INTRODUCTION

Cancer is a class of diseases characterized by out-of-control cell growth. There are over a hundred different types of cancer, and each is classified by the type of cell that is initially affected. Most cancers are named for the type of cell or organ in which they start. Cancer cells often spread to other parts of the body, where they begin to grow and form new tumors. This process is called metastasis. Untreated cancers can cause serious illness and end death ***(American Cancer Society [ACS], 2010).***

Worldwide, it is estimated that childhood cancer has an incidence more than 175.000 per year, and a mortality rate of approximately 95.000 per year ***(American Academy of Pediatrics [AAP], 2012).*** In developed countries, on one hand childhood cancer has a mortality of approximately (20%) of cases. In low resource settings, on the other hand, mortality is approximately (80%) or even (90%) in the world's poorest countries (***International Childhood Cancer Day 2012). National Cancer Institute [NCI], (2011),*** illustrates that, approximately 18000 cases of cancer admitted annually 2000 (11%) of this cases are children under the age of 18 years. The most common cancers of children are Leukemia, brain tumors, Wilms' tumor, lymphoma, rhabdomyosarcoma, and osteosarcoma.

Childhood cancers treatment based mainly on the type and stage of the cancer. Treatment options might include surgery, radiation therapy, chemotherapy, and/or other types of treatment. In many cases, more than one of these treatments is used. While advances in chemotherapy, surgery, and/or radiation therapy have led to increased survival among childhood cancer patients ***(Preidt, 2014).***

Caregivers get very little help from health care professionals in managing their tasks and the emotional demands of caregivers. Among the greatest challenges for family caregivers is interacting with nurses and other professionals in the hospital setting, and a rough crossing back home, as the patient is discharged to family ***(Levine et al., 2007).***

Parents dealing with childhood cancer face many different stresses throughout the course of their child's illness. The responsibility is often on mothers. Therefore, it is essential that mothers receive adequate information and explanation of disease treatment, plans, goals, side effects and care provided from health care professionals to cope with the child's physical and emotional needs **(*Stewart et al., 2012).***

Coping is expending conscious effort to solve personal and interpersonal problems, and seeking to master, minimize or tolerate stress or conflict. Effectiveness of the coping efforts

depends on the type of stress and/or conflict ***(Weiten and Lloyd, 2008).*** Mean while, coping responses are partly controlled by personality (habitual traits), but also partly by the social environment, particularly the nature of the stressful environment ***(Charles and Jennifer, 2010).***

Significance of the study

According to Pediatric Oncology Units, (NCI) Cairo University, the numbers of children with cancer during the year of 2011 are 1948 cases diagnosed with cancer ***(NCI, 2011).*** In addition, all caregivers admitted to Pediatric Oncology Units, with their risk children exposed to multitude problems in caring for their children from time of diagnosis through period of treatment.

According to ***Bahy, (2008),*** It is significant to focus on recommendation of study on caregiver classes at inpatient and outpatient units to discuss issues as side effects of chemotherapy and offer help in the management of these problems. Caregivers should be included as active member in child care. So, discharge plan is required within the illness continuum because caregivers can feel insecure and unsure about how to care for their children's needs in relation to side effects as well as come to the realization of illness and try to live with cancer.

AIM OF THE STUDY

The aim of this study was to assess the effect of discharge plan for children having cancer and undergoing chemotherapy and their caregivers on improving practice and coping pattern.

This aim was achieved through:

- Assessing caregivers' knowledge about care of children undergoing chemotherapy before / after implementation of discharge plan.
- Designing, implementing and evaluating discharge plan based on assessment.
- Assessing stress and coping pattern of caregivers caring for children undergoing chemotherapy before and after implementation of discharge plan.

Research hypothesis

Discharge plan had a positive effect on caregivers coping pattern and understand the medical situation and enhance physical care of their children.

REVIEW OF LITERATURE

Chapter I: Overview about Cancer Growth

Cells are the fundamental units of life. Whether it may be unicellular or multicellular life forms, all living organisms are composed of and depend on cells to function normally. Scientists estimate that bodies contain anywhere from 75 to 100 trillion cells. Cells do everything from providing structure and stability to providing energy and a means of reproduction for an organism ***(Ignatavicius and Workman, 2010).***

Human cells have a membrane that holds the contents together. However, this membrane is not just a sac. It has receptors that identify the cell to other cells. The receptors also react to substances produced in the body and to drugs taken into the body, selectively allowing these substances or drugs to enter and leave the cell. Reactions that take place at the receptors often alter or control a cell's functions ***(Ball et al., 2010)***.

Within the cell membrane, there are two major compartments, the cytoplasm and the nucleus. The cytoplasm contains structures that consume and transform energy and perform the cell's functions. The nucleus contains the cell's genetic material and the structures that control cell division and reproduction. Inside every cell are mitochondria. Mitochondria

are tiny structures that provide the cell with energy ***(Ignatavicius and Workman, 2010).***

The body is composed of many different types of cells, each with its own structure and function. Some cells, such as skin cells, divide and reproduce quickly. Others, such as nerve cells, do not divide or reproduce except under usual circumstances ***(DeBaradinis, 2008).***

Definition of Cancer:

Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems ***(Kushi et al., 2012).***

There is no one definition that describes all cancers. They are a large family of diseases which form a subset of neoplasms, which show features of malignancy. A neoplasm or tumor is a group of cells that have undergone unregulated growth and will often form a mass or lump, but may be distributed diffusely ***(Jemal et al., 2011).***

Cancers are a broad group of diseases and have a wide range of causes. Each cancer is different according to its biology and pathophysiology ***(Norwood, 2012).***

Cancer cells are more autonomous than normal cells and are independent of growth control path ways and regulatory mechanism. Cancer is also less differentiated than cells of the tissue of origin and behaves more like embryonic cells, which also proliferate rapidly, despite the importance of loss of differentiation in cancer ***(Robert, 2014).***

In children, many cells are growing quickly; this fast growth can lead to the proliferation of both cancerous and normal cells. Cell division that is out of control may normally trigger a mechanism called apoptosis (is programmed cell death), where by cell realizes something is wrong and destroys itself, the process of apoptosis or physiologic cell death limits the growth of cancerous cells. However, this recognition of abnormality and subsequent destruction of cells may not be well developed in young children ***(Griffiths et al., 2012).***

Childhood cancers are quite different from the more common cancers of adults. Approximately 92% of childhood cancers arise from the mesodermal germ layer, which in the embryo becomes connective tissue, bone, cartilage, muscles, blood, vessels, and sex organs. The resulting cancers are most commonly of primitive embryonal tissue, sarcomas, leukemia, or lymphomas. Some childhood cancers arise from neuroectodermal tissue, resulting in central nervous system (CNS) tumors ***(Renshaw, 2013).***

Etiology and Pathophysiology of Cancer in Children

Cancer in children often has different etiology than those in adult. Most adult cancers are epithelial in origin, whereas in children, nonepithelial or embryonal cell types predominate (occurring during development of the fetus). Most children cancers that appear healthy may suddenly appear ill over a period of days or weeks ***(Norwood, 2012).***

Neonates and young infants have cancer that is diagnosed soon after birth. The types of cancers most common in this age group include CNS tumors, neuroblastoma, leukemia, retinoblastoma renal or hepatic tumors, sarcomas and teratomas (arising from primary germ layers) ***(Collins, 2012).***

The rate of cell growth in children also can play a role in the rapidity with which some childhood cancers progress the continuing presence of fetal cells in small children is related to same cancers ***(Rao et al., 2008).***

Carcinogenesis takes years and depends on several tumor and child factors. There are three interacting factors influence cancer development which are exposure to carcinogen, genetic predisposition, and immune function. These factors account to variation in cancer development from one person to another, even when each person exposed to the same hazards ***(ACS, 2010).***

Internationally, the greatest variation in childhood cancer incidence occurs when comparing high-income countries to low-income ones. This may result from differences in being able to diagnose cancer, differences in risk among different ethnic or racial population subgroups, as well as differences in risk factors ***(American Society of Clinical Oncolog [ASCO], 2012).***

Oncogene activation is the main mechanism of carcinogenesis regardless the specific cause. These carcinogens are the genes that directed early embryonic development, at about eight days after conception. These genes should be controlled forever. They are turned on under controlled conditions when cells need to divide for normal growth and replacement of dead or damaged tissues. At other times, they are turned off, controlled, suppressed by suppressor genes, suppressor genes can act directly at the Deoxyribonucleic acid [DNA] level, and preventing the oncogenes from being over expressed. Another way that suppressor genes work is by preventing cells from dividing, or maintaining control over the cell cycle ***(Ignatavicius and Workman, 2010).***

When a normal cell is exposed to any carcinogen (initiator) the normal cell's DNA can be damaged or mutated. The mutations damage suppressor gene, preventing them from controlling the expression of oncogenes. As a result, the oncogenes are over expressed in a cell; excessive amounts of cyclins (proteins that promote cell division) are produced and

upset the balance between cell growth enhancement and cell growth limitation. The effect of these excessive cyclins is greater than the effect of the suppressor gene products, thus, allowing uncontrolled cell division ***(Robert, 2014).***

About 70 different oncogenes have been identified this oncogenes are not abnormal genes but are part of every cells normal make up. They are also important in early development oncogenes become a problems only if they are activated and over expressed as result of exposure to carcinogens agents or events both external and personal factors can activate oncogenes ***(Ignatavicius and Workman, 2010).***

According to ***Kanwal and Gupta, (2012),*** alteration of cellular growth occurs in response to external and internal stimuli. Neoplasms are by one or a combination of three factors:-

1- External stimuli that cause genetic mutations.
2- Innate immune system and gene abnormalities.
3- Chromosomal abnormalities.

1- External stimuli

External stimuli may affect the child's general health and cause mutations in body cells. Carcinogens are chemical or industrial processes, that, when combined with genetic traits

and in interaction with one another, result in cancer (***Kanwal and Gupta, 2012).***

2- Innate immune system and gene abnormalities

One critical function of a normal immune system is immune surveillance, in which phagocytic cells circulate throughout the body, detecting and destroying abnormal and cancerous cells. Children with congenital immune deficiencies are at high risk for cancer ***(Samaras et al., 2010).***

Viruses and other substances may act in the body to alter the immune system, thereby allowing cancer to occur. Their action is based on changing protooncogenes that normally regulate cellular growth and development to oncogenes that allow unregulated cell division and cancerous growth. Tumor suppressor genes counteract the effect of oncogenes, keeping cellular growth within normal limits. When tumor suppressor genes are missing, unregulated cellular growth can occur. These genes are commonly missing in children with retinoblastoma and Wilms tumor ***(Kahm et al., 2010).***

3- Chromosomal abnormalities

Normal chromosomes undergo change as a part of the genetic process. Most of the changes are not harmful, although some result in chromosomal are abnormal such as hyperploidy

(more than the normal number of chromosomes), deletion, translocation, and breakage. Aneuploidy is more or less than the expected two sets of similar chromosomes. Deletions are loss of some genetic material from chromosomes. Translocation is shifting of a fragment of one chromosome to another chromosome. Fragility is breaking of chromosomes ***(Signorello et al., 2011).***

Incidence and Mortality of Cancer

Worldwide, it is estimated that childhood cancer has an incidence more than 175.000 per year, and the mortality rate of approximately 95.000 per year ***(AAP, 2012).*** In Egypt there are 100.000 cases are diagnosed with cancer annually (6%-8%) of these cases are children ***(El Hasraey, 2008).*** National Cancer Institute (NCI) has illustrated that approximately 18000 cases of cancer admitted annually 2000 (11%) of this cases are children under the age of 18years. The most common cancers of children are leukemia, brain and other nervous system, Wilms' tumor, lymphoma, rhabdomyosarcoma, and osteosarcoma ***(NCI, 2011).*** According to ***Omera, (2013)*** there are 150.000 cases diagnosed with cancer annually 1.8 per 1000 persons**.**

In the United States, cancer is the second most common cause of death among children between the ages of 1 and 14 years, exceeded only by accidents ***(Kaatsch et al., 2010).*** In the United States in 2013, it is estimated that there is an incidence

of about 11,630 new cases, and 1,300 deaths, from cancer among children 0 to 15 years of age ***(American Society of Clinical Oncology [ASCO], 2013).***

In developed countries, childhood cancer has a mortality rate approximately (20%) of cases. In low resource settings mortality is approximately (80 %) or even (90%) in the world's developed countries ***(International Childhood Cancer [ICC], 2013).***

Types of Cancer

According to ***Ball et al., (2010)***, there are more than one hundred different types of cancer. Each type is classified by the type of cell the cancer originates from. Each type of cancer generally falls into one of three categories:

1- Carcinomas are cancers that arise from cells which line a body surface, or the lining of a gland, for example, the skin, or the lining of the gut, mouth, cervix, airways, etc.

2- Sarcomas are cancers that arise from cells which make up the connective tissues such as bones or muscles. For example, an osteosarcoma is a cancer of bone tissue.

3- Leukaemias and lymphomas are cancers of cells in bone marrow and lymph glands. For example, leukaemia is a cancer of cells that make white blood cells.

Clinical Manifestations

Many presenting signs and symptoms of cancer are typically common childhood illnesses are:

Pain: It may be the result of a neoplasm either directly or indirectly affecting nerve receptors through obstruction, inflammation, tissue damage, stretching of visceral tissue, or invasion of susceptible tissue. The pain may be in any body part ***(Yarbo et al., 2011).***

Cachexia: It is a syndrome characterized by anorexia, continued unexplained weight loss, anemia, asthenia (weakness), and early satiety (feeling of being full) ***(Hockenberry and Wilson, 2010).***

Anemia: It may be experienced during time of chronic bleeding or iron deficiency. In chronic illness the body uses iron poorly. Anemia is also present in cancers of the bone marrow ***(ASCO, 2012).***

Infection: It is usually a result of an altered or immature immune system. In addition, infection occurs when bone marrow cancers inhibit maturation of normal immune system cells. Absolute neutrophil count (ANC) is less than 500, risk of infection. Normal values are from 1500 to 8000 cells per/microlitter ***(Yarbo et al., 2011).***

Bruising (ecchymosis): It can occur if the bone marrow cannot produce enough platelets ***(Yarbo et al., 2011).***

Neurological symptoms: It may result from impingement on the brain or nervous system. Signs of increased intracranial pressure, decreased or altered consciousness, eye abnormalities, whitish color behind the pupil, or other neurological or behavior changes may be evident ***(Ball et al., 2010)***.

A palpable mass: It may present for certain cancer. This is most commonly abdominal but may be mediastinal, in the neck, chest, pelvis, or armpits or other sites ***(Renshaw, 2013).***

A variety of other symptoms can occur depending on the location of the cancer. Subcutaneous Nodules (SCN) may appear if leukocytosis is present. Superior Vena Cava (SVC) syndrome (obstruction of the superior vena cava by a mass which lead to increase venous pressure and involvement of the lungs and other mediastinal structures), or respiratory difficulty can occur with mediastinal tumors (such as neuroblastoma). Enlarged lymph nodes are common with lymphomas ***(Scheinemann and Boyce 2012).***

Diagnostic Evaluation

Diagnosis begins with obtaining a detailed medical history. Special attention is given to factors that suggest the