي ، والألم أو الحاجة إلى التبول، وألم الجيوب الأنفية الغثيان والقيء.

- **بعض أنواع العلاج الكيميائي يمكن أن يسبب الغثيان او القئ، أو الاثنين معا.**
- **الغثيان هو عندما يشعر المريض بالرغبة في التقيئ ، وعادة يصاحبه فقدان في الشهية ويتبعه القئ.**

***القئ هو إفراغ ما بداخل المعدة مما يسبب الضيق والألم خصوصا إذا كانت المعدة فارغة.**

طريقة العلاج :-

- **هنالك أدويه يمكن أن تساعد علي منع الغثيان والقيء. وتسمى هذه بأدوية الغثيان (مضادات القئ) و قد تحتاج إلى أن تأخذ هذه الأدوية قبل 1 ساعة من الأكل في كل فترة العلاج الكيميائي ويجب أخذها حتى في اليوم الذي تشعر فيه بالراحة.**
- **ولكي نقلل من القئ يجب منع الغثيان.وذلك بتناول الأطعمة سهلة الهضم والمشروبات التي لا تؤثر علي معدتك. وتشمل هذه الشروبات الغازية ، والجيلاتين. – بعض الناس يشعرون على نحو أفضل عندما يأكلون وجبة خفيفة قبل العلاج الكيميائي. كما يشعر آخرين أنهم أفضل عندما يتلقو العلاج الكيميائي على معدة فارغة (أكل أو شرب لمدة 2 إلى 3 ساعات قبل العلاج).**
- **بعد العلاج، انتظر على الأقل 1 ساعة قبل تناول الطعام أو الشراب.**
- **أكل وجبات صغيرة والوجبات الخفيفة. بدلا من 3 وجبات كبيرة كل يوم، قد يشعر على نحو أفضل إذا كنت تأكل 5 أو 6 وجبات صغيرة أو وجبات خفيفة.**
- **لا تشرب كثيرا قبل أو أثناء وجبات الطعام. أيضا، لا تستلقي مباشرة بعد تناول الطعام.**

- تناول الأطعمة والمشروبات التي هي دافئة أو باردة (وليس ساخن أو بارد).
- إعطاء الأطعمة والمشروبات الساخنة الوقت لتبرد، أو جعلها أكثر برودة بإضافة الثلج.
- الابتعاد عن الأطعمة والمشروبات التي تحتوي على الروائح القوية. وتشمل هذه القهوة، السمك
- ، البصل،  والثوم، والأطعمة التي يتم طهيها.

- مص النعناع الخالية من السكر أو الحلوى لاذعة الطعم. ولكن لا تستخدم الحلوى حامضة إذا كان لديك قروح في الفم أو الحلق.

الشكل (47)

- الاسترخاء قبل العلاج الكيميائي يقلل الشعور بالغثيان

وذلك عن طريقة التأمل، والقيام بتمارين التنفس العميق، أو التخيل أو مشاهدة التلفاز , يمكنك أيضا القيام بهوايات هادئة مثل القراءة، والاستماع إلى الموسيقى.

الشكل (48)

- عندما تشعر بالقيء تنفس بعمق وببطء أو الحصول على الهواء النقي. ويمكنك أيضا صرف نفسك عن طريق الدردشة مع الأصدقاء أو العائلة، والاستماع إلى الموسيقى.
- التحدث مع طبيبك . طبيبك يمكن أن يعطيك أدوية للمساعدة في منع الغثيان أثناء وبعد العلاج الكيميائي. تأكد من أن تأخذ هذه الأدوية كما أمرت ويجب أن تبلغ الطبيب أو الممرضة عن ما إذا كانت هذه الأدوية تعمل أو لا تعمل (أي أن الاستفراغ والطعام قل أو لا.

التغييرات في النظام العصب

العلاج الكيميائي يمكن أن تسبب أضررا على الجهاز العصبي. العديد من المشاكل في الجهاز العصبي تتحسن في غضون سنة من انتهاء من العلاج الكيميائي، ولكن البعض قد تستمر بقية حياتك.

الأعراض قد تشمل ما يلي:

- وخز، وحرق، والضعف، أو خدر في اليدين أو القدمين
- شعور أكثر بالبرودة من المعتاد
- الألم عند المشي
- ضعف العضلات، التهاب، والتعب
- مشكلة في التقاط الأشياء أو التزرير ملابسك.

الأعراض قد تشمل ما يلي:

- **الهز أو الارتجاف**
- **فقدان السمع**
- **آلام في المعدة، مثل الإمساك أو حرقة**
- **التعب**
- **مشاكل الارتباك والذاكرة**
- **دوخة**
- **كآبة**

طريقة العلاج:-

- **اخبر طبيبك أو ممرضتك على الفور إذا لاحظت أي تغييرات في النظام العصبي. فمن المهم لعلاج هذه المشاكل في أقرب وقت ممكن.**
- **كن حذرا عند التعامل مع السكاكين، مقص، وأدوات حادة أو خطيرة أخرى.**
- **تجنب السقوط. المشي ببطء، التمسك بالدرابزين عند استخدام الدرج.**
- **ارتداء الأحذية الرياضية، أو الأحذية الأخرى بنعال مطاطي.**

الشكل (50)

- **تحقق من درجة حرارة ماء الاستحمام الخاص بك مع ميزان الحرارة. هذا لكي لا يحدث حرق بواسطة الماء الذي هو حار جدا.**
- **كن حذرا كثيرا لتجنب الحرق أو القطع لليد أثناء الطهي.**
- **ارتداء القفازات عند العمل في الحديقة، والطبخ أو غسل الأطباق.**

- **اخذ قسط من الراحة عندما تحتاج إليها.**
- **ثبت نفسك عند المشي باستخدام عصاه أو أي أداة ارتكاز.**
- **التحدث مع طبيبك أو ممرضتك إذا لاحظت مشاكل في الذاكرة، والشعور بالخلط، أو الاكتئاب.**
- **اطلب من طبيبك إعطائك دواء للألم إذا كنت في حاجة إليها.**

الألم

بعض أنواع العلاج الكيميائي تتسبب في آثار جانبية مؤلمة. وتشمل هذه الحرق، وخدر، ووخز أو الشعور بسخانه في اليدين والقدمين. يمكن أن يحدث أيضا تقرحات في الفم، والصداع، وآلام في العضلات، وآلام في المعدة.

يمكن أن يكون سبب الألم عن طريق السرطان نفسه أو من العلاج الكيميائي.

الألم هو وسيلة جسدك لإخبارك بأن هناك شئ غير مضبوط، لذا فلا تتجاهله. اخبر طبيبك عن عدد مرات الألم ومدى شدته. لمساعدتك في وصف الألم تذكر النقاط التالية التي تصف الأنواع المختلفة من الألم:

- **ألم ضعيف.**
- **طعنة حادة.**
- **ألم حارق.**
- **ألم نابض.**

عند التحدث عن الألم يستخدم مصطلحين اثنين: حاد (acute) ومزمن(chronic) .

الألم الحاد هو الألم الذي يظهر فجأة ولا يستمر طويلا ويمكن أن يكون أيضا شديدا بالرغم من عدم استمراره طويلا.

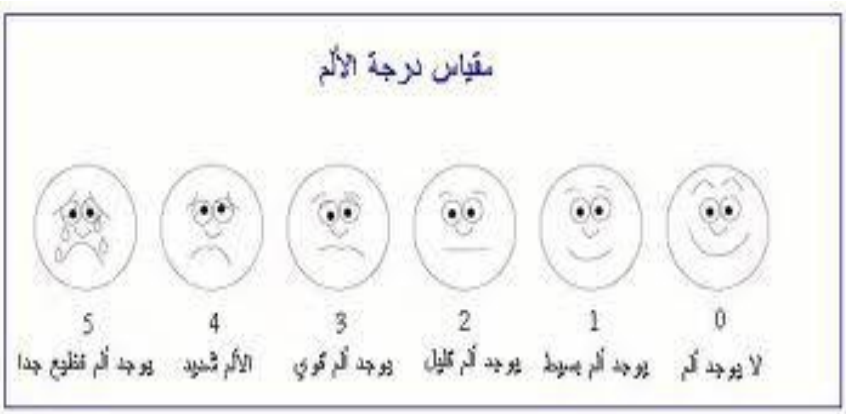
الألم المزمن هو الألم الذي يستمر طويلا ويتراوح بين ألم ضعيف إلى ألم شديد وكثيف.

السيطرة على الألم

- **تناول دواء الألم الخاص بك على جدول منتظم (قبل ساعة) حتى عندما لا تكون متألم. وهذا مهم جدا عندما يكون لديك ألم أكثر من مرة .**
- **محاولة التنفس العميق، اليوغا، أو طرق أخرى للاسترخاء. وهذا يمكن أن تساعد في الحد من التوتر العضلي والقلق والألم.**

طريقة العلاج

- **الأطباء والممرضات لديهم طرق لتقليل أو تخفيف الألم.**
- **تأكد من إخبار الطبيب أو الممرضة إذا كان لديك ألم.**
- **الحديث عن الألم مع الطبيب، الممرضة، أو الصيدلي. أن تكون محدد وواصف الألم.**
- **هل هو في جزء واحد من الجسم أو في جميع أنحاء؟**
- **هو حاد، ممل،أو نوبات الألم؟أنها لا تأتي وتذهب، أم أنها ثابتة؟**
- **مدى قوة الألم. أصف ذلك على مقياس من 0-5**



- **إلى متى يستمر الألم. لبضع دقائق، ساعة، أو لفترة أطول؟**
- **ما يجعل الألم أفضل أو أسوأ.**
- **الأدوية التي تأخذ ها للألم. أنها لا تساعد؟ كم أنها لا تستمر؟ -كم كنت تأخذ؟ كيف في كثير من الأحيان؟**
- **اسمح لعائلتك وأصدقائك بالتعرف علي ألمك.**
- **الوقاية هي المفتاح وهذا يعني أنه عليك أخذ الدواء المسكن للألم باستمرار، حسب إرشاد الطبيب، قبل شعورك بالألم مهما كان شعورك بالألم، احرص على طلبك للمساعدة فإنه يمكن علاج هذا الألم.**

عناوين مواقع الصور

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- http://www.womenhealthzone.com/general-health/anemia/iron-deficiency-anemia-symptoms-in-women/
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- **http://www.hkacs.org.hk/content/JTT/eng_file/Management of Side Effects from Chemotherapy.pd**
- **http://en.wikipedia.org/wiki/Chemotherapy**

Curriculm Vita

Personal Data:

Family Name : Abdelrhman

Full Name : Sara Awadelkareem Abdelrhman Elhassan

Birth Date : 19\8\1976

Home Adress : Shandi , Square No(7).

Phone Number: Mobile 0911389126-0123622802

Work Address: Elmak Nimer Hospital.

Academic Field: Nursing.

The Job : Head of early detection of Ca breast unit in Elmak Nemir Hospital .

Present Job: Head of early detection of ca breast unit in Elmak Nemir Hospital &have cooperation with medical surgical unit in nursing college in Shendi university.

Qualification and Years of Graduation:

- **B.SC of Nursing, Shendi University, 2001 (good with honored degree).**
- **COMPUTER APPLICATION DIPLOMA 2006(Excellent)**
- **Master Degree in Medical Surgical Nursing, Faculty of Nursing, Shendi University 2010**
- **Master Title:- Medical Surgical Nursing**
- **Passed an approved basic life support course on 13-15/2/2014**
- **Ph .in Medical Surgical Nursing**

Academic Positions:

- **Experience in medical surgical nursing teaching .Now head of oncology unit in Elmak Nimer Hospital.**

clinical experience;

- **Head of pediatric unit for 2years (2003-2005)**
- **Co opprative teacher in nursing collage in Shendi Universitey since (2005).**
- **Head of surgery for 4years from(2006-2010) .**
- **Experience in different clinical nursing specialitiesas intencive care unit for operative patient post cardio thorasicsurgery and neurosurgery.(ICU).**
- **Experience in Asthmatic care unit for the patient with asthmatic disease (A.C.U).**

Workshops and Training Programs:

- **Work shop about "Enaceing Women Rights to Health "In14-16july,2010 Shendi.**
- **Ethics and the Challenges of Nursing Professinal 12 May 2014 .**