

Understanding Weight Loss in Patients With Colorectal Cancer: A Human Response to Illness

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Colorectal cancer (CRC) is the second and third leading cause of cancer-related deaths in Canada and the United States, respectively (American Cancer Society [ACS], 2009; Canadian Cancer Society [CCS], 2009). Per 100,000 people, about 62 Canadians, 59 American men, and 44 American women are diagnosed with CRC annually (ACS, 2009; CCS, 2009). Although patients with CRC experience many symptoms, unintentional weight loss is a common issue. The weight loss has a detrimental effect on patients' physical and emotional well-being, including their self-image, quality of life, employment, and survival. The Human Response to Illness (HRTI) model provides an appropriate framework for understanding the physiologic, pathophysiologic, behavioral, and experiential perspectives of a response to an illness (Mitchell, Gallucci, & Fought, 1991). In this article, the HRTI model will be used to develop a comprehensive understanding of weight loss in patients with CRC. The insights gleaned from the application of this model will provide the foundation for a holistic and evidence-based approach to nursing interventions.

Weight Loss in Colorectal Cancer

Cancer-related weight loss is an important predictor of negative health outcomes in patients with cancer (Cunningham & Bell, 2000). The weight loss is attributable to a broad range of factors, including altered metabolism, decreased dietary intake, increased energy expenditure, loss of appetite, cancer-related treatments, and stress related to cancer itself. According to DeWys et al. (1980), patients with gastrointestinal malignancies experience the second highest frequency and severity of cancer-related weight loss. Individuals with gastro-

Purpose/Objectives: To provide a comprehensive overview of weight loss in patients with colorectal cancer (CRC) within the context of the Human Response to Illness (HRTI) model.

Data Sources: Research from 1990–2008 and classic research from the 1980s were included. PubMed, CINAHL®, and Google™ Scholar were searched for the terms *cancer*, *CRC*, *weight loss*, and *cancer cachexia*.

Data Synthesis: Progressive, unintentional weight loss is a common issue in patients with CRC that has a devastating effect on patients' self-image, quality of life, and survival. Physiologic abnormalities, responses to the tumor, and treatments contribute to weight loss in these patients. In addition, cancer cachexia is an end-stage wasting syndrome and a major cause of morbidity and mortality in this population.

Conclusions: The HRTI model provides an appropriate framework to gain a comprehensive understanding of the physiologic, pathophysiologic, behavioral, and experiential perspectives of weight loss and cancer cachexia in patients with CRC.

Implications for Nursing: By examining weight loss in patients with CRC within the context of the four perspectives of the HRTI model, oncology and gastroenterology nurses can gain insight into optimal, evidence-based assessment and management of this patient population. In addition, current gaps in knowledge can be identified and provide guidance for future nursing research.

intestinal tumors lose more than 50% of their muscle mass and 30%–40% of body fat (Huhmann, 2006). As a result, muscle loss and malnutrition cause 30%–50% of deaths in patients with gastrointestinal cancer (Palesty & Dudrick, 2003).

Cancer cachexia falls on the distal end of the weight-loss continuum in patients suffering from malignant diseases. MacDonald, Easson, Mazurak, Dunn, and Baracos (2003) defined cancer cachexia as “a wasting

syndrome involving loss of muscle and fat directly caused by tumor factors, or indirectly caused by an aberrant host response to tumor presence" (p. 143). The loss of adipose and skeletal muscle mass, which is associated with symptoms such as weight loss, anorexia, fatigue, early satiety, and asthenia in patients with cancer, also is identified as cancer cachexia syndrome (Fearon, Barber, & Moses, 2001; Palesty & Dudrick, 2003). Healthcare professionals should understand weight loss as well as cancer cachexia because cancer cachexia syndrome is a major source of morbidity and mortality in patients with cancer.

Human Response to Illness Model

According to Mitchell et al. (1991), human-response phenomenon should be viewed from physiologic, pathophysiologic, behavioral, and experiential perspectives. The HRTI model facilitates an understanding of complex physiologic responses that are based on the concept of normal biologic functioning and pathophysiologic responses that describe malfunctioning in the direction of decompensation. Although behavioral responses are objective, observable, and measurable, the experiential responses highlight the individual's lived experiences and shared meaning of the phenomenon. Therefore, the HRTI model provides a framework for a holistic approach to care.

Physiologic Perspective of Weight Loss

Physiologic regulatory responses are based on healthy biologic functions and include a measurable phenomenon (Mitchell et al., 1991). A balanced intake of carbohydrates, proteins, and fats is a critical factor in maintaining a healthy weight. Individuals are expected to gain weight as a result of overeating and lose weight as a result of short-term reduction in caloric intake, loss of appetite, stress, and increased energy expenditure.

Metabolism of nutrients: Metabolism is the sum total of all chemical reactions required for human bodily functions. The kilocalorie is the standard measure of the quantity of energy obtained from nutrients. In a resting state, an average adult requires a daily intake of 375 kcal of proteins, 560 kcal of carbohydrates, and 1,170 kcal of fats (Dills, 1993). Proteins are central to several key body functions and form much of the structural framework of the body cells; they function as hormones to regulate physiologic processes, as enzymes to regulate biochemical reactions, and as antibodies to protect the body from invading microbes. Proteins also play an important role in maintaining fluid electrolyte balance, facilitating muscle contraction, and transporting vital substances such as oxygen and carbon dioxide. During the process of digestion, proteins break down into amino acids. The amino acids are absorbed into the blood stream and then

transported to the liver and skeletal muscles (Huether, 2006).

Carbohydrates are the body's major source of energy. During digestion, carbohydrates such as starches, milk, and table sugar are hydrolyzed into monosaccharides (e.g., glucose, fructose, galactose). Monosaccharides then are absorbed in the duodenum and upper jejunum and transported to muscle tissue and the liver (Huether, 2006). For regular muscular activity to occur, carbohydrates must go through several phases of metabolism, referred to as Cori cycle. In the Cori cycle, muscles convert glycogen to lactic acid, which is carried by the blood to the liver and converted to glycogen. Glycogen then is broken down into glucose and transported to muscles, where it is converted to glycogen and used as a source of energy (Dills, 1993).

Although lipids are a secondary source of energy, their central role is to provide the structural component of cell membranes and organs. Fat enters the liver in the form of triglycerides that are hydrolyzed to glycerol and free fatty acids. Once fats are hydrolyzed, they can be used to provide structure to molecules or to synthesize essential substances, such as adenosine triphosphate, a source of metabolic energy. Surplus lipids are transported to adipose cells for storage (Huether, 2006).

Causes of weight loss: Dieting and fasting are common strategies for deliberate weight loss. Loss of appetite related to pregnancy, flu-like illnesses, or loss of sense of taste because of injury to the oral cavity are examples of nondeliberate weight loss in healthy individuals. Although stress is a normal part of daily life, excessive stress also can cause weight loss. The body responds to stress by releasing catecholamines and cortisol. Catecholamines mobilize the additional glucose needed in times of stress by reducing glucose uptake by peripheral tissues and stimulating lipolysis. Catecholamines also are responsible for decreased protein synthesis in the gastrointestinal tract (McCance, Forshee, & Shelby, 2006). Cortisol diminishes the peripheral uptake and usage of glucose and also decreases protein synthesis in muscles and other tissues (McCance et al., 2006). Therefore, stress contributes to weight loss in healthy individuals. Finally, increased energy expenditure related to exertion because of physically demanding jobs and physical training also can result in weight loss. Physical exertion causes increased energy consumption by working muscles and increased lipolysis of adipose tissues, leading to weight loss (Ross et al., 2000). Short-term weight loss in healthy individuals is characterized by increased lipolysis of adipose cells and preservation of muscle mass.

In summary, the gastrointestinal tract plays an important role in metabolizing essential nutrients such as carbohydrates, proteins, and fats. Dieting, exercise, stress, and loss of appetite cause temporary alteration in the metabolism of nutrients and cause weight loss in healthy individuals.

Pathophysiologic Perspective of Weight Loss

Pathophysiologic responses occur when healthy bodily functions become disordered or derailed (Mitchell et al., 1991). Chronic and pathologic starvation caused by debilitating chronic illness or cancer alters healthy bodily functions. Patients with CRC experience unintentional weight loss for a number of reasons, including progressive tissue depletion caused by altered metabolism (see Table 1), increased resting energy expenditure resulting from tumor-induced changes, the stress response caused by anxiety related to the illness, and decreased nutrient intake because of anorexia, nausea, and vomiting. Gastrointestinal obstruction and perforation resulting from an expanding tumor, postoperative complications, and radiation side effects also can cause decreased nutrient intake and malabsorption in patients with CRC (Mattox, 2005) (see Figure 1). Therefore, the malignancy, treatment, altered metabolism, and psychological stress all contribute to weight loss and cancer cachexia in patients with CRC (Mattox, 2005; McCance et al., 2006). Weight loss is considered severe when individuals lose 10% or more of their usual body weight within six months, or 5% or more within one month (Cunningham & Bell, 2000).

Altered metabolism: Muscle wasting or decrease in lean body mass occurs when the breakdown of proteins increases and protein synthesis decreases (Trujillo & Nebeling, 2006). Research indicates that bioactivity, known as proteolysis-inducing factor, is instrumental in the loss of skeletal muscle mass in patients with cancer

(Belizario, Katz, Chenker, & Raw, 1991). Simultaneously, an abnormal elevation in Cori cycle activity (Douglas & Shaw, 1990) causes energy losses up to 300 kcal per day (Tisdale, 2002). Abnormal Cori cycle activity results in increased gluconeogenesis, glucose synthesis, glucose intolerance, and insulin resistance with a consequent increase in hepatic glucose production (Strasser & Bruera, 2002). The metabolic alterations manifest as anorexia and alterations in taste. In addition, increased energy expenditure occurs because of an increase in glucose turnover and an increase in energy demand by tumor. Bosaeus, Daneryd, Svanberg, and Lundholm (2001) reported higher resting energy expenditure in patients with gastrointestinal tumors. In addition, insulin resistance appears to be enhanced by the tumor itself or by the tumor-influenced host and the acute-phase response (Trujillo & Nebeling, 2006). Acute-phase response refers to a series of physiologic and metabolic changes that occur in response to tissue injury, infection, or inflammation and accelerated weight loss in patients with cancer (Dills, 1993; Tisdale, 2003). Therefore, weight loss in patients with CRC occurs as a consequence of abnormal Cori cycle activity, increased energy expenditure, and decreased intake.

Patients with cancer-related weight loss often lose significant amounts of adipose tissue. Researchers have found that the lipid-mobilizing factor produced either by the tumor or the host tissue may induce lypolysis (Tisdale, 2000; Todorov et al., 1996). Evidence to date suggests that the presence of tumor in the body alters healthy cell processes and increases cytokine production, thus contributing to the continuation of malignancy process. In addition, proinflammatory cytokines such as tumor necrosis factor, interleukin-1, and interferon α contribute to alteration in healthy biologic responses, causing muscle wasting and loss of adipose tissues (Trujillo & Nebeling, 2006) and subsequently resulting in cancer cachexia. Research also indicates that cytokines can increase patients' perception of pain and cause depression, cognitive impairment, peripheral neuropathy, fatigue, and lethargy (Myers, 2008; Seruga, Zhang, Bernstein, & Tannock, 2008).

Effects of colorectal cancer treatments on weight loss:

CRC treatment options depend on the type, stage, and grade of the cancer. Adenocarcinoma is the most common type, accounting for 90%–95% of all CRCs. Treatment for colorectal adenocarcinoma ranges from simple surgical resection of the affected portion of the colon or rectum to a combination of therapeutic and palliative interventions. However, the treatment outcomes may be negatively affected by progressive weight loss.

Surgery is considered to be the primary treatment for CRC. The goals of surgery include removal of the tumor as well as surgical resection of the affected portion of the colon or rectum. Patients with cancer who have lost 10% of their preillness body weight are at higher

Table 1. Metabolic Alterations in Fasting or Dieting Compared With Progressing Cancer Cachexia

Alteration	Fasting or Dieting	Cancer Cachexia
Resting energy expenditure	Decreased	Normal or increased
Carbohydrate metabolism		
Glucose tolerance	Decreased	Decreased
Insulin sensitivity	Decreased	Decreased
Glucose turnover	Decreased	Increased
Serum glucose level	Decreased	Unchanged
Serum insulin level	Decreased	Unchanged
Cori cycle activity	Unchanged	Increased
Fat metabolism		
Lypolysis	Increased	Increased
Lipoprotein lipase activity	Unchanged	Decreased
Serum triglyceride level	Unchanged	Increased
Protein metabolism		
Protein turnover	Decreased	Increased
Skeletal muscle catabolism	Decreased	Increased
Nitrogen balance	Negative	Negative
Urinary nitrogen excretion	Decreased	Unchanged

Note. Based on information from Bozzetti, 2002.

Consequences of Malignancy

- Obstruction or perforation of gastrointestinal tract
- Intestinal secretory abnormalities
- Malabsorption
- Intestinal dysmotility
- Fluid or electrolyte abnormalities

Consequences of Treatment

- Chemotherapy
 - Anorexia
 - Nausea and vomiting
 - Mucositis and enteritis
- Surgery
 - Malabsorption and diarrhea
 - Adhesion-induced obstruction
 - Fluid or electrolyte abnormalities
 - Vitamin and mineral abnormalities
- Radiation
 - Anorexia
 - Altered taste
 - Mucositis, enteritis
 - Obstruction
 - Perforation
 - Stricture

Anorexia

- Altered taste
- Food aversion
- Depression

Other Consequences

- Opioid-induced constipation
- Gastrointestinal tract abnormalities associated with fungal, viral, or bacterial infections

Figure 1. Potential Contributions to Unintentional Weight Loss in Patients With Colorectal Cancer

risk for postoperative complications (Bozzetti, 2002). Abdominal surgery itself leads to a surgical stress response that is associated with hypermetabolism, accelerated tissue breakdown, loss of protein, and increased energy expenditure (Sato, Oyamatsu, Koyama, Tamiya, & Hatakeyama, 2000). In addition, a postoperative decrease in dietary intake and decreased absorption because of a shortened bowel can cause postoperative weight loss in patients with CRC. Colorectal surgeries also are associated with a high sepsis rate (Keighley, 1982) and postoperative adhesion-induced intestinal obstructions (Kössi, Salminen, & Laato, 2004) that may aggravate existing gastrointestinal symptoms (Chen et al., 2009).

Commonly used chemotherapy drugs for CRC treatment are 5-fluorouracil, irinotecan, capecitabine, and oxaliplatin. The drugs are designed to kill malignant cancer cells (Capra, Ferguson, & Ried, 2001). Although the drugs destroy cancer cells, they also are toxic to healthy host cells, including cells of the oral, esophageal, and gastrointestinal mucosa. Consequent damage to mucosal cells can cause diarrhea (Viale, Fung, & Zitella, 2005) and infections and adversely affect the digestion and absorption of nutrients (Capra et al., 2001). There-

fore, chemotherapeutic drugs can exacerbate weight loss in patients with CRC. In addition to chemotherapy, patients may be receiving a variety of medications such as analgesics, antinausea treatments, steroids, antibiotics, and biotherapy. As a result, patients may develop constipation, indigestion, nausea, and vomiting. The gastrointestinal side effects also have an effect on weight loss.

Similar to chemotherapy, radiotherapy is toxic to tumor as well as healthy host cells within the area of treatment (Capra et al., 2001). Therefore, any treatment directed at the gastrointestinal tract is likely to result in malabsorption that, in turn, will lead to weight loss (Guckenberger & Flentje, 2006). Patients also may experience systemic effects such as fatigue, anorexia, altered smell and taste, and emotional stress that can inhibit adequate nutritional intake and contribute to weight loss (Capra et al., 2001). In addition, patients with CRC may develop radiation enteritis and perforation because the gastrointestinal tract is very sensitive to ionizing radiation. Capra et al. (2001) reported that at least 11% of patients treated with radiation to the abdomen experienced nutritional issues, and up to 15% also developed chronic-radiation enteritis. As a result, the incidence of nutritional issues leading to weight loss tends to be higher in patients who undergo radiotherapy.

Tumor-host interactions: The presence of cancer affects patients' biochemical and metabolic functions. As a result, hypoxia and metabolite deprivation are observed commonly in patients with solid tumors such as those seen in CRC. Tumors are prone to consume more glucose than healthy tissues because of hypoxia and increased activity of glycolytic enzymes (Gatenby & Gillies, 2004), leading to an increased metabolic demand on the liver and a consequent increase in energy expenditure. In addition, cytokines produced by healthy cells as a result of the inflammatory process alter the signals that regulate satiety and affect gastric motility and emptying, which leads to the feeling of fullness. The feeling of fullness restricts patients from consuming adequate amounts of nutrients and, therefore, leads to malnutrition and progressive weight loss followed by cancer cachexia.

Effect of stress: Cancer diagnosis is a traumatic psychological event that results in acute stress. Acute stress often transforms into chronic stress during subsequent stages of the cancer illness trajectory. Similar to the stress response in healthy individuals, cumulative stress causes catecholamine and cortisol hyperactivity, resulting in weight loss.

In summary, weight loss often is a significant issue for patients with CRC. The pathophysiologic mechanisms underlying weight loss include altered metabolism, effects of CRC treatments, tumor-host interactions, and effects of stress. Therefore, nurses should focus on

these mechanisms when developing strategies to reduce weight loss in this population.

Behavioral Perspective of Weight Loss

Behavioral responses are directly observable and measurable verbal and motor behaviors (Mitchell et al., 1991). Direct measurement is accomplished by weighing the individual at the first visit and subsequent medical visits and following trends in weight loss. Indirect objective measures of weight loss are anthropometry, weight index, body mass index (BMI), and serum albumin (Hammerlid et al., 1998). Patients are considered malnourished when their weight index is lower than 80, BMI is lower than 20, and serum albumin is lower than 33 g/L.

Weight changes are interlinked with food intake, gastrointestinal symptoms, and performance status in patients with cancer (Ovesen, Hannibal, & Mortensen, 1993). To date, many supportive assessment tools, such as the Prognostic Nutritional Index (Tei et al., 2010), the Prognostic Inflammatory and Nutritional Index (Bonney et al., 1998), and the Subjective Global Assessment (SGA) (Detsky et al., 1987) are available to healthcare professionals. An adapted version of the SGA, the scored Patient-Generated Subjective Global Assessment (PG-SGA), has been developed to meet the specific needs of patients with cancer (Ottery, 2000). The PG-SGA assists in gathering information regarding patients' weight, food intake, symptoms, activities, and functions (see Table 2). The information can be used to understand weight history and to calculate the nutritional requirements and metabolic demands of patients with cancer. The PG-SGA has been validated for use in patients with cancer (Bauer, Capra, & Ferguson, 2002);

the scored PG-SGA also correlates highly with quality of life. Therefore, PG-SGA appears to be an appropriate tool to assess weight loss in patients with CRC.

Experiential Response to Weight Loss

According to Mitchell et al. (1991), experiential perspective includes introspection, personal experience, and derivation of shared meaning. The concepts facilitate a patient's ability to verbalize and share the illness experience. Therefore, healthcare professionals can gain insight into the responses to an illness through patient verbalization and self-report. Although specific lived experiences of patients with CRC regarding their progressive weight loss or cancer cachexia have not been documented in the literature, research examining the lived experiences of patients with cancer cachexia is gaining momentum.

Hopkinson, Wright, and Corner (2006) explored the experience of weight loss in patients (N = 30) with various types of cancers. Hopkinson et al. (2006) concluded that although many patients sensed their weight loss, they did not know that weight loss would occur because of their cancer. Similarly, Hinsley and Hughes (2007) explored the perception of body image in patients with cancer and cancer cachexia in a palliative setting (N = 12; six had gastrointestinal cancer). Hinsley and Hughes (2007) concluded that an altered body image not only affects patients' physical, emotional, and spiritual state of well-being but also interferes with their relationships and social functioning. Based on the research findings, weight loss and cachexia have a significant effect on the physical and emotional well-being of patients with cancer.

Food is an important component of human survival and holds a wide range of symbolic meanings in social, religious, and economic aspects of daily life (Cunningham & Bell, 2000). Therefore, food provides nutrition as well as contributes to an individual's quality of life. Researchers have explored the eating behaviors of patients with cancer and their families' responses to decreased dietary intake to understand patient and family perceptions of quality of life (McClement & Harlos, 2008). However, a paucity of evidence exists related to weight loss in patients with CRC along their illness trajectory.

Implications for Nursing

Oncology and gastroenterology nurses are ideally positioned to assess weight loss and cancer cachexia in patients with colorectal cancer throughout their illness trajectory. The physiologic, pathophysiologic, behavioral, and experiential perspectives of weight loss in patients with CRC provide insights into the etiology of disease- and treatment-related sequelae as well as enhance nurses' assessment skills. Such knowledge is essential because it

Table 2. Summary of Patient-Generated Subjective Global Assessment

Aspect	Description
Domains of factors	Weight history, food history, symptoms, activity level, metabolic demand, and physical assessment
Number of items	17
Scaling	Consistent scales among questions are not used in this instrument. Each item has a series of responses that are checked by the patient or practitioner.
Scoring	On completion of the instrument, a score of A (well nourished), B (moderately or suspected of being malnourished), or C (severely malnourished) is calculated. Algorithms of optimal nutrition intervention for each category are described.

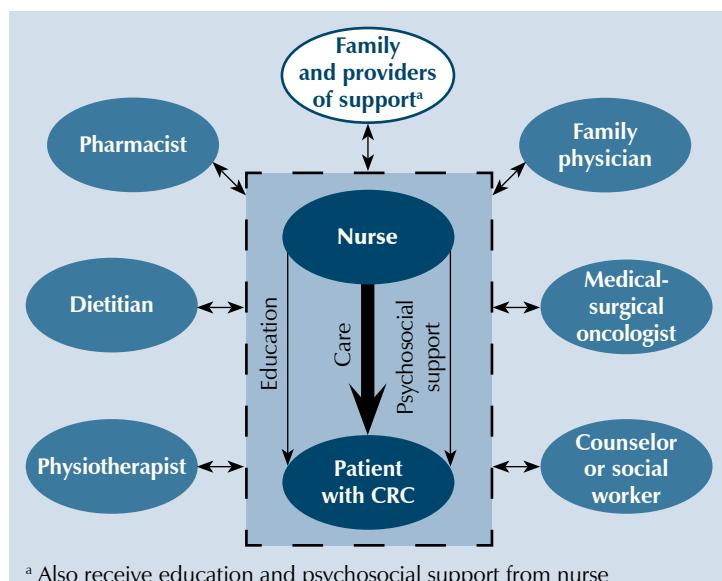
Note. Based on information from Ottery, 1996.

assists nurses in evaluating and guiding clinical practice. In addition, support for specific nursing interventions and a nurse-led multidisciplinary approach would improve health outcomes in patients with CRC. In addition, experienced nurses can provide mentorship to novice nurses and educate patients and their families as well as advance the evidence-based knowledge of the CRC illness trajectory.

Clinical Practice

Nurses are inundated with various assessment tools that tend to result in suboptimal implementation of evidence-based measures. Research has validated the PG-SGA and identified it as a comprehensive assessment tool for patients with CRC (Gupta et al., 2004). Therefore, nurses caring for patients with CRC may consider using and evaluating the PG-SGA in their healthcare settings. Assessing, monitoring, and addressing weight loss and its causes with patients are important steps in managing this response to CRC.

Nurse-led multidisciplinary approach to care: The information gathered in assessments must be analyzed, used in preparing care plans, and shared with a multidisciplinary team. Weight loss often can be stabilized if pharmacologic interventions, adequate nutritional supplements, and physical and psychosocial counseling are provided while patients are receiving treatment. Therefore, nurses could collaborate with medical-surgical oncologists, pharmacists, dietitians, physiotherapists, social workers, and psychologists to create individualized nursing care plans and provide care (see Figure 2).



^a Also receive education and psychosocial support from nurse

Figure 2. Nurse-Led Multidisciplinary Approach to Permeable Care and Two-Way Communication in Colorectal Cancer (CRC) Treatment

From a pharmacologic perspective, dexamethasone, megestrol, and medroxyprogesterone acetate are commonly used to stimulate appetite in patients with cancer (Mattox, 2005). However, Barber (2002) reported that anti-inflammatory drugs (e.g., ibuprofen) and appetite stimulants are more effective because they reduce circulating levels of interleukin-6 and cortisol. Angiotensin-converting enzyme inhibitors such as captopril and enalapril may improve muscle function and reduce protein loss (MacDonald et al., 2003). Solid tumors cause gastric stasis, which results in a sense of fullness and a decrease in appetite. To this end, research has shown that use of gastrointestinal stimulants (e.g., metoclopramide) increases the movement of food through the alimentary system (Mantovani, Maccio, Massa, & Madeddu, 2001).

Consultations with dietary and nutrition experts are central to providing patients with appropriate dietary and nutritional supplements. Several randomized trials have compared preoperative total parenteral nutrition with enteral nutrition or no nutritional support in malnourished patients with cancer and concluded that nutritional support has the potential to decrease postoperative complications by as much as 36% (Bozzetti, 2002). Patients with CRC generally require a diet that is low in fiber, high in protein, and high in calories (Grant & Byron, 2006). In addition, patients with CRC should be encouraged to eat small meals more than four times a day to improve digestion and caloric intake.

Physiotherapists should be consulted to establish an appropriate program of activity and exercise for patients. Patients with cancer often experience physical weakness and, therefore, drastically reduce their daily activities (Hinsley & Hughes, 2007). The physiotherapist can develop a program of gentle exercises that, in turn, will decelerate muscle wasting, increase protein synthesis in the muscles, and improve personal sense of well-being (Brown et al., 2003).

A paucity of research-based evidence exists to guide healthcare professionals in the psychosocial aspects of caring for patients with CRC and their families. A notable exception is a qualitative study by Hinsley and Hughes (2007) of the lived experiences of 12 patients with cancer cachexia. Hinsley and Hughes (2007) concluded that an enormous need to improve holistic care exists and recommended raising awareness about the detrimental effects of cancer cachexia on patients. McClement (2005) argued that altered body image, conflict in patient-family units, and conflict between family members and healthcare professionals cause stress in patients. Therefore, providing education related to cancer cachexia to patients and their family members and promoting clear and effective communication in the patient-family unit will help patients to maintain positive self-regard and self-respect.

Education

Nurses providing care for patients with CRC must ensure that their practice is guided by current research evidence related to weight loss so that they can provide the most accurate information to their colleagues and their patients. Mentoring and educating novice nurses regarding the best practices related to weight loss in patients with CRC is an important role for oncology nursing experts. In addition, oncology nurses must educate patients and their families regarding strategies that will optimize their weight status and improve their quality of life.

Research

To date, an optimal assessment tool for weight loss in patients with CRC has not been established. Additional research regarding use of the PG-SGA in this population is needed. Very little research exists about weight loss in patients with CRC across their illness trajectory. Although research literature related to cancer cachexia is abundant, minimal evidence exists related to personal and environmental factors that contribute to weight loss in patients with CRC. Therefore, additional research is needed to determine why patients with CRC develop weight loss and how it can be managed optimally to improve outcomes.

Conclusion

CRC is a leading cause of cancer-related death in North America, and progressive weight loss is a common clinical response in patients with CRC. The HRTI model provides a comprehensive framework for nurses to assess and manage weight loss in patients with CRC. Insights gleaned from the physiologic, pathophysiologic, behavioral, and experiential perspectives related to weight loss will supply nurses with the knowledge needed to provide optimal care to patients with CRC. In addition, the knowledge will enable nurses to collaborate effectively with other disciplines to ensure the provision of evidence-based patient care and educate patients and their families. Finally, additional research is central in reducing the incidence of unintentional weight loss and cancer cachexia and achieving the goal of optimal health outcomes in this patient population.

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Digital Object Identifier: 10.1188/10.ONF.303-310

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