



TRAINEE ARTICLE

# Long Term Psychosocial Outcomes of Childhood Cancer Survivors

Ashley M. Perry, MD<sup>1</sup>; Andrew J. Galligan, MD, MS, FAAP<sup>2,3</sup>

<sup>1</sup>*Pediatric Resident, University of South Florida Morsani College of Medicine, Department of Internal Medicine-Pediatrics*

<sup>2</sup>*University of South Florida Morsani College of Medicine, Department of Pediatrics*

<sup>3</sup>*Tampa General Hospital, Division of Pediatric Hematology/Oncology*

## INTRODUCTION

Survivors of childhood cancer are at risk for numerous long-term adverse effects on their health and quality of life. Some are followed in survivorship clinics, developed to screen for long-term cancer or treatment-related health outcomes. However, many survivors may not have the opportunity to do so due to limited availability of these clinics. As a result, primary care providers may be the only clinician the patient sees on a yearly basis. As primary care providers we can help improve outcomes for survivors by being aware of the specific risks, remaining vigilant in screening for them, and by providing early intervention where possible.

Social determinants of health are increasingly recognized as important factors for health outcomes across all patient populations, and are very important for childhood cancer survivors. We discuss some of these factors including education, economic stability, community and social context, and health care systems. We also explore other psychological issues which can impact health outcomes including mental health disorders, risky behaviors, and fatigue/sleep problems.

The Children's Oncology Group generated long-term follow-up guidelines for survivors of childhood, adolescent, and young adult cancers based on the consensus of a panel of experts.<sup>1</sup> Screening for psychosocial issues is recommended for all survivors, regardless of the type of cancer or treatment received. The guidelines are intended to be implemented two or more years following completion of therapy. The document is available at [survivorshipguidelines.org](http://survivorshipguidelines.org); this article is based on the October 2018 version. Health Links, available for each topic, provide information and handouts suitable for patients and families. We list the current recommendations.

## EDUCATIONAL PROBLEMS

Recommendation: yearly psychosocial assessment with attention to educational and/or vocational progress; refer as indicated to school liaison to facilitate acquisition of educational or vocational resources; refer as indicated for neuropsychological evaluation

One study used parental reports to compare educational difficulties in cancer survivors versus age matched controls. Survivors were significantly more likely to have repeated a grade (21% vs. 9%) or have other educational or school problems (46% vs 23%). They were also more likely to be participating in special education programs (20% vs 8%) or programs for learning disabilities (19% vs 7%).<sup>2</sup>

Studies show that survivors diagnosed during the adolescent young adult (AYA) period are less likely than sibling controls to have attained post-high school education.<sup>3</sup> Assessment of a subset of neuroblastoma survivors showed increased risk for psychological impairment. Psychological impairment was associated with increased use of special education services during childhood or adolescence and lower adult education attainment.<sup>4</sup> Referrals for early educational interventions and supportive services are essential to maximize their academic and social success.

## UNDER-EMPLOYMENT/UNEMPLOYMENT

Recommendation: yearly psychosocial assessment

Survivors are significantly less likely than siblings to be employed. Those with central nervous system (CNS) or bone cancer,  $\geq 30$  Gy cranial radiation, or age under 4 years at diagnosis are at a particularly increased risk.<sup>5</sup> Kirchoff et al. reported that survivors with impaired health have a nearly 8-fold higher rate of health-related unemployment than physically healthy survivors.<sup>6</sup> Survivors are also more likely to be unemployed but seeking work than siblings, indicating they could benefit from assistance in job-seeking.<sup>7</sup> Additionally, female survivors are less likely to work in professional or managerial positions if they have limitations in task efficiency, emotional regulation, and memory. Male survivors who have problems with somatization, memory, or task efficiency are more likely to be unemployed.<sup>6</sup> Addressing these underlying attention and cognitive issues could improve the patients' overall quality of life and career achievements.

## SOCIAL WITHDRAWAL AND DEPENDENT LIVING

Recommendation: yearly psychosocial assessment with attention to social withdrawal

Kunin-Batson et al. reported that survivors are more than twice as likely as siblings to live dependently. The risk was increased in those with CNS tumors or leukemia. Risk was also increased in patients using neuroleptic, anticonvulsant or psychostimulant medication and in those with attention and processing speed problems, poor physical functioning, depression, or of racial/ethnic minority.<sup>8</sup>

Survivors were 1.7 times as likely as siblings to report antisocial behaviors. These behaviors included having trouble getting along with or being disliked by other children.<sup>9</sup> In a study of survivors diagnosed during the AYA period, survivors were significantly less likely than siblings to be married. Survivors diagnosed prior to the AYA period were also less likely to be married and less likely to be living independently.<sup>3</sup>

## LIMITATIONS IN HEALTHCARE ACCESS

Recommendation: yearly psychosocial assessment with attention to healthcare and insurance access; potentially consider social work consultation

Brinkman et al. categorized survivors into three classes based on their health-related concerns and motivations.

- The “worried” class reported the highest levels of worries, health concerns and extrinsic motivation, but the lowest level of intrinsic motivation.
- The “self-controlling” group had the lowest concerns about current or future health problems, but were highly intrinsically motivated for self-care, and placed little value on medical check-ups.
- The “collaborative” group showed intermediate scores across all domains.

Overall, the worried class was most likely to complete follow-up health screening as recommended, and the self-controlling class was least likely.<sup>10</sup> Recognizing these subtypes may help identify survivors who are at high risk for not completing follow-up as recommended.

## MENTAL HEALTH DISORDERS

Recommendation: *yearly psychosocial assessment with attention to depression, anxiety, post-traumatic stress and suicidal ideation; potentially consider psychological consultation in patients with emotional difficulties related to cancer experience; potentially consider psychotropic medications; potentially consider evaluation of parent for post-traumatic stress*

Overall, survivors were 1.5 times more likely than siblings to report depression or anxiety symptoms, including feeling worried/fearful/anxious or unhappy/sad/depressed.<sup>9</sup> AYA survivors reported greater emotional distress, anxiety, depression, and somatization than siblings. They also self-reported high rates of problems with task efficiency, emotional regulation, and memory.<sup>3</sup>

Brinkman et al. reported that survivors tend to fall into four categories of mental health symptoms:

1. No symptoms,
2. Externalizing – headstrong behaviors and attention deficit,
3. Internalizing – anxiety, depression, peer conflict, social withdrawal and attention deficit;
4. Global – increased symptoms across all domains.

Among survivors who received cranial radiation therapy, approximately 1/3 experienced internalizing and none experienced externalizing symptoms. For survivors who did not receive cranial radiation therapy, approximately 1/6 experienced externalizing symptoms with a small percentage experiencing internalizing or global symptoms.<sup>11</sup>

Tonorezos et al. used a baseline exercise question and long-term symptom questionnaires, and demonstrated an association between vigorous exercise and less psychological burden and cognitive impairment. Survivors who completed 9 metabolic equivalent (MET) hours per week (approximately 20 minutes of vigorous exercise 3 times per week) had a lower prevalence of depression and somatization. Those who completed 15-21 MET-hours per week self-reported better task completion, organization, and working memory.<sup>12</sup>

## RISKY BEHAVIORS

Recommendation: *yearly psychosocial assessment*

Compared to siblings, survivors of childhood cancer reported similar rates of tobacco, alcohol and illicit drug use, and similar rates of risky sexual behaviors, such as not using protection or having multiple partners.<sup>13</sup> However, because survivors are at increased risk for adverse physical and mental health outcomes, as well as second cancers, they should be educated about risky behaviors.

## FATIGUE/SLEEP PROBLEMS

Recommendation: *yearly psychosocial assessment; potentially consider screening for physical sources of fatigue, such as anemia, sleep disturbances, nutritional deficiencies, cardiomyopathy, pulmonary fibrosis, hypothyroidism, or other endocrinopathy; potentially consider referral to specialties such as endocrinology, sleep medicine center, or nutrition as indicated; potentially consider referral to psychology for behavioral intervention for emotional difficulties contributing to sleep and fatigue*

Daniel et al. investigated a randomly selected subset of survivors and siblings who completed a sleep survey. Survivors were more likely than siblings to report poor sleep efficiency (<85% of time in bed spent asleep), daytime sleepiness, snoring, and use of supplements and medications to aid in sleeping. Cranial or neck radiation was associated with delayed sleep onset (>30 minutes to fall asleep 3 time per week).<sup>14</sup>

## CONCLUSION

As children transition from a cancer patient to a cancer survivor they continue to face adverse effects, both physical and mental, as a result of their disease and treatment. Many patients and families may wish to put these difficult times behind them at this time, but as healthcare providers we must remain vigilant for the presence of adverse effects. Ultimately many of these patients will lead relatively normal lives compared to healthy peers and many report high levels of life satisfaction. However, as reflected by the guidelines and research studies, survivors are at increased risk for specific adverse outcomes. As their primary care providers, we must be aware of the relevant risks they face, and take the opportunity for early identification and intervention. These initiatives may be crucial to ensure optimal outcomes for survivors of childhood cancer.

## REFERENCES

1. Children's Oncology Group. Long-Term Follow-Up Guidelines for Survivors of Childhood, Adolescent, and Young Adult Cancers, Version 5.0 Monrovia, CA: Children's Oncology Group; October 2018; Available on-line: [www-survivorshipguidelines.org](http://www-survivorshipguidelines.org).
2. Barrera M, Shaw AK, Speechley KN et al. Educational and social late effects of childhood cancer and related clinical, personal, and familial characteristics. 2005 Oct; 104(8):1751-60. PMID: 16130127.
3. Prasad PK, Hardy KK, Zhang N, et al. Psychosocial and neurocognitive outcomes in adult survivors of adolescent and early young adult cancer: a report from the childhood cancer survivor study. *J Clin Oncol*. 2015 Aug 10; 33(23): 2545-52. PMID: 26150441.
4. Zheng DJ, Krull K, Chen Y, et al. Long-term psychological and educational outcomes in survivors of neuroblastoma: a report from the childhood cancer survivor study. *Cancer*. 2018 Aug 1; 124(15): 3220-30. PMID: 29888538.
5. Pang JWY, Friedman DL, White JA, et al. Employment status among adult survivors in the childhood cancer survivor study. *Pediatr Blood Cancer* 2008 Jan;50(1):104-10. PMID 17554791.
6. Kirchoff AC, Krull KR, Ness KK, et al. Physical, mental and neurocognitive status and employment outcomes in the childhood cancer survivor study cohort. *Cancer Epidemiol Biomarkers Prev*. 2011 Sep;20(9):1838-49. PMID 21844244.
7. Kirchoff AC, Leisenring W, Krull KR et al. Unemployment among adult survivors of childhood cancer: a report from the childhood survivor study. *Med Care*. 2010 Nov; 48(11):1015-25. PMID 20940653.
8. Kunin-Batson A, Kadan-Lottick N, Zhu L et al. Predictors of independent living status in adult survivors of childhood cancer: a report from the childhood cancer survivor study. *Pediatr Blood Cancer*. 2011 Dec 15;57(7):1197-1203. PMID: 21294244.
9. Schultz KA, Ness KK, Whitton J, et al. Behavioral and social outcomes in adolescent survivors of childhood cancer: a report from the childhood cancer survivor study. *J Clin Oncol*. 2007 Aug 20; 25(24):3639-56. PMID: 17704415.
10. Cox CL, Zhu L, Hudson MM, et al. Survivor typologies predict medical surveillance participation: the childhood cancer survivor study. 2013 Jul; 22(7):1534-42. PMID: 22968964.
11. Brinkman TM, Li C, Vannatta K, et al. Behavioral, social, and emotional symptoms comorbidities and profiles in adolescent survivors of childhood cancer: a report from the childhood cancer survivor study. *J Clin Oncol*. 2016 Oct 1; 34(28):3417-25. PMID 27432919.
12. Tonorezos ES, Ford JS, Wang L, et al. Impact of exercise on psychological burden in adult survivors of childhood cancer: a report from the childhood cancer survivor study. *Cancer*. 2019 Sep 1;125(17):3059-3067. PMID: 31067357.
13. Klosky JL, Howell CR, Li Z, et al. Risky health behavior among adolescents in the childhood cancer survivor study cohort. *J Pediatr Psychol*. 2012 Jul;37(6):634-46. PMID: 22427699.
14. Daniel LC, Wang M, Mulrooney DA, et al. Sleep, emotional distress, and physical health in survivors of childhood cancer: a report from the childhood cancer survivor study. *Psycho-oncology*. 2019 Apr; 28(4):903-12. PMID: 30817058.