School Attendance in Childhood Cancer Survivors and Their Siblings

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Objective To investigate school absenteeism among childhood cancer survivors and their siblings and examine factors related to absenteeism in survivors.

Study design A cross-sectional study was conducted among consecutive cancer survivors attending a large pediatric cancer survivor clinic. Absenteeism rates were obtained for survivors and their closest in age sibling from school report cards. Absenteeism was compared with a population control group of 167 752 students using 1-sample *t* tests. The Child Vulnerability Scale, Pediatric Quality of Life Inventory, and Behavior Assessment System for Children were administered to survivors. Univariate and multiple regression analyses assessed variables associated with days absent.

Results One hundred thirty-one survivors (median age at assessment: 13.4 years, range 8.0-19.2; median age at diagnosis: 9.4 years, range 4.3-17.3) and 77 siblings (median age at assessment: 13 years, age range 7-18) participated. Survivors and siblings missed significantly more school days than the population control group (mean ± SD: 9.6 ± 9.2 and 9.9 ± 9.8 vs 5.0 ± 5.6 days, respectively, $P < .0001$). Among matched survivor-sibling pairs (N = 77), there was no difference in absenteeism (9.6 ± 9.2 vs 9.9 ± 9.8 days, $P = .85$). Absenteeism in survivors was significantly associated with a low Pediatric Quality of Life Inventory Physical Health Summary Score ($P = .01$). Parents' perception of their child's vulnerability and emotional and social functioning were not associated with absenteeism.

Conclusions Childhood cancer survivors and siblings miss more school than the general population. The only predictor of absenteeism in survivors is poor physical quality of health. More research should be devoted to school attendance and other outcomes in siblings of childhood cancer survivors. *(J Pediatr 2013;162:160-5)*.

There are >330 000 survivors of childhood cancer alive in the US.[1] Because these survivors are at significant risk for physical, neurocognitive, or psychosocial morbidities,[2,3] preventing or modifying the long-term impact of cancer treatment is a priority.

Children undergoing cancer therapy miss more school than they did in the year before their diagnosis[4] and have absenteeism rates that are more than double those of children with other chronic illnesses (17% vs 8% in 1 study).[5] This has been attributed to frequent hospitalizations for treatment, numerous clinic appointments, and possibly overprotection of these children by physicians and parents.[6] After cancer is cured, it is not clear whether school attendance improves. Regular school attendance is important for child development and academic achievement.[7] School absenteeism has been associated with poor academic achievement, an increased risk of high school dropout, lack of graduation, and future maladaptive behavior and unemployment.[7] Survivors of childhood cancer, particularly those treated with therapies targeted at the central nervous system, are at risk for long-term academic and neurocognitive difficulties and unemployment.[8] Absenteeism in vulnerable cancer survivors might exacerbate treatment-related learning challenges.

During the year following diagnosis, siblings of new patients with childhood leukemia have been shown to have a decrement in academic performance.[4] Additionally, several studies have demonstrated that siblings are at risk for poor psychological outcomes as a result of their brother's or sister's cancer diagnosis and treatment.[9-12] However, it is unknown whether siblings' academic performance recovers once their brother or sister has recovered his or her health after completing cancer therapy. The objectives of this study were 2-fold: (1) to assess the rates of school absenteeism among childhood cancer survivors and their siblings compared with population controls; and (2) to examine the factors influencing school absenteeism in childhood cancer survivors.

Methods

After obtaining permission from our institution's research ethics board, we performed a cross-sectional study of childhood cancer survivors followed in The Hospital for Sick Children's Oncology AfterCare clinic. The AfterCare

PedsQL	Pediatric Quality of Life Inventory
TDSB	Toronto District School Board

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clinic follows childhood cancer survivors who are >4 years past their diagnosis, >2 years from the end of their therapy, and in continuous remission. Most survivors are seen on an annual basis. Survivors attending the clinic were considered eligible if they were aged ≥8 years, attending school full-time in grades 1-12, and had a home telephone number with a 3-number prefix indicative of residing in the Greater Toronto area (allowing comparison with a population control group from the Toronto District School Board [TDSB]). Survivors were excluded if they (or their parents) were unable to complete the study questionnaires due to inability to communicate in English or cognitive/developmental deficits or if the children were home-schooled. All eligible survivors were invited to participate. One week before the clinic visit, eligible survivors were contacted by telephone to invite them to participate in the study. Interested survivors were asked to bring their report card from the academic year (2008-2009) preceding the clinic visit. The closest in age sibling (where available) of survivors who agreed to participate was invited to participate as a control. Siblings were considered eligible if they were attending school full-time in grades 1-12 and had no history of cancer. Consent/assent was obtained from the survivor at the time of the clinic visit. Because siblings were not required to attend the clinic, verbal assent to use their school attendance data was obtained by telephone.

Because comparison of school attendance between survivors and siblings might be confounded by their belonging to a common family unit, we obtained aggregate school absenteeism data for all children attending school full-time in grades 1-12 in the TDSB during the 2008-2009 academic year to act as the population control. The TDSB is the largest school board in Canada and the fourth largest in North America. It is a public school board that is made up of almost 600 schools, which are attended by >250 000 students. The aggregate school absenteeism data from the TDSB for the 2008-2009 academic year was provided as the sample size, median, mean, and SD for the entire cohort and then subdivided by age groups (ages 8-13.9 years and 14-18 years) and sex.

School Absenteeism

School absenteeism was determined from each survivor's and sibling's final school report card. If the survivor did not bring the report card to clinic, then he/she was provided with an envelope so that it could be mailed.

In addition to calculating the total number of school days missed, we also calculated the "net" number of days missed to account for absenteeism due to attending clinic appointments or hospital admissions. Each clinic visit was counted as 1 half-day of school missed. If children visited the emergency department or had a hospital admission, the total duration of their stay in hospital was subtracted from their days absent to calculate the "net" number of missed school days (total number of days absent from school as reported on the individual child's report card minus total number of clinic or other hospital visits).

Factors Related to School Absenteeism

Demographic, disease, and treatment data were obtained from the hospital chart and supplemented by a questionnaire completed by a parent or caregiver. Academic performance was assessed by asking parents to rate their child's school performance as above average, average, below average, or failing. Social and psychological factors that may influence absenteeism were assessed by several questionnaires. The Child Vulnerability Scale[13] was completed by the parent/guardian to measure parental perceptions of their child's vulnerability to illness and death. The questionnaire contains 8 statements that respondents rank using a 4-point Likert scale. A score ≥10 is reflective of children who are viewed as "highly vulnerable" by their caregivers. The Pediatric Quality of Life Inventory, Version 4.0 (PedsQL)[14] was completed by the survivors to assess physical, emotional, social, and school functioning. The test is scored based on a total score of 100, with a higher score indicating a higher health-related quality of life. Each PedsQL score can be divided into a Physical Health Summary Score and an Emotional Health Summary Score. The Behavior Assessment System for Children, Second Edition is a validated tool that was completed by the survivor to assess depression, anxiety, attention problems, attitude to school, attitude to teachers, interpersonal relationships, relationship with parents, self-esteem, and social stress. A computer-generated report is provided in scoring each questionnaire that, in addition to T scores for each item assessed, also provides 5 composite T scores: (1) school problems; (2) internalizing problems, assessing social stress, anxiety, depression, and sense of inadequacy; (3) inattention/hyperactivity; (4) emotional symptom index, an index of emotional distress; and (5) personal adjustment, assessing relations with parents, interpersonal relations, self-esteem, and self-reliance. For the first 4 composite scores, a T score >70 is clinically significant, and >60 is in the "at-risk" range. For personal adjustment, a T score <30 is clinically significant, and <40 is in the "at-risk" range. Because siblings did not attend clinic, we were unable to administer these questionnaires to them.

Statistical Analysis

We generated summary data (ie, means, SD) for school days missed by survivors, siblings, and the TDSB control group. One-sample t tests were used to compare absenteeism rates among matched survivor-sibling pairs and to the TDSB cohort. Univariate and multiple normal regression analyses were used to assess variables associated with total and net days absent in the survivor cohort. We assessed the impact of sex, current age, age at diagnosis, cancer diagnosis, language spoken at home, parental perception of school performance, Child Vulnerability Scale score, PedsQL scores, and Behavior Assessment System for Children, Second Edition composite scores. Variables were included in the multivariate model if they demonstrated a P value <.2 in the univariate analysis. In addition, we included age at time of study, age at diagnosis, and diagnosis type because they were considered a priori to be clinically relevant. Variables that did not meet