Physical Activity Participation and Preferences: Developmental and Oncology-Related Transitions in Adolescents Treated for Cancer

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ABSTRACT

Purpose: To describe motor function and participation in, barriers to, and preferences for physical activity (PA) in adolescents during and after treatment of cancer and to discuss PA promotion in the context of developmental and cancer transitions. **Method:** A cross-sectional survey study used the Transfer and Basic Mobility and Sports/Physical Functioning self-report and parent-report scales of the Pediatric Outcomes Data Collection Instrument (PODCI) and questions about PA participation and preferences to collect information from 80 adolescents and 63 parents. **Results:** PODCI scores for adolescents receiving treatment were more variable and significantly lower than those of adolescents who had been off treatment for more than 2 years. Fatigue, pain, general health, and doctor's orders were frequently identified as barriers to PA for adolescents receiving treatment. Many did not achieve recommended levels of PA. The adolescents expressed preferences for being active with friends and family, at home or in school, in the afternoon or evening, and through daily recreational and sports activities typical of teenagers. **Conclusions:** Physical abilities and participation in and barriers to PA vary across the cancer journey. Interventions should be sensitive to variability and acknowledge individual preferences and environments throughout the trajectories and transitions of cancer treatment and youth development to achieve lifelong healthy lifestyles.

Key Words: adolescent; cancer; physical activity.

RÉSUMÉ

Objet: Décrire la fonction motrice, la participation, les obstacles et les préférences en matière d'activité physique chez les adolescents avant et après un traitement du cancer et discuter de la promotion de l'activité physique dans le contexte des transitions du développement et du cancer. **Méthode:** Une étude transversale a utilisé les échelles d'autodéclaration et de déclaration par les parents du questionnaire Pediatric Outcomes Data Collection Instrument (PODCI) et des questions sur la participation et les préférences en matière d'activité physique afin de recueillir des données sur la mobilité des transferts, la mobilité de base, le fonctionnement dans les sports et le fonctionnement physique auprès de 80 adolescents et de 63 parents. **Résultats:** Les résultats du questionnaire PODCI pour les adolescents recevant un traitement étaient plus variables et considérablement plus bas que pour les adolescents qui avaient terminé leur traitement il y a plus de deux ans. La fatigue, la douleur, la santé en général et les recommandations du médecin étaient fréquemment désignées comme étant des obstacles à l'activité physique chez les adolescents qui reçoivent un traitement. Bon nombre d'entre eux n'atteignaient pas les niveaux d'activité physique recommandés. Les adolescents ont exprimé des préférences pour l'activité physique pratiquée avec des amis ou en famille, à la maison ou à l'école, dans l'après-midi ou le soir et dans des loisirs et des sports que les adolescents choisissent habituellement. **Conclusions:** Les capacités physiques, la participation et les obstacles en matière d'activité physique varient au cours du parcours du cancer. Les interventions devraient tenir compte de la variabilité ainsi que des préférences et des environnements des individus au cours des trajectoires et des transitions du traitement du cancer et du développement du jeune pour que ce dernier puisse adopter de saines habitudes de vie tout au long de sa vie.

For children and adolescents treated for cancer, the probability of surviving into adulthood is now over 80% as a result of multi-modal therapies including chemotherapy, radiation, and surgery.¹ As a result, a large and growing population faces a multitude of disease- and treatment-related complications across all components

of the *International Classification of Functioning, Disability and Health (ICF)*,² both during treatment and as survivors. These complications cover a diverse and complex spectrum of body structure and function impairments of varying severity and can include fatigue, pain, sleep problems, decreased muscle strength and

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extensibility, impaired balance, neuropathy, compromised bone integrity, poor aerobic and anaerobic physical fitness, over- or underweight, and cardiac and pulmonary disease, as well as endocrine, reproductive, cognitive, emotional, and psychosocial issues.^{3–10} Many of these impairments have bidirectional associations with other components of the *ICF*—motor skills, activities of everyday life, participation in recreation, sports, education, social activities, and employment—and ultimately affect overall quality of life and the transition to a productive and healthy adult life.^{3,8–14} Young adult survivors of childhood cancer have a higher than expected prevalence of frailty, a physiologic phenotype manifested by low lean muscle mass, exhaustion, low activity levels, slow ambulation, and weakness and associated with chronic conditions, suggesting accelerated aging.⁶ By age 45 years, 95% of adults treated for childhood cancer will have a chronic health condition, and 80% will have a disabling or life-threatening chronic condition.⁴

Physiologic principles and exercise science have suggested that many of the adverse effects of cancer and its treatment can be ameliorated by participation in physical activity (PA).^{15,16} A large body of oncology research involving adult populations and an increasing number of pediatric studies have shown that exercise is safe and feasible during and after cancer treatment.^{10,15–17} Despite variable outcomes and challenging methodology, the evidence has shown overall positive effects on physiologic and psychosocial cancer-related impairments, physical functioning, quality of life, and the prevention of future cancers.^{15,16,18–20}

Adolescents with cancer face unique challenges. Typically, adolescence is a time of brain development, physical growth, and transitions involving the development of self-awareness, autonomy from family, new body image, sexual identity, and influential relationships; roles change, expectations shift, and new social opportunities arise.^{7,21,22} Teenagers dealing with cancer also experience transitions related to the cancer continuum—from health to diagnosis, treatment, end of therapy, long-term follow-up for late effects, and a shift to adult services.^{22–24} The cancer trajectory merges with and challenges the developmental life course with issues such as changes in physical appearance, isolation from peers, missed social experiences, interference with academic and vocational goals, and interruption of evolving independence from parents, resulting in fewer opportunities to participate in typical youth experiences.^{7,22–24}

Adolescence is also a critical period in the life span of participation in PA because patterns of activity and inactivity during this period have been shown to track into adulthood.²⁵ Many teens become less active during these years,²⁶ and cancer and its treatment can exacerbate declines¹³ because most adolescents become less active during treatment, and many do not return to pre-diagnostic levels.^{8,13} Levels of PA for childhood cancer

survivors have shown wide variation: Many studies have reported decreased amounts and intensities,^{8,10,13,15} and others have demonstrated PA levels similar to peer or sibling comparison groups but have also found that many in both groups were not meeting recommended levels of PA.^{8,14,28} Survivors have more to gain from a healthy lifestyle, given their long-term and heightened risk for cardiopulmonary and musculoskeletal morbidity, metabolic syndrome, and second cancers.^{10,14,28}

Lack of engagement in PA is also reflected in low recruitment rates, poor adherence, and disappointing sustainability in intervention studies.^{8,10,19,20,28} These issues have contributed to challenges in demonstrating efficacy and, to a greater extent, effectiveness in this area of research.

Ambivalent commitment to PA both in daily life and in research protocols suggests that exercising may not be motivating or practical for young people. Motivators for participation in PA in the adolescent cancer population include having fun, feeling good about oneself, connecting with friends, and doing age-appropriate activities, as well as realizing health benefits such as weight management, stress reduction, and increased energy, strength, flexibility, and fitness.^{13,26,29} Beyond motivation, multiple personal and environmental factors interact to influence participation in PA. Factors common to all teenagers include family support, self-efficacy, attitude, availability of time, skill, educational priorities, peer influence, weather, transportation, and access to safe and appropriate exercise facilities.^{8,26,28,29} Adolescents with cancer may experience additional barriers specific to their disease and its treatment, including impairments such as pain, weakness, fatigue, nausea, neuropathy, and limitations in functional motor skills such as running and jumping.^{8,11,26,28–30} Environmental barriers related to the cancer experience can include overprotective parents, teachers, and coaches; isolation precautions; apprehension about what peers will think; hospitalizations; and multiple medical appointments.^{8,13,28,30,31} For adult survivors, the most influential factors restricting PA participation include lack of interest, motivation, time, and self-efficacy; programs that are not conducive to a busy life; older age; and female gender.^{10,14,30}

Taking personal preferences into account when designing exercise programs can influence participation in PA, promote long-term sustainability, and inform service delivery and research protocols. PA preferences have been studied in adult cancer populations,^{10,32,33} but such research in adolescents is lacking.^{8,30,33,34} The purpose of this study, therefore, was, first, to describe self- or parent-reported motor function and participation in, barriers to, and preferences for PA in adolescents during and after treatment for cancer and, second, to discuss the findings in relation to promotion of PA in the context of merging trajectories and transitions of cancer treatment and youth development.

Table 1 Participant Characteristics ($n = 80$)

Characteristic	OnRx ($n = 11$)	OffRx < 2 ($n = 16$)	OffRx > 2 ($n = 53$)
Age, y, mean (SD)	15.0 (1.5)	15.2 (2.0)	14.9 (2.1)*
Sex, M:F, no.	5:6	8:8	33:20*
Diagnosis, no. (%)			
Leukemia	5 (45)	8 (50)	34 (64)
Lymphoma	2 (18)	5 (31)	9 (17)
Other	4 (36)	3 (19)	10 (19)
Time off Rx, y, mean (SD) [range]	N/A	1.1 (0.6) [0.3–1.9]	7.9 (3.3) [2.5–14.0]

*Not significant.

OnRx = receiving treatment; OffRx < 2 = completed treatment within the previous 2 y; OffRx > 2 = off treatment for >2 y; Rx = treatment; N/A = not applicable.

METHODS

This study was a single-institution, cross-sectional survey study of adolescents, ages 12–19 years at the time of enrolment, who were receiving or had completed treatment (0.3–14 y after end of treatment) for cancer at a tertiary-care pediatric oncology centre and their parents. Individuals with central nervous system tumours and those receiving palliative care were not included in this particular study.

Data were collected through self-administered paper-and-pencil surveys distributed in out-patient clinic settings, using the adolescent self-report and parent-report versions of the Transfer and Basic Mobility (TBM) and Sports/Physical Functioning (SPF) scales of the Pediatric Outcomes Data Collection Instrument (PODCI) as primary measures.³⁵ The PODCI is a reliable and validated musculoskeletal functional health questionnaire that addresses multiple ICF dimensions, including routine motor activities (TBM; 11 items), participation in recreational and competitive sports activities (SPF; 12 items), and selected impairment- and context-related barriers to participation in PA (pain, poor general health, doctors' or parents' instructions not to exercise, dislike of the activity, fear of what others think). Fatigue was added for this study because it is associated with cancer.³⁰ The survey also included additional questions about PA preferences and practices.

Data were summarized using descriptive statistics and analyzed to determine between-groups differences. Statistical calculations were performed using *t*-tests, analysis of variance (ANOVA), and χ^2 with α set at 0.05. Standardized scores are based on normative data.

The study was approved by the Research Ethics Board of McMaster University/Hamilton Health Sciences, which considered submission of the survey to constitute informed consent.

RESULTS

A total of 82 eligible, consecutively attending adolescent participants were approached, and 80 completed questionnaires. Table 1 summarizes the participants' characteristics. Respondents were categorized into three groups:

Figure 1 PODCI standard scores: means with standard error bars.

Note: For each subscale, the normative score has a mean of 50 (SD 10).

*Different from OffRx > 2 at $p < 0.05$.

†Different from OffRx > 2 at $p < 0.01$.

OffRx > 2 = off treatment for >2 y; PODCI = Pediatric Outcomes Data Collection Instrument; TBM = Transfer and Basic Mobility scale; SPF = Sports/Physical Functioning scale.

11 adolescents receiving treatment (OnRx), 16 who had completed treatment within the previous 2 years (OffRx < 2), and 53 who had been off treatment for more than 2 years (OffRx > 2). Questionnaires were completed by 62 parents (10 OnRx, 10 OffRx < 2, and 42 OffRx > 2), plus 1 parent whose child (OffRx > 2) was not cognitively capable of completing the self-report questionnaire; a further 18 parents were not present or declined to participate.

PODCI subscale group means are shown in Figure 1. The OnRx group's TBM and SPF scores were significantly lower than those of both OffRx groups, both for self-reports (ANOVA; $F_{79} = 22.1$, $p < 0.001$, and $F_{62} = 39.8$, $p < 0.001$, respectively) and for parent reports ($F_{47} = 27.0$, $p < 0.001$, and $F = 15.6$, $p < 0.001$). Self-reports were not significantly different from parent reports for the 62 matched pairs, except for the OffRx > 2 SPF group, for which self-reports were scored higher than parent reports (49.6 vs. 46.8; paired *t*-tests, $t = 3.3$, $p = 0.002$). There were no significant age-related correlations. Male

Figure 2 Frequency of PODCI factors affecting physical activity.

*OnRx different from OffRx > 2 at $p < 0.05$.

†OnRx different from OffRx < 2 and OffRx > 2 at $p < 0.05$.

OnRx = receiving treatment; OffRx > 2 = off treatment for > 2 y;

OffRx < 2 = completed treatment with the previous 2 y;

PODCI = Pediatric Outcomes Data Collection Instrument.

Table 2 Percentage of Participants Participating in 30 and 60 Minutes of Moderate to Vigorous Physical Activity on Most Days of the Week According to Self- and Parent-Reports

	% "yes" responses			<i>p</i> -value
	OnRx	OffRx < 2	OffRx > 2	
30 m				
Self-report	55	94	80	*
Parent report	60	100	74	
60 m				
Self-report	0	56	63	*†
Parent report	0	75	61	*†

Note: OnRx = receiving treatment; OffRx < 2 = completed treatment with the previous 2 y; OffRx > 2 = off treatment for more than 2 y.

*OnRx different from Off Rx < 2.

†OffRx > 2 at $p < 0.05$.

respondents scored higher on the TBM (48.7 vs 35.2; independent-samples t -tests, $t_{35} = -2.3$, $p = 0.030$) and SPF (46.6 vs 36.2; $t = -2.2$, $p = 0.035$). The PODCI identified fatigue, pain, general health, doctors' instructions, parents' instructions, dislike of the activity, and fear of what others would think as barriers to participation in PA. There were significant group differences between the OnRx group and the two OffRx groups (Fisher's exact test, $p < 0.05$; see Figure 2).

Responses to the PA participation questions are summarized in Table 2. Respondents in the OnRx group reported less moderate to vigorous PA than those in the OffRx < 2 group (Fisher's exact test, $p < 0.05$). There were non-significant decreases between the OffRx < 2 and OffRx > 2 groups. More than half of the self- and parent reports indicated at least 30 minutes of PA on most days, but none reported 60 minutes. There were no age trends.

Table 3 Self-Reported Physical Activity Preferences

PA preference	% of respondents
Who do you like to be active with?*	
Friends	97
Siblings	52
Parents	41
Yourself	38
Teens on or off cancer Rx	7
How do you prefer to be active?	
Recreational or daily activities	55
Specific exercise programs	3
No preference	41
When do you prefer to exercise?	
Afternoon	28
Evening	28
Morning	3
No preference	41
Where do you like to be active?*	
Home	76
School	65
Fitness club	40
Hospital	3
PT clinic	0

*Participants were able to select more than one answer.

PA = physical activity; Rx = treatment; PT = physiotherapy.

No significant differences were found in PODCI TBM standard scores between participants who participated in at least 30 minutes of moderate-intensity PA per day and those who did not; however, these groups did differ significantly on PODCI SPF standard scores (45.3 vs 30.3; independent samples t -tests, $t_{17} = 2.16$, $p = 0.045$).

PA preference ratings are summarized in Table 3. Ratings were highest for exercising with friends and family; being active through recreational or daily activities; exercising in the afternoon or evening; and being active at home, at school, or at a club. Respondents were asked to indicate their favourite physical activities; they listed a total of 52 different activities. Female participants most frequently listed (in order) swimming, biking, dance, soccer, and volleyball; male participants most frequently listed hockey, basketball, biking, soccer, and swimming. These pursuits were listed by all three treatment-phase groups.

DISCUSSION

An appreciation of how cancer and its treatment affect all aspects of functioning and of the benefits of PA in ameliorating these issues has heightened interest in PA as a health promotion priority for people with cancer. In this study, adolescents in three phases of the cancer care continuum and their parents completed surveys that addressed various aspects of functioning and participation in PA. Those currently receiving treatment had poorer and more variable ratings of their self- and parent-reported motor function and sports participation as measured by PODCI scores. They reported less participation

in moderate to vigorous PA, and a higher percentage were affected by the barriers of fatigue, pain, general health, and precautions about activity. Although the data were cross-sectional, group differences in PODCI scores reflect a trajectory in physical functioning and participation through the cancer continuum. Parental responses were similar to paired self-reports for most questions, but parental PODCI SPF scores were significantly lower than self-report scores, which suggests either that adolescents were overestimating their functioning in these areas or that parents were not fully aware of their children's activity practices.

The survey item asking respondents to report the amount of moderate to vigorous PA was very basic compared with more intricate self-report measures, pedometry, or accelerometry and may have led to inflated PA participation responses based on comparisons with adolescent population data.²⁶ Nevertheless, responses reflected changes from the on- to off-treatment phases and suggested that many participants did not achieve recommended levels of PA.

Most adolescent respondents liked to exercise with their friends, and many enjoyed being active with family or alone. Studies have recognized relationships with friends and families as critical sources of support for participation in PA.^{13,20,22,28,33} Very few respondents wanted to exercise with teens who had similar cancer experiences, a preference also noted in studies of young adult cancer groups.^{10,33} The adolescent participants also indicated a preference for being active through recreational or daily activities as opposed to a specific exercise program; exercising in the afternoon or evening rather than the morning; and being active at home, at school, or at a club instead of a hospital or clinic—inclinations common to typical adolescents.

Adolescent respondents reported enjoying activities such as swimming, biking, hockey, and basketball, activities that provide typical teen experiences and opportunities for socialization. These activities were similar to those reported by adolescents who have and have not had cancer in comparable environments²⁸ and may reflect geography or resources. In contrast, adults with cancer have reported preferring home-based walking programs because of their low cost and skill level, minimal equipment or travel needs, and flexibility in intensity, duration, and socialization.^{10,28,33}

Various theoretical frameworks have been used to understand PA participation in youths with cancer.^{20,29,31,33} A complementary conceptual model developed by Gorter and colleagues³⁶ provides a structure for exploring how relationships, opportunities, and experiences arise from dynamic interactions between personal and environmental factors to influence outcomes during transitions over the life course. This model can be adapted to include the impact of cancer in childhood and adolescence (see Figure 3). This framework helps to augment the

Figure 3 Conceptual framework – merging cancer and developmental transitions and trajectories.

P&E = person and environment.

findings of the current study with complementary research to inform the promotion of healthy lifestyle programs and specific interventions to optimize participation in PA for youths throughout the cancer continuum.

Knowledge influences personal and environmental factors. Adolescents and their families need and want knowledge across all phases of cancer care, into adulthood, and particularly at times of transition.^{9,21,32,33,37} Education about vulnerability to current and future cancer-related impairments and limitations; awareness of the safety and multiple benefits of PA; and an understanding that follow-up visits, surveillance testing, and preservation of health are lifelong responsibilities can have an impact on modifiable personal factors such as attitude, autonomy, adherence, and motivation and build capacity for the informed decision-making and self-management skills adolescents need to develop.^{21,29,33,37} Completion of treatment is a pivotal time, characterized by a transition from a focus on cancer treatment to an emphasis on wellness while dealing with late effects.²³ Off-treatment education is important because youths may become complacent with less frequent appointments, developing the attitude that cancer is part of the past.^{23,24} Key topics may have to be revisited for adolescent survivors treated as young children, who may have limited knowledge of their prior treatment.²⁴ Education regarding the transfer from pediatric to adult services can contribute to smooth transition experiences.^{14,23,24}

Knowledge translation is also important for peers, teachers, and community mentors, who contribute to mindful, encouraging, and supportive environments through their relationships with youths. Conversely, a lack of education can create attitudinal barriers, low expectations, overprotection, and unnecessary restrictions, which can limit opportunities and experiences.^{8,28,36}

Broad population-based health promotion strategies can also contribute to environments conducive to general adolescent participation in PA.^{14,28}

Physiotherapists are well positioned to couple health promotion strategies with the implementation of individually targeted, tailored, or adapted interventions as a standard of care. Input should begin shortly after diagnosis and continue through all phases and transitions.^{38,39} PA recommendations can be grounded in guidelines developed for the general population and tailored individually on the basis of specific impairments and limitations, because there is currently no evidence to determine the optimal intensity or amount of exercise for adolescents receiving treatment for cancer.¹⁰ The pediatric Canadian Physical Activity and Sedentary Behaviour (PASB) Guidelines suggest engaging in moderate to vigorous PA for at least 60 minutes per day and limiting sedentary time. Vigorous-intensity and muscle-strengthening activities should be included at least 3 days per week, and the guidelines suggest that more PA provides greater health benefits.⁴⁰ The guidelines are similar to the recommendations of the Children's Oncology Group for survivors of childhood cancer to maintain a healthy body weight and reduce the risk of recurrence, chronic diseases, and health issues.^{10,41} Adult guidelines typically suggest accumulating 150 minutes of moderate to vigorous activity throughout a week.^{10,41}

A true life-span approach requires considering the cancer population from early childhood to older adulthood. Family-focused lifestyle activity programs are important and feasible for children diagnosed and treated in the preschool and elementary school years and can set the foundation for healthy behaviours in adolescence.^{42,43} Guidelines incorporating specific assessments and activity recommendations for the transition to older adulthood are also being considered, because this group will experience the impact of aging coupled with existing cancer-related health challenges.⁴⁴

Although the PASB guidelines address the common problems of loss of muscle strength and extensibility and cardiorespiratory fitness associated with treatment of cancer in childhood,^{28,42} PA counseling is often not sufficient.^{5,14} The diverse array of body function and structure impairments and activity limitations results in a heterogeneous population. Preventing and treating impairment-based barriers such as pain, fatigue, neurological or musculoskeletal sequelae, and over- or underweight; facilitating activity; and promoting participation through specific exercises, bracing, and mobility devices are integral parts of oncology rehabilitation.^{14–16,28,38} It is also important to identify and address modifiable environmental facilitators, such as safe facilities, and barriers, such as overprotection.^{8,14,30}

Whether providing health promotion or specific interventions, realistic goals should be coupled with reasonable interventions to achieve outcomes important to

adolescents. Both should be established collaboratively and customized to personal needs, strengths, and preferences within the context of families, peers, and educational and community environments. During active cancer treatment, adolescents may experience constant transitions in and out of their typical social, educational, and recreational lives, depending on protocol phases, chemotherapy routines, hospitalizations, varying states of wellness, and vulnerability to infection or injury.^{8,10} Short-term PA goals and interventions may need to be realigned, sometimes on a daily basis, to be sensitive to a constantly changing array of impairments and associated physical and psychosocial issues. Long-term goals and strategies during and after treatment should emphasize an ongoing healthy lifestyle across the life span.

Strategies should be specific to adolescent developmental and cancer trajectories. Capabilities and preferences must be factored into clinical recommendations that promote experiences and opportunities valued by youths.^{10,21,22,28} Capitalizing on the desire to maintain social relationships and engage in normal adolescent experiences and gaining the support of peers and families can be useful strategies.²² Menus of age-appropriate activities that involve fun, recreational, or daily activities and respect individual pre-cancer and current interests, preferences for timing, location, and service delivery options may optimize adherence, confidence, and self-management to achieve sustainable active lifestyle outcomes.^{10,14,28,34,42}

Although evidence that exercise is safe for people with cancer is growing,^{15,17} various risk assessments and recommendations are available to guide safe exercise practices.^{10,17} Although these are geared toward adults and do not reflect conclusive evidence, they can be used as guides, in combination with clinical judgment.¹⁰ Exercise recommendations for childhood survivors exposed to cardio-toxic therapies have also been developed.⁴⁵

Health professionals work collaboratively and holistically within a team to address a wide range of developmental and healthy lifestyle issues such as nutrition, skin protection, cancer screening, smoking, alcohol intake, sexual behaviour, and illicit drug use.^{34,41,46} Coupling exercise suggestions with psychosocial support and behavioural strategies has been advocated to enhance well-being, self-efficacy, coping, intention to exercise, and family support and to optimize the adoption and maintenance of PA interventions in both clinical and research situations.^{7,20,43}

LIMITATIONS

Limitations of this study include the following. First, the study was cross-sectional in design, and participants were therefore not tracked longitudinally through transitions. Second, group sizes were unequal, the OnRx and OffRx < 2 groups were small, and there were fewer parent-than self-report participants. Finally, the question eliciting

data on moderate to vigorous PA was very basic, and our survey did not address the issue of sedentary activity.

CONCLUSIONS

Participation in PA has a positive impact on many aspects of physiologic and psychosocial health and quality of life for adolescents during and after treatment of cancer. Adherence is a major, multifaceted challenge, and adolescent preferences must be respected. Variability in individual body function and body structure impairments, activity limitations, and participation restrictions associated with cancer, together with personal characteristics such as knowledge, preferences, and motivation, interact dynamically with social, physical, and attitudinal environments to affect PA experiences and opportunities as youths transition through their cancer and developmental trajectories. Physiotherapists can play an important role in health promotion and creating specific interventions for youths during and after treatment of cancer.

KEY MESSAGES

What is already known on this topic

The population of childhood cancer survivors who face multiple, chronic late effects is growing. Physical activity has physical and psychological benefits, but adherence to activity recommendations can be challenging. Personal and environmental factors influence participation in physical activity.

What this study adds

This study describes motor function, physical activity preferences, participation and barriers to participation, and transitions faced by adolescents across the cancer treatment continuum. This information, discussed in combination with related literature in the context of merging cancer and developmental transitions and trajectories, can inform clinical practice and future research.

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