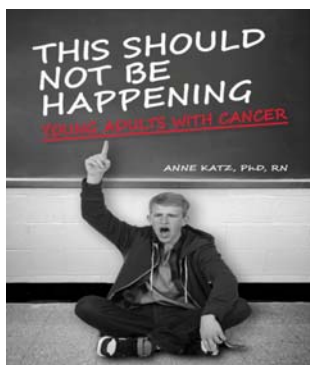


Exercise in Adolescent and Young Adult Cancer Survivors for Improving Lifelong

Significant medical advancements and progress has been made in cancer research, awareness, care delivery, quality of life, and survival; however, there are still underserved populations. The Adolescents and Young Adults (AYA) population, commonly defined as persons between the ages of 15 and 39 years, account for about 2% of all patients diagnosed with cancer in Canada. ¹ The mortality rate in AYA survivors greatly surpasses rates seen in the general population, and is considered the leading cause of disease-related deaths with homicide, suicide and unintentional injury claiming more lives than cancer. ² Despite the relatively smaller numbers of AYA with cancer, the numbers do not accurately convey the drastic impact this disease has on the patients, families and society as a whole.

The decline of lean body mass (LBM) at diagnosis and during treatment negatively contributes to skeletal muscle cachexia. Furthermore, certain chemotherapeutic agents and corticosteroids can result in muscle protein catabolism, which further decreases LBM and increases adiposity and insulin-resistance. ¹² Empirical evidence suggests a higher prevalence of musculoskeletal complications including but not limited to: musculoskeletal pain, growth failure, disturbed gait, fractures, kyphosis, and osteopenia/osteoporosis (during active stages of the disease and post-treatment) among the AYA population living with cancer. ¹³⁻¹⁵

Given that musculoskeletal function is among the greatest determinants of morbidity and mortality across the life course, the need to foster and implement healthy lifestyle behaviours is even more critical in AYA population. ¹⁶



Cancer has distinct features among the AYA population with a spectrum of malignant diseases, making it very different from the pediatric and older adult population. Among this age group, cancer is reported to be the leading cause of non-accidental deaths with little improvements in cancer survival rates in comparison to both pediatric and older age groups. ² The challenges experienced by AYA is further complicated by the higher rates of cancer recurrence and the limited knowledge of the epidemiologic, biologic and genetic issues. The often late diagnosis received followed by the aggressive treatment obtained, and significant adverse physiological and psychosocial outcomes ³⁻⁵ have left them referred to as the "the orphans of cancer." ⁶⁻⁷

Oncology related treatment have been shown to contribute to psychological and cognitive impairments, mood disturbances, behavioral problems, somatic distress, cardiopulmonary toxicity, endocrinopathy, neurological dysfunction and multiple physiological mechanisms affecting quality of life in the AYA population. ⁸⁻¹¹

Designed to target specific late effects, empirical evidence indicates that exercise is important in the reduction of long term sequelae as it alters metabolic pathways that may influence the development of chronic diseases associated with cancer treatment. With well documented benefits of exercise noted in the general population, cancer survivors may also reap the same benefit of regular exercise. These benefits include and are not limited to: improved cardiovascular fitness, improvement and or maintenance of muscle and bone strength, decreased anxiety and depression risk, reduce risk of a second primary, functional mobility and bone mineral density. ¹⁷⁻²¹

In summary, because of the distinctive nature of cancer among the AYA population, the implementation of physical activity interventions during the treatment and survivorship phase is imperative in order to abate the multifaceted long-term health risks of cancer and oncology related treatment. This can be accomplished through both aerobic exercise and strength training, which has the potential to mitigate many cancer-related effects, enhance musculoskeletal health and improve the quality of life among this population.

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