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The Family Impacts of Proton Radiation Therapy for Children With Brain Tumors

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Abstract

Children with brain tumors experience significant alterations to their health and well-being due to the tumors themselves and oncologic treatment. Caring for children with brain tumors can have significant impacts on families, especially during and shortly after treatment. In this study of the impacts on families caring for children undergoing proton radiation therapy for brain tumors, the authors found that families experienced a broad array of negative impacts. Families reported feeling like they were living on a roller coaster, feeling that others treated them differently, and having to give up things as a family. In the multivariable linear regression model, older age of the child and higher reported child health-related quality of life were associated with less family impact. The presence of concurrent chemotherapy was associated with increased family impact. This is the first study to specifically evaluate the families of children being treated with proton radiation therapy. The findings in this study are consistent with the findings in other studies of children treated with standard therapy that show that families experience a variety of stressors and negative impacts while their children are receiving treatment. Health care providers should be aware of the potential impacts on families of children with brain tumors and their treatment to provide robust services to meet the health, psychological, and social needs of such children and their families.

Keywords

family impact; brain tumors; proton radiation; quality of life

Introduction

Malignant tumors of the brain account for approximately 20% of all pediatric cancers, second only to leukemia in incidence (Fangusaro & Chi, 2009; National Cancer Institute, 2009). Every year, approximately 2500 children are diagnosed with brain tumors (Li, Thompson, Miller, Pollack, & Stewart, 2008; National Cancer Institute., 2009). Low-grade

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astrocytomas make up about half of all childhood brain tumors (Baldwin & Preston-Martin, 2004; Fangusaro & Chi, 2009; Levy, 2005), whereas medulloblastomas are the most common high-grade brain tumor and the second most common brain tumor in children (Dhall, 2009; Fangusaro & Chi, 2009; Rickert & Paulus, 2001). Treatment of pediatric brain tumors has dramatically improved over the past few decades with improvements in the survival rates as well. Survival rates for pediatric brain tumors are approaching 70% at 5 years (Jemal et al., 2008). Many pediatric brain tumors require aggressive intervention consisting of one or more of the following: surgery, chemotherapy, or radiotherapy. Because the various treatments can cause a variety of side effects that manifest years later, great emphasis has been placed in the past decade on decreasing the side effects associated with the treatment.

Surviving children can be left with substantial deficits and alterations to their quality of life (Mulhern & Butler, 2004; Mulhern, Merchant, Gajjar, Reddick, & Kun, 2004). Neurological sequelae result from the direct and indirect effects of the tumors themselves and the effects of their treatment (Ullrich, 2009). The treatments themselves can also lead to neurological deficits, and in particular, radiotherapy has been implicated in causing cognitive dysfunction, endocrine abnormalities, impaired hearing, behavior and adaptation difficulties, and secondary tumors (Fangusaro & Chi, 2009; Levy, 2005; Mulhern & Butler, 2004; Mulhern et al., 2004; Ullrich, 2009). Newer treatment options, including proton radiation therapy, attempt to mitigate the negative consequences by providing more targeted, tissue-sparing therapy. However, there are only a few centers offering this promising therapy in the United States; patients and their families usually need to travel to a proton center and stay for approximately 2 months in order to avail of it. How this treatment and the displacement from home affects families is an area for clinical research inquiry. To date, no studies have evaluated the family impacts for children with brain tumors treated with proton radiation therapy.

It is well documented that the diagnosis, treatment, and sequelae of pediatric brain tumor treatment can have profound effects on families (Hutchinson, Willard, Hardy, & Bonner, 2009). The experiences of parents of children with brain tumors are unique due to the complexities and uncertainties associated with the treatment, the constellation of long-term consequences, and the risk of relapse or secondary malignancy (Hutchinson et al., 2009). Much of the existing literature focuses on specific psychiatric and psychological consequences (Barakat et al., 1997; Fuemmeler, Mullins, & Marx, 2001; Hardy et al., 2008; Kazak, Boevig, Alderfer, Hwang, & Reilly, 2005; Patino-Fernandez et al., 2008; Vrijmoet-Wiersma et al., 2008). Caregivers of children with chronic needs frequently report impairments in family functioning, time constraints, poor health, chronic sorrow, depressive symptoms, and anxiety (Aitken et al., 2009; Brannan & Heflinger, 2006; Dodgson et al., 2000; Fleming et al., 1994; Knafl, Breitmayer, Gallo, & Zoeller, 1996; Reichman, Corman, & Noonan, 2008). Medical uncertainty, an inherent part of brain tumor treatment, is often cited as a major stressor for families (Dodgson et al., 2000; Garwick, Patterson, Meschke, Bennett, & Blum, 2002; Hutchinson et al., 2009; Stewart & Mishel, 2000).

In this article, we seek to examine the negative family impacts as measured by the Impact on Family Scale (IOFS) for parents of children with brain tumors who have sought out, and in many cases, traveled to a proton center to receive this special form of treatment. This work intends to complement existing research examining the quality of life for children treated with proton radiation therapy for brain tumors. Additionally, as this promising therapy gains traction and more pediatric patients requiring therapy will need to travel to receive it, this article will uniquely add to the literature on caregiver stress and strain. We hypothesize that families of children with tumors that require additional treatment beyond proton radiation

therapy and families of children with lower quality-of-life scores will experience more substantial negative family impacts.

Methods

Study Description

As part of a longitudinal quality-of-life study, we assessed the impact of the tumor and treatment on families. We approached all English- or Spanish-speaking pediatric patients and their parents between the ages of 2 and 18 years treated with proton radiation at Massachusetts General Hospital (MGH), during the first 2 weeks of the start of radiation, at the end of radiation, and annually thereafter. We collected data for patients treated from March 2004 to March 2010. A total of 285 children treated with protons were offered enrollment, of whom 242 (85%) agreed to participate. Children who had suffered relapse or died were excluded from this cohort. Of the 242 children in the sample, 142 had a brain tumor, and among those, 96 had complete data for the family impact measure and the key independent variables. We recruited parents as proxy respondents for their assessment of their children's quality of life; this assessment was completed at the end of the radiation treatment. When both parents were available, we asked the parent who spent the most time with the child to complete the survey. Study staff approached families in the radiation waiting room and offered to meet with them in a private space. After giving consent, parents filled out the parent proxy forms, and children filled out the self-report forms. The research assistant was available to read the questions to the children. Assessments were conducted in English and Spanish as appropriate. This study was approved by the University of California San Francisco Committee on Human Subjects and by the MGH's internal review board.

Impact on Families

The main outcome of interest is the impact on families. The IOFS was administered to families at the end of proton radiation therapy for all enrollees. The original IOFS was a 33-item questionnaire designed by Drs Stein and Risessman (1980) to measure the impacts of chronic childhood illnesses on families. Families self-report level of agreement from *strongly disagree* to *strongly agree* with each of the survey statements. These statements are scored 1 to 4 to determine the amount of impact parents experience in 4 domains: financial burden, family/social impacts, personal strain, and mastery (Stein & Riessman, 1980). Since the development of the original scale, additional validation studies support the use of 15 of the 33 questions to assess the overall negative personal, social, and familial impacts of childhood illness (Stein & Jessop, 2003; Williams, Piamjariyakul, Williams, Bruggeman, & Cabanela, 2006). Therefore, our outcome is the total score on the 15 items. The maximum obtainable score is 60, with a higher score indicating more negative impacts on the family.

Child Characteristics

Demographic characteristics, disease-specific and treatment-specific data, as well as quality-of-life data for the child subject were collected on all subjects in the study. Demographic characteristics and disease-specific data were collected on enrollment in the study. Treatment data were gathered from the radiation clinical information system. Quality of life was assessed using parent proxy for the PedsQL (Pediatric Quality of Life Inventory) Core module, Brain Tumor module, and Cancer module.

The PedsQL measures health-related quality of life in children and adolescents and consists of generic brief core scales suitable for use with both healthy populations and populations with acute and chronic health conditions. Physical (8 items), emotional (5 items), social (5 items), and school (3-5 items) functioning are measured. Parents respond based on a 5-point Likert-type scale from 0 (*never*) to 4 (*almost always*). The PedsQL has strong psychometric

properties and has been used on a wide variety of healthy and chronically ill populations (Palmer, Meeske, Katz, Burwinkle, & Varni, 2007; Varni, Burwinkle, Katz, Meeske, & Dickinson, 2002; Varni, Seid, & Kurtin, 2001). Subscales include physical and psychosocial functioning (emotional, social, and school functioning). The PedsQL Brain Tumor module (PedsQL-BT) is similar to the PedsQL, but it consists of the following 6 scales: (a) pain and hurt, (b) nausea, (c) procedural anxiety, (d) worry, (e) cognitive problems, and (f) movement and balance (Palmer et al., 2007). We also administered 3 scales from the PedsQL Cancer module that were not part of the PedsQL-BT. They are (a) treatment anxiety, (b) perceived physical appearance, and (c) communication. All quality-of-life scores are scaled from 0 to 100, with higher scores indicating better health-related quality of life.

Statistical Analysis

Descriptive statistics were calculated to characterize the study population, their disease parameters and treatment, and their quality of life. The mean family impact score was calculated, as was the percentage of families reporting agreement with the impact statements. The bivariate relationships between the parental proxy report of the child's quality of life, demographics and child disease characteristics, and the outcome of family impact were calculated. Factors with statistically significant bivariate relationships were included in the multivariate regression model of family impact. All analyses were conducted using SAS (version 9.1; SAS Institute Inc, Cary, NC).

Results

Disease and Treatment Characteristics

Table 1 describes the study population. More than three quarters of the children were white, and more than 50% were male. The age distribution ranged from 2 to 17 years. For the 96 children for whom full clinical data were available from the records, the disease and treatment characteristics are also reported in Table 1. Among the children enrolled in this study, the most frequently reported brain tumor type was medulloblastoma. Approximately half of the children had tumors located in the posterior fossa. All but 3 children had operative intervention, with 63.5% achieving gross total resection. Approximately two thirds of the children were treated with chemotherapy during the study, and 94.8% were treated with high-dose radiation. Only 13.4% required ventriculoperitoneal shunts or third ventriculostomies for hydrocephalus management.

Quality of Life

Parent proxy reports of quality-of-life scores ranged from 60.3 to 83.2, as shown in Table 2. The procedural subscore was notably lower than all other quality-of-life measures (60.3). The highest rated quality-of-life subscore was the Core Social score, 83.2. The average School score was 70, the lowest of the subscores within the Core module. Parent proxies reported high quality-of-life subscores for movement and balance (81.1), pain/hurt (82.8), treatment anxiety (82.4), cognitive problems (80.5), and perceived physical appearance (81.8).

Family Impact

The average IOFS score was 35.3 (SD = 7.8), indicating that families experienced negative social and familial impacts from their children's tumors and treatment, as shown in Table 3. A majority of parents reported fatigue, having to give things up, living on a roller coaster, feeling that they are treated differently, and wondering if they should treat their child specially. Although 85% of families traveled to the center for treatment, only 50% reported strain from traveling to the hospital. Less than one third of families endorsed little desire to

go out, difficulty finding reliable child care, thinking about not having more children, and having no one who understands their burden. Notably, although 76.7% of families reported living on a roller coaster, only 42.2% reported living from day to day, and 49.6% reported needing to change plans at the last minute.

Table 4 shows the unadjusted and adjusted relative risks of family impact by demographic, disease, treatment, and child quality-of-life variables. In the unadjusted analysis, higher average IOFS scores were associated with non-white race and treatment with chemotherapy. Lower average IOFS scores (less burden) were associated with older age of child, medulloblastoma, noncraniospinal radiation, and higher reported quality of life on both the Core and Tumor modules. For every additional point on the PedsQL Core module parent proxy, the average IOFS score was 0.14 points lower. Similarly, for every additional point on the PedsQL Tumor/Cancer module parent proxy, the average IOFS score was 0.21 points lower. The multivariate regression model included the independent variables that were significant in the bivariate analyses: age, race, tumor type, tumor location, the need for chemotherapy, radiation type, and PedsQL values. In this model, older age remained significantly related to the IOFS, such that for every additional year of age, the IOFS score was 1.79 points lower. This indicates that the parents of older children endorsed less family burden after controlling for other factors in the model. In addition, for every 1-point increase in the PedsQL Tumor/Cancer module, there was a 0.23-point decrease in the IOFS scale, indicating that higher quality of life was significantly associated with lower reports of family burden after controlling for other factors. Conversely, families of children treated with chemotherapy endorsed more family burden. Compared with families of children who did not require chemotherapy, families of children treated with chemotherapy had IOFS scores 4.83 points higher.

Discussion

This study is the first of its kind to detail the family impacts for families of children treated with proton radiation therapy for brain tumors. Parents identified various impacts—personal, familial, and social. Most notably, more than three quarters of parents reported feeling like they live on a roller coaster, although fewer families felt like they were living from day to day. There was also high agreement with feeling that people treat them specially and having to give things up because of their child's condition. On a positive note, a large majority of families felt that they could find reliable child care, still desired to go out, and did not worry about having more children. Similarly, only slightly more than one quarter of parents reported that no one understood their burden.

The level of impact endorsed by families in this study was overall similar to the level reported by families caring for adolescents with cancer (Sawyer, Antoniou, Toogood, & Rice, 1999). Sawyer et al. found that families of adolescents undergoing active treatment for cancer reported an average score of 36.6 on the combined personal strains and family/social subscales. They also reported an average score of 42 for families of children off therapy (Sawyer et al., 1999). Although direct comparisons to our study cannot be made because the populations of children in each study differed substantially, Sawyer et al.'s findings indicate that, in general, families of children with cancer experience negative family impacts.

Because of the negative family impacts experienced by children with cancer, providers should be aware of how families are experiencing the diagnosis, treatment, and follow-up of childhood brain tumors. Much of clinical practice is focused on the problems experienced by patients, but in the case of pediatric chronic disease, it is especially important to attend to the experiences of families (Witt et al., 2010). Addressing this aspect of family-centered care would likely enhance the care experiences of families because there may be areas for

intervention to help families adjust. For example, families who report living on a roller coaster might benefit from increased anticipatory guidance and a clear timeline for follow-up. Families that struggle with social limitations, such as seeing family and friends less, having difficulty with child care, and feeling that they cannot travel, might benefit from social worker support or counseling to determine if alternatives exist. Similarly, parents who feel that there is little time for other family members and that the family has to give up certain things may benefit from sibling support groups and designing family plans to incorporate the needs of the whole family. Parents endorsing items that are often associated with depression, such as fatigue and having little desire to go out, may benefit from further evaluation and a referral to a mental health specialist. Clinics might also consider helping families with other aspects of daily life to alleviate some of the stressors families often experience. Concrete resources such as travel vouchers, letters to employers, and even parking passes could help mitigate some of the strain of traveling for treatments and dealing with unexpected problems as they arise. Clinical programs and policies that encourage parental screening, coupled with appropriate referrals and resource assistance, should be incorporated into the care of children with brain tumors, with the intention of improving outcomes for families (Witt et al., 2010).

As one might expect, when the child's quality of life was deemed poorer, the negative impact on families was more substantial. In the regression analysis, after controlling for other factors, the child's quality of life was inversely associated with family impacts such that as quality of life was rated higher, the family impacts were scored as less of a problem. Therefore, mechanisms that might improve the quality of life of children undergoing tumor treatment, such as proton radiation, might attenuate the negative family impacts of childhood brain tumors. Because our study does not have a control population of children treated with standard photon radiation therapy, we are unable to elucidate the relationship between treatment type, quality of life, and impact on families. Therefore, we are unable to comment on the direct impact of proton therapy. Nonetheless, improving childhood outcomes through enhanced therapeutics and addressing the psychosocial issues that arise during and after treatment should be associated with improved family outcomes. We also found that families of children requiring concurrent chemotherapy experience more negative impacts. This is not surprising because these children likely have more severe disease. Therefore, providers should be aware of the potentially added burden on families when the tumor requires more advanced treatment.

The results of this study support findings from other studies that indicate that families of children with brain tumors and other cancers struggle with family functioning (Lähtenmäki, Sjöblom, Korhonen, & Salmi, 2004; Witt et al., 2010). Our study also adds to the existing literature that focuses on the psychological impacts of childhood cancers on parents. Posttraumatic stress has been identified by several researchers (Barakat et al., 1997; Fuemmeler et al., 2001; Kazak et al., 2005). For example, Fuemmeler and colleagues (2001) found that 42% of parents met the diagnostic criteria for posttraumatic stress disorder. Symptoms of posttraumatic stress were reported by nearly all families in a study by Kazak et al (2005). Although our study does not specifically capture the diagnostic criteria of posttraumatic stress, parents did report familial stresses. Hutchinson and colleagues (2009) found that much of the burden experienced by parents/caregivers was internalized in the form of uncertainty, guilt, and worry. Our study findings of living on a roller coaster and living from day to day indicate that some parents are concerned about uncertainty. Half of the parents in this study also worried about how to treat their children, and more than one fourth think of not having more children, indicating ongoing worry and concern. These findings, taken with the existing literature, indicate that there are likely several areas for successful intervention to help families adapt and adjust to the chronicity and uncertainty of childhood brain tumors.

Limitations

This project has several limitations. It is important to note that although the IOFS is well validated, it does not address all the potential impacts on families. This measure was not intended to capture issues such as posttraumatic stress or parental depression. Furthermore, we cannot determine whether the impacts result from the disease itself or its treatment; nor do we have a comparison group of children treated with standard radiotherapy. Therefore, we cannot attribute the impact on families to proton radiation therapy. Another important limitation is that this study is cross-sectional in design. Family impacts may change over time, especially as the treatment phase ends and families have to deal with the long-term sequelae of brain tumors and their treatment. Evaluating this change is a part of the longitudinal study from which the data for this project were derived. And last, although the clinical site of this study has numerous support systems in place for families, we are unable to decipher which families used these supports and therefore cannot determine the potential benefit of these supportive interventions.

Future Research

This project provides a snapshot of the family impacts of childhood brain tumors after diagnosis and initial treatment. Because there are significant sequelae of brain tumors and their treatment for children, the family impacts are likely to persist and change over time (Van Dongen-Melman, Van Zuuren, & Verhulst, 1998). Therefore, it is important to longitudinally follow children and their families to determine how family impacts change over time. Additional research could also include an evaluation of the relationship of neurocognitive deficits and physical limitations with family impacts, as one might hypothesize that families of children with more substantial impairments would experience more family impacts. Furthermore, studies that link family impact with parental stress, physical and mental health, and quality of life would benefit our understanding of how best to mitigate the negative experiences from pediatric brain tumors, their treatment, and their sequelae.

Conclusion

This study is the first of its kind to evaluate the family impacts of brain tumors and their treatment on a cohort of children treated with proton radiotherapy. We identified several negative consequences endorsed by families, including uncertainty, social restrictions, and concerns for personal and family well-being. These impacts are likely not unique to families of children treated with proton radiation and have been endorsed in other cohorts (Hsieh, Huang, Lin, Wu, & Lee, 2009; Sawyer et al., 1999). Therefore, this study is likely applicable to families of children with brain tumors treated with standard therapies. Our findings indicated that there are several possible areas of intervention at the level of the family to improve their experiences with the diagnosis, treatment, and follow-up of childhood brain tumors. As treatment advances continue, addressing optimal quality of life for children and minimizing the negative impacts on families are increasingly important.

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Bios

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Table 1

Demographic, Disease and Treatment Characteristics of Children With Brain Tumors Treated With Proton Radiation Therapy

Demographic Characteristics	n	Percentage
Total	106	100
Age at beginning of treatment (years)		
2-4	21	19.8
5-7	32	30.2
8-12	34	32.1
13-17	19	17.9
Gender		
Female	47	44.3
Male	59	55.7
Race		
White	83	78.3
Other	19	17.9
Not recorded	4	3.8
Disease and Treatment Characteristics	n	Percentage
Total	106	100
Tumor type		
Astrocytoma/glioma/ neurocytoma/ craniopharyngiomas	27	28.1
Ependymoma	20	20.8
Germ cell tumors	10	10.4
Medulloblastoma/PNET	39	40.6
Tumor location		
Posterior fossa	50	52.1
Other	46	47.9
Tumor management surgery type		
Gross total resection	61	63.5
Subtotal or near resection/ biopsy/no surgery	35	36.5
Shunt for hydrocephalus		
Yes	5	5.2
No	91	94.8
Chemotherapy		
Yes	62	64.6
No	34	35.4
Radiation dose		
Low (<45)	5	5.2
High (45+)	91	94.8

Demographic Characteristics	n	Percentage
Radiation type		
Craniospinal	41	42.7
Noncraniospinal	55	57.3

Table 2**PedsQL Scores: Parent Proxy Reported During Treatment**

	Parent proxy	
	n	Mean (SD)
PedsQL Core module		
PedsQL Core Total score	90	73.5 (16.6)
PedsQL Core Physical Health score	90	70.6 (21.3)
PedsQL Core Psychosocial Health score	89	75.8 (15.8)
PedsQL Core Emotional score	90	72.9 (19.3)
PedsQL Core Social score	89	83.2 (18.0)
PedsQL Core School score	59	70.0 (22.0)
PedsQL Tumor/Cancer module		
PedsQL Tumor Total score	90	78.3 (13.0)
Pain/hurt	90	82.8 (17.9)
Nausea	89	78.9 (21.7)
Procedure anxiety	90	60.3 (33.3)
Movement and balance	56	81.1 (22.3)
Treatment anxiety	89	82.4 (22.0)
Worry	89	79.0 (25.5)
Cognitive problems	55	80.5 (17.8)
Perceived physical appearance	88	81.8 (20.2)
Communication	89	78.1 (25.1)

NOTE: SD = standard deviation; PedsQL = Pediatric Quality of Life Inventory (possible score range = 0-100, with higher score reflecting better quality of life).

Table 3

Average Family Impact Score by Item

Family Impact Questionnaire^a	Percentage Agree or Strongly Agree	Mean (SD)
Fatigue is a problem because of illness	55.0	2.5 (0.8)
See family and friends less	43.0	2.2 (0.9)
Need to change plans at the last minute	49.6	2.4 (0.9)
Little desire to go out	28.5	2.0 (0.9)
No time for other family members	47.0	2.3 (0.8)
Live from day to day	42.2	2.3 (0.8)
Hard to find reliable person to care for child	19.4	1.9 (0.8)
Family gives up things	60.0	2.6 (0.8)
Nobody understands the burden	27.9	2.1 (0.8)
Can't travel out of the city	48.5	2.3 (1.0)
Live on a roller coaster	76.7	3.1 (0.8)
People treat us as special	70.4	2.8 (0.8)
Traveling to the hospital is a strain	50.0	2.5 (0.8)
Think about not having more children	26.5	1.9 (1.1)
Wonder whether to treat child specially	50.4	2.5 (0.8)
Total (max = 60)	N/A	35.3 (7.8)

^a Each item has a possible score of 1 to 4, with 4 indicating more family impact.

Table 4

Factors Associated With Increased Risk of Family Impact: Relative Risk and Adjusted Relative Risk

Factor	Relative Risk (Confidence Intervals)	Adjusted Relative Risk (Confidence Intervals) ^a
Age at beginning of treatment	-1.48 (-2.96, 0.00)	-1.79 (-3.44, -0.15)
Gender		
Male	Reference	—
Female	-1.75 (-4.77, 1.26)	N/A
Race		
White	Reference	Reference
Other racial groups	5.17 (1.31, 9.03)	3.68 (-0.42, 7.79)
Tumor type		
Medulloblastoma/PNET	-0.35 (-7.40, -1.30)	-5.08 (-11.82, 1.67)
Tumor location		
Posterior fossa	-3.66 (-6.67, -0.65)	2.16 (-2.64, -6.96)
Other	Reference	Reference
Tumor management surgery type		
Gross total resection	Reference	—
Near or Subtotal/biopsy/none	-1.07 (-4.29, 2.14)	N/A
Shunt for hydrocephalus		
Yes	1.18 (-5.93, 8.29)	N/A
No	Reference	—
Chemotherapy		
Yes	6.07 (3.07, 9.06)	4.83 (0.59, 9.08)
No	Reference	Reference
Radiation dose		
Low (<45)	Reference	N/A
High (45+)	2.14 (-4.83, 9.10)	
Radiation type		
Craniospinal	Reference	Reference
Noncraniospinal	-3.68 (-6.72, -0.63)	2.66 (-2.80, 7.84)
PedsQL Core module	-0.14 (-0.24, -0.04)	.03 (-0.10, 0.17)
PedsQL Tumor/Cancer module	-0.21 (-0.34, -0.09)	-.24 (-0.40, -0.08)

NOTE: PedsQL = Pediatric Quality of Life Inventory; N/A = not applicable. Entries in boldface indicate statistical significance in the adjusted model.

^a Adjusted model includes the following variable: age, race, tumor type, tumor location, treatment with chemotherapy, radiation type, and PedsQL Core and PedsQL Tumor/Cancer modules.