This research was conducted at a summer camp for siblings of children with cancer. The camp is designed to address emotional problems, provide peer interaction and validation, and bolster siblings’ self-esteem. Standardized measures assessing posttraumatic stress, anxiety, quality of life, and self-esteem were administered to 77 siblings (ages 6–17) prior to attending camp and again 3 months after camp. From pre- to post-camp, the siblings reported statistically significant decreases in symptoms of posttraumatic stress and anxiety, and statistically significant improvements in quality of life and self-esteem. These preliminary findings are encouraging and suggest the value of camp as a psychological intervention and provide a model for other pediatric cancer facilities designing intervention programs for siblings.

When a child is diagnosed with cancer, the entire family system is confronted with severe distress (Houtzager, Grootenhuis, & Last, 1999; Kazak et al., 1999). Several studies have documented increased psychological risk among healthy siblings.
of pediatric cancer patients (Sahler & Carpenter, 1989; Sahler et al., 1994). In a study of children with cancer, investigators found that siblings’ emotional needs were met at a significantly lower level than those of other family members (Spinetta & Deasy-Spinetta, 1981). In an examination of donor and nondonor siblings of pediatric bone marrow transplant patients, researchers found anxiety, social withdrawal, and moderate to severe levels of posttraumatic stress disorder in close to one third of the sibling sample (Packman et al., 1997). Some investigators have also noted that siblings of pediatric cancer patients experience low self-esteem (Bendor, 1990; Rollins, 1990; Spinetta & Deasy-Spinetta, 1981).

In addition, pediatric health-related quality of life (HRQOL), a relatively new assessment tool, has been a viable source of important information aiding clinicians in their understanding of the impact of childhood chronic illness on overall life experience (Landgraf & Abetz, 1998). HRQOL issues often relate to the everyday functioning of children including their physical functioning, bodily pain, emotional and social well-being, behavior, school performance, self-esteem, and family life (Landgraf & Abetz, 1998). Although some research has been conducted concerning the HRQOL of pediatric cancer patients (Barrera et al., 2003; Goodwin, Boggs, & Graham-Pole, 1994), few studies have examined the HRQOL of siblings of pediatric cancer patients. Nonetheless, the domains that compose the HRQOL construct (physical functioning, emotional, social, and school) have been examined in siblings. For example, studies have suggested that siblings of cancer patients present with somatic complaints (Walker, 1990; Zeltzer et al., 1996), school problems (Fife, Norton, & Groom, 1987; Packman et al., 1997), social problems (D. S. Cohen, Friedrich, Jaworski, Copeland, & Pendergrass, 1994; Sahler et al., 1994), and emotional reactions (Packman et al., 1997; Spinetta & Deasy-Spinetta, 1981). In the view of Bearison and Mulhern (1994), siblings of cancer patients could develop a range of emotional and somatic symptoms unless an intervention that focuses on the siblings’ adjustment to the family crisis is implemented.

A promising intervention for siblings of pediatric cancer patients is summer camp. An earlier study (see Carpenter, Sahler, & Davis, 1990; Sahler & Carpenter, 1989) evaluating a camping program for siblings found that the camp experience enhanced siblings’ medical knowledge. Our study expands previous research by empirically examining whether participation in a summer camp for siblings of pediatric cancer patients leads to improvement in psychosocial functioning. Specifically, the study question asked whether participation in Camp Okizu’s Special and Important Brothers and Sisters (SIBS) Camp was associated with improvement in posttraumatic stress, anxiety, quality of life, and self-esteem.

The SIBS Camp, run by the Okizu Foundation for the siblings of pediatric cancer patients, was instituted in 1985. It is designed to help with the psychosocial and behavioral issues faced by the siblings of children with cancer. As just noted, cancer in a child upsets the normal family patterns and activities in major ways, and
siblings are significantly impacted. Siblings are often asked to assume greater family responsibility but get less attention and reward from their parents (Chesler, Allswede, & Barbarin, 1992; Powell & Ogle, 1985). Some feel isolated, neglected, and unimportant (Packman et al., 1997; Spinetta & Deasy-Spinetta, 1981). They may be jealous and angry about the extra attention lavished on the cancer patient, but then they often feel guilty for having these negative feelings (Packman et al., 1997). These emotions and feelings are often internalized, translating into lowered self-esteem for these children. This is expressed in a variety of ways, including discipline problems, poor school performance, and sometimes health-risk behaviors (Houtzager et al., 1999; Packman et al., 1997).

Camp Okizu SIBS Camp is designed to provide these children with peer interaction to validate their feelings as normal in the context of serious illness in the family and to bolster their self-confidence and esteem. On the 2nd day of each session, the siblings meet for a facilitated discussion of their family situations and to share tips on coping. This establishes a bond of understanding that continues to grow throughout the week. In addition, the camp program is structured to provide consistent positive feedback from caring adult counselors. There are opportunities to acquire new skills or improve performance of traditional camping skills such as archery, swimming, boating, sports, and arts and crafts. Counselors are specifically trained in techniques for recognition and reinforcement of positive behaviors and for ensuring that all campers have the experience of succeeding at something during the week. Older campers also participate in traditional trust activities, team initiatives, and high ropes course elements to allow them to experience success in the context of supportive peer interaction and adult mentoring.

METHODS

Participants and Procedure

Pre-camp participants included 100 siblings ages 6 to 17 about to attend camp for one of the 2001 summer sessions. Of the original 100, 77 participants completed both pre-camp and post-camp measures. Because this was a convenience sample, there was no available comparison group and a randomized control design was not feasible. The 23 participants with missing post-camp data can be grouped into five categories: lost to follow-up (n = 3), could not be interviewed due to weather conditions or geographic logistical problems (n = 6), siblings did not attend camp (n = 3), scheduling difficulties or multiple cancellations by family (n = 10), and sibling or parent declined to participate (n = 1).

The average camper was 11.7 years old (range = 6–17 years) and in the sixth grade (range = 1–11). There were 42 girls (54.5%) and 35 boys (45.5%). Approximately 16% (n = 12) were first-time campers, whereas 84% (n = 65) had attended
camp before (range = 1–9 times). In 18 of the 77 families, the child with cancer had died by the end of the second data collection.

The sample was 75.3% White (n = 58), 14.3% Latino (n = 11), 3.9% African American (n = 3), 1.3% Asian (n = 1), and 5.2% other (n = 4). Socioeconomic indicators, family income, and maternal and paternal education are also detailed, indicating a middle-income majority.

Families with siblings were recruited from the Camp Okizu Registry according to inclusion criteria: currently enrolled in camp for one of the 2001 1-week sessions, between the ages of 6 to 17 years, English-speaking, and able to understand and respond to the study instruments. If more than one sibling per family was eligible to participate, we interviewed the sibling closest in age to the patient to minimize developmental differences.

Recruitment was conducted through procedures approved by the Administrative Panel on Human Subjects in Non-Medical Research (Stanford University). A member of the research team phoned and explained the purpose of the study to parents. Approximately 280 eligible registered campers were contacted. Of these, 180 declined to participate or were nonresponsive. There were no data available to allow us to differentiate the participants from nonparticipants. If parents agreed to participate, informed written consent was obtained along with informed written assent from children at the time of data collection. The research team administered the study instruments to families in their homes, starting 4 to 8 weeks before camp for the pre-camp phase and 12 to 16 weeks after camp. The instruments for siblings were administered orally to all participants. At each session, the study instruments took approximately 1 hr for the siblings to complete. The parent background questionnaire took parents approximately 10 min to complete.

The research team comprised graduate-level students specializing in pediatric psychology. Training was conducted by Wendy Packman and consisted of a detailed review of the study instruments, live rehearsal of procedures for administering the instruments, and development of a standardized protocol for administering the study instruments to siblings and parents.

Measures

**Parent questionnaire.** Parents reported sibling background information (ethnicity, age, grade in school, sex) as well as parental education, income level, and marital status.

**The UCLA PTSD Index for DSM–IV.** The Posttraumatic Stress Disorder (PTSD) Index is a 24-item (22 items for adolescents) self-report scale focusing on posttraumatic stress symptoms experienced during the past month (Rodriguez, Steinberg, & Pynoos, 1998). The scale is an updated version of the UCLA Reac-
tion Index (Pynoos et al., 1987) and has been used to assess symptoms after exposure to a broad range of traumatic events (Frederick, 1985; Packman et al., 1997; Stuber, Nader, Yasuda, Pynoos, & Cohen, 1991). The PTSD index uses a 5-point scale ranging from 0 (none) to 4 (most of the time) to rate the frequency of occurrence of symptoms. Seventeen of the items assess core Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM–IV) symptoms. An overall severity score can be calculated with higher scores indicating more severe symptoms. In addition, separate symptom cluster scores can be calculated for reexperiencing, avoidance and increased arousal symptoms. Studies have reported high internal consistency (Cronbach’s $\alpha = .92$) and moderate to strong convergent validity (.37–.63; Kutlac et al., 2000). A categorical diagnosis of none, partial, or full PTSD can also be calculated using this instrument.

**Revised Children’s Manifest Anxiety Scale.** The Revised Children’s Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985) is a 37-item self-report instrument that measures chronic, manifest anxiety in children ages 6 to 19. On the RCMAS, the child responds to each statement by circling a yes or no answer. The yes responses are counted to determine a total anxiety score. There are four subscales labeled (a) Physiological Anxiety, (b) Worry or Oversensitivity, (c) Social Concerns, and (d) Lie. For the total anxiety score, an internal consistency estimate of .83 was obtained with a sample of 329 children. A cross-validation sample of 167 children yielded a similar reliability estimate of .85 (Reynolds & Richmond, 1985). Convergent validity has been reported as high as .85 (Reynolds, 1980).

**Pediatric Quality of Life Inventory.** The Pediatric Quality of Life Inventory (PedsQL) measures quality of life in children ages 2 to 18 (Varni, Seid, & Kurtin, 1999). The PedsQL Generic Core Scales are multidimensional child self-report scales and measure the core dimensions of health delineated by the World Health Organization: (a) physical health, (b) emotional health, (c) social functioning, and (d) school functioning. Items are reverse scored and linearly transformed on a scale from 0 to 100 ($0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0$) so that higher scores indicate better HRQOL (Varni, Burwinkle, Katz, Meeske, & Dickinson, 2002). The PedsQL has high internal consistency with alphas for the full 23-item scale approaching .90 (Varni, Seid, Knight, Uzark, & Azer, 2001). Validity has been demonstrated using the known-groups method. The PedsQL distinguished between healthy children and children with cancer as a group (Varni et al., 2002).

**Rosenberg Self-Esteem Scale.** The Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965; Wylie, 1974) is a widely used standardized rating of self-esteem consisting of 10 items describing one’s sense of self-worth and confidence. The RSE has a Guttman scale coefficient of reproducibility of .92, indicating good in-
ternal consistency (Rosenberg, 1965). Two studies of 2-week test–retest reliability show correlations of .85 and .88, indicating excellent stability (Silber & Tippett, 1965). Convergent validity of the RSE with three other self-esteem measures was reported to be .67, .83, and .56 (Silber & Tippett, 1965).

As it is not possible to use the RSE for younger children because of its adult language, the wording of items in the RSE was rephrased and certain items were combined to develop the six-item Children’s Self-Image Scale (CSI; Rosenberg & Simmons, 1972). In a sample of school children, the RSE and the CSI had a gamma of 0.6119, indicating reasonably high association (Rosenberg & Simmons, 1972). In a sample of siblings of bone marrow transplant patients (Packman et al., 1997), five of the older participants were given both self-esteem measures in a single sitting. The association between the RSE and the CSI was near perfect, with a Pearson correlation of \( r = .91, p = .033 \). In our study, the RSE was used with older siblings (12 years of age and older) and the CSI was used with younger children.

**Human figure drawing.** The Koppitz (1968) scoring system was used to quantitatively score the siblings’ human figure drawing (HFD). The Koppitz system has been used to assess psychological stress in ill and bereaved children (Eng & Davies, 1991; Tharinger & Stark, 1990) and in siblings of pediatric bone marrow transplant patients (Packman, Beck, VanZutphen, Long, & Spengler, 2003). The system contains 30 scorable emotional indicators (EI). In the Koppitz system (1968), a drawing that is scored as having two or more EI is highly suggestive of emotional problems and unsatisfactory interpersonal relationships. Interrater reliability in past studies has ranged from .89 to .91 (Packman et al., 2003; Rae & Hyland, 2001). Validity has been demonstrated by comparing clinic patients with well-adjusted children. Seventy-two percent of clinic patients scored two or more EI, whereas only 5% of the normative sample scored two or more EI (Koppitz, 1968).

**Coddington Life Events Scale for Children and Adolescents.** The Coddington Life Events Scale for Children and Adolescents (CLES) quantifies the stress the child has had to cope with in the past year (Coddington, 1999). In creating the CLES, the author asked judges (pediatricians, teachers, and mental health workers) to rate by severity various events that impact children’s lives. The events were assigned weights derived from the severity estimates by the judges. Life Change Units (LCU) are calculated for the past 0 to 3-, 4- to 6-, 7- to 9-, and 10- to 12-month periods. In our study, we used the 10- to 12-month period and administered it only post-camp. Coddington reported content validity of .84 and asserted sufficient reliability but did not supply statistics.
RESULTS

Analysis of Potential Confounders

Analyzes of pre–post-camp participants versus pre-camp participants.
To determine whether there were differences between participants who completed the pre-and post-camp instruments \((n = 77)\) and those who completed only pre-camp instruments \((n = 23)\), we used a one-way analysis of variance (ANOVA) for continuous variables and a Crosstabulation function (SPSS) for noncontinuous variables. On demographic variables, there were no significant group differences for sibling age, grade, ethnicity, mother or father education, or income.

On child outcome measures, the results of independent group \(t\) tests suggested that the two groups did not differ significantly in their pretest level of symptoms. There were no statistically significant differences on the PTSD Index Severity Score, total anxiety score (RCMAS), quality of life total score (PedsQL), or a self-esteem scale (RSE or CSI). Based on these analyses, no systematic bias seemed to distinguish pre-and post-camp participants from those who completed only pre-camp measures.

Analyzes of bereaved versus nonbereaved siblings. To determine whether there were differences between participants whose siblings were alive versus participants whose siblings had died, we used a one-way ANOVA. There were no statistically significant differences on the PTSD Index, RCMAS, a self-esteem scale, or PedsQL scales.

Pre- and Postintervention Data: Findings of Siblings on Self-Report Measures

We first addressed the question, Is participation in Camp Okizu associated with significant improvements in posttraumatic stress, anxiety, quality of life, and self-esteem? We used a series of paired-sample \(t\) tests using pre- versus post-camp mean scores on the PTSD Index, the RCMAS, the PedsQL, and a self-esteem scale (RSE or CSI). On all measures, the mean scores changed in the expected directions. The magnitude of the effect sizes, as calculated using information in J. Cohen (1988), ranged from \(.32\) to \(.60\) with the majority in the moderate range. A pattern emerged in which the effect sizes of the emotionally laden subscales were the largest in magnitude. The details of these encouraging results are presented next.

The PTSD Index. The PTSD Index overall severity scores were summed and means were calculated. The mean pretest sum score was 15.80 \((SD = 9.02)\), and the mean posttest score was 11.69 \((SD = 8.37)\). The effect size was \(.43\).
Posttraumatic stress scores decreased significantly pre- to post-camp, \( t(73) = 5.13, p = .000 \). Of the 74 camp participants for whom we have complete PTSD data, 28 out of 74 (38%) reported posttraumatic stress reactions pre-camp and 13 of the same 74 (18%) reported posttraumatic stress reactions post-camp (full and partial PTSD diagnoses combined).

In addition, symptom cluster scores were analyzed. The mean score for the Reexperiencing cluster at pre-camp was 4.55 (SD = 3.71) and at post-camp was 2.70 (SD = 3.02). The mean score for the Avoidance cluster at pre-camp was 5.24 (SD = 3.97) and at post-camp was 3.81 (SD = 3.80). The mean score for the Increased Arousal cluster at pre-camp was 6.00 (SD = 3.27) and at post-camp was 5.18 (SD = 3.30). The \( t \)-test results indicate that all three clusters—Reexperiencing, Avoidance, and Increased Arousal—contained statistically significant differences pre- to post-camp. The most dramatic change scores were in the Reexperiencing and Avoidance symptom clusters whose effect sizes were .47 and .34, respectively.

The RCMAS. For the RCMAS total anxiety score, the mean pretest sum score was 48.38 (SD = 10.68), and the mean posttest score was 43.86 (SD = 9.97). The effect size was .43. Total anxiety scores decreased significantly pre- to post-camp, \( t(75) = 5.36, p = .000 \). Subscale scores were also analyzed. The mean score for physiological anxiety at pre-camp was 9.20 (SD = 2.81) and at post-camp was 8.67 (SD = 3.98). The mean score for worry at pre-camp was 9.28 (SD = 3.10) and at post-camp was 7.76 (SD = 3.02). The mean score for social concerns at pre-camp was 9.29 (SD = 2.76) and at post-camp was 8.22 (SD = 2.66). The \( t \)-test results indicate that two subscales—Worry and Social Concerns—contained statistically significant differences pre- to post-camp. The effect sizes for worry and social concerns were .50 and .39, respectively.

The PedsQL. For the PedsQL total score, the mean pretest sum score was 77.18 (SD = 11.98), and the mean posttest score was 80.98 (SD = 11.39). The effect size was .32. The PedsQL total score increased significantly pre- to post-camp, \( t(76) = –3.45, p = .001 \), indicating an improvement in quality of life.

In addition, the five domain scores were analyzed. The mean score for the physical health domain at pre-camp was 83.64 (SD = 11.33) and at post-camp was 86.04 (SD = 10.62), and the difference was not significant. The mean score for the emotional health domain at pre-camp was 71.49 (SD = 17.64) and at post-camp was 76.17 (SD = 16.93). The effect size was .27. The emotional health domain score increased significantly pre- to post-camp, \( t(76) = –2.92, p = .005 \). The mean score for the social functioning domain at pre-camp was 80.45 (SD = 18.09), and at post-camp was 84.29 (SD = 15.53). The effect size was .21. The social functioning domain score increased significantly pre- to post-camp, \( t(76) = –2.24, p = .028 \). The mean score for the school functioning domain at pre-camp was 73.12 (SD = 16.62) and at post-camp was 76.75 (SD = 15.60). The effect size was .22. The
school functioning domain score increased significantly pre- to post-camp, $t(76) = -2.14, p = .035$. The mean score for the psychosocial health domain (emotional health, social and school functioning) at pre-camp was 75.02 ($SD = 13.46$) and at post-camp was 79.31 ($SD = 12.66$). The effect size was .27. The psychosocial health domain score increased significantly pre- to post-camp, $t(76) = -3.57, p = .001$. The $t$-test results indicate that the three domains and their composite domain—emotional, social, school, and psychosocial—contained statistically significant differences from pre- to post-camp.

**Self-esteem scales (RSE or CSI).** For the self-esteem total score, the mean pretest sum score was 1.91 ($SD = 1.20$), and the mean posttest score was 1.34 ($SD = 1.42$). The effect size was .47. Self-esteem scores decreased significantly pre- to post-camp, $t(75) = 3.89, p = .000$, indicating improvement in self-esteem.

**HFD.** In our study, two art therapists scored the HFDs independently. Inter-rater reliability was high for the drawings’ overall EI score (pre-camp $r = .87$, post-camp $r = .85$). On these projective drawings, the mean pretest HFD EI score was 4.12 ($SD = 2.26$), and the mean posttest score was 2.78 ($SD = 1.69$). The effect size was .60. The EI scores decreased significantly pre- to post-camp, $t(72) = 4.85, p = .000$, indicating a significant reduction in emotional problems.

**CLES.** To examine life events stress as a possible confound, we looked at the amount of stress the siblings had experienced over the past year by summing the weighted LCU and correlating that score with each of the change scores for each siblings self-report measure. There were no significant correlations of LCU with the pre- and post-camp change scores for either PTSD, quality of life, or self-esteem. There was a significant, but not large, correlation (Pearson’s $r = -.25, p = .031$) with the LCU anxiety change score, reducing the anxiety improvement by only 6%.

**Previous Camp Experience**

**Analyses of first-time campers versus returning campers.** We compared first-time campers and returning campers to see if there were differences on the pre- and post-camp change scores. Using a one-way ANOVA, the results showed marginally significantly larger improvements for first-time campers on both the PTSD change score, $F(1, 72) = 3.32, p = .073$, and the PedsQL change score, $F(1, 75) = 3.85, p = .054$, indicating greater impact of first time attendance on PTSD symptoms and quality of life. There were no statistically significant differences on the RCMAS or self-esteem change scores indicating no difference in impact of first-time versus repeated attendance on anxiety and self-esteem. Overall,
first-time campers showed marginally greater improvement in their change scores pre- to post-camp.

**Analyses of returning campers.** We examined whether the differences from pre- to post-camp were related to the number of times the child had attended sibling camp, because 65 of the 77 campers had attended camp before (range = 1–9 times, \( M = 3.3 \)). We correlated the pre- to postchange scores with the number of times the 65 returning campers had attended camp, using Pearson correlations. We found that there was no gradient in the PTSD, RCMAS, PedsQL or self-esteem change scores for how many times the sibling had gone to camp. In summary, the improvements in PTSD, anxiety, quality of life, and self-esteem change scores were not dependent on the number of times the sibling had attended camp.

**DISCUSSION**

Prior to this study, there had been no empirical investigations into the effects of summer camp for siblings of pediatric cancer patients on the constructs of PTSD, anxiety, quality of life, and self-esteem. Statistically significant differences emerged on all sibling self-report measures. Specifically, the total PTSD severity scores and the total anxiety scores were significantly reduced. In addition, there was significant improvement in quality of life and self-esteem scores. Our findings based on sibling self-reports are consistent with research of positive psychological changes related to an 8-week manualized group intervention for siblings of cancer patients (Barrera, Chung, Greenberg, & Fleming, 2002) as well as research documenting less anxiety in siblings of pediatric oncology patients following participation in a 5-week psychosocial support group (Houtzager, Grootenhuis, & Last, 2001).

Equally important to the statistically significant findings are the clinically meaningful results of this study. The pre- to post-camp 3-month differences suggest that camp clearly benefits siblings. Previous research in self-esteem indicates normative ranges on the RSE (Rosenberg, 1965) as 0 or 1 (high self-esteem), 2 (medium), and 3 to 6 (low self-esteem). In our sample, the pre-camp mean was 1.91, whereas the post-camp mean was 1.34; thus, our change score suggests improvement in siblings’ self-esteem. In the area of anxiety, one other study (Chemtob, Nakashima, & Carlson, 2002) reported differences of comparable magnitude on the RCMAS as clinically significant reductions in anxiety.

It is also noteworthy that in our sample there was marked improvement in the siblings’ HRQOL following camp (PedsQL). When compared to both the healthy and oncology sample means in Varni et al. (2002), the pre-camp mean total
PedsQL scores of siblings (77.18) were approximately halfway between the healthy (83.00) and oncology (72.20) sample means. The post-camp mean total PedsQL scores of siblings (80.98) were closer to the healthy sample mean (83.00) than the oncology sample mean (72.20).

Similar to the PedsQL results, the scores on the HFDs reflect a marked decrease in psychological distress post-camp. Once again, it is important to point out that in the Koppitz scoring system, two or more EI indicate emotional problems and unsatisfactory interpersonal relationships (Koppitz, 1968). Although the siblings showed dramatic improvement (pretest $M = 4.12$, posttest $M = 2.78$), these overall HFD scores along with the quality of life scores suggest that siblings of cancer patients are an at-risk group in need of targeted mental health services in addition to the camp intervention.

To further illustrate the clinical meaningfulness of our findings, it is useful to compare the magnitudes of the effect sizes for the various sibling outcome measures. The reactions of siblings to the experience of childhood cancer can be grouped into physical, social, and emotional responses (Houtzager et al., 1999; Walker, 1990). Emotional reactions refer to internalized reactions of siblings to feelings of distress stemming from the illness experience (Houtzager et al., 1999). The responses of our sibling sample on the emotionally laden subscales (Reexperiencing and Avoidance, PTSD; Worry, RCMAS; Emotional Health, PedsQL; Self-Esteem; and Emotional Distress, HFD) accounted for the greatest change pre- to post-camp. Next in magnitude were the improvements in both social functioning (PedsQL) and social concerns (RCMAS). In our view, the siblings’ opportunity to communicate and bond with a true peer group as well as the positive feedback, reinforcement, and recognition from supportive counselors may have accounted for the dramatic improvement in emotional functioning and the marked improvement in social functioning.

With respect to posttraumatic stress, it is notable that 38% of siblings had posttraumatic stress reactions pre-camp as measured by the PTSD index. This is, indeed, a very high rate of PTSD. It is notable that previous studies have reported lower prevalence rates of PTSD in children, namely, 5.4% (Shannon, Lonigan, Finch, & Taylor, 1994) and 11.9% (March, Amya-Jackson, Terry, & Constanzo, 1997). However, in a recent study of 78 adolescent siblings of cancer survivors, 49% of the sample reported mild posttraumatic stress, and 32% indicated moderate to severe levels (Alderfer, Labay, & Kazak, 2003). Our results complement and extend the findings of previous research by providing an index of current need in a population of siblings of pediatric cancer patients. It is encouraging that the rate of PTSD symptoms in siblings dropped to 18% post-camp and suggests that participation in camp activities may be linked to improvements in PTSD. In fact, the same pattern was reflected in RCMAS total anxiety scores. Fourteen percent of siblings reported clinically significant anxiety scores (greater than 1 SD above $M$;
Reynolds & Richmond, 1985) pre-camp, whereas only 4% reported clinically significant anxiety scores post-camp.

However, even with the dramatic drop in PTSD post-camp, the findings that 18% of the siblings continued to meet criteria for PTSD again suggests a need for additional psychosocial interventions in the camp setting and for specialized mental health services for siblings of pediatric cancer patients. Although camp helped all of the siblings, there was a slightly higher benefit for first time campers in PTSD. This finding parallels other research (Briery & Rabian, 1999) that has found more of a change in attitude toward illnesses and levels of trait anxiety in first-time campers (children with chronic illness, not siblings). Of importance, the overall findings in our study suggest that all siblings (first-time campers and returning campers) had decreased posttraumatic stress, decreased anxiety, improved quality of life, and improved self-esteem when measured following camp. The analyses taken as a whole suggest that Camp Okizu needs to continue to focus on recruiting new campers; however, returning sibling campers do still continue to reap a benefit from the camp experience.

There are a number of limitations to our study. First, the lack of a comparison or control group limits the internal validity of the results. Thus, we cannot rule out the effects of history and maturation. Second, interpretation of the findings presented here must be made cautiously due to the absence of a follow-up assessment phase. An additional problem pertains to attrition in the number of participants pre- to post-camp.

Of importance, all of the post-camp data collection took place after the terrorist attacks of September 11, 2001 (9/11), and several siblings reported on the CLES that 9/11 may have affected them. It is possible that some of the siblings’ scores, especially on the PTSD Index, may have remained high, in part, because of the timing of 9/11 (Salloum, Avery, & McClain, 2001). In addition, the media continued coverage of 9/11 for a protracted period of time. Ongoing exposure to the events of 9/11 makes it difficult to isolate the key variables. However, because the overall PTSD scores decreased post-camp, 9/11 may not have had a great impact. The effects of camp as a psychological intervention may have been greater, however, without 9/11.

Major strengths of this study include novelty in the area of research on siblings camp experience, a relatively large sample size for camp research, the use of empirically supported measures to assess the constructs of interest, and the administration of measures to the participants in their home pre- and post-camp. Our findings provide very promising support for the effectiveness of Camp Okizu in reducing posttraumatic stress and anxiety, and promoting quality of life and self-esteem in siblings. Future research should be conducted in a randomized control trial. In addition, a longitudinal follow-up of siblings might show whether a long-term reduction in psychosocial functioning occurs.
IMPLICATIONS FOR PRACTICE

Siblings have been identified as the most emotionally neglected and unhappy of all family members during serious childhood illnesses (Chesler & Barbarin, 1987; Spinetta & Deasy-Spinetta, 1981). Indeed, scores on several of our outcome measures suggest that siblings of pediatric cancer patients are an at-risk group in need of targeted mental health services. Summer camp is a promising intervention for siblings. This study represents one of the first attempts to use empirically based measures to assess whether participation in summer camp for siblings of pediatric cancer patients leads to improvement in psychosocial functioning. Our preliminary findings support the effectiveness of camp in reducing posttraumatic stress and anxiety, and promoting quality of life and self-esteem in siblings. In addition, this study suggests that camp can be a normalizing experience for healthy siblings in families where normality has been disrupted by the experience of cancer. We hope that Camp Okizu can serve as a model for other pediatric oncology groups interested in developing intervention programs for siblings and we encourage interested clinicians to contact the Executive Director of the Okizu Foundation at http://www.okizu.org or (415) 382–9083.

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