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Managing Cancer-Related Fatigue: A Comprehensive Guide for Nurses

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Abstract

Cancer-related fatigue (CRF) is a prevalent and debilitating symptom experienced by cancer patients throughout the disease trajectory. This review synthesizes findings from high-quality studies to examine the effectiveness of nonpharmacological interventions in managing CRF. An extensive search of eight databases was conducted, encompassing English and Chinese literature, including clinical guidelines, systematic reviews, meta-analyses, and intervention studies. The most common nonpharmacological interventions for CRF include exercise therapies, psychosocial interventions, sensory art therapies, light therapy, nutritional management, traditional Chinese medicine (TCM) therapies, sleep management, combination therapies, and health education. Exercise therapy, particularly combining aerobic and resistance exercises or incorporating practices such as yoga, has been shown to significantly reduce CRF. Psychosocial interventions, including cognitive behavioral therapy,

mindfulness-based stress reduction, stress management therapy, psychoeducation, and peer support, have demonstrated efficacy in alleviating fatigue and improving emotional well-being. Sensory art therapies, such as music therapy and art therapy, have shown promise in reducing CRF severity. Bright white light therapy, delivered at an optimal intensity of 1000-5000 lux for 30 minutes daily, has been effective in improving CRF within two weeks of treatment initiation. Nutritional management, emphasizing a balanced diet rich in anti-inflammatory nutrients, may help mitigate CRF. TCM therapies, including acupuncture, moxibustion, and acupressure, have been found to be safe and effective in managing CRF. Sleep management strategies, such as stimulus control therapy and sleep hygiene practices, are crucial for addressing sleep disturbances that contribute to CRF. Combination therapies, integrating two or more nonpharmacological interventions, have the potential for synergistic effects in reducing CRF. Health education plays a vital role in empowering patients and caregivers with knowledge and skills to manage CRF effectively. Nurses are essential in implementing these interventions, providing personalized care, and promoting patient adherence. Future research should focus on developing standardized protocols, exploring innovative delivery methods, and evaluating the long-term effectiveness of nonpharmacological interventions in diverse cancer populations.
Keywords: nurses, Cancer-Related Fatigue, CRF

Introduction

Cancer represents a pressing global public health challenge, with 19.29 million new cases identified worldwide in 2020, as highlighted by the global cancer burden data published by the International Agency for Research on Cancer (Sung et al., 2021). As the most populous nation, China reported the highest number of new cancer diagnoses, with an estimated 4.82 million cases in 2022. Throughout the course of cancer treatment, patients encounter a diverse spectrum of symptoms, which vary according to cancer type, stage, and specific treatments administered. Among the commonly reported symptoms are fatigue, nausea, vomiting, pain, appetite changes, hair loss, and cognitive dysfunction, especially those associated with chemotherapy (Xia et al., 2022).

Cancer-related fatigue (CRF) emerges as the most prevalent concomitant symptom experienced by cancer patients. The incidence of CRF is reported to be approximately 40% at the time of cancer diagnosis, increasing to between 62% and 85% during active treatment, with 30%–60% of cases classified as moderate to severe. Additionally, severe CRF persists in about 30% of long-term cancer survivors. This evidence underscores that CRF is not confined to the later stages of cancer but can manifest at any point throughout the disease trajectory, often enduring for years post-treatment. CRF exerts a multifaceted impact on patients, affecting their physical, mental, psychological, and emotional well-being. Clinical manifestations may include low energy, weakness, apathy, lack of focus, memory impairment, and depression. Moreover, CRF has been identified as a potential risk factor for reduced survival rates. Unlike typical fatigue, CRF is distinguished by its heightened intensity, rapid onset, disproportionate response to activity or energy expenditure, prolonged duration, and resistance to relief through rest or sleep (Bower, 2014). Consequently, early detection, heightened awareness, and proactive management of CRF are essential.

Treatable factors contributing to CRF encompass pain, emotional disturbances, anemia, sleep disorders, and complications such as organ dysfunction or infections. Management strategies often require a combination of pharmacological and nonpharmacological approaches tailored to the specific circumstances of each patient. Clinical guidelines recommend appropriate pharmacological treatments for managing CRF. Among the most researched pharmacological approaches in cases where treatable factors are absent are psychostimulants and hormones, including cortisol and progesterone (Chen et al., 2015).

Given the limitations in the efficacy of pharmacological treatments, nonpharmacological interventions are gaining increasing recognition as effective strategies for managing CRF. In a meta-analysis conducted by Mustian et al., the four most recommended interventions—exercise, psychological therapies, combined exercise and psychological therapies, and pharmacological treatments—were evaluated for their effectiveness in alleviating CRF during and after primary cancer treatment. The findings revealed that nonpharmacological interventions were more effective in reducing CRF compared to pharmacological methods (Mustian et al., 2017). This highlights the importance of providing a comprehensive review of nonpharmacological interventions for CRF management.

To systematically analyze nonpharmacological approaches for CRF, this review encompasses various strategies, including exercise, psychosocial therapies, sensory art therapy, light therapy, nutritional interventions, traditional Chinese medicine (TCM) therapies, sleep management, combination therapies, and health education. For accuracy and reliability, an extensive search of eight databases was conducted, encompassing both English and Chinese literature. The search criteria were restricted to clinical guidelines, systematic reviews, meta-analyses, and intervention studies.

This review synthesizes findings from high-quality studies to address three key questions: (1) What are the most common nonpharmacological interventions for CRF? (2) How effective are these interventions in CRF management? and (3) What role do nurses play in the nonpharmacological management of CRF? Additionally, this review defines each therapeutic approach, examines its respective advantages and limitations, and provides evidence-based recommendations for clinical practice.

Exercise Therapies

The National Comprehensive Cancer Network (NCCN) endorses exercise therapy as a vital approach for managing fatigue in cancer patients, while the American College of Sports Medicine (ACSM) asserts the safety and efficacy of exercise programs in addressing cancer-related fatigue (CRF) during and after treatment for most cancer survivors. Various exercise modalities, including aerobic activities, resistance training, yoga, qigong, Tai Chi, muscle relaxation exercises, and combination routines, have been explored. Meta-analytical evidence highlights the effectiveness and feasibility of exercise interventions, particularly when combining aerobic and resistance exercises or incorporating practices such as yoga and consistent physical activity, in alleviating CRF. Clinical guidelines emphasize exercise therapy not only as a preventive measure but also as a therapeutic tool to reduce CRF during both active treatment and post-treatment recovery phases (Fabi et al., 2020).

Nonetheless, the application of exercise interventions for patients with advanced cancer remains contentious, necessitating more targeted research to ascertain the optimal exercise dosages and protocols tailored to specific cancer types and stages. The ACSM provides guidance recommending moderate-intensity aerobic exercises three times weekly for a duration of at least 12 weeks to significantly reduce CRF. Combining aerobic exercises with resistance training twice or thrice weekly, or engaging in resistance training alone twice weekly, also proves effective (Campbell et al., 2019). Although multimodal and moderate-to-high-intensity exercises are suitable for most patients, individuals at a higher risk of disease progression are advised to engage in low-to-moderate-intensity activities.

It is noteworthy that there is no universal exercise prescription or dosage established for all cancer patients, emphasizing the importance of individualized plans. Research suggests that supervised exercise programs yield greater benefits compared to unsupervised ones, and community-based or home-supervised interventions have been shown to enhance adherence and outcomes (Wagoner et al., 2021). Oncology nurses play a pivotal role in promoting exercise among cancer patients, integrating it into standard care practices, and ensuring the feasibility

of such programs within diverse clinical settings. Nurses' ability to assess patient needs and adapt exercise regimens to individual capabilities further underscores their crucial position in optimizing CRF management through physical activity. Additionally, patient education led by nurses on the significance of exercise adherence and safe practices can significantly enhance patient outcomes.

Psychosocial Interventions

Psychosocial interventions encompass a spectrum of psychological and social rehabilitation strategies designed to mitigate cognitive, emotional, and social challenges encountered by cancer patients (Penn et al., 2005). These interventions often aim to foster resilience, improve coping mechanisms, and alleviate distress associated with the disease and its treatment. Nurses play an indispensable role in the successful implementation of these strategies by utilizing evidence-based theories and health education to formulate holistic care plans. Moreover, their efforts in providing personalized behavioral guidance, offering emotional support, and cultivating patients' self-confidence contribute significantly to the overall efficacy of psychosocial interventions.

Cognitive Behavioral Therapy (CBT)

Cognitive Behavioral Therapy (CBT) is a structured psychosocial intervention aimed at enhancing mental health by addressing cognitive distortions, refining emotional regulation, and fostering effective coping strategies. The therapeutic process is executed through three phases: cognitive identification, cognitive restructuring, and behavioral interventions. Typically, CBT involves one-hour weekly sessions conducted face-to-face with a trained therapist over 6 to 12 weeks. The efficacy of CBT in mitigating CRF has been consistently demonstrated in various meta-analyses comprising 31 randomized controlled trials (RCTs) with a combined sample size of 3,599 participants (Zhang et al., 2019). Additionally, RCTs exploring both traditional and web-based CBT approaches have documented positive outcomes in alleviating fatigue across diverse cancer types, stages, and treatment modalities. Notably, a study by Janse et al. reported sustained benefits of CBT up to 18 months post-treatment, although the generalizability of long-term efficacy remains constrained as most studies have a maximum follow-up period of nine months (Janse et al., 2017).

Despite its proven effectiveness, the accessibility and delivery of CBT face logistical challenges, particularly in low-resource settings where trained therapists may be limited. Nurses can bridge this gap by integrating CBT principles into their practice, offering simplified behavioral interventions and reinforcing strategies taught during therapy sessions. They can also play an active role in facilitating web-based CBT programs, which have shown promise as an alternative for patients with limited access to face-to-face therapy. Furthermore, regular assessments conducted by nurses to monitor patients' progress and provide timely adjustments to intervention plans can amplify the therapeutic benefits of CBT.

Mindfulness-Based Stress Reduction (MBSR)

Mindfulness-Based Stress Reduction (MBSR) is a structured meditation program designed to alleviate stress, manage negative emotions, and improve physical symptoms, thereby promoting adaptation to illness. Core components of MBSR include body scanning, meditation, breathing exercises, walking meditation, and yoga practices. The standard protocol for MBSR involves weekly group sessions lasting 2 to 2.5 hours for eight weeks, accommodating up to 30 participants per group, supplemented by self-directed practice of 45 minutes per day, six days per week. Most studies exploring MBSR have employed interventions lasting 6 to 9 weeks, with subgroup analyses indicating significant improvements in CRF that persist for up to six months post-intervention (Yang & Li, 2020).

However, existing research predominantly focuses on breast cancer patients, limiting the generalizability of findings to other cancer types. Additionally, the structured and prolonged nature of MBSR interventions may pose challenges for patients experiencing severe fatigue,

making adherence difficult without robust support systems. Professional guidance is critical for effective implementation, as improper techniques or inconsistent practice can diminish the intervention's benefits. Nurses can address these barriers by providing tailored education on mindfulness practices, encouraging consistent participation, and facilitating access to group sessions or digital resources.

Emerging evidence suggests that combining MBSR with other interventions, such as light therapy or psychosocial support, may yield synergistic effects in managing CRF. Nurses are well-positioned to coordinate such multimodal approaches, leveraging their holistic understanding of patient needs and the therapeutic landscape. Further research exploring the efficacy of MBSR across diverse cancer populations and the integration of nurse-led mindfulness initiatives could broaden its applicability and enhance its impact.

Stress Management Therapy (SMT)

Stress management therapy (SMT) is a psychological intervention designed to assist patients in managing stress by identifying its sources and improving coping mechanisms. SMT has been demonstrated to reduce fatigue, enhance quality of life, and increase self-efficacy, particularly among cancer patients. In breast cancer patients, SMT typically involves a 10-week, structured, manualized program aimed at equipping women with skills to cope with stress and optimize social resources. For instance, a study by Vargas et al. included 240 breast cancer patients in an SMT program comprising weekly 2-hour sessions. These sessions integrated didactic presentations, cognitive-behavioral techniques, and relaxation exercises such as progressive muscle relaxation and guided imagery. Although no significant differences were observed in changes in fatigue intensity post-intervention, participants experienced a greater reduction in fatigue-related disturbances during the daytime compared to the control group (Vargas et al., 2014).

SMT equips patients with essential tools to manage stress and anxiety, reframe negative thought patterns that contribute to cancer-related fatigue (CRF), and provides a non-invasive and low-risk therapeutic option. Moreover, SMT sessions often incorporate mindfulness and resilience training to promote emotional stability and improve overall mental well-being. Despite its benefits, SMT is not universally effective, as individual responses may vary. The lack of extensive, high-quality research evaluating its efficacy in managing CRF, particularly in diverse cancer populations, limits its generalizability. Therefore, future studies with larger sample sizes and rigorous methodologies are essential to substantiate the long-term impact of SMT on CRF management. Additionally, exploring culturally tailored SMT interventions could further enhance its applicability and effectiveness.

Psychoeducation (PE)

Psychoeducational (PE) interventions encompass various components, including educational sessions, information dissemination, counseling, and supportive interactions, aimed at empowering patients to better cope with cancer-related challenges. These interventions often occur in face-to-face meetings with healthcare providers, allowing patients to share their experiences with CRF and receive validation and guidance. PE interventions can be delivered in both individual and group formats and may occur either in-person or remotely, depending on resource availability and patient needs. Notably, PE has demonstrated significant improvements in symptom severity, fatigue burden, and sleep disturbances in cancer patients (Nguyen et al., 2018).

A comparative study of PE and mindfulness-based stress reduction (MBSR) found that both interventions yielded significant reductions in fatigue, depression, anxiety, and sleep disturbances. Furthermore, a meta-analysis highlighted PE and MBSR as the most effective psychosocial interventions for CRF. Beyond symptom management, PE often incorporates goal-setting and problem-solving strategies to enhance patients' sense of control over their

health. While PE provides valuable benefits, its implementation may require considerable resources, including trained facilitators, educational materials, and time for preparation and delivery. Developing cost-effective and scalable models, such as digital PE platforms, could help address these challenges and extend access to underserved populations.

Future research should also explore the integration of PE with complementary therapies, such as yoga or physical activity programs, to amplify its benefits. Examining the longitudinal effects of PE on overall quality of life and survival outcomes could provide further insights into its role in comprehensive cancer care.

Peer Support (PS)

Peer support (PS) is a form of social support where individuals with shared experiences provide emotional, informational, and evaluative assistance to one another. Peer support groups offer patients opportunities to connect with others facing similar challenges, fostering a sense of community and understanding. These interactions can address questions related to cancer treatment, reduce feelings of isolation, and promote emotional well-being. The effectiveness of PS is influenced by factors such as the quality of peer relationships, the training provided to peer supporters, and the type of support offered (Zhu et al., 2022).

Research has shown that PS can alleviate CRF by fostering a positive attitude, enhancing self-confidence, and providing empathetic emotional support. Additionally, PS helps patients gain health-related knowledge and develop coping strategies tailored to their unique circumstances. Virtual PS platforms have emerged as a viable option, especially for patients with mobility challenges or those in remote areas. These platforms enable real-time communication through video calls or forums, offering flexible and accessible support options.

While PS is beneficial, challenges such as maintaining the quality of peer relationships and ensuring confidentiality can arise. Addressing these issues through standardized training for peer supporters and robust guidelines can enhance the effectiveness of PS interventions. Future studies should evaluate the impact of cultural and demographic differences on the efficacy of PS and investigate the role of technology in enhancing peer interaction.

Sensory Art Therapies

Sensory art therapies encompass diverse modalities that engage the senses, including music therapy, visual arts, and movement-based therapies, to promote emotional and physical well-being. Music therapy, for instance, has proven effective in alleviating CRF among patients with hematological malignancies and gastrointestinal cancers during both treatment and rehabilitation phases. By stimulating the brain's functional processes, music therapy triggers the release of endorphins, dopamine, and serotonin, reducing fatigue severity and improving mood. Similarly, art therapy, which involves creating visual artwork for expression and communication, has demonstrated positive effects on CRF in breast cancer patients (Qi et al., 2021).

Dance movement therapy presents mixed results, with some studies reporting no significant impact on CRF while others suggest its potential benefits in fatigue alleviation. Among pediatric cancer patients, sensory art therapies such as recreational and therapeutic games have been shown to improve emotional and social well-being. For instance, a one-month study involving professional artists who conducted painting and manual art therapy sessions for pediatric cancer patients reported significant improvements in their energy levels and physical strength (Melesse et al., 2022).

Despite these promising outcomes, implementing sensory art therapies requires healthcare providers to possess advanced artistic and cultural knowledge, as well as systematic training. Additionally, integrating therapies such as color therapy, aromatherapy, and play therapy into CRF management remains underexplored. Future research should focus on investigating the biological mechanisms underlying the benefits of sensory art therapies and determining their long-term effects on quality of life across various cancer types. Developing interdisciplinary

collaborations between artists, therapists, and healthcare providers could further refine these interventions and broaden their accessibility.

Light Therapy (LT): Bright White Light (BWL) Therapy

Light therapy (LT) is a therapeutic approach that utilizes natural or artificial light to prevent and manage various health conditions. Bright white light (BWL) therapy, delivered via a specialized light box for 30 minutes each morning, has been shown to be effective in reducing cancer-related fatigue (CRF) compared to dark red light (DRL) therapy. Studies indicate that a four-week duration of LT is more effective than shorter or longer interventions. The efficacy of LT in alleviating CRF is strongly influenced by light intensity, with optimal outcomes observed within the range of 1000–5000 lux. Interventions using light intensities below 1000 lux or exceeding 5000 lux generally show no significant differences compared to control groups. For patients with non-Hodgkin's lymphoma, the therapeutic effects of phototherapy typically manifest within two weeks, and the severity of fatigue often correlates inversely with the intensity and duration of bright light exposure. A four-week regimen of BWL therapy at an intensity of 1000–5000 lux for 30 minutes daily significantly improves CRF in cancer patients, with noticeable benefits emerging within two weeks of treatment initiation (Starreveld et al., 2021).

Despite its potential, LT may cause minor discomforts, such as irritation to the eyes or skin, particularly in individuals with heightened sensitivity to light or skin conditions. Additionally, LT is not always feasible for home use due to the need for specialized equipment and handling expertise. To address these limitations, future research could explore portable and user-friendly LT devices that enable at-home therapy while maintaining safety and efficacy. Furthermore, integrating LT with other nonpharmacological approaches, such as cognitive-behavioral therapy or exercise programs, may enhance its therapeutic benefits. Investigating the long-term effects of LT on CRF and its applicability across diverse cancer types and stages is crucial for optimizing its clinical utility.

Nutritional Management

Nutritional management is an emerging area in the treatment of CRF, with limited but growing evidence supporting its role. A comprehensive nutritional assessment is critical, encompassing evaluations of weight fluctuations, nutritional intake issues, anemia, and imbalances in vitamins, fluids, and electrolytes. This assessment helps identify deficiencies that may exacerbate CRF and enables the development of personalized nutritional interventions tailored to the patient’s specific needs. Nutrition counselling can address deficits caused by symptoms such as anorexia, diarrhea, nausea, and vomiting, but it requires specialized resources and expertise that may not be readily available in all healthcare settings.

The efficacy of dietary supplements, including guarana, acetyl-L-carnitine, and coenzyme Q, in managing CRF remains controversial, with inconsistent findings in existing studies. Nonetheless, adequate protein intake and a balanced diet rich in omega-3 and omega-6 fatty acids, as well as high-fiber carbohydrates, have been suggested to mitigate inflammation and reduce obesity-related fatigue. A dietary pattern emphasizing fruits, vegetables, whole grains, and anti-inflammatory fatty acids may further alleviate CRF in cancer patients. While micronutrient supplementation has shown promise in post-treatment fatigue among cancer survivors, its specific role in addressing CRF requires further investigation (Inglis et al., 2019).

Implementing nutritional management can be challenging due to the variability in dietary needs based on cancer type, treatment modality, and individual patient preferences. Physical and emotional factors related to a cancer diagnosis often complicate adherence to dietary recommendations. Addressing these barriers may involve incorporating flexible dietary plans that align with patients' daily routines and preferences, thus enhancing compliance. Research should also focus on integrating nutritional management with other interventions, such as

physical activity programs or psychological therapies, to provide a holistic approach to CRF management. Evaluating the effects of culturally tailored nutritional interventions could further enhance their effectiveness and accessibility.

Traditional Chinese Medicine (TCM) Therapies

Traditional Chinese Medicine (TCM) attributes CRF to imbalances in qi, blood, yin, and yang, leading to impaired organ function. TCM approaches aim to alleviate CRF by regulating internal organ systems and restoring the balance of qi and blood. A wide range of TCM practices is employed for this purpose, including acupuncture, acupressure, moxibustion, Qigong, Tai Chi, Tai Chi sword, Baduanjin (eight-section exercise), and Wuqinxi (five-animal mimic exercise).

Acupuncture

Acupuncture is among the most used TCM methods for managing fatigue and is endorsed by the National Comprehensive Cancer Network (NCCN) guidelines for CRF management, particularly for cancer survivors who have completed treatment. Multiple systematic reviews and meta-analyses confirm that acupuncture is a safe and effective intervention for CRF, especially in patients with breast and lung cancer or those actively undergoing cancer therapy. The ST36 acupuncture point is frequently used in these treatments (Choi et al., 2022). However, the administration of acupuncture requires professional expertise, involves a prolonged course of treatment, and carries a small risk of adverse effects, such as needle-related injuries. Exploring standardized acupuncture protocols and incorporating patient feedback into treatment designs could optimize outcomes. Furthermore, additional studies focusing on the cost-effectiveness of acupuncture could broaden its accessibility and acceptance in clinical practice.

Moxibustion

Moxibustion, a non-invasive TCM therapy, involves burning dried mugwort leaves near the skin to stimulate acupoints and promote healing. This technique activates the body's endogenous regulatory systems and facilitates the release of protective substances, thereby enhancing overall well-being. Systematic reviews, such as the one conducted by Deng et al., highlight the efficacy and safety of moxibustion in treating CRF (Deng et al., 2021). However, the lack of standardized treatment protocols and clinical consensus on moxibustion techniques presents challenges to its broader adoption. Future research could address these gaps by developing evidence-based guidelines and exploring its potential for integration into multidisciplinary cancer care.

Acupressure

Acupressure is a non-invasive, safe, and side-effect-free TCM intervention recommended by the NCCN guidelines for managing CRF. It involves applying pressure to specific acupoints on the body to stimulate energy flow and alleviate symptoms. Meta-analyses confirm that acupressure is effective in reducing CRF, with commonly targeted points including Hegu (LI4), Zusanli (ST36), Sanyinjiao (SP6), as well as auricular points like Shenmen and subcortex. Treatment protocols often recommend daily application for 1–3 minutes at each body acupoint and 3 minutes at auricular acupoints for optimal results (Chou et al., 2022).

While acupressure is accessible and easy to perform, ensuring proper technique and consistency is essential for achieving desired outcomes. Developing digital or video-based training tools for patients and caregivers could enhance the scalability of acupressure interventions. Investigating the synergistic effects of combining acupressure with other TCM therapies, such as Qigong or moxibustion, may further enhance its therapeutic benefits for CRF.

Sleep Management

Cancer-related fatigue (CRF) is a common and multifactorial symptom in cancer patients, with sleep disturbances being both a contributing and treatable factor. Effective management of sleep is recommended to alleviate CRF and enhance the quality of life in cancer patients.

Nonpharmacological strategies for sleep management include relaxation therapy, stimulus control therapy, sleep restriction therapy, sleep hygiene, and cognitive behavioral therapy (CBT). Among these, stimulus control therapy, which consists of five fundamental steps, is a critical element of CBT for insomnia and is recognized as a Level I intervention in the National Comprehensive Cancer Network (NCCN) guidelines for treating sleep disorders. Sleep restriction therapy, another effective approach, involves avoiding prolonged daytime naps and limiting the overall time spent in bed. This technique helps regulate the sleep-wake cycle and reduces sleep fragmentation (Page et al., 2006).

Sleep hygiene practices focus on establishing consistent sleep schedules, refraining from physical or mental stimulation before bedtime, and optimizing the sleeping environment. Both CBT and bright white light (BWL) therapy, as discussed earlier, have demonstrated effectiveness in improving CRF and addressing sleep disturbances. However, further studies are needed to identify the most effective timing, duration, and frequency of BWL therapy for sleep disorder management. Proper education and training on sleep hygiene practices, along with regular monitoring and follow-up, are crucial to ensure adherence and success. Severe sleep disorders may necessitate specialist referrals for more comprehensive interventions.

Sleep management not only alleviates fatigue but also restores physical strength and boosts immunity. However, improper management, such as excessive restriction of sleep or inconsistent practices, can exacerbate fatigue and reduce treatment efficacy. Emerging research should investigate the integration of advanced technologies, such as wearable sleep monitors and mobile applications, to enhance compliance with sleep management interventions. Personalized sleep management plans, tailored to the unique needs and preferences of cancer patients, can further improve outcomes by addressing individual barriers and enhancing long-term adherence.

Combination Therapy (CT)

Combination therapy (CT) involves the integration of two or more nonpharmacological interventions, such as the combination of exercise therapy and sleep management or exercise therapy paired with cognitive behavioral therapy (CBT). A meta-analysis revealed that pharmacological interventions, as currently studied, show limited effectiveness in alleviating CRF during and after primary cancer treatment (Mustian et al., 2017). Conversely, exercise, psychological interventions, and their combinations have demonstrated significant efficacy in reducing CRF. Nevertheless, the combined approach does not always outperform individual therapies, potentially due to the increased complexity and duration of CT, which can lead to decreased adherence among patients. This highlights the importance of carefully planning and coordinating the timing and order of interventions to achieve optimal results.

While CT may require additional resources and time for implementation compared to single interventions, it offers the potential for synergistic effects, often achieving outcomes greater than the sum of its individual components. This "1 + 1 > 2" effect provides an opportunity to customize treatment plans based on the unique needs and preferences of patients. For instance, a patient experiencing severe CRF may benefit from integrating psychological support with structured physical activity to address both mental and physical dimensions of fatigue. Future research should focus on evaluating the effectiveness of CT through both objective measures and patient-reported outcomes, identifying optimal combinations and sequencing of interventions, and assessing the long-term sustainability of CT in various healthcare settings.

It is also crucial to address the feasibility of CT in resource-limited settings. Strategies such as streamlined protocols, remote delivery of psychological interventions, and community-based exercise programs may improve accessibility. Collaborative approaches involving multidisciplinary teams can further enhance the success of CT by ensuring comprehensive care tailored to the patient's needs.

Health Education

Health education plays a pivotal role in enhancing knowledge, attitudes, skills, and behaviors related to health, using individual, group, institutional, community, and systemic strategies (Hou, 2014). This approach is cost-effective, convenient, and not only improves individual and community health behaviors but also influences the environments in which people live and work. In oncology care, health education for cancer patients and their families raises awareness about the disease, helps set realistic expectations for treatment, and fosters positive emotional states, potentially leading to improved treatment outcomes. Oncology nurses can deliver health education on CRF, including its clinical manifestations, underlying causes, and available therapeutic or relief measures, through diverse mediums such as brochures, instructional videos, or online platforms.

The degree and nature of CRF and related symptoms often vary across different stages of the cancer trajectory, including active treatment, post-treatment, and terminal phases. Consequently, health education should be tailored to the specific stage of the disease, informing patients about potential experiences during each phase. For example, patients undergoing radiotherapy, chemotherapy, or immunotherapy should be made aware of the likelihood of moderate to severe CRF, while post-treatment patients should understand that persistent fatigue does not necessarily indicate ineffective treatment or disease progression. Oncology nurses play a critical role in delivering this information empathetically, which can improve patient acceptance and caregiver understanding.

Customized educational programs should be designed to address individual patient needs, preferences, and cultural contexts. Encouraging patients to actively participate in their care and self-management, while providing tools for monitoring and evaluating the effectiveness of educational initiatives, is vital for achieving desired outcomes. Healthcare providers involved in education must be well-trained and possess up-to-date knowledge and positive attitudes to ensure the delivery of high-quality, effective health education. Future research could explore innovative methods for delivering health education, such as virtual reality simulations or interactive mobile applications, to enhance patient engagement and comprehension. Additionally, longitudinal studies evaluating the impact of health education on CRF outcomes and overall quality of life would further validate its role in comprehensive cancer care.

Conclusion

Cancer-related fatigue (CRF) remains a pervasive and debilitating symptom among cancer patients, significantly impacting their quality of life. This review highlights the diverse nonpharmacological interventions available for CRF management, emphasizing the role of exercise, psychosocial therapies, sensory art therapies, light therapy, nutritional management, traditional Chinese medicine (TCM) practices, sleep management, combination therapies, and health education. These approaches not only address the physical and psychological dimensions of CRF but also offer individualized, patient-centered care that aligns with the principles of holistic oncology.

The critical role of nurses in implementing these interventions cannot be overstated. From promoting exercise and guiding mindfulness practices to delivering health education and supporting psychological well-being, nurses serve as pivotal agents in mitigating CRF. Their ability to tailor interventions to the unique needs of each patient and provide continuous monitoring ensures the sustainability and effectiveness of these therapeutic strategies.

While the evidence supporting nonpharmacological interventions is robust, further research is necessary to refine these approaches, identify optimal combinations, and ensure their accessibility across diverse populations and healthcare settings. Innovative technologies, such as digital health platforms and telemedicine, hold promise for enhancing the delivery and scalability of CRF interventions.

Ultimately, this review underscores the necessity of a multidisciplinary approach to CRF management, wherein nurses, oncologists, therapists, and other healthcare professionals collaborate to provide comprehensive care. By integrating evidence-based nonpharmacological strategies into routine clinical practice, the burden of CRF can be alleviated, empowering patients to navigate their cancer journey with improved resilience and quality of life.

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