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## Research Article

# THE BALANCING ACT: IMPACT OF EXERCISE, SLEEP QUALITY, AND STRESS MANAGEMENT ON CANCER NUTRITION

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### ABSTRACT

This comprehensive discussion delves into the intricate relationship between lifestyle factors such as exercise, sleep quality, and stress management and their profound impact on nutritional health within the realm of cancer care. It highlights the interplay of these elements, emphasising their collective influence on dietary habits, and overall well-being during cancer treatment and recovery. The text explores the significance of exercise, sleep quality, and stress management, revealing their critical roles in supporting cancer patients. It also elucidates strategies for integrating these lifestyle factors into care plans and emphasises the importance of holistic approaches in supporting individuals throughout their cancer journey. The content emphasises collaborative efforts between healthcare providers and patients, acknowledging and addressing potential barriers to implementing lifestyle changes. This comprehensive review aims to underscore the importance of adopting a multifaceted approach to enhance the well-being of individuals navigating cancer care.

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### INTRODUCTION

Lifestyle is a manner of living adopted by individuals, communities, and nations, shaped by distinct geographical, economic, political, cultural, and religious contexts. It encapsulates the unique features of the residents of a particular area at a specific moment, encompassing the everyday actions and roles individuals play in their work, leisure, social engagements, and dietary choices<sup>1</sup>. As per the World Health Organisation (WHO), around 60% of elements influencing an individual's health and overall well-being are associated with their lifestyle choices. Unhealthy lifestyle traits include malnutrition, poor dietary habits, engaging in harmful behaviours, substance misuse, and leading a sedentary lifestyle<sup>2</sup>. Lifestyle diseases refer to health conditions associated with individuals' patterns of living. These diseases, often non-communicable, typically result from insufficient physical activity, poor dietary choices, alcohol consumption, substance abuse, and smoking<sup>3</sup>. Nutrition is a crucial factor in lifestyle practises, significantly impacting chronic non-communicable diseases (NCDs) like cardiovascular disease, diabetes, chronic respiratory disease and cancer. Nutrition plays a pivotal role in shaping and influencing the development of these conditions<sup>4</sup>. Each year, NCDs are responsible for 41 million deaths globally, making up 74% of all fatalities. Among these, cardiovascular diseases claim the most lives, with approximately 17.9 million deaths annually. Closely, cancer

causes around 9.3 million deaths each year. Chronic respiratory diseases account for roughly 4.1 million fatalities, while diabetes, including deaths related to kidney disease caused by diabetes, results in approximately 2.0 million deaths annually<sup>5</sup>. The relationship between lifestyle factors and cancer nutrition is intricate and impactful. Exercise, sleep quality, stress management, and dietary choices collectively shape the well-being of individuals navigating cancer care. Exercise aids metabolism and immunity, while sleep quality influences recovery and dietary patterns. Stress management affects appetite and digestion. These lifestyle elements synergise, profoundly influencing nutritional health in the context of cancer. Understanding and integrating these factors is pivotal for comprehensive cancer care.

Exercise, quality sleep, and stress management are crucial components of comprehensive cancer care. Exercise not only aids physical strength but also boosts immunity and mitigates treatment side effects. Quality sleep supports healing and regulates hormones essential for recovery. Effective stress management not only aids mental health but also impacts appetite, digestion, and overall well-being during cancer treatment and recovery. Integrating these lifestyle factors into care plans can significantly improve patients' outcomes and quality of life.

The purpose of this discussion is to explore the intricate relationship between lifestyle factors-specifically exercise,

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sleep quality, and stress management-and their impact on nutritional health in the context of cancer care. By examining how these factors intersect with dietary habits, nutrient absorption, and overall well-being, the aim is to underscore the importance of a holistic approach to support cancer patients throughout their journey, from treatment to recovery and survivorship.

### **Exercise and Its Influence on Cancer Nutrition**

Cancer patients typically engage in less physical activity compared to individuals without cancer, with a significant percentage, ranging from 53% to 70% of cancer survivors, not adhering to recommended physical activity standards. Nonetheless, regular exercise holds crucial importance for cancer patients undergoing various oncological treatments. Lack of physical activity can undermine bone strength, result in muscle atrophy, and contribute to fat accumulation, elevating the risk of adverse outcomes related to body composition, obesity-related illnesses, frailty, fractures, and the recurrence of cancer<sup>6</sup>. Engaging in exercise during cancer treatment is considered safe and can enhance physical functioning and various dimensions of quality of life. Adequate evidence supports the positive impact of exercise during cancer treatment<sup>7</sup>. Moderate physical activity has demonstrated effectiveness in reducing cancer-related symptoms and associated side effects, including fatigue, anxiety, depression, and sleep disturbances. Additionally, it contributes positively to cardiovascular health, muscle strength, and body composition assessment, including fat, bone, and muscle percentages within the body<sup>8</sup>. Studies based on epidemiology and observations indicate that patients engaging in regular physical activity demonstrate reduced risks of cancer recurrence and lower overall mortality rates<sup>9</sup>.

The recommendations advise incorporating consistent aerobic exercises, like walking, jogging, or cycling, and strength training, such as weightlifting or using resistance bands, for patients whose cancer is localised. Aerobic activities contribute to enhancing cardiovascular health, while resistance exercises focus on strengthening muscles<sup>10</sup>. A meta-analysis revealed that cancer survivors engaging in 15 MET (metabolic equivalent of task) hours per week experienced a 27% reduced risk of cancer mortality compared to non-participants. Notably, this effect was more pronounced in individuals who had a sedentary lifestyle before their cancer diagnosis<sup>9</sup>.

### **Sleep Quality and Its Significance in Cancer Nutrition**

Up to half of individuals diagnosed with cancer experience sleep disturbances, with insomnia and irregular sleep-wake cycles being the most prevalent sleep disorders among them<sup>11</sup>. These sleep issues often arise due to treatment side effects, medication usage, extended hospital stays, stress, and various other contributing factors<sup>12</sup>. Sleep might influence cancer progression and its development over time. Factors like the impact of sleep on hormones, metabolism, and inflammation could potentially affect the aggressiveness of cancer. However, further research is needed to better understand and confirm this potential link between sleep and cancer, particularly regarding its impact on the advancement of the disease. The circadian rhythm influences the cell growth and division process, potentially rendering cancer cells more susceptible or resistant to treatments based on the timing of intervention. Cancer treatments often target proteins, enzymes, or cell surface receptors, many of which are influenced by circadian timing.<sup>13</sup>

Inadequate sleep has been linked to disruptions in leptin and ghrelin levels. Insufficient sleep correlates with higher ghrelin levels and lower leptin levels, which can result in heightened hunger and reduced feelings of fullness, ultimately prompting an increase in calorie consumption and altering food choices<sup>14</sup>.

### **Stress Management and Its Role in Cancer Nutrition**

Stress significantly affects cancer patients from diagnosis to treatment and beyond, creating uncertainty and impacting their psychological and physical well-being. This stress stems from various sources like the unpredictable nature of the disease, its severity, physical challenges, treatments, psychological state, and family concerns. The detrimental effects of stress on cancer patients, leading to psychiatric conditions like anxiety, depression, or post-traumatic stress disorder, and lowering their quality of life, highlight the necessity for a comprehensive and integrated approach to their care<sup>15</sup>. Research conducted in laboratory settings using animal models and human cancer cells cultivated in labs indicates that persistent stress could aggravate the progression and spread (metastasis) of cancer. This chronic stress might prompt the release of glucocorticoids, a class of steroid hormones. These glucocorticoids potentially hinder a form of cell death known as apoptosis in tumour cells, promoting increased metastasis and resistance to chemotherapy. Additionally, they might impede the body's immune system from identifying and combatting cancer cells<sup>16</sup>.

### **Synergies among Exercise, Sleep Quality, and Stress Management**

Positive lifestyle changes can have a cumulative and profound impact on someone dealing with cancer. Implementing healthy habits like regular exercise, balanced nutrition, stress reduction techniques, and adequate sleep can collectively enhance the overall well-being of individuals throughout their cancer journey<sup>17</sup>.

Tailored exercise and diet plans have shown significant benefits in aiding weight loss, reducing fatigue induced by cancer, regulating hormonal fluctuations, decreasing inflammatory markers, and enhancing mental well-being and energy levels. Comprehending how physical activity and a balanced diet work together can notably enhance the quality of life for individuals with breast cancer. This understanding not only addresses various aspects of health but also underscores the interconnected mechanisms that contribute to improved overall well-being in breast cancer patients<sup>18</sup>.

The combined influence of sleep, exercise, and stress management profoundly affects nutritional intake, digestive health, and immune function. Adequate sleep supports better dietary choices, promoting a balanced intake of nutrients crucial for digestive health and immune function. Regular exercise not only enhances digestion but also boosts the immune system, contributing to overall well-being<sup>19</sup>. Effective stress management plays a pivotal role as it helps regulate appetite, supports healthy digestion, and prevents immune system suppression<sup>20</sup>. Together, these factors create a holistic synergy, positively impacting nutritional absorption, digestive processes, and immune resilience for optimal health.

## **Strategies for Integrating Exercise, Improved Sleep, and Stress Management**

Research has revealed the soothing impact of nature exposure, whether through visual media showcasing natural scenes or auditory stimulation like sounds of water or birdsong, in reducing stress and elevating positive emotions compared to urban settings. Essential oils, such as hinoki cypress leaf and lavender scents, have shown relaxation-promoting effects through olfactory stimulation. Mindfulness-based stress reduction (MBSR), adaptable to diverse needs, notably enhances mental well-being, employing practises like body scan, sitting meditation, and mindful hatha yoga<sup>21</sup>. Moreover, music, either independently or as part of relaxation techniques, has proven effective in stress reduction across various environments<sup>22</sup>. Patients and their families often turn to various complementary and integrative therapies aiming to alleviate stress and enhance overall well-being, potentially offering notable anti-cancer effects as previously indicated. The National Centre for Complementary and Alternative Medicine (NCCAM), part of the National Institutes of Health (NIH), encompasses a broad spectrum of healthcare systems and practises. Among these modalities within NCCAM are mind-body medicine, nutritional supplements, herbal product usage, exercises, and diverse energy-based techniques.<sup>23</sup> Improving overall sleep quality requires regulating sleep patterns and behaviours. Monitoring sleep habits helps identify patterns and offers guidance for enhancing sleep quality and consequently, quality of life. Key factors influencing sleep hygiene include maintaining consistent sleep and wake times, avoiding late caffeine intake, abstaining from alcohol and nicotine close to bedtime, considering meal timing and avoiding high-fat foods in the evening, regular exercise while avoiding it close to bedtime, stress reduction before sleep, minimising noise in the sleep environment, and limiting daytime naps, as they can disrupt nighttime sleep patterns<sup>22</sup>.

Research findings indicated that close to 70% of individuals undergoing cancer treatment encountered substandard sleep quality. Therefore, it remains imperative to establish an environment that mitigates elements exacerbating sleep disruptions. This involves strategies such as noise reduction, adjusting lighting conditions, maintaining optimal room temperature, ensuring the cleanliness of sleep-related items and the sleeping space, offering suitable bedding for warmth, arranging pillows for comfort, providing patients with loose and soft clothing, encouraging emptying of the bladder and bowel before bedtime, managing fluid and fibre intake across the day, limiting intake before sleep can alleviate sleep disturbances among cancer patients.<sup>24</sup> Certain foods rich in melatonin, tryptophan, and magnesium are suggested to potentially enhance sleep quality based on some research findings. Melatonin sources include eggs, fish, nuts, seeds, berries, tomatoes, and peppers. Tryptophan-rich foods encompass poultry like chicken and turkey, eggs, fish, dairy products, tofu, soy products, chocolate, and various seeds. Additionally, magnesium can be found in fish, nuts, seeds, legumes, fortified grains, spinach, and soy products. These food groups are believed to contain compounds that might positively influence sleep quality, as per certain studies<sup>25</sup>.

Meta-analysis findings revealed that exercise interventions have the potential to enhance the quality of life (QoL), physical function, and social function while also alleviating symptoms of fatigue, insomnia, and dyspnoea in individuals facing

advanced cancer<sup>26</sup>. Several frameworks aid in facilitating safe and efficient exercise training, such as progression, prescription, and screening methods. For individuals dealing with cancer cachexia or experiencing limitations in free movement due to muscle performance issues, a combination of aerobic and resistance exercises is recommended<sup>27</sup>. Various exercise programmes have demonstrated effectiveness in managing breast cancer, specifically targeting cardiorespiratory health, strength, and flexibility. Among these programmes, aerobic or endurance training and strength or resistance training are highlighted as key methods in breast cancer management<sup>28</sup>.

## **Practical Approaches and Recommendations**

### ***Implementing Lifestyle Modifications in Cancer Patient Care Plans***

Lifestyle practises are crucial in both preventing cancer and supporting individuals undergoing cancer treatment. Guidelines for nutrition, in particular, largely align with general healthy eating principles. Yet, adjustments might be needed to prevent specific cancers or manage treatment-related side effects like significant weight loss. The World Cancer Research Fund International suggests that around 20% of cancer instances in the United States could be averted through practises like maintaining physical activity, weight management, and adopting a nutritious diet<sup>29</sup>. Enhancing cancer care involves lifestyle shifts for overall well-being. Recommendations include seeking social support, managing stress, ensuring adequate sleep, regular exercise, and a balanced diet emphasising plant-based foods, probiotics, and fibre while reducing processed and refined foods. Limiting exposure to environmental toxins is vital. Collaborating with healthcare professionals and supportive networks helps devise personalised plans for navigating these changes during cancer care<sup>30</sup>.

### ***Collaborative Efforts between Healthcare Providers and Patients***

Collaborative partnerships between healthcare providers and patients are pivotal. These efforts involve open communication, mutual respect, and shared decision-making to ensure optimal care. It includes patients actively participating in their care, providing crucial information, adhering to treatment plans, and healthcare providers offering guidance, expertise, and tailored support. This collaborative approach enhances treatment efficacy, patient satisfaction, and overall health outcomes<sup>31</sup>.

### ***Addressing Challenges and Potential Barriers***

Recognising impediments to adopting lifestyle changes in cancer patients is vital. These challenges encompass individual factors like insufficient awareness or motivation, practical hurdles such as time constraints or financial limitations, and emotional obstacles like fear or uncertainty. Healthcare system-related barriers, such as limited access to resources or inadequate support, also impact implementation<sup>32</sup>. Addressing these challenges involves personalised education, support networks, access to resources, and customised strategies to empower patients to overcome these obstacles and embrace beneficial lifestyle changes. Overcoming resistance or difficulties in adhering to recommendations requires a multifaceted approach. This includes personalised education to enhance understanding and motivation, setting realistic goals, employing behaviour change techniques like positive reinforcement, and offering practical support<sup>33</sup>. Tailoring

recommendations to individual preferences and circumstances, fostering a supportive environment, and providing ongoing encouragement and feedback are pivotal<sup>34</sup>. Collaborative efforts between patients and healthcare providers remain essential in overcoming resistance and fostering enduring behavioural changes.

## CONCLUSION

The intricate relationship between lifestyle factors like exercise, sleep quality, stress management, and nutrition significantly impacts cancer patients' well-being. These elements synergise, profoundly influencing nutritional health and overall health during cancer care. Understanding their interconnectedness and integrating them into care plans is pivotal for comprehensive cancer support. Strategies involving tailored exercise, improved sleep practises, stress reduction techniques, and dietary adjustments showcase significant benefits in managing symptoms, promoting recovery, and enhancing overall quality of life. Implementing these lifestyle changes demands collaborative efforts between healthcare providers and patients, overcoming challenges and barriers to ensure successful adoption. By embracing these lifestyle modifications and fostering a supportive environment, cancer care can become more holistic and impactful, aiming to enhance patients' well-being throughout their journey from diagnosis to survivorship.

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