Association between childhood trauma and physical disorders among adults in the United States

RENEE D. GOODWIN[1] AND MURRAY B. STEIN

*From the Department of Epidemiology, Mailman School of Public Health, Columbia University,
New York, NY; and Department of Psychiatry, University of California – San Diego, La Jolla, CA, USA*

ABSTRACT

Background. The goal of this investigation was to determine the association between self-reported childhood trauma and physical disorders among adults in the United States.

Method. Data were drawn from the National Comorbidity Survey ($N = 5877$). Multiple logistic regression analyses were used to determine the associations between childhood physical abuse, sexual abuse, and childhood neglect and the likelihood of specific physical disorders among adults.

Results. Childhood physical abuse, sexual abuse and neglect were associated with a statistically significantly increased risk of a wide range of physical illnesses during adulthood. After adjusting for demographic characteristics, lifetime anxiety and depressive disorders, alcohol and substance dependence, and all types of trauma: results showed that childhood physical abuse was associated with increased risk of lung disease (OR = 1·5 (1·1, 2·2)), peptic ulcer (OR = 1·5 (1·03, 2·2)) and arthritic disorders (OR = 1·5 (1·1, 2·2)); childhood sexual abuse was associated with increased risk of cardiac disease (OR = 3·7 (1·5, 9·4)); and childhood neglect was associated with increased risk of diabetes (OR = 2·2 (1·1, 4·4)) and autoimmune disorders (OR = 4·4 (1·7, 11·6)).

Conclusions. Consistent with previous work, these results suggest that self-reported childhood trauma is associated with increased risk of a range of physical illnesses during adulthood. Future research that includes replication of these findings using prospectively assessed physical and mental disorders with objectively measured biological data using a longitudinal design, including other known risk factors for these diseases and more detailed information on specific forms of abuse, is needed to understand the potential mechanisms of these links.

INTRODUCTION

In recent years, there has been growing interest in and evidence suggesting a relationship between childhood trauma and poor physical health outcomes during adulthood. These data come mainly from three sources. First, results from clinical studies suggest that adult general medical patients who are high utilizers of care are more likely to have histories of childhood trauma than those who use fewer services (Arnow *et al.* 1999; Newman *et al.* 2000). Secondly, data from speciality medical and psychiatric clinics show higher than expected levels of childhood physical and sexual abuse among patients seeking treatment for specific illnesses (e.g. irritable bowel syndrome, headache, chronic pelvic pain) (Walker *et al.* 1988, 1997; Drossman *et al.* 1990; Rapkin *et al.* 1990; Toomey *et al.* 1993; Walker *et al.* 1993; Talley *et al.* 1994; Drossman, 1995; Van Houdenhove *et al.* 2001). Thirdly, findings from several epidemiological studies have consistently suggested that childhood trauma is associated with increased levels of physical health problems among adults in the population (Fearon & Hotopf, 2001; Flett *et al.* 2002). For instance, a recent study (Romans *et al.* 2002) found childhood abuse was associated with increased risk

[1] Address for correspondence: Dr Renee D. Goodwin, 1051 Riverside Drive, Unit 43, New York, NY 10032, USA.
  (Email: rdg66@columbia.edu)

of chronic fatigue syndrome, bladder problems, migraine, asthma, diabetes and heart problems in a community sample of women in New Zealand. Similarly, studies from adults in the US have reported linkages between childhood abuse and diabetes, migraine, gastrointestinal disorders and ulcer (Talley *et al.* 1994; Goodwin & Weisberg, 2002; Goodwin *et al.* 2003*a*).

Despite consistent and mounting evidence from methodologically diverse studies of a link between childhood trauma and physical illness during adulthood, several questions remain unanswered. First, while previous data suggest that childhood trauma is associated with physical health problems, no previous epidemiological study has examined a range of physical health problems in order to determine whether there is a general link between early risk factor and poor overall health, or whether there is any evidence of specificity to particular physical disorders. Secondly, data from clinical studies may not reflect findings in the general population, and most clinical studies have not adjusted for the possibly confounding effects of anxiety and depressive disorders. For instance, previous studies have documented linkages between childhood abuse and increased risk of depression (Kessler & Magee, 1993; Harkness & Wildes, 2002) and between physical health problems and increased risk of depression (Pattern, 2001). Therefore, it is possible that an observed association between childhood abuse and physical health problems may be attributable to a common link between each of these factors and major depression. Similarly, some effects of childhood abuse on physical health might reasonably be expected to be mediated through an increase in alcohol or other substance use (e.g. Dube *et al.* 2002). Thirdly, previous investigations have not examined whether there is a link between specific forms of abuse, compared with others (e.g. physical abuse *v.* sexual abuse) and increased risk of specific physical disorders during adulthood. This type of information may be important toward future efforts aimed at uncovering the mechanism of these links, as well as in designing intervention and prevention strategies for high-risk groups. Fourthly, while several population-based samples from Canada (Stein *et al.* 1996) and New Zealand (Romans *et al.* 2002) have investigated linkages between childhood trauma and physical illness, these links

have not been documented in a population sample of the United States.

Against this background, the goal of the current study is to determine the association between childhood trauma and physical disorders among adults in the United States. First, the study will examine the relationship between specific types of childhood trauma and specific physical disorders. Secondly, the study will investigate the contribution of co-morbid anxiety and depressive disorders and alcohol and substance dependence to these associations. Thirdly, the study will examine the specificity of the associations with each form of childhood trauma in predicting each physical disorder. Fourthly, the study will examine the gender-specific linkages between childhood trauma and physical disorders during adulthood. We hypothesized that childhood trauma would be associated with increased risk of physical disorder during adulthood, and that mental disorders and alcohol/substance use disorders would contribute to this association but would not account completely for these linkages in all cases.

METHOD

Sample

The National Comorbidity Survey is based on a national probability sample ($N = 5877$) of individuals age 15 to 54 in the non-institutionalized population (Kessler *et al.* 1994, 1995). Fieldwork was carried out between September 1990 and February 1992. There was an 82·4% response rate. The data were weighted for differential probabilities of selection and non-response. A weight was also used to adjust the sample to approximate the cross-classification of the population distribution on a range of sociodemographic characteristics. Weighting and a full description of study methodology are described in detail elsewhere (Kessler *et al.* 1994, 1995).

Diagnostic assessment

Psychiatric diagnoses were generated from a modified version of the World Health Organization (WHO) Composite International Diagnostic Interview (WHO, 1990), a structured interview designed for use by trained interviewers who are not clinicians. WHO field trials (Wittchen, 1994) and National Comorbidity

Survey clinical reappraisal studies (Blazer *et al.* 1994; Wittchen *et al.* 1995, 1996) documented acceptable reliability and validity of all the diagnoses. Psychiatric disorders examined here include major depression, generalized anxiety disorder, agoraphobia, specific phobia, social phobia, post-traumatic stress disorder, non-affective psychosis, antisocial personality disorder, conduct disorder, bipolar disorder, dysthymia, mania, alcohol dependence and substance dependence. Medical diagnoses were obtained by means of a self-report form that provided a checklist of physical illnesses (past 12-month prevalence), beginning with the question: 'The next questions are about your physical health. Looking at the list, have you experienced any of these health problems during the past 12-months?' The list included: lung disease (severe asthma, bronchitis, emphysema, tuberculosis, or other lung problems); arthritic disorders (severe arthritis/rheumatism, or other bone or joint problems); high blood pressure or hypertension; diabetes or high blood sugar; heart attack or other serious heart trouble; severe hernia or rupture; severe kidney or liver disease; lupus, thyroid disease, or other auto-immune disorders; multiple sclerosis, epilepsy, or other neurological disorders; chronic stomach or gall bladder trouble; stroke; and ulcer. Written informed consent was obtained from each participant after the survey had been fully explained.

Childhood abuse

A checklist of life events was presented to each respondent as part of the assessment of post-traumatic stress disorder, given to the part II sample of the NCS ($N = 5877$). The list included: (1) raped and sexually molested, which were combined and restricted to those who reported such an experience at age 18 or earlier to create a childhood sexual abuse category to be consistent with previous NCS investigations of childhood sexual abuse (Molnar *et al.* 2001); (2) physically abused as a child; and (3) seriously neglected as a child. These variables were binary with yes/no responses.

Analytical strategy

First, *F*-based tests for independence were used to determine differences in demographic characteristics associated with childhood physical abuse, sexual abuse, and neglect. Multiple logistic regression analyses were then used to determine the association between each type of trauma and each physical disorder. Demographic differences were adjusted and subsequent analyses were additionally adjusted for any lifetime depressive and anxiety disorders and lifetime alcohol and substance dependence. Finally, separate multiple logistic regression analyses were run with each physical illness as the dependent variable and demographic characteristics, any depressive and anxiety disorders, alcohol and substance dependence, and the three types of trauma entered simultaneously. Gender specific analyses were then run. Analyses were performed using STATA 6.0 (Statacorp, 1999).

RESULTS

Prevalence and sociodemographic characteristics

Childhood physical abuse was prevalent among 10·64% ($N = 862$) of adults, 10·42% ($N = 607$) reported childhood sexual abuse and 2·89% ($N = 234$) reported childhood neglect. Among males, 11·8% ($N = 454$) reported childhood physical abuse, 3·45% ($N = 99$) reported childhood sexual abuse and 2·5% ($N = 96$) reported childhood neglect. Among females, 9·6% ($N = 408$) reported childhood physical abuse, 17·17% ($N = 508$) reported childhood sexual abuse and 3·25% ($N = 138$) reported childhood neglect.

Adults with a history of physical abuse were younger ($F(3, 110) = 3·2$, $P = 0·03$), had lower incomes ($F(3, 114) = 3·9$, $P = 0·01$), less formal education ($F(3, 118) = 2·8$, $P = 0·04$), more likely to be male ($F(1, 42) = 5·9$, $P = 0·02$) and more likely to be separated/divorced ($F(2, 80) = 14·6$, $P < 0·0001$), compared with those without physical abuse histories. There was no statistically significant difference in race between those with and without childhood physical abuse. Adults who reported childhood sexual abuse were more likely to be female ($F(1, 42) = 11·8$, $P < 0·0001$) to have lower annual income ($F(3, 105) = 6·2$, $P = 0·001$) and be separated/divorced ($F(2, 84) = 6·2$, $P = 0·003$), compared with those without childhood sexual abuse. There were no statistically significant differences in age, education, or race among those with and without childhood sexual abuse exposure. Adults who reported childhood neglect had

Table 1. *Association between physical abuse and physical disorders among adults in the community*

	No physical abuse (N=7236) %	Physical abuse (N=862) %	Adjusted odds ratio (95% CI)		
			Model 1	Model 2	Model 3
Arthritis	5·80	12·00	**2·2** **(1·6, 3·1)**	**1·9** **(1·5, 2·5)**	**1·7** **(1·2, 2·3)**
Lung disease	4·70	9·40	**2·1** **(1·6, 2·9)**	**2** **(1·5, 2·6)**	**1·6** **(1·2, 2·2)**
Diabetes	2·10	1·90	0·9 (0·5, 1·5)	1·3 (0·8, 2·2)	0·9 (0·5, 1·5)
Cardiac	0·80	1·50	**2·1** **(1·7, 2·6)**	1·5 (0·8, 2·8)	1·5 (0·6, 3·4)
Gastrointestinal	3·00	3·80	1·3 (0·8, 2·2)	1·3 (0·9, 1·8)	1 (0·7, 1·6)
Hernia	0·60	1·90	**3·1** **(1·1, 8·7)**	**2·1** **(1·1, 3·9)**	1·9 (0·6, 6·0)
Ulcer	2·00	4·70	**2·3** **(1·6, 3·4)**	**1·6** **(1·1, 2·4)**	**1·5** **(1·1, 2·3)**
Kidney	0·50	1·80	**3·1** **(1·3, 7·7)**	**2·7** **(1·4, 5·3)**	2 (0·9, 4·5)
Stroke	0·10	0·50	2·9 (0·6, 14·3)	1 (0·3, 4·2)	1·9 (0·4, 10·0)
Neurological	0·70	2·00	**2·8** **(1·4, 5·9)**	**2·2** **(1·3, 3·8)**	**2·2** **(1·1, 4·5)**
Autoimmune	1·20	3·40	**3·1** **(1·5, 6·6)**	1·7 (1·0, 2·9)	**2·6** **(1·3, 5·3)**
Hypertension	8·10	8·80	1·1 (0·7, 1·6)	**1·4** **(1·1, 1·8)**	0·9 (0·6, 1·3)

Model 1: adjusted for age, gender, race, marital status, income and education.
Model 2: adjusted for demographics, any depressive or anxiety disorder.
Model 3: adjusted for demographics, any depressive or anxiety disorder, and alcohol and substance dependence.
Bold type indicates $P \leqslant 0.05$.

significantly lower annual income ($F(3, 120) = 8.4$, $P = 0.0001$), lower formal education ($F(3, 107) = 3.3$, $P = 0.03$) and were more likely to be separated/divorced ($F(2, 75) = 5.4$, $P = 0.009$) and less likely to be never married, compared with those who did not experience childhood neglect. There were no significant differences in age, sex, or race between adults with and without childhood neglect.

Association between physical abuse and physical disorders among adults in the community

Overall, physical disorders were more common among adults with, compared with those without, a history of childhood physical abuse (see Table 1). After adjusting for differences in demographic characteristics, childhood physical abuse was associated with a significantly increased risk of arthritic disease, lung disease, cardiac disease, hernia, peptic ulcer, kidney/liver disease, neurological disorders and autoimmune disorders. After adjusting for differences in lifetime depressive and anxiety disorders, physical abuse remained significantly associated with arthritic disease, lung disease, hernia, ulcer,

kidney/liver disease, neurological disorders, autoimmune disorders and hypertension. After additionally adjusting for alcohol and substance dependence, physical abuse remained associated with arthritis, lung disease, ulcer, neurological disorders and autoimmune disorders.

Gender-specific analyses (see Table 2) revealed that among males, physical abuse was only associated with increased risk of lung disease and kidney/liver disease after adjustment for differences in demographic characteristics, lifetime mood and anxiety disorders and alcohol and substance dependence. Among females, physical abuse was associated with increased risk of arthritic disease, lung disease, hernia, ulcer, and autoimmune disorders after adjustment.

Association between childhood neglect and physical disorders among adults in the community

After adjusting for differences in demographic characteristics, childhood neglect was associated with increased likelihood of arthritic disease, lung disease, diabetes, hernia, kidney/liver disease, neurological disorders, gastrointestinal

Table 2. *Association between childhood physical abuse and physical disorders among males and females*

	Males					Females				
	No physical abuse (N=3393) %	Physical abuse (N=454) %	Adjusted odds ratio (95% CI)			No physical abuse (N=3843) %	Physical abuse (N=408) %	Adjusted odds ratio (95% CI)		
			Model 1	Model 2	Model 3			Model 1	Model 2	Model 3
Arthritis	3·77	9·47	**2·7** **(1·8, 3·9)**	**1·7** **(1·2, 2·6)**	1·6 (0·9, 2·8)	5·23	16·67	**2·3** **(1·6, 3·5)**	**1·7** **(1·2, 2·6)**	**1·7** **(1·1, 2·5)**
Lung disease	2·86	8·81	**3·2** **(2·2, 4·7)**	**2·3** **(1·6, 3·5)**	**1·7** **(1·1, 2·7)**	4·23	12·50	**2·2** **(1·4, 3·3)**	**1·8** **(1·2, 2·6)**	**1·6** **(1·1, 2·4)**
Diabetes	1·27	1·76	1·4 (0·7, 3·0)	1·2 (0·5, 2·8)	0·7 (0·3, 1·8)	1·51	3·19	1·1 (0·6, 2·2)	1·1 (0·6, 2·1)	1·1 (0·6, 2·1)
Cardiac	1·12	1·98	1·8 (0·8, 3·8)	1·4 (0·6, 3·3)	1·6 (0·7, 3·9)	0·36	1·23	2 (0·5, 8·1)	1·2 (0·3, 4·9)	1·2 (0·3, 4·8)
Gastrointestinal	1·65	2·64	1·6 (0·8, 3·0)	0·8 (0·4, 1·6)	0·9 (0·4, 2·0)	2·71	7·11	1·3 (0·8, 2·3)	1·1 (0·7, 1·9)	1·1 (0·7, 1·9)
Hernia	0·62	1·76	**3** **(1·3, 6·8)**	1·7 (0·7, 4·2)	1·2 (0·3, 4·5)	0·34	1·96	**7·3** **(1·6, 32·7)**	**4·7** **(1·1, 20·2)**	**4·9** **(1·1, 22·3)**
Ulcer	1·71	4·63	**2·7** **(1·6, 4·5)**	**1·7** **(1·0, 3·0)**	1·4 (0·7, 2·8)	1·95	5·64	**2·2** **(1·4, 3·6)**	**1·7** **(1·1, 2·6)**	**1·6** **(1·1, 2·5)**
Kidney	0·38	1·98	**5** **(2·1, 12·0)**	**4·9** **(1·9, 12·5)**	**2·5** **(1·1, 5·9)**	0·34	1·72	**4·4** **(1·7, 11·3)**	1·63 (0·63, 4·26)	1·6 (0·5, 4·5)
Stroke	0·18	0·22	**1** **(1·2, 8·6)**	0·5 (0·1, 4·4)	0·8 (0·1, 10·8)	0·10	0·49	4·02 (0·71, 22·74)	3 (0·4, 25·3)	3·3 (0·4, 27·4)
Neurological	0·62	1·98	**3·5** **(1·1, 11·5)**	3·2 (0·9, 11·8)	3 (0·9, 10·1)	0·91	2·70	**2·3** **(1·0, 5·7)**	1·7 (0·7, 4·5)	1·7 (0·7, 4·3)
Autoimmune	0·21	0·44	**3·5** **(1·1, 11·5)**	1·9 (0·2, 16·0)	1·7 (0·2, 13·1)	1·64	4·66	**3·6** **(1·6, 7·7)**	**2·8** **(1·4, 5·7)**	**3·1** **(1·5, 6·5)**
Hypertension	6·28	9·69	**1·6** **(1·2, 2·3)**	1·2 (0·8, 1·8)	1 (0·6, 1·6)	5·05	12·25	1·1 (0·6, 1·8)	0·9 (0·5, 1·5)	0·9 (0·5, 1·4)

Model 1: adjusted for age, gender, race, marital status, income and education.
Model 2: adjusted for demographics, any depressive or anxiety disorder.
Model 3: adjusted for demographics, any depressive or anxiety disorder, and alcohol and substance dependence.
Bold type indicates $P \leqslant 0.05$.

disorders and autoimmune disorders (see Table 3). After adjusting for demographic differences, anxiety and depressive disorders, and alcohol and substance dependence, neglect remained a significant predictor of arthritic disease, lung disease, diabetes, kidney/liver disease, neurological disorders and autoimmune disorders. Among males, neglect was associated with a significantly increased risk of lung disease after adjustment (see Table 4). Among females, neglect was associated with kidney/liver disease and autoimmune disorders.

Association between sexual abuse and physical disorders among adults in the community

After adjusting for differences in demographic characteristics, sexual abuse was associated with a significantly increased risk of lung disease, cardiac disease, gastrointestinal disorders, peptic ulcer, hernia, kidney/liver disease, neurological disorders and hypertension (see Table 5).

After adjusting for differences in demographic characteristics, anxiety and depressive disorders, alcohol and substance dependence, sexual abuse was associated with increased likelihood of lung disease and cardiac disease. Among males, sexual abuse was associated only with lung disease after adjusting for differences in demographic characteristics and co-morbid anxiety and depressive disorders, and alcohol and substance dependence (see Table 6). Among females, childhood sexual abuse was associated only with an increased risk of cardiac problems after adjusting for demographic characteristics, anxiety and depressive disorders, alcohol and substance dependence.

Adjusted association between specific types of trauma and each physical illness, controlling simultaneously for all three types of trauma

After adjusting for demographic differences and anxiety and depressive disorders, alcohol and

Table 3. *Association between childhood neglect and physical disorders among adults*

	No neglect (N=7864) %	Neglect (N=234) %	Adjusted odds ratio (95% CI)		
			Model 1	Model 2	Model 3
Arthritis	6·20	17·00	**2·6** **(1·6, 4·1)**	**2·1** **(1·4, 3·0)**	**1·6** **(1·0, 2·5)**
Lung disease	5·10	12·20	**2·3** **(1·5, 3·5)**	**2·3** **(1·5, 3·3)**	**1·7** **(1·1, 2·5)**
Diabetes	2·00	4·50	**2·1** **(1·2, 3·9)**	**2·4** **(1·3, 4·6)**	**2·3** **(1·2, 4·2)**
Cardiac	12·30	32·30	0·6 (0·2, 2·0)	1 (0·3, 2·9)	0·5 (0·2, 1·5)
Gastrointestinal	3·00	6·60	**2** **(1·0, 4·0)**	**1·9** **(1·2, 3·1)**	1·5 (0·8, 3·0)
Hernia	0·60	3·00	**4·2** **(1·0, 17·5)**	2·8 (0·7, 11·8)	2·4 (0·5, 10·7)
Ulcer	2·20	5·80	2·1 (0·9, 4·9)	1·1 (0·6, 2·0)	1·3 (0·6, 3·1)
Kidney	0·60	3·80	**5·4** **(1·8, 16·0)**	**3·5** **(1·6, 7·9)**	**3·4** **(1·1, 10·0)**
Stroke	0·20	0·90	3·4 (0·4, 33·0)	0·9 (0·1, 7·1)	2·1 (0·7, 6·3)
Neurological	0·80	2·80	**3** **(1·0, 8·6)**	2·2 (0·7, 6·6)	2·1 (0·7, 6·3)
Autoimmune	1·20	11·90	**10** **(4·9, 20·2)**	**7·8** **(3·9, 15·5)**	**1·3** **(1·0, 1·8)**
Hypertension	8·00	11·40	1·3 (0·7, 2·2)	1·5 (1·0, 2·2)	1 (0·6, 1·8)

Model 1: adjusted for age, gender, race, marital status, income and education.
Model 2: adjusted for demographics, any depressive or anxiety disorder.
Model 3: adjusted for demographics, any depressive or anxiety disorder, and alcohol and substance dependence.
Bold type indicates $P \leqslant 0.05$.

substance dependence, we adjusted simultaneously for all types of trauma, in order to examine whether observed associations between trauma were due to specific effects of each trauma or whether having many trauma was responsible for the effect, without specific linkages with disease. Results revealed evidence of some specificity with physical abuse predicting lung disease (OR = 1·5 (1·1, 2·2)), arthritic disease (OR = 1·5 (1·1, 2·2)), peptic ulcer (OR = 1·5 (1·03, 2·2)) and neurological disorders (OR = 1·9 (0·9, 4·1)), but this link did not reach statistical significance. Finally, neglect was associated with increased risk of diabetes (OR = 2·2 (1·1, 4·4)) and autoimmune disorders (OR = 4·4 (1·7, 11·6)).

When gender-specific analyses were run, physical abuse was associated with increased risk of kidney/liver disease (OR = 3·1 (1·2, 8·1)) and arthritis (OR = 1·6 (1·004, 2·6)) among males. Among females, physical abuse was associated with increased risk of lung disease (OR = 1·7 (1·1, 2·6)), arthritis (OR = 1·5 (1·01, 2·2)), and kidney/liver disease (OR = 6·0 (1·4, 25·7)). Sexual abuse was associated with increased risk of cardiac disease (OR = 6·2 (1·7, 22·2)) and neglect was associated with increased risk of autoimmune disorders (OR = 5·8 (3·0, 11·4)). These associations were adjusted for differences in demographic characteristics, lifetime anxiety and depressive disorders, alcohol and substance dependence, and all three types of trauma.

DISCUSSION

These findings are consistent with previous evidence of linkages between childhood trauma and poor health in adulthood, and extend these data in several ways. First, these results suggest some degree of specificity in terms of the strength of relationships between each form of childhood trauma and the risk of any physical problems during adulthood. Secondly, these data indicate that the relationship between childhood abuse and neglect and physical disorders in adulthood persists independent of the effects of co-morbid mental disorders and alcohol and substance dependence in most cases of physical abuse, though the relationship between sexual abuse, and neglect, and physical

Table 4. *Association between childhood neglect and physical disorders among males and females*

	Males					Females				
	No neglect (N=3751) %	Neglect (N=96) %	Adjusted odds ratio (95% CI)			No neglect (N=4113) %	Neglect (N=138) %	Adjusted odds ratio (95% CI)		
			Model 1	Model 2	Model 3			Model 1	Model 2	Model 3
Arthritis	4·08	18·75	**4·3** (**2·4, 7·6**)	**2·3** (**1·3, 4·3**)	1·6 (0·8, 3·1)	5·84	21·01	**3·9** (**2·5, 6·1**)	**1·9** (**1·2, 3·1**)	1·8 (0·9, 3·4)
Lung disease	3·23	16·67	**5·5** (**3·1, 9·4**)	**3·3** (**1·8, 6·0**)	**2·7** (**1·5, 4·9**)	4·96	15·22	**3·2** (**2·0, 5·2**)	**1·8** (**1·1, 3·0**)	1·2 (0·8, 2·1)
Diabetes	1·28	3·12	2·2 (0·9, 5·0)	2·6 (1·0, 6·5)	2·6 (1·0, 7·1)	1·48	7·25	**4·6** (**2·3, 9·3**)	**2·9** (**1·4, 6·0**)	2·1 (0·9, 4·7)
Cardiac	1·23	1·04	0·6 (0·1, 4·7)	0·4 (0·1, 2·9)	0·1 (0·02, 0·8)	0·39	2·17	**5·7** (**2·2, 14·5**)	2 (0·5, 7·7)	1·2 (0·3, 5·5)
Gastrointestinal	1·65	6·25	**3·3** (**1·4, 7·9**)	1·5 (0·6, 3·7)	1 (0·3, 3·2)	2·87	10·87	**2·9** (**2·0, 4·4**)	**2·1** (**1·2, 3·9**)	1·7 (0·7, 4·4)
Hernia	0·67	4·17	**5·7** (**1·9, 17·1**)	2·9 (0·9, 9·2)	1·4 (0·3, 5·9)	0·46	1·45	6·7 (0·6, 71·4)	3·9 (0·4, 40·5)	4 (0·4, 39·5)
Ulcer	2·00	4·17	1·8 (0·7, 5·1)	0·9 (0·3, 2·5)	0·9 (0·2, 3·2)	2·19	5·80	**2·3** (**1·1, 4·8**)	1·2 (0·5, 2·6)	1·6 (0·6, 4·2)
Kidney	0·56	1·04	1·3 (0·2, 9·8)	0·9 (0·1, 7·5)	0·2 (0·01, 1·6)	0·29	5·80	**11·9** (**3·6, 39·9**)	**6·8** (**2·1, 22·5**)	**6·8** (**2·1, 22·2**)
Stroke	0·19	0·00	n/a	n/a	n/a	0·12	0·72	7·1 (0·6, 80·5)	5·3 (0·4, 61·9)	5·9 (0·5, 67·1)
Neurological	0·72	3·12	**3·8** (**1·1, 12·9**)	2·2 (0·6, 7·9)	2·4 (0·5, 11·4)	1·05	2·17	2 (0·6, 6·5)	1·2 (0·4, 3·9)	1·8 (0·5, 5·9)
Autoimmune	0·24	0·00	n/a	n/a	n/a	1·58	12·32	**13·1** (**6·6, 26·0**)	**10·2** (**5·5, 19·0**)	**10·6** (**5·7, 20·0**)
Hypertension	6·53	12·50	1·8 (1·0, 3·4)	1·1 (0·6, 2·2)	0·7 (0·3, 1·6)	5·37	16·67	1·5 (0·7, 3·1)	1·2 (0·6, 2·4)	1·2 (0·6, 2·4)

Model 1: adjusted for age, gender, race, marital status, income and education.
Model 2: adjusted for demographics, any depressive or anxiety disorder.
Model 3: adjusted for demographics, any depressive or anxiety disorder, and alcohol and substance dependence.
Bold type indicates $P \leqslant 0.05$.

disorders appears to be more strongly influenced by co-morbid depression and anxiety disorders. Thirdly, the data suggest that the relationship between childhood trauma and physical disorders in adulthood is evident in the general adult US population, not only in selected samples. The mechanisms underlying the relationships observed here cannot be determined from these data. As such, several possible explanations will be outlined and discussed below. We will then discuss implications and suggestions for future research.

Overall, these data indicate that exposure to either childhood physical abuse or neglect is associated with higher levels of physical health problems during adulthood among adults in the United States. These findings are consistent with results from other population samples (Talley *et al.* 1994; Stein *et al.* 1996; Romans *et al.* 2002; Goodwin *et al.* 2003*b*) as well as reports from clinical data (Walker *et al.* 1988; Drossman *et al.* 1990; Rapkin *et al.* 1990; Toomey *et al.* 1993; Walter & Stenchever, 1993; Drossman, 1995; Arnow *et al.* 1999; Newman *et al.* 2000; Van Houdehove *et al.* 2001). These associations appear most robust for the links between physical abuse and arthritis, lung disease, hernia, kidney disease, and neurological disorders and between neglect and arthritis, lung disease, diabetes, kidney disease and autoimmune disorders. While anxiety and depressive disorders appear to explain part of the link between childhood abuse and physical disorders, as does alcohol/substance dependence, these factors do not appear to completely explain these links. More specifically, it appears that alcohol/substance dependence may contribute most strongly to linkages between physical abuse and hernia, kidney/liver disease and hypertension, though these disorders did not appear to contribute significantly to other links. We cannot determine the mechanism of these associations on the basis of the data used here. Also, while some associations appear stronger than others, it is not

Table 5. *Association between sexual abuse and physical disorders among adults*

	No sexual abuse (N=7556) %	Sexual abuse (N=607) %	Adjusted odds ratio (95% CI)		
			Model 1	Model 2	Model 3
Arthritis	6·16	9·52	1·5 (1·0, 2·4)	1·1 (0·8, 1·7)	1·1 (0·7, 1·7)
Lung disease	4·78	10·07	**1·9** (**1·2, 3·0**)	**1·6** (**1·0, 2·4**)	**1·5** (**1·0, 2·3**)
Diabetes	2·05	1·98	0·9 (0·5, 1·9)	1 (0·5, 1·9)	1 (0·5, 1·9)
Cardiac	0·74	1·68	**4·1** (**1·9, 8·9**)	**3·5** (**1·6, 8·0**)	**3·5** (**1·6, 7·8**)
Gastrointestinal	2·73	5·47	**1·7** (**1·0, 3·0**)	1·4 (0·7, 2·5)	1·3 (0·7, 2·5)
Hernia	0·64	1·13	**2·7** (**1·0, 7·8**)	1·9 (0·7, 5·4)	1·6 (0·5, 5·0)
Ulcer	2·09	4·18	**1·8** (**1·0, 3·1**)	1·2 (0·7, 2·1)	1·2 (0·7, 2·0)
Kidney	0·53	1·61	**3·8** (**1·3, 11·1**)	2·7 (0·8, 8·5)	2·4 (0·7, 8·5)
Stroke	0·15	0·33	2·3 (0·6, 9·0)	1·5 (0·3, 7·4)	1·5 (0·3, 7·8)
Neurological	0·79	1·89	**2·1** (**1·1, 4·1**)	1·6 (0·8, 3·2)	1·6 (0·8, 3·0)
Autoimmune	1·25	2·31	1·1 (0·6, 2·1)	0·9 (0·5, 1·6)	0·9 (0·5, 1·6)
Hypertension	7·76	11·52	**1·6** (**1·0, 2·4**)	1·4 (0·9, 2·1)	1·4 (0·9, 2·1)

Model 1: adjusted for age, gender, race, marital status, income and education.
Model 2: adjusted for demographics, any depressive or anxiety disorder.
Model 3: adjusted for demographics, any depressive or anxiety disorder, and alcohol and substance dependence.
Bold type indicates $P \leqslant 0.05$.

possible to definitively confirm specificity of these associations.

There are a number of plausible explanations for these associations. One, it could be that abuse leads to increased health risk behaviours, in general, thereby increasing the risk of poor adult health in general. For instance, it is possible that growing up in an environment with exposure to childhood abuse and neglect may result in exposure to other health risks and lead more generally to worse health status manifested, for example, in obesity, which has been found to be prevalent among adult victims of sexual abuse (Felitti *et al.* 1998). It could be then that conditions such as obesity increase the risk of a range of specific disorders (e.g. diabetes and arthritis), such as those seen in these results. Alternatively, low socio-economic status in childhood could be associated with both lung disease and depression later in life as links to both have been demonstrated. Without more detailed information on the other factors related to these linkages, which may confound or contribute to them, it is difficult to identify possible

pathways. Future studies that can investigate these linkages using longitudinal data as well as information on specific mechanisms will be needed next.

In contrast to the above associations and previous literature more generally, sexual abuse was not associated with physical health problems among adults with the exception of a link between sexual abuse, lung disease and cardiac problems. This paucity of associations between sexual abuse and adverse physical outcomes may be easier to explain. It may be that some prior studies, which focused on sexual abuse but not on any other forms of childhood maltreatment, may have detected associations because sexual abuse is a marker for severe childhood maltreatment in general (Briere & Runtz, 1988; Bernet & Stein, 2001). It is also conceivable that the definition of sexual abuse use in this investigation influenced these outcomes and that a looser definition of sexual abuse may have led to different results. To understand better the relationship between abuse experiences and health, it will be important to survey as wide as

Table 6. *Association between sexual abuse and physical disorders among males and females*

	Males					Females				
	No sexual abuse (N=277) %	Sexual abuse (N=99) %	Adjusted odds ratio (95% CI)			No sexual abuse (N=2450) %	Sexual abuse (N=508) %	Adjusted odds ratio (95% CI)		
			Model 1	Model 2	Model 3			Model 1	Model 2	Model 3
Arthritis	6·06	10·67	1·7 (0·7, 4·0)	1·3 (0·6, 2·7)	1·2 (0·6, 2·7)	6·28	9·30	1·5 (0·9, 2·5)	1·1 (0·7, 1·7)	1 (0·7, 1·6)
Lung disease	3·91	17·71	**5** (**1·9, 12·9**)	**4·1** (**1·4, 11·8**)	**4** (**1·3, 11·7**)	5·80	8·59	1·5 (1·0, 2·3)	1·2 (0·8, 1·7)	1·1 (0·8, 1·6)
Diabetes	2·10	1·94	0·8 (0·2, 3·6)	0·9 (0·2, 4·0)	0·9 (0·2, 3·9)	2·00	1·98	1 (0·4, 2·2)	1 (0·5, 2·2)	0·9 (0·4, 2·1)
Cardiac	1·22	2·20	1·7 (0·3, 11·5)	1·5 (0·2, 12·2)	1·5 (0·2, 12·1)	0·17	1·58	**8·5** (**2·3, 31·7**)	**5·4** (**1·7, 17·2**)	**5·4** (**1·7, 16·9**)
Gastrointestinal	2·31	1·10	0·4 (0·05, 3·3)	0·3 (0·04, 2·2)	0·3 (0·04, 2·1)	3·23	6·31	**2** (**1·0, 3·8**)	1·6 (0·8, 3·3)	1·7 (0·8, 3·4)
Hernia	0·99	0·91	0·8 (0·1, 7·5)	0·6 (0·1, 5·3)	0·4 (0·05, 4·0)	0·23	1·17	**5** (**1·3, 19·2**)	3·1 (0·7, 12·7)	3·2 (0·8, 2·5)
Ulcer	1·91	1·90	0·9 (0·2, 4·0)	0·6 (0·1, 2·4)	0·5 (0·1, 2·2)	2·30	4·63	**1·9** (**1·1, 3·5**)	1·4 (0·8, 2·6)	1·4 (0·8, 2·5)
Kidney	0·74	0·00	n/a	n/a	n/a	0·28	1·92	**6·6** (**1·7, 26·5**)	**4** (**1·0, 15·9**)	3·7 (0·9, 15·6)
Stroke	0·19	0·00	n/a	n/a	n/a	0·00	0·39	3·8 (0·6, 24·5)	3·1 (0·2, 43·3)	3·2 (0·2, 43·9)
Neurological	0·66	1·86	2·9 (0·7, 11·2)	2·3 (0·6, 9·7)	2·1 (0·5, 8·8)	0·94	1·89	1·9 (0·9, 4·3)	1·4 (0·7, 3·2)	1·4 (0·6, 3·0)
Autoimmune	0·05	0·00	n/a	n/a	n/a	2·12	2·76	1·2 (0·7, 2·3)	1 (0·6, 1·8)	1·1 (0·6, 1·9)
Hypertension	8·15	10·72	1·2 (0·5, 2·7)	1·1 (0·5, 2·4)	1·1 (0·5, 2·3)	7·30	11·67	**1·6** (**1·0, 2·6**)	1·4 (0·9, 2·3)	1·4 (0·8, 2·3)

Model 1: adjusted for age, gender, race, marital status, income and education.
Model 2: adjusted for demographics, any depressive or anxiety disorder.
Model 3: adjusted for demographics, any depressive or anxiety disorder, and alcohol and substance dependence.
Bold type indicates $P \leqslant 0.05$.

possible an array of abuse experiences, as each of these (and their aggregate burden) may contribute to adverse health outcomes (Baynard *et al.* 2001; McNutt *et al.* 2002). It is also conceivable that physiological features of anxiety disorders, such as post-traumatic stress disorder, influence or explain the link between childhood trauma and increased risk of physical disorders, suggested by Schnurr and colleagues (Schnurr & Jankowski, 1999; McDonagh-Coyle *et al.* 2001; Schnurr *et al.* 2002). Future studies that more closely investigate this potential pathway with longitudinal data may be useful.

There are several limitations of this study, which should be considered when interpreting results. First, the lack of a global test of association using structural equation modelling techniques is a major limitation of these analyses and recommended in future studies. Secondly, the information on childhood abuse is retrospective and limited in detail. Therefore, these reports are subjects to recall bias. Limited conclusions can be drawn about the mechanisms

of the observed associations as there is little available information about severity and type of abuse, beyond the initial category. Also, it is possible that recall of abuse experiences decades earlier may be faulty (i.e. resulting in misclassification bias), though we have adjusted for differences in depression and anxiety disorders and differential recall of these events persists. If the reporting of these experiences were due solely to misperception or bias associated with poor mental or physical health, it would be surprising to find evidence of specificity or differences in strength of these linkages after adjustment for mental disorders. Another limitation with the use of self-reported childhood abuse is report bias, in that the extent to which reports are accurate, either due to intentional or unintentional misreporting, is not known. That the data are retrospective may compound this issue, though it is not possible from these data alone to determine the impact on results. Another limitation of the study is the self-report of physical illnesses. It is well-known that childhood sexual

trauma is associated with increased reporting of somatic symptoms (Barsky & Borus, 2000). It is, therefore, possible that some respondents are merely reporting their experience of somatic symptoms that they label as belonging to particular medical disorders. Confirmation of these findings using actual physician reporting of diagnoses would strengthen the level of confidence in these findings (e.g. Stein & Barrett-Connor, 2000). The potential problems inherent with the use of cross-sectional data cannot be overestimated. Using cross-sectional data, is not possible to determine whether, or in what way, childhood abuse and physical disorders are related to one another. It is not possible to determine anything about a potential causal relationship between the two. Moreover, the lack of information on the age of onsets of disorders prohibits an even retrospective evaluation of the sequence of abuse and physical disorders. It seems relatively safe to assume that the onset, or at least the persistence, of most of these physical disorders follows the exposure to childhood abuse experiences since the assessment of physical illness is limited to past 12-months. Still, replication of these findings using prospectively collected data with age of onset is needed. As self-reported physical illness is known to have questionable validity/reliability, these findings need replication using data with objective data on physical health status. Finally, the use of a strict definition of sexual abuse is a potential limitation to this study. This definition was used for consistency with previous investigations using the NCS though future investigation of these links using a wider range of definitions of sexual abuse.

In aggregate, these findings are consistent with previous data linking early trauma to poor health in adulthood and extend these findings by showing some evidence of specificity in the strength of the links between specific forms of childhood abuse and specific physical illnesses in adulthood. In addition, these results suggest that the linkages between childhood abuse and physical illness are not entirely attributable to co-morbid mental disorders, as these associations persist after adjustment. Moreover, the data suggest that while alcohol and substance dependence appear to contribute, and may to some degree mediate, the link between childhood abuse and physical disorders, abuse of these substances does not appear to explain many of the observed relationships. These data also call into question the precise nature of the previously reported linkages between sexual abuse and physical health problems in women by suggesting that many of these linkages may be better explained by associations with other forms of childhood maltreatment (i.e. neglect or physical abuse).

In some sense, these data raise more questions than they answer. Although numerous clinical and epidemiological studies have pointed to a link between trauma and physical and mental health, these data are the first to address the specificity of the link between the type of trauma and risk of physical health problems. Moreover, to our knowledge, these data are the first to examine the association between various forms of childhood abuse and physical illness, adjusting for the effects of mental disorders and alcohol/substance dependence. There has been increasing interest in, and evidence supporting, a relationship between childhood abuse and neuroimmunological abnormalities, which are thought to relate to the development of mental disorders. If it is possible that childhood abuse can cause brain changes that lead to mental disorders (Heim et al. 2000) then it seems equally likely that childhood abuse can cause dysregulation in other systems – such as neuroendocrine system problems leading to diabetes or immune system problems leading to allergies or asthma. These findings are consistent with this hypothesis, and further introduce the first evidence, to the best of our knowledge, of possible specificity of linkages between various forms of childhood abuse/neglect and specific types of physical disorders.

Future studies are needed that can examine the links observed in these data, using physiological information, mental health information and more detailed data on trauma exposure. The collection and analysis of such information in a longitudinal, community-based sample, with prospective data collection on trauma exposure, and both mental and physical health outcomes by physician diagnosis using clinical examination and objective physiological measures, is needed to ideally examine each of these relationships. Studies of this type will enable researchers to uncover underlying mechanisms with the ultimate goal of understanding

aetiology and identifying modifiable risk factors that can be used to develop prevention and early intervention strategies for those at high risk.

REFERENCES

Arnow, B. A., Hart, S., Scott, C., Dea, R., O'Connell, L. & Taylor, C. B. (1999). Childhood sexual abuse, psychological distress, and medical use among women. *Psychosomatic Medicine* **61**, 762–770.

Banyard, V. L., Williams, L. M. & Siegel, J. A. (2001). The long-term mental health consequences of child sexual abuse: an exploratory study of the impact of multiple traumas in a sample of women. *Journal of Trauma Stress* **14**, 697–715.

Barsky, A. J. & Borus, J. F. (2000). Functional somatic syndromes. *Annals of Internal Medicine* **130**, 910–921.

Bernet, C. Z. & Stein, M. B. (2001). Relationship of childhood maltreatment to the onset and course of major depression in adulthood. *Depression and Anxiety* **9**, 169–174.

Blazer, D. G., Kessler, R. C., McGonagle, K. A. & Swartz, M. S. (1994). The prevalence and distribution of major depression in a national community sample: the National Comorbidity Survey. *American Journal of Psychiatry* **151**, 979–986.

Briere, J. & Runtz, M. (1988). Symptomotology associated with childhood sexual victimization in a nonclinical adult sample. *Child Abuse and Neglect* **12**, 51–59.

Drossman, D. A. (1995). Physical and sexual abuse and gastrointestinal illness: what is the link? *American Journal of Medicine* **97**, 105–107.

Drossman, D. A., Leserman, J. & Nachman, G. (1990). Physical and sexual abuse in women with functional gastrointestinal disorders. *Annals of Internal Medicine* **113**, 828–833.

Dube, S. R., Anda, R. F., Felitti, V. J., Edwards, V. & Croft, J. B. (2002). Adverse childhood experiences and personal alcohol abuse as an adult. *Addictive Behaviors* **27**, 713–725.

Fearon, P. & Hotopf, M. (2001). Relation between headache in childhood and physical and psychiatric symptoms in adulthood: national birth cohort study. *British Medical Journal* **322**, 1145.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P. & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences ACE Study. *American Journal of Preventive Medicine* **14**, 245–258.

Flett, R. A., Kazantzis, N., Long, N. R., MacDonald, C. & Millar, M. (2002). Traumatic events and physical health in a New Zealand community sample. *Journal of Traumatic Stress* **15**, 303–312.

Goodwin, R. D. & Weisberg, S. P. (2002). Childhood abuse and diabetes in the community. *Diabetes Care* **25**, 801–802.

Goodwin, R. D., Hoven, C. W., Murison, R. & Hotopf, M. (2003a). Childhood abuse and risk of gastrointestinal disorders and migraine during adulthood. *American Journal of Public Health* **93**, 1065–1067.

Goodwin, R. D., Wamboldt, M. Z. & Pine, D. S. (2003b). Lung disease and internalizing disorders: is childhood abuse a shared etiologic factor? *Journal of Psychosomatic Research* **55**, 215–219.

Harkness, K. L. & Wildes, J. E. (2002). Childhood adversity and anxiety versus dysthymia comorbidity in major depression. *Psychological Medicine* **32**, 1239–1249.

Heim, C., Newport, D. J., Miller, A. H. & Nemeroff, C. B. (2000). Long-term neuroendocrine effects of childhood maltreatment. *Journal of the American Medical Association* **284**, 592–597.

Kessler, R. C. & Magee, W. J. (1993). Childhood adversities and adult depression: basic patterns of association in a US national survey. *Psychological Medicine* **23**, 679–690.

Kessler, R. C., McGonagle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, H. U., Wittchen, H. U. & Kendler, K. S. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Archives of General Psychiatry* **51**, 8–19.

Kessler, R. C., Little, R. J. A. & Groves, R. M. (1995). Advances in strategies for minimizing and adjusting for survey nonresponse. *Epidemiology Review* **17**, 192–204.

McDonagh-Coyle, A., McHugo, G. J., Friedman, M. J., Schnurr, P. P., Zayfert, C. & Descamps, M. (2001). Psychophysiological reactivity in female abuse survivors. *Journal of Traumatic Stress* **14**, 667–683.

McNutt, L. A., Carlson, B. E., Persaud, M. & Postmus, J. (2002). Cumulative abuse experiences, physical health and health behaviors. *Annals of Epidemiology* **12**, 123–130.

Molnar, B. E., Buka, S. L. & Kessler, R. C. (2001). Child sexual abuse and subsequent psychopathology: results from the National Comorbidity Survey. *American Journal of Public Health* **91**, 753–760.

Newman, M. G., Clayton, L., Zuellig, A., Cashman, L., Arnow, B., Dea, R. & Taylor, C. B. (2000). The relationship of childhood sexual abuse and depression with somatic symptoms and medical utilization. *Psychosomatic Medicine* **30**, 1063–1077.

Patten, P. B. (2001). Long-term medical conditions and major depression in a Canadian population study at waves 1 and 2. *Journal of Affective Disorders* **63**, 35–41.

Rapkin, A. J., Kames, L. D. & Darke, L. L. (1990). History of physical and sexual abuse in women with somatic and nonsomatic chronic pelvic pain. *American Journal of Obstetrics and Gynecology* **76**, 92–96.

Romans, S., Belaise, C., Martin, J., Morris, E. & Raffi, A. (2002). Childhood abuse and later medical disorders in women. An epidemiological study. *Psychotherapy and Psychosomatics* **71**, 141–150.

Schnurr, P. P. & Jankowski, M. K. (1999). Physical health and posttraumatic stress disorder: review and synthesis. *Seminars in Clinical Neuropsychiatry* **4**, 295–304.

Schnurr, P. P., Friedman, M. J. & Bernardy, N. C. (2002). Research on posttraumatic stress disorder: epidemiology, pathophysiology, and assessment. *Psychotherapy in Practice* **58**, 877–889.

Statacorp (1999). *STATA 6.0 Release for Windows*. Statacorp: College Station, TX.

Stein, M. B. & Barrett-Connor, E. (2000). Sexual assault and physical health: findings from a population-based study of older adults. *Psychosomatic Medicine* **62**, 838–843.

Stein, M. B., Walker, J. R., Anderson, G., Hazen, A. L., Ross, C. A., Eldridge, G. & Forde, D. R. (1996). Childhood physical and sexual abuse in patients with anxiety disorders and in a community sample. *American Journal of Psychiatry* **153**, 275–277.

Talley, N. J., Fett, S. L., Zinsmeister, A. R. & Melton, L. J. 3rd (1994). Gastrointestinal tract symptoms and self-reported abuse: a population-based study. *Gastroenterology* **107**, 1040–1049.

Toomey, T. C., Hernandez, J. T. & Gittleman, D. F. (1993). Relationship of sexual and physical abuse to pain and psychological assessment in chronic pelvic pain patients. *Pain* **53**, 105–109.

Van Houdenhove, B., Neerinckx, E., Lysens, R., Vertommen, H., Van Houdenhove, L., Onghena, P., Westhovens, R. & D'Hooghe, M. B. (2001). Victimization in chronic fatigue syndrome and fibromyalgia in tertiary care: a controlled study on prevalence and characteristics. *Psychosomatics* **42**, 21–28.

Walker, E., Katon, W. & Harrop-Griffiths, J. (1988). Relationship of chronic pelvic pain to psychiatric diagnosis and childhood sexual abuse. *American Journal of Psychiatry* **145**, 75–78.

Walker, E. A. & Stenchever, M. (1993). Sexual victimization and chronic pelvic pain: clinical and research issues. *Obstetrics and Gynecology Clinics of North America* **20**, 795–807.

Walker, E. A., Keegan, D., Gardner, G., Sullivan, M., Bernstein, D. & Katon, W. J. (1997). Psychosocial factors in fibromyalgia compared with rheumatoid arthritis: II. Sexual, physical, and emotional abuse and neglect. *Psychosomatic Medicine* **59**, 572–577.

Wittchen, H.-U. (1994). Reliability and validity studies of the WHO Composite International Diagnostic Interview (CIDI): a critical review. *Journal of Psychiatric Research* **28**, 57–84.

Wittchen, H.-U., Kessler, R. C., Zhao, S. & Abelson, J. (1995). Reliability and clinical validity of UM-CIDI DSM-III-R generalized anxiety disorder. *Journal of Psychiatric Research* **29**, 95–110.

Wittchen, H.-U., Zhao, S., Abelson, J. M., Abelson, J. L. & Kessler, R. C. (1996). Reliability and procedural validity of UM-CIDI DSM-III-R phobic disorders. *Psychological Medicine* **25**, 1169–1177.

World Health Organization (1990). *Composite International Diagnostic Interview* (*CIDI*), *Version 1.0*. WHO: Geneva.