

ORIGINAL ARTICLE

Sociodemographic and Symptom Correlates of Fatigue in an Adolescent Primary Care Sample

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Purpose: To describe the prevalence of prolonged fatigue, chronic fatigue syndrome (CFS)-like illness, and associated symptom patterns in adolescents attending primary care.

Methods: The design was cross-sectional. A questionnaire designed by the authors assessing fatigue and associated symptoms was administered to 901 adolescents (aged 11–18 years) attending 12 primary care clinics in the Chicago area. Prevalence rates for prolonged fatigue and CFS-like illness were calculated. Univariate comparisons involving sociodemographic data and fatigue severity were made between adolescents with and without prolonged fatigue, and sociodemographic and symptom predictors of prolonged fatigue were identified using logistic regression analysis.

Results: Prolonged fatigue (≥ 1 month) occurred at a rate of 8.0% and CFS-like illness occurred at a rate of 4.4%. Adolescents with prolonged fatigue were significantly older and also reported greater fatigue severity than those without fatigue. Findings from logistic regression indicated that, in addition to increasing age, headaches, muscle pains, fever, and fatigue made worse by exercise were significantly associated with prolonged fatigue.

Conclusions: Abnormal fatigue is a disabling and prevalent condition in adolescents in primary care. It is associated with a number of additional symptoms, many of which may have viral origins. © Society for Adolescent Medicine, 2004

KEY WORDS:

Fatigue
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Fatigue is a significant problem for some adolescents, accounting for approximately 15% of medical care visits to infectious disease clinics [1]. It is a disabling consequence of many medical conditions, psychiatric disorders, syndromes of unknown etiology, and lifestyle choices [2]. Fatigue is poorly understood or ignored because of its nonspecific nature [3]. The prevalence of fatigue alone can range from 8% to 41%, depending on age, extent and duration of the fatigue, the approach to measurement, and the setting from which participants are drawn [4–6]. Though various forms of fatigue are commonly reported and studied in adult samples [3,7,8], relatively little is known about the nature and extent of fatigue in adolescents.

In the adult literature, a distinction has been made between prolonged fatigue (i.e., fatigue lasting 1 month or longer), chronic fatigue (i.e., fatigue lasting 6 months or longer), and chronic fatigue syndrome (the least prevalent and most rigorously defined of the three conditions). Chronic fatigue syndrome (CFS) is defined in adults as 6 or more months of debilitating, medically unexplained fatigue that occurs concurrently with at least four of the following

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symptoms: sore throat; tender cervical or axillary lymph nodes; muscle pain; multi-joint pain; headache of a new type, pattern, or severity; unrefreshing sleep; substantially reduced short-term memory or concentration; and post-exertional malaise lasting 24 hours or more [9].

Researchers studying fatigue in children and adolescents appear to agree that the diagnostic criteria used to define chronic fatigue syndrome in adults [9] may not be appropriate for pediatric studies [1,10–13]. Consequently, the term, “CFS-like” has been used to reflect varying degrees of fatigue and additional physical and cognitive symptoms (e.g., [14]). Increasingly, “prolonged fatigue” and “CFS-like illness” are becoming the focus of independent epidemiological, etiological and treatment research in pediatric studies [15]. Prolonged fatigue and CFS-like illness can be characterized by impairment comparable to that seen in individuals with chronic medical conditions [16] and can involve significant performance limitations in educational, occupational, and home settings [8,17].

To date, there has been limited research on the characteristics of fatigue in adolescents. In studies of prolonged and chronic fatigue, the symptom pattern observed in child and adolescent samples has been found to be similar to that observed in the adult presentation, with a few exceptions [17]. For example, reports of acute onset and increased viral symptoms appear more frequent in pediatric samples [1,12,17]. Therefore, it is possible that an infectious illness at onset may play a role in the development of abnormal fatigue in some adolescents. Alternatively, findings of an increased prevalence of viral symptoms may be explained by sample and setting differences among studies. Previous studies of symptom patterns associated with fatigue in adolescent samples have drawn participants from tertiary care settings (e.g., fatigue specialty clinics or pediatric infectious disease clinics). It is unclear whether similar symptoms would be reported by adolescents in primary care. Accordingly, the aim of this study is to describe the prevalence of prolonged fatigue, CFS-like illness, and associated symptom patterns in adolescents attending primary care sites. It is hypothesized that prolonged fatigue will be associated with older age, greater fatigue severity, and viral symptoms.

Methods

Participants

Data were collected from subjects at nine pediatric primary care offices, all members of the Pediatric

Practice Research Group, a Chicago-area primary care, practice-based research network [18]. A research assistant established the recruitment and data collection process at each office. Consecutive adolescents aged 11–18 years were asked to participate in a study examining tiredness and other health symptoms at the time of an office visit. Eligible subjects were visiting the office for well care, a required physical examination for school or work involvement, a minor illness, or a minor injury. Offices were unable to track the number of eligible subjects not invited to participate or refusing to participate. Signed assent from adolescents and consent from parents was obtained. This study was approved by the Children’s Memorial Hospital Institutional Review Board.

A total of 901 adolescents completed an in-office survey regarding fatigue and associated symptoms. The average age of participants was 14 years ($M = 13.8$ years, $SD = 1.9$, range = 11–18 years). Fifty-four percent were young women and 46% were young men. Most identified as white (83%), followed by 10% Latino, 4% African-American, 2% Asian and 1% Multiracial/Other. Eight percent of the sample was involved in special education.

Procedure

Data were collected during a 1-year period using a self-report pencil-and-paper questionnaire.

Measures

The Pediatric Fatigue Questionnaire. The questionnaire, designed by the authors, included demographic questions (assessing gender, age, ethnicity, grade in school, enrollment in special education programs), a measure of fatigue severity, *The Fatigue Scale* [19], and a list of 13 symptoms commonly reported by adolescents with CFS proposed by Bell [20]. This included all of the symptoms in the most recent diagnostic criteria [9]. It took approximately 10 minutes to complete.

The Fatigue Scale. *The Fatigue Scale* [19] is a valid and reliable measure of fatigue severity that was originally used in a hospital-based case control study [21] and further refined by Chalder et al. [19] with a sample of 374 primary care patients at a clinic in Great Britain. This 11-item scale contains responses that are rated on a four-option continuum ranging from 0 = “less/better than usual” to 3 = “much

more/much worse than usual," with total scores spanning from 0–33. Higher scores indicate greater fatigue levels.

Data Analytic Techniques

For comparative analyses we focused on comparing the adolescents with prolonged fatigue to those without prolonged fatigue for two reasons. First, prolonged fatigue is a more broadly defined and prevalent condition than CFS-like illness. Second, because our aim was to explore which CFS symptoms were most strongly associated with prolonged fatigue, classifying individuals according to the criteria for CFS-like illness beforehand would be redundant and tautological because the same symptoms used in classification would be used as correlates.

A series of Chi-square tests were used to compare adolescents with prolonged fatigue to those without fatigue for categorical variables of gender, ethnicity, and educational status. Independent-samples Student's *t*-tests were used to compare groups in terms of the continuous variables of age and fatigue severity.

A hierarchical logistic regression analysis was conducted to identify symptoms most strongly associated with prolonged fatigue in adolescents. Wald criteria were used to judge the statistical significance of predictors in the logistic regression. Sociodemographic variables of sex, age, and ethnicity were entered first as covariates, followed by the 13 individual CFS symptoms [9,20]. Fatigue group membership (presence versus absence of prolonged fatigue) served as the dependent variable.

Results

In the overall sample, prolonged fatigue (≥ 1 month) occurred at a rate of 8.0% ($n = 70$) and CFS-like illness (prolonged fatigue + at least four of the eight Fukuda et al CFS symptoms [9]) occurred at a rate of 4.4% ($n = 39$).

Table 1 presents comparisons of individuals with prolonged fatigue with individuals without fatigue in terms of sociodemographic characteristics and fatigue severity. Chi-square analysis revealed no significant differences between adolescents with prolonged fatigue and those without fatigue in terms of gender, ethnicity, and educational status. Independent-samples Student's *t*-tests indicated that participants with prolonged fatigue were significantly older than those without fatigue ($t [1, 866] = 3.88, p$

Table 1. Fatigue Group Comparisons According to Sociodemographic Characteristics and Fatigue Severity^a

	Prolonged Fatigue f (%)	Not Fatigued f (%)
Gender		
Female	43 (61)	428 (53)
Male	27 (39)	373 (47)
Ethnicity		
White	59 (84)	661 (83)
Latino	7 (10)	79 (10)
African-American	3 (4)	32 (4)
Asian American	0 (0)	14 (2)
Multiracial/Other	1 (1)	10 (1)
Educational status		
Regular education	64 (91)	725 (92)
Special education	6 (9)	62 (8)
	M (SD)	M (SD)
Age (yrs)*	14.6 (1.8)	13.7 (1.9)
Fatigue Severity*	15.2 (5.1)	9.8 (4.3)

* Significant difference between groups at the $p < 0.01$ level.

^a 30 participants did not provide information on sex, 35 participants did not provide information on ethnicity, 44 participants did not provide information on educational status, and 8 did not provide information regarding age.

$< .01$). As expected, participants with prolonged fatigue also reported greater fatigue severity than those without fatigue ($t [1, 870] = 8.56, p < .01$).

Findings from the hierarchical logistic regression analysis are presented in Table 2.

Findings indicate that, in addition to increasing age, headaches, muscle pains, fever, and fatigue made worse by exercise were significantly associated with prolonged fatigue. Table 2 also indicates that, with the exception of rash, the remaining symptoms are more prevalent among adolescents with prolonged fatigue. However, these symptoms did not emerge as significant correlates.

Discussion

Fatigue is a disabling and familiar complaint in primary care that is commonly associated with additional somatic symptoms, many of which may have viral origins. The aim of this study was to describe the prevalence of prolonged fatigue, CFS-like illness, and associated symptom patterns in adolescents attending primary care. In our sample, the estimated rate of CFS-like illness was 4.4%. The rate of prolonged fatigue in our sample was 8.0%. It is possible that these rates are higher than what might be observed in a community-based sample because our participants were drawn from primary care medical settings where adolescents would be more likely to present with fatigue or fatigue-related

Table 2. Sociodemographic and Symptom Predictors of Prolonged Fatigue

	Prolonged Fatigue	Not Fatigued	b	Odds Ratio	95% CI
Sociodemographics ^a					
Gender			NS	NS	NS
Age*			.29	1.34	1.15–1.56
Ethnicity			NS	NS	NS
Symptoms					
Headache*	69.1%	30.2%	.88	2.41	1.24–4.69
Sore throat	44.1%	20.6%	NS	NS	NS
Joint pain	46.3%	29.4%	NS	NS	NS
Muscle pain*	52.9%	18.3%	.95	2.58	1.36–4.88
Stomach pain	53.7%	19.6%	NS	NS	NS
Swollen glands	19.1%	7.8%	NS	NS	NS
Rash	10.4%	11.0%	NS	NS	NS
Fever and chills*	39.7%	9.0%	1.04	2.82	1.35–5.86
Eye pain	32.4%	14.5%	NS	NS	NS
Sleep difficulties	49.3%	19.8%	NS	NS	NS
Memory	25.4%	11.6%	NS	NS	NS
Concentration	44.8%	17.7%	NS	NS	NS
Exercise worsens fatigue*	38.2%	10.5%	.88	2.41	1.19–4.86

* Significant difference between groups at the $p < .01$ level.

^a Group percentages and means for sociodemographic characteristics are presented in Table 1.

NS = not significant.

conditions associated with acute illnesses, such as viral or bacterial infections.

As predicted, prolonged fatigue was associated with older age and greater fatigue severity. Findings for an increase in rates of prolonged fatigue with age are consistent with findings from other studies of adolescents in tertiary care [17,22]. Potential explanations for this finding include the possibility that psychosocial stress, or its cumulative effects, may increase with age in adolescence [23]. This stress may interact with any number of biological and behavioral variables, including genetic predispositions, immunological and/or neuroendocrine abnormalities, and nutritional intake and activity patterns [24].

In addition, it is possible that the fatigue and many of the viral symptoms are, in some cases, part of an acute postinfectious fatigue syndrome, which occurs most often in later adolescence and young adulthood [25,26]. In approximately two-thirds of adolescents with CFS, prolonged fatigue and symptoms have been observed to follow an acute febrile illness [1,11–13,17]. Careful documentation of the nature of common infectious illnesses and specific diagnostic testing for acute illnesses known to be associated with fatigue are recommended. This would clarify the etiology of prolonged fatigue in clinical settings and in future research.

The primary symptoms that emerged as correlates of fatigue (headaches, muscle pains, fever, and fatigue made worse by exercise) were consistent with

those reported in other studies. For example, headache, exercise intolerance, muscle pain and fever were among the most common symptoms reported by Smith and Carter [17]. In another study, headaches and muscle pain were among the more prevalent symptoms [1]. Krilov et al. [12] found that fevers, among other viral symptoms, were reported by more than one-third of adolescents. Other viral symptoms commonly observed in both adolescents and adults with CFS, such as sore throat and swollen glands [12,27], did not emerge as significant correlates in our study. It is possible that sample heterogeneity, differences in sampling methodologies, settings, and timing, and developmental differences contribute to the observed discrepancies.

Another observation that emerged from our study was the finding for similar rates of prolonged fatigue in young men and women. This finding was supported by one other study of children and adolescents that found roughly equivalent rates of fatigue and CFS-like illness between the genders [14]. Though one study of fatigue in prepubertal children found no difference between the genders [28], a number of studies have reported a greater prevalence of fatigue or CFS in girls and young women [1,12,29]. This finding is more consistent in adult studies [30]. Primary care and tertiary care studies have found that adolescent and adult women are more likely to experience fatigue than men (some by a ratio of 3:1) [6,12,31–34]. Similar observations have

been made in community-based studies of adults, and this suggests that the gender differences observed in some studies may occur independently of help-seeking behavior [5,28,35–39]. It is unclear whether and why discrepancies related to gender may become more pronounced in adulthood as compared with adolescence, and further research is needed to clarify the reasons behind these discrepant findings.

Limitations

This study has a number of limitations, including the fact that offices were unable to obtain information on the number of subjects not invited to participate by office staff, and those refusing to participate. This likely affected the accuracy of the prevalence estimates. In addition, psychological and behavioral variables were not evaluated. Thus, the degree to which variables such as depressed mood, psychological distress, lifestyle practices, and activity patterns influenced findings is unclear. In addition, because the study design was cross-sectional, conclusions about causal and temporal relationships between variables were not possible. The fact that subjects were informed and invited to participate in a study about tiredness could have biased the findings toward over-inclusion of teens with fatigue. Another limitation of the study involved the lack of specific diagnostic information for participants who attended primary care offices for reasons of minor injury or illness. Additional information regarding the circumstances surrounding fatigue onset and whether reports of fatigue and associated symptoms may have been associated with infectious illness will need to be obtained in future studies. Another limitation involves the absence of data on immune and neuroendocrine functioning, which could have provided additional information on the etiology of fatigue in this sample. In sum, additional studies of biological, psychological, behavioral, and social correlates of abnormal fatigue are necessary to clarify and eventually inform treatment approaches to fatigue-related conditions and impairments observed in adolescents.

Conclusions

In summary, prolonged fatigue is a prevalent symptom in primary care, and it is often accompanied by fever, decreased endurance with exertion, and pain-related symptoms. Fatigue in adolescents does not

appear to discriminate between genders, and it tends to increase with age. It is possible that viral or bacterial infections are responsible for the high prevalence rates of fatigue and accompanying symptoms observed in primary care. Prospective, longitudinal studies of recovery from severe infections are necessary to explore this possibility and to determine the course and prognosis of postinfectious fatigue syndromes in adolescents over time.

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