

The Role of Nurses in Multidisciplinary Cancer Cachexia Care Teams

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Abstract

Cancer cachexia is a complex metabolic syndrome characterized by involuntary weight loss, muscle wasting, and systemic inflammation, affecting a significant proportion of cancer patients and contributing to increased morbidity and mortality. The etiology of cancer cachexia is multifactorial, involving tumor-host interactions, abnormal metabolic processes, and reduced food intake. Diagnosis and classification of cancer cachexia have been standardized by international consensus, with distinct stages identified as precachexia, cachexia, and refractory cachexia. A multidisciplinary approach is essential for the effective management of cancer cachexia, encompassing nutritional, metabolic, symptomatic, and psychosocial dimensions. Nurses play a pivotal role within the multidisciplinary team, contributing to the diagnosis, evaluation, and management of cancer cachexia through nutritional assessment, symptom control, and patient education. Multimodal interventions, including pharmacologic and nonpharmacologic strategies, are recommended for the treatment of cancer cachexia. Pharmacologic interventions target systemic inflammation, muscle wasting, and appetite stimulation, while nonpharmacologic approaches focus on nutritional support, physical exercise, and symptom management. Nurses are integral to the delivery of these interventions, providing individualized care, psychosocial support, and care coordination. However, deficits in nursing knowledge, skills,

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and confidence in managing cancer cachexia highlight the need for targeted education and training. Future research should focus on developing robust clinical evidence to guide decision-making and optimize the role of nurses in the multidisciplinary management of cancer cachexia.

Keyword: Cancer cachexia, multidisciplinary team, nurse

Introduction

Cachexia is a prevalent syndrome linked to various chronic illnesses, including chronic obstructive pulmonary disease, chronic kidney disease, heart failure, critical illnesses, neurological disorders, Acquired Immune Deficiency Syndrome (AIDS), rheumatoid arthritis, and cancer (Di Girolamo et al., 2019). Historically, Hippocrates described cachexia in the 4th to 5th century B.C. as a condition in which patients experienced their flesh being “consumed” or “melt away,” signifying its fatal nature. While weight loss was traditionally seen as the primary feature of cachexia, it is now more accurately defined as an involuntary loss of body weight accompanied by dysregulation in energy homeostasis and protein degradation. Cachexia is associated with adverse clinical outcomes, reduced quality of life (QOL), and decreased survival rates among patients.

Among the various forms of cachexia, cancer cachexia is particularly severe and complex, characterized by unique tumor-driven mechanisms that contribute to functional decline, complications related to treatment, diminished QOL, and cancer-related mortality. Cancer cachexia is associated with numerous symptoms leading to weight loss, such as anorexia, which often reduces oral intake. Other related symptoms include altered taste and smell perception. This syndrome is common among cancer patients, with estimates suggesting that 60%–80% of patients with advanced cancer are affected. Moreover, cancer cachexia is responsible for up to 20% of cancer-related deaths, accounting for approximately two million deaths annually worldwide (von Haehling et al., 2016).

The prevalence of cancer cachexia varies depending on the type and location of the tumor. Certain cancers, such as head-and-neck, upper gastrointestinal tract, and lung cancers, have a higher likelihood of leading to cachexia. The condition is particularly prevalent in patients with gastric and pancreatic cancers (80%), thoracic cancers (50%), and newly diagnosed head-and-neck cancers (42%), whereas it is less common among individuals with breast cancer or leukemia. Additionally, men are more susceptible to cancer cachexia compared to women (Berry et al., 2018). Several factors contribute to the variability in prevalence across populations, including advanced cancer stages, older age, genetic predisposition, specific genotypes, comorbid conditions, and the catabolic effects of treatments. The significant prevalence of cancer cachexia underscores its importance as a critical concern for oncology nurses.

Etiology

Cancer cachexia arises from metabolic abnormalities and reduced food intake. A key feature of this condition is a negative balance of protein and energy. Depending on its underlying causes, cachexia can be categorized as either primary or secondary.

Primary cachexia primarily results from abnormal metabolic processes driven by tumor-host interactions leading to significant physiological changes. A critical factor in primary cachexia is the role of cytokines, which are produced by immune cells in response to cancer, trauma, or sepsis. The most prominent cytokines involved include tumor necrosis factor- α (TNF- α), interleukin-1 (IL-1), interleukin-6 (IL-6), interleukin-10, and interferons (α , β , γ). These cytokines are believed to drive the progression of cachexia. Their effects include a relative depletion of muscle amino acids, suppression of appetite via hypothalamic pathways similar to those seen in anorexia, and the induction of insulin resistance in the liver. These changes disrupt

glucose and fat metabolism, resulting in a negative balance of calorie and protein intake and a significant decline in skeletal muscle mass (Naito, 2019a). Systemic inflammation contributes to weight loss, impaired physical functioning, and exacerbates symptom clusters such as anorexia, fatigue, pain, and depression which are critical targets for nursing interventions.

Secondary cachexia, on the other hand, is influenced by multiple factors, including tumor-related symptoms or the adverse effects of anticancer therapies such as surgery, radiotherapy, and chemotherapy. Symptoms like anorexia, oral mucositis, dysphagia, pain, and depression often reduce oral intake, necessitating effective symptom management as a core component of cancer nursing. For instance, oral care can mitigate the severity of oral mucositis caused by radiotherapy or chemotherapy. Additionally, reduced physical activity due to muscle wasting and chronic conditions such as infections, diabetes mellitus, and chronic heart failure further contributes to secondary cachexia. Patients with secondary cachexia may benefit from symptom control, nursing consultations, and health education as part of an interdisciplinary care approach.

Cancer cachexia is a complex and multifactorial condition influenced by various factors. According to our findings, a significant portion of care for cancer cachexia is delivered by nurses. This care involves critical roles in nutritional management, symptom control, and metabolic support.

Diagnosis and Classification

A variety of definitions have been employed to describe cancer cachexia in past studies (Bozzetti & Mariani, 2009), leading to variability in diagnostic approaches and taxonomic classification. In 2011, prominent diagnostic criteria were developed by international experts from organizations such as the European Palliative Care Research Collaborative, the Society on Cachexia and Wasting Disorders, the National Cancer Research Institute, the Palliative Care Clinical Studies Group, and the European Society for Clinical Nutrition and Metabolism (ESPEN) Special Interest Group on Cachexia. These criteria have since been widely adopted in clinical practice (Fearon et al., 2011). According to these standards, the diagnostic threshold for cancer cachexia includes weight loss of more than 5% over a six-month period (excluding cases of simple starvation), a body mass index (BMI) of less than 20 kg/m² with weight loss exceeding 2%, or an appendicular skeletal muscle index indicative of sarcopenia (less than 7.26 kg/m² for males and less than 5.45 kg/m² for females) combined with weight loss of more than 2%. Furthermore, ESPEN emphasizes that the diagnostic framework should include clinical evidence of inflammation, loss of muscle mass, and diminished physical functionality, enabling clinicians to identify the presence of cachexia or its associated risk factors. A holistic approach is recommended to evaluate cachexia, considering its nutritional, metabolic, symptomatic, and comorbid components.

In the same year, international experts also approved a standardized classification system for cachexia progression, dividing it into three distinct stages: precachexia, cachexia, and refractory cachexia (Fearon et al., 2011). This classification accounts for the condition's multifaceted symptomatology, including evidence of systemic inflammation. Precachexia is characterized by weight loss of 5% or less, accompanied by early clinical and metabolic changes such as anorexia and impaired glucose tolerance, without severe complications. Cachexia is defined by weight loss exceeding 5% within six months, a BMI below 20 kg/m² with weight loss greater than 2%, or sarcopenia with weight loss over 2%, combined with poor food intake and systemic inflammation. Refractory cachexia is marked by active catabolism, poor physical performance, and a lack of responsiveness to treatment or situations where the risks of treatment outweigh potential benefits. Patients with refractory cachexia typically have a life expectancy of less than three months. Each stage of cachexia necessitates tailored management strategies.

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Clinical Approaches for Cancer Cachexia Treatment in Multidisciplinary Settings

Diagnosis and Evaluation of Cancer Cachexia in Multidisciplinary Settings

It is crucial for nurses and other healthcare professionals to monitor and evaluate the risk of cancer cachexia during disease management. Given the multifactorial and complex nature of cancer cachexia, evidence supports the need for its diagnosis, evaluation, monitoring, and management through a multidimensional approach.

Diagnosis and Evaluation of Nutritional Indicators of Cancer Cachexia

To improve the diagnosis and evaluation (D and E) of cancer cachexia, the nutritional dimension of the syndrome, which significantly contributes to its onset and morbidity, must be carefully considered.

As weight loss is a key diagnostic criterion for cancer cachexia, routine monitoring of patient weight should be a fundamental part of cancer care. While BMI is a useful one-time measure for evaluating weight loss, longitudinal monitoring of weight provides more comprehensive insights into nutritional status, food intake, and related markers. Regular weight monitoring is a cost-effective and straightforward strategy, making it a mandatory practice for healthcare providers, particularly nurses, during patient visits. Although self-reported weight changes by patients are considered reliable follow-up assessments by nurses involving both patients and their families can enhance the monitoring process.

The Patient-Generated Subjective Global Assessment (PG-SGA), a validated and reliable tool for nutritional evaluation in cancer patients, has been endorsed by professional societies (Arends et al., 2017). This tool facilitates a holistic assessment conducted collaboratively by patients and healthcare providers. Patients report on weight changes, food intake, symptoms, and functional capacity, while medical staff evaluate additional parameters such as metabolic stress, physical examination findings, and global assessment categories. A shorter version, the abridged PG-SGA (a-PG-SGA), which patients can complete in less than five minutes, has also proven effective for cancer populations. Given its efficiency and reliability, widespread use of the PG-SGA is recommended for nursing staff managing cancer cachexia. Alternative tools, such as the Mini Nutritional Assessment and the Malnutrition Screening Tool, are also used, but they exhibit lower specificity compared to the PG-SGA (Read et al., 2005).

Objective indices of cancer cachexia symptoms obtained through medical instrumentation can further enhance the accuracy of D and E. Computed tomography imaging is a reliable method for assessing lean muscle mass, a significant indicator of cachexia, and related data have been extensively documented. Additionally, bioelectrical impedance analysis (BIA) provides high-sensitivity measurements of body composition, including lean muscle and fat mass, intracellular and extracellular fluid volumes, phase angle values, and other parameters. These precise nutritional metrics not only reveal underlying pathogenic mechanisms in certain populations but also serve as early indicators for nutritional interventions (Naito, 2019b), offering valuable insights for nurses and other clinicians involved in cachexia management.

Diagnosis and Evaluation of the Inflammatory Indicators of Cancer Cachexia

Cancer cachexia is recognized as a systemic inflammatory disease, as previously established by research; therefore, the monitoring of inflammatory biomarkers is integral to ensuring high-quality care. Commonly utilized biomarkers for assessing cancer cachexia include C-reactive protein (CRP), albumin, prealbumin, tumor necrosis factor-alpha (TNF- α), and interleukin-6 (IL-6), as these are implicated in the development and progression of the syndrome (Naito, 2019b). The modified Glasgow Prognostic Score, which combines CRP and albumin levels, is based on the premise that systemic inflammation plays a central role in the pathophysiology of cancer cachexia (Douglas & McMillan, 2014). This tool is user-friendly and is noted for its strong predictive and diagnostic reliability in evaluating and treating cancer cachexia.

Additionally, elevated resting energy expenditure (REE), a common metabolic feature in cachexia patients compared to those without cachexia, highlights increased energy demands for maintaining cellular and organ function at rest. Indirect calorimetry serves as a method for measuring REE, enabling the determination of individualized energy and protein requirements for nutritional support.

Diagnosis and Evaluation of Comorbid Symptoms

Cancer cachexia is often associated with various symptoms, as previously described in its etiology and epidemiology, particularly in the context of secondary cachexia. Consequently, a comprehensive evaluation of a patient's symptoms by clinicians or the care team is essential to delivering effective and patient-centered care (Del Fabbro et al., 2015). The Edmonton Symptom Assessment Scale is an example of a tool employed for assessing nutrition-related symptoms. Other instruments, such as the Functional Assessment of Anorexia/Cachexia Therapy and the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire, are also utilized for this purpose. However, these tools are typically limited to specific items or subscales relevant to cachexia assessment. Recently, a cancer cachexia-specific questionnaire, the QLQ-CAX24, was developed to provide a more comprehensive evaluation of the symptoms and biometrics associated with cancer cachexia. This tool includes five multi-item scales (food aversion, concerns about eating and weight loss, eating difficulties, loss of control, and physical decline) alongside four single-item assessments. It has been widely adopted by nurses and other healthcare providers, often in combination with objective measures such as 24-hour dietary recall diaries, the six-minute walk test (6MWT), and muscle strength evaluations in both clinical practice and research. The QLQ-CAX24 offers a holistic and specialized approach to assessing symptoms in cancer cachexia, while the integration of objective measures adds quantitative precision to its diagnostic and evaluative utility.

Multimodal Therapy for the Treatment of Cancer Cachexia

Historically, cancer cachexia was perceived as a monofactorial nutritional disorder, and as such, it was treated using monotherapy for several decades. However, clinical trials involving nutritional support and other single-component interventions have demonstrated limited success in halting or reversing the progression of cachexia (McKeaveney et al., 2021). Consequently, ESPEN now advocates for a multimodal approach to therapy and management encompassing both pharmacologic and nonpharmacologic strategies.

Pharmacologic Interventions

In pharmacologic management, combination therapies are recommended to address the multifaceted nature of cancer cachexia. Given that systemic inflammation is a primary driver of the condition, anti-inflammatory agents such as nonsteroidal anti-inflammatory drugs, eicosapentaenoic acids (EPA), thalidomide, and megestrol acetate have been employed to mitigate cachexia-related inflammation. Additionally, muscle stimulation has emerged as a therapeutic strategy, with agents like enobosarm demonstrating significant efficacy in increasing lean body mass. Other pharmacologic interventions focus on enhancing appetite, such as anamorelin, a ghrelin receptor agonist (Garcia et al., 2015). Studies suggest that combining multiple anticachexia agents can yield greater benefits compared to single-agent therapies though the efficacy of combination therapy depends on patient-specific factors, and no standardized regimen has yet been established (Madeddu et al., 2012). Consequently, ongoing research and individualized patient care within a multidisciplinary framework are necessary.

Nonpharmacologic Interventions

Nonpharmacologic interventions have gained prominence in clinical practice and research, often forming a cornerstone of multimodal strategies. Core components of these interventions include nutritional supplementation, dietary counseling, physical exercise, and symptom management. Nurses play an essential role in all these areas. Providing tailored nutritional

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support is a critical nursing responsibility, with REE and protein requirements often calculated using indirect calorimetry. Effective nutritional interventions typically involve individualized, family-centered consultations, a process that nursing staff are well-suited to lead (Dev et al., 2017).

Physical exercise interventions can attenuate systemic inflammation and promote lean body mass accrual. The NEXTAC (Nutrition and Exercise Treatment for Advanced Cancer) program combined low-intensity resistance training with nutritional counseling, demonstrating high compliance, safety, and improved behavioral outcomes among elderly patients with cachexia. Other studies that combined exercise with nutritional support reported enhancements in physical function and reductions in depressive symptoms (Uster et al., 2018).

Multimodal therapy also encompasses the active management of symptoms such as pain, nausea, dysphagia, and fatigue, all of which can limit nutritional intake and physical activity. Such symptom management is vital for delivering high-quality, holistic care. Patients with cancer cachexia often experience impairments in physical and psychosocial functioning, contributing to historically poor treatment adherence. To address these challenges, psychosocial support should be prioritized as part of the multimodal approach, with nurses playing a pivotal role in fostering patient compliance and enhancing quality of life.

In summary, the importance of multimodal therapy for cancer cachexia is increasingly recognized as an effective and patient-centered approach. Nurses are integral to this multidisciplinary effort, contributing significantly to cachexia management and treatment within the clinical care team.

Clinical Practice in a Multidisciplinary Setting

As outlined above, cancer cachexia is a multifactorial disorder requiring multimodal therapy coordinated by an interdisciplinary team, including nurses. Consequently, a multidisciplinary approach is essential for delivering high-quality and cost-effective care to cancer cachexia patients. One prominent example of multidisciplinary clinical practice is the Cancer Appetite and Rehabilitation (CARE) clinic, established in 2007 at the Joan Karnell Cancer Center at Pennsylvania Hospital in the United States. Operating for over a decade, the CARE clinic comprises a team including a physician, nurses, a nutritionist, a physical therapist, a speech and swallowing therapist, a patient navigator, and a program assistant. These professionals are divided into four departments: medical and nursing, nutrition, physical therapy, and speech and swallowing therapy. The clinic's goal is to mitigate the impact of cancer cachexia while improving nutrition, physical function, symptom management, and quality of life (QOL) for cancer patients. Nurses in the CARE clinic fulfill roles as nurse navigators, nurse practitioners (NPs), and nurse administrators (Kagan et al., 2020). Their responsibilities encompass assessment, symptom control, care coordination, follow-ups, and program administration. Nurses play a critical role in multidisciplinary teamwork by identifying nutritional and related symptoms earlier than scheduled evaluations allow. With the availability to engage directly with patients and their families, they conduct holistic family assessments, set care goals, and initiate prompt referrals to other team members. The administrative role of the CARE clinic's nurse manager ensures resource availability and the delivery of high-quality care.

Another model of multidisciplinary care is the McGill Cancer Nutrition Rehabilitation Program (CNR) clinic at the Jewish General Hospital in Canada (CNR-JGH). The clinic's team includes a physician, a nurse, a physiotherapist, and a dietitian. Patients are evaluated every six weeks by each professional, allowing for the creation of tailored multidisciplinary intervention plans. Subsequent evaluations document clinically significant improvements in measures such as the six-minute walk test (6MWT) and QOL assessments. Follow-up visits are customized based on individual patient needs. In nurse-led clinics, nurses transform the theoretical framework of

multidisciplinary teamwork into practical application, providing timely, family-centered assessments, collaborating on management decisions, and delivering comprehensive care in partnership with the wider team.

Cancer cachexia also induces psychosocial stress among patients, families, and care providers. Researchers have highlighted the psychosocial effects of impaired eating abilities on patients. Patients who experience weakness, functional decline, diminished mobility, altered appearance, and appetite changes often report a range of emotions, including anger, anxiety, disappointment, grief, and sadness along with a sense of compromised dignity in care settings. Family members and caregivers may feel distress, conflict, and social isolation, with significant disruptions to their daily lives, often requiring external support from medical staff, including nurses. Clinicians, too, may find discussions about cancer cachexia distressing due to limited knowledge of the condition. As a result, integrating psychosocial management into teamwork is imperative. Psychosocial function assessments related to cancer cachexia are increasingly implemented in clinics, inpatient settings, and communities for patients and their families. Hospitals and community programs provide psychosocial support to reduce stress and enhance therapy adherence for patients and caregivers. Nurses are pivotal in these efforts, providing direct psychosocial care and support (Marshall et al., 2020).

The Role of Nurses in a Multidisciplinary Cancer Cachexia Care Team

Screening, Referral, and Care Coordination

Screening is a fundamental responsibility for nurses working with patients in the early stages of cancer cachexia, aiming to slow disease progression. Nurses are often the first professionals to identify cachexia-related issues due to their expertise in nutrition and symptom management. Berry et al. implemented a screening initiative for cancer anorexia and cachexia within the thoracic infusion services of a cancer institute. In this intervention, nurses effectively classified patients' nutritional status when equipped with appropriate tools, leading to more than 50% of patients at moderate to severe risk for cancer cachexia being referred for nutritional services. Multimodal therapy for cancer cachexia necessitates collaboration across departments and specialists, making it challenging to determine which professional will next see a patient. Nurses play a central role in providing referrals, serving as accessible points of contact for patients and other healthcare providers. In the CARE clinic model, an oncology nurse navigator conducted initial comprehensive assessments, delivered early education, facilitated targeted referrals, and coordinated care between cancer-care providers and patients. Similarly, in an NP-led symptom management clinic, nurses monitored patient weight to identify excessive weight loss and assessed factors such as activity level, exercise, fatigue, and relevant laboratory results for cachexia markers. In summary, nurses are well-positioned to screen for cancer cachexia and its associated symptoms at every stage of the condition. They are often the first to detect issues, making them essential for referrals and coordination within multidisciplinary teams. Nurse leaders, similar to those in the CARE clinic, can ensure appropriate staffing, teamwork processes, and support care protocols through coordination with administrative and funding bodies.

Nutritional and Physical-Exercise Consultation

Nutritional consultation is typically a long-term, individualized, and often home-based intervention. While initiating nutritional therapy is a key focus, evaluating patient progress and adaptations to health-related challenges ensures continuity of optimal care. Re-emphasizing patient education following these adaptations is also essential. Although dietitians typically lead nutritional consultations, home care nurses are recommended for standard care provision in programs such as the PICNIC initiative, which is implemented in Hong Kong and Australia. In another program, NEXTAC, nurses and other staff conducted clinical and exercise consultations, resulting in improved QOL outcomes. Across various healthcare systems, nurses play a crucial role in providing continuity of care, particularly through family visits. During

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these visits, nurses discuss nutrition and exercise with patients and their families, leveraging their expertise to address related concerns. Preventing accidental harm, such as falls, is a basic nursing skill that further underscores their suitability for conducting nutritional consultations. A similar initiative has been in operation at the Beijing Cancer Hospital since September 2020. In this clinical practice, an online nursing consultation program offers nutritional and dysphagia support to cancer patients every Thursday afternoon. This program evaluates nutritional status and dysphagia using assessment tools, providing e-counseling to help patients manage cachexia and related symptoms. Compared to other healthcare professionals, nurses often provide more comprehensive and personalized consultations due to their close, day-to-day interactions with patients. Emerging e-consultation technologies may further expand the populations nurses can serve and improve care delivery.

Direct Nutritional Support

Providing nutritional support is a central aspect of nursing practice, particularly for patients requiring enteral or parenteral feeding, which serve as their primary sources of sustenance. Nurses are responsible for monitoring patients' nutritional status and identifying adverse reactions to nutrition, making this a crucial part of their role. Nurses with specialized training in nutrition management, known as nutrition nurse specialists (NNSs), are integral members of hospital nutrition support teams. These specialists conduct comprehensive patient assessments, provide consultations, and manage complications arising from enteral feeding—such as abdominal distension, diarrhea, vomiting, and aspiration—and parenteral feeding issues. In a study conducted by Sutton, the introduction of NNSs resulted in a significant reduction in sepsis rates over four years, decreasing from 52% to 2.3%, along with a substantial reduction in associated costs.

Direct nutritional nursing encompasses more than feeding alone. Nurses are responsible for tasks such as inserting and managing feeding tubes educating patients and medical staff, and improving quality standards in healthcare settings. They also carry out initial screening and diagnostic tasks. Since cachexia disrupts glucose metabolism, closely monitoring and managing blood glucose levels during nutritional support and consultation are essential for patient care (Zhu et al., 2019). In outpatient and community settings, internet-based services have enhanced nurses' ability to provide nutritional support, with telehealth rapidly expanding in countries like mainland China. Given that cachexia is a chronic syndrome, there is a growing demand for direct nutritional nursing, including the management of nutritional support and feeding tubes, in outpatient services. Expanding telehealth services could further address these needs within the community.

Psychosocial Support

Cancer cachexia treatment can elicit profound emotional responses in patients and caregivers, including anger, anxiety, disappointment, grief, sadness, guilt, powerlessness, and shame. Food serves not only as a physical necessity but also as a symbol of relationships and connection. Nurses' familiarity with patients' health habits, socioeconomic conditions, and cultural contexts enables them to facilitate effective communication with patients and their families. For instance, a clinical trial involving Macmillan-trained nurses included psychosocial interventions, such as providing informational leaflets on cachexia and conducting guided psychointerventions based on these materials. Patients responded positively to these interventions, reporting reduced distress related to eating and an improved ability to eat foods of their choice. This highlights the potential for nurses to make significant psychosocial contributions to cancer cachexia care, provided they receive adequate training in psychosocial skills.

Barriers to the effective delivery of multimodal treatment often include psychosocial factors, such as patients', caregivers', and healthcare professionals' attitudes, beliefs, and behaviors. Incorporating professional communication strategies within psychosocial interventions can enhance the success of multimodal therapeutic approaches. As cancer cachexia-related nursing continues to evolve in research and practice, psychosocial nursing will play a vital role in helping patients and caregivers adapt to the challenges and changes brought about by this condition.

Cachexia-Related Symptom Management

Effective management of symptoms associated with cancer cachexia can increase food intake and improve patients' nutritional status. For example, patients with head-and-neck cancer undergoing chemoradiation often experience significant changes in their nutritional health. Nurses can prevent conditions like oral mucositis by providing oral care and teaching patients strategies to modify food textures, reducing pain and dysphagia. Experts consistently highlight the critical role nurses play in managing both physical and psychosocial symptoms (Hopkinson, 2015).

In the CARE clinic, the nurse navigator and nurse practitioner (NP) collaborate in symptom management. The nurse navigator evaluates symptoms before multidisciplinary interventions and refers patients to appropriate specialists. The NP provides direct symptom management; for example, when oral mucositis reduces oral intake, the NP may deliver intensive oral care followed by liquid morphine. To address cachexia-related fatigue, the NP educates patients on energy conservation and fatigue management techniques, and prescribes home-based exercise and walking programs.

Another example is a nurse-led self-care program that includes relaxation training and education on managing nausea and vomiting. In this context, the NP prescribes antiemetic medications for symptom control. Therefore, symptom management, which involves monitoring, evaluation, and both pharmacologic and non-pharmacologic strategies, is a cornerstone of clinical care aimed at rehabilitating patients with cachexia.

End-of-Life Care Services

At the end of life, patients with cachexia are more likely to refuse food than those not in end-of-life stages. However, caregivers often perceive cachexia as an indication of imminent death and may pressure patients to eat, sometimes even resorting to force-feeding to alleviate their own anxiety. This dynamic can create food-related conflicts, as caregivers often lack sufficient knowledge about nutrition and hydration. Evidence suggests that nutritional feeding provides limited benefit for end-of-life patients.

Education provided by nurses can guide caregivers to respect patients' preferences regarding food intake and discourage forced feeding when patients do not wish to eat. At this stage, ensuring patient comfort is paramount. Nurses can assist caregivers in delivering basic care, allowing them to express love, compassion, and affection, which can help reduce anxiety and conflict between patients and caregivers. Additionally, nurses are responsible for monitoring patients' nutritional status to prevent complications such as aspiration, abdominal distension, or fluid overload when feeding is provided in line with patient preferences.

Deficits in Nursing in a Multidisciplinary Team Setting

While nurses have made significant contributions to the multidisciplinary approach to cancer cachexia treatment, some are inadequately prepared for the interdisciplinary care role. These deficits arise from insufficient mastery of the requisite knowledge, lack of skills training, unfamiliarity with clinical tools, and a limited understanding of the clinical evidence surrounding cachexia care (Vasiloglou et al., 2019).

Although nutritional care is a fundamental component of standard nursing practice, cancer cachexia care is not a mandatory subject in most nursing degree curricula. As a result, nurses often lack the knowledge and confidence needed to provide adequate nutritional care. Ongoing

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education is necessary to train nurses on screening methods for precachexia and cachexia. Cachexia has profound physical and psychosocial effects on patients, yet this dual impact is insufficiently addressed in both medical literature and practice. For example, a study found that almost 90% of healthcare providers are unaware of the concept of a cachexia-related dignity defense. Another study highlights that cachexia is a stigmatized topic in clinical environments, with nurses lacking the training or skills to discuss it effectively with patients and their families. Additionally, the rapid evolution of treatments and therapeutic mechanisms for cachexia presents challenges to effective communication. For instance, emerging anticancer therapies, such as programmed death-1 (PD1) inhibitors and their ligands (PDL1), have been associated with cachexia, underscoring the need for continuous education to enable nurses to make informed clinical decisions with their patients.

A major challenge in clinical practice is the lack of specialized tools for diagnosing and evaluating cachexia. While screening is a core responsibility for nurses, there is no tool capable of differentiating between malnutrition, cachexia, and sarcopenia. Efforts to develop simplified prediction tools for cachexia have proven ineffective (Helfenstein et al., 2016). Cytokines, such as TNF- α , IL-1, and IL-6, are used to monitor cachexia, but they are not yet validated as specific biomarkers for diagnosis.

Furthermore, high-quality primary studies and meta-analyses on cachexia care are scarce. One reason for this is the poor condition of patients diagnosed with cachexia, which often prevents them from adhering to treatment protocols and leads to high dropout rates in clinical trials. Moreover, refractory cachexia is frequently excluded from research parameters, limiting the application of evidence in real-world clinical treatment.

To address these challenges, nurses require specific training tailored to their roles in multidisciplinary teams. The knowledge and skills needed by nurses depend on their responsibilities within the team. Granda-Cameron et al. proposed the CARE interdisciplinary framework to help nurses explore their roles at different stages of the clinical process. The CARE framework emphasizes the diverse responsibilities of nurses, extending beyond clinical practice to include administrative, research, and educational dimensions. As highlighted in this study, further education and research are essential for advancing nursing practice in these areas.

Conclusions

Cancer cachexia is a multifaceted health issue associated with abnormal metabolic function, reduced food intake, and significant morbidity. Due to its varied manifestations affecting nutrition, metabolism, and symptomatology, comprehensive evaluation is essential to ensure high-quality cancer care. The contemporary care model for cancer cachexia employs multimodal therapy, integrating pharmacologic and nonpharmacologic interventions, such as nutrition counselling, dietary supplementation, physical exercise, and symptom management. These interventions are delivered by a multidisciplinary team, with nurses playing a central role.

Despite their critical role, many nurses lack the necessary knowledge, tools, and confidence to provide the advanced care that patients require. Nevertheless, skilled nurses are broadening their scope of practice by offering comprehensive and personalized care within multidisciplinary teams and utilizing innovative technologies. Moving forward, nurses may assume even greater responsibilities in managing and treating cachexia. Continued professional education for nurses and other healthcare providers is vital to support this transition. Moreover, the development of robust clinical evidence will strengthen decision-making protocols for cancer cachexia care, aligning with the overarching aim of this study.

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