HEALTH-RELATED QUALITY OF LIFE AND ANXIETY FOR PARENTS OF CHILDHOOD CANCER SURVIVORS DURING THE OFF THERAPY PERIOD

by

LAUREN F. QUAST

(Under the Direction of Ronald L. Blount)

ABSTRACT

Objective: This study examined psychosocial risk and aspects of problem-solving associated with health-related quality of life (HRQOL) and anxiety in parents of childhood cancer survivors. *Method:* Parents of childhood cancer survivors, 12-19 months from the conclusion of cancer-directed treatment, were administered measures of HRQOL, anxiety, psychosocial risk, and problem-solving. *Results:* Generally, parents reported HRQOL and anxiety within normal limits; however, a small subset of parents reported at risk levels of HRQOL and anxiety. Mothers reported greater anxiety than fathers. Other demographic and medical variables were not related to study measures. Regression analyses revealed that aspects of problem-solving accounted for additional variance in HRQOL and anxiety, over and above psychosocial risk. *Conclusions:* Psychosocial risk and aspects of problem-solving, particularly negative problem orientation, were significantly associated with parents' HRQOL and anxiety during the off-therapy period. Implementing interventions that target problem-solving would likely benefit parents and families of childhood cancer survivors.

INDEX WORDS: Pediatric cancer, health-related quality of life, parents, anxiety, problem-solving, off therapy

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CHAPTER 1

INTRODUCTION

Approximately 10,590 children under the age of 14 years were expected to be newly diagnosed with cancer in the United States in 2018 (American Cancer Society, 2018). Following their diagnosis, children must undergo often complicated, lengthy, and grueling treatment regimens including combinations of surgery, chemotherapy, radiation therapy, bone marrow transplantation, and new treatments, such as immunotherapy. Treatment typically involves numerous hospitalizations and/or regular visits to an outpatient clinic and can cause significant side effects including immunosuppression and infection, hair loss, anemia, thrombocytopenia, malnutrition, mood swings, nausea and vomiting, mucositis, and pain (Bryant, 2003; Long & Marsland, 2011). Cancer and its treatment may also impact a child's psychosocial functioning, potentially causing increased anxiety, depression, and distress (Patenaude & Kupst, 2005).

Due to increased participation in clinical trials and improved treatments, the five-year survival rate for children with cancer has increased to 83% (Cancer Facts & Figures, 2018). There are currently more than 420,000 childhood cancer survivors in the United States and this number continues to grow (Robison & Hudson, 2014). However, childhood cancer and its treatments leave survivors at high risk for physical, neurocognitive, and psychosocial late effects (Anderson & Kunin-Batson, 2009; Bitsko et al., 2016; Stein, Syrjala, & Andrykowski, 2008). Research shows that by the time childhood cancer survivors are 45 years old, more than 95% of survivors will have a chronic health condition and over 80% will have a severe or life-threatening health condition (Hudson et al., 2013; Robison & Hudson, 2014).

Late effects are defined as health problems or adverse effects that persist or develop after the conclusion of treatment and can be attributed to the disease or side effects of treatment. Late effects vary based on the child’s type of cancer, age, and treatment regimen, and encompass many areas of functioning, such as psychosocial effects (e.g., social withdrawal, educational problems, dependent living), mental health disorders (e.g., anxiety, depression), dental abnormalities (e.g., tooth/root agenesis, root thinning), neurocognitive deficits (e.g., processing speed and executive function difficulties), organ damage (e.g., kidney failure), secondary cancers, growth hormone deficiency, precocious puberty, and infertility (Children's Oncology Group, 2013). Physical and neurocognitive late effects can also impact survivors’ social functioning, occupational functioning and employment, finances, academic achievement, self-concept, and family functioning (Patenaude & Kupst, 2005). Thus, it is crucial that childhood cancer survivors receive ongoing follow-up care to monitor their health after the completion of cancer-directed treatment and throughout survivorship.

The completion of treatment marks a critical time for patients and their families characterized by a range of emotions, including both stress and relief (Duffey-Lind et al., 2006; Ortiz & Lima, 2007; Wakefield et al., 2010). For example, children and their families may experience fear related to cancer relapse, difficulty reintegrating into “normal life,” concerns related to physical appearance, lower self-confidence, absence of a treatment or hospital schedule, and perceived abandonment by their healthcare team (McGrath, Suppiah, & Patton, 2005; Ortiz & Lima, 2007; Wakefield et al., 2010). On the other hand, families also often feel relief and excitement related to the completion of treatment, as well as being able to return to a more typical lifestyle (e.g., attending school, spending time with friends; Wakefield et al., 2010). The off therapy period (i.e., the two-year period after the end of treatment before children enter the survivorship period) is significant because children are still recovering from treatment and are at greatest risk for cancer recurrence during this time (Children's Oncology Group, 2013). A systematic review by Wakefield and colleagues (2010) found that children in the off therapy period experience increased anxiety and depression, decreased social competence or self-esteem, emotional instability, reduced quality of life, and greater learning and behavioral difficulties compared to healthy peers.

However, while some children are reported to experience psychosocial difficulties during the off therapy period, the majority of pediatric cancer survivors do not go on to experience significant psychosocial difficulties during survivorship (i.e., years following the completion of cancer treatment; Long & Marsland, 2011; Patenaude & Kupst, 2005). Despite possible late effects and ongoing medical follow-up care, the literature suggests that survivors of childhood cancer generally score within normal ranges on measures of anxiety, depression, and self-esteem during survivorship when compared to same-age peers (Zebrack & Zeltzer, 2003). Still, another study found that a subset of young adult survivors of childhood cancer (i.e., 5-20%) experience moderate-to-severe posttraumatic stress symptoms (PTSS; Hobbie et al., 2000). This suggests that although cancer is a stressful experience and can have a lasting psychosocial impact for some patients, the majority of children are resilient and go on to live relatively normal lives in the years following the completion of their cancer treatment.

Impact on Parents and Families

Childhood cancer impacts each member of the family in unique ways throughout treatment and into survivorship. During the first few months following diagnosis, parents may fear upcoming invasive and painful medical procedures and uncertainty related to the course of treatment and their child’s prognosis. Parents must often restructure their schedules and responsibilities across multiple domains (e.g., at home, work, and in the community) to adapt to the unpredictable and uncontrollable nature of cancer treatment and related side effects. Many families report a range of logistical challenges including needing to integrate hospital stays into their daily lives, balancing the needs of the ill child with the needs of the rest of the family, occupational demands, and managing household tasks (Long & Marsland, 2011). Families are also faced with changes in employment and increased financial burden due to large medical bills and related out-of-pocket costs (e.g., traveling for treatment, hotel costs; Long & Marsland, 2011; Warner, Kirchhoff, Nam, & Fluchel, 2015). Additionally, some families report marital strain or living as a “split family” so that one parent can stay with the ill child while the other cares for siblings and manages work, finances, and household tasks (Long & Marsland, 2011).

A previous systematic review suggests that although parents’ psychiatric symptoms and psychological distress were generally comparable to normative samples, there is a subgroup of parents and caregivers who experience clinically significant levels of PTSS more than two years after the end of treatment (i.e., during survivorship; Ljungman et al., 2014). Parent distress is often most prominent following diagnosis and during early stages of treatment; however, some parents experience increased emotional distress that persists for years after diagnosis (Norberg & Boman, 2008; Norberg, Lindblad, & Boman, 2005). Previous studies report that approximately 21-54% of parents experience PTSS related to their child’s cancer journey (Bruce, 2006; Kazak et al., 2004; Ljungman et al., 2014; Ozono et al., 2007). Phipps and colleagues (2015) found that although parents show some increased levels of PTSS following their child’s cancer diagnosis, the rates of PTSS were not significantly different than parents of healthy children. However, parents of children more than five years from diagnosis reported fewer PTSS than the control group, suggesting that the cancer journey may promote resilience for many families (Phipps et al., 2015). Similarly, in another study, less than ten percent of parents of long-term survivors of childhood acute lymphoblastic leukemia (ALL) reported clinically significant levels of anxiety, depression, or post-traumatic stress (Malpert et al., 2015).

Parent distress affects how the rest of the family adapts to the disease and has been shown to impact child adjustment and psychological distress. Specifically, research has shown that greater parent psychological distress, including anxiety, depression, and PTSS, is associated with greater distress and lower quality of life in childhood cancer patients and long-term survivors (Maurice-Stam, Oort, Last, Brons, Caron, & Grootenhuis, 2008; Malpert et al., 2015; Okado et al., 2016; Racine et al., 2018). This is likely due to a combination of factors, such as increased overprotection, inconsistent parenting, difficulties providing the child with appropriate emotional and behavioral support, and teaching or reinforcing maladaptive coping strategies. While there may be a bi-directional relationship between parent and child functioning, a study by Garber and Cole (2010) found that parent distress predicted child symptoms rather than the other way around. Notably, in one study, the association between parent and child distress symptoms (e.g., depression, anxiety, PTSS) became stronger over time, as children progressed farther out from diagnosis (Okado et al., 2016). Thus, parent and child psychological functioning should continue to be researched and monitored as children transition to being off therapy and enter survivorship.

It is important to note that parents, particularly mothers, are at greater risk for developing post-traumatic stress disorder (PTSD) than childhood and adult cancer survivors (Kangas, Henry, & Bryant, 2002; Kearney, Salley, & Muriel, 2015; Ozono et al., 2007). Reasons for this may include fewer resources and less support for parents than patients, significant stress, and the need to attend to multiple responsibilities (e.g., siblings, family, finances, medical care, etc.). Thus, it is recommended that the mental health needs of parents and caregivers be continually assessed and monitored over the course of cancer treatment, during the off therapy period, and into survivorship (Kearney, Salley, & Muriel, 2015).

The literature highlights specific areas of concern for parents and caregivers. A study by Greenbery and Meadows (1991) found that parents express significant concerns regarding treatment-related late effects and their child's future health. There is often much uncertainty about their child's future functioning as late effects and secondary health conditions may not emerge for multiple years or decades following the conclusion of cancer-directed treatment. Relatedly, parents have expressed specific concerns regarding their child's academic performance, social difficulties (e.g., lack of friends and school re-integration), slowed physical growth, and possible infertility (Ljungman et al., 2014). Uncertainty about the future and what to expect appears to be the most common theme among many parents' worries; however, Maurice-Stam, Oort, Last, and Grootenhuis (2008) found that feelings of helplessness and uncertainty typically decreased during the first year after the end of treatment, and for most families returned to normal levels two years after the end of treatment (i.e., once children entered the survivorship stage). Beyond their survivor's health and general functioning, parents also report worrying about the impact of the illness on siblings and family finances (Long & Marsland, 2011). For instance, siblings often experience emotional vulnerability (e.g., feelings of sadness, worry, helplessness, guilt and loss), decreased attention and support from their family, school problems, unmet needs and increases in responsibility and independence as a result of their sibling's cancer diagnosis (Alderfer et al., 2010; Long et al., 2018).

Much of the past literature has focused on psychological distress (e.g., PTSS, anxiety, and depression) during survivorship; however, it is also important to examine health-related quality of life (HRQOL). HRQOL is a multidimensional concept that includes physical and psychosocial functioning. While psychological distress (e.g., anxiety and depressive symptoms) influences HRQOL, HRQOL is a broader construct that assesses general well-being, including positive aspects of health. Dockerty, Williams, McGee, and Skegg (2000) found a small but significant difference in HRQOL and mood ratings for parents of children with cancer (on treatment, off treatment, and deceased) and controls. This suggests that although HRQOL and mood rating scores were significantly lower for parents of children with cancer at various stages of treatment, parents are also relatively resilient. However, consistent with much of the literature, subgroups of parents reported poor HRQOL, with worse mental HRQOL linked to poorer social support (Dockerty et al., 2000). Other studies found that parents' psychological distress relates to low HRQOL, functional disability, parenting challenges, and increased risk for somatic disorders (Ljungman et al., 2014).

Risk Factors for Anxiety and HRQOL

Identifying families at risk for psychosocial distress (e.g., anxiety) or poor HRQOL is important in order to provide additional support and evidence-based interventions that match their needs. Raina and colleagues' (2004) Conceptual Model of Caregiving Process and Caregiver Burden Among Pediatric Populations offers a framework for studying risk and protective factors for caregiver functioning. This model considers the influence of background/context factors (e.g., socioeconomic status), child characteristics (e.g., medical and behavioral problems), caregiver strain (e.g., daily demands), caregiver intrapsychic factors (e.g., self-esteem and sense of mastery), and coping/supportive factors (e.g., social support, family functioning) on caregiver physical and psychological health.

Although few investigations have evaluated the complete model, research in this area has evaluated different components of the model. A systematic literature review of psychological late effects for parents of long-term childhood cancer survivors found that type of cancer, family functioning, and social support influence parents' psychological functioning and adjustment (Ljungman et al., 2014). For instance, parents of children with brain or central nervous system (CNS) tumors report higher levels of psychological distress than parents of children with leukemia. This is likely because having a brain or CNS tumor places survivors at greater risk for severe late effects (e.g., social difficulties, executive function and other academic struggles, adjustment difficulties) that require increased care and support by caregivers (Patenaude & Kupst, 2005). Additionally, Malpert and colleagues (2015) found that caregiver strain and parent perception of their child's emotional functioning were significantly related to parent emotional distress (i.e., anxiety, depression, and PTSS). The Standards of Psychosocial Care for parents of children with cancer (Kearney, Salley, & Muriel, 2015) supports previous findings that higher socio-economic status, higher levels of social support, higher parent educational attainment, better family functioning, optimism, and use of problem-solving coping may act as protective or resiliency factors. Interestingly, the literature suggests that there is no relation between parent psychological distress and time since their child's cancer diagnosis, time off-treatment, treatment modalities, or treatment intensity (Ljungman et al., 2014). This indicates that demographic, family, and social factors are likely more salient for coping and psychological well-being, regardless of disease- and treatment-related factors.

The Psychosocial Assessment Tool (PAT) is a widely-used screening device that assesses a range of risk factors shown to impact psychosocial well-being for children with cancer and their families from diagnosis into survivorship (Gilleland et al., 2013; Kazak et al., 2015; Kazak et al., 2018). The PAT is modeled after the Pediatric Psychosocial Preventative Health Model (PPPHM) and assesses constructs that reflect several areas associated with health disparities, including income, health behaviors, knowledge, and healthcare access, as well as areas of social and family functioning. The PAT generates a total score that allows clinicians to classify families into one of three categories (i.e., Universal, Targeted, or Clinical) based on their level of psychosocial risk. Previous literature suggests this classification is relatively stable over time (Kazak et al., 2015). For instance, Alderfer et al. (2009) found that across the first four months of cancer treatment, approximately two-thirds of families remained at the same level of risk. Notably, there appears to be greatest stability at the Universal level (i.e., least distress) compared to the Targeted or Clinical levels (i.e., greater distress; Kazak et al., 2015). This suggests that families with fewer risk factors are more likely to remain at a lower level of risk, whereas families with greater risk may be both vulnerable to increased stress and more likely to benefit from added support or intervention.

Problem-Solving

It is important to identify modifiable factors, such as problem-solving, that might impact a family's adjustment following their child's cancer diagnosis and throughout their cancer journey. Social problem-solving refers to utilizing cognitive-behavioral processes to solve or cope with problems as they occur in everyday life. Social problem-solving is made up of two, independent processes: problem orientation and problem-solving strategy (D'Zurilla & Nezu, 2010). Problem orientation refers to the metacognitive process that acts as a motivating factor in social problem-solving, whereas problem-solving strategies are the methods an individual may use to conceptualize problems and generate solutions or ways to cope with the problem. That is, problem orientation reflects an individual's first interpretation of a problem and occurs prior to strategy implementation. D'Zurilla and Nezu (2010) suggest two problem orientation dimensions: positive problem orientation (PPO) and negative problem orientation (NPO).

Individuals high in PPO view problems as challenges that can be solved. They tend to believe in their ability to successfully solve problems by being effortful and persistent, which leads these individuals to approach problems rather than avoid them. On the other hand, individuals high in NPO tend to view problems as significant threats to their well-being and often doubt their ability to successfully solve the problem. This can lead to frustration and heightened emotions when confronted with a problem. Thus, individuals high in NPO often try to avoid or ignore problems.

D'Zurilla and Nezu (2010) also propose three distinct problem-solving strategies: Rational Problem Solving (RPS), Impulsivity/Carelessness Style (ICS), and Avoidance Style (AS). RPS is a productive problem-solving style that incorporates specific problem-solving skills, such as defining the problem, generating potential solutions, and selecting and implementing a solution. Individuals with a RPS style typically research the problem, identify obstacles, set realistic goals, and continually monitor and assess outcomes. Alternatively, individuals utilizing an ICS attempt to solve problems in an impulsive, careless or hurried manner (D'Zurilla & Nezu, 2010). In contrast to a RPS style, those using an ICS do not take the time to brainstorm multiple options and instead, impulsively attempt one of the first solutions that come to mind, without carefully monitoring outcomes. Lastly, individuals with an AS prefer to avoid problems altogether or procrastinate. They put off confronting the problem for as long as possible and may hope for the problem to resolve itself. These individuals also tend to place responsibility on other people to solve their problems. In sum, the most effective social problem-solving ability is indicated by high scores on PPO and RPS and low scores on NPO, ICS, and AS.

Problem-solving has been shown to relate to important indices of functioning (e.g., quality of life, psychological distress) in caregivers of individuals with various medical conditions. Specifically, the adult literature suggests that problem-solving predicts quality of life and psychological distress in caregivers of adults with amyotrophic lateral sclerosis (ALS; Murphy, Felgoise, Walsh, & Simmons, 2009) and caregivers of men with prostate cancer (Malcarne et al., 2002). Murphy et al. (2009) found that caregivers who reported a positive problem orientation and rational problem solving style also had the best quality of life and lowest psychological morbidity. Similarly, caregivers of men with prostate cancer who had better problem-solving reported less distress than those with more maladaptive problem-solving (Malcarne et al., 2002).

Researchers have also begun to examine problem-solving in relation to quality of life and psychological distress in parents of children with chronic health conditions. Greening and Stoppelbein (2007) found that use of problem appraisal and an emotion regulation strategy, such as social support, related to decreased symptoms of psychological distress (i.e., depression, PTSS, and anxiety) for parents of children with cancer. Additionally, they showed that parents who used avoidant coping or other strategies, such as negative self-blame, had increased psychological distress. Similarly, Norberg et al. (2005) found that parents of children with cancer who more frequently used active problem-solving skills, as opposed to avoidance behaviors or passive reactions, had lower levels of anxiety and depression. These findings are consistent with the adult literature and suggest that problem-solving has implications for future interventions.

Sahler and colleagues (2013) compared the effects of a problem-solving skills training intervention (i.e., Bright IDEAS) to nondirective support (i.e., nonjudgmental support and expression of feelings) for mothers of children newly diagnosed with cancer. At the end of the intervention, there were no significant differences between anxiety, depression, and PTSS in mothers; however, mothers who received problem-solving skills training continued to improve (i.e., reported lower levels of anxiety, depression, and PTSS) three months following the end of the intervention. This suggests that parents can continue to apply previously learned problem-solving skills to new situations as they arise.

The Current Study and Hypotheses

HRQOL and anxiety for parents and caregivers of pediatric cancer survivors are important domains to examine, as parents' ability to provide continued care for their child is dependent on how well they are functioning. The off therapy period is of particular interest due to the transition of care from the medical team to the family and the high risk for relapse. Greater levels of parent distress may impact a family's ability to reintegrate back to normal life while anticipating potential late effects. Parent functioning is also linked to child psychological functioning and adjustment. No known studies to date have examined parent functioning exclusively during the off therapy period. Therefore, psychosocial risk, problem-solving, HRQOL, and anxiety will be assessed for parents approximately 12-19 months from the conclusion of their child's cancer treatment.

The current study examined HRQOL and anxiety in parents of childhood cancer survivors during the off therapy period, as well as psychosocial risk factors (i.e., medical, demographic, child, and family) and aspects of problem-solving associated with HRQOL and anxiety. It was hypothesized that while the majority of parents will report HRQOL and anxiety within normal limits, a subset of parents will experience clinically significant levels of anxiety and poor HRQOL. It was predicted that greater overall psychosocial risk and non-adaptive problem-solving (i.e., negative problem orientation, impulsivity/carelessness style, and avoidance style) will be correlated with increased anxiety symptoms and poorer HRQOL. On the other hand, adaptive problem-solving (i.e., positive problem orientation and rational problem-solving) was hypothesized to be correlated with fewer anxiety symptoms and better HRQOL. Lastly, it was hypothesized that when controlling for demographic and medical factors, and psychosocial risk factors, problem-solving orientation, as well as problem solving strategies, will account for significant additional variance in parent anxiety and HRQOL.

CHAPTER 2

METHOD

Participants

Participants included 122 parents and caregivers of children who had been off therapy for childhood cancer for 12 to 19 months. Family inclusion criteria specified that patients must be (1) between the ages of 1 and 17 years old, and (2) 12 to 19 months since their last cancer treatment. Parents and caregivers were required to be (1) over the age of 18 years and (2) fluent in English. Parents were excluded from participation if surgical resection was the only cancer-related treatment their child received. The study team determined eligibility through review of medical records.

One hundred and thirty-six of the 275 (49.5%) families approached agreed to participate. Twenty-two families actively declined participation, 87 families passively declined participation (i.e., they were contacted and never followed up), and 30 families were partially recruited but did not participate. Child gender did not differ between consenting and non-consenting families; however, a greater portion of declining families were minority races (57%; i.e., African American, Asian, Hispanic) compared to consenting families. There were incomplete data sets for 14 participants (10.3%). Thus, the final sample consisted of 122 parents or caregivers. The majority of parents were females (*n* = 108; 88.5%) and in a partnered relationship (*n* = 98; 80.3%). Parents ranged between the ages of 25 and 61 years (*M* = 39.68; *SD* = 7.64) and were primarily biological parents (*n* = 112; 91.8%). Most participants were Caucasian (*n* = 82;

67.2%), followed by African American (*n* = 26; 21.3%), Hispanic/Latino (*n* = 6; 4.9%), Asian (*n* = 3; 2.5%), multiracial (*n* = 2; 1.6%), and other (*n* = 2; 1.6%).

Demographic information about the parents' children was also collected. Children (54.9% male) were on average 9.66 years of age (*SD* = 4.77), 2.58 years from diagnosis (*SD* = 1.24) and 15.24 months (*SD* = 1.68 months; range = 12.00 – 19.66) from the conclusion of tumor-directed therapy. Approximately 37% of children were diagnosed with leukemia, 16% with lymphoma, 11% with kidney tumors, 23% with a solid tumor or bone cancer, 10% with another malignancy, 2% with non-malignant disease, and 1% with a brain tumor. All children were treated with chemotherapy. Approximately 42% of children also had a surgical resection, 24% had radiation therapy, and 11% received a bone marrow transplant (BMT). See Table 1 for complete sample characteristics.

Procedure

All study procedures were approved by the Institutional Review Board of the participating institution. Participants were identified and screened for eligibility through an electronic medical chart review. Families were contacted by the research team at the Aflac Cancer Center Research Program via email and/or mailing to invite them to participate in this study. Details regarding the study aims were provided in the initial contact email. Parents were asked to click on a secure electronic consent and survey battery via the Research Electronic Data Capture (REDCap) platform. After three unsuccessful email attempts to contact eligible participants, research staff contacted families by telephone to invite them to participate in the study and answer any questions that they had about the research procedures and goals. Parents reached by research staff over the phone completed a verbal consent over the phone. Participants were compensated for their time.

Measures

Demographic and medical information. Demographic information for children and their parents (e.g., age, race, annual income, employment) was collected using a standard demographic questionnaire. Medical information was obtained via electronic medical chart review (e.g., diagnosis, date of diagnosis, date of last cancer-directed treatment, treatment modalities). Treatment intensity was calculated using the Intensity of Treatment Rating scale (ITR-3; Kazak et al., 2011b). The ITR-3 uses treatment modalities and stage/risk level to categorize the intensity of pediatric cancer treatment from least (Level 1) to most intensive (Level 4). The ITR is a widely-used measure and has been shown to relate to survivor perceptions of late effects (Schwartz et al., 2010).

Patient-Reported Outcomes Measurement Information System – Global Health. The Patient-Reported Outcomes Measurement Information System (PROMIS) consists of a set of self- or proxy-report measures used to assess physical, social, and mental health in adults and children and improve communication between patients and healthcare professionals. Parent HRQOL was assessed using the ten-item self-report PROMIS – Global Health (Hays, Bjorner, Revicki, Spritzer, & Cella, 2009) which assesses an individual's physical and mental HRQOL. It is comprised of two domains: Physical Health (four items) and Mental Health (four items). There are two additional items that assess general health. A total global health score was calculated by summing the responses from all ten items. Item responses range from 1 (*Poor*) to 5 (*Excellent*). Total scores for the Physical and Mental Health subscales were converted to *T*-scores, with higher scores representing better HRQOL. There are not published norms for Global Health and thus, the raw score was used in analyses. Cronbach's alpha for the Global Health scale was .90. The PROMIS Mental Health scale demonstrated good internal reliability (Cronbach's α = .85) and the Physical Health scale demonstrated fair internal reliability (Cronbach's α = .70) in the current sample.

Patient-Reported Outcomes Measurement Information System-Anxiety. Parent anxiety was measured using the Patient-Reported Outcomes Measurement Information System - Anxiety module (PROMIS-Anxiety; Pilkonis et al., 2011). The PROMIS Anxiety consists of eight items examining the extent to which parents felt anxious over the past seven days. Items responses range from 0 (*Never*) to 4 (*Always*) and were summed to calculate a total score. Total scores were converted to *T*-scores, with higher scores indicating greater anxiety symptoms. The PROMIS Anxiety demonstrated excellent internal reliability in the current study (Cronbach's α = .96).

Psychosocial Assessment Tool. Psychosocial risk was assessed using the Psychosocial Assessment Tool (PAT 2.0; Pai et al., 2008). The PAT 2.0 was designed to assess psychosocial risk in families of children with cancer and uses a social ecological model to identify areas of risk and resiliency across seven subscales: Family Structure and Resources, Family Social Support, Family Problems, Parent Stress Reactions, Family Beliefs, Child Problems, and Sibling Problems. Each item response is classified dichotomously as indicative of risk or no risk. The PAT 2.0 yields seven subscale scores and a total score. The total score is calculated by summing the subscale scores and can be used to categorize families into three levels of risk: Universal (i.e., distressed but resilient), Targeted (i.e., acute distress and risk factors present), and Clinical (i.e., persistent and/or escalating distress and high risk factors). Greater scores indicate higher levels of distress and risk, such that PAT 2.0 total scores less than 1.0 are categorized as "Universal," scores between 1.0 and 1.99 are categorized as "Targeted," and scores 2.0 or greater are categorized as “Clinical.” The PAT 2.0 demonstrated good internal reliability for the Total score (Cronbach’s α = .83).

Social Problem Solving Inventory-Revised Short Form. Parent coping style and social problem-solving were assessed using the Social Problem Solving Inventory-Revised Short Form (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 2002). The SPSI-R consists of 25 items that measure aspects of problem-solving. Two scales specifically assess problem orientation (i.e., Positive Problem Orientation [PPO; five items] and Negative Problem Orientation [NPO; five items]). The three remaining scales measure particular coping strategies (i.e., Rational Problem Solving [RPS; five items], Impulsivity and Carelessness Style [ICS; five items], and Avoidance Style [AS; five items]). Parents were asked to indicate how true each statement is for them using a five-point Likert scale ranging from 0 (*not at all true of me*) to 4 *(extremely true of me*; e.g., “I go out of my way to avoid having to deal with problems in my life”). Standard scores, calculated based on norms, were used in analyses. In the current sample, Cronbach’s alpha ranged between .69 and .81 for each subscale.

Data Analytic Plan

All statistical analyses were conducted using IBM Statistical Package for the Social Sciences, Version 24.0 (SPSS; IBM Corp., Armonk, NY). Descriptive statistics, including means, standard deviations (*SD*), and ranges, were calculated for all sociodemographic (e.g., parent and child age, gender, ethnicity, parent education, and annual family income), medical (i.e., time off-treatment, time since diagnosis, treatment intensity), and study variables (i.e., HRQOL, anxiety, psychosocial risk, and problem-solving) to characterize the sample. Annual household income was grouped into four categories in analyses: “less than $25,000”; “$25,000-$74,999”; “$75,000-$124,999”; or “greater than $125,000.” Parent education was also combined into four groups for analyses: “high school degree or less”; “some college/vocational school”; “graduated from college or vocational school”; or “graduate degree.” Preliminary analyses were conducted to determine if there were any significant associations between sociodemographic or medical variables and study variables.

Because the PROMIS is a norm-referenced test, one-sample *t*-test analyses were conducted to compare parent HRQOL and anxiety *T*-scores with 50, which is the mean score of the normative sample used to derive *T*-scores for the PROMIS. Norms were also used to identify the percentage of parents with at-risk levels of HRQOL and anxiety (i.e., 1.5 *SD*s below and above the normative mean, respectively). Pearson product-moment correlations and partial correlations controlling for relevant demographic factors were used to investigate the associations between parent HRQOL, anxiety, psychosocial risk, and problem-solving. Hierarchical multiple regression analyses were conducted to examine the influence of problem-solving on HRQOL and anxiety, over and above relevant medical, demographic, and psychosocial risk factors. Any significantly associated medical and demographic factors were entered on Step 1, psychosocial risk factors were entered in Step 2, and relevant aspects of problem-solving orientation or strategy (as determined by correlational analyses) were entered in Step 3 of the regression models.

Power Analyses

Sample sizes necessary to detect significant statistical effects were determined a priori using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) with power = .80, $\alpha = .05$, and a medium effect size for correlational analyses = .30 (Cohen, 1988). It was determined that 82 participants were required to detect effects for correlational analyses and 90 participants were required to detect effects for *t*-tests comparing participant scores to norms. A sample size of 55 participants was required to detect a medium effect size (.15) for multiple regression analyses with up to six predictors, with power = .80 and $\alpha = .05$.

CHAPTER 3

RESULTS

Descriptive Data and Preliminary Analyses

Means and standard deviations for all study variables are presented in Table 2. The mean score for psychosocial risk on the PAT was 1.16 (*SD* = 0.64). Fifty-six parents (46%) were in the Universal risk group (i.e., distressed but resilient), 53 parents (43%) were in the Targeted risk group (i.e., acute distress and risk factors present), and 13 parents (11%) were in the Clinical risk group (i.e., persistent and/or escalating distress and high risk factors). Parents reported higher physical HRQOL (*M* = 52.03, *SD* = 7.91) compared to community norms, *t*(118) = 2.79, *p* < .01 and had a small effect size (Cohen's *d* = .23). Parent mental HRQOL (*M* = 51.35, *SD* = 8.81) and anxiety (*M* = 50.52, *SD* = 10.70) did not significantly differ from community norms. Three parents (2.5%) reported at-risk levels of mental health, four parents (3.3%) reported at-risk levels of physical health, and seven parents (5.7%) reported at-risk levels of anxiety.

Preliminary correlational analyses and one-way analyses of variance (ANOVAs) were conducted to determine if there were any significant associations between sociodemographic or medical factors and study variables. Results indicated that parent gender was related to anxiety such that males (*n* = 14; *M* = 44.34, *SD* = 10.36) reported less anxiety than females (*n* = 108; *M* = 51.32, *SD* = 10.52), *t*(120) = -2.34, *p* < .05, and had a medium effect size (Cohen's *d* = .67). Child age, child gender, race, parent age, parent marital status, diagnosis, treatment intensity, time since diagnosis, and time since completion of treatment were not related to any main study variables (i.e., HRQOL or anxiety).

Correlational Results

Pearson correlations were conducted to investigate the associations between psychosocial risk, problem-solving, and all aspects of HRQOL. Partial correlations controlling for parent gender were conducted to investigate the associations between psychosocial risk, problem-solving, and anxiety. Overall psychosocial risk (PAT) was negatively associated with global, mental, and physical HRQOL and positively associated with anxiety. Positive problem orientation was positively correlated with mental HRQOL and negatively correlated with anxiety, whereas negative problem orientation was negatively associated with global, mental, and physical HRQOL and positively associated with anxiety. Rational problem-solving strategies were not related to global, mental, or physical HRQOL, or anxiety. Impulsivity/carelessness and avoidance styles were positively related to anxiety. Correlations between all study variables are presented in Table 2.

Regression Analyses

Hierarchical regression models tested the strength of the associations between significantly correlated demographic factors, psychosocial risk, and significantly correlated problem-solving variables and aspects of parent HRQOL and anxiety. Significant medical and demographic factors, if any, were entered on the first step, psychosocial risk was entered on the next step, and relevant problem-solving orientation or strategies were entered on the following step. If medical or demographic factors were not significant, psychosocial risk was entered on the first step and problem-solving orientation or strategies were entered on the second step. Individual models were analyzed separately for significantly correlated problem-solving orientations (i.e., PPO and NPO) and problem-solving strategies (i.e., RPS, ICS, and AS).

Global HRQOL

In the first step, psychosocial risk explained a significant 30% of the variance in global HRQOL, $F(1, 116) = 49.50$, $p < .001$. Adding NPO into the model significantly increased the amount of variance explained in global HRQOL, $R^2\Delta = .05$, $p < .01$. The total model consisting of psychosocial risk and NPO explained 35% of the variance in global HRQOL, $F(2, 115) = 30.77$, $p < .001$. Examination of the individual variables revealed that both psychosocial risk and NPO were significantly associated with global HRQOL, $t = -6.04$ $p < .001$, and $t = -2.96$, $p < .01$, respectively. See Table 3 for details.

Mental HRQOL

Psychosocial risk (PAT) was entered into the first step and problem-solving orientation (i.e., PPO and NPO) was entered into the second step. In the first step, psychosocial risk explained a significant 26% of the variance in mental HRQOL, $F(1,118) = 42.14$, $p < .001$. Adding PPO and NPO into the model significantly increased the amount of variance explained in mental HRQOL, $R^2\Delta = .08$, $p < .01$. The overall model explained 34% of the variance in mental HRQOL, $F(3,118) = 20.09$, $p < .001$. Examination of the individual variables revealed that psychosocial risk and NPO were significantly associated with mental HRQOL, $t = -5.46$, $p < .001$, and $t = -2.99$, $p < .01$, respectively. See Table 4 for details.

A second trimmed model (Table 5) assessing parent mental HRQOL included psychosocial risk (PAT) and PPO alone rather than in combination with NPO on step 2, to examine whether positive problem-solving was related to mental HRQOL, above and beyond psychosocial risk. In the first step, psychosocial risk explained a significant 26% of the variance in mental HRQOL, $F(1, 118) = 42.14$, $p < .001$. Adding PPO into the model significantly increased the amount of variance explained in mental HRQOL, $R^2\Delta = .03$, $p < .05$. The overall model explained 29% of the variance in mental HRQOL, $F(2,117) = 24.02$, $p < .001$.

Examination of the individual variables revealed that both psychosocial risk and PPO were significantly associated with mental HRQOL, t = -6.39, $p < .001$, and t = 2.15, $p < .05$, respectively.

Physical HRQOL

In the first step of a model consisting of psychosocial risk and NPO, psychosocial risk explained a significant 22% of the variance in physical HRQOL, $F(1, 116) = 33.12$, $p < .001$. Adding NPO into the model did not significantly improve the amount of variance explained in physical HRQOL, $R^2\Delta = .01$, $p = .15$. The total model explained 24% of the variance in physical HRQOL, $F(2,115) = 17.79$, $p < .001$. See Table 6 for details.

Anxiety

Separate models were examined for problem-solving orientation and problem-solving strategies with regard to parent anxiety. The first (Table 7) examined psychosocial risk and problem-solving orientation, whereas a separate model examined psychosocial risk and problem-solving strategies. The first model consisted of parent gender, psychosocial risk, and PPO and NPO. In the first step, parent gender explained a significant 4% of the variance in anxiety, $F(1, 119) = 5.46$, $p < .05$. In the second step, psychosocial risk significantly increased the amount of variance explained in anxiety, $R^2\Delta = .13$, $p < .001$. Adding PPO and NPO into the model explained an additional significant 14% of the variance in anxiety. The total model explained 32% of the variance in anxiety, $F(4, 116) = 13.50$, $p < .001$. Examination of the individual variables revealed that both psychosocial risk and NPO were significantly associated with greater anxiety, t = 3.20, p < .01 and t = 4.51, $p < .001$, respectively.

A second trimmed model (Table 8) assessing parent anxiety included psychosocial risk (PAT) and PPO alone rather than in combination with NPO on step 3, to examine whether PPO was related to anxiety, above and beyond psychosocial risk. In the first step, parent gender explained a significant 4% of the variance in anxiety, $F(1, 119) = 5.46$, $p < .05$. In the second step, psychosocial risk significantly increased the amount of variance explained in anxiety, $R^2\Delta = .13$, $p < .001$. Adding PPO into the model did not significantly increase the amount of variance explained in anxiety, $R^2\Delta = .04$, $p = .06$. The overall model explained 21% of the variance in anxiety, $F(3,117) = 7.67$, $p < .001$.

In addition to examining the effects of problem-solving orientation, the effects of parent gender, psychosocial risk, and significantly correlated problem-solving strategies (i.e., ICS, and AS) on parent anxiety were analyzed. In the first step, parent gender explained a significant 4% of the variance in anxiety, $F(1, 119) = 5.46$, $p < .05$. In the second step, psychosocial risk significantly increased the amount of variance explained in anxiety, $R^2\Delta = .13$, $p < .001$. Adding ICS and AS into the model did not significantly increase the amount of variance in anxiety. The overall model explained 21% of the variance in parent anxiety, $F(4, 116) = 7.67$, $p < .001$. See Table 9 for details.

CHAPTER 4

DISCUSSION

The aim of the current study was twofold: to examine HRQOL and anxiety in parents and caregivers of childhood cancer survivors during the off therapy period, and to determine the associations between both psychosocial risk and problem-solving and parents' HRQOL and anxiety. As hypothesized, the majority of parents appear to be coping well during the off therapy period, with only 2.5-5.7% reporting at-risk levels of HRQOL and/or anxiety. This is consistent with previous literature on parent functioning following the conclusion of treatment. Prior studies suggest that parents are most impacted immediately following their child's diagnosis and during early stages of treatment and continue to improve over time (Dalquist, Czyzewski, & Jones, 1996; Norberg & Boman, 2008; Norbeg, Lindblad, & Boman, 2005; Sawyer, Antonious, Toogood, Rice, & Baghurst, 1993; Steele, Long, Reddy, Luhr, & Phipps, 2003). Further, research suggests that feelings of helplessness and uncertainty typically decrease during the year after concluding cancer-directed treatment (Maurice-Stam et al., 2008b). Families may feel a sense of normalcy after a year off treatment as they have often transitioned back to a more normal schedule and can look forward and make plans beyond prior treatment schedules and hospital stays. Also, children typically have not yet begun to develop late effects, which may lead parents to feel relieved and more in control of their child's functioning compared to while their child was actively on treatment.

Surprisingly, parents reported significantly higher physical HRQOL compared to community norms, suggesting that they perceive their physical health (e.g., their ability to carry out everyday physical activities, fatigue, pain, etc.) to be better than that of the general population. Parents may perceive their own pain, fatigue, and general physical health differently after having gone through their child's cancer journey and experiencing the impact of the disease and treatment on their child's physical health. That is, their perception of their own physical HRQOL could be influenced by their experience of their child's lowered physical functioning during treatment. Similarly, parents may be comparing their current functioning to their own previous functioning around the time of their child's diagnosis and throughout treatment, when parent distress is typically most prominent.

The current study also examined whether psychosocial risk factors and aspects of coping relate to parent HRQOL and anxiety. Consistent with the theoretical model (Raina et al., 2004) and our hypotheses, psychosocial risk factors assessed by the PAT were strongly related to lower levels of all aspects of parent HRQOL and higher parent anxiety. The PAT has been well-established as a measure of a family's risk for experiencing clinically significant distress during their child's cancer treatment and includes a range of domains, such as available resources (e.g., support, childcare, income), child and sibling problems, parent support, distress, and family beliefs. Current findings support the literature that greater psychosocial risk predicts parent distress (Alderfer et al., 2009). Although strongly related to lower HRQOL and higher anxiety, psychosocial risk includes variables that are, for the most part, stable. Therefore, level of psychosocial risk may be best thought of as a means of identifying those parents who are likely to have difficulties with HRQOL and/or anxiety, rather than necessarily specifying particular targets for intervention.

Consistent with our hypotheses, results of the correlational analyses indicated that parent problem-solving orientation was related to global, mental, and physical HRQOL, and anxiety.

Negative problem orientation was related to worse global, mental, and physical HRQOL and increased anxiety, with mostly medium effect sizes. Negative problem orientation describes a tendency to interpret problems as threatening and doubt one’s ability to successfully solve the problem. Individuals who view problems in this way often become overwhelmed or emotionally upset when faced with difficulties, which could lead to further cognitive distortions or catastrophizing. Moreover, negative problem orientation also emerged as significantly related to global and mental HRQOL and anxiety, above and beyond the variance already accounted for by psychosocial risk. Negative problem orientation likely exacerbates the effects of an already stressful situation because of low frustration and uncertainty tolerance. Positive problem orientation (i.e., viewing problems as challenges or solvable problems) was also related to greater mental HRQOL and lower anxiety. Further, positive problem orientation significantly increased the variance in mental HRQOL, over and above psychosocial risk, although the effect was small. This suggests that increased confidence in one’s ability to successfully handle a difficult situation is associated with better mental HRQOL. However, while appraising problems as challenges and having confidence in one’s ability to solve the problem is an adaptive coping technique, it appears that appraising problems in a maladaptive way (i.e., negative problem orientation) has a greater impact on HRQOL and anxiety.

Notably, problem-solving strategies (i.e., RPS, ICS, AS) were not associated with any aspect of HRQOL and only impulsivity/carelessness style (i.e., impulsively attempting the first possible solution) and avoidance style (i.e., avoiding or procrastinating addressing the problem) were related to anxiety. The size of these bivariate correlations was small, and impulsivity/carelessness and avoidant style did not add significant variance to anxiety after accounting for the effects of parent gender and psychosocial risk. Problem-solving strategies are the activities or methods one uses to attempt to understand problems and discover effective ways to cope with them. Responding to stress and problems with impulsivity/carelessness or avoidance likely contributes to and maintains anxiety symptoms. That is, the tendency to put off a problem or avoid thinking about and addressing it increases a parent's uncertainty and anxiety, particularly when combined with a negative problem orientation.

Of the demographic and medical variables considered, only parent gender was related to anxiety, and no demographic or medical variables were related to HRQOL. Females generally reported greater anxiety than males, which is consistent with the literature (McLean, Asnaani, Litz, & Hofmann, 2011). Our null findings regarding demographic factors contradicts previous research that suggests younger parent age, higher income, and higher education are related to better HRQOL (Klassen et al., 2008; Rensen et al., 2019). This difference may be due to the time frame assessed as previous studies were conducted with families of children still receiving active cancer treatment, whereas the current sample included only parents of children who were off-treatment. That is, demographic factors may be more salient for acute distress. Similarly, child factors (i.e., age, gender, race) were not directly related to parent HRQOL or anxiety. Previous studies have shown that parent psychosocial distress and health relate to caregiving demands and perceived competence to appropriately handle those demands, rather than specific child characteristics (Klassen et al., 2008; Klassen et al., 2011; Quast, Turner, McCurdy, & Hocking, 2016). Additionally, child disease- and treatment-related factors (i.e., time since diagnosis, diagnosis, and treatment intensity) were not associated with parent HRQOL or anxiety. This supports previous findings that medical factors do not contribute to HRQOL in adolescents, parents, or levels of psychosocial risk for families of children with cancer (Barakat, Marmer, & Schwartz, 2010; Kazak et al., 2011a; Ljungman et al., 2014; Pai et al., 2008).

Our findings have important clinical implications with regard to intervention efforts for families of childhood cancer survivors. Problem-solving training has been shown to be feasible and efficacious for a variety of individuals, including individuals with diverse health conditions and their caregivers (D'Zurilla & Nezu, 2010). For example, Wade, Wolfe, Brown, and Pestian (2005) offered an internet-based family problem-solving intervention to parents of children with traumatic brain injuries. Parents in the intervention group experienced significant improvements in injury-related burden, parent psychosocial functioning, and parenting stress, while children displayed decreases in antisocial behaviors. This suggests that parent problem-solving has implications for child and family functioning as well. Additionally, Bright IDEAS Problem-Solving Skills Training program has been shown to decrease distress (i.e., anxiety, depression, and post-traumatic stress) in mothers of children recently diagnosed with cancer (Sahler et al., 2005). Sahler and colleagues (2013) showed that mothers who had participated in the PSST program continued to show improvements three months following the intervention, suggesting that problem-solving training can generalize and allows for continued progress and growth. Problem-solving therapy not only reduces current distress and psychopathology, but can also prevent future psychopathology from developing by increasing an individual's ability to effectively cope with stressful situations.

Research suggests that problem-solving training is intended for individuals who may be distressed, but do not display clinical levels of psychopathology (Sahler et al., 2013). Thus, parents would likely benefit from problem-solving training, even if they are not currently experiencing at-risk levels of anxiety or poor HRQOL. Assessing psychosocial risk and tendency toward negative problem orientation could also help to identify parents who might benefit from training. The Children's Oncology Group (COG) recommends regular survivorship care for childhood cancer survivors to monitor and address late effects across their life span (Children's Oncology Group, 2013). The off therapy period offers a unique window to intervene with families during a less stressful period. Problem-solving training could provide families with skills that they could continue to use as difficult situations arise in the future, such as the development of late effects, school challenges, or social difficulties. Decreasing negative problem orientation may also increase caregiver competence and participation in survivorship care, as approximately 15-25% of families are lost to follow-up care (Barakat, Schwartz, Szabo, Hussey, & Bunin, 2012; Klosky et al., 2008).

While this is the first known study examining HRQOL in parents of children 12-19 months off cancer-directed treatment, it is not without limitations. First, our sample is mostly representative of Caucasian mothers in a partnered relationship. Greater diversity of participants in terms of demographics and family role (e.g., inclusion of more fathers) would increase the generalizability of our findings and allow us to better compare the experiences of mothers and fathers. Previous literature suggests that there are unique predictors of HRQOL for mothers and fathers (Rensen et al., 2019) and therefore, the current findings may not fully capture fathers' experiences. Second, participants' children had a variety of malignancies and findings may not capture differences regarding specific needs and risk of late effects between cancer diagnoses. No disease or treatment variables were related to parent functioning in the current study, which suggests that parents may have similar experiences during the off therapy period regardless of their child's specific diagnosis or treatment. Disease- and treatment-related factors may become more relevant as some survivors develop late effects or secondary malignancies. Third, all participants were recruited from a single oncology center in the Southeastern United States and may not be representative of parents nationwide. Similarly, all measures were self-report questionnaires and were only offered in English. Multi-site studies may be useful in recruiting a more diverse and representative sample. Lastly, the cross-sectional nature of the study prohibits us from examining causation. Longitudinal studies will be important to examine how parent HRQOL and anxiety change over the course of treatment and as children transition to survivorship.

This study expands upon previous research on the impact of having a child with cancer on parent functioning by examining psychosocial risk and problem-solving during the off therapy period. Little research has examined parent HRQOL during this period and the current findings offer directions for future research and interventions. Negative problem orientation appears to play an important role for parent HRQOL and anxiety and may offer the most promising avenue for intervention. Well-established problem-solving interventions, such as the Bright IDEAS training (Sahler et al., 2005; Sahler et al., 2013), could be adapted for parents during the off therapy period, particularly for those with children at high risk for developing late effects. Problem-solving training might also increase parents' competence in handling daily challenges (e.g., child and sibling problems, parent distress), thereby decreasing their psychosocial risk. Prospective studies from diagnosis or early treatment to the transition to survivorship could help identify the most appropriate time to introduce intervention efforts and which families may benefit most. The off therapy period is an understudied time period for parents and families of childhood cancer survivors and warrants further examination as this period may serve as a point for early intervention with childhood cancer survivors and their families.

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Table 1.

Sample Characteristics of Participants.

Variables	*n* (%) or *M* ± *SD*
Child Characteristics	
Child age in years	9.7 ± 4.8
Child Gender	
Male	67 (54.9)
Female	55 (45.1)
Child Race/Ethnicity	
Caucasian	80 (65.6)
African-American	23 (18.9)
Multiracial	11 (9.0)
Hispanic/Latino	4 (3.3)
Asian	1 (0.8)
Other	2 (1.6)
Decline to respond	1 (0.8)
Parent Characteristics	
Parent age in years	39.7 ± 7.6
Parent gender	
Male	14 (11.5)
Female	108 (88.5)
Parent Race/Ethnicity	
Caucasian	82 (67.2)
African American	26 (21.3)
Hispanic/Latino	6 (4.9)
Asian	3 (2.5)
Multiracial	2 (1.6)
Other	2 (1.6)
Decline to respond	1 (0.8)
Relation to child	
Biological parent	112 (91.8)
Step-parent	3 (2.5)
Adoptive parent	2 (1.6)
Foster parent	1 (0.8)
Grandparent	4 (3.3)
Parent Education	
High school degree or less	19 (15.6)
Some college/vocational school	16 (13.1)
Graduated from college or trade school	64 (52.5)
Graduate degree	23 (18.9)
Parent Relationship Status	
Single	12 (9.8)
Married/partnered	98 (80.3)

Separated/divorced	11 (9.0)
Other	1 (0.8)
Total Household Income	
< $25,000	20 (16.4)
$25,000-$74,999	35 (28.7)
$75,000-$124,999	25 (20.5)
>$125,000	25 (20.5)
Declined to answer	17 (13.9)
Cancer-related characteristics	
Diagnosis	
Leukemia	46 (37.7)
Hodgkin lymphoma	13 (10.7)
Non-Hodgkin lymphoma	7 (5.7)
Kidney tumors	13 (10.7)
Neuroblastoma	8 (6.6)
Soft tissue sarcoma	6 (4.9)
Ewing sarcoma	2 (1.6)
Osteosarcoma	8 (6.6)
Other sarcoma	4 (3.3)
Other malignancy	12 (9.8)
Non Malignant disease	2 (1.6)
Brain Tumor	1 (.8)
Treatment(s)	
Surgical resection	51 (41.8)
Chemotherapy	122 (100.0)
Radiation therapy	29 (23.8)
Bone marrow transplant (BMT)	13 (10.7)
Treatment Intensity	
Level 1: Least Intensity	6 (4.9)
Level 2: Moderately Intensive	46 (37.7)
Level 3: Very Intensive	53 (43.4)
Level 4: Most Intensive	17 (13.9)
Years since diagnosis	2.6 ± 1.2
Months since completion of treatment	15.3 ± 1.7

Note. *N* = 122.

Table 2.

Bivariate and Partial Correlations Among Key Study Variables.

		Global HRQOL	Mental HRQOL	Physical HRQOL	Anxiety[a]
	M (*SD*)	38.52 (6.63)	51.35 (8.81)	52.03 (7.91)	50.52 (10.70)
Psychosocial Risk	1.16 (0.64)	-.54**	-.51**	-.47**	.37**
Positive Problem Orientation	100.54 (13.87)	.18	.21*	.05	-.18*
Negative Problem Orientation	92.49(12.81)	-.38**	-.41**	-.26**	.47**
Rational Problem-Solving	102.40 (14.23)	.08	.10	.02	-.03
Impulsivity/ Carelessness Style	92.97 (12.73)	-.17	-.14	-.17	.26**
Avoidance Style	92.32 (10.71)	-.14	-.15	-.09	.20*

Note. [a]Partial correlations controlling for parent gender. Raw score is presented for Global Health and Psychosocial Risk (PAT), *T*-scores for Mental Health, Physical Health, and Anxiety, and Standard Scores for SPSI-R subscales. *$p \le .05$; **$p \le .01$.

Table 3.

Hierarchical Regression Analysis for Psychosocial Risk and NPO Associated with Parental Global HRQOL.

Global HRQOL	ß	*t*	R^2	ΔR^2	*F*
Step 1			.30***		49.50***
Psychosocial Risk	-.55	-7.04***			
Step 2			.35***	.05**	30.77***
Psychosocial Risk	-.48	-6.04***			
NPO	-.23	-2.96**			

Note. NPO = negative problem orientation; *$p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 4.

Hierarchical Regression Analysis for Psychosocial Risk and Problem Orientation Associated with Parental Mental HRQOL.

Mental HRQOL	*ß*	*t*	R^2	ΔR^2	*F*
Step 1			.26***		42.14***
Psychosocial Risk	-.51	-6.50***			
Step 2			.34***	.08**	20.09***
Psychosocial Risk	-.43	-5.46***			
PPO	.09	1.17			
NPO	-.25	-2.99**			

Note. PPO = positive problem orientation; NPO = negative problem orientation; *$p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 5.

Hierarchical Regression Analysis for Psychosocial Risk and PPO Associated with Parental Mental HRQOL.

Mental HRQOL	*ß*	*t*	R^2	ΔR^2	*F*
Step 1			.26***		42.14***
Psychosocial Risk	-.51	-6.49***			
Step 2			.29***	.03*	24.02***
Psychosocial Risk	-.50	-6.39***			
PPO	.17	2.15*			

Note. PPO = positive problem orientation; *$p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Table 6.

Hierarchical Regression Analysis for Psychosocial Risk and NPO Associated with Parental Physical HRQOL.

Physical HRQOL	*ß*	*t*	R^2	ΔR^2	*F*
Step 1			.22***		33.12***
Psychosocial Risk	-.47	-5.76***			
Step 2			.24***	.01	17.79***
Psychosocial Risk	-.43	-5.07***			
NPO	-.13	-1.46			

Note. NPO = negative problem orientation; $^*p \leq .05$; $^{**} p \leq .01$; $^{***} p \leq .001$.

Table 7.

Hierarchical Regression Analysis for Parent Gender, Psychosocial Risk, and Problem Orientation Associated with Parental Anxiety.

Anxiety	*ß*	*t*	R^2	ΔR^2	*F*
Step 1			.04*		5.46*
Parent Gender	.21	2.34*			
Step 2			.17***	.13***	12.37***
Parent Gender	.12	1.45			
Psychosocial Risk	.37	4.30***			
Step 3			.32***	.14***	13.51***
Parent Gender	.07	.90			
Psychosocial Risk	.26	3.20**			
PPO	-.05	-.63			
NPO	.38	4.51***			

Note. PPO = positive problem orientation; NPO = negative problem orientation; $*p \leq .05$; $** p \leq .01$; $*** p \leq .001$.

Table 8.

Hierarchical Regression Analysis for Parent Gender, Psychosocial Risk, and PPO Associated with Parental Anxiety.

Anxiety	ß	t	R^2	ΔR^2	F
Step 1			.04*		5.46*
Parent Gender	.21	2.34*			
Step 2			.17***	.13***	12.37***
Parent Gender	.12	1.45			
Psychosocial Risk	.37	4.30***			
Step 3			.20***	.03	9.63***
Parent Gender	.10	1.21			
Psychosocial Risk	.36	4.24***			
PPO	-.16	-1.90			

Note. PPO = positive problem orientation; $*p \leq .05$; $** p \leq .01$; $*** p \leq .001$.

Table 9.

Hierarchical Regression Analysis for Parent Gender, Psychosocial Risk, and Problem-Solving Strategies Associated with Parental Anxiety.

Anxiety	*ß*	*t*	R^2	ΔR^2	*F*
Step 1			.04*		5.46*
Parent Gender	.21	2.34*			
Step 2			.17***	.13***	12.37***
Parent Gender	.12	1.45			
Psychosocial Risk	.37	4.30***			
Step 3			.21***	.04	7.67***
Parent Gender	.13	1.54			
Psychosocial Risk	.32	3.75***			
ICS	.16	1.62			
AS	.06	.59			

Note. ICS = impulsivity/carelessness style; AS = avoidance style; $*p \leq .05$; $** p \leq .01$; $*** p \leq .001$.