

Educational attainment in long-term survivors of childhood cancer: A report from the Childhood Cancer Survivor Study (CCSS).

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Background:

Diagnosis and treatment of childhood cancer place survivors at risk for lower educational attainment, the increased burden of chronic conditions on attainment has not been examined.

Methods:

Participants included 16724 survivors (48% female; mean diagnosis age 9.1 years, current age 36.2 years, time since diagnosis 26.6 years) and 4098 siblings (mean current age 39.3 years) Educational attainment was categorized as college graduation (yes/no) among survivors \geq age 25 years. Chronic conditions occurring before age 25 years of age were graded using Common Terminology for Adverse Events 4.3. Modified Poisson regression models estimated relative risks (RR) and 95% confidence intervals (CI) of treatment exposures and chronic conditions on education attainment, adjusting for age at diagnosis and sex.

Results:

College graduation was reported by 8391 (51%) survivors and 2410 (59%) siblings. Survivors of all diagnoses were more likely to not graduate compared to siblings (all p 's $<$ 0.05), with survivors of CNS tumor (RR1.36, CI 1.25-1.49), leukemia (RR 1.17, CI 1.07-1.28), and Hodgkin lymphoma (RR 1.17, CI 1.07-1.29) being at higher risk than survivors of neuroblastoma. Compared to survivors with no history of cranial radiation therapy (CRT), higher risk of not graduating college was seen in those who received 20-30Gy (RR 1.16, CI 1.09-1.25), 30-50Gy (RR 1.37, CI 1.26-1.49) and \geq 50Gy (RR 1.35, CI 1.28-1.42). Among survivors not exposed to CRT, dexamethasone had a protective effect on college education (RR 0.88, CI 0.80-0.97) compared to no corticosteroid exposure. Male sex and older age (\geq 5 years) at diagnosis were associated with being more likely to not graduate college. survivors reporting any serious/life threatening chronic condition prior to age 25 years (grades 3-4) were more likely to not graduate college (RR 1.14, 95% CI 1.10-1.18) compared to no or mild/moderate conditions (grades $<$ 3).

Conclusions:

Survivors reporting chronic conditions are less likely to complete a college education by age 25 years and may need additional early educational or vocational resources.