

Special Article

## Fatigue in Cancer Patients Undergoing Chemotherapy: A Nursing Approach

**Maria Lavdaniti**

Associate Professor, Nursing Department, International Hellenic University, Thessaloniki, Greece

**Correspondence:** Maria Lavdaniti, International Hellenic University  
e-mail: maria\_lavdaniti@yahoo.gr

### Abstract

**Background:** Cancer is the second leading cause of death worldwide. Fatigue is a subjective and multidimensional symptom in cancer patients. It occurs both as a consequence of the cancer itself and as an adverse effect of cancer treatment.

**Purpose:** The purpose of the present study was to review literature about fatigue in cancer patients undergoing chemotherapy.

**Findings:** Fatigue is a well document side-effect of chemotherapy and is often reported as the most distressing symptom. Fatigue intensity seems to be increasing as cycles of chemotherapy progress. The onset, duration and the severity of fatigue is varied and depends on the types of the chemotherapy drugs and the schedule therapy. A thorough assessment of the symptom before chemotherapy and during it is required. Management included therapy of etiologic factors, pharmacologic and non-pharmacologic interventions. Managing fatigue requires a coordinated effort by all members of the health team. Nurses should provide patients and their families with lifestyle education and guidance programs on the benefits of pharmacological and non-pharmacological interventions to effectively manage fatigue in order to enhance survival and quality of life.

**Key words:** fatigue, chemotherapy, cancer

### Introduction

Cancer is one of the leading global causes of death. Its occurrence is increasing due to the aging global population and the increasing adoption of high-risk behaviour (Jemal et al., 2011). About 18.1 million new cases and 9.6 million cancer deaths were reported in 2018 (Ferlay et al., 2019)

Fatigue is a common side effect in patients undergoing chemotherapy, radiation therapy, bone marrow transplantation or immunotherapy. It is a subjective symptom and the incidence of fatigue in patients undergoing chemotherapy varied between 30 and 91%. The symptom continues to occur after the treatment is completed (Roe & Lennan, 2013; National Cancer Institute, 2017)

Fatigue is a difficult symptom to define while being understood by patients as a feeling of weakness, tiredness or exhaustion often associated with remarkable decrease in activity

(Nowicki et al., 2017). The National Comprehensive Cancer Network (NCCN, 2017) defined cancer-related fatigue as ‘a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning’. The diagnosis of cancer-related fatigue was accepted by the International Classification of Diseases, 10th Revision, Clinical Modification, in 1999 (Yeo & Cannaday, 2015).

Fatigue in healthy people can be seen in two forms –acute and chronic (Yeo & Cannaday, 2015). Acute fatigue is experienced as a temporary condition as an excessive burden of mental and physical activity and serves as a protective mechanism. In chronic fatigue, the person cannot recover an adequate energy level even after prolonged rest period (Di Marco et al., 2018).Cancer –related fatigue interferes with usual functioning and can disturb mood,

concentration, perception, ability to work, performance of usual daily activities and compliance with medical treatment and has a negative impact on patient and family's quality of life (Yeo & Cannaday, 2015). The patients experience fatigue, report the most common symptoms that are related to the following domains: physical level, psychological level, social level, professional level (Di Marco et al., 2018).

The purpose of the present study is to review literature about fatigue in cancer patients undergoing chemotherapy. A literature review was conducted using the electronic databases PubMed and Google Scholar. The following key words were entered: 'fatigue', 'nursing', 'cancer', 'chemotherapy' and a combination thereof. The exclusion criterion of articles was the language – only English.

### **The etiology and patterns of fatigue in chemotherapy**

Generally, cancer-related fatigue is a multifactorial symptom and may be influenced by a variety of demographic, medical, psychosocial, behavioural and biological factors (Bower, 2014). A variety of mechanisms contribute to fatigue development. These include effects of cancer and its treatment on neuropsychological impairment, muscle metabolism dysregulation, circadian rhythms disruption, mediators of inflammation and stress, immune activation and hormonal changes related to effects on the hypothalamic-pituitary axis, premature menopause in women, or androgen deprivation in men (Mohandas et al., 2017).

The etiology of fatigue is not yet completely understood. There are several hypotheses suggest possible explanations for this phenomenon (Wang & Woodruff, 2015). These hypotheses are: the inflammation hypothesis (hypothesis that activation of the proinflammatory cytokine network), disruption in metabolic activity by cancer or its treatment abnormalities in energy metabolism, decreased substrates or abnormal accumulation of muscle metabolites (Wang, 2008; Wang & Woodruff, 2015). Also it is suggested that immobility and lack of exercise, chronic comorbidities, psychological/psychiatric conditions, or long-term use of central nervous system stimulating/sedating medications (eg, opioids) may be related to the development of fatigue (Wang & Woodruff, 2015.)

The causes of fatigue due to chemotherapy are not well explained. Chemotherapy destroys cancer and physiologically cells and the body reaction in this destruction is considered as possible etiological mechanism. Anemia caused by the suppression of bone marrow due to chemotherapy appears to contribute to the presence of the symptom (National Cancer Institute, 2017). Organic, psychological and nutritional factors such as nausea, vomiting, chronic pain, cachexia, depression and anxiety are associated with the occurrence of fatigue in patients undergoing chemotherapy (Yeo & Cannaday, 2015). Chemotherapy induces various toxicities, such as gastrointestinal-tract, haematological and neural toxicities, that could be significant factors in the development of fatigue (Wang & Woodruff, 2015).

The onset, duration, patterns and intensity of fatigue during chemotherapy depended not only on the type of medication administered but also on the planning of treatment (National Cancer Institute, 2017). In a study conducted in breast cancer patients, fatigue was found to have increased after 3–5 days after chemotherapy (Hsu et al., 2017). A cyclic pattern of it has been documented with each cycle of chemotherapy followed by a gradual decline after completion of treatment (Ancoli-Israel et al., 2014). Fatigue intensity fluctuates during the day and increases after the completion of the infusion of chemotherapy drugs (Junghaenei et al., 2015). Some chemotherapy drugs that cause fatigue are vinca alkaloids, 5-FU, antimetabolites and alkylating agents (Lavdaniti et al., 2006).

### **Assessment tools and management of fatigue**

In clinical settings, in order to manage fatigue caused by chemotherapy, an initial assessment of the symptom should be done with a simple visual scale from 0 to 10 where 0 corresponds to none and 10 to the maximum intensity of the symptom. Nurses encourage patients to have a calendar in which they maintain daily information about fatigue, such as its intensity and frequency (Yeo & Cannaday, 2015).

Fatigue assessment tools can be either unidimensional or multidimensional (Wang & Woodruff, 2015). Unidimensional measures can be single-item tools, such as the widely used NCCN patient reported fatigue-intensity rating or the 'fatigue at its worst' item from the Brief Fatigue Inventory, which uses a 0–10 numeric scale. Medical staff use the CTCAE (Common

Toxicity Criteria Adverse effects) which rated fatigue in a 5-point Likert scale. Some unidimensional measures for cancer may have multiple items, as the Brief Fatigue Inventory and the Fatigue Severity Scale (Wang & Woodruff, 2015). Multiple-item unidimensional measures included in questionnaires measure the quality of life, e.g. European Organization of Research and Treatment Quality of Life Questionnaire-C30 (EORTC-QLQC30), Functional Assessment of Cancer Therapy (FACT) and the World Health Organization Quality of Life (WHOQOL). Furthermore, it is referred as a symptom in questionnaires that assessed symptoms that appeared during antineoplastic treatment, e.g. Memorial Symptom Scale and MD Anderson Symptom Inventory (Day et al., 2016). The aforementioned questionnaires may be used as rapid screening tools or a continual-monitoring variable in clinical practice (Wang & Woodruff, 2015).

Multidimensional measures may distinguish between physical and mental fatigue, measuring responses in affective functioning and activity (Wang & Woodruff, 2015). A large number of questionnaires that measure fatigue as a multidimensional symptom exists, e.g. Piper Fatigue Scale, Multidimensional Fatigue Symptom Inventory and Cancer-Related Fatigue Distress Scale (Day et al., 2016). One of the most popular scale is Revised Piper Fatigue Scale (PFS) which consists of 22 items that measure four dimensions of subjective fatigue – behavioural/severity, affective meaning, sensory and cognitive mood. Possible scores range between 0 and 220, with higher scores indicating higher levels of fatigue. The scores on all of the items in a particular subscale were added, and the sum was divided by the number of items in the particular subscale, providing a mean subscale score on the original 0–10 scale (Piper et al., 1998). There is evidence for revised Piper Fatigue Scale with 12 questions. The revised scale has acceptable psychometric properties (Reeve et al., 2012) Some multidimensional scales are too long making it difficult for very ill patients to complete or these tools were too complicated in their wording for translation (Wang & Woodruff, 2015).

The use of an appropriate tool for assessing fatigue depends on a number of factors that will be taken into consideration. Its research or clinical use, the measurement model needed for statistical analyses, how well a tool has

performed in the past, its psychometric validity, and how frequently it will need to be administered are some of these considerations (Barsevick et al., 2010)

Fatigue's frequency and intensity is often underestimated by health professionals (Yeo & Cannaday, 2015). Nurses need a comprehensive assessment of fatigue in order to provide appropriate interventions to reduce fatigue and to improve patients' quality of life (Mulhaeriah et al., 2018). After the primary fatigue assessment is completed, the patient's clinical status (active cancer treatment, post treatment with no active treatment except hormonal therapy or end of life) should be determined because of its influence on cancer related fatigue management and treatment strategies. If treatable contributing factors are identified during the primary evaluation phase, it should be treated as an initial approach to fatigue management (NCCN, 2017).

Both pharmacologic and non-pharmacologic interventions are used in alleviating fatigue. It is reported that 'pharmacological therapy is not sufficiently effective in managing fatigue in patients with cancer, and a combination of pharmacological and non-pharmacological therapy is necessary' (Mulhaeriah et al., 2018). Some non-pharmacologic interventions include physical activity (aerobic exercise, e.g. walking, swimming) and patient and family education on conservation of energy. Some of the conservation strategies are setting daily priorities and doing activities when the patient has energy; the patient should take small naps during the day, listen to music, etc. Other non-pharmacological interventions include physical therapies, psychosocial interventions (behavioural therapy, psychoeducational therapy and supportive expressive therapy), nutritional support and complementary therapies (e.g. medical Qigong, massage, healing touch, Reiki, aromatherapy and yoga). The pharmacological management of fatigue is prescribed for patients experiencing high levels of fatigue and other symptoms such as pain, nausea, anorexia, depression or sleep disturbances. Medicines commonly administered are psycho-stimulants (e.g. methylphenidate, modafinil, etc.), corticosteroids and selective serotonin receptor blockers (Wang & Woodruff, 2015). It is important to note that managing cancer-related fatigue requires a coordinated effort by all members of the health team. They have to taking into account that this management

should be done according to established clinical guidelines.

### Nursing interventions

Nurses play a pivotal role in the management of fatigue in cancer patients undergoing chemotherapy. Some evidence-based nursing interventions are as follows:

- Explain that fatigue can develop or worsen as a direct result of treatment;
- Suggest a diary of activities, fatigue severity, associated feelings/symptoms and an evaluation of self-care actions;
- Develop an individualized plan for fatigue management;
- Inform patient and family that interventions such as energy conservation, exercise, relaxation, psychosocial support and measures to optimize sleep quality and reduce concurrent symptoms should be effective in limiting the severity of fatigue during chemotherapy;
- Teach energy conservation strategies and principles of cognitive-behavioural self-management to improve sleep quality;
- State the benefits of open communication between patient, family and caregiving team to facilitate discussions on the experience of fatigue and its effects on daily life;
- Encourage attention restoring activities such as exposure to natural environments and pleasant distractions such as music
- Provide information concerning the importance of a balanced diet with adequate intake of fluid, calories, protein, carbohydrates, fat, vitamins and minerals (Bennet et al., 2016; Tuominen et al., 2019).

### Conclusions

Fatigue is a subjective and multidimensional symptom in cancer patients. The causes of fatigue due to chemotherapy are not well explained. There are many unidimensional and multidimensional tools in order to measure fatigue.

The management of fatigue is difficult but there are some pharmacological and non-pharmacological interventions to alleviate it. It is important for nurses to provide patients and their families with lifestyle education and guidance programs on the benefits of pharmacological and non-pharmacological interventions to effectively manage fatigue to enhance survival and quality of life.

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