

Financial hardship in adult survivors of childhood cancer: A report from the Childhood Cancer Survivor Study (CCSS)

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Background: The impact of childhood and adolescent cancer on the long-term financial outcomes of survivors is poorly understood. We compared financial hardship between survivors and siblings enrolled in the CCSS and identified survivors at elevated risk.

Methods: Survivors treated for cancer at age <21 years in 1970-1999 and siblings responded to a survey (23 binary-response questions) at age ≥ 26 years administered in 2017-2019. Principal component analysis with promax rotation extracted 3 factors with eigenvalues >1 and KR-20 reliability coefficients >0.7, retaining items with factor loadings >0.4. These factors were behavioral hardship (8 items, e.g., forgone needed medical care), material hardship/financial sacrifices (8 items, e.g., problems paying medical bills) and psychological hardship (3 items, e.g., worry about having enough money to pay rent/mortgage). Factor scores were calculated by adding the item responses and dividing by their standard deviation. Multiple linear regression examined the association of sociodemographic and cancer treatment variables with factor scores.

Results: Among 3349 survivors (49% male; median age [range] 40.2 [26.0-67.4] years) and 976 siblings (42% male, median age 46.5 [26.1-69.2] years), survivors were more likely to report being sent to debt collection (29.5 vs 21.4%), problems paying medical bills (20.0 vs 11.9%), foregoing needed medical care (13.3 vs 7.7%) and worry/stress about paying their mortgage (32.8 vs 23.2%) or having enough money to buy nutritious meals (25.0 vs 16.2%), all $P < 0.001$. Survivors reported greater hardship than siblings on all 3 factors: behavioral hardship (standardized mean score 0.51 vs 0.36), material hardship/financial sacrifices (0.63 vs 0.44), psychological hardship (0.69 vs 0.44), all $P < 0.001$. Behavioral hardship was increased by female gender (regression coefficient [β] 0.17, 95% CI 0.10-0.25), <high school (β 0.45, CI 0.12-0.79) or <college (β 0.18, CI 0.09-0.26) education, no (β 1.14, CI 0.93-1.35) or public (β 0.23, CI 0.10-0.35) health insurance, being divorced/separated (β 0.28, CI 0.10-0.46) and $\geq 250\text{mg/m}^2$ anthracycline chemotherapy (β 0.09, CI 0.00-0.19). The same variables were significantly associated with the other two hardship factors, but total body irradiation and cranial radiation also contributed to the risk of material hardship/financial sacrifices, and $\geq 8\text{g/m}^2$ cyclophosphamide equivalent dose and cranial radiation contributed to psychological hardship.

Conclusions: Survivors of childhood and adolescent cancer are at elevated risk for financial hardship as compared to sibling controls. Those at highest risk can be defined using a combination of sociodemographic and treatment variables. This information can be used to inform targeted intervention strategies to reduce the risk of poor financial outcomes in this vulnerable population.