WHAT MAKES A GOOD DAY FOR YOU? RESPONSES FROM PEDIATRIC

PATIENTS WITH ACUTE LYMPHOBLASTIC LEUKEMIA DURING

THEIR FIRST YEAR OF THERAPY

by

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ABSTRACT

The goal of the study is to explore how pediatric patients with acute lymphoblastic leukemia (ALL) describe what makes a good day during their first year of treatment. This study advances the knowledge base of quality of life (QOL) in children with ALL, specifically the particular influences on their QOL, by asking an open ended question. Unlike past research that typically used Likert-type scales, open ended questions allow patients to report information that may be missed by current QOL tools. Self-reported responses from pediatric patients with ALL, rather than parent-proxied responses as in past studies, also contributes to soliciting information that is usually not volunteered by pediatric patients.

This study is an analysis of data collected from St. Jude Children's Research Hospital in Memphis, Tennessee. The analysis is just one component of a larger study that explored multiple QOL measures associated with a particular cancer protocol (Total XV). Pamela Hinds and her team at St. Jude Children's Research Hospital defined QOL as an overall sense of well-being based on being able to participate in usual activities; to interact with others and feel cared about; to cope with uncomfortable physical, emotional, and cognitive reactions; and to find meaning in the illness experience. One hundred and seventeen children ages 8-18 years old who have ALL were asked "What makes a good

day for you?" Analysis resulted in 28 themes. Data were then analyzed according to age, gender, and three time points within their first year of treatment. Across all ages, genders, and time points in treatment, pediatric patients with ALL reported that being able to do their usual activities, such as participating in typical activities or going to school, was the most important factor in contributing to a good day. Significant findings were that teens with ALL reported the absence of physical or mental symptoms as contributing to a good day more than the younger children across all time points; and females reported social interactions with others, especially family and friends, as contributing to a good day more than males. It was also found the percentage of patients reporting the absence of symptoms as contributing to a good day was greatest at the beginning of treatment; and that being told positive treatment-related news or being able to do self care was found to contribute to a good day later in the first year of treatment. The results from this study also indicate that children ages 8-18 can articulate what makes a good day for them.

Chapter 1

THE PROBLEM

What makes a good day during the first year of treatment for children with leukemia? This is the question for this study. Quality of life (QOL) in pediatric oncology patients is a relatively new area of research. The bases of most pediatric QOL instruments have been derived from research of adults with life-threatening illnesses, developmental theories of childhood and adolescents, or from clinical impressions of pediatric patients (Hinds et al., 2004). Therefore, the conceptual bases are incomplete in their use for pediatric oncology patients. In addition, QOL for pediatric oncology patients is often assessed through their parents. But, obtaining responses for a child through their parents has been found in previous research to not consistently agree with the child's reports of their own QOL, especially in the social and emotional domains of QOL (Matziou et al., 2008).

Likert scales are commonly used in QOL research in the pediatric oncology population to ascertain the impact cancer has on a child's QOL. A Likert scale is an interval-based rating scale in which respondents indicate their level of agreement with statements. Typically there are between four and five options from which a respondent

can choose. Since Likert scales are not open ended, they have not been shown to fully

encompass the meaning or specific concerns of pediatric patients with cancer.

The childhood acute lymphoblastic leukemia (ALL) national survival rate is

approximately 85% (National Cancer Institute's Division of Cancer Control and

Population Sciences, 2006) creating a high census of survivors. QOL in pediatric patients

with ALL has primarily been assessed after the completion of their cancer treatment.

With little research conducted while pediatric patients with ALL are still receiving cancer

therapies, knowledge is lacking in the area of what the QOL in pediatric patients with

ALL is during the course of their treatment. Treatment modalities may be able to be

modified to help improve the QOL of pediatric patients with ALL during their treatment

while still maintaining the treatment protocol's efficacy.

Hinds et al. (2004) conducted two pilot studies aimed to solicit the views pediatric

oncology patients have of QOL during their treatment for cancer. One question that was

asked in each pilot study was "What makes a good day for you?" From the results, a new

definition of the quality of life for pediatric oncology patients was proposed; it is "an

overall sense of well-being based on being able to participate in usual activities; to

interact with others and feel cared about; to cope with uncomfortable physical, emotional,

and cognitive reactions; and to find meaning in the illness experience" (Hinds et al.,

2004, p. 767). Previously established pediatric oncology QOL instruments had not

contained items assessing the meaning of being ill.

Information regarding pediatric patients with acute lymphoblastic leukemia's

current QOL status throughout their treatment is not often considered by healthcare

providers or volunteered by the patient. Simple questions, such as asking what makes a good day for pediatric patients with ALL, could open up an array of opportunities for healthcare providers to help improve a patient's QOL. By allowing pediatric patients with ALL to answer open-ended questions addressing their QOL throughout the course of their treatment, this knowledge gap will be addressed and will enable the child to specifically state what contributes to their QOL.

Purpose

The purpose of this study was to explore what makes a good day in pediatric patients with ALL at St. Jude Children's Research Hospital in Memphis, Tennessee. This information will expand the knowledge base about the QOL in pediatric patients with ALL and subsequently suggest changes in nursing practice and hospital policy.

Problem Statements

The primary problem is: What are the most significant factors according to the six domains of QOL identified by Hinds et al. (2004) that contribute to a good day for pediatric patients with ALL? Secondary questions include: 1) Are there differences between age, gender, and time point in treatment in the QOL of pediatric patients with ALL? 2) Are children between the ages of 8 and 18 able to appropriately answer open ended questions regarding their QOL?

Definition of Terms

Acute Lymphoblastic Leukemia

      Theoretical definition. Acute lymphoblastic leukemia (ALL) is a type of cancer of the blood and bone marrow in both children and adults in which the bone marrow makes too many immature lymphoid cells, a type of white blood cell called lymphoblasts, that cannot help the body fight infections (NCI, 2002). Lymphoblastic leukemia can either be classified as acute or chronic. "The term "acute" means that the leukemia can progress quickly, and if not treated, would probably be fatal in a few months" (American Cancer Society (ACS), 2009a). Chronic lymphoblastic leukemia is when leukemic cells gradually accumulate in the body and people usually do not experience any symptoms for a few years (ACS, 2009c). Since ALL is a hematologic cancer, tumor masses do not form; therefore, the severity of ALL depends on the immunophenotype of the lymphoblasts. According to the ACS (2009b), there are many distinctive subtypes of ALL and different systems used to classify forms of ALL. Tests, such as cytogenic tests, divide ALL into subgroups by taking into account the type of lymphocyte (B cell or T cell) from which the leukemia cells come and the degree of maturation of these cells (ACS, 2009b). B-lymphoblastic leukemia is subdivided by the presence or absence of specific recurrent genetic abnormalities (NCI, 2010a).

      Operational definition. For the purpose of this study, ALL is defined as an Acute Non-B cell lymphoblastic leukemia (T-cell and Precursor B-cell lymphoblastic leukemia).

Pediatric Patient with ALL

    Theoretical definition. A pediatric patient with ALL is a child between the ages of zero and eighteen who has been diagnosed with ALL.

    Operational definition. For the purpose of this study, a pediatric patient with ALL is defined as a child diagnosed with a Non-B cell lymphoblastic leukemia ranging in age from 8 to 18 who is within their first year of cancer treatment at St. Jude Children's Research Hospital under the Total XV treatment protocol.

Treatment for Childhood ALL

    Theoretical definition. The types of standard treatment used in treating childhood ALL include chemotherapy, radiation therapy, as well as bone marrow transplantation. Treatment usually is completed in three phases: 1) induction, 2) consolidation, and 3) maintenance therapy. The total treatment usually takes approximately two to three years with four to six weeks of induction therapy, four to nine weeks of consolidation treatment, and approximately two years of maintenance chemotherapy (ACS, 2009a; Pui et al., 2004). Induction therapy is the time when patients receive a high dosage and high frequency of chemotherapy. The goal of induction therapy is to achieve remission. Remission is a term denoting that there are no leukemic cells found in the bone marrow and that blood counts normalize. Consolidation therapy is the phase of chemotherapy after induction. The goal of consolidation therapy is to reduce the number of leukemic cells left in the body and preventing these cells from developing resistance to the chemotherapies being administered. Maintenance or continuation therapy follows the consolidation phase and begins only when ALL remains in remission after induction and

consolidation therapy. It is characterized by a lower dose and number of chemotherapy drugs.

Patients are enrolled in treatment protocols, a specific and detailed chemotherapy treatment schedule. According to the treatment protocol, patients are required to meet certain blood counts, such as having a particular white blood cell level, before they are able to advance to the next phase of treatment. This criterion is what usually accounts for the variation from patient to patient as to when they move from one phase of therapy to the next. The protocol clearly identifies which patients are eligible to take part in all the treatments being offered, what chemotherapies will be administered, what tests will be done and how often, and what information will be collected (NCI, 2010c).

Operational definition. All pediatric patients with ALL in this study were on the same treatment protocol, Total XV (see Appendix D) and therefore received the same treatment modalities. For the purpose of this study, the treatment time frame for all patients fell within three specific time points within their first year of treatment corresponding to the three phases of treatment: induction, consolidation, and continuation therapy. Time point one, T1, was day 40, at the end of induction therapy which is at least six weeks in this protocol. Time point two, T2, was the seventh week of the nine regular weeks of consolidation therapy after induction therapy; therefore, it was approximately day 89 of treatment. Time point three, T3, was the forty-eighth week of total treatment, approximately day 336, while patients were in their thirty-third week of 120-140 weeks of continuation therapy. However, the time frame of each phase of treatment varied per patient according to their blood level counts. The treatment protocol consists of multiple

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chemotherapies including prednisone, vincristine, methotrexate, daunorubicin, E coli

asparaginase, cyclophosphamide, mercaptopurine, cytarabine, etoposide, and

dexamethasone. These chemotherapies were primarily administered intravenously;

however, according to the Total XV protocol, a few of these chemotherapies were given

intramuscularly, and intrathecally. The Total XV treatment protocol for pediatric patients

in this study also varied slightly among patients according to three risk groups—low,

standard and high-risk (see Appendix E).

Quality of Life (QOL)

Theoretical definition. Quality of life is an ill-defined term and there have been

many attempts at defining it. QOL has been thought to represent the widest range of

human experience, as a subjective report of wellbeing; it "…means different things to

different people, and takes on different meanings according to the area of application"

(Fayers & Machin, 2000, p. 3).

Operational definition. For the purpose of this study, quality of life is defined in

regards to pediatric patients with ALL at St. Jude Children's Research Hospital as the

"overall sense of wellbeing based on being able to participate in usual activities, to

interact with others and feel cared about, to cope with uncomfortable physical, emotional,

and cognitive reactions, and to find meaning in the illness experience" (Hinds et al., 2004,

p. 767) and is conceptualized into six different domains. These domains are symptoms,

usual activities, social/family interactions, health status, mood, and meaning of being ill.

Significance

The results of this project will allow health care providers to move beyond the medical treatment of a child with ALL by integrating the voice of the patient into their treatment plan. Measuring QOL in pediatric patients with ALL may help families and healthcare professionals choose specific treatment strategies, with the ultimate goal of increasing the number of patients who are experiencing a good day. No other large scale study has explored what contributes to pediatric patients with ALL experiencing a good day. Self reporting in open ended questions, as in this study, allows pediatric patients to report certain information that they may not otherwise volunteer to healthcare providers or parents. For this reason, patient self-report is considered the standard for measuring perceived QOL in children (Varni, Limbers, & Burwinkle, 2007). Analysis of the responses to "What makes a good day for you?" will expand the knowledge base of what makes a good day for pediatric patients with ALL. Changes to nursing practice and hospital policies may be able to be made to accommodate these responses. Implementing measures to improve the quality of how patients feel into their daily care may have an immense positive impact on their QOL. Implications of this study could influence nursing care and hospital policies by adding a question during admission for the patient to report what makes a good day for them; therefore, the data would be accessible by all members of the healthcare team. Other policies that are already found in some institutions but should be in place in all pediatric oncology units include allowing liberal visiting policies, having Internet access for email and website updates, and ensuring phone access and available social networking for pediatric patients with ALL.

Chapter 2

REVIEW OF LITERATURE

This literature review will examine recent studies about quality of life (QOL), especially those that relate to the pediatric oncology population. The term, quality of life, was first reported in 1920 in relation to economics and welfare (Wood-Dauphinee, 1999) but it was not until the late 1970s when the first measure of QOL for patients was developed. The 1980s and 1990s were when the instruments measuring QOL began to become sensitive to age and disease of the patients. To date, most QOL research in pediatric cancer has been conducted to develop reliable and valid instruments that detail expected QOL outcomes in the pediatric oncology population (Sung et al., 2009). However, these tools have primarily focused on assessing the QOL of patients after the completion of their treatment. It is expected that "QOL should be very different between children receiving active treatment *vs* those who have completed treatment, as the treatment period is predominated by toxicities of therapy and often radical changes in normal day-to-day routines for the child and the family" (Sung et al., 2009, p. 87). This chapter will give a general synopsis of acute lymphoblastic leukemia (ALL) and explore studies on QOL in children and adolescents with cancer.

Acute Lymphoblastic Leukemia

Three thousand children are diagnosed each year in the United States with ALL (ACS, 2009d) comprising approximately 15% of all childhood cancers under age 18 (National Cancer Institute's Division of Cancer Control and Population Sciences, 2006) making ALL the most common childhood cancer. ALL occurs when there is an overproduction of immature white blood cells called lymphoblasts. Lymphoblasts proliferate and overcrowd the bone marrow inhibiting other blood cells from forming. Due to the immaturity of lymphoblasts, they are not able to function appropriately and the patient is left without a functioning immune system. "ALL is most common in early childhood, peaking between 2 and 4 years of age, is slightly more common among white children than among African-American and Asian-American children, and is more common in boys than in girls" (ACS, 2009d).

The many different and distinct subtypes of ALL include T-cell and B-cell. T-cell ALL is a fast and aggressive type of blood cancer in which too many T-cell lymphoblasts are found in the bone marrow and blood (NCI, 2010d). Precursor B-cell ALL is an aggressive type of leukemia in which too many B-cell lymphoblasts are found in the bone marrow and blood (NCI, 2010b). The diagnosis of childhood ALL in the pediatric population is determined as follows. If a child has symptoms that suggest leukemia [fever, fatigue, frequent infections, swollen lymph nodes], the physician may first order blood tests to determine the quantity of blood cells and the morphology of the cells to ascertain if any leukemic cells are present. For a definitive diagnosis of ALL, a sample of bone marrow is examined and is obtained by a procedure called bone marrow aspiration.

In this procedure, the doctor inserts a needle into a large bone, usually the iliac crest of the hip, and a small amount of liquid bone marrow is removed for examination. If leukemic cells are found in the bone marrow sample, other tests are ordered to determine the extent of the disease (NCI, 2010a).

Chemotherapy is the primary treatment for ALL. The specific chemotherapy drugs vary according to the subtypes of ALL and the treatment protocol in which patients are enrolled. Treatment protocols for children with ALL are complex and involve multiple drugs given in precise schedules over a period of approximately two to three years (NCI, 2010a). To date, treatment protocols for children with ALL continue to be developed with changing medication types, dosages, and frequencies.

From the fine-tuning of treatment protocols, the five year survival rate of children with ALL has drastically improved. Five year survival rate is a term used with cancer patients referring to the percentage of patients who live at least five years after their cancer was diagnosed, for it is rare for cancers to return after such a period of time (ACS, 2009d). The improvement in survival for children with ALL has been a great success of research on cancer treatments. Five percent of children with ALL survived for more than five years in the 1960s. Today, the United States national five year survival rate for children with ALL is approximately 85% (NCI, 2010a). At St. Jude Children's Research Hospital, the site of this research, the average five year survival rate of a child diagnosed with ALL has risen from 4% in 1962 to approximately 94% (St. Jude Children's Research Hospital, 2010a). Due to the rising rate of children surviving ALL, there has been a shift

in the literature to focusing not only on curing children diagnosed with ALL, but also maintaining their QOL through and after their treatment regimens.

Quality of Life in Pediatric Oncology Patients

Several studies have assessed the quality of life in pediatric oncology patients. The largest was conducted by Sung et al. in 2009. It focused on QOL by describing physical, emotional and social parameters in pediatric cancer patients while they were receiving active treatment for cancer. Three hundred and seventy six patients, 214 of whom had ALL, from five Canadian tertiary care centers were included in this study. Inclusion criteria included participants being two years of age and older, actively receiving treatment for any type of cancer, and being diagnosed with cancer at least two months before joining the study. All study participants' parents completed the QOL questionnaire, PedsQL. PedsQL is a multidimensional instrument that has been demonstrated to be reliable and valid in the healthy pediatric population as well as in children with cancer (Varni, Limbers, & Burwinkle, 2007). Specifically, the PedsQL 4.0 Generic Core scale was used. This is a 23-item, Likert scale instrument reflecting physical, emotional, social and school functions. This study found that being an older child and having more intensive chemotherapy treatments were both "…independently associated with worse physical, emotional and social functions" (Sung et al., 2009, p. 84). Female patients were found to report poorer social functioning than male children with cancer. Those diagnosed with ALL were found to report better physical functioning than children with other types of cancers. This finding by Sung et al. was consistent with

previous research (Meeske, Katz, Palmer, Burwinkle, & Varni, 2004; Varni et al., 2007). Another interesting finding was that if a parent or sibling had a chronic condition, it was associated with worse physical and emotional QOL domains in the child with cancer; however a possible explanation to this finding is that "it is possible that parents who perceive their own health or the health of their other children as worse may also perceive that the child with cancer has worse QOL" (Sung et al., 2009, p. 86). Thus, a limitation to this study was that only parent-proxied QOL reports were utilized to gather the QOL data for children with cancer.

QOL changes from the time of diagnosis of a child with ALL to the completion of treatment for those who only received chemotherapy was investigated by Peeters et al. in 2009. Time point one was between zero to two weeks after the diagnosis was made; time point two was at the completion of the re-induction, or consolidation, phase; time point three was at the end of maintenance, or continuation, therapy. Ninety-six patients between the ages of two and eighteen were enrolled in the study. The QOL instruments used in this study were the parent-proxied, POQOLS tool, and self-proxied, KINDL tool.

"POQOLS is a cancer-specific tool to measure health-related quality of life from the parent perspective with high levels of internal consistency and inter-rater reliability" (Peeters et al., 2009, p. 157). Twenty one items are included on the tool comprising aspects of physical complaints, emotion, and activity of the child with cancer in a Likert scale format. KINDL is a self-proxied test with good internal consistency and discriminative validity to measure QOL amongst children (Peeters et al., 2009). The KINDL test is also a Likert scale questionnaire with three options from which the child

can choose: never, sometimes, or very often. QOL was found to increase over time during chemotherapy treatment, especially in physical and mental function of QOL. Specifically, physical activity and complaints improved according to the POQOLS responses and physical and mental functions improved according to KINDL findings. This finding was not related to age and reflects the positive impact of chemotherapy from the time children are diagnosed with ALL to the completion of therapy. Although QOL did improve over time, the QOL in study participants was still lower than the general population of children ages two to eighteen.

Research by Landolt, Vollrath, Niggli, Gnehm, and Sennhauser in 2006 focused on the QOL in children with cancer during the first year after diagnosis. More specifically, the goal of the study was to show an association between parental psychological adjustment and child self-reported QOL in pediatric oncology patients. Fifty-two patients between the ages of six and a half and fifteen years were enrolled into this study if they had no other major illness and were newly diagnosed with cancer. The TNO-AZL Questionnaire for Children's Health-Related QOL (TACQOL) was self-proxied and the Brief Symptom Inventory (BSI) was completed by the parents at six weeks and one year post diagnosis. The BSI "measures the presence and intensity of psychopathological symptoms in adults" (Landolt et al., 2006, p. 3). TACQOL is a QOL instrument consisting of five health measure scales assessing physical functioning, basic motor functioning, autonomy, cognitive and social functioning. In addition, two scales are used to assess mood; positive emotional functioning and negative emotional functioning.

Better parental adjustment was found to be associated with better QOL in the child. It was also found that there was a greater diminished QOL in physical, motor, and emotional domains reported by children six weeks post diagnosis than at one year which is consistent with previous findings by Eiser, Eiser, & Stride in 2005. Although these findings were not statistically significant, it is important to note that at six weeks post diagnosis, leukemia patients were most affected by the majority of QOL dimensions and also had the most significant improvements in QOL between six weeks and one year in comparison to other diagnostic groups. A limitation of this study is its small sample size along with the TACQOL being a generic measure of QOL in pediatric patients. Therefore, this tool may lack sensitivity for problems associated specifically with pediatric oncology patients.

Quality of Life in Adolescent Pediatric Oncology Patients

Wu et al. (2007) conducted a study to assess the QOL of adolescent cancer patients in twenty institutions across the United States using the Minneapolis-Manchester QOL Adolescent Questionnaire. This questionnaire was developed specifically for adolescent cancer survivors and is a "self-report questionnaire whose sensitivity, validity, internal consistency, and test-retest reliability have been demonstrated previously" (Wu et al., 2007, p. 679). Three hundred and sixty two patients with a history of cancer ages 13-20 at the completion of the questionnaire and 134 healthy adolescents were included in this study. It was found that female patients on therapy were at a significantly higher risk of reporting poor overall QOL. Specifically, the female gender was at a significant risk

for poorer physical functioning, psychological functioning, cognitive functioning, body image, and outlook on life. In addition, older age (18- 20 years old) was associated with significantly elevated risk estimates for poorer outlook on life compared to 13-14 year old patients on therapy (Wu et al., 2007).

The study indicated that the long-term impact of cancer and its treatment on adolescent QOL is modest and QOL does not differ in healthy controls and those patients off therapy. Specifically, "cancer patients on active therapy were at a significantly increased risk for poor overall QOL and physical functioning when compared with healthy controls" (Wu et al., 2007, p. 681). Vulnerable sub-populations were identified in the cancer patients. These included older participants, females, and non-whites who held a more negative perception of psychological, social, and physical functioning and body image (Wu et al., 2007).

Abrams, Hazen, and Penson conducted a research study on adolescent oncology patients (2007). They found that the adolescent is at a fragile point of finding himself at the same time as facing multiple physical and social changes. The cognitive maturity needed to understand the multiple demands of cancer "may overwhelm the adolescent's newly acquired independence and necessitate reliance on a parent" (Abrams et al., 2007, p. 623). Initially adolescents cope with their diagnosis by "…relying on social supports, believing in recovery, and getting back to a normal life as soon as possible" (Knygas et al., 2001, p. 110). However, four to eight weeks after diagnosis, the main rates and types of distress reported by adolescents were physical concerns, personal changes, and

treatment-related worries and staff were not as adept at recognizing the causes and depths

of distress (Hedstrom, Ljungman, & vonEssen, 2005).

Quality of Life Measures

A QOL instrument must be multidimensional, consisting at the minimum of the

physical, mental, and social health dimensions (Fayers & Machin, 2000). From the

previously mentioned studies, it is apparent that there are many QOL instruments being

used in the literature. Research into quality of life of pediatric patients "has evidenced a

dramatic increase in the development and utilization of pediatric health-related quality of

life measures in an effort to improve pediatric patient health and determine the value of

health care services" (Matza et al., 2004; in Varni, Burwinkle, & Lane, 2005, p. 1). The

three most widely used measures of QOL in pediatric oncology patients are the PedsQL,

the Health Utilities Index (HUI), and the CHQ instruments (Banks, Barrowman, &

Klaassen, 2008). It has been found that different modes of assessing QOL may provide

different responses to the same area of interest, such as physical, emotional, mental, or

social functions of QOL (Wood-Dauphinee, 1999).

Starting on the third day of the pediatric patient's chemotherapy treatment cycle,

Banks et al. conducted a study to assess the correlation of parent and child responses on

the PedsQL, the CHQ, and the HUI QOL measures at one week intervals for a total of

four weeks (2008). These three QOL instruments recorded both parent and self reports for

all 29 patients enrolled, 62% of whom were diagnosed with leukemia. Patients ranging

from 2 to 18 years of age were included in this study. It was found that "over the 4 weeks

of a typical course of chemotherapy, a child with cancer can experience significant change in their QOL" (Banks et al., 2008, p. 294). There was a greater change in the PedsQL instrument over the 4-week study period and less of a change in the HUI and the CHQ, showing that the PedsQL instrument is most responsive to change when measuring QOL repeatedly in a heterogeneous population (Banks et al., 2008). This study also found, as previous research has indicated, that parent proxy respondents tended to report lower QOL than their child did. Limitations of this study include participants being on a variety of different chemotherapy regimens and the small sample size. In addition, almost a quarter of the patients enrolled in the study were less than five years old and children less than ten years of age could only complete the PedsQL. Therefore, the parent responses were used for comparison in most cases since only eleven children completed all three QOL measures.

Pediatric Self Report of Quality of Life

Varying modes of measuring QOL may provide different responses between self-report and parent proxy responses. Therefore, it matters who actually completes the questionnaire. Past research has generally demonstrated a tendency for the parents of children with serious illness to report a poorer QOL than their child self reports, or to underestimate the QOL of their children on various domains including mental, physical, and general QOL (Britto et al., 2004; Levi & Drotar, 1999; Parsons, Barlow, Levy, Supran, & Kaplan, 1999; Sprangers & Aaronson, 1992; Wood-Dauphinee 1999; as cited in Russell, Hudson, Long, & Phipps, 2006). Two studies used self-report measures in

children as young as five years old. However, children of younger ages were reported to have an increased difficulty responding to items and had a greater variance in their responses (Varni, Burwinkle, Katz, Meeske, & Dickinson, 2002; Zeltzer et al., 1988; as cited in Linder, 2005). Children seven years of age and older were reported to successfully and subjectively complete self-report measures of QOL. Parent proxy reports may serve as adequate reports of young children's symptoms below the age of seven (Collins et al., 2002; Hockenberry et al., 2003; Lo & Hayman, 1999; Phipps, Dunavant, Jayawardene, & Srivastiva, 1999; Tyc et al., 1993; Varni et al., 2002; as cited in Linder, 2005). However, parent-proxied reports of less directly observable symptoms, such as delayed nausea, should be implemented with caution (Linder, 2005).

A comparative study by Russell, Hudson, Long, and Phipps in 2006 examined the consistency and agreement between parent and child reports of QOL in pediatric cancer patients. There were three subgroups in this study: 1) children receiving active cancer treatment at least one month post diagnosis, 2) children with cancer off treatment, and 3) a healthy control subgroup. Seventy-one patients were receiving active treatment, 25 of whom had ALL; 128 patients were off treatment, 22 of whom had ALL; and 108 were healthy control participants. Each child involved in the study also had a parent participating. The Children's Health Questionnaire (CHQ) is a generic QOL measure that is available in both child and adult report format. This study used a 50 item report version "covering 10 different domains, including physical functioning, role/social limitations-physical, general health perceptions, body pain, change in health, impact on the family, role/social limitations-behavioral, self-esteem, mental health, and general behavior"

(Russell et al., 2006, p. 2269). The child's version had 44 overlapping items to the parent report; and only these overlapping items were used in the analysis.

The children in the two cancer groups studied by Russell et al. (2006) did not differ in the role/social limitations-physical scale and the general health perceptions scale from each other; however, they were lower than the control group's report. Children in the cancer group receiving treatment reported a significantly lower QOL score in the body pain scale than the children in the off treatment group and the control group, who did not differ from each other. Parents reported a worse QOL than their children off treatment from cancer on the general health perceptions scale. Parents reported a worse QOL than their children receiving cancer treatment on the physical functioning scale and the role/social limitations-physical scale. In the control group, parents reported a significantly better QOL than the child in 8 out of the 10 CHQ scales. The trend for parents to underestimate QOL in their child was present in the cancer samples on most scales of the CHQ; the difference was seldom found to be statistically significant. "In the cancer group that was receiving treatment, the lowest parent-child agreement was with regard to physical functioning and physical limitations" (Russell et al., 2006, p. 2271). Parents on these two subscales overestimated the challenges faced compared to the child's report.

Age tends to be a significant factor in the use of self-reported QOL measure in the pediatric oncology population. "Recent results of pediatric studies in general and childhood ALL in particular, indicate that by the age of 7 or 8 years, children generally provide reliable responses and, moreover, children can often provide information that is unavailable from parental reports" (Parsons & Brown, 1998; Parsons et al., 1999; Pickard

et al., 2004; as cited in Peeters et al., 2009, p. 160). This is further exemplified by the fact that three of the five studies found in the Journal of Pediatric Psychology between January 2002 and January 2007 assessing the QOL of pediatric cancer patients and survivors from both the perspective of the child and parent did not include child self report for children under the age of 8 years (Varni, 2007). Findings of these studies indicate that children under the age of eight have greater difficulty in reporting their QOL. Children as young as eight years of age are able to self report their symptoms and QOL subjectively and accurately.

Summary

It is evident that there is little research in the nursing literature exploring QOL in pediatric patients with ALL during the course of their treatment. Open ended questionnaires have not been previously used in this population to explore QOL; Likert scales are the predominant QOL instrument utilized and parent proxies are often the sample tested. Studies compare age, gender, and time point in treatments according to various domains of QOL including physical, emotional, social, and mental functions in pediatric oncology patients. All of these factors and domains of QOL are pertinent in the exploration of QOL in pediatric patients with ALL during the course of their treatment.

Chapter 3

METHODOLOGY

The purpose of this study was to explore what makes a good day for pediatric patients with acute lymphoblastic leukemia (ALL) at St. Jude Children's Research Hospital in order to expand the knowledge base regarding quality of life (QOL) in this population. This chapter will discuss the design, setting, sample, approvals, instrumentation, data collection, and data analysis for this study.

Design

This analysis is part of an ongoing single-site descriptive qualitative study at St. Jude Children's Research Hospital. The overall study is comprised of 5 to 6 total time points in therapy, depending on the gender of the patients, and spans over the patients' first two years of treatment. This study reports on the first three time points of the overall study which fall within patients' first year of therapy.

Setting

The data were collected at St. Jude Children's Research Hospital in Memphis, Tennessee from 2000 to 2007. This is the largest freestanding pediatric cancer center in

the United States whose "…mission is to find cures for children with cancer and other catastrophic diseases through research and treatment" (St. Jude Children's Research Hospital, 2010b). No child is denied treatment due to the inability to pay; St. Jude Children's Research Hospital covers all costs that a patient's insurance does not cover. St. Jude Children's Research Hospital specializes in researching pediatric cancers and has been designated as the first and only pediatric Comprehensive Cancer Center by the National Cancer Institute. St. Jude is a 78-inpatient bed non-profit hospital that treats the majority of its patients on an outpatient basis. Approximately 260 patients are seen each day, averaging 5,700 patient visits each year. The population served by this hospital includes children from all 50 states and from around the world, with a variety of races, religions, ethnic and socioeconomic backgrounds (St. Jude Children's Research Hospital, 2010b).

Sample

The patient study group consisted of all patients who met the inclusion criteria and agreed to participate. The study group included pediatric patients with ALL enrolled in the Total XV treatment protocol (See Appendix A and B) at St. Jude Children's Research Hospital; were between the ages of 8 and 18 years old; spoke English or Spanish; and stayed on the Total XV protocol. The study group excluded patients who received a bone marrow transplant or a more aggressive therapy regimen as well as those under the age of 8 years.

A total of 500 patients were enrolled in the Total XV treatment protocol for pediatric patients with ALL at St. Jude Children's Research Hospital and 150 patients (30%) met the inclusion criteria. Three hundred-fifty patients were excluded from the study for the following reasons: 12 declined, 1 had no forms available in their primary language, 23 were not evaluable, 3 were missed, 1 was off protocol before the first time point, and 1 had parent participation only for QOL measurements. Two hundred and twenty-five patients were less than 5 years of age and 84 were between the ages of five and seven.

Of the 150 eligible patients, only 129 were still in the sample at the time of the first measurement for this study; nine patients refused to fill out the Good Day questionnaire form, four patients did not return the questionnaire, one patient was too ill to fill out the form, four patients were missed, and for three patients there was a language barrier to completing the Good Day questionnaire. An additional twelve patients did not answer the Good Day question on the questionnaire (See Appendix C). Therefore, the final sample size for this study is 117 at T1 (90.7%).

Between T1 and T2, one patient expired and five children required bone marrow transplant that resulted in them no longer meeting study eligibility. At T2, 120 patients were offered the questionnaire but only 110 responded. Ten patients did not answer the Good Day question on the questionnaire. Between T2 and T3, twenty-three patients were no longer eligible for the study. At T3, 102 were offered the questionnaire, but only 72 responded. Thirty patients did not answer the Good Day question on the questionnaire; no reasons were given for this refusal at T3.

Demographic data of eligible participants studied included sex and age (See Table 3.1). Age was rounded to the nearest year. The 117 participants who were included in the study analysis were further classified into cohorts according to age: child or teen. Participants were considered as a child if they were between 8 and 12 years of age during data collection for the first time point of this study; and participants were classified as teens if they were between 13 and 19 years of age at the first time point. Sixty-six study participants were classified as children (8-12 years of age) and 51 study participants were classified as teens (13-18 years of age). The overall mean age of the sample was 12.7 ± 3.2 years. The average age of the child cohort was 10.4 ± 1.6 years and the average age of the teen cohort was 15.8 ± 1.6 years. The majority of the sample was male (60.7%), which is consistent with a higher prevalence of ALL in the pediatric male population. The greater part of the study participants were treated on a clinic outpatient basis. Data on race were not available for this analysis.

The study sample, which excluded those pediatric patients with ALL under the age of eight, tended to be older than the US pediatric ALL population. The majority of study participants were between the ages of 8 and 12, signifying that this study population does trend towards younger children being diagnosed with ALL. However, in the overall population the primary age for ALL is in children 2 to 3 years of age (>80 per million per year); the rates

Table 3.1.

Demographic Characteristics of Study Sample at Time Point One

Characteristic		Study Sample	Percent Distribution
SEX			
Female		46	39.3 %
Male		71	60.7 %
	Total (n)	117	100 %
AGE (years)			
Child	(8-12)		
Mean		10.2	
Median		9.9	
Mode		8.5	
	Total (n)	66	56.4 %
Teen	(13-18)		
Mean		16.1	
Median		15.8	
Mode		14.8	
	Total (n)	51	43.6 %

decrease to 20 per million for ages 8 to 10 years. "The incidence of ALL among children

ages 2 to 3 years is approximately fourfold greater than that for infants and is nearly

tenfold greater than that for adolescents aged 16 to 21 years" (NCI, 2010a). An explanation for the demographic difference in age between the study sample and the US pediatric ALL population is the sample inclusion criteria. In order for pediatric patients to be at the developmental level to answer open-ended questions, previous research has shown that age eight is when children are able to do so. Therefore, in order for this sample to answer the study question, the lower age limit was set at eight.

Instrumentation

In 2004, nursing researchers from St. Jude Children's Research Hospital met with the members of the Health Promotion and Quality of Life working group in the Cancer Control Program at St. Jude Children's Research Hospital. Existing literature, instruments, and the qualitative data from studies of childhood cancer that were completed at St. Jude Children's Research Hospital were discussed (Hinds et al., 2004). From these meetings, three interview questions were developed to directly solicit from children and adolescents their perspectives about their quality of life while receiving inpatient or outpatient cancer treatment. A pilot study was conducted utilizing all three questions. The lead-in prompt and three questions were as follows:

" 'When getting treatment for cancer, some days are good days, and some days are

bad days.'

1. What makes a good day for you?

2. What makes a bad day for you?

3. Are there some things you like to do that you cannot do now?" (Hinds et al., 2004, p. 762)

During one interview in a pilot study "…a patient, a 10-year-old girl, made the following statement, 'you did not ask all of the right questions.' When prompted to explain that statement, the patient added, 'you should ask, ''how has being sick been for you?'' The question 'how has being sick been for you?' was then added to the list of interview questions and posed to the subsequent participants" as question 4 (Hinds et al., 2004, p. 762).

A second pilot study was then conducted utilizing only questions 1 and 4 in order "to reduce the burden for participants responding to quality-of-life questions without sacrificing variability or completeness in responses" (Hinds et al., 2004, p. 765). This second pilot study laid the foundation for the current study.

The tool utilized to collect information for this study was an open ended questionnaire (See Appendix C). Participants were handed the tool with a lead-in prompt and two questions as follows:

"Some days are good days and some days are bad. Would you please tell me:

What makes a good day for you?

How has being sick been for you?"

Spaces were left between each question for study participants to write their responses without any text limit. The PedsQL, one of the most common QOL tools used in pediatric oncology patients, was also completed by the patient and a parent at each time

point in this study. The PedsQL consists of a five point Likert scale to determine how problematic a particular item has been for the child and asks the child to reference, at most, the past seven days in the responses. For the purpose of this study, only responses to the question, "What makes a good day for you?" were analyzed.

Study Approvals

The study proposal was submitted and approved by the Human Subjects Review Board of St. Jude Children's Research Hospital. Patients were enrolled into the study only if parents consented to the study and patients verbalized informed consent to participate. Per approval of the Director of Nursing Research, Dr. Belinda Mandrell, the data were to be analyzed at the University of Delaware, where the senior thesis is being completed. Approval was then received by the University of Delaware's Institutional Review Board.

Data Collection

Eligible patients for this study were identified by electronic notification from the hospital's Central Protocol and Data Management Office (CPDMO) each time a patient was enrolled in the Total XV treatment protocol. Written consent was obtained from parents and verbal assent was received from eligible patients for QOL measurements by a study team member. Once consent was obtained, the Peds QL questionnaire and the "Good Day" questionnaire were distributed by a study team member to the patient at the appropriate time points. Data collection for the first time point of the study was between November of 2000 and December of 2007. Enrollment ended at this time because patients

were no longer being enrolled in the Total XV treatment protocol. All researchers administering the questionnaires were members of the Nursing Research division at St. Jude Children's Research Hospital who completed initial and quarterly training in interviewing techniques for research throughout the study.

Data were collected over three time points: day 40 of induction therapy; week 7 of consolidation therapy; and week 48 of consolidation therapy (approximately one year of treatment). The locations where the questionnaire was administered varied, but most were completed in the hospital's clinic rooms. Each response was self reported.

Data Analysis

For the purpose of this study, only the responses to the question 'What makes a good day for you?' were analyzed. Current analysis includes all self reported responses to this question at all three time points. Analysis was tabulated from multiple perspectives: 1) the total number of responses made by a pediatric patient with ALL based on the identified codes or domains of QOL and 2) the total number of pediatric patients with ALL who reported a code categorized into a domain of QOL. Analysis of the responses was also analyzed according to age, gender, and time point in treatment. Responses were entered into the Caregiver Recording Information System (CRIS) software program. Each phrase was analyzed for meaning independently by at least three study group members. The trained nursing researchers reviewed patient responses and assigned key phrases with codes. According to established qualitative research principles, as data were collected, codes were established. Codes continued to be established when

new, unique responses were given that did not fit the pre-established codes. This process repeated until the point of data saturation was met and no new codes were being identified. As codes were established, a coding dictionary evolved to define each code. All patients' responses were again coded independently by a minimum of three researchers using the coding dictionary. Fifty-one codes were originally developed and were combined into 28 codes by the St. Jude Children's Hospital Research team.

Six domains of QOL were identified by the Hinds et al. study (2004) and were utilized in this analysis. The domains '*Symptoms*,' '*Usual Activities*,' '*Social/Family Interactions*,' '*Health Status*,' '*Mood*,' and '*Meaning of Being Ill*' (See Appendix D) were derived from the definition of QOL. To combine the frameworks from Hinds et al. and the 28 codes, as denoted in parentheses, this study divided the codes into their respective domains with input from the coordinator of the overall research study at St. Jude Children's Research Hospital as well as a doctorally prepared pediatric nurse educator (See Appendix E).

A patient not able to do usual activities such as participate in sports, play, or attend school (Do Usual) falls into the domain of QOL, *'Usual Activities,'* along with the other codes of patients reporting feeling or seeing themselves like others or like themselves when they are feeling well (Be Normal) and going places or being entertained (Go Places). The code of not experiencing symptoms (No Sick) falls into the domain of QOL '*Symptoms.*' Other codes under the domain '*Symptoms*' include the patients not experiencing nausea, being able to eat, or eating favorite foods (Able Eat); having more

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strength and energy (Energy); getting more sleep (More Rest); and having no unexpected symptoms occur (Smooth).

A patient having a connection with friends by talking with them or being contacted by them (Friends) fell into the category of '*Social / Family Interactions.*' This domain of QOL includes seven other codes. These include being able to be at home (At Home), being with their family (Family), or when others are doing well (Fine). In addition, the '*Social / Family Interactions*' domain of QOL includes the patient receiving gifts or mail (Gift Mail), helping others (Meaningful Interactions), being with others who they met at the hospital, including health care providers (Others), or being visited by others in general (Visits). The code denoting the need to go to the hospital or undergo any sort of treatment (No Hospital) falls into the '*Health Status*' domain of QOL. Other codes that fell into the domain of '*Health Status*' included having good medical reports or laboratory levels (Counts), having a brief visit at the hospital (Short Stay), or being able to take care of themselves (Take Care).

The domain of '*Mood*' is comprised of four codes: being in a positive mood (Good Mood), not being antagonized by siblings or others (No Antagonist), believing in a higher entity (Spirit), or when there is nice weather (Nice Weather). The domain of '*Meaning of Being Ill*' contains two codes: being able to do special things as a result of being ill (Benefit) or just being alive (Just Live). An '*Other*' category was created to include codes that did not fit into the six previously defined domains of QOL. The '*Other*' category included the codes in which patients were uncertain about how to respond to the question (Not Sure) or when the data were not interpretable (UNC). Inter-

rater reliability estimates (percent agreement) ranged for all 28 codes at each time point

ranged from 96.3% to 98.1% within and across all responses. An overall inter-rater

agreement of 97.3% was achieved.

An example of this process is as follows. A female teen patient during the second

time point of the study (the middle of consolidation therapy), responded to the question

"What makes a good day for you?" by writing "When I feel well. When I talk to friends.

When I don't come to the hospital. Basic stuff—if I get around well, can walk easily, I

feel good." There are five codes found in this response: *Be Normal, Do Usual, Friends,*

No Hospital, and *Take Care* (for code definitions see Appendix E). The code *Friends* is

denoted by the key phrase "When I talk to friends." *Friends* was defined as: Patient

considers having a connection with friends (talking with them, being contacted by them,

etc.) to contribute to a good day in treatment. *Friends* was then categorized into the

'*Social/Family Interactions'* domain of QOL which is defined as: The ability and

opportunity to interact with others (relatives, friends, other patients, or animals) and to

feel cared about or acknowledged by others" as contributing to a good day (See Appendix

E). Responses to the question "What makes a good day for you" were entered into

SPSS and were analyzed using frequency tables for both numbers of patients responding

as well as the total number of responses for each code. These frequencies were then

reanalyzed by their respective domains. These results were then differentiated by gender,

age group and time point in treatment.

Chapter 4

RESULTS

This chapter contains the description of the research findings. For this study, one hundred and seventeen pediatric patients with ALL who were between the ages of eight and eighteen responded to the open-ended question "What makes a good day for you?" during their first year of chemotherapy. A total of 28 codes were identified and 666 responses were tabulated from the study participants across all time points. The most common responses that contributed to a good day were to the following codes: 1) "Do Usual" where the patient was able to do usual activities, such as being able to play attend school, or take part in physical or quiet activities, 2) "No Sick" where the patient had no symptoms or did not feel ill or in pain, 3) "Friends" where having a connection with friends by talking with them or being contacted by them contributed to a good day, and 4) "No Hospital" where not needing to go to the hospital or undergo any sort of treatment contributed to a good day for patients (See Appendix E). These accounted for 24.2%, 14.0%, 9.2% and 7.8% of responses by the total number of responses respectively (See Table 4.1).

Table 4.1.

Most Frequently Reported Codes According to Age and Time Point in Treatment

Variable	Total # of Responses	Percent of Responses by n	Percent of Responses by Total # of Responses
Child			
T1 (n = 66)	167		
Do Usual	42	63.6	25.1
No Hosp	20	30.3	12.0
No Sick	15	22.7	9.0
T2 (n = 60)	118		
Do Usual	27	45.0	22.9
Family	14	23.3	11.9
No Hosp	12	20.0	10.2
No Sick	12	20.0	10.2
T3 (n = 43)	110		
Do Usual	38	88.4	34.5
Friends	16	37.2	14.5
No Hosp	8	18.6	7.3
Teen			
T1 (n = 51)	124		
No Sick	31	60.8	25.0
Do Usual	11	21.6	8.9
No Hosp	10	19.6	8.1
Friends	10	19.6	8.1

Table 4.1. cont.

T2 (n = 50)	124		
Do Usual	25	50.0	40.3
Friends	19	38.0	15.3
No Sick	18	36.0	14.5
T3 (n = 29)	92		
Do Usual	18	62.1	19.6
No Sick	17	58.6	18.5
Friends	16	55.2	17.4
All Ages and Time Points (n=117)	666		
Do Usual	161	137.6	24.2
No Sick	93	79.5	14.0
Friends	61	52.1	9.2
No Hosp	52	44.4	7.8

Note. Percentages do not total to 100%; they only include the top 4 calculated codes.

Each patient response, on average, included 2.2 ± 1.8 codes in their responses to the question, "What makes a good day for you?" For the code pertaining to doing their usual activities, patients across all ages and time points averaged 1.4 responses. This equated to 137.6% of total responses to this code by the sample and denoted being able to do usual activities, such as play, contributed to a good day for them. Not feeling physically or mentally sick, interacting with friends in any way, and not being at the

hospital or receiving treatment were reported in 79.5%, 52.1%, and 44.4% of responses, respectively as to what contributes to a good day.

The child age group consistently reported that being able to do their usual activities is what contributed to a good day (ranging from 45.0% - 88.4% of patients). Being able to play or go to school or do normal activities for the patient was found to be most reported at the third time point in treatment (T3). Not being in the hospital was rated either number 2 or 3 at all time points (ranging from 18.6% - 30.3% of patients). Spending time with family was reported as number two at the second time point (T2) (23.3% of patients). At T3, interacting with friends was number two (37.2% of patients).

For the teen age group, 60.8% of patients reported not having any symptoms such as pain or feeling ill as contributing to a good day at time point one (T1); this is the phase of induction when symptoms resulting from chemotherapy administration is highest. This correlates to 25% of all responses by the teen age group in T1. Not having any symptoms was among the top three responses at all time points of this study (ranging from 36.0% - 60.8% of patients). The second most reported response at T1 for teens was being able to do usual activities (21.6% of patients). Being able to be involved in typical activities of teens was the most reported response at T2 (50.0% of patients) and T3 (62.1% of patients). Interacting with friends was either number 2 or 3 across all time points (ranging from 19.6% - 55.2% of patients).

When analyzing findings by the number of responses, the most frequent domains of QOL identified were: 1) being able to do usual activities (30.5% of total responses), 2) interacting with others including family and friends (24.7% of total responses) and 3) the

absence of symptoms (22.7% of total responses). When comparing the domains by the number of patients, the results differ somewhat. Interactions with others, including family and friends was found to be the top reported code (43.0% of all patients). Being able to do usual activities (42.8% of all patients) and not experiencing symptoms (36.3% of all patients) were ranked as second and third, respectively.

‘Usual Activities’ is a domain of QOL that is defined as the ability to participate in typical functions for their age, such as school or sports and to be in a preferred place (Hinds et al., 2004). This domain of QOL (‘*Usual Activities’*) was found to increase in reporting as time point in treatment progressed in both age groups and genders (See Table 4.2). Therefore, the highest number of responses of being able to do usual activities across all age groups and genders was at T3 (35.6 % of total responses). This coincides with the findings from Table 4.3 where being able to do usual activities was the highest reported domain of QOL according to the number of total patients per response at T3 (54.2% of patients).

The domain *‘Social/Family Interactions’* was defined as the ability and opportunity of pediatric oncology patients to interact with others (relatives, friends, other patients, healthcare providers, or animals) and to feel cared about or acknowledged by others (Hinds et al., 2004). Being social and interacting with others and family was the second most commonly reported domain of QOL with 24.5% of all responses across all time points and the most common domain of QOL according to the number of total patients. Forty-three percent of all patients across both age groups and all time points found being social and interacting with others including their family contributed to a good

day. The percentage of patients indicating that social and family interactions contribute to a good day increased across all ages, genders, and time points as the study progressed.

The third most common domain of QOL reported by the number of total responses was not experiencing distressing symptoms. The absence of symptoms was reported 23.9% out of all responses (See Table 4.2) and out of 50.4% of all patients at T1 (See Table 4.3). The domain of QOL, *'Symptoms,'* is defined as distressing mental and physical reactions to ALL or its treatment and the effort needed to control those reactions in pediatric patients with ALL (Hinds et al., 2004). Many patients indicated that the absence of symptoms did contribute to a good day in as many as seven times in a single response. The teen age group and the male gender had more responses of the absence of symptoms as contributing to a good day across all time points in comparison to the child age group and the female gender. However, at T1, not experiencing symptoms was reported more commonly in teens (64.7% of teen patients) than in children (39.4% of child patients) and evenly between females (50.7%) and males (50.4%). .For T1, there was a higher reporting of the domain of QOL *'Symptoms'* as contributing to a good day than T2 or time point T3 across both age groups and gender. Therefore, not experiencing distressing symptoms decreased in importance in study participants as time in the first year of therapy progressed in regards to contributing to a good day.

The *'Health Status'* domain of QOL was defined as being given positive treatment-related news and being able to do some self care activities (Hinds et al., 2004). The greatest frequencies of responses were at T1 for both age groups. The frequencies of *'Health Status'* reported by gender according to time point in treatment show a greater

Table 4.2   The Number of Total Responses in a Domain of QOL Based on Age, Sex, and Time Point in Treatment.

Number of Total Responses (n=666) in a Domain of QOL Based on Age, Sex, and Time Point in Treatment

Domains of QOL	Time Point 1 (T1)					Time Point 2 (T2)				
	Child	Teen	Female	Male	Total (n=278)	Child	Teen	Female	Male	Total (n=228)
Symptoms	37 (13.3%)	49 (17.6%)	34 (12.2%)	52 (18.7%)	86 (30.9%)	20 (8.8%)	26 (11.4%)	20 (8.8%)	26 (11.4%)	46 (20.2%)
Usual Activities	50 (18.0%)	20 (7.2%)	31 (11.1%)	39 (14.0%)	70 (25.2%)	32 (14.0%)	38 (16.7%)	23 (10.1%)	47 (20.6%)	70 (30.7%)
Social/ Family Interactions	33 (11.9%)	24 (8.6%)	28 (10.1%)	29 (10.4%)	57 (20.5%)	36 (15.8%)	32 (14.0%)	28 (12.3%)	40 (17.5%)	68 (29.8%)
Health Status	24 (8.6%)	18 (6.5%)	16 (5.8%)	26 (9.3%)	42 (15.1%)	15 (6.6%)	14 (6.1%)	13 (5.7%)	16 (7.0%)	29 (12.7%)
Mood	9 (3.2%)	3 (1.1%)	3 (1.1%)	9 (3.2%)	12 (4.3%)	4 (1.7%)	2 (0.9%)	2 (0.9%)	4 (1.7%)	6 (2.6%)
Meaning of Being Ill	3 (1.1%)	1 (0.3%)	0 (0.0%)	4 (1.4%)	4 (1.4%)	1 (0.4%)	2 (0.9%)	1 (0.4%)	2 (0.9%)	3 (1.3%)
Other	7 (2.5%)	0 (0.0%)	1 (0.3%)	6 (2.2%)	7 (2.5%)	5 (2.2%)	1 (0.4%)	4 (1.7%)	2 (0.9%)	6 (2.6%)

Table 4.2. cont.   The Number of Total Responses in a Domain of QOL Based on Age, Sex, and Time Point in Treatment.

Domains of QOL	Number of Total Responses (n=666) in a Domain of QOL Based on Age, Sex, and Time Point in Treatment				
	Time Point 3 (T3)				
	Child	Teen	Female	Male	Total (n=160)
Symptoms	11 (6.9%)	16 (10.0%)	14 (8.8%)	13 (8.1%)	27 (16.9%)
Usual Activities	38 (23.7%)	19 (11.9%)	15 (9.4%)	42 (26.2%)	57 (35.6%)
Social / Family Interactions	23 (14.4%)	15 (9.3%)	15 (9.3%)	23 (14.4%)	38 (23.7%)
Health Status	12 (7.5%)	4 (2.5%)	4 (2.5%)	12 (7.5%)	16 (10.0%)
Mood	4 (2.5%)	4 (2.5%)	3 (1.9%)	5 (3.1%)	8 (5.0%)
Meaning of Being Ill	5 (3.1%)	2 (1.3%)	1 (0.6%)	6 (3.8%)	7 (4.4%)
Other	3 (1.9%)	4 (2.5%)	2 (1.3%)	5 (3.1%)	7 (4.4%)

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Table 4.3.   The Number of Total Patients Reporting a Domain of QOL Based on Age, Sex, and Time Point in Treatment.

Domains of QOL	Time Point 1 (T1)					Time Point 2 (T2)				
	Child n=66	Teen n=51	Female n=46	Male n=71	Total (n=117)	Child n=60	Teen n=50	Female n=43	Male n=67	Total (n=110)
Symptoms	26 (39.4%)	33 (64.7%)	23 (50.0%)	36 (50.7%)	59 (50.4%)	16 (26.7%)	22 (44.0%)	16 (37.2%)	20 (29.9%)	37 (33.6%)
Usual Activities	25 (37.9%)	14 (27.5%)	15 (32.6%)	29 (40.8%)	39 (33.3%)	23 (38.3%)	22 (44.0%)	16 (37.2%)	29 (43.3%)	45 (40.9%)
Social / Family Interactions	27 (40.9%)	15 (29.4%)	20 (43.5%)	22 (31.0%)	42 (35.9%)	27 (45.0%)	22 (44.0%)	21 (48.8%)	28 (41.8%)	49 (44.5%)
Health Status	20 (30.3%)	14 (27.5%)	12 (26.1%)	22 (31.0%)	34 (29.1%)	11 (18.3%)	13 (26.0%)	11 (25.6%)	13 (19.4%)	24 (21.8%)
Mood	8 (12.1%)	3 (5.9%)	3 (6.5%)	8 (11.3%)	11 (9.4%)	4 (6.7%)	2 (4.0%)	2 (4.7%)	4 (6.0%)	6 (5.5%)
Meaning of Being Ill	3 (4.5%)	1 (2.0%)	0 (0.0%)	4 (5.6%)	4 (3.4%)	1 (1.7%)	2 (4.0%)	1 (2.3%)	2 (3.0%)	3 (2.7%)
Other	6 (9.1%)	1 (2.0%)	1 (2.2%)	6 (8.5%)	7 (6.0%)	5 (8.3%)	1 (2.0%)	4 (9.3%)	2 (3.0%)	6 (5.5%)

Note. Percentages do not total to 100% since patients' responses may include more than one domain of QOL.

Table 4.3. cont. The Number of Total Patients Reporting a Domain of QOL Based on Age, Sex, and Time Point in Treatment.

Domains of QOL	Time Point 3 (T3)				
	Child n=43	Teen n=29	Female n=24	Male n=48	Total (n=72)
Symptoms	7 (16.3%)	11 (37.9%)	8 (33.3%)	10 (20.8%)	18 (25.0%)
Usual Activities	25 (58.1%)	14 (48.3%)	11 (45.8%)	28 (58.3%)	39 (54.2%)
Social / Family Interactions	21 (48.8%)	14 (48.3%)	12 (50.0%)	23 (47.9%)	35 (48.6%)
Health Status	8 (18.6%)	6 (20.7%)	4 (6.7%)	10 (20.8%)	14 (19.4%)
Mood	3 (7.0%)	3 (10.3%)	2 (8.3%)	4 (8.3%)	8 (11.1%)
Meaning of Being Ill	4 (9.3%)	3 (10.3%)	1 (4.2%)	6 (12.5%)	7 (9.7%)
Other	3 (7.0%)	3 (10.3%)	2 (8.3%)	4 (8.3%)	7 (9.7%)

Note. Percentages do not total to 100% since patients' responses may include more than one domain of QOL.

trend towards males reporting *'Health Status'* as what contributes to a good day more at

T1 (31.0% male versus 26.1% of female patients) and T3 (20.8% versus 6.7%). There

was not a great difference in the percentage of child or teen patients reporting given

positive treatment-related news as contributing to a good day across all time points.

The least reported domains of QOL were '*Mood*,' '*Meaning of Being Ill*,' and the

category of *'Other'* respectively (See Table 4.2). The *'Mood'* domain of QOL is defined

as being scared, worried, angry, or bored; seeing others upset or crying; or being on a

medication that causes short-temperedness (Hinds et al., 2004). The greatest percentage

of patients reporting not being scared, worried, or angry as contributing to a good day was

the child age group at T1 (12.1%).

The *'Meaning of Being Ill'* domain of QOL across all three time points was the

least reported out of all of the six domains of QOL. The '*Meaning of Being Ill'* is defined

as the patient wondering why they have cancer but assuming that there is an important

reason and believing that a positive perspective will help to sustain them throughout the

disease's course (Hinds et al., 2004).

The '*Other*' category of responses includes two of the twenty-eight unique codes

defined from the Good Day questionnaire: "UNC" (uncoded) and "Not Sure." These

responses were not used in the data analysis. Fifteen phrases in a response were coded as

"Not Sure," where the patient indicated being uncertain about how to respond to the good

day question. Five phrases in a response were "UNC" because the data were not

interpretable. The majority of respondents who did indicate that they were uncertain

about how to respond to the good day question were between the ages of 8 and 12.

Chapter 5

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Prior to this study, many researchers exploring quality of life (QOL) in pediatric patients with ALL used parent-proxied reports. Self reported measures of QOL being utilized in the pediatric oncology population are relatively new. This is the only study that has assessed QOL in pediatric patients with ALL using an open-ended question. Results confirmed that children as young as 8 are able to answer open-ended questions in regards to QOL accurately. Through this modality, this study gave voice to the patient.

Discussion

The purpose of this study was to assess "What makes a good day?" for pediatric patients with ALL during the first year of treatment according to age, gender, and time point in treatment. The framework for the study was based on Hinds et al.'s two pilot studies published in 2004. One open-ended question that was asked in each pilot study was "What makes a good day for you?" From their results, a new definition of the quality of life for pediatric oncology patients was proposed; it is "an overall sense of well-being based on being able to participate in usual activities; to interact with others and feel cared about; to cope with uncomfortable physical, emotional, and cognitive reactions; and to

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find meaning in the illness experience" (Hinds et al., 2004, p. 767). A new definition was needed because the established pediatric oncology QOL instruments did not contain items assessing the meaning of being ill.

This study developed 28 unique codes that pertain to the six domains of QOL used in this study. No other study has asked pediatric patients with ALL "What makes a good day for you?" The study found that the top reported codes were a patient being able to do their usual activities such as play (Do Usual), not having to go to the hospital or receive any treatments (No Hospital), not experiencing any symptoms such as pain (No Sick), being with their family or pet (Family), and interacting with friends (Friends).

The findings from this study confirmed and expanded upon previously conducted research in the field of pediatric oncology QOL. Most importantly, the study confirmed the findings of Sung et al. (2009) that the older the patients were, the more distressed they became about experiencing bothersome symptoms. This study found that the percentage of patients were greatest at T1 indicating that 'not experiencing symptoms' was a good day. The teen age group reported a higher level of not experiencing symptoms as contributing to a good day across all time points in comparison to the child age group. This finding signifies that symptoms were distressing and therefore the reporting of symptoms not being present improves the patient's perception of their day and ultimately their QOL.

Another finding by Sung et al (2009) and confirmed by this study was that females indicated the need for social interactions with others more than males. On average, 47.4 % of females reported social and family interactions as contributing to a

good day across all ages and time point in treatment. In comparison, only 40.2% of males across all ages and time points in treatment reported social and family interactions as contributing to a good day.

This study differed from past findings in the following. The social component of QOL found by Sung et al. (2009) decreased as the age of the patient increased. For this study, across all time points, the child age group reported an increasing frequency of responses in social and family interactions as contributing to a good day. This signifies that the social and family component of QOL is more important to the younger age group.

Both age groups trended towards decreased reports of not experiencing symptoms as time progressed. This finding is consistent with the literature on pediatric oncology patients' reports on QOL during treatment; however these previous studies utilized parent-proxied data (Eiser, Eiser, & Stride, 2005; Landolt et al., 2006; Peeters et al., 2009). There does not seem to be a difference in gender in regards to reporting the absence of symptoms as contributing to a good day for pediatric patients with ALL.

Being able to complete usual activities has previously been found to be important in the pediatric oncology population (Kyngas et al., 2001). In this study, *'Usual Activities'* was the domain of QOL found to contain the most common code, reported as "Do Usual." Gender did not seem to make a difference in the reporting of *'Usual Activities'* to contributing to a good day. The trend for the child reporting *'Usual Activities'* remained constant, between 32% and 37%, across all time points and from 22% - 37% in teens. This varies from previous research that has found adolescent oncology patients rate physical concerns, personal changes, and treatment-related worry as the most distressing

changes to QOL (Abrams et al., 2007). This study found above all other domains of QOL, *'Usual Activities'* was what mattered most.

Overall teens less frequently reported the domain of QOL '*Social / Family Interactions'* than the child cohort. In regards to gender differences, females more frequently reported social and family interactions as contributing to a good day in comparison to males at T1 and T2. The domain '*Social /Family Interactions*' was found to be the top reported domain with 43.0% of participants across all ages, genders, and time points in treatment with the domain '*Usual Activities*' being reported by 42.8% of patients. This finding makes the '*Social / Family Interactions'* domain to appear to have more of an impact that the domain *'Usual Activities'* even though the highest reported code was in the domain of '*Usual Activities.*' Therefore, there is a discrepancy between the domains and codes. There was no science guiding the placement of codes into the domains of QOL. The 28 codes in this study denote the priorities described by the children and the domains may not reflect these findings due to varying frequencies of codes into domains. This may indicate that the domains described by Hinds et al. (2004) may need to be revised.

'Health Status' was reported when a patient received positive treatment-related news or being able to do some self care activities. Gender did not seem to be a variable in the reporting of the domain of QOL, *'Health Status.'* Receiving positive treatment news contributed to a good day most frequently at T2 across both cohorts. This finding is consistent with literature relating to receiving positive treatment-related news and being able to do some care activities for self as being important to children and teens. As

treatment progresses, the health status of the patient is supposed to improve; therefore, these findings support that the treatment regimen the study participants were receiving (Total XV) was perceived as being effective.

The domains of *'Mood'* and the *'Meaning of Being Ill'* did not seem to be major variables in contributing to a good day. There is little research previously conducted studying the domain of QOL *'Meaning of Being Ill'* since this is a relatively newly defined domain of QOL. The *'Meaning of Being Ill'* was indicated by a pediatric oncology patient wondering why they have cancer but assuming there is an important reason for them to have cancer. The only previous study looking into the domain of *'Meaning of Being Ill'* in pediatric oncology patients is the pilot study published by Hinds et al. in 2004.

Limitations of the Study

This study of assessing "What makes a good day?" for pediatric patients with ALL during the first year of treatment according to age, gender, and time point in treatment was limited by internal and external validity factors. Threats to the internal validity of the study included the following:

1. The sample size was small yet comprised the entire accessible population. Only 150 patients were found to meet the inclusion criteria, primarily due to the higher age cut off.

2. The Good Day questionnaire was developed by the St. Jude Nursing Research staff for this study and its reliability or validity has not been calculated independently.

3. "The results of longitudinal investigations can be affected by the so-called "Response Shift", i.e. a shift of contents, values, and standards of the subjective evaluation in the ascertained state of health. A positive influence on the results could be expected from an adaptation to the illness by learned coping strategies or other social processes. In addition, child-specific considerations should be taken into account such as their understanding of the questions asked and of their own disease, a different perceptions of time and the fact that children incessantly keep changing" (Peeters et al., 2009).

4. The domains as described by Hinds et al. (2004) may not accurately capture the priorities of pediatric patients as identified by the 28 codes; therefore, the findings reported in terms of the domains of QOL may be skewed.

Threats to the external validity of the study include the following:

1. The sampling procedure used in this study involved the entire accessible population. However, patients studied varied by age and did not included the peak ages of children diagnosed with ALL. This may restrict generalizability to the general pediatric ALL population.

2. The collaborative practice of a single facility was assessed. Other facilities with different treatment protocols may produce different results.

3. Socioeconomic status was included as a factor in many other studies. With patients at St. Jude Children's Research Hospital, ability to pay is not a stressor on the family since the hospital will cover costs for the child to receive the necessary cancer treatments they need.

4. Race was not included as a demographic factor as in many other studies. Racial differences would have been beneficial to identify within the study sample to see how generalizable the sample is to the overall pediatric ALL population.

5. Not all patients responded to all three time points; therefore, the results may not be generalizable to draw longitudinal analysis.

Recommendations

The results of this study have implications for research, nursing practice, and hospital policy. This section presents recommendations based on study results.

<u>Research</u>

Based on the findings of this study, the following recommendations for further research are suggested:

1. The study should be replicated using a larger pediatric ALL population to compare the codes and corresponding domains of QOL at a statistically significant level. This could be realistically accomplished by recruiting study participants from multiple sites across the United States.

2. Further investigation of use of the Good Day questionnaire would be useful in further assessing the reliability and validity of the instrument as a QOL measure in

the pediatric ALL population. Again, this could be realistically accomplished by recruiting study participants from multiple sites across the United States.

3. Continue this study to include all six time points of the overall study in order to further show how QOL changes during the course of cancer treatment in pediatric patients with ALL. This will be attempted upon the completion of the overall study.

4. Analyze data using a greater number of demographic variables, such as race or socioeconomic status to see if other variables influence QOL.

5. Explore the coping mechanisms utilized by pediatric patients with ALL in accordance to their self-reported QOL status. This would be useful in assessing certain patient characteristics that could influence their QOL.

6. Conduct the same study and include children between the ages of 5 and 7 to determine if patients in this age range are able to accurately answer open-ended questions in regards to their QOL.

7. Correlated findings from this analysis with the findings from the other QOL measures used in the larger study.

<u>Nursing Practice</u>

The study results show that pediatric oncology patients as young as eight can verbalize what contributes to having a good day while undergoing their first year of cancer treatment. Upon admission, a question should be asked by the nurse as to what makes a good day for the pediatric oncology patient. With this information the nurse could focus care in order to provide high levels of patient satisfaction. This question

would not only help cater care towards the patient, but assist nurses in establishing rapport with the patient by already knowing the preferences of the child. Nurses should continue to encourage patients to express what would contribute to a good day and should try to incorporate the patient's verbalizations as is deemed safe.

Based on the findings from the study, having bothersome symptoms was one of the major impediments to having a good day at T1. Nurses caring for pediatric patients with ALL, especially during the beginning of treatment, should focus on managing a patient's symptoms which are most bothersome to them. Across all time points, patient ability to do their usual activities was found to be the single most reported factor to contribute to a pediatric patient with ALL having a good day. Nurses should try to incorporate usual activities in which the child can participate safely. This may include arts and crafts, play time, school work, or social gatherings. Nurses should coordinate with other health care professionals, such as Child Life Specialists and Social Work, to help incorporate the patients' usual activities into their daily schedule, including having visitors present. Nurses should case manage the care that their patients are receiving while collaborating with other healthcare professionals.

Hospital Policy

Based on the findings of this study, it is recommended that hospitals include a question focused on ascertaining the activities that contribute to a good day for the patient during the admission process. This could help give the patient a voice in guiding the care the patient is to receive. In addition, hospital policies should cater to pediatric patients with ALL and allow them to do as many usual activities as their health permits. This

could include changing hospital visiting policies to include more liberal visiting hours, expanding the cafeteria menu options so a child can eat their favorite food when not nauseous, and insuring phone and internet access to all patient rooms to enhance their ability to social network with their peers from their hospital bed.

Conclusions

The results of this study demonstrate that there are trends towards differences of the self-reported QOL in pediatric patients with ALL as to what contributes to a good day in regards to their age, gender, and time point of treatment. The areas of QOL that are most important to children and teens are being able to do their usual activities, to be free from experiencing any distressing symptoms, and being able to interact with others, especially family and friends. Doing usual activities was found to be the single most important factor to contribute to a good day across all ages, genders, and time points within the first year of treatment. Females were found to value social and family interactions more than males; and the absence of symptoms greatly contributed to experiencing a good day in the earlier stages of cancer treatments. Pediatric patients between the ages of 8-18 were found to be able to answer an open-ended question in regards to QOL accurately without assistance. Generalizability of the results of this study to a greater pediatric ALL population is limited by the small sample size and the demographic differences between the study population and the general pediatric ALL population. These results support other studies which show trends in gender, age, and time point differences in the QOL of pediatric patients with ALL.

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Appendix A

TOTAL XV ACUTE LYMPHOBLASTIC LEUKEMIA TREATMENT PROTOCOL'S

RISK CLASSIFICATION.

Total XV Risk Classification

Risk Group *	Criteria

Low	B-cell precursor cases with:
	
	o Age between 1 and 10 years and presenting leukocyte count <50×109/L
	
	o OR Leukemic cell DNA index ≥1.16
	
	o OR TEL-AML1 fusion
	
	o AND do not have:
	
	    o Testicular or central-nervous-system (CNS) leukemia (i.e., CNS3 status)
	
	    o OR Hypodiploidy (<45 chromosomes),
	
	    o OR E2A-PBX1 fusion
	
	    o OR MLL rearrangement.

Standard	All T cell ALL cases and all other cases.
High	Patients with BCR-ABL fusion (Philadelphia chromosome).
* Final risk status depends on the response to remission-induction therapy. Any patients with 0.01% to 0.99% residual leukemia after completion of 6-week induction therapy are considered to have standard-risk ALL and receive intensive postremission therapy, whereas those with 1% or more residual disease are designated to have high-risk ALL and are candidates for allogeneic hematopoietic stem cell transplantation (Pui et al., 2004).	

Appendix B

TOTAL XV TREATMENT PROTOCOL.

Total XV Treatment Protocol

Phase of Treatment	Treatment Modalities
Optional Upfront Methotrexate (4 Days before Day 0)	Patients are stratified and randomized to receive: o Methotrexate (1g/m² over 24 hours or over 4 hours)
Induction (Day 0 to Week 6)	o Daily prednisone (40 mg/m2 for 28 days) o Weekly vincristine (1.5 mg/m² for four doses) o Weekly daunorubicin (25 mg/m² for two doses) o Thrice weekly E coli asparaginase (10,000 units/m² intramuscularly for 6 doses). Patients with 5% or more residual leukemia in bone marrow after 2 weeks of induction are given three additional doses of asparaginase. Subsequent induction therapy consists of: o Cyclophosphamide (1,000 mg/m²) on day 26 o Mercaptopurine (60 mg/m² per day) on days 26–39 o Cytarabine (75 mg/m²) on days 27–30 and 34–37
Induction	Upon recovery of hematopoietic function, bone marrow is

(Day 0 to Week 6) (continued).	performed to determine remission status and the presence of minimal residual disease" (Pui et al., 2004).
Consolidation (Week 7 to Week 15)	o High-dose methotrexate and age-adjusted triple intrathecal therapy with methotrexate, hydrocortisone and cytarabine (every other week for 4 doses) The dosage of methotrexate depends on the risk classification of patients, since higher dose (i.e., 5 gm/m²) is needed to improve outcome of T-cell and standard-/high-risk B-cell precursor ALL and lower dose (2.5 gm/m²) is adequate for low-risk B-cell precursor cases with the dose targeted to achieve a steady-state concentration of 65 μM or 33 μM, respectively. o Daily mercaptopurine (50 mg/m² per day) for 8 weeks. Reintensification therapy with high-dose cytarabine, etoposide, dexamethasone, and asparaginase is given to only high-risk cases following consolidation therapy to maximize leukemic cell kill before allogeneic hematopoietic stem cell transplantation. In this regard, high levels of minimal residual leukemia conferred a poor outcome even in the setting of allogeneic stem cell transplantation (Pui et al., 2004).
Continuation	o In the first 20 weeks of continuation therapy, low-risk

(Week 16 to Week 120 for girls; 140 for boys)	cases receive:
	
	   o Daily mercaptopurine (75 mg/m²)
	
	   o Weekly methotrexate (40 mg/m²)
	
	   o With pulses of:
	
	         o Daily mercaptopurine (75mg/m²)
	
	         o Dexamethasone (8 mg/m² per day in three divided doses for 5 days)
	
	         o Vincristine (2 mg/m²) given every 4 weeks
	
	   o In the first 20 weeks of continuation therapy, standard-risk cases receive:
	
	     o Daily mercaptopurine (50 mg/m²)
	
	     o Weekly E coli asparaginase (25,000 units/m²)
	
	     o Weekly doxorubicin (30 mg/m²)
	
	     o Vincristine (1.5 mg/m²) every three weeks.

Continuation (Week 16 to Week 120 for	o All patients receive reinduction therapy twice (weeks 7–9 and weeks 17–20) during the first 20 weeks of continuation therapy.

girls; 140 for boys) (continued).	o Reinduction therapy in low-risk cases consists of:
	
	      o Dexamethasone (8 mg/m² on days 1–8 and days 15–21)
	
	      o Vincristine (1.5 mg/m² weekly for 3 doses)
	
	      o Asparaginase (10,000 units/m² thrice weekly for 9 doses)
	
	      o Doxorubicin (30 mg/m² on day 1)
	
	o Reinduction therapy in standard-risk cases consists of:
	
	      o Dexamethasone (8 mg/m² on days 1–8 and days 15–21)
	
	      o Vincristine (1.5 mg/m² weekly for 3 doses)
	
	      o Asparaginase (25,000 units/m² on days 1, 8 and 15)
	
	      o Doxorubicin (30 mg/m² on days 1 and 8) in the first course, or high-dose cytarabine (2 gm/m² every 12 hours for four doses on days 15 and 16) in the second course.

Continuation (Week 16 to Week 120 for girls; 140 for	o The remaining continuation therapy in low-risk cases consists of: o Daily mercaptopurine (75 mg/m²) and weekly methotrexate (40 mg/m²), interrupted by pulse therapy

boys) (continued).	every 4 weeks (up to week 100) with dexamethasone (8 mg/m² per day in 3 divided doses for 5 days) o Vincristine (2 mg/m²) and mercaptopurine (75 mg/m² per day for 7 days). o The remaining continuation therapy in standard-risk cases consists of 3 drug pairs given in 4-week blocks: o Mercaptopurine (75 mg/m² daily for 7 days) plus methotrexate (40 mg/m² per week) in the 1st and 2nd weeks o Cyclophosphamide (300 mg/m²) plus cytarabine (300 mg/m²) in the third week (to be replaced by mercaptopurine and methotrexate after week 67) o Dexamethasone (12 mg/m² per day in 3 divided doses for 5 days) plus vincristine (2 mg/m²) in the 4th week (to be replaced by mercaptopurine and methotrexate after week 100)" (Pui et al., 2004).

Appendix C

"WHAT MAKES A GOOD DAY FOR YOU?" STUDY QUESTIONNAIRE.

Some days are good days and some days are bad. Would you please tell me:

What makes a good day for you?

How has being sick been for you?

Appendix D

"WHAT MAKES A GOOD DAY FOR YOU?" DOMAINS OF QOL: DOMAIN

DEFINITION, CORRESPONDING CODE NUMBERS FROM CODE BOOK,

AND FREQUENCY OF CODES PER DOMAIN.

Good Day Domains of Quality of Life – With Code Frequency

Domain's Category	Domains of QOL	Domain Definition	Corresponding Code #s	Frequency of Codes per Domain
A	Symptoms	Uncomfortable physical and mental reactions to disease or its treatment and the effort needed to control those reactions	1, 7, 16, 20, 24	5
B	Usual activities	Ability to participate in usual functions such as school or sports and to be in a preferred place.	4, 6, 13,	3
C	Social / Family interactions	Ability and opportunity to interact with others (relatives, friends, other patients, or animals) and to feel cared about or acknowledged by others.	2, 8, 9, 10, 12, 15, 22, 28	8
D	Health status	Receiving positive treatment-related news and being able to do some care activities for self.	5, 19, 23, 26	4
E	Mood	Being worried, angry, scared, or bored; seeing others upset or crying; or being on a medication that causes short-temperedness.	11, 17, 18, 25	4
F	Meaning of being ill	Wondering why he or she has cancer but assuming that there must be an important reason; believing that a positive perspective will help to sustain himself or herself.	3, 14	2
	Other	Codes do not fit into the other domains of QOL.	21, 27	2

Appendix E

"WHAT MAKES A GOOD DAY FOR YOU?" CODE BOOK: CODE WORD, CODE

DEFINITION, AND DOMAIN DENOTATION.

Good Day Code Book – With Domain Category

#	Code Word	Code Phrase	Code Definition	Domain Category
1	ABLE EAT	Being able to eat.	Patient marks a good day by not having much or any nausea and being able to or allowed to consume and taste some food, or eating favorite foods.	A
2	AT HOME	Being able to be at home.	Patient considers being in own house rather than at a health care facility as the basis of a good day.	C
3	BENEFIT	Receiving benefits.	Patient is able to do special things as a result of being ill such as being home schooled or temporarily living in a different setting or is excused from usual activities, received special attention from others, or is allowed to experience new social outings. Patient enjoys not having to be part of age-typical functions such as attending school daily. Patient reports that a benefit of being ill is no longer being required to be involved in certain activities that he/she wanted to avoid. Patient reports a benefit being at a health care facility such as being away from sibling.	F
4	BE NORMAL	Being normal.	Patient reports a positive contribution is feeling or seeing self as regular, natural, like others or like self when feeling well.	B
5	COUNTS	Having good counts.	Patient acknowledges that having good medical reports or positive laboratory indicators contributes to a positive day.	D
6	DO USUAL	Being able to do my usual activities.	Patient considers being able to play, attend school, go outside, take part in physical or quiet activities to be examples of typical involvements for self or other age peers.	B
7	ENERGY	Having energy.	Patient perceives having more strength contributes to a good day.	A
8	FAMILY	Being with family.	Patient describes having time with relatives and family or pets as part of a good day.	C
9	FINE	Others are fine.	A good day is when parents, patients, or significant others are doing well.	C
10	FRIENDS	Feeling close with	Patient considers having a connection with friends (talking with them, being contacted by	C

			friends.	them, etc) to contribute to a good day in treatment.	
11	GOOD MOOD	Being in a positive mood.		Patient reports that feeling positive, happy, or even laughing contributes to a good day. Patient is pleased about succeeding or accomplishing something like finishing homework or making good grades.	E
12	GIFT MAIL	Receiving gifts or mail.		Being given items or letters from others contributes to a positive day.	C
13	GO PLACES	Going places/being entertained.		Patient enjoys being a part of activities/environments and going on outings contribute to a good day.	B
14	JUST LIVE	Being alive, in general.		Patients feel that just living is a good day.	F
15	MEANINGFUL INTERACT	Meaning interactions.		Patient is pleased to be able to successfully interact with others, help others, or lighten others' burdens.	C
16	MORE REST	Getting more sleep.		Patient describes being able to get more time to rest.	A
17	NICE WEATHER	Enjoy the weather.		Patient describes nice outside atmosphere contributes to a good day.	E
18	NO ANTAGONIST	Not being annoyed.		Patient reports a good day is when no other person or event antagonizes them.	E
19	NO HOSPITAL	Not needing to go to the hospital.		Not having an appointment or any other reason to be at a health care facility for a day or more, or being discharged from the hospital. Patient does not have to take medicine/undergo treatment. Patient does not feel anxious/ worried about planned or actual treatment or test. Patient does not have painful procedures scheduled.	D
20	NO SICK	Not feeling sick.		Patient describes not having symptoms such as pain or not feeling ill as being a good day.	A
21	NOT SURE	Not sure.		Patient indicates being uncertain about how to respond to question.	Other
22	OTHERS	Being with others that I like.		Patient enjoys being with other patients, staff, or patients' families and considers this a positive part of being treated for cancer. Patient enjoys visiting with health care providers who are close to them.	C

23	SHORT STAY	Not being at the hospital all day.	A brief visit rather than a prolonged visit at the health care facility contributes to a positive day.	D
24	SMOOTH	Nothing goes wrong.	Patient reports that a positive day is when treatment proceeds as planned and no unexpected symptom or adverse experiences or disease occur.	A
25	SPIRIT	Believing in a greater being.	A good day is when having faith in a higher entity, such as God. Patient prays to a greater being for help.	E
26	TAKE CARE	Able to do daily activities.	Patient reports that being able to take care of self, including health promotion activities such as walking, contributes to a good day.	D
27	UNC	Uncoded.	Data is not interpretable	Other
28	VISITS	Being visited by others.	Patient reports that having visitors in general, not just family or friends is a good day.	C