

---

---

# Self-reported childhood maltreatment, lifelong traumatic events and mental disorders in fibromyalgia syndrome: a comparison of US and German outpatients

---

W. Häuser<sup>1,2</sup>, E.-M. Hoffmann<sup>2</sup>, F. Wolfe<sup>3</sup>, A.B. Worthing<sup>4</sup>, N. Stahl<sup>5</sup>,  
R. Rothenberg<sup>6</sup>, B. Walitt<sup>7,8</sup>

---

<sup>1</sup>Department Internal Medicine I, Klinikum Saarbrücken, Saarbrücken, Germany;

<sup>2</sup>Department of Psychosomatic Medicine, Technische Universität München, München, Germany;

<sup>3</sup>National Data Bank for Rheumatic Diseases and University of Kansas School of Medicine, Wichita, KS, USA;

<sup>4</sup>Georgetown University Medical Center, Washington, DC, USA;

<sup>5</sup>Arthritis and Rheumatism Associates Group Practice, Washington, DC, USA;

<sup>6</sup>Rheumatology Practice, Burke, VA, USA;

<sup>7</sup>MedStar Health Washington Hospital Center, Washington, DC, USA;

<sup>8</sup>National Institute of Nursing Research, National Institutes of Health, Bethesda, MD, USA.

Winfried Häuser, MD

Eva-Maria Hoffmann

Frederick Wolfe, MD

Angus B. Worthing, MD

Neil Stahl, MD

Russell Rothenberg, MD

Brian Walitt, MD

Please address correspondence to:

Winfried Häuser,

Department Internal Medicine I,

Klinikum Saarbrücken gGmbH,

Winterberg 1,

D-66119 Saarbrücken, Germany.

E-mail:

whauser@klinikum-saarbruecken.de

Received on November 23, 2014; accepted in revised form on February 17, 2015.

Clin Exp Rheumatol 2015; 33 (Suppl. 88): S86-S92.

© Copyright CLINICAL AND

EXPERIMENTAL RHEUMATOLOGY 2015.

**Key words:** fibromyalgia syndrome, childhood maltreatment, traumatic experiences, transcultural epidemiology, mental disorder

*Funding:* this research was supported (in part) by the Intramural Research program of the NIH, National Institute of Nursing Research and by the Georgetown Howard Universities Center for Clinical and Translational Science.

*Competing interests:* none declared.

## ABSTRACT

**Objective.** *The robustness of findings on retrospective self-reports of childhood maltreatment and lifetime traumatic experiences of adults with fibromyalgia syndrome (FMS) has not been demonstrated by transcultural studies. This is the first transcultural study to focus on the associations between FMS, childhood maltreatment, lifetime psychological traumas, and potential differences between countries adjusting for psychological distress.*

**Methods.** *71 age- and sex-matched US and German FMS outpatients were compared. Childhood maltreatment were assessed by the Childhood Trauma Questionnaire and potential, traumatic experiences by the trauma list of the Munich Composite International Diagnostic Interview. Potential posttraumatic stress disorder (PTSD) was diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders IV-TR symptom criteria by the Posttraumatic Diagnostic Scale. Potential depressive and anxiety disorder were assessed by the Patient Health Questionnaire PHQ 4.*

**Results.** *US and German patients did not significantly differ in the amount of self-reported childhood maltreatment (emotional, physical and sexual abuse or neglect) or in the frequency of lifetime traumatic experiences. No differences in the frequency of potential anxiety, depression, and PTSD were seen. Psychological distress fully accounted for group differences in emotional and sexual abuse and emotional and physical neglect.*

**Conclusion.** *The study demonstrated the transcultural robustness of findings on the association of adult FMS with self-reports of childhood maltreatment and lifelong traumatic experiences. These associations are mainly explained by current psychological distress.*

## Introduction

Fibromyalgia syndrome (FMS) is defined by a set of chronic symptoms that include widespread pain, problems with sleep, fatigue and cognition in the absence of somatic disease that sufficiently explains these symptoms (1). In recent surveys of the general German and Japanese population, 2% of the participants met FMS research criteria (2-5). FMS patients also frequently meet the criteria of mental disorders such as anxiety, depression and post-traumatic stress disorder (PTSD) (6). The definite aetiology of FMS remains unknown. A model of interacting biological and psychosocial variables in the predisposition, triggering and development of the chronicity of FMS has been suggested (7). Genes (8), depression (9), obesity combined with physical inactivity (10), sleep problems (11), smoking (12), rheumatoid arthritis (13) and physical/sexual abuse in childhood/adolescence (14) might predispose to future development of FM. Medical disease (15), workplace-related stress (16) and traumatic events (17) might trigger the onset of FMS-symptoms in predisposed people. Depression and PTSD have a negative impact on FMS outcome (17-19).

Today, the robustness of findings on the association of adult FMS and self-reported childhood maltreatment or lifetime traumatic experiences is not known because no transcultural studies have been conducted (14, 16). Also, only one study has adjusted the findings of self-reported childhood maltreatment of FMS-patients for depression (20). Due to these research gaps, the aims of the study were to compare the retrospective self-reports of childhood maltreatment and lifetime major life/traumatic experiences of US and German FMS-patients by standardised in-

struments while properly adjusting for concomitant mental disorders and psychological distress.

## Methods

### *Participants and settings*

All consecutive patients with FMS of the participating study centres were asked by their physicians to take part in the study. Data collection took place in the USA from July 1, 2013 to December 31, 2013 and from July 1, 2013 to July 31, 2014 in Germany. In the US, patients were recruited by four private rheumatology offices. Patients under continuous care were included. In Germany, patients were recruited from one ambulatory health care centre for pain medicine. Only newly referred patients were approached for participation.

Patients were included if the diagnosis of FMS had been established in the past or recently by one of the study physicians. All physicians were experienced in the management of FMS-patients. Because there is no gold standard for FMS case identification (21), the American College of Rheumatology (ACR) 1990 (22) and the modified preliminary diagnostic ACR 2010 (research) criteria (23) could be used for diagnosis. All participants were required to meet a total polysymptomatic distress score (PSD) (23) of 11 or greater. Only persons aged 18 years and above with adequate written comprehension of their native tongue were included. Patients with inflammatory rheumatic diseases were excluded from the analyses of this study, even if they fulfilled FMS criteria. There were no other inclusion or exclusion criteria.

The questionnaires were handed out by the physicians at each centre with a standardised letter explaining the study and providing directions on proper completion of the questionnaires. Each physician kept a list of the age, gender, and ethnicity for each potential participant handed a questionnaire packet for the purpose of calculating response rate and if there was response bias. No identifying information was on the study materials or questionnaires. Completed questionnaires were sealed in an envelope and returned anonymously to the investigators.

### *Measures and questionnaires*

#### • *Demographic data*

Age, sex, family status, educational level, and current professional status were assessed by a demographic questionnaire.

#### • *Length of FMS*

Years since onset of chronic widespread pain (CWP) and FMS-diagnosis were assessed by a medical questionnaire.

#### • *Severity of FMS*

The polysymptomatic distress scale was used as a measure of fibromyalgia severity (23, 24).

#### • *Psychological distress, potential anxiety and potential depression*

The 4-item Patient Health Questionnaire-4 (PHQ-4) (24, 25) was used to determine mental distress and illness. Two PHQ-4 items measure two of the DSM-IV criteria for major depression over a four-point scale (0: "not at all" - 3: "nearly every day"). A score  $\geq 3$  has a sensitivity of 82.9 % and a specificity of 90% for the diagnosis of major depression and sensitivity of 62.3 % and a specificity of 94% for the diagnosis of any depressive disorder and was used as the cut-point for depression in this study (25). Two PHQ-4 items measure two DSM-IV criteria for general anxiety disorder. A score  $\geq 3$  has sensitivities of 0.86, 0.76, 0.70, 0.59 and 0.65, as well as specificities of 0.83, 0.81, 0.81, 0.81 and 0.88 for the criterion standards generalised anxiety disorder, panic disorder, social anxiety disorder, posttraumatic stress disorder and any anxiety disorder and was used as the cut-point for anxiety in this study (27). The total score of the PHQ-4 (Minimum 0, Maximum 12) is a measure of psychological distress (25).

#### • *Pain-related disability*

Pain Disability Index (PDI) rates the degree to which pain interferes with the patient's functioning in 7 broad areas: family/home responsibilities, recreation, social activity, occupation, sexual behaviour, self-care, and life-support activity (28, 29). Each domain is rated using an 11-point scale ranging from 0 (no disability) to 10 (total disability). The total score range from 0 to 70.

#### • *Childhood maltreatment*

The 28-item short form of the standardised self-report Childhood Trauma Questionnaire (CTQ) is a well-validated and highly reliable instrument that measures the severity of different types of childhood and adolescence maltreatment (emotional, physical and sexual abuse, emotional and physical neglect). The scores of each subscale range between 5 (no abuse or neglect) and 25 (maximum abuse or neglect). Moreover, minimisation/denial of maltreatment can be assessed by 3 items with a score ranging from 0-3. We used the validated CTQ cut-off scores to detect any type of maltreatment and to grade the severity of maltreatment (30, 31).

*PTSD*: The trauma list of the PTSD module (30) of the Munich Composite International Diagnostic Interview (M-CIDI) (33) comprises ten major war-related and civilian potential traumatic events. Additionally, an inquiry was made on witnessing one of these 10 events in a significant other person and on another potential traumatic event which had not been specified in the previous ten potential traumatic events. In case a participant had indicated more than one potential traumatic event, he or she was asked to state the most burdensome event and the year of this event. The following questions and the determination of symptoms were then related to this specified event. An item representing the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) A2 criterion (intensive fear, shock and helplessness) of PTSD followed (32). In case a major life event which met the A2-criterion was reported, the diagnostic criteria for PTSD according to DSM-IV were assessed with part 3 of the Posttraumatic Diagnostic Scale (PDS). The PDS is a renowned diagnostic instrument for the assessment of PTSD in clinical study settings. It consists of 17 items that assess the three symptom clusters (intrusions, avoidance and arousal). The answers referred to the occurrence in the last month on a 4-point scale ranging from 0 ('not at all') to 3 ('several times per week/almost always'). The items cover the criteria B (intrusive re-experiencing of the traumatic event in the form of

nightmares and flashbacks, with an exaggerated response to trauma-related reminders/cues), C (persistent avoidance of stimuli associated with the trauma and emotional numbing) and D (persistent symptoms of exaggerated startle response, increased physiological arousal and sustained preparedness for an instant alarm response) according to DSM-IV. Furthermore the duration of symptoms (E-criterion: at least one month) and disability compared to the time before the traumatic event (F-criterion) were assessed. PTSD - diagnosis according to DSM-IV-TR criteria (cluster ABCDEF) was determined by the algorithm of the PDS: A1- and A2- E- and F- criteria met and at least 1 B-, at least 3 C- and at least 2-D criteria with scores  $\geq 1$ . The sensitivity and specificity of the PDS compared to the structured clinical interview for mental disorders of DSM-IV was 64% and 100% in the German validation study (35, 36).

**Ethics**

The US study was approved by the MedStar Health, protocol number 2012-391. The German study was approved by the institutional ethics review board of the Medical Faculty of the Ludwig-Maximilian University Munich (Project number 010-12).

There was no external funding for the study. The patients were not paid for their participation in the study.

**Statistical analysis**

Data were analysed by SPSS Version 18.0. Categorical descriptive data were presented as absolute values with percentages and continuous data as mean (standard deviation). Group comparisons of categorical data were performed by  $\chi^2$ -tests and of continuous data by the Mann-Whitney U-test. We performed a Bonferroni correction to adjust for multiple testing. A *p*-value of  $\leq 0.001$  was assumed to be significant.

The potential association of psychological distress/mental disorders with childhood maltreatments in both groups were tested for by two approaches:

a. Continuum approach:

We compared the CTQ-subscale scores of both groups by ANOVA. Group was specified as a fixed be-

**Table I.** Comparison of demographic data of *n*=71 age- and sex-matched US and German patients with fibromyalgia syndrome.

	USA <i>n</i> =71	Germany <i>n</i> =71	<i>p</i> -value
Mean age (mean, SD)	51.9 (10.2)	50.0 (10.3)	<i>Z</i> =0.99, <i>p</i> =0.32
Female gender (%)	68 (95.8)	68 (95.8)	
<b>Race</b>			
Caucasian (%)	56 (78.5)	71 (100)	$\chi^2 = 16.8; p < 0.001$
Black (%)	6 (8.5)		
Asian (%)	1 (1.4)		
Hispanic (%)	2 (2.8)		
Pacific (%)	6 (8.5)		
<b>Living with family /partner (%)</b>	70 (98.6)	55 (77.5%)	$\chi^2 = 15.0; p < 0.001$
<b>Highest educational level</b>			
Primary school (%)	0	7 (9.6)	$\chi^2 = 32.7; p < 0.001$
Secondary school (%)	1 (2.3)	43 (64.0)	
High school (%)	8 (5.6)	9 (12.7)	
University (%)	62 (83.8)	12 (16.9)	
<b>Current professional status</b>			
Student/training (%)	0	3 (4.2)	$\chi^2 = 32.7; p < 0.001$
Working (%)	36 (50.8)	40 (36.2)	
Without job (%)	7 (9.9)	4 (5.6)	
Pension (%)	23 (32.4)	13 (18.3)	
Homemaker (%)	5 (7.0)	11 (15.5)	
<b>Applying for disability pension (%)</b>	22 (31.0)	11 (15.5)	$\chi^2 = 16.0; p < 0.001$

Significant (Bonferroni adjusted) differences are marked as bold.

tween-subject factor. Additionally, we performed a group comparison of the CTQ-subscale scores including psychological distress (PHQ 4 total score) as continuous covariate by ANCOVA. Effect sizes for ANCOVA were expressed as partial  $\eta^2$  which were interpreted as a small effect size when  $\geq 0.01$ , a medium effect size when  $\geq 0.06$  and as a large effect size when  $\geq 0.13$ . Partial  $\eta^2$  describes the proportion of total variation attributable to the factor, excluding other factors from the non-error variation (37).

b. Categorical approach:

We analysed, if study participants with a potential depressive or anxiety disorder or PTSD reported more severe types of childhood maltreatment than study participants without these potential disorders.

**Results**

In the US sample 171 persons with FMS were approached. 65 potential participants did not complete the questionnaires or returned empty questionnaires. An additional 24 persons had concomitant inflammatory rheumatic disease were also excluded. 11 patients

with primary FMS were excluded from analysis because of a PSD total score  $< 11$ . In the German sample, 74 patients were approached. No patient refused to participate in the study. One patient each was excluded for organisational reasons and because of lack of adequate comprehension of written German language. In addition, three patients were excluded because of concomitant inflammatory rheumatic disease.

In the US sample, Caucasians constituted 78.5% of the cohort. The entire German cohort was Caucasian. The differences in the cohorts is illustrated in Table I. Educational level was substantially different, with 83.8% of US having attended University compared to 16.9% of Germans with FMS. The US cohort was also more likely to living with family or a partner (98.6%) and receiving retirement (32.4%) or disability (31.0%) pensions than seen in the German cohort (77.5%, 18.3% and 15.5%, respectively).

The differences in the clinical characteristics of the two cohorts can be seen in Table II. The duration of CWP was 2.1 times longer and time since diagnosis were 1.5x significantly longer in the US sample. No statistically meaningful

**Table II.** Comparison of clinical data of age- and sex-matched US and German patients with fibromyalgia syndrome.

	USA n=71	Germany n=71	p-value
Mean years since chronic widespread pain (SD)	16.0 (12.4)	7.6 (6.4)	Z = -5.5; <b>p&lt;0.0001</b>
Mean years since fibromyalgia diagnosis (SD)	11.6 (8.0)	7.6 (6.4)	Z = -5.5; <b>p&lt;0.0001</b>
Mean number of pain sites polysymptomatic distress scale (SD) (0-19)	11.2 (4.2)	12.9 (4.0)	Z = -2.3; p=0.02
Mean somatic symptom score polysymptomatic distress scale (SD) (0-12)	8.8 (2.1)	8.7 (2.2)	Z = -0.2; p=0.87
Mean total score polysymptomatic distress scale (SD) (0-31)	19.9 (5.1)	21.6 (5.1)	Z = -1.7; p=0.02
Psychological distress Patient Health Questionnaire 4 total score (SD) (0-12)	4.6 (3.4)	6.0 (3.5)	Z = -2.4; p=0.02
Patient Health Questionnaire potential depressive disorder n (%)	29 (43.9)	37 (56.1)	$\chi^2 = 5.6$ ; p=0.06
Patient Health Questionnaire potential anxiety disorder n (%)	27 (42.2)	37 (57.6)	$\chi^2 = 2.8$ ; p=0.06
Probable posttraumatic stress disorder n (%)	24 (33.8)	24 (33.8)	
Mean Pain Disability Index total score (SD) (0-70)	37. (16.2)	36.0 (12.4)	Z = -0.8; p=0.45

Significant (Bonferroni adjusted) differences are marked as bold.

**Table III.** Unadjusted and adjusted (for psychological distress) comparisons of retrospective reports of childhood maltreatment of adult US and German patients with fibromyalgia syndrome (FMS).

Variable	USA n=71	Germany n=71	Unadjusted comparison	Adjusted comparison Effect size Group	Adjusted comparison Effect size Psychological distress
<b>Emotional abuse CTQ (5-25)</b>					
Unadjusted (Mean, SD)	10.7 (5.7)	9.2 (5.0)	F = 2.8	partial eta <sup>2</sup> = 0.04	partial eta <sup>2</sup> = 0.07
Adjusted (Mean, SD)	11.0 (5.2)	8.9 (5.2)	p=0.09	p=0.02	<b>p=0.001</b>
<b>Physical abuse CTQ (5-25)</b>					
Unadjusted (Mean, SD)	6.6 (3.0)	7. (3.5)	F = 0.9	partial eta <sup>2</sup> = 0.003	partial eta <sup>2</sup> = 0.02
Adjusted (Mean, SD)	6.6 (3.3)	7.0 (3.3)	p=0.36	p=0.54	p=0.13
<b>Sexual abuse CTQ (5-25)</b>					
Unadjusted (Mean, SD)	7.3 (4.8)	7.7 (5.7)	F = 0.3	partial eta <sup>2</sup> = 0.000	partial eta <sup>2</sup> = 0.08
Adjusted (Mean, SD)	7.5 (5.1)	7.5 (5.1)	p=0.58	p=0.92	<b>p=0.001</b>
<b>Emotional neglect (5-25)</b>					
Unadjusted (Mean, SD)	10.8 (5.3)	10.6 (6.5)	F = 0.3	partial eta <sup>2</sup> = 0.0001	partial eta <sup>2</sup> = 0.08
Adjusted (Mean, SD)	11.1 (5.7)	10.3 (5.7)	p=0.87	p=0.39	<b>p=0.001</b>
<b>Physical neglect (5-25)</b>					
Unadjusted (Mean, SD)	7.4 (3.4)	7.5 (3.7)	F = 0.2	partial eta <sup>2</sup> = 0.000	partial eta <sup>2</sup> = 0.09
Adjusted (Mean, SD)	7.5 (3.5)	7.3 (3.5)	p=0.67	p=0.82	<b>p&lt;0.001</b>

Significant (Bonferroni adjusted) differences are marked as bold.

**Table IV.** Comparison of retrospective reports on childhood adversities (assessed by Childhood Trauma Questionnaire) of age- and sex-matched US and German patients with fibromyalgia syndrome.

	USA n=71	Germany n=71	p-value
Severe and very severe emotional abuse n (%)	16 (22.5)	10 (14.1)	$\chi^2 = 1.7$ ; p=0.19
Severe and very severe physical abuse n (%)	7 (9.9)	12 (16.9)	$\chi^2 = 1.6$ ; p=0.22
Severe and very severe sexual abuse n (%)	16 (22.5)	16 (22.5)	
Severe and very severe emotional neglect n (%)	15 (18.5)	23 (32.4)	$\chi^2 = 2.3$ ; p=0.13
Severe and very severe physical neglect n (%)	13 (18.3)	14 (19.7)	$\chi^2 = 0.1$ ; p=0.83

differences were seen in FMS severity, psychological symptom burden, or probable depression, anxiety and post-traumatic stress between the groups. Table III displays the comparison of the CTQ-subcales between the US and German cohorts. There were no significant differences between the unadjusted mean scores of the CTQ-subcales

between the national cohorts. When adjusted for psychological distress, statistical differences between the cohorts emerged. These differences were fully accounted for by psychological distress with small effect for emotional and medium effects for sexual abuse, emotional neglect and physical neglect (see Table III).

There was no difference in the frequency of self-reported severe and very severe abuse/neglect in childhood/adolescence between the national cohorts (Table IV).

The retrospective reports of trauma in the two national cohorts can be seen in Table V. There were no significant differences in the reports of severe physical violence, rape, childhood sexual abuse, witnessed severe trauma, or other traumatic event. US FMS patients reported more frequently severe accidents (29.6%) compared to Germans (8.4%, p=0.001).

How probable depression, anxiety, and PTSD correlate with severe childhood adversities is presented in Tables VI–VIII. In unadjusted analyses, every type of severe or greater childhood ad-



**Table V.** Comparison of retrospective reports on (potential) lifetime traumatic events (assessed by the trauma list of the posttraumatic stress syndrome module of the Munich Composite International Diagnostic Interview: frequency  $\geq 10$  in at least one group) of age- and sex-matched US and German patients with fibromyalgia syndrome.

	USA n=71	Germany n=71	p-value
Severe physical violence n (%)	10 (14.1)	9 (12.7)	$\chi^2=0.1; p=0.77$
Rape n (%)	12 (16.9)	12 (16.9)	$\chi^2=1.6; p=0.22$
Sexual abuse before 14 years n (%)	17 (23.9)	16 (21.3)	$\chi^2=2.0; p=0.69$
Severe accident n (%)	21 (29.6)	6 (8.4)	$\chi^2=10.8; p=0.001$
Witnessed one severe life event n (%)	17 (24.3)	8 (11.3)	$\chi^2=4.2; p=0.04$
Other severe life event n (%)	30 (42.9)	22 (31.0)	$\chi^2=2.1; p=0.14$
At least one traumatic event n (%)	45 (63.4)	40 (57.1)	$\chi^2=0.6; p=0.75$

Significant (Bonferroni adjusted) differences are marked as bold.

**Table VI.** Comparisons of self-reported severe and very severe childhood adversities in US and German patients with fibromyalgia syndrome and with and without potential depressive disorder.

	With probable depressive disorder n=66	Without probable depressive disorder n=73	p-value
Severe and very severe emotional abuse n (%)	27.3	11.0	$\chi^2=6.1; p=0.04$
Severe and very severe physical abuse n (%)	15.2	11.0	$\chi^2=1.0; p=0.33$
Severe and very severe sexual abuse n (%)	34.8	12.3	$\chi^2=10.0; p=0.002$
Severe and very severe emotional neglect n (%)	39.4	16.4	$\chi^2=6.4; p=0.01$
Severe and very severe physical neglect n (%)	28.8	11.0	$\chi^2=7.0; p=0.008$

**Table VII.** Comparisons of self-reported severe and very severe childhood adversities in US and German patients with fibromyalgia syndrome and with and without potential anxiety disorder.

	With probable anxiety disorder n=64	Without probable anxiety disorder n=78	p-value
Severe and very severe emotional abuse n (%)	30.0	9.4	$\chi^2=10.2; p=0.002$
Severe and very severe physical abuse n (%)	20.3	7.7	$\chi^2=4.8; p=0.03$
Severe and very severe sexual abuse n (%)	34.4	12.8	$\chi^2=9.4; p=0.003$
Severe and very severe emotional neglect n (%)	37.5	17.9	$\chi^2=6.9; p=0.009$
Severe and very severe physical neglect n (%)	30.0	10.3	$\chi^2=8.6; p=0.003$

**Table VIII.** Comparisons of self-reported severe and very severe childhood adversities in US and German patients with fibromyalgia syndrome and with and without potential post-traumatic stress disorder (PTSD).

	With probable PTSD n=48	Without probable PTSD n=94	p-value
Severe and very severe emotional abuse n (%)	37.5	7.4	$\chi^2=4.1; p=0.04$
Severe and very severe physical abuse n (%)	10.4	2.1	$\chi^2=4.7; p=0.03$
Severe and very severe sexual abuse n (%)	22.9	5.3	$\chi^2=9.8; p=0.002$
Severe and very severe emotional neglect n (%)	18.8	4.3	$\chi^2=8.1; p=0.005$
Severe and very severe physical neglect n (%)	16.7	3.2	$\chi^2=8.1; p=0.005$

versity was associated with probable depression, anxiety disorder or PTSD, with the lone exception of physical abuse with depression. After Bonferroni's correction for multiple comparisons, none of these findings remained statistically significant.

**Discussion**

*Summary of main findings*

In a cross-sectional comparison, the frequency of retrospectively reported childhood adversities and of lifetime traumatic events was comparable in US and German FMS patients derived

from specialist practices. Patients with potential mental disorders more frequently reported severe and very severe childhood adversities than patients without a probable mental disorder. The group differences in the mean CTQ scores of emotional and sexual abuse and of emotional and physical neglect were fully explained by psychological distress. The study findings sustain previous findings the association between FMS, childhood maltreatment and mental disorders in a binational cohort of subjects with FMS.

The frequency of self-reported childhood maltreatment of the German patients of the sample was identical to those found in two previous German studies using the same instruments. The stability of the findings in different assessment periods (since 2005) and in different German settings (20, 38) and the comparability of the data of US and German patients – despite substantial demographic and clinical differences between the two samples – strengthens the reliability of the importance of self-reported childhood maltreatment in the biopsychosocial model of FMS (7).

The frequency of traumatic events and potential depressive disorder and PTSD in this study was similar to what was reported in a German multicentre study which used the same instruments to investigate FMS patients in different clinical settings (17, 39). The transcultural and setting-related robustness of the findings strengthens the importance of mental disorders in the biopsychosocial model of FMS (7).

The binational study confirms findings of previous studies with German FMS-patients that retrospective reports of childhood maltreatment of FMS patients are substantially confounded by comorbid mental disorders/psychological distress (20, 38). The strong association between FMS and mental disorders can be explained by genetic factors (40) and by common environmental factors such as childhood adversities and lifelong psychosocial stress. In short, lifelong psychological stress is a nonspecific risk factor for functional somatic symptoms such as FMS and irritable bowel syndrome

(41, 42) as well as for mental disorders (43), which seems to be equally penetrant in the US and Germany. A German cross-sectional study with FMS-patients of clinical institutions hypothesised that FMS and mental disorders (depressive and anxiety disorders and PTSD) are linked in several ways: Mental disorders are a potential risk factor of FMS and vice versa. FMS and mental disorders are comorbid conditions because they are associated with common antecedent traumatic experiences (17). Most probably, the association between potential traumatic events and widespread pain/FMS is mediated by mental disorders (44). However, the association of childhood maltreatment, traumatic events and mental disorders with FMS needs clarification by further longitudinal studies.

Of course, not every FMS patient reported physical and sexual abuse in childhood and adulthood and not every FMS patient had a mental comorbidity. A history of abuse or trauma is neither necessary nor sufficient to cause a person to develop fibromyalgia. FMS is a heterogeneous condition and most probably different biological and psychosocial factors play a role in the aetiology of FMS (7).

### Limitations

A standard psychiatric interview for mental and childhood maltreatment was not conducted as part of this study. Instead, this study was carried out in the context of routine clinical care. The data on childhood maltreatment were based on self-reports which are subject to recall and response biases (45). However, inconsistencies in reporting traumatic events are also inherent in standardised clinical interviews (46).

The clinically based samples limit the generalisability of the results to the whole population of FMS-patients. We did not include a control group without FMS. However, we have demonstrated the higher frequency of childhood adversities and traumatic events in German FMS-patients if compared to age- and sex matched population controls (17). We did not test the transcultural robustness of our findings with FMS-patients of other countries.

### Conclusions

**Clinical practice:** Abuse and trauma are potential risk factors for developing FMS across different cultures. Mental disorders have a negative impact on FMS outcome (17-19). Because of the high prevalence of potential mental disorders in FMS-patients, appropriate screening for mental disorders should be performed (47).

**Research:** Studies on the aetiology and pathophysiology of FMS should consider concomitant mental disorders/psychological distress and adjust their findings accordingly.

### References

1. WOLFE F, WALITT B: Culture, science and the changing nature of fibromyalgia. *Nat Rev Rheumatol* 2013; 9: 751-5.
2. WOLFE F, CLAUW DJ, FITZCHARLES MA *et al.*: The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. *Arthritis Rheum* 2010; 62: 600-10.
3. WOLFE F: Fibromyalgia research criteria. *J Rheumatol* 2014; 41: 187.
4. WOLFE F, BRÄHLER E, HINZ A, HÄUSER W: Fibromyalgia prevalence, somatic symptom reporting, and the dimensionality of polysymptomatic distress: results from a survey of the general population. *Arthritis Care Res (Hoboken)* 2013; 65: 777-85.
5. NAKAMURA I, NISHIOKA K, USUI C *et al.*: An epidemiologic internet survey of fibromyalgia and chronic pain in Japan. *Arthritis Care Res (Hoboken)* 2014; 66: 1093-101.
6. FIETTA P, FIETTA P, MANGANELLI P: Fibromyalgia and psychiatric disorders. *Acta Biomed* 2007; 78: 88-95.
7. SOMMER C, HÄUSER W, BURGNER M, ENGELHARDT R, GERHOLD K, PETZKE F: Etiology and pathophysiology of fibromyalgia syndrome. *Schmerz* 2012; 26: 259-67.
8. ARNOLD LM, FAN J, RUSSELL IJ *et al.*: The fibromyalgia family study: a genome-wide linkage scan study. *Arthritis Rheum* 2013; 65: 1122-8.
9. FORSETH KO, HUSBY G, GRAN JT, FØRRE O: Prognostic factors for the development of fibromyalgia in women with self-reported musculoskeletal pain. A prospective study. *J Rheumatol* 1999; 26: 2458-67.
10. MORK PJ, NILSEN TI: Sleep problems and risk of fibromyalgia: longitudinal data from the Norwegian HUNT-study. *Arthritis Rheum* 2012; 64: 281-4.
11. MORK PJ, NILSEN TI: Sleep problems and risk of fibromyalgia: longitudinal data on an adult female population in Norway. *Arthritis Rheum* 2012; 6: 281-4.
12. CHOI CJ, KNUTSEN R, ODA K, FRASER GE, KNUTSEN SF: The association between incident self-reported fibromyalgia and nonpsychiatric factors: 25-years follow-up of the Adventist Health Study. *J Pain* 2010; 1: 994-1003.
13. WOLFE F, HÄUSER W, HASSETT AL, KATZ RS, WALITT BT: The development of fibromyalgia--I: examination of rates and predictors in patients with rheumatoid arthritis (RA). *Pain* 2011; 152: 291-9.
14. HÄUSER W, KOSSEVA M, ÜCEYLER N, KLOSE P, SOMMER C: Emotional, physical, and sexual abuse in fibromyalgia syndrome: a systematic review with meta-analysis. *Arthritis Care Res (Hoboken)* 2011; 63: 808-20.
15. BUSKILA D, ATZENI F, SARZI-PUTTINI P: Etiology of fibromyalgia: the possible role of infection and vaccination. *Autoimmun Rev* 2008; 8: 41-3.
16. KIVIMÄKI M, LEINO-ARJAS P, VIRTANEN M *et al.*: Work stress and incidence of newly diagnosed fibromyalgia: prospective cohort study. *J Psychosom Res* 2004; 57: 417-22.
17. HÄUSER W, GALEK A, ERBSLÖH-MÖLLER B *et al.*: Posttraumatic stress disorder in fibromyalgia syndrome: prevalence, temporal relationship between posttraumatic stress and fibromyalgia symptoms, and impact on clinical outcome. *Pain* 2013; 154: 1216-23.
18. LANGE M, PETERMANN F: [Influence of depression on fibromyalgia : A systematic review]. *Schmerz* 2010; 24: 326-33.
19. DELL'OSSO L, CARMASSI C, CONSOLI G *et al.*: Lifetime post-traumatic stress symptoms are related to the health-related quality of life and severity of pain/fatigue in patients with fibromyalgia. *Clin Exp Rheumatol* 2012; 29 (Suppl. 69): S73-8.
20. HÄUSER W, BOHN D, KÜHN-BECKER H, ERDKÖNIG R, BRÄHLER E, GLAESMER H: Is the association of self-reported childhood maltreatments and adult fibromyalgia syndrome attributable to depression? A case control study. *Clin Exp Rheumatol* 2012; 30 (Suppl. 74): S59-64.
21. GOLDENBERG DL: Diagnosis and differential diagnosis of fibromyalgia. *Am J Med* 2009; 122 (12 Suppl.): S14-21.
22. WOLFE F, SMYTHE HA, YUNUS MB *et al.*: The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990; 33: 160-72..
23. WOLFE F, CLAUW DJ, FITZCHARLES MA *et al.*: Fibromyalgia criteria and severity scales for clinical and epidemiological studies: a modification of the ACR Preliminary Diagnostic Criteria for Fibromyalgia. *J Rheumatol* 2011; 38: 1113-22.
24. HÄUSER W, JUNG E, ERBSLÖH-MÖLLER B *et al.*: Validation of the Fibromyalgia Survey Questionnaire within a cross-sectional survey. *PLoS One* 2012; 7: e37504.
25. KROENKE K, SPITZER RL, JANNETT BW, WILLIAMS DSW, LÖWE B: An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ-4. *Psychosomatics* 2009; 50: 613-21.
26. LÖWE B, WAHL I, ROSE M *et al.*: A 4-item measure of depression and anxiety: validation and standardization of the Patient Health Questionnaire-4 (PHQ-4) in the general population. *J Affect Disord* 2011; 122: 86-95.
27. KROENKE K, SPITZER RL, WILLIAMS JB, MONAHAN PO, LOEWE B: Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Ann Intern Med* 2007; 146: 317-25.

28. TAIT RC, CHIBNALL JT, KRAUSE S: The Pain Disability Index: psychometric properties. *Pain* 1990; 40: 171-82.
29. DILLMANN U, NILGES P, SAILE H, GERBERSHAGEN HU: [Assessing disability in chronic pain patients.]. *Schmerz* 1994; 8: 100-10.
30. BERNSTEIN DP, STEIN JA, NEWCOMB MD *et al.*: Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse Negl* 2003; 27: 169-90.
31. WINGENFELD K, SPITZER C, MENSEBACH C *et al.*: [The German version of the Childhood Trauma Questionnaire (CTQ): preliminary psychometric properties]. *Psychother Psychosom Med Psychol* 2010; 60: 442-50.
32. PERKONIGG A, KESSLER RC, STORZ S, WITTCHEN HU: Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity. *Acta Psychiatr Scand* 2000; 101: 46-59.
33. WITTCHEN H-U, LACHNER G, WUNDERLICH U, PFISTER H: Test-retest reliability of the computerized DSM-IV version of the Munich-Composite International Diagnostic Interview (M-CIDI). *Soc Psychiatry Psychiatr Epidemiol* 1998; 33: 568-78.
34. AMERICAN PSYCHIATRIC ASSOCIATION: Diagnostic and statistical manual of mental disorders – DSM-IV-TR (4<sup>th</sup> ed.). Washington, DC: APA, 2000.
35. FOA EB, RIGGS DS, DANCU CV, ROTHBAUM BO: Reliability and validity of a brief instrument for assessing posttraumatic stress disorder. *J Traumatic Stress* 1993; 6: 459-73.
36. GRIESEL D, WESSAM, FLOR H: Psychometric qualities of the German version of the Post-traumatic Diagnostic Scale (PTDS). *Psychol Assess* 2006; 18: 262-8.
37. HARLOW LL: The essence of multivariate thinking. Basic theories and methods. Harvard: Lawrence Erlbaum Assoc, 2005.
38. KOSSEVA M, SCHILD S, WILHELM-SCHWENK R, BIEWER W, HÄUSER W: [Comorbid depression mediates the association of childhood/adolescent maltreatment and fibromyalgia syndrome. A study with patients from different clinical settings]. *Schmerz* 2010; 24: 474-84.
39. GALEK A, ERBSLÖH-MÖLLER B, KÖLLNER V *et al.*: [Mental disorders in patients with fibromyalgia syndrome : Screening in centres of different medical specialties.]. *Schmerz* 2013; 27: 296-304
40. KATO K, SULLIVAN PF, EVENGÅRD B, PEDERSEN NL: A population-based twin study of functional somatic syndromes. *Psychol Med* 2009; 39: 497-505.
41. AFARI N, AHUMADA SM, WRIGHT LJ *et al.*: Psychological trauma and functional somatic syndromes: a systematic review and meta-analysis. *Psychosom Med* 2014; 76: 2-11.
42. PARAS ML, MURAD MH, CHEN LP *et al.*: Sexual abuse and lifetime diagnosis of somatic disorders: a systematic review and meta-analysis. *JAMA* 2009; 302: 550-61.
43. CARR CP, MARTINS CM, STINGEL AM, LEMGRUBER VB, JURUENA MF: The role of early life stress in adult psychiatric disorders: a systematic review according to childhood trauma subtypes. *J Nerv Ment Dis* 2013; 201: 1007-20.
44. HÄUSER W, GLAESMER H, SCHMUTZER G, BRÄHLER E: Widespread pain in older Germans is associated with posttraumatic stress disorder and lifetime employment status - Results of a cross-sectional survey with a representative population sample. *Pain* 2012; 153: 2466-71.
45. DAVIS DA, LUECKEN LJ, ZAUTRA AJ: Are reports of childhood abuse related to the experience of chronic pain in adulthood? A meta-analytic review of the literature. *Clin J Pain* 2005; 21: 398-405.
46. HEPP U, GAMMA A, MILOS G *et al.*: Inconsistency in reporting potentially traumatic events. *Br J Psychiatry* 2006; 188: 278-83.
47. KÖLLNER V, HÄUSER W, KLIMCZYK K *et al.*; ARBEITSGEMEINSCHAFT DER WISSENSCHAFTLICHEN MEDIZINISCHEN FACHGESELLSCHAFTEN: [Psychotherapy for patients with fibromyalgia syndrome. Systematic review, meta-analysis and guideline]. *Schmerz* 2012; 26: 291-6.