
Is the association of self-reported childhood maltreatments and adult fibromyalgia syndrome attributable to depression?

A case control study

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ABSTRACT

Objectives. Systematic reviews of case-control studies demonstrated an association between self-reported childhood sexual and physical abuse and fibromyalgia syndrome (FMS). We tested in a case-control study if the association of self-reported childhood maltreatments in childhood and in adult FMS-patients is attributable to depression.

Methods. All consecutive patients diagnosed with FMS of two clinical centres were included into the study from January to June 2011. Randomly selected age- and sex-matched controls from a representative survey of the general German population were used as controls. Childhood maltreatments were assessed by the German version of the Childhood Trauma Questionnaire CTQ and depression by the two-item depression scale of the German version of the Patient Health Questionnaire PHQ-4. The scores of the five CTQ-subcales were compared between FMS-patients and controls using analysis of covariance adjusting for depressed mood.

Results. 153 FMS-patients (87.6% women; mean age 50.3 years) and 153 age- and sex matched participants of the general population were included. The comparison between FMS-patients and population controls, adjusted for depressed mood, demonstrated a significant group difference for emotional ($p < 0.001$), and sexual abuse ($p = 0.01$). Depressed mood fully accounted for group difference in physical abuse ($p = 0.01$) and in emotional neglect ($p < 0.001$). Depressed mood partially accounted for group difference in emotional abuse ($p < 0.001$), but did not account for group difference in sexual abuse ($p = 0.10$).

Conclusion. Reports of FMS-patients some on childhood maltreatments were biased by depressed mood. However, the difference in self-reported child-

hood sexual abuse between adult FMS-patients and population controls was not attributable to depression.

Introduction

Fibromyalgia syndrome (FMS) is characterised by chronic widespread pain, fatigue and sleep disturbances and overlapping conditions such as irritable bowel syndrome and depressive or anxiety disorders. The etiological causes for the moment only consist of assumptions, and the underlying pathogenetic mechanisms still remain to be clarified (1). In prospective population-based studies smoking (2), reduced physical activity combined with obesity (3), sleep problems (4) and work-place related psychological stress (5) were associated with an increased risk of FMS. Systematic reviews of case-control studies demonstrated an association between self-reported sexual and physical abuse in childhood and FMS in adulthood (6, 7). However, the case-control studies reviewed did not analyse whether the association of self-reported childhood maltreatments and FMS was attributable to depression.

Affective disorders are frequent comorbidities of FMS (8). Persons with a history of emotional neglect and sexual abuse were more likely to develop more than one lifetime affective disorder (9). Therefore, the association between childhood maltreatments and adult FMS might be mediated by depressive disorders. A cross-sectional case series with 328 German FMS-patients of different levels of care (10) and a cross-sectional population-based US study with 10,424 older women and men (11 with personal communication) found that FMS-patients with depressive disorder reported more childhood maltreatments than FMS-patients without depressive disorder.

In addition, cognitive theories of de-

pression emphasise a vicious circle between depressed mood and biased recall towards negative information. Depressed adults show selectively enhanced recall for negative information (12). Therefore the memory and retrospective evaluation of childhood events could be influenced by a depressive recall bias.

Because the association between self-reports of childhood maltreatments and adult FMS might be attributable to depression, we tested in a case-control study if FMS-patients report more severe childhood maltreatments than general population controls and, if yes, whether depression accounted for the group differences.

Methods

Participants and settings

A cross-sectional survey of a randomly generated representative sample of the German general population was conducted by an independent public opinion and social research institute (USUMA, Berlin) in April 2010. The sample contained persons resident in 258 different places in Germany, 210 in the former West Germany and 48 in the former East Germany. The details of the study had been outlined in a previous paper (13).

All consecutive patients diagnosed with FMS, either by American College of Rheumatology (ACR) 1990 (14) or by modified preliminary diagnostic ACR 2010 criteria (15) of one secondary and one tertiary care pain medicine centre referred for diagnosis and/or medical treatment were included into the study from January to June 2011. The specialties of the three investigators (WH, HKB, RE) were pain medicine and psychosomatic medicine. The clinicians had been experienced in the diagnosis and treatment of FMS since more than ten years.

Only persons aged 18 years and above with adequate comprehension of written German were included in both studies. Patients with somatic diseases sufficiently explaining the majority of pain sites and patients referred for medical expertise because of applying for disability pension were excluded in the clinical settings.

Measures and questionnaires

Demographic data: Age, sex, family status, educational level, current professional status were assessed in both studies by a demographic questionnaire. The medical data (years since chronic widespread pain and FMS-diagnosis) of the clinical samples were assessed by a clinical interview.

Childhood maltreatment: The 28-item short form of the standardised self-report Childhood Trauma Questionnaire (CTQ) was used as a well-validated and highly reliable instrument that measures the severity of different types of childhood and adolescence maltreatments (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 a tendency to 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 (16, 17). We used the validated German version of the CTQ (18).

Depression: was measured the 2-item depression scale of the 4-item Patient Health Questionnaire-4 (PHQ-4) which scores two DSM-IV criteria of major depression as "0" (not at all) to "3" (nearly every day). With reference to the Structured Clinical Interview for DSM-IV (SCID), a score of 3-or-greater on the depression subscale had a sensitivity of 87% and a specificity of 78% for of major depression disorder and a sensitivity of 79% and a specificity of 86% for any depressive disorders (19). We used the validated German version of the PHQ 4 (20). We did not use the PHQ 9 (21) which overestimates depression in FMS because of the inclusion of key symptoms of FMS (fatigue, sleeping and concentration problems).

Statistical analysis

Data were analysed by SPSS Version 16.0. Categorical descriptive data were presented as absolute values with percentages and continuous data as mean (standard deviation, range). Group comparisons of categorical data were performed by χ^2 -tests.

The potential association of depression with childhood maltreatments in both groups were tested for by two approaches:

a. Categorical approach: We analysed in FMS-patients and population controls separately, if study participants with a potential depressive disorder (PHQ 2 score ≥ 3) reported more slight, moderate and severe types of childhood maltreatments than study participants without a potential depressive disorder (PHQ 2 score < 3).

b. Continuum approach: We compared the CTQ-subscale scores of FMS-patients and population controls by ANOVA. Group was specified as a fixed between-subject factor. Additionally we performed a group comparison of the CTQ-subscale scores including depressed mood as continuous covariate by ANCOVA. Effect sizes for ANCOVA were expressed as partial η^2 which were interpreted as a small effect size when ≥ 0.01 , a medium effect size when ≥ 0.06 and as a large effect size when ≥ 0.13 . Partial η^2 describes the proportion of total variation attributable to the factor, partialling out (excluding) other factors from the non-error variation (22).

Ethics

All participants were informed about the study design and goals and signed a consent form. The population study adhered to the ethical guidelines of the ICC/ESOMAR International Code of Marketing and Social Research Practice (23). The study of the clinical institutions had been approved by the regional ethical committee.

Results

The population survey was carried out in April 2010. The sample comprised 4455 persons, 2504 (56%) of whom completed the questionnaire. The reasons for non-participation were inability to contact the person (28.4%) and refusal to be interviewed (15.6%) (10). A total of 186 patients were approached to take part in the study in the secondary and in the tertiary care centre. In the secondary care centre, two patients refused to take part in the study and 10 patients did not return the question-

naires. In the tertiary care centre, no patient refused to take part in the study. Two patients were excluded because of active inflammatory rheumatic diseases, one patient because of lacking ability to speak German, 18 patients because of referral for medical expertise. There were no significant differences in age and sex between included and excluded patients.

One hundred and fifty-three FMS-patients (87.6% women; mean age 50.3 years) with a mean duration of chronic widespread pain of 10.6 years were included into the study. 153 age- and sex-matched participants of the general population were randomly selected for comparison. There were no significant differences between FMS-patients and population controls in partnership situation, graduation and professional status (see Table I).

FMS-patients reported more severe types of emotional, physical and sexual abuse and emotional neglect in childhood and adolescence than sex- and age-matched controls of the general population (see Table II).

The mean depression score of FMS-patients (3.5, SD 1.8) was significantly higher ($F=423, p<0.001$) than the ones of population controls (1.1, SD 1.4). 98/153 (64.0%) of FMS-patients and 15/153 (9.8%) of population controls scored ≥ 3 on the PHQ 2 ($\chi^2=96.6, p<0.001$). In both groups, participants with a probable depressive disorder differed significantly in the frequency of the different severities of self-reported emotional abuse and neglect, but not in the frequency of the different severities of self-reported sexual abuse and physical neglect (see Table III).

The unadjusted comparisons revealed significant group differences in depression and all CTQ-subcales except physical neglect (see Table IV).

The comparison between FMS-patients and subjects of the general population, adjusted for depression, demonstrated a significant group difference for emotional ($p<0.001$), and sexual abuse ($p=0.01$). Depression fully accounted for group difference in physical abuse ($p=0.001$) with a small effect size and in emotional neglect ($p<0.001$) with a medium effect size. Depression par-

Table I. Demographic comparisons of patients with fibromyalgia syndrome (FMS) with age- and sex-matched subjects of the general population.

Variable	FMS sample n=153	General population n=153	Comparison
Sex (female) n. (%)	134 (87.6)	133 (86.9)	Not applicable
Age (Mean, SD) (Range)	50.3 (9.6)	50.4 (13.6)	Not applicable
Living in partnership n. (%)	74 (48.4%)	87 (56.9%)	$\chi^2=2.2$ $p=0.14$
Graduation n. (%)			
No school finished	1 (0.7%)	4 (2.6%)	
Primary school	81 (52.9%)	66 (43.1%)	$\chi^2=4.7$ $p=0.32$
Secondary school	49 (32.0%)	59 (38.6%)	
High school	13 (8.5%)	12 (7.8%)	
University	9 (5.9%)	12 (7.8%)	
Current professional situation n. (%)			
Working	81 (52.9%)	82 (53.6%)	$\chi^2=5.2$ $p=0.24$
Without job	30 (19.6%)	17 (11.1%)	
Homemaker	15 (9.8%)	13 (8.5%)	
Pensioner	27 (17.7%)	41 (26.8%)	

Table II. Comparisons of different severities of childhood maltreatments of patients with fibromyalgia syndrome and age- and sex-matched persons of the general population

Variable Childhood Trauma questionnaire subscale (cut-off values)	FMS sample n=153 n. (%)	General population controls n=153 n. (%)	Comparison
Emotional abuse			$\chi^2=51$ $p<0.001$
None to slight (5-8)	80 (52.3)	132 (86.3)	
Slight to moderate (9-12)	24 (15.7)	16 (10.5)	
Moderate to severe (13-15)	15 (9.8)	4 (2.6)	
Severe to extreme (16-25)	34 (22.2)	1 (0.7)	
Physical abuse			$\chi^2=20.4$ $p\leq 0.001$
None to slight (5-7)	112 (73.2)	135 (88.2)	
Slight to moderate (8-9)	9 (5.9)	12 (7.8)	
Moderate to severe (10-12)	18 (11.8)	3 (2.0)	
Severe to extreme (13-25)	14 (9.2)	3 (2.0)	
Sexual abuse			$\chi^2=19.3$ $p\leq 0.001$
None to slight (5)	102 (66.7)	130 (85.0)	
Slight to moderate (6-7)	15 (9.8)	9 (5.9)	
Moderate to severe (8-12)	12 (7.8)	10 (10.5)	
Severe to extreme (13-25)	24 (15.7)	4 (2.6)	
Emotional neglect			$\chi^2=22.5$ $p<0.001$
None to slight (5-9)	61 (39.9)	65 (42.5)	
Slight to moderate (10-14)	30 (19.6)	58 (37.9)	
Moderate to severe (15-17)	22 (14.4)	16 (10.5)	
Severe to extreme (16-25)	20 (26.1)	14 (9.2)	
Physical neglect			$\chi^2=6.4$ $p=0.09$
None to slight (5-7)	83 (54.2)	76 (49.7)	
Slight to moderate (8-9)	24 (15.7)	32 (20.9)	
Moderate to severe (10-12)	20 (13.1)	30 (19.6)	
Severe to extreme (13-25)	26 (17.0)	15 (9.8)	

tially accounted for group difference in emotional abuse ($p<0.001$) with a small effect size as high as the one of group. Depression did not account for group difference in sexual abuse ($p=0.10$). Group status fully accounted for group difference in sexual abuse with a small effect size (see Table IV).

Discussion

Summary of main results

FMS-patients reported more emotional, physical and sexual abuse and emotional neglect than age- and sex-matched persons of the general population. The group differences were partially attributable to depressed mood for emo-

Table III. Comparisons of different severities of childhood maltreatments of patients with fibromyalgia syndrome with and without probable depressive disorder and of age- and sex-matched persons of the general population with and without probable depressive disorder

Variable Childhood Trauma questionnaire subscale (cut-off values)	FMS patients with probable depressive disorder n=98 n. (%)	FMS patients without probable depressive disorder n=55 n. (%)	Population controls with probable depressive disorder n=15 n. (%)	Population controls without probable depressive disorder n=138 n. (%)
Emotional abuse				
None to slight (5-8)	45 (45.9)	35 (86.3)	8 (53.3)	124 (89.9)
Slight to moderate (9-12)	17 (17.3)	7 (10.5)	4 (26.7)	12 (8.7)
Moderate to severe (13-15)	8 (8.2)	7 (2.6)	2 (13.3)	2 (1.4)
Severe to extreme (16-25)	28 (28.6)	6 (0.7) ¹	1 (6.7)	0 ⁶
Physical abuse				
None to slight (5-7)	67 (68.4)	45 (88.2)	12 (80.0)	123 (88.2)
Slight to moderate (8-9)	5 (5.1)	4 (7.8)	0	12 (8.7)
Moderate to severe (10-12)	16 (16.2)	2 (2.0)	1 (33.3)	2 (1.4)
Severe to extreme (13-25)	10 (10.2)	4 (2.0) ²	2 (66.7)	1 (0.7) ⁷
Sexual abuse				
None to slight (5)	64 (65.4)	38 (85.0)	11 (73.3)	119 (86.2)
Slight to moderate (6-7)	8 (8.2)	7 (5.9)	1 (6.7)	8 (5.8)
Moderate to severe (8-12)	10 (10.2)	2 (10.5)	2 (13.3)	8 (5.8)
Severe to extreme (13-25)	16 (16.2)	8 (2.6) ³	1 (6.7)	3 (2.2) ⁸
Emotional neglect				
None to slight (5-9)	32 (32.7)	29 (42.5)	1 (6.7)	64 (46.4)
Slight to moderate (10-14)	18 (18.4)	12 (37.9)	6 (40.0)	52 (37.7)
Moderate to severe (15-17)	15 (15.3)	7 (10.5)	4 (26.7)	12 (8.7)
Severe to extreme (16-25)	33 (33.7)	7 (9.2) ⁴	4 (26.7)	10 (7.2) ⁹
Physical neglect				
None to slight (5-7)	48 (49.0)	35 (49.7)	6 (40.0)	70 (50.7)
Slight to moderate (8-9)	14 (14.3)	10 (20.9)	3 (20.0)	29 (21.0)
Moderate to severe (10-12)	15 (15.3)	5 (19.6)	3 (20.0)	27 (19.6)
Severe to extreme (13-25)	21 (21.4)	5 (9.8) ⁵	3 (20.0)	12 (8.7) ¹⁰

χ^2 and *p*-values: ¹ 8.3; 0.04; ² 6.3; 0.10; ³ 2.8, 0.42; ⁴ 9.9 ; 0.02; ⁵ 5.9 0.12; ⁶ 22.8 <0.001; ⁷ 14.3; 0.002; ⁸ 2.5, 0.47; ⁹ 14.8; 0.002, ¹⁰ 2.1; 0.56.

tional abuse and totally attributable to depressed mood for physical abuse and neglect. The group difference in sexual abuse was not attributable to depressed mood. In both groups participants with probable depressive disorder reported more severe emotional abuse and neglect, but not more severe sexual abuse and physical neglect than participants without probable depressive disorder.

Comparisons with other studies

Using the CTQ, the prevalence of at least slight emotional (31 vs. 14%), physical (16 vs. 12%) and sexual (10 vs. 15%) abuse was different in two US randomised telephone interview community-based surveys with 1887 adults aged 18 to 65 years conducted in 1997 and 2003 (24) compared to the German population sample (13). The prevalence of all types of severe maltreatments were nearly double as high in FMS-pa-

tients of this study compared to 1348 patients with migraine of 11 US and Canadian clinical centres (25).

The prevalence rates of (probable) depressive disorder of 64% in the FMS-sample was in the upper range of the prevalence rates reported in a systematic review (8) and can be due to a selection bias of FMS-patients presenting in secondary and tertiary care centres.

The study confirms the association of self-reported childhood physical and sexual abuse and FMS in adulthood reported in systematic reviews of case-control studies (6, 7). The association of self-reported childhood sexual abuse and FMS remained after controlling for depressed mood, but not the association between self-reported childhood physical abuse and FMS. In contrast to these reviews, this study found an association between self-reported childhood emotional abuse and FMS after adjusting for

depressed mood. The problems of defining and measuring emotional abuse had been discussed in a systematic review (7) and might explain the different findings on self-reported childhood emotional abuse and FMS.

We could confirm our hypotheses that the differences between FMS-patients and controls in self-reported physical abuse and neglect and emotional neglect were attributable to depressed mood. However, group status and not depression accounted for the differences in sexual abuse. Moreover, probable depressive disorder was not associated in FMS-patients and population controls with sexual abuse. We hypothesize that memories of childhood sexual abuse are less susceptible to depressive recall bias than memories of physical neglect. Reports of more severe emotional abuse and neglect were associated with potential depressive disorder both in FMS-patients and population controls. Depressive disorder might therefore mediate the association between these childhood adversities and adult FMS.

Limitations

A standardised psychiatric interview for depression and childhood maltreatments was not conducted because the study was carried out in the context of routine clinical care. The data on childhood maltreatments were based on self-reports which are subject to recall and response biases (26). However, inconsistencies in reporting traumatic events are also inherent in standardised clinical interviews (27).

The clinically based samples limit the generalisability of the results to the whole population of FMS-patients.

The time frame of the study was different in the clinical and the general population sample.

Persons of the population sample were not assessed for FMS. The prevalence of FMS in another representative German population survey was 3.8 % (28) using the previous survey criteria of FMS (29). Therefore persons with FMS might have been included in the population sample leading to an underestimation of the differences in childhood maltreatments between FMS-patients and controls.

Table IV. Unadjusted and adjusted (for depressed mood) comparisons of childhood maltreatments of adult patients with fibromyalgia syndrome (FMS) with age- and sex-matched subjects of the general population.

Variable	FMS sample n=153	General population n=153	Unadjusted comparison	Adjusted comparison Effect size Group	Adjusted comparison Effect size Depression
Emotional abuse CTQ					
Unadjusted (mean, SD)	10.3 (5.7)	6.3 (2.5)	F= 62.1	partial eta ² = 0.05	partial eta ² = 0.05
Adjusted (mean, SD)	9.6 (4.9)	7.1 (2.5)	p<0.0001	p<0.001	p<0.001
Physical abuse CTQ					
Unadjusted (mean, SD)	7.2 (3.7)	5.7 (2.1)	F=19.5	partial eta ² = 0.009	partial eta ² = 0.03
Adjusted (mean,SD)	6.8 (3.3)	6.1 (3.3)	p<0.0001	p=0.09	p=0.001
Sexual abuse CTQ					
Unadjusted (mean, SD)	7.5 (4.7)	5.6 (2.2)	F=19.3	partial eta ² = 0.02	partial eta ² = 0.009
Adjusted (mean, SD)	7.2 (4.1)	5.9 (4.1)	p<0.0001	p=0.01	p=0.10
Emotional neglect					
Unadjusted (mean, SD)	12.4 (6.2)	10.9 (4.8)	F=5.4	partial eta ² = 0.0003	partial eta ² = 0.07
Adjusted (mean, SD)	11.3 (6.1)	12.0 (4.8)	p=0.02	p=0.37	p<0.001
Physical neglect					
Unadjusted (mean, SD)	8.4 (3.8)	8.2 (3.2)	F=0.4	not applicable	not applicable
			p=0.58		

The PHQ 4 is a valid screener for depressive and anxiety disorder (19). Its validity in assessing the severity of depression still needs to be determined. We did not assess if lifetime potentially traumatic events, anxiety and post-traumatic stress disorders which are frequently associated with FMS (8, 30), contributed to group differences in childhood maltreatments. In sum, a more detailed assessment of depressive symptoms by a clinical interview or by a more elaborate questionnaire, e.g. the Hospital Anxiety and Depression Scale (HADS) (31) would have allowed a more extensive investigation of the relationships between symptoms of FMS, depression and posttraumatic stress disorder.

Finally the control group consisted of persons of the general population. An additional control group with patients with other chronic pain syndromes such FMS (e.g. neuropathic pain syndromes) would have been more appropriate to estimate the significance of childhood adversities in chronic pain syndromes.

Conclusions

Biological, psychological and social factors are presumed to interact in the predisposing to, triggering and perpetuating FMS-symptoms (32). This study gives further evidence that childhood sexual abuse may constitute one (not obligatory) predisposition to FMS (6).

Prospective designs, although cumbersome, are needed to clarify the causal mechanisms that can account for observed associations between reports of past sexual abuse and the presence of FMS.

The study demonstrates that patients diagnosed with FMS can differ in various dimensions: Many, but not all FMS-patients report childhood adversities and many, but not all FMS-patients are depressed (33). A recent study defined by cluster analysis a subgroup of FMS-patients distinguished by a history of childhood maltreatment, hypocortisolism and reports of the most pain and disability (34). The definition of distinct FMS-subgroups is necessary to evaluate most appropriate treatment strategies.

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