Introduction

Cancer is a process of uncontrolled abnormal cell growth and development. Under normal circumstances, cells are formed, mature, carry out their intended function, and then die. New cells are constantly regenerated in the body to replace those cells and to maintain normal cellular function. Cancer represents the disturbance of this process, which can occur in several way **(Lewis, Ruff, Maclean, Bucher and Camera, 2011).**

Leukemia is a group of chronic malignant disorders of white blood cells and white blood cells precursors **(Morton & Fontaine, 2013).** The term leukocytosis refers to an increase level of leukocytes in the circulation. Typically, only one specific cell type is increased. Because the proportion of several types of leukocytes (e.g., eosinophiels, pasophils, coenocytes) are small, only increase in neutrophils or lymphocytes can be great enough to elevate the total leukocytes count **(Smelczer, Bare, Hinkle, Cheever, 2010).**

Incidence and prevalence:

Leukemia account for 2% of all new cases of cancer and 4% of all death from cancer. The incidence depends on many factors, including the type of white blood cells affected, age, gender, race and geographical area. In the United States about 44000 new cases of leukemia occur In 2013 48.610 people are diagnosed with leukemia .approximately 31 percent males are living with leukemia . more males than female are diagnosed with leukemia and die of leukemia each year (**American Cancer Society, 2013)**.

Leukemia is classified into four types based on the cell type affected and how fast the disease progresses: Acute mylogenous leukemia (**AML**) is the most common form of adult –onset leukemia. Acute lymphocyctic leukemia (**ALL**) makes up about 10% of adult – onset leukemia but is most common in children. In adults with **ALL**, the Philadelphia chromosome, usually the hallmark of chronic mylogenous leukemia, it is a common chromosome abnormality. Chronic myelogenous leukemia (**CML**) makes up about 20% of adult – onset leukemias, occurring more often in people older than 50 years old. A major feature of **CML** is the presents of Philadelphia chromosome abnormality in the leukemic cells. **CML** has three phases:

According to **Johnston, (2009)**, the chronic phase; it is a often a slowly progressing course during which the patient may have mild symptoms and respond to standard treatments but the bone marrow usually shows less than 10% blast cells at this time. The accelerated phase characterize by features including spleen enlargement and progressive manifestations, such as fevers, night sweats, and unexplained weight loss. The patient usually doesn't respond to stander treatment and the bone marrow may contain 10% to 30% to blast cells and promyelocytes .This phase typically lasts 6 to 12 months (**Ignatavisius & Linda, 2011).**

Diagnosis is usually confirmed with bone marrow examination as mentioned by **(Lemon and Bruke, 2008)** whom stated that the diagnosis of leukemia is based on a complete medical history, physical examination and on the following diagnostic tests: complete blood count, bone marrow aspiration and biopsy, lumber puncture and chest X-ray **(American Cancer Society, 2010**).

The patient with Leukemia needs support in adapting to any physical limitation or change imposed by the illness, or social, psychological

limitation. Biopsychosocial needs assessment for patient with leukemia is a critical step in providing high quality of care and achieving needs satisfaction for patients with leukemia and his/her family, instrument can be used to assess needs to guide the information of care planning **(Aghabarari & Ahmadi & Mohammadi & Hajizadeh, 2007).**

Significance of the study:

Leukemia is a life- threatening illness; patient undergoing leukemia treatment perceives a variety of physical, psychological, and social change that influence their lives **(Black & Hawks, 2005 and Chou, 2007).** The incidence of leukemia is increasing and mortality rate among the affected patients increases **(National Cancer Institute, 2010).**

About 44.600 individual diagnosed with leukemia and nearly 220000 die with this disease in the United States during the year 2011. Complications of leukemia and side effects of its treatment may be frightening, painful and often embarrassing to patient with leukemia **(Bruke et al., 2008 and National Cancer Institute, 2009).** Patients admitted with leukemia were (1080) during the year (**2011).** According to Ain shams university hospital statistical department during(2011) ,Those patients needs physical, social, psychological and spiritual

management, those patients who have not meaningful Biopsychosocial needs view disease hopeless, horrible and they cannot obtain remission or even disease control **(American Cancer Society, 2010).**

Aim of the study:

The study aims at:

Assess the Biopsychosocial needs for patients with leukemia.

Research question:

What are the Biopsychosocial needs for patient with leukemia.

Literature Review

Normal blood contains white blood cells, red blood cells, and platelets. All three types of blood elements develop from one immature cell type, called blood marrow stem cells, in a process called hematopoiesis. These stem cells divide and develop to a more developed, but still immature precursor, called a blast, which then develops through several more stages, into a mature blood cell. This process takes place in the bone marrow, which is the soft spongy material found in the center of most bones **(Colbert, Ankney and Lee 2010).**

The term leukocytosis refers to increase the number of white blood cells or increase level of leukocytes in the circulation typically only one specific cell type is increased because the proportion of several types of leukocytes are small, only an increase in neutrophils or lymphocytes can be great enough to elevate the total leukocytes count. Cells may grow and reproduce in a disorganized and out-of-control fashion. Cells may fail to develop properly, so they will not function normally. Cells may fail to die normally. One or a combination of

these processes may occur when cells become cancerous **(Daniels, Nicoll and John, 2010)**.

Each of the two major types of leukemia, myelogenous and lymphocytic; include both acute and chronic forms. Acute essentially refers to a disorder of rapid onset. In the acute myelocytic leukemia, the abnormal cells grow rapidly and do not mature. Most of these immature cells tend to die rapidly. In the acute lymphocytic leukemia, growth is not as rapid as that of the myelocytic cells. Rather, the cells tend to accumulate. Common to both types of leukemia is their inability to carry out the functions of healthy white blood cells. Untreated, death occurs within weeks or a few months **(Osborn, Wraa and Watson, 2010).**

In the chronic leukemia, the onset tends to be slow and the cells generally mature abnormally and often accumulate in various organs, often over long intervals. Their ability to fight infections and assist in repairing injured tissues is impaired. However, unlike the acute forms of leukemia, untreated, these disorders may persist for many months or, as in the chronic lymphocytic group, many years. A distinctive feature of the chronic myelocytic type is its invariable conversion, if untreated, to a more

rapidly fulminating acute type, leading to rapid death. Include hairy cell leukemia and human T-cell leukemia **(National comprehensive cancer Network, 2010).**

Anatomy and physiology of hematological system:

According to **Khurana & Aurshi, (2010)** blood is a fluid connective tissue which transports substances from one part of the body to another parts it provides nutrients and hormones to the tissue and removes their waste products blood, confined in the cardiovascular system, constitutes major part of extracellular fluid of the body. Some of the important physical characteristics of the blood are: color of the blood is opaque red due to the pigment hemoglobin in the red blood cells. The arterial blood is bright red and venous blood is dark red in color (**Tortora &Grabowski, 2011).**

Function of the blood

Blood performs many important functions within the body including:

Supply of oxygen tissues ,Supply of nutrients such as glucose, amino acids, and fatty acids,

removal of waste such as carbon dioxide, urea, and lactic acid, immunological functions, including circulation of white blood cells, and detection of foreign material by antibodies coagulation, which is one part of the body's self-repair mechanism, messenger functions including the transport of hormones and the signaling of tissue damage, regulation of body pH, regulation of core temperature, hydraulic function **(Colbert & Ankney, 2010).**

Composition of the blood:

Blood is composed of two mean component plasma and cellular elements.

Plasma:

Plasma is the straw-colored, liquid portion of the blood. It consists of the following: Water (90 percent). Proteins (8 percent). Albumin, the most common protein, is produced by the liver and serves to preserve osmotic pressure between blood and tissues. Other proteins include alpha and beta globulins (proteins that transport lipids and metal ions), gamma globulins (antibodies), fibrinogen and prothrombin (clotting proteins), and hormones. Waste products (urea, uric acid, creatinine, bilirubin and

others). Nutrients (absorbed from the digestive tract). Electrolytes (various ions such as sodium, calcium, chloride and bicarbonate **(National Cancer Institute, 2008).**

Composition of the plasma:

Plasma contain the following conistituents; water is the main constitute of the plasma forming 91% of it, the solids dissolved in the plasma constitute a total of 9% of the plasma, plasma protein form 7% of the solids in plasma, other organic molecules which form 1 % of the solids include carbohydrate, fats, on protein nitrogenous, in organic substances which constitute 1% of the solids in plasma include sodium, potassium, calcium, magnesium, chloride, iron, phosphateand copper **(Salone, 2011).**

Cellular elements of blood are about 45% of total blood volume and constitute the so-called packed cell volume (PCV). Blood cells Erythrocytes or red blood cells (RBCs), transport oxygen (O_2) and carbon dioxide (CO_2) in the blood. Erythrocytes contain the protein hemoglobin to which both O_2 and CO_2 attach. Mature erythrocytes lack a nucleus and most cellular organelles, thereby maximizing the

cell's volume and thus its ability to carry hemoglobin and transport O_2. Erythrocytes are shaped like flattened donuts with a depressed center .Their flattened shape maximizes surface area for the exchange of O_2 and CO_2 and allows flexibility that permits their passage through narrow capillaries **(Martini, 2005).**

Leukocytes:

Leukocytes, or white blood cells (WBCs), protect the body from foreign microbes and toxins. Although all leukocytes can be found in the bloodstream, some permanently leave the bloodstream to enter tissues where they encounter microbes or toxins, while other kinds of leukocytes readily move in and out of the bloodstream. Leukocytes are classified into two groups, granulocytes and a granulocytes, based on the presence or absence of granules in the cytoplasm and the shape of the nucleus. Leukocytes have just one nucleus, but some leukocytes have a multiplied nucleus, making them look like they have several nuclei **(Colbert, Ankney and Lee, 2010).**

Function of leukocytes:

Leukocytes protect the body from invasion by bacteria and other foreign entiries the major function of neutrophils is aphagocytosis neutrophils arrive at a given site within 1 hour after the onset of an inflammatory reaction and initiate phagocytosis, but they are short-lived. An influx of the monocytes follows: these cells continuo their phagocyte activities for long period as macrophages this process constitutes a second life of defense for the body against inflammation and infection. **Khurana &Arushi, 2010).**

The lymphocytes attack foreign material the T-lymphocytes kills forigen cells directely and releases lymphokines, that enhance the activity of phagocytes cells-lymphocytes are responsible for delayed tue allergic reaction, rejection for foreign tissue as cellular immunity to other group of lymphocytes the B- lymphocytes is capable of differentiation into the plasma cells, in turn, produce antibodies called immunoglobulin's (Ig), which are protein molecules that destroy foreign material by several mechanisms this process is known as humeral immunity. **(Donna & Lnda, 2010).**

Neutrophils, the most numerous of granulocytes, have an S- or C-shaped nucleus with

three to six lobes. Neutrophils are the first leukocytes to arrive at a site of infection, responding (by chemotaxis) to chemicals released by damaged cells. Eosinophils actively phagocytize complexes formed by the action of antibodies on antigens (foreign substances). Numbers of eosinophils increase during parasitic infection and allergic reactions **(Ignatavisius & Workman, 2010).**

Basophils have a **U** or **S** shaped nucleus with two to five lobes connected by a narrow strand of chromatin. Their granules, which stain blue-purple with basic dyes, contain histamine, serotonin, and heparin. Basophils release histamine in response to tissue damage and to pathogen invasion (as part of the inflammatory response). Basophils resemble mast cells, which are similar in appearance and function to basophils, but found only in connective tissues. Many times, there are so many granules in a basophil that you cannot see the nucleus **(Dewits, 2010).**

Platelets:

As stated by **Leukemia and Lymphoma Society, (2005),** bone marrow is a spongy tissue where blood cell development take place. It is a central cavity of the bone all bones have active

marrow at birth, by the time a person reaches young adulthood, the bones of the hand, feet, arms and legs no longer have functioning marrow (yellow marrow). The back bones (vertebrae) hip and shoulder bones, ribs, chest bone and skull contain marrow that is actively making blood cells **(Bagbt & Meyers, 2007).**

Definition of Leukemia:

Leukemia is a type of cancer that affects the blood and bone marrow, the spongy center of bones where our blood cells are formed. The disease develops when blood cells produced in the bone marrow grow out of control **(Black et al., 2010).**

Leukemia is newly diagnosed in about 47,000 people each year in the United States. In adults, the acute leukemia's occur in those of all ages, where as the chronic varieties, particularly **CLL**, tend to occur in people older than 40 years Leukemia is more common in people of European descent than in African Americans, Hispanic Americans, Asian Americans, or Native Americans. Leukemia is one of the most common cancers of children **(Timby & Smith, 2010).**

Incidence and prevalence