

Childhood predictors of self reported chronic fatigue syndrome/myalgic encephalomyelitis in adults: national birth cohort study

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Abstract

Objective To study childhood risk factors for chronic fatigue syndrome in adult life.

Design Examination of data from the 1970 British birth cohort.

Participants 16 567 babies born 5-11 April 1970, followed up at 5, 10, 16, and 29-30 years.

Main outcome measures Chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME) identified by self report at age 30 years. Data from childhood from questionnaires given to parents and teachers. Maternal mental health assessed with the malaise inventory.

Results 93 (0.8%, 95% confidence interval 0.7 to 1.0) of 11 261 participants reported ever having CFS/ME, and 48 (0.4%, 0.3 to 0.6) had the condition currently. Higher risk of CFS/ME was associated with having a limiting longstanding condition in childhood (odds ratio 2.3, 1.4 to 3.9), female sex (2.3, 1.4 to 2.6), and high social class in childhood (2.2, 1.4 to 3.5). Higher levels of exercise in childhood were associated with lower risk (0.5, 0.2 to 0.9). Maternal psychological disorder, psychological problems in childhood, birth weight, birth order, atopy, obesity, school absence, academic ability, and parental illness were not associated with risk of CFS/ME.

Conclusions We identified no association between maternal or child psychological distress, academic ability, parental illness, atopy, or birth order and increasing risk of lifetime CFS/ME. Sedentary behaviour increased the risk.

Introduction

The aetiology of chronic fatigue syndrome (CFS), also known as myalgic encephalomyelitis (ME), remains unclear. Longitudinal studies in adults have suggested that past psychiatric disorder may have a role.¹ Other studies have implicated female sex,² stressful events,³ high academic achievement,⁴ infections such as mononucleosis⁵ and viral meningitis,¹ higher levels of routine exercise,⁶ birth order,⁷ atopy,⁸ and physical symptoms and diagnoses.⁹

While factors at the family level are known to be important, it is unclear whether these operate primarily at the environmental or genetic level.¹⁰ Case-

control studies have suggested that maternal overprotectiveness and depression¹¹ may be associated with increased risk of disease in adult life, and a recent cross sectional epidemiological study showed an association between maternal psychological distress and parental report of ME/CFS in children.¹² Cohort studies of childhood risk factors for adult illness, however, have not been published.

We used longitudinal data from the 1970 British birth cohort study to explore whether childhood risk factors were associated with lifetime risk of developing CFS/ME by the age of 30 years.

Methods

The 1970 British cohort study is a cohort study that enrolled 16 567 babies born in England, Scotland, and Wales on 5-11 April 1970. Participants were followed up at 5, 10, 16, and 29-30 (n=11 261) years of age. Between 10 and 30 years, loss to follow up was highest in those from lower socioeconomic groups and those with a disability (loss of about 5% in both groups).

CFS/ME was identified by self report questionnaire completed at 30 years. Participants were asked whether they had ever had CFS/ME, whether they currently had CFS/ME, and at which age their condition developed. Measures of socioeconomic status in childhood were obtained from interviews with parents at 10 years. Socioeconomic status at 30 years was derived from participants' reported current occupation. Data on ethnicity were recorded at 30 years.

At 5, 10, and 16 years, mothers were asked to complete 19 items from the Rutter parental A scale of behaviour disorder. At 10 years, teachers completed a 53 item social development scale, with items drawn from the Conner teacher rating scale and the Rutter teaching scale. A 14 item subscale for problems/impulsivity/hyperactivity in conduct and an eight item subscale for attention deficit has been previously identified.¹³ At 16 years, teenagers completed the 12 item self report general health questionnaire (GHQ 12) to screen for recent psychological distress. Self esteem at

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Multivariate model of factors predicting lifetime risk of CFS/ME (n=8512)

Factor	Odds ratio (95% CI)	P value
Presence of longstanding medical condition significantly affecting home or school life at 10 years	2.2 (1.3 to 3.8)	0.003
Sport played in spare time at 10 years:		
Never or hardly ever (reference category):	1	P=0.04 for trend
Sometimes	0.5 (0.3 to 1.0)	
Often	0.5 (0.2 to 0.9)	
Female sex	2.4 (1.4 to 4.3)	0.003
Father in professional/managerial occupation in childhood	2.5 (1.4 to 4.3)	0.001
Mother achieved A levels or equivalent/degree/diploma*	1.1 (0.6 to 2.1)	0.6
High scorer on malaise inventory at 30 years	2.6 (1.6 to 4.3)	<0.0001
Professional/managerial occupation at 30 years*	0.8 (0.5 to 1.5)	0.6

*Mother's education status and socioeconomic status at 30 years were included a priori in model.

10 and 16 years was measured in school with the Lawrence self esteem questionnaire for children, validated for these age groups.

At 5, 10, and 16 years mothers completed the Rutter malaise inventory, a 24 item self completion scale designed to assess psychiatric morbidity. Participants also completed the malaise inventory at the age of 30 years.

At 10 years participants completed two verbal and two non-verbal subscales of the British ability scales for the assessment of cognitive attainment.

Also at 10 years parents were interviewed to obtain a history of severe or prolonged illness in either parent in the previous 5 years. Mothers provided information on the child's history of atopy, how often the child played sport in his or her spare time, and the number of days off school that term because of health or emotional problems. Teachers' reports provided data on the usual number of hours of sport played by the child at school each week. The presence of a longstanding condition in the child was recorded from both medical examination and maternal report at 10 years, with maternal report of whether the condition considerably limited the child's daily life. School doctors measured the child's height and weight at 10 years. Obesity was defined as body mass index \geq 95th centile.

Analysis

We explored differences between those with any CFS/ME and the remainder of the cohort. We then used logistic regression to assess factors associated with the risk of ever having CFS/ME. Factors were initially assessed at univariate level and then examined after adjustment for sex, father's social class in childhood, and mother's educational status. We used a final multivariable model to determine which factors were independently associated with CFS/ME, entering all variables shown to be significantly associated simultaneously, including sex, father's social class, and mother's education. Adult psychological morbidity (high scorer on malaise inventory at 30 years) was also included a priori in the multivariable model to control for potential confounding of self report CFS/ME status.

Results

Of the 11 261 participants, 93 (0.8%, 95% confidence interval 0.7 to 1.0) reported ever having CFS/ME and 48 (0.4%, 0.3 to 0.6) had the condition currently. After we excluded two participants, the reported age range

at onset of CFS/ME of the 91 remaining participants ranged from 14 to 29 years, with a median of 24 years (mean 22.9, SD 4.6 years).

Risk of lifetime CFS/ME was significantly increased by female sex, high socioeconomic status in childhood, and having a longstanding medical condition in childhood that considerably affected home or school life, or both. A parent's report of a child playing sport in his or her spare time significantly decreased the risk of later CFS/ME (see bmj.com).

There were no significant associations between maternal or child psychological factors and lifetime risk of disease. A high score on the malaise inventory at 30 years was strongly associated with increased risk of CFS/ME.

We then included factors significantly associated with lifetime risk of CFS/ME at the previous stage in a multivariable model (table). A limiting longstanding medical condition in childhood, female sex, and high social class in childhood were independently associated with a higher risk of CFS/ME, while higher levels of exercise in childhood were independently associated with lower risk. High malaise scores in adulthood were also significantly associated with higher risk. When we added to this model the childhood factors that were not individually associated with risk of CFS/ME, effect sizes or significance were not substantially altered (except for high score on general health questionnaire at 16 years, which attenuated the significance but did not alter the effect size of limiting medical condition in childhood, probably because of the low number for adolescent general health questionnaire score).

Discussion

In this large longitudinal population based study, we found no association between childhood or adolescent behavioural or psychological problems or maternal psychological morbidity and the risk of self reported CFS/ME by the age of 30 years. Children at higher risk for CFS/ME had higher socioeconomic backgrounds, played sport rarely, and had limiting physical or mental longstanding conditions other than CFS/ME.

Strengths and limitations

We used data from a large national birth cohort. The participants became adults at a time when CFS/ME was increasingly recognised. When examining potential risk factors for self reported lifetime CFS/ME, we were able to control for current socioeconomic status and psychological morbidity, the best documented associations of CFS/ME in adult life.¹⁻¹⁴ Maternal psychological morbidity was assessed with a validated instrument at three periods during participants' childhood and adolescence. The final multivariable model was robust to the inclusion of other childhood variables.

Our estimated prevalence for current and lifetime CFS is comparable with that in other epidemiological studies. The main weakness of this study, however, is the reliance on self reported CFS/ME. The diagnosis of CFS requires certain physical and mental disorders to be absent, and a proportion of the CFS/ME group might not have met diagnostic criteria. Similarly, participants who did not report the diagnosis may have been misclassified. The epidemiology of self reported fatigue states may differ from that of states defined with

operational diagnostic criteria.¹² Our finding that individuals with CFS/ME are more likely to come from high socioeconomic backgrounds in childhood is at odds with results of epidemiological studies that have found operationally defined CFS in adults to be more common in lower socioeconomic groups, but our findings relate to a people who reported CFS/ME themselves.

Loss to follow up of those from disadvantaged groups is a common limitation of birth cohort studies. However, in the 30 year survey, 62% of participants were born into a manual social class compared with 64% of the birth cohort. It is unlikely that this small difference significantly influenced our finding that high childhood social class increased the risk of CFS/ME.

Comparison with other studies

Retrospective studies have proposed maternal over-protectiveness and depression¹¹ as possible aetiological factors for later disease. In contrast, we found no association with maternal psychological morbidity measured in early and mid-childhood and adolescence using a commonly used screening instrument for depression. We also found no association between maternal somatisation and later illness. Our findings, however, confirm previous work showing that current psychological morbidity is associated with higher prevalence of CFS/ME in adult life.^{1 2 14}

Case-control studies have suggested that people have an excess of physical symptoms and diagnoses before the onset of CFS/ME.^{8 9} We found that longstanding physical or mental illness in childhood was more common in those with later CFS/ME, with illness that significantly affected the child's daily life increasing the risk of CFS/ME more than twofold. These reports of illness preceded the onset of CFS/ME by more than four years, excluding confounding by prodromal fatigue states. This finding contrasts with that from a retrospective case-control study that suggested that there were no differences in childhood experience of illness in adults with CFS and healthy controls.¹¹ Possible mechanisms for this association may include both biological and psychological vulnerabilities associated with chronic illness. Contrary to previous suggestions we found no association between intellectual ability in childhood and later CFS/ME.

We found no evidence to support the suggestions that chronic illness, whether physical or mental, in either parent is common among adolescents with CFS/ME.¹⁵

MacDonald et al suggested that higher levels of routine exercise may precipitate or exacerbate CFS/ME.⁶ We found that children who routinely played more sport in their spare time had a significantly lower risk of CFS/ME, a finding that was independent of potential confounding by limiting chronic illness or obesity and was also robust to adjustment for sex and socioeconomic status. Children who were sedentary at 10 years had about twice the risk of lifetime CFS/ME. Hours of sport played at school was not associated with risk of CFS/ME, which suggests that the protective effect of exercise lies within the individual and family rather than in timetabled school activities.

What is already known on this topic

Chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME) in adults is associated with higher rates of psychological disturbance

Atopy, higher levels of physical exercise, parental depression and illness, and child psychopathology have been suggested as risk factors

What this study adds

Maternal psychopathology, parental illness, childhood or adolescent psychological distress, academic ability, atopy, birth order, birth weight, and obesity are not associated with the risk of lifetime self reported and physician diagnosed CFS/ME

Sedentary children are at greater risk of later CFS/ME

Conclusions

Our findings do not support a role for previously suggested risk factors for CFS, and contrary to previous suggestions that high levels of exercise increase risk, we found that the most sedentary children were at greatest risk.

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