

Fatigue in Children and Adolescents With Cancer

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Fatigue is a common symptom found in the adult oncology literature. However, little is known about its occurrence, causes, conceptual and operational definitions, and effective interventions in children and adolescents with cancer. The purpose of this study was to define and describe fatigue experienced by children and adolescents receiving treatment for cancer. A focus group approach was used to reveal the contextual understanding of fatigue through discussions. Eleven focus groups were convened during a 2-month period at two major children's cancer centers. Twenty-nine children participated in the focus groups: 14 were 7 to 12 years of age and 15 were 13 to 16 years of age. Focus groups were held separately for each age group, lasted from 30 to 45 minutes, and were audiotaped. The audiotapes were transcribed verbatim, and Ethnograph software was used to number the data to sort and code the information. Researchers at both study sites coded the data independently within the context of the unit of analyses, which, in this study, were the study questions. Codes and descriptions were developed for the definitions of fatigue, causes of fatigue, and what helps. Eight codes emerged from the children groups and 12 from the adolescent groups to define fatigue. Six codes were developed from the children groups and 12 from the adolescent groups to describe causes of fatigue. Three codes from the children groups and eight from the adolescent groups described what helps. This study is the first to evaluate fatigue as a symptom in children and adolescents with cancer. Findings from this study will provide the foundation for developing a conceptual model for cancer-related fatigue in children and adolescents.

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AN IMPORTANT part of the pediatric oncology nursing role is to provide education for the family and patient regard-

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ing potential side effects that may be experienced as a part of cancer treatment. Although it is recognized that children and adolescents experience symptoms such as nausea and vomiting, pain, anorexia, and weight loss during treatment for cancer, little is known about the symptom of fatigue. This article is the first to discuss the characteristics of fatigue, causes of fatigue, and what helps children and adolescents with cancer who are experiencing fatigue.

Review of the Literature

Cancer Related Fatigue in Adults

Cancer-related fatigue in adults has been described in the literature by various investigators. The definitions include the following physical manifestations: lack of energy,¹ decreased physical ability,² impaired functional status,³ and subjective feelings of tiredness influenced by circadian rhythms.⁴ The prevalence of fatigue ranges from 60% to 100% in the adult cancer literature,^{2,3,5-8} and has been shown to be a common symptom associated with chemotherapy,^{1,5,9-11} radiation therapy,^{7,12-14} and biologic response modifiers.⁶

Adult cancer studies during the past 18 years have revealed numerous symptoms associated with fatigue including insomnia,¹⁵⁻¹⁶ changes in taste or appetite,⁹ mood disturbances, nervousness, or depression,^{9,11-13} alteration in self-care activities,¹ changes in attention capacity,¹⁷ and decreased participation in leisure activities.¹⁸ McCorkle and Young (1978), in one of the earliest nursing studies evaluating fatigue in adult patients with cancer, described fatigue as the most distressing side effect associated with the disease.¹⁶ Although previous studies showed fatigue as a common symptom in adults with cancer, they provide limited insight into factors associated with the onset and duration of fatigue, the effect on daily activity and performance, and modulating factors associated with the symptom.¹⁹ Design and methodologic inadequacies in the adult oncology fatigue research literature may contribute to conflicting findings. Many of these studies had no control groups, lacked reliable fatigue measures, were unable to examine the onset and duration of fatigue, had small sample sizes, and often used only one criterion to measure fatigue. The limited approach to examining fatigue is a concern in the majority of the adult studies.

Cancer-related fatigue is associated with physiologic and psychologic signs and symptoms. Fatigue may be a primary symptom occurring from increased energy expenditures caused by disease. For example, changes in skeletal muscle protein stores

have been associated with tumor necrosis factor (TNF), resulting in muscle wasting and cachexia.²⁰ Progressive muscle wasting has been found in studies of mice bearing tumors that secrete TNF/cachectin.^{21,22} Fatigue may also be a secondary symptom related to other contributing factors. Anemia, cancer cell destruction by-products, nausea and vomiting, infection and fever, and side effects of drugs causing neurotoxicities are just a few examples that may be associated with fatigue.^{4,23} Limited studies exist to provide insight regarding these physiologic influences on fatigue. For example, previous researchers have not shown a consistent relationship between fatigue and anemia.^{24,25} One study found that weight loss was positively associated with fatigue in adult cancer patients receiving radiation therapy.²⁴ Mood disturbances including anxiety, depression, confusion, and anger have been associated with fatigue in adults with cancer.^{11,13,15,16,26,27} Several investigators found significant correlations between fatigue and a depressed mood state in adult patients.^{13,15,16} Previous adult literature reveals that activity and rest patterns can play a role in the prevention of fatigue.

Fatigue in Children

Chronic fatigue in children is a rare problem, but several articles have been published on its occurrence that provide some insight into the concept of fatigue in children. Chronic fatigue syndrome in children is defined as severe and disabling fatigue that affects both mental and physical functioning and lasts for at least 6 months.²⁸ Carter and others²⁹ examined symptoms of chronic fatigue in 20 children and found that these children experienced concentration changes, muscle weakness, depressed mood, decreased appetite, sleep disturbances, and a need for excessive sleep. An article published in 1996 by Carter et al³⁰ evaluated certain psychological factors that discriminated chronic fatigue from depressive symptomatology in matched groups of 20 healthy, depressed, and chronic fatigue subjects. Characteristics of pediatric patients with chronic fatigue included multiple somatic complaints, excessive sleepi-

ness, low energy, decreased appetite, loss of interest or pleasure in usual activities, loneliness, social isolation, and feelings of unhappiness. Depressed subjects reported more symptoms of affective disturbances and were more likely to have suicidal ideation, pronounced social isolation, and demonstrated acting-out behaviors such as irritability, restlessness, trouble concentrating, anger, and aggressive behavior. Depressed subjects were significantly affected by feelings of tiredness, fatigue, and an excessive need for sleep.

Cancer-Related Fatigue in Children

Although the review of the adult oncology fatigue and chronic fatigue literature provides important information regarding this symptom, it provides limited insight into the changes cancer and treatment cause in the lives of children. No studies are found evaluating fatigue in the childhood cancer literature. Researchers evaluating an instrument developed to measure childhood cancer stressors, found that more than 50% of a group of 75 school-age children reported being tired, not sleeping well, and were unable to do the things they wanted to do.³¹ More than half of these children were not as active as before the illness, and reported playing less.

Not only are children with cancer experiencing symptoms of the disease process, they are also experiencing side effects of the treatment. In addition, these children are undergoing normal physiologic and developmental changes. Normal daily functions and behavior (eg, school performance, affect, ability to focus attention) can be disturbed by the physiologic and psychologic side effects of treatment. These side effects include nausea and vomiting, weight loss or gain, nutritional deficits, electrolyte imbalances, weakness, lethargy, and myelosuppression. These symptoms may be experienced differently in the child with cancer when compared to the adult oncology patient. For this reason, it is important to undertake a comprehensive evaluation of fatigue as a symptom in children with cancer, to eventually characterize the presentation, frequency, severity, and natural history of this phenomenon.

Methods

Study Design

The purpose of this study was to define and describe fatigue experienced by children and adolescents with cancer. This study is part of the Clinical Fatigue Scholars Program, funded by the Oncology Nursing Foundation. A focus group approach was used to reveal the contextual understanding of fatigue through discussions with children and adolescents. Focus group interviews are used to determine feelings and opinions of small groups of participants about an identified topic.³² The approach is unique in that it combines elements of group process theory and qualitative research methods. The moderator for the focus group guides a group of participants through an in-depth exploration of the topic by using a structured interview, with all participants being encouraged to discuss their thoughts and feelings regarding the questions.

Sample and Setting

Eleven focus groups were convened during a 2-month period at two major children's cancer centers. Twenty-nine children/adolescents presently receiving treatment for cancer participated in the focus groups: 14 were 7 to 12 years of age, and 15 were 13 to 16 years of age. Sixty-seven percent were girls and 43% were boys in the adolescent groups, and 43% were girls and 57% boys in the children groups. Sixty percent of the adolescents were Caucasian, 13% were African-American, and 27% were Hispanic. In the children groups, 86% were Caucasian, and 14% were African-American. Fifty-three percent of the adolescents were diagnosed with leukemia/lymphoma and 47% with a solid tumor. In the children groups, 57% had leukemia/lymphoma and 43% had a solid tumor. The months since diagnosis for the adolescent groups ranged from 1 to 59 months and from 1 to 95 months for the children groups.

Procedures

Before implementation of the study, research teams at both cancer centers partici-

pated in a session to discuss how to lead focus groups. In addition, the use of focus groups as a research method was presented at the first teleconference between the study sites.

Both study sites used the same questions during the focus groups sessions. Specific questions asked during the focus groups are found in Table 1.

Children and adolescents were asked to participate separately in a 30- to 45-minute audiotaped focus group discussion during their clinic or hospital visit. Focus groups were held separately for each age group in a clinic or hospital conference room and were led by one of the nurse researchers.

Data Analysis

The audiotapes were transcribed verbatim by medical transcriptionists, and Ethnograph software was used to number the data to sort and code the information. One member of the team at each site validated the accuracy of each transcription before the analysis. Three researchers at each study site coded the data independently within the context of the unit of analyses, which, in this study, were the study questions. After each transcript was coded, the researchers met as a group to review the codes and to evaluate

inter-rater reliability of the coding, which ranged from .80 to .95. To verify interpretations of the data, researchers used peer debriefing through frequent sessions to review each coded transcript and examine its contextual meaning, and by member checking with participants to assure accurate assessment of the data. Codes and descriptions were developed for the definitions of fatigue, causes of fatigue, and what helps to alleviate fatigue.

Trustworthiness of the Data

In this study, the researchers used several procedures to gather accurate data with meaningful interpretations, including prolonged engagement, peer debriefing, and member checking.³³ Data in this study were gathered by nurses who were specialists in pediatric oncology. Having an understanding of the language and culture of pediatric oncology assisted the researchers in maintaining an open, honest relationship with the children and adolescents. The establishment of a trusting rapport with the participants most likely made it easier for them to disclose information about their experiences. A strength of the study was the participation of multiple researchers in data collection and analysis. Research teams included three pediatric oncology nurses at each study site.

Peer debriefing was accomplished by extended discussions of the research teams at the separate research settings, and as a combined research group through four teleconferences convened during data collection and analysis. This allowed for input from multiple researchers regarding the codes, definitions, and themes that emerged from the data. Codes, definitions, and themes were labeled with the children's words so that interpretation would accurately reflect the perceptions of the participants.

To verify interpretations by the research team, the researchers conducted member-checking concurrently with data collection and interpretation. Member-checking involves reviewing information from the previous focus groups with the current focus group to determine if consistency in the findings exist. This provided assurance that

TABLE 1.
Focus Group Questions

We are going to spend some time today talking about how children/teens feel during treatment for cancer. One of the side effects some kids have talked about in the past is feeling tired or having fatigue.

1. How would you describe fatigue or being tired.
2. Are there different kinds of feeling tired? Like being tired in your body or in your mind?
3. Please describe the things that you can't do when you feel tired.
4. How long does feeling tired last?
5. Have your school activities changed? If so how?
6. Do you ever have trouble falling asleep at night? Why do you think that happens?
7. Does sleep make you feel less tired?
8. How tired are you feeling today? Why do you think you are feeling this way?
9. When you are tired, or have low energy, what kind of things help you feel better?

the interpretations were supported by the children and adolescents with cancer.

Interpretation and Discussion

This research study is the first to examine the concept of fatigue in children and adolescents with cancer. Findings revealed that the definition of fatigue varies depending on the developmental level of the participants. Adolescents used a noticeably larger vocabulary to describe what fatigue is like and to discriminate between mental and physical fatigue (12 codes were identified in the adolescent groups, eight were identified in the children groups to describe fatigue). Teens described the causes of fatigue in much greater detail than children and had many more factors associated with their fatigue (12 causes for the adolescents, six causes identified by the children). The adolescent groups described more symptoms of worry and concern that resulted in fatigue than the children groups. Adolescents were able to identify more interventions that helped to decrease fatigue (eight interventions that helped fatigue were identified by the adolescents, three were identified by the children). Both children and adolescents described fatigue in terms of physical and mental symptoms. Discussion of the study results are presented in terms of the child's and adolescent's descriptions of fatigue, perceived causes of fatigue, and what helps when they are experiencing fatigue.

Describing Fatigue

Children in this study described both physical and mental symptoms of fatigue. Eight codes emerged from the children's groups to describe fatigue and are listed in Table 2. The children's groups described physical fatigue as "it's hard to move and run" and mental fatigue as feeling "sad or mad." Children expressed their perception of fatigue in relation to changes that have occurred in their ability to perform activities they did before having cancer. One child stated that, "because I am tired I don't have any energy. I can't run fast or anything." The descriptions of fatigue revealed significant changes in their physical abilities such as playing sports

TABLE 2.
Children Describe Fatigue

Codes	Descriptions
Hard to move or run	Child describes that they are not as active as they used to be.
Feel like laying around	Child describes needing to lie down and wanting to do nothing.
Weak/tired	Child describes feelings of weakness and being tired. They watch TV and aren't able to do much.
Makes you sad/mad	Child discusses feeling upset when they are emotionally tired.
When fatigue occurs	Child discusses when fatigue occurs and how long it lasts.
Not able to play	Child discusses not being able to participate in sports such as baseball or physical education.
Physical signs	Child discusses when tired his/her eyes are hard to keep open. They notice their eyes are tired, and they have a dull face.
Fall asleep	Child discusses falling asleep easily and needing to sleep more when he/she is tired.

or participating in activities with their friends. A young boy with a brain tumor, when asked to describe fatigue stated, "Well back before my surgery and I was kind of really active, but not very tired usually, and now I am very tired." Several children described fatigue in terms of now doing more sedentary activities such as watching television or reading books. One child stated, "when I am tired I can watch a movie, I can't read too well anymore because I can't keep my eyes open." Children were able to describe physical symptoms related to their fatigue. One child described fatigue as "I see a dull face when I look in the mirror." Another child responded, "I get tired all over." Some children were able to identify when fatigue occurred. In these children, fatigue occurred most often in the mornings, on school days, and after treatment.

Twelve codes emerged from the focus groups describing the adolescent's perception of fatigue and are found in Table 3. The

TABLE 3.
Adolescents Describe Fatigue

Codes	Descriptions
Wearing away of your body	Adolescent discusses fatigue as causing changes in their body.
All in your mind	Adolescent discusses fatigue as originating in your mind. You think you are going to be tired so you become tired.
Mental and physical	Adolescent discusses fatigue as being both mental and physical. Sometimes when they are physically tired, they are mentally challenged.
Not normal self	Adolescent discusses not being able to be up to his/her normal activity level. Not playing with friends, sports, or school.
Makes you mad	Adolescent discusses feeling upset when tired and getting mad about it.
Not be bothered	Adolescent discusses when they feel tired they don't want to be bothered by others.
Feeling sorry	Adolescent talks about feeling sorry for yourself when you just lay in your bed.
When fatigue occurs	Adolescent talks about when fatigue occurs and how long it lasts.
Physical symptoms	Adolescent discusses physical symptoms such as dizziness, nausea, and hot and cold flashes that are related to fatigue.
Sleepy	Adolescent discusses being sleepy when fatigued, falling asleep anywhere.
Mentally tired	Adolescent discusses being mentally tired, having to go through so much.
Feel like laying around	Adolescent discusses not wanting to do anything but lay down when fatigue occurs.

adolescent groups described physical fatigue as “you don’t feel like your normal self” and mental fatigue as “tired of everything that has happened.” Adolescents, like the children, frequently expressed fatigue in terms of physical activities they can no longer per-

form. One teen stated, “I used to play sports and play with my friends all the time, and now I am on crutches.” Another teen reported, “you can’t hang out with your friends and go to the skating rink.” Mental fatigue was described in terms of feeling sorry for oneself, being mad at the world, or just not wanting to be bothered. One adolescent stated, “. . . sometimes you are tired and the mind doesn’t do anything but shut off.” Adolescents were able to describe the influence of mental and physical fatigue on each other. One teen stated, “you think about it, dwell on it, [and] it makes it worse. So, part of it’s [fatigue] mental, part of it’s physical.” Another teen stated that, “when you get cancer your lifestyle has changed 100% because you have to deal with getting cancer, understanding what you are about to go through. You have to mentally prepare yourself. I’m not going to let this take control.”

Adolescents mentioned being mad or upset about feeling so bad during treatment. One adolescent discussed what it was like during treatment, “. . . you’re in there getting chemo . . . and you feel really bad . . . it makes you so mad.” Another teen described what it is like to experience fatigue by discussing feeling sorry for oneself when, “you see this nice beautiful sunny day and you’re sitting there feeling, Ugh, feeling your chemo.” Adolescents were able to discuss when fatigue occurs, describing it was usually following chemotherapy and when their counts were low. One adolescent said, “I just felt tired the days I get chemo.” Another teen described fatigue as, “when your counts are down, it’s really bad.”

Causes of Fatigue

Six codes were developed from the children’s groups and are listed in Table 4. Children discussed that the hospital environment caused fatigue because of frequent disruptions to their sleep. Some children also had trouble falling asleep in the hospital. One child stated that, “when I am in the hospital, I am just so drained when I get home.” Some children described low blood counts had caused fatigue and related it to altering their activities. A child stated, “I had

TABLE 4.
Children Discuss Causes of Fatigue

Codes	Descriptions
Treatment	Child discusses how chemotherapy, radiation, and surgery can cause fatigue, often associated with feeling sick.
Being active	Child discusses being tired after play and activities.
Pain	Child discusses being tired when they experience discomfort such as pain.
Sleep changes	Child's sleeping patterns change making it hard to sleep all night or get to sleep. Schedule changes may influence this.
Low counts	Child discusses feeling tired when experiencing myelosuppression.
Hospital environment	Child discusses noises, frequent interruptions, location of their hospital room as causing fatigue because of lack of sleep. Sometimes they have trouble falling asleep in the hospital.

to quit playing baseball, my counts were too low." Another child described having to stay home from school when the blood count was low. Sleep changes were identified as a cause of fatigue by the children. Difficulty going to sleep was discussed as a cause of fatigue in the morning. Pain was identified as a cause of fatigue in one focus group.

Twelve codes came from the adolescent groups to describe causes of fatigue and are listed in Table 5. Treatment and its side effects were frequently described as causes of fatigue. One teen stated, "that's the worst, knowing what's going to happen . . . knowing that you have to go do it [chemotherapy], that it's going to wear you out." The hospital environment was discussed as a frequent cause of fatigue because of its disruption of sleep. Teen focus group participants discussed noises such as the nurses' station, younger patients, IV infusion pumps, telephones, shutting of doors, and frequent interruptions as causing fatigue because of lack of sleep. Sleep changes occurred when teens

went to sleep late and were awakened in the middle of the night while in the hospital. One adolescent described being in the hospital as, "It's like jet lag." Another teen stated, ". . . whenever I am home, like whenever I get to bed, I get rested. But whenever I'm in the hospital, I have to take vitamins [leukovorin] every 4 to 8 hours . . . you have to have blood drawn every 12 to 24 hours . . . and then you get the doctors coming in at 6 AM listening to your heart and stuff. So, at the hospital, I feel drained in the morning, not like I got any rest. But whenever I'm at home and I get a real night's sleep I feel a whole lot better." One adolescent also stated it was difficult to fall asleep because of problems getting comfortable in bed because of the IV and needle placement. In addition to the hospital environment disrupting sleep, lifestyle changes also altered the adolescents' previous sleep patterns. Teens who were on homebound education programs discussed staying up late at night and sleeping late into the morning. This made getting up early in the morning a problem and caused fatigue when having to get out of bed early.

Two causes of fatigue in the adolescent groups that were absent in the children groups were fear and worry. Adolescents discussed being afraid to fall asleep at times, causing them to be tired the next day. One teen discussed being afraid to go to sleep in the emergency room, for fear of what might happen while she was asleep. Teens also discussed worrying about the future and being unable to fall asleep at night due to concerns that were on their mind.

What Helps Fatigue

Children described fewer interventions that helped to decrease fatigue when compared with the adolescents. Three codes from the children's groups and eight from the adolescent groups described what helps (Table 6). One child's description of how rest helps was, "I usually take two naps every day and that makes me feel better." A good night's sleep was described as something that helped the children when they were tired. One child,

TABLE 5.
Adolescents Discuss Causes of Fatigue

Codes	Descriptions
Chemotherapy	Adolescent discusses how chemotherapy can cause fatigue, making them feel bad, causing them to dread having the treatment.
Hospital environment	Adolescent discusses noises, frequent interruptions, location of their hospital room as causing fatigue because of lack of sleep. Sometimes they have trouble falling asleep in the hospital.
Sleep position changes	Because of needle placement and IVs, the adolescent's sleeping position must change, causing difficulty in sleeping, making them tired in the morning.
Sleep pattern changes	Adolescent's sleeping patterns change making it hard to sleep all night or get back to a schedule. They may not get enough sleep.
Young children making noise	Adolescent discusses younger patients making noise on the unit, keeping them awake at night.
Going for treatment	Adolescent discusses being tired because of going for treatment so often (ie, daily trip for treatment).
Doing too many things	Adolescent discusses being tired from being too active and participating in many activities.
Nurses making noise	Adolescent discusses that sleep is disrupted from the noise the nurses make at the nurses' station.
Being bored	Adolescent discusses just sitting around makes them bored and they become drained and tired.
Treatment side effects	Adolescent discusses being fatigued from treatment side effects such as low counts and fever.
Fear	Adolescent expresses fear keeps him/her awake at night, making them tired. They fear something may happen.
Worry	Adolescent discusses worrying about what may happen to them, sometimes keeps them awake at night, causing fatigue the next day.

who discussed not being tired at the time of the focus group, stated that, "I slept good last night." Children discussed quiet activities such as reading a book, or listening to music as helping when they experience fatigue. "Having someone come visit you," is an example of a child's description of how visitors can help distract them when in the hospital.

Eight codes emerged from the adolescent groups that describe what helps and are listed in Table 7. The need for protected rest

TABLE 6.
Children Describe What Helps

Codes	Descriptions
Naps/sleep	Child describes resting during the day and at night sometimes helps.
Visitors	Child describes having someone come and visit as helping he/she feel less tired.
Fun/activities	Child describes activities such as going to the movies, reading a book or listening to music, make him/her less tired.

time when in the hospital and for naps when at home were described as very helpful for most teens. One adolescent discussed how his mother provided a rest period when in the hospital. "My mom normally will tell them not to come in and put a sign on the door . . . because I'm just so tired that I really can't talk to them." Participating in activities that keep the adolescent busy and help take their mind off feeling tired were discussed as helping to decrease fatigue. One teen stated, "I don't know what it does for me, but I've heard people say, that if you're sick, laughter helps you . . . watching movies kind of relaxes you, and if it is funny and makes you laugh, then you feel better because you forget about being tired, hurting, and all that." Going outside also was described as helping to decrease fatigue by teens in one focus group. One teen expressed the need for sleeping pills at night to decrease fatigue and one discussed that blood transfusions made him less tired. Several had participated in physical therapy while hospitalized and found that this decreased fatigue.

TABLE 7.
Adolescents Describe What Helps

Codes	Descriptions
Going outside	Adolescent discusses going outside to enjoy the day as a help to them.
Protected rest time	Adolescent discusses not being interrupted when they are resting helps a great deal.
Need for medication	Adolescent discusses need for sleeping pills because they get their days and nights mixed up in the hospital.
Physical therapy	Adolescent discusses going to physical therapy when in the hospital helps the fatigue.
Having fun	Adolescent discusses doing something they like makes them feel less tired when they are in the hospital and at home (socializing). Staying happy helps.
Rest/naps	Adolescent describes resting during the day (naps), sitting down, or more sleep helps the fatigue.
Keep busy	Adolescent describes getting out of bed and keeping busy helps fatigue.
Blood transfusion	Adolescent discusses after a blood transfusion he/she feels less tired.

Nursing Implications

Fatigue in children with cancer is a symptom that often remains forgotten in the midst of other more obvious side effects of treatment. This study is the first to provide insight into the occurrence of fatigue in children and adolescents with cancer. Children in this study who were as young as 7 years of age were aware of physical and emotional indicators of fatigue. This finding supports the importance of nursing assessments that include questions that reflect the descriptions of fatigue by the participants in this study. Changes in activity and participation in sports and play are common occurrences in the younger children who are experiencing fatigue. Men-

tal descriptions such as feeling sad or mad may be reflective of fatigue and should be evaluated in children and adolescents. Mental symptoms such as altered mood, decreased communication with others, and not wanting to be bothered may be mistaken for depression instead of fatigue. Astute observation of the child or adolescent may assist the nurse in differentiating between symptoms of fatigue from depression.

Several causes of fatigue described by children and adolescents in this study are found in the adult literature. These causes included treatment that included chemotherapy, radiation therapy, and surgery, and side-effects such as low blood counts and fever. These contributing factors, while obvious causes of fatigue, are often not considered when providing education to the pediatric patient and family regarding what to expect after treatment. It is important for the nurse to discuss fatigue as a symptom after treatment and to develop awareness of interventions that will decrease fatigue while in the hospital and at home. In addition, accurate assessment of other contributing factors that are also associated with fatigue will allow the nurse to educate the patient and family regarding other lifestyle changes. Sleep disturbances brought on by altered schedules, staying up late at night, and not sleeping in his/her own bed may need to be discussed with the child or adolescent and parents. Realization that the hospital environment was a major contributor to the occurrence of fatigue in children and adolescents is important. Knowledge of the impact a noisy hospital unit has on the sleep patterns of patients provided insight into changes that may need to occur in hospital settings. Awareness that fatigue during hospitalization occurs because of disruptions in sleep due to noises, frequent interruptions, and even the location of the room can stimulate thoughts and ideas on how to make the hospital setting more conducive to rest and sleep. Grouping necessary nursing activities together to disturb the child or adolescent less frequently is an important consideration. Providing protected rest periods during the day and at night were

helpful for the children and adolescents in this study. Increased awareness that the nurses' station should have quiet hours at night may also impact patients' ability to sleep at night.

Boredom brought on by having nothing to do created fatigue for participants in this study. Children and teens described participating in fun activities helped their fatigue. Hospital activities may be used as an intervention to prevent fatigue in the future. Teens discussed worry and or fear sometimes caused fatigue, providing insight into the importance of nurses spending time with them, listening to their concerns.

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Summary

This study is the first to evaluate fatigue as a symptom in children with cancer. Findings from this study will provide the foundation for developing a conceptual model for cancer-related fatigue in children. Data from this study will be used to design a self-report measure to determine the incidence, defining characteristics, and intensity of fatigue in children with cancer. The development of instruments to examine fatigue will assist nursing with the evaluation of specific interventions to alleviate fatigue in children in the future.

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