

Psychosocial and Physical Impact of Chronic Fatigue in a Community-Based Sample of Children and Adolescents

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SUMMARY. Background: Few studies have examined the problem of chronic fatigue in children and adolescents and its potential impact on functioning. Chronic fatigue may have a negative impact on school functioning, family activities, psychological well-being, physical functioning, and severity of medical symptomatology.

Objectives: This study compared psychosocial, family, and physical functioning between a randomly selected community based sample of 36 children and adolescents with chronic fatigue and a group of 21 children and adolescents without fatigue.

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Methods: Children and parents completed a comprehensive medical history questionnaire and questionnaires assessing psychological functioning, family functioning, and school attendance.

Results: Results indicated that children with chronic fatigue tended to have more difficulties in overall physical and psychological functioning, as measured by the Child Health Questionnaire and the Child Behavior Checklist. In addition, children in the chronic fatigue group experienced disruptions in a range of activities and reported more severe physical symptomatology when compared to children without fatigue.

Conclusions: Findings suggest that children and adolescents with chronic fatigue may have a range of associated difficulties, including limitations in physical and psychosocial functioning and a negative impact on the ability to engage in normative activities. doi:10.1300/J092v13n02_03 [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2006 by The Haworth Press, Inc. All rights reserved.]

KEYWORDS. Chronic fatigue, children, adolescents, psychosocial functioning, physical functioning

INTRODUCTION

Fatigue has been found to be a significant problem in adult populations, but has less frequently been studied in children. Fatigue is a common symptom among pediatric populations, particularly adolescents (1). Children and adolescents are generally less at risk for fatigue than adult populations; however, when fatigue has been found in pediatric populations, it has been associated with negative consequences, including increased psychiatric comorbidity, decreases in functioning, and school disruption (2).

Some researchers have investigated the occurrence of chronic fatigue syndrome (CFS) in children, a chronic condition characterized by severe disabling fatigue. When using criteria developed by Fukuda et al. (3), this condition also encompasses a variety of additional symptoms, including sore throat, headache, joint pain, muscle pain, lymph node pain or tenderness, unrefreshing sleep, post-exertional malaise, memory and concentration impairment. However, the application of the Fukuda case definition to pediatrics is controversial because these criteria were developed for adults, and some have questioned its applicabil-

ity to children (4,5). For this reason, some researchers have focused on children with chronic fatigue, or severe fatigue lasting 6 months or more, to determine whether children and adolescents with longer-lasting fatigue that does not resolve on its own might be more indicative of difficulties in this population (1). It is possible that children and adolescents with chronic fatigue, even if they do not fully meet the Fukuda criteria for chronic fatigue syndrome, might still be experiencing significant difficulties and disruption in functioning due to the presence of chronic fatigue.

The prevalence of children and adolescents with either general fatigue (lasting more than a few days) or prolonged fatigue (fatigue lasting one month or more) range from .06% (6) to 16% (7). The prevalence of pediatric chronic fatigue, or fatigue lasting 6 months or more, has been estimated at between .01% and 4% (8, 9). Farmer et al. (10) conducted a postal study of a twin registry in Great Britain consisting of 3,051 pairs of twins, and they found that 4.4% were identified as having more than a few days of disabling fatigue. In this sample, the mean duration of fatigue was 9 months for boys and 14 months for girls. Steele et al. (6) conducted a random digit-dialing telephone survey of chronic fatigue in the San Francisco urban area with 8,004 households and found unexplained prolonged fatigue (fatigue lasting for 1 month or more) in .06% of the children and adolescents under the age of 18. Peterson et al. (7) found that, among a randomized cluster sample of 1,155 Swedish schoolchildren ages 6-13 years, the prevalence of fatigue at least once a week was 31%, and 16% felt tired almost every day, with older school children reporting more recurrent fatigue. In a randomly-selected community-based epidemiological study conducted in Wichita, Kansas, with 34,018 households, the prevalence of adolescents having chronic fatigue (fatigue lasting 6 months or more) was 1,298 per 100,000, or .01% (8). Finally, in a second large-scale community-based epidemiological study conducted in the US among a socioeconomically and ethnically diverse random community sample of 18,675 households, 4% of children and adolescents exhibited either fatigue or school learning/memory problems (9).

In studies of children with fatigue or chronic fatigue, it has been found that school difficulties and school failure are a significant problem. Nagane (2) found, in a study of 32 healthy Japanese children age 9-10, that children with greater fatigue had lower scores on some items of academic achievement and sports ability. This study suggested that fatigue may be a risk factor for reduced mental and physical activity in school children. Carter et al. (1), in their study of 31 adolescents (aver-

age age 14.3) of unexplained chronic fatigue lasting 6 months or more referred to a pediatric infectious disease clinic, found that 55% of these participants had missed 20 to 60 days of school during the most recent school year because of their fatigue. Further, 35% of these participants indicated declines in academic performance due to their illness, and 52% experienced declines in extracurricular activities. These individuals also reported impairment in their social activities (55%), problems with social relationships (35%) and feeling as if their family members treated them differently (39%). Smith, Martin-Herz, Womack, and Marsigan (11) also found that adolescents referred for evaluation of chronic fatigue to a specialty clinic reported a greater level of absenteeism from school, with those individuals with unexplained chronic fatigue reporting an average of 44 school days missed within the past 6 months. Farmer et al. (10) identified 96 children and adolescents from a community-based twin registry with disabling fatigue, and they found that the boys missed a mean of 10 days of school during the past school term, and the girls missed a mean of 15 days per school term. Finally, Van Hoof, De Becker, Lapp, and DeMeirlier (12) conducted a qualitative study in 27 adolescents diagnosed with CFS, and these adolescents reported a range of school difficulties, including prolonged absenteeism, difficulty with completing courses and the need for accommodations in order to complete exams, conflicts and lack of support at school, impaired social interaction and fewer friends after becoming ill, and participation in fewer extracurricular activities because of illness.

Further, some researchers have suggested that children and adolescents with chronic fatigue may be at more risk for poor psychological and psychosocial functioning. Carter et al. (1) found that, on the Child Behavior Checklist (CBCL), fatigued adolescents had more internalizing symptoms when compared to healthy controls and had fewer externalizing symptoms when compared to depressed adolescents. Fatigued adolescents exhibited lower scores on the majority of the Children's Depression Inventory scales and the overall score when compared to depressed adolescents and exhibited higher overall depression and anhedonia than healthy controls. Thus, the fatigued adolescents appeared to have poorer overall psychological functioning when compared to controls, but this did not always fall into the clinical ranges of these subscales, and these difficulties appeared to be less when compared to depressed adolescents. Carter et al. (1) indicated that their results suggest pediatric patients with chronic fatigue are at risk for psychological disturbances. It is possible that psychological difficulties may result when a child has difficulty coping with their fatigue illness,

or may result from the stress of having chronic medical problems. Similarly, Farmer et al. (10) found that the parents of 96 children with chronic fatigue experienced impaired relationships with family and friends and limitations in leisure activity participation. Further, they found that individuals with disabling fatigue were more likely to develop symptoms of depression during their fatigue episodes, with 38% of boys and 39% of girls in their sample experiencing DSM-IV criteria for depression (10). Limitations in energy may have a significant impact in psychological functioning due to its impact on school, academic, or social functioning.

While there have been limited studies that have examined the problem of fatigue and chronic fatigue in children and adolescents, findings from research cited above indicate that chronic fatigue may potentially be disruptive, particularly to school functioning. It is possible that children with chronic fatigue are experiencing an overall higher level of physical impairment and other physical symptoms which may occur as a result of the fatigue. Examining the effects of chronic fatigue is particularly important to determine the impact of this symptom on everyday physical functioning. Further, information regarding the associations with chronic fatigue may be helpful for family care specialists and pediatricians who often must evaluate the causes and significance of unexplained chronic fatigue in their patients.

This study examined the effect of chronic fatigue on school functioning, family functioning, and overall physical and emotional impairment in a randomly selected community based sample of children with fatigue or other health difficulties and in a group of children without fatigue. It was hypothesized that children and adolescents with chronic fatigue would exhibit increased difficulties in various areas of life functioning when compared to a control group of children without chronic fatigue.

METHODS

Procedure

The data from this study are derived from a larger epidemiological prevalence study of chronic fatigue in a randomly selected, community-based sample of adults and children (13,14). This larger study of CFS entailed a cross-sectional screening telephone survey of a random sample of 28,673 households. Procedures described in Jason et al. (13)

were used to select one adult from each household. Birth dates for each adult were gathered, and the person with the most recent birth date was interviewed. A random sample of adults (18 years or older) was screened for inclusion into the larger study, and as part of the screening process, information regarding the fatigue and illness status of all children in the household were collected. This pediatric study was carried out in three stages.

Stage 1. First, a brief screening questionnaire was added to the adult screening questionnaire protocol several months after adult data collection had commenced. This screening questionnaire took approximately one to two minutes to administer. This brief questionnaire was developed for this study and assessed for either the presence of severe fatigue and/or disruption in school activities. This second question regarding school activities was asked because previous research has suggested that children may not report fatigue as their principal symptom or may exhibit fatigue through irritability or in other ways (15). The questionnaire also assessed symptoms that commonly occur in CFS, as defined by Fukuda et al. (3), as well as additional symptoms proposed by Bell (16).

Stage 2. Children and adolescents were invited to participate in the second and third phases of the study if they had no exclusionary medical conditions, at least 4 of the additional CFS symptoms (sore throat, headache, lymph node pain, joint pain, muscle pain, post-exertional malaise, unrefreshing sleep, and memory/concentration problems), and significant fatigue or problems with memory or learning at school. Further, a control group was randomly selected from among those children who screened negative for study inclusion in stage 1.

The second phase of the study included a psychological examination with the children and adolescents. The structured clinical interview for the DSM-IV, Childhood version (KID-SCID, 17) was administered by one of three master's level clinicians. The KID-SCID utilizes multiple information (i.e., parent and child) to determine the presence of a psychiatric diagnosis.

Stage 3. Following completion of the psychological examination, children and adolescents received a medical evaluation to rule out medical conditions leading to fatigue and to determine whether an individual met criteria for a diagnosis of CFS. The medical evaluation included an extensive medical history questionnaire which assessed the child's medical history, current symptoms, and fatigue symptomatology. Also, a full medical evaluation was conducted by a pediatrician, and laboratory testing was performed. The laboratory testing included a urinalysis,

complete blood count with differential, erythrocyte sedimentation rate, chemistry panel, thyroid function tests, and an HIV test. A chest x-ray was performed if one had not been conducted within 8 months of the physical examination date, and a tuberculosis skin test (PPD) was conducted. The medical examination and laboratory testing were administered to rule out other potential diseases, as recommended by Fukuda et al. (3).

Finally, the results obtained from the all testing performed (medical, psychiatric, etc.) were reviewed by an independent physician review panel who were blind to the experimental status (experimental vs. control) of each study participant. The team of four physicians determined the final diagnosis for each participant after completion of all phases of the study. Final diagnoses included a diagnosis of CFS, meaning that the participant met the criteria for CFS as defined by Fukuda et al. (3). Alternately, individuals were also diagnosed with Idiopathic Chronic Fatigue (ICF), defined as those children experiencing unexplained fatigue that did not fully meet criteria for CFS as defined by Fukuda et al. (3) or as having Chronic Fatigue Explained, meaning that the individual was experiencing significant fatigue, but that their fatigue was fully explained by a medical or psychiatric diagnosis. Finally, individuals could be classified as No Fatigue, meaning that the child was not currently experiencing significant problems with fatigue.

Participants: Fifty-seven children and adolescents participated in stages 2 and 3. Because only 2 children were identified with CFS, it was decided that children would be grouped into two categories. Those who exhibited CFS, ICF, or Chronic Fatigue Explained were classified into the “Chronic Fatigue” group. Individuals who did not exhibit chronic fatigue were classified into the “No Fatigue” group.

The current study examined those individuals who had chronic fatigue (CFS, ICF, or Chronic Fatigue Explained) and those individuals without ongoing fatigue difficulties (No Fatigue). In addition, this investigation examined among all respondents the association between whether one had chronic fatigue or not, and the other psychosocial and disability-related measures to determine whether chronic fatigue might also be associated with these variables.

The final sample of 57 participants was 54.4% female and 45.6% male. Regarding ethnicity, 22.8% were African-American, 24.6% were Caucasian, 49.1% were Latino, and 3.5% were of another ethnicity. The average age of the sample was 11.4, with the age range of the sample from 5 to 18 years old. Using chi-square analyses, no statistically significant differences were found between the two groups (Chronic Fatigue vs. No Fatigue) for gender, age, or ethnicity.

Measures

CFS Medical Questionnaire: Parent and Child Report. This questionnaire assessed the study participants' demographic information and complete medical history, including current and past symptomatology, history of service utilization, results of past medical and psychiatric evaluations, history and course of illness, and effects of illness on overall functioning. This questionnaire was developed for use specifically within this research investigation. It was administered to both the parent and the child.

The Structured Clinical Interview for the DSM-IV, Childhood Version (KID-SCID) (17) is a semi-structured psychiatric interview that assesses for the presence of psychiatric disorders in children and adolescents age 5 to 18. The KID-SCID obtains information from multiple informants (i.e., parent and child), and this information is then used by the clinician to arrive at the appropriate diagnosis. This interview has demonstrated good interrater reliability in the Disruptive Behavior module, .842 for ODD and CD, and 1.0 for ADHD (18). In addition, this instrument has demonstrated good test-retest reliability, with Kappa scores consisting of .84 for Attention Deficit/Hyperactivity Disorder, .84 for Conduct Disorder, .63 for Oppositional Defiant Disorder, 1.0 for Social Phobia, .66 for Separation Anxiety Disorder, and .44 for Posttraumatic Stress Disorder (19).

The Fatigue Scale (21). This scale was used to assess fatigue severity. This scale was originally used in a hospital-based case control study (20) and was further refined by Chalder et al. (21). Despite its brevity, the scale was found to be reliable and valid, and it had good face validity and reasonable discriminant validity. The fatigue scale consists of 11 items, and includes items such as "Do you have problems with tiredness?" "Do you feel weak?" and "Do you have difficulty concentrating?" with responses rated on a four-option continuum. Total fatigue severity scale scores range from 0 to 33, with higher scores signifying more fatigue.

Child Health Questionnaire (22). This instrument measure the physical and psychosocial well-being of children 5 years of age and older. Several versions for parent and child are available. In the current study, Parent Form 50 (PF50) was administered to all parents; and the Child Form 87 (CH87) was administered to all children age 10 and older. The PF50 and the CF87 each yield the following subscales: Physical functioning (measure and extent of physical limitations due to health-related problems); Role/Social Physical (limitations in daily functioning as a

result of physical health); General Health Perceptions (subjective assessment of overall health and illness); Bodily Pain (intensity and frequency of pain and discomfort); Role/Social-Emotional (limitations in activities as a result of emotional problems); Role/Social-Behavior (limitations in activities as a result of behavior problems); Self-Esteem (satisfaction with academic, athletic abilities, appearance, social functioning, and overall life satisfaction); Mental Health (measures the frequency of both positive and negative mental states); General Behavior (frequency of behavior problems and ability to get along with others); Family-Limitations in Activities (degree of disruption in usual family activities); Family-Cohesion (degree to which family members 'get along'); and Changes in Health (change in health over previous year). In addition, the PF-50 also includes the following two subscales: Parent Impact-Time (limitations in personal parental time as a result of child's medical, psychological, or psychosocial difficulties) and Parent Impact-Emotional (amount of parental distress as a result of child's medical, psychological, or psychosocial difficulties). Finally, the PF-50 combined the Role/Social-Emotional and Role/Social-Behavior scales into one scale, Role/Social-Emotional/Behavioral.

The CHQ demonstrates adequate reliability and validity and has been used with children with a range of physical and psychiatric difficulties (22,23). For US representative samples, the Parent Form 50 exhibits high inter-item consistency, with 91% of the items exceeding the minimum criteria for item internal consistency ($\geq .40$). The average success rate for tests of item discriminant validity was 95%. Similarly, in a representative sample of children in the US, 94% of the items met the minimum criteria for item internal consistency ($\geq .40$), and the average success rate for test of item discriminant validity was 92%. Test-retest reliabilities for the CHQ fall between .54-.73 for the parent version, and .18-.77 for the child version (23).

Child Behavior Checklist and Youth Self-Report (24,25). The Child Behavior Check List (CBCL) and Youth Self-Report (YSR) measure internalizing and externalizing problems in children. The CBCL is a questionnaire containing 120 items that is completed by parents of children age 4 to 18 years. The YSR is a self-report measure containing 119 items that is completed by adolescents age 11 to 18 years. The CBCL and the YSR each yield nine subscales: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, Aggressive Behavior, Sex Problems. In addition, there are two composite scales (Internalizing and Externalizing) and three competence scales (Activities, Social, and School).

The CBCL and YSR both demonstrate adequate reliability and validity. Internal consistency reliabilities for the CBCL range from .56 to .92, and inter-rater reliability coefficients range from .26 to .86 (26). For the YSR, internal consistency reliabilities range from .59 to .90, and test-retest reliabilities range from .47 to .81 when re-tested over a 1-week interval (26). Finally, the CBCL and YSR demonstrate satisfactory concurrent and discriminant validity (26).

Family Environment Scale: Parent and Child Version (27). The Family Environment Scale (FES) is a self-report questionnaire that measures a broad array of family environment dimensions. There are parent and child versions available for this scale. This scale consists of 90 true-false items that assess ten dimensions of family environment: Cohesion, Expressiveness, Conflict, Independence, Achievement, Intellectual-Cultural Orientation, Active-Recreational Orientation, Moral-Religious Emphasis, Organization, and Control. This scale has exhibited appropriate internal consistencies, ranging from .61-.78 for all of the FES subscales. Further, two-month and four-month test-retest reliabilities were also in the acceptable range, with two-month test-retest reliabilities ranging from .68-.85, and four-month test-retest reliabilities ranging from .54-.91 (27). Finally, this instrument has demonstrated appropriate convergent and discriminant validity with other scales measuring family interaction and family environment variables (27,28).

Statistical Analyses

Because the majority of variables were not normally distributed, Mann-Whitney tests, the non-parametric alternative to the t-test, were used to compare results between the chronic fatigue and no fatigue on the majority of the subsequent analyses. However, when data was normally distributed, the t-test statistic was used as indicated below. Because of the large number of separate analyses conducted, a p-value of .01 or below was set as the threshold for statistical significance in order to minimize Type I error.

RESULTS

First, analyses were conducted that examined the differences between the chronic fatigue and no fatigue groups on the subscales of the Child Health Questionnaire. Using the Mann-Whitney non-parametric

test statistic, separate analyses compared the two groups on each of the parent and child subscales. On the Parent Form-50, children in the chronic fatigue group had significantly poorer scores on the following subscales: physical functioning ($p < .01$); behavior ($p < .01$); mental health ($p < .01$); general health ($p < .01$); parent impact-emotional ($p < .01$); parent impact-time ($p < .001$); and family activities ($p < .01$). On the Child Form-87, there were no statistically significant differences between the chronic fatigue group and the no fatigue group, when using the Mann-Whitney test statistic. These results are summarized in Table 1.

Next, comparisons between the two groups on the CBCL subscales and the YSR subscales were conducted. On the CBCL, children in the chronic fatigue group were rated as having significantly poorer functioning on the following subscales: Somatic problems ($p < .01$); Anxious/Depressed ($p < .01$); Thought Problems ($p < .01$); and Attention Problems ($p < .01$). On the competence scales, children with chronic fatigue scored more poorly on the Activities subscale ($p < .01$). On the composite scores, children with chronic fatigue scored more poorly on the Total Score ($p < .001$) and the Internalizing ($p < .01$) composite scales. None of the group means fell into the clinical range (i.e., 65 and above), with the exception of the Somatic Problems subscale for the chronic fatigue group. When examining the results of the Youth Self-Report subscales, adolescents did not differ on any of the YSR individual subscales, nor did they differ on the composite scales. None of the YSR subscale or composite scores fell into the clinical range (i.e., 65 and above). The results are summarized in Table 1.

Next, t-test analyses were used to compare mean subscale scores on the Family Environment Scale for the two groups. The only statistically significant difference found between the families of children with chronic fatigue and families of children with no fatigue were found on the parent report ($t(51) = 3.236$, $p < .01$) of the Active-Recreational subscale and on the child report of the Control subscale ($t(51) = -3.798$, $p < .01$). These results are summarized in Table 1.

Regarding missed days of school, separate t-test analyses were conducted to compare number of missed days of school reported by the parent and the child. Parents in the chronic fatigue group reported an average of 1.02 days missed during the past month, as compared to .17 days reported missed in the no fatigue group. Also, parents of children with chronic fatigue reported an average of 3.40 days missed in the past 6 months and 6.94 days missed in the past year, and parents of children with no fatigue reported an average of .94 days missed during the past month and 3.22 days in the past year. Children in the chronic fatigue

TABLE 1. Results of comparisons between chronic fatigue and no fatigue group on psychosocial and behavioral rating scales, using the Mann-Whitney test statistic.

	Parent Report		Sig.	Child Report		Sig.
	Chronic Fatigue <i>n</i> = 36	No Fatigue <i>n</i> = 21		Chronic Fatigue <i>n</i> = 30	No Fatigue <i>n</i> = 13	
Child Health Questionnaire						
Physical Functioning	84.84	94.44	**	83.46	88.60	
Role/Social-Physical	82.83	95.03		81.85	92.31	
General Health Perceptions	59.00	73.96	**	61.47	69.10	
Bodily Pain	72.42	83.00		65.33	79.23	
Parental Impact-Time	64.31	92.78	***	-	-	
Parental Impact-Emotional	52.27	75.42	**	-	-	
Role/Social-Emotional/Behavior	77.44	94.44		-	-	
Role/Social-Emotional	-	-		73.70	87.18	
Role/Social-Behavior	-	-		86.30	98.29	
Self-Esteem	68.54	79.00		74.49	82.19	
Mental Health	64.73	81.00	**	61.35	73.77	
Behavior Scale	63.21	78.25	**	75.65	76.13	
Family Activities	72.35	88.33	**	67.64	77.56	
Family Cohesion	58.94	70.50		63.17	71.15	
Achenbach Behavior Rating Scales—CBCL and YSR	Child Behavior Checklist (CBCL)			Youth Self-Report (YSR)		
	<i>n</i> = 36	<i>n</i> = 21		<i>n</i> = 21	<i>n</i> = 9	
Total T score	61.36	49.62	***	56.71	46.89	
Internalizing T score	62.97	51.24	**	55.43	46.44	
Externalizing T score	53.82	46.62		54.67	46.89	
Withdrawn T score	60.73	53.86		57.71	52.56	
Somatic Problems T score	66.64	57.95	**	58.62	52.22	
Anxious/Depressed T score	61.36	53.71	**	58.76	51.22	
Social Problems T score	59.82	54.76		55.19	52.67	
Thought Problems T score	60.58	53.52	**	53.29	53.33	
Attention Problems T score	63.12	54.14	**	55.33	51.89	
Delinquent Behavior T score	56.81	53.76		58.57	55.44	
Aggressive Behavior T score	56.55	52.19		58.95	51.33	
Sex Problems T score (ages 4-11)	52.27	51.27		-	-	
Self-Destructive T score (boys)	-	-		58.25	52.75	
Activities T score	38.55	45.62	**	40.64	39.61	
Social T score	39.27	44.29		41.14	43.63	
School T score	41.43	44.58		-	-	
Total Competence T score	37.20	44.58	**	49.74	46.00	
	Parent version			Child version		
Family Environment Scale	<i>n</i> = 36	<i>n</i> = 21		<i>n</i> = 34	<i>n</i> = 21	
Expressiveness T score	50.78	45.29		50.82	50.62	
Independence T score	46.00	49.57		48.71	48.33	
Achievement T score	50.97	53.67		50.24	46.81	
Control T score	54.25	55.67		56.50	48.14	***
Cohesion T score	50.38	55.48		49.35	52.19	
Conflict T score	50.78	45.43		42.41	41.19	
Intellectual/Cultural T score	49.84	53.38		51.65	54.19	
Active Rec. T score	43.41	51.67	**	42.21	48.29	
Moral Religious T score	56.31	59.38		49.29	50.38	
Organization T score	53.34	54.48		49.68	50.95	

** = significant at the $p < .01$ level *** = significant at the $p < .001$ level

group self-reported that they missed 1.67 days during the past month, as compared to .40 days reported in the control group. Using the Mann-Whitney non-parametric test, there were no statistically significant differences found in the number of days of school reported over the past month by both the parent and the child, nor was there a difference in number of days missed in the past 6 months or past year as reported by the parents.

Next, parent and child rating of overall activity level were compared between the chronic fatigue and no fatigue group using separate Mann-Whitney tests. These analyses found that both the parent ratings ($p < .01$) and the child rating ($p < .01$) of activity levels in the chronic fatigue group were significantly lower when compared to the no fatigue group.

Finally, the severity of physical symptoms reported by parent and child were compared between the chronic fatigue group and the no fatigue group using the Mann-Whitney test-statistic. Separate analyses were conducted for each of the following symptoms: fatigue, sore throat, lymph node pain, eye pain/light sensitivity, stomach pain, muscle pain, joint pain, headache, memory/attention problems, dizziness/fainting after standing quickly, dizziness/fainting after hot shower, dizziness/fainting when turning head fast, dizziness/fainting when bending over, sleep problems, sick/worse/exhausted after physical exertion, fever/chills/night sweats, and depression. Children in the chronic fatigue group reported significantly higher levels of memory and attention problems ($p < .01$) and sleep problems ($p < .001$), when compared to those in the no fatigue group. Parents of children in the chronic fatigue group reported that their children were experiencing more severe levels of fatigue ($p < .01$), eye pain/light sensitivity ($p < .01$), headache ($p < .01$), memory and attention problems ($p < .001$), and depression ($p < .01$). No other analyses were statistically significant.

DISCUSSION

As hypothesized, children with chronic fatigue tended to exhibit difficulties in psychosocial and physical functioning when compared to a control group of children with no fatigue. The presence of chronic fatigue (fatigue lasting 6 months or more) was associated with impairments in overall functioning on the Child Health Questionnaire. On this questionnaire, parents of children in the chronic fatigue group reported more severe difficulties with in a variety of areas, including physical functioning, general health perceptions, mental health, family activities,

and impact on parental time and parental emotions. In contrast, children in the chronic fatigue group did not report poorer functioning on any of the CHQ subscales when compared to the no fatigue group. It should be noted that, when examining the mean scores between the two groups, the majority of the statistically different subscale mean scores did not fall below one standard deviation of the subscale mean for the general population (22). For the chronic fatigue group, only the subscales of Parent Impact-Time, Parental Impact-Emotional, and the Mental Health on the parent report fell more than one standard deviation away from the respective subscale means for the general US population. The presence of chronic fatigue may negatively impact a child's overall mental health for many reasons. Not being able to engage in the same normative activities as their peers, such as being able fully participate in school, participate in active recreation with their friends, attend peer or class functions, and even feeling singled out or different because of their illness, may have a particularly devastating impact on a child's sense of identity and subsequently lead to feelings of sadness or anxiety. Regarding the other CHQ subscales, although functioning was poorer when compared to the no fatigue group, the chronic fatigue group appeared to be only mildly impaired.

Similarly, there were many differences found on the CBCL between the chronic fatigue and no fatigue group, and it appeared that children in the chronic fatigue group had more difficulties with internalizing behavior. However, as with the CHQ, very few of these subscales scores fell within the clinical range (i.e., above 65). Only the somatic problems subscale was considered to be in the clinical range (i.e., above 65). Some (26) have noted that children with physical disorders commonly score higher on this particular subscale than children without physical or medical disorders, so whether this mean score is truly indicative of abnormal functioning in the chronic fatigue group is unclear. This results are similar to findings reported by Carter et al. (1), who found that, when comparing a group of healthy controls, depressed adolescents, and adolescents with unexplained chronic fatigue, the latter group had scores that fell somewhere between the healthy controls and the depressed adolescents. Thus, while there appear to be somewhat more difficulty on this psychological measure, the changes within the chronic fatigue group may in fact be milder than the difficulties reported in children with primarily psychiatric difficulties.

Significant differences were found between when examining overall activity levels and reported physical symptoms of children with chronic fatigue, in that children with chronic fatigue appeared to be more physi-

cally limited when compared to those in the no fatigue group and also exhibited more severe physical symptoms. However, as with the other psychosocial measures, these differences tended to be mild when examining the overall means reported for the overall activity level and the reported physical symptoms. For the rating of overall activity levels, the chronic fatigue group mean was at 85 on a scale from 0-100. On this scale, a score of 85 corresponded roughly to a level of disability where the children either exhibited no or mild symptoms at rest, symptoms present primarily after physical exertion, activity restriction was minimal, and the child was still able to go to school full-time. Likewise, when examining the severity of the physical symptoms scored on Likert-type scale from 0-7, the means of those symptoms which were significantly different in the chronic fatigue group tended to fall within 2.32 and 3.14, whereas the means of those in the control group tended to fall below one. A severity score of approximately 2-3 corresponded to a descriptor of 'mild' on the severity Likert-type item scale. Thus, the symptom severity reported by the chronic fatigue group appeared to be mild.

In terms of associations with the family environment, few differences were found. Only the active recreation subscale was reported to be significantly different by parents when compared between the two groups. Also, children with chronic fatigue were more likely to report higher levels of the control dimension. It might be expected that families of children with chronic fatigue would indeed engage in less active recreation due to the limited ability or negative potential effects of engaging in active family past-times. Regarding the perception of increased family control reported by children with chronic fatigue, it is possible that this perception of more rules and regulations in the family could have occurred because the children are having more difficulty meeting their family roles and responsibilities. Likewise, these additional rules and responsibilities might be perceived as more burdensome by children who are experiencing problems with chronic fatigue. In general, these findings are consistent with those reported above that the presence of chronic fatigue appeared to be associated with a negative impact on the family.

When examining the number of days of school missed, children and parents in the chronic fatigue group reported slightly more days of school missed when compared to the no fatigue group, but this difference was not statistically significant. The total number of missed school days reported by children and parents was fewer than days missed than

reported in other research studies. In the chronic fatigue group, parents reported that their children missed an average of 1 day within the last month, 3 days within the past 6 months, and 7 days within the past year. However, other researchers have reported much higher mean number of days of school missed within the past year. For example, Carter et al. (1) reported that the majority of participants with unexplained chronic fatigue missed between 20 to 60 days of school during the past year; and Smith, Martin-Herz, Womack, and Marsigan (11) reported a mean of 44 school days missed within the past 6 months in their sample of chronically fatigued adolescents. Van Hoof et al. (12) reported that only 22% of the adolescents with CFS in their sample attended school full-time. In contrast, Farmer et al. (10) found that the boys missed a mean of 10 days of school during the past school term, and the girls missed a mean of 15 days per school term, and these days of missed school are similar to the results found in the current study. This discrepancy in results might be due to the fact that the individuals in the Carter et al. (1), Smith et al. (11), and Van Hoof et al. (12) studies were samples of adolescents referred to specialty and tertiary care clinics, whereas, children and adolescents in the current investigation and in the Farmer et al. (10) were samples drawn from the community. It is likely that young people drawn from tertiary care clinics were more severely ill when compared to a community-based sample of children and adolescents who may not have sought help from a medical professional on their own. In the current sample, it is possible that the number of days missed was not statistically different than healthy children because these children were less severely ill when compared to clinic-referred samples.

In general, when comparing the parent versus child report on these various measures, many more significant differences arose on parent report, and few differences were found on the child report of functioning. Thus, the parents' assessment of their child's functioning may be particularly valuable in identifying changes in their child's behavior. Some of the difficulty in identifying and classifying the presence of chronic fatigue in children may be due to the fact that, as with adults, fatigue is a vague, poorly defined physical and emotional state, and children in particular may have difficulty in accurately reporting the presence of fatigue and the effects of fatigue on life. They may be less able to accurately verbally describe their emotional and physical well-being because of their cognitive developmental level (15). Parents, by contrast, may be better at noticing subtle changes in their children's behavior, and thus, active involvement with the parents of children with

fatigue seems warranted in order to more fully assess the presence of chronic fatigue and understand the impact that fatigue may be having in their child's life.

Taken together, the results suggest that children in the chronic fatigue group experienced a range of impairment at both the individual and family level. However, most of the reported physical and psychological impairments were mild and were not at the same level of severity as would be expected in a psychiatrically ill or a hospital-based population. It is possible that the mild impairments found in this study are due to the fact that the children in adolescents in this study were drawn from a community based study, while samples in other studies were drawn from clinic-referred samples. Also, as noted above, the children and adolescents in the CF group engaged in fewer overall activities as measured by the Activities competence scale on the CBCL and a general activity scale, and engaged in fewer family activities, as measured by the FES. While these children are not so ill that they miss more days of school when compared to a healthy sample, there appears to be a reduction in activities that occurs such that they may need to spend all of their energy on school attendance and may not have any energy available for other normative, out of school activities. This is consistent with Van Hoof et al. (12), who found that adolescents with CFS reported not only school failure or prolonged absenteeism, but a range of school-related problems including reductions in social and extra-curricular activities. Further, it is unknown whether these children might request help from their physicians or mental health professionals, as the children in general still appeared to be functioning with the average or non-clinical range, so these effects of chronic fatigue may be harder to detect on an individual basis. In contrast, clinic-referred samples may represent those children from the community whose chronic fatigue is the most severe and disruptive to school functioning, which may have caused them to seek out medical help.

In addition, it is unknown whether the presence of even these mild difficulties might place a child 'at risk' for future difficulties, as the long-term consequences are unknown. Research from the CFS literature, which investigates the course of CFS in children and adolescents suggest that young people with CFS recover much more quickly than adults with the disorder. It is possible that, in contrast to their adult counterparts, these mild difficulties may reflect the resilience experienced by children and adolescents that has been often reported in the CFS literature. It is unknown whether individuals in the current sample,

many of whom are much less severely affected than those fully meeting the stringent Fukuda et al. (3) case definition for CFS, would be expected to show a relatively good prognosis in recovering from their fatigue difficulties. It is also unknown whether these children and adolescents recover from fatigue and other symptoms on their own. However, it is also possible that the individuals in the current sample, even though they experience less severe fatigue difficulties when compared to children diagnosed with CFS, might still be more at risk for developing more serious fatigue problems or even CFS in the future.

Limitations of this study include the fact that, due to the small sample size, the chronic fatigue group as a whole was examined in the statistical analyses, and other variables that might help predict differences in physical and psychological status, such as age or ethnicity, could not be entered as covariates. Further, because the data was correlational in nature, it is unclear whether having chronic fatigue causes impairments in a range of physical, psychosocial, and psychological functioning, whether deficits in everyday functioning contribute to the experience or persistence of chronic fatigue, or whether impairment and the presence of chronic fatigue are due to other factors that were not measured as part of this study. Research utilizing larger samples sizes and longitudinal data would allow for the inclusion of other factors that may be related to the presence of chronic fatigue, and may help provide support for the results found in this investigation. Finally, research with pediatric samples having CFS rather than just CF might more strongly differentiate this ill group from healthy controls, particularly if more appropriate ways are developed to better diagnosis CFS in pediatric samples (see article in this volume on the new pediatric case definition).

In summary, these results suggest that children and adolescents with chronic fatigue, defined as severe fatigue lasting 6 months or longer, may exhibit a range of associated difficulties, including limitations in physical and emotional functioning and a negative impact on parental and family functioning. However, the functional limitations found in the current investigation appear to be mild in severity, and it is currently unknown whether this group of children and adolescents with chronic fatigue might be at risk for other, longer-term fatigue difficulties. Longitudinal studies of the course of fatigue symptomatology in a community sample of children and adolescents are needed to better understand the prognosis and long-term consequences of chronic fatigue.

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