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One single diagnosis, bodily distress syndrome, succeeded to capture 10 diagnostic categories of functional somatic syndromes and somatoform disorders

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Abstract

Background: In order to clarify the classification of physical complaints not attributable to verifiable, conventionally defined diseases, a new diagnosis of bodily distress syndrome was introduced. The aim of this study was to test if patients diagnosed with one of six different functional somatic syndromes or a *DSM-IV* somatoform disorder characterized by physical symptoms were captured by the new diagnosis. **Method:** A stratified sample of 978 consecutive patients from neurological (n=120) and medical (n=157) departments and from primary care (n=701) was examined applying post-hoc diagnoses based on the Schedules for Clinical Assessment in Neuropsychiatry diagnostic instrument. Diagnoses were assigned only to clinically relevant cases, i.e., patients with impairing illness. **Results:** Bodily distress syndrome included all patients with fibromyalgia (n=58); chronic fatigue syndrome (n=54) and hyperventilation syndrome (n=49); 98% of those with irritable bowel syndrome (n=43); and at least 90% of patients with noncardiac chest pain (n=129), pain syndrome (n=130), or any somatoform disorder (n=178). The overall agreement of bodily distress syndrome with any of these diagnostic categories was 95% (95% CI 93.1–96.0; kappa 0.86, P<.0001). Symptom profiles of bodily distress syndrome organ subtypes were similar to those of the corresponding functional somatic syndromes with diagnostic agreement ranging from 90% to 95%. **Conclusion:** Bodily distress syndrome seem to cover most of the relevant "somatoform" or "functional" syndromes presenting with physical symptoms, not explained by well-recognized medical illness, thereby offering a common ground for the understanding of functional somatic symptoms. This may help unifying research efforts across medical disciplines and facilitate delivery of evidence-based care.

Keywords: Classification; Functional somatic syndromes; Somatoform disorders; CFS; IBS; Chronic pain syndrome

Introduction

Physical complaints not attributable to verifiable, conventionally defined diseases, i.e., functional somatic symptoms, are prevalent in all medical settings, but their classification is contested as numerous overlapping diagnoses and syndrome labels exist [1]. Each medical specialty seems to have its own diagnostic label [2]. Psychiatry uses the designation somatoform disorders, while medical specialties prefer diagnoses like chronic fatigue syndrome (CFS), fibromyalgia, irritable bowel syndrome (IBS), chronic benign pain syndrome or multiple chemical sensitivity (MCS) [2,3]. These diagnoses are referred to as functional somatic syndromes. There is, however, substantial evidence now that the various functional somatic syndromes are not clearly distinct disease entities [2,4–7], but rather represent a common phenomenon [8–10] with different subtypes [11–13]. Similarities have been documented as regards diagnostic criteria [4], etiology [5], pathophysiology [10,14], neurobiology [15–17], psychological mechanisms [18], patient characteristics [2,3], and treatment response [19]. The current fragmented approach to functional somatic symptoms due to the various syndrome diagnoses is an obstacle for research and a hindrance for effective patient care.

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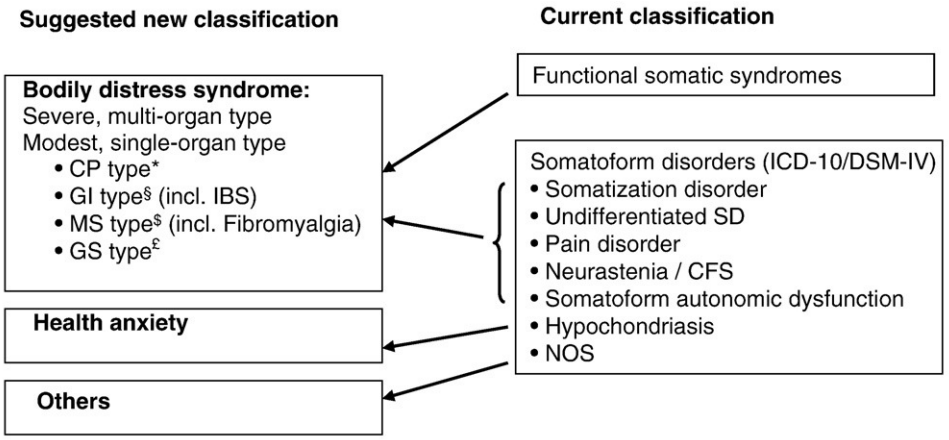
Recently, bodily distress syndrome was introduced as an empirically based diagnosis that may help solve the problem of diagnostic confusion [12]. In contrast to the diagnoses of functional somatic syndromes and the somatoform disorders that have been developed on the basis of highly selected patient populations or just by consensus, the bodily distress syndrome diagnosis is based on a large representative sample of patients recruited from primary care, a neurological and an internal medical setting [12]. The patients were assessed by trained physicians for any physical symptoms and not only for symptoms belonging to a predefined (specialty-specific) symptom list. Furthermore, we applied an exploratory statistical approach that explores the relationship of the symptoms to each other without any presumption regarding symptom clusters. This is in contrast to the confirmatory approach that is very popular in classification research, but which can only confirm a predefined symptom structure. Although functional somatic symptoms form a continuum from few to many symptoms without clear "cut-off" to define the boundary of illness, one distinct bodily distress syndrome could be identified. Bodily distress syndrome could be divided into a severe, multiorgan type and a modest, single-organ type with symptoms primarily from one organ system. The single-organ type was further divided into four subtypes; a cardiopulmonary (CP), a gastrointestinal (GI), a musculoskeletal (MS) and a general symptoms (GS) type (Fig. 1). Since these symptom profiles are in line with various other studies [13,20], the finding of bodily distress syndrome subtypes seems to be quite robust.

We have previously hypothesized that bodily distress syndrome may replace most of the existing diagnostic categories of functional somatic syndromes and those of the somatoform disorders that are characterized by physical symptoms [21] (Fig. 1). This would be preferable to the approach proposed by the *DSM-V* workgroup on somatic symptom disorders which would entail two diagnoses: a "psychiatric" diagnosis on Axis I of "complex somatic symptom disorder" together with a "medical" diagnosis of a functional somatic syndrome on Axis III [22]. We believe that this proposed dual diagnosis solution would be a step backward in terms of attempting to unify the efforts of functional somatic syndrome research and to resolve the current dualistic diagnostic approach [23]. Very few previous studies have examined the overlap of the categories of the functional somatic syndromes and somatoform disorders, and no study to date has examined the unifying bodily distress syndrome approach against current diagnostic categories.

In the current study, we aimed to test whether (1) patients fulfilling criteria for six different functional somatic syndromes and four different somatoform disorders were diagnosed by the new construct of bodily distress syndrome, (2) symptom profiles were comparable between specific functional somatic syndromes and their corresponding bodily distress syndrome subtypes, and (3) comorbidity rates with anxiety and depression differed between "medical" functional somatic syndromes, "psychiatric" somatoform disorders and the unifying bodily distress syndrome diagnosis.



*≥ 3 CP symptoms: Palpitations / heart pounding, precordial discomfort, breathlessness without exertion, hyperventilation, hot or cold sweats, trembling or shaking, dry mouth, churning in stomach / "butterflies", flushing or blushing

§ ≥ 3 GI symptoms: Abdominal pains, frequent loose bowel movements, feeling bloated / full of gas / distended, regurgitations, constipation, diarrhoea, nausea, vomiting, burning sensation in chest or epigastrium

$ ≥3 MS symptoms: Pains in arms or legs, muscular aches or pains, pains in the joints, feelings of paresis or localized weakness, back ache, pain moving from on place to another, unpleasant numbness or tingling sensations

£ ≥3 General symptoms: Concentration difficulties, impairment of memory, excessive fatigue, headache, dizziness

BDS multi-organ type: ≥ 3 symptoms from 3 or 4 of the above symptom groups

BDS single-organ type: ≥ 3 symptoms from 1 or 2 of the above symptom groups, or ≥4 symptoms out of all listed

Fig. 1. Suggested new classification.

Methods

This study is a secondary analysis of three representative samples of patients from primary care (n=1785), internal medicine (n=294) and neurology (n=198). A detailed description of the included samples and study procedures can be found in [12]. We therefore provide only a short overview of how the data on functional symptoms were obtained.

Patients

In a two-phase design, consecutive patients attending their primary care physician or a medical or a neurological department were screened for physical symptoms [24], illness worry [25], and anxiety or depression [26]; those with high scores on any of these instruments were selected for the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) diagnostic interview. In order to produce a stratified sample including low-scorers, we also selected for interview a random sample of one ninth of the remaining primary care patients and one third of the neurological and internal medical patients [12,27–29]. For details on attrition analysis, see [27–31].

The final study population consisted of 978 patients based on the following three samples:

a) *Neurological sample*: 120 patients aged 18 or older [69 (57.5%) women, mean age 49.8 (S.D. 15.4)] referred for the first time for inpatient or outpatient treatment at a neurological service at a general hospital.
b) *Medical sample*: 157 patients aged 18 or older (70 [44.6%] women, mean age 58.6 [SD 16.3]) admitted to the internal medicine service at a general hospital.
c) *Primary care sample:* 701 patients aged 18–65 (466 [66.5%] women, mean age 40.5 [SD 12.7]) consulting 38 family physicians for a new illness problem.

All the participating patients received written and oral information and gave written informed consent.

Procedures

The diagnostic research interview

For the vast majority of patients, the diagnostic interviews were performed within a week after initial contact. We used the World Health Organization (WHO)-endorsed semi-structured SCAN interview, version 2.1 [32], which includes an extensive section on physical health and covers all types of psychiatric disorders. The interviews were performed by one of two research physicians (hospitalized patients) or one of six research physicians (primary care patients). All the interviewers had been certified at the WHO SCAN training centre in Aarhus and had at least 2 years of medical and surgical residency besides psychiatric residency. Inter-rater agreement between these different interviewers for *ICD-10* somatoform disorders and other psychiatric diagnoses was found to be high (kappa=0.86 in the neurological/medical sample, and 0.88 in the primary care sample) [27,31].

The physical health chapter of the SCAN interview explores 76 physical symptoms distributed on eight symptom groups: pain, gastrointestinal, cardiopulmonary, urogenital, neurological, skin/glands, autonomic, and fatigue symptoms. The interviewers rated each symptom as absent or present, i.e., bothersome for the patient or attracting medical attention at some point during the past two years. Symptoms rated as present (in total 9346 symptoms in the 978 patients) were further divided into those attributable to a medical condition or side-effect of medication (n=2664; 28.5%), and those who were judged to be "functional," i.e., to represent body distress rather than well-recognized medical illness (n=5303; 56.7%). A minority of symptoms (n=1379; 14.8%) could not reliably be allocated to one of these groups; these were excluded from all analyses in this study. Only "functional" somatic symptoms were counted as physical symptoms in the diagnostic algorithms. We tried to warrant the clinical relevance of our findings by: first, mimicking the clinical situation, where physical symptoms are always interpreted in their context (e.g., abdominal pain and diarrhea would not trigger an IBS diagnosis in a patient with inflammatory bowel disease, and transient severe fatigue associated with a flu would not give rise to suspicion of chronic fatigue syndrome); and second, allowing for comorbidity of the explored diagnoses with medical conditions (e.g., a patient with coronary heart disease may be diagnosed with fibromyalgia, but not with noncardiac chest pain).

The interviewers were free to explore aspects that were not fully clarified in the interview, e.g., by reviewing medical records or discharge letters, or by consulting relevant specialists.

Diagnostic categories

The data from the SCAN interviews were used to derive computerized diagnoses. We explored six functional somatic syndromes: CFS, fibromyalgia, irritable bowel syndrome (IBS), non-cardiac chest pain, hyperventilation syndrome, and chronic pain syndrome. Diagnostic algorithms were constructed on the basis of existing clinical and research criteria [33–37] and in accordance with previous studies investigating overlap of several functional somatic syndromes [6,38]. Diagnostic criteria and algorithms for the six functional somatic syndromes are shown in Appendix A. We did not explore all possible syndromes, for instance MCS (multiple chemical sensitivity) and chronic WAD (whiplash associated disorder), as we could not establish these diagnoses based on the SCAN interview. Furthermore, we did not use diagnoses defined by one single symptom (e.g., tension headache).

The *DSM-IV* somatoform disorders were generated by the SCAN algorithms developed by the WHO, using current research criteria [39]. These are based not only on "functional" physical symptoms, but also on psychological characteristics. We included only those somatoform

disorders that are primarily (i.e., according to criterion A [39]) defined by physical symptoms: somatization disorder (300.81), undifferentiated somatoform disorder (300.82), pain disorder associated with psychological factors (307.80), and conversion disorder (300.11), excluding hypochondriasis, body dysmorphic disorder, and somatoform disorder not otherwise specified.

Bodily distress syndrome diagnoses were based on diagnostic algorithms reported by Fink et al. [12]. The bodily distress syndrome diagnosis is based on four organ subtypes or symptom clusters: musculoskeletal (MS), gastrointestinal (GI) CP, and GS. These organ subtypes do not demand a specific symptom but are defined by at least three symptoms from the "organ system" of interest (Fig. 1). The symptoms accounting for each organ subtype are shown in Fig. 1 and Appendix A. On the basis of these four organ subtypes and one additional category defined by the presence of at least four of the 30 symptoms used to define the organ subtypes, the bodily distress syndrome is divided into a modest, single-organ, and a severe, multiorgan type (Fig. 1 and Appendix A).

To exclude cases without clinical relevance, the functional somatic syndromes, somatoform disorders and bodily distress syndrome diagnoses were only assigned to patients with modest or severe impairment due to functional somatic symptoms, based on the clinical judgment of the interviewer.

Depressive disorder was defined as patients fulfilling *ICD-10* diagnostic criteria for F31.3–5, F32, F33.0–3, F33.8–9 and anxiety disorder F40.0–42.9.

Statistical analysis

Data were processed in STATA version 9 [40]. We calculated percentages for patients fulfilling diagnostic criteria for single functional somatic syndromes and for the overlap of diagnostic categories. In addition, we calculated diagnostic agreement and kappa values for the bodily distress syndrome category with any of the explored diagnoses and for the four bodily distress syndrome organ subtypes with their corresponding functional somatic syndromes. In the latter analysis, all patients reaching criteria for the explored functional somatic syndromes and the explored organ subtype were included, regardless of whether the patients belonged to the modest, single-organ or the severe, multiorgan type. To reduce complexity in figures and tables, we combined the four somatoform disorder diagnoses into one "any somatoform disorder" diagnostic category.

Symptom profiles were plotted for bodily distress syndrome organ subtypes and their corresponding functional somatic syndromes and were analyzed on the basis of their visual convergence or divergence.

Weighted prevalences were calculated according to previously reported methods [12]. These prevalences refer to the original sample of 2277 consecutive patients from primary care, internal medicine, and neurology.

Finally, we calculated percentages for comorbidity with *ICD-10* anxiety and depressive disorders and for the presence of two psychological features that are often described as core phenomena of somatoform disorders (namely, "preoccupation with physical symptoms" and "refusal of medical reassurance") in each of the explored diagnoses and in bodily distress syndrome.

Ethical approval

The Science Ethics Committee of the Central Denmark Region approved this study.

Results

Table 1 shows that all the patients except one reaching criteria for Fibromyalgia, CFS, IBS, or hyperventilation

Table 1
Agreement between bodily distress concept and various functional somatic syndromes (only impairing disorders/syndromes)

	Fibromyalgia (*n*=58)	CFS (*n*=54)	IBS (*n*=43)	Chest pain (*n*=129)	Hypervent. syndrome (*n*=49)	Pain syndrome (*n*=130)	Any Som. disorder (*n*=178)	Any Func. som. syndr. or som. dis. (*n*=242)
	n/%	*n*/%	*n*/%	*n*/%	*n*/%	*n*/%	*n*/%	*n*/% of BS
Bodily distress	58	54	42	123	49	122	160	220
syndrome (*n*=250)	100.0	100.0	97.7	95.3	100.0	93.8	89.9	88.0
Multi-organ	25	28	21	39	21	35	43	55
type (*n*=57)	43.1	51.9	48.8	30.2	42.9	26.9	24.2	96.5
Single-organ	33	26	21	84	28	87	117	165
type (*n*=193)	56.9	48.1	48.8	65.1	57.1	66.9	65.7	66.0
CP subtype (*n*=60)	5	7	5	38	18	25	33	53
	8.6	13.0	11.6	29.5	36.7	19.2	18.5	21.2
GI subtype (*n*=46)	4	5	19	26	4	19	25	41
	6.9	9.3	44.2	20.2	8.2	14.6	14.0	16.4
MS subtype (*n*=71)	27	18	3	24	5	41	48	60
	46.6	33.3	7.0	18.6	10.2	31.5	27.0	24.0
GS subtype (*n*=66)	15	16	3	29	5	29	46	59
	25.9	29.6	7.0	22.5	10.2	22.3	25.8	23.6

syndrome as defined by our diagnostic algorithms also fulfilled diagnostic criteria for Bodily distress syndrome. Among the patients diagnosed with any of the *DSM-IV* somatoform disorders presenting with physical symptoms, 89.9% qualified for the bodily distress syndrome diagnosis. For the remaining functional somatic syndromes explored, this was the case in between 93.8% and 95.3% of the patients.

The overlap of any functional somatic syndrome with any somatoform disorder and with the new bodily distress syndrome diagnosis is displayed in Fig. 2, which also shows that 272 patients reached criteria for at least one of the explored diagnoses and that there is a huge diagnostic overlap. Of the patients diagnosed with either somatoform disorder or functional somatic syndrome, only 22 (9.1%) out of 242 did not reach criteria for bodily distress syndrome [18 of 178 (10.1%) among the somatoform disorder patients and 12 of 221 (5.4%) among the functional somatic syndrome patients]. Conversely, 30 patients (11.0%) diagnosed with bodily distress syndrome did not fulfill diagnostic criteria for any of the ten explored functional somatic syndromes or somatoform disorders. The overall agreement of the bodily distress syndrome diagnosis with any functional somatic syndromes or somatoform disorders combined was 94.7% (95% CI 93.1–96.0), which corresponds to a kappa of 0.86 ($P<.0001$).

Organ subtypes of the modest, single-organ bodily distress syndrome category are presented in Table 1. It is seen that the vast majority of patients with IBS (93.0%) was captured either by single-organ bodily distress syndrome, GI subtype or multiorgan bodily distress syndrome. Likewise, 89.7% of the fibromyalgia patients were diagnosed with either single-organ bodily distress syndrome, MS subtype, or multiorgan bodily distress syndrome, and 81.5% of the CFS patients reached criteria for either single-organ bodily distress syndrome, GS subtype or multiorgan bodily distress syndrome. The corresponding overlap of non-cardiac chest pain and hyperventilation syndrome with

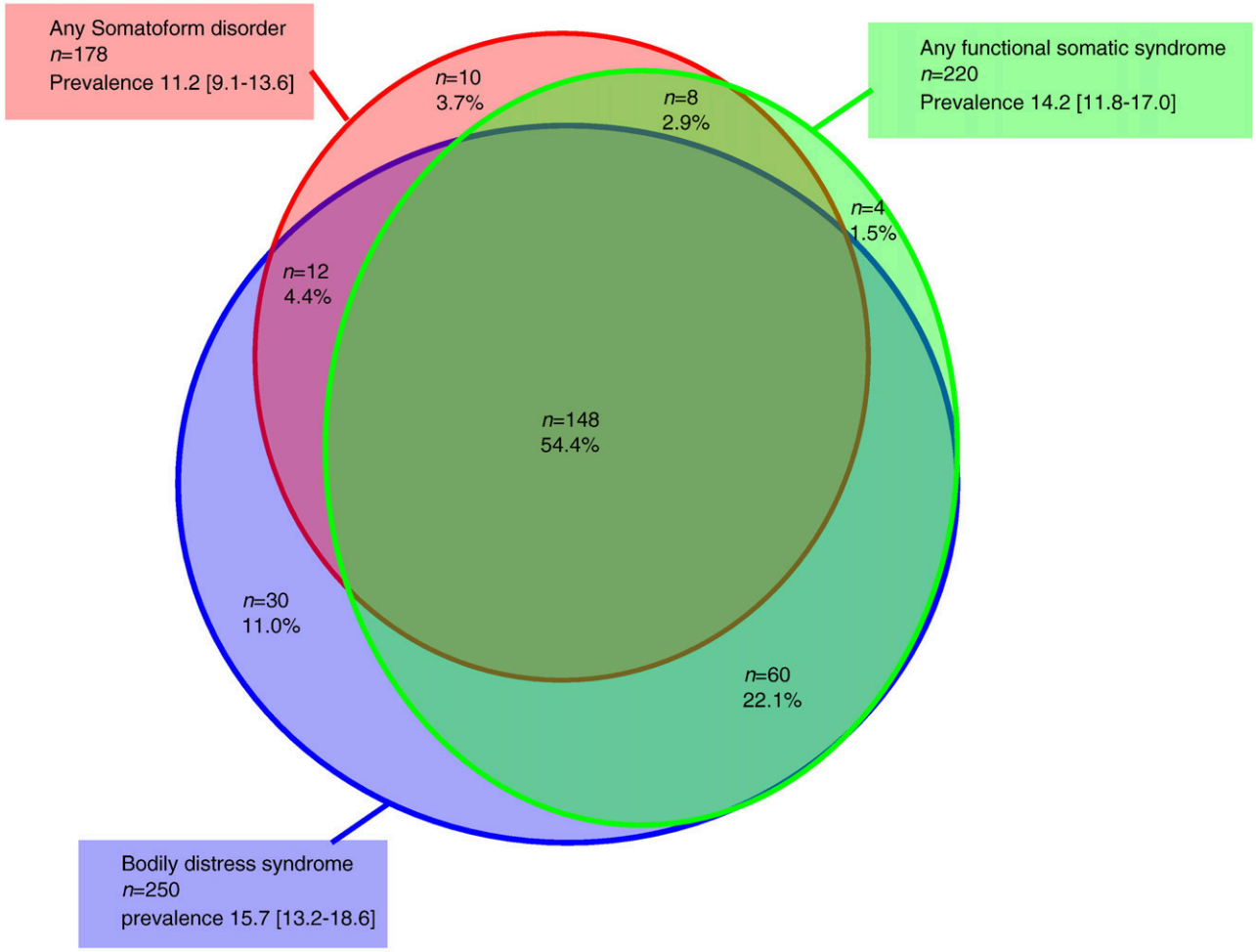


Fig. 2. Diagnostic overlap of bodily distress syndrome with the explored diagnostic categories. Within the circles, percentages indicate how many of the patients reaching criteria for any of the explored diagnostic categories (n=272) belong to a subgroup of diagnostic overlap. For instance, 30 (11%) of the 272 patients are diagnosed with bodily distress syndrome, but not with any somatoform disorder or any of the explored functional somatic syndromes. Within the boxes, corrected prevalences (95% CI) for combined diagnoses refer to the original sample of consecutive patients from primary care, internal medicine and neurology (n=2277).

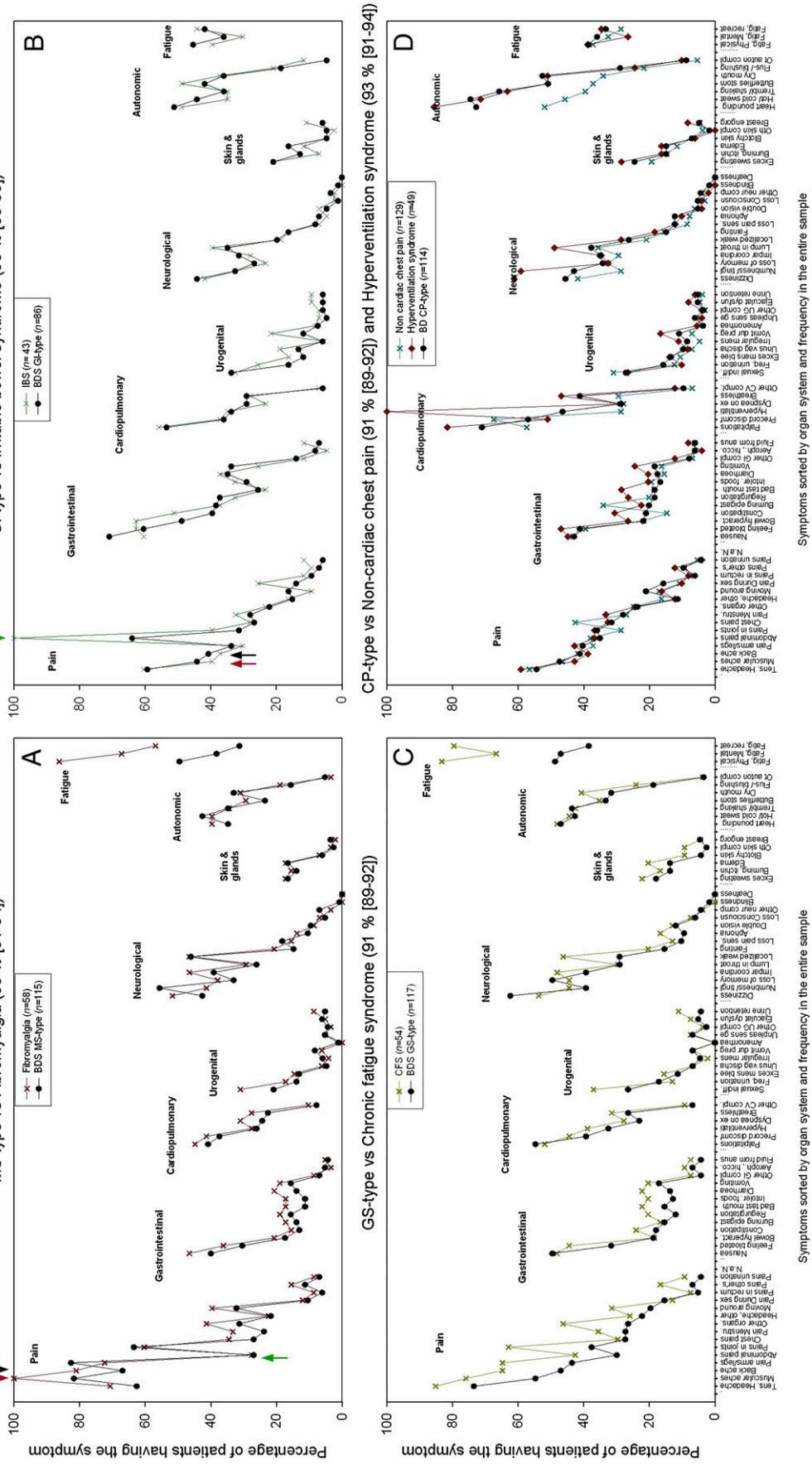


Fig. 3. Diagnostic agreement with 95% CIs is given in parentheses. In (A), all patients reaching criteria for the bodily distress syndrome (BDS) MS-type are compared with patients fulfilling the diagnostic algorithm for fibromyalgia. On the x-axis, symptoms are ordered by organ system, and within each organ system, by their frequency in the entire sample. On the y-axis, the percentage of patients within each diagnosis who have a specific symptom is indicated. Core symptoms for each syndrome or organ-subtype are expected to show high frequency in patients having the syndrome, while symptoms not part of the syndrome definition are expected to be less prevalent. It is seen that muscle pain (indicated by red arrows) is highly prevalent in fibromyalgia and BDS MS-type (A), but not irritable bowel syndrome or BDS GI-type (B). Accordingly, abdominal pain (green arrows) is more prevalent in patients with IBS or BDS GI-type than in patients with fibromyalgia or BDS MS-type. However, back pain (black arrows), which is part of the BDS MS-type algorithm only, is highly prevalent in both fibromyalgia and BDS MS-type (Panel A), but not in irritable bowel syndrome or BDS GI-type (Panel B). Similar patterns are seen for other comparisons. This means that both functional somatic syndromes and bodily distress syndrome organ subtypes are able to capture subgroups of patients that are characterized by specific symptom profiles, with the criteria for bodily distress syndrome organ subtypes describing patients' actual symptoms more precisely than corresponding functional somatic syndrome definitions (e.g., back pain in not part of the diagnostic criteria of fibromyalgia). Moreover, the requirement of one specific core item (e.g., abdominal pain in IBS) excludes large groups of patients that do not have this specific symptom, but otherwise an identical symptom pattern (e.g., GI-type captures twice as many patients as the IBS diagnosis).

Table 2
Number of functional somatic syndromes (out of seven)

No. of functional somatic syndromes *	Bodily distress syndrome			
	No	Single-organ type	Multiorgan type	Total
0	706	28	2	736
1	14	42	3	59
2	7	55	7	69
3	1	42	11	54
4	0	19	13	32
5	0	7	11	18
6	0	0	8	8
7	0	0	2	2

* Any somatoform disorder was included as additional category.

single-organ bodily distress syndrome, CP subtype, and multiorgan bodily distress syndrome was 59.7% and 79.6%, respectively (Table 1).

Fig. 3 shows diagnostic agreement and compares symptom patterns of bodily distress syndrome organ subtypes with their corresponding functional somatic syndromes. It appears that the symptom profiles for various functional somatic syndromes are quite similar to those of the corresponding bodily distress organ subtypes. This indicates that the diagnoses of bodily distress syndrome and their corresponding functional somatic syndromes include largely the same type of patients, which is also supported by the finding of high diagnostic agreement between different definitions ranging from 91% to 95% (Fig. 3. A-D).

Table 2 shows that most of the patients fulfilling diagnostic criteria for one of the seven functional somatic syndromes assessed in this study (we included "any somatoform disorder" as one additional functional somatic syndrome category) fulfilled diagnostic criteria for more than one diagnosis. Only 24.4% (59 out of 242) of the patients received just one syndrome diagnosis, while 47.1% (114 out of 242) reached criteria for three or more of the seven functional somatic syndromes. As expected, patients diagnosed with bodily distress syndrome single-organ type were diagnosed with fewer functional somatic syndromes than patients with multiorgan bodily distress syndrome.

The comorbidity with depression and anxiety was high in most of the syndromes displayed in Table 3, ranging from 33.1% to 51.0% for depression and from 27.6% to 67.3% for anxiety disorders. With the exception of hyperventilation syndrome showing the strongest association with both depression and anxiety, comorbidity rates were quite similar across syndromes. Moreover, comorbidity rates did not differ markedly between the "medical" functional somatic syndromes and the "psychiatric" somatoform disorders, and the strongest associations were seen for the functional somatic syndromes and not for the somatoform disorders. This was also the case for the explored psychological features: "preoccupation with physical symptoms" was highly prevalent in all the explored diagnoses—multiorgan bodily distress syndrome showing the strongest association—while "refusal of medical reassurance" was found in one third to one half of the patients, regardless of diagnostic category.

Table 3 also provides weighted prevalences for the explored diagnostic categories, referring to the entire original sample of 2277 consecutive patients from primary care, internal medicine, and neurology. Weighted prevalences for combined diagnoses are shown in Fig. 2. While prevalences for functional somatic syndromes ranged from 2.6% for hyperventilation to 8.6% for pain syndrome, combined diagnoses showed quite similar prevalences in

Table 3
Depression and anxiety comorbidity and psychological features in various syndromes

	Fibromyalgia (*n*=58)	CFS (*n*=54)	IBS (*n*=43)	Chest pain (*n*=129)	Hypervent. Syndrome (*n*=49)	Pain syndrome (*n*=130)	Any som. disorder (*n*=178)	Bod. distr. syndr. multiorgan (*n*=57)	Bod. distr. syndr. single-organ (*n*=193)
	pr=3.7 (2.6–5.3)	pr=2.9 (2.2–3.8)	pr=2.8 (1.9–4.3)	pr=7.7 (6.2–9.5)	pr=2.6 (1.9–3.5)	pr=8.6 (6.7–10.9)	pr=11.2 (9.1–13.6)	pr=3.6 (2.5–5.1)	pr=12.1 (10.0–14.7)
	n/%	n/%	n/%	n/%	n/%	n/%	n/%	n/%	n/%
Comorbid diagnoses									
Depression (*n*=181)	21	23	19	51	25	43	59	24	69
(total 18.5%)	36.2	42.6	44.2	39.5	51.0	33.1	33.1	42.1	35.8
Anxiety (*n*=181)	16	21	21	46	33	44	59	31	51
(total 18.5%)	27.6	38.9	48.8	35.7	67.3	33.8	33.1	54.4	26.4
Psychological features									
Preoccupation with physical	42	39	27	74	28	81	94	43	97
symptoms (*n*=274, total 28.0%)	72.4	72.2	62.8	57.6	57.1	62.3	52.8	75.4	50.3
Refusal of medical reassurance	26	24	22	47	19	51	55	29	54
(*n*=148, total 15.1%)	44.8	44.4	51.2	36.4	38.8	39.2	30.9	50.9	28.0

pr indicates prevalences (95% CI) in the original sample of consecutive patients from primary care, internal medicine and neurology (*n*=2277).

the entire sample (range 11.2–15.7%, Fig. 2). However, bodily distress syndrome was slightly more prevalent than both any functional somatic syndrome and any somatoform disorder (Fig. 2).

Discussion

In this secondary analysis of a large epidemiological study, the proposed diagnostic concept of bodily distress syndrome included nearly all patients who fulfilled criteria for one of six functional somatic syndromes as defined by our diagnostic algorithms, or for one of the *DSM-IV* somatoform disorders characterized by physical symptoms. Furthermore, the subcategories of bodily distress syndrome single-organ type seemed to be supported by their close relationship with the corresponding functional somatic syndromes in terms of overlapping diagnostic criteria, marked diagnostic agreement and similar symptom profiles. We found a large overlap between functional somatic syndromes and somatoform disorder diagnoses, and nearly half of the patients met criteria for three or more of the explored diagnoses. This supports numerous other studies that question the existence of functional somatic syndromes as distinct diagnoses [2,4–7]. On the other hand, our study could identify patients who qualified for only one or two diagnostic labels. The bodily distress syndrome concept seems to provide a solution for these contradictory findings, since functional syndromes are conceptualized as both a common phenomenon, but at the same time allowing distinct subtypes.

Our study does not support the presumption that "psychiatric" somatoform disorders as defined by *DSM-IV* are more strongly linked to psychiatric comorbidity or distinctive psychological features than "medical" functional somatic syndromes. Furthermore, since we were able to capture patients with these psychological features only by means of the physical symptom profiles of bodily distress syndrome, it may not be necessary to include those characteristics in the diagnostic criteria [22]. Our results indicate that such an approach would split bodily distress patients into groups of "with" and "without" manifest psychological features, thereby perpetuating the current diagnostic confusion with parallel and overlapping "medical" and "psychiatric" diagnoses, which is not helpful in treatment planning [19]. It has been shown, for instance, that "psychological" treatments are effective in functional somatic syndromes, regardless of the level of psychiatric comorbidity [41]. One of the major advantages of the bodily distress syndrome diagnosis may actually be that it is not based on psychological features. The vast majority of (non-psychiatric) physicians who are often unfamiliar with exploring complicated or "hidden" behavioural and psychological phenomena could benefit from the new diagnosis, and it may also be acceptable to physicians and patients who are reluctant to give or accept a psychiatric diagnosis for physical symptoms. However, this does not mean that specific behavioral or psychological characteristics of the patients may not be helpful in supporting the diagnostic process, predicting outcome or targeting treatment to individual patients. Therefore, these features should routinely be assessed in specialist settings but, in our opinion, need not to be part of a syndrome definition.

Overall, this large epidemiological study provides some empirical evidence for our previous suggestions for a new classification of functional somatic syndromes, since our findings indicate that the numerous syndrome diagnoses used in different specialties as well as the somatoform diagnoses characterized by physical symptoms may simply be replaced by one single diagnostic category (Fig. 1).

Compared with alternative diagnostic proposals that have been suggested [42–44], the bodily distress syndrome concept may have several advantages. First, it introduces a multiorgan and four single-organ types. This may resolve the intensively discussed problem of comorbidity between various functional somatic syndromes [2]. For IBS patients, for instance, the bodily distress syndrome multiorgan type may represent those with comorbid functional somatic syndromes [45] or with "extra GI symptoms" [46], while the single-organ GI-type represent those with "pure" IBS. Second, the bodily distress syndrome diagnosis provides a common, non–specialty-specific ground to understand the phenomenon of persistent and disabling physical symptoms not attributable to well-defined medical disease, which will make it easier to communicate and collaborate across specialties. Finally, the bodily distress syndrome diagnosis may have the potential to facilitate patient care given that very similar treatments have been shown to be effective in various functional somatic syndromes [47–51] and somatoform disorders [19,52,53]. It may be easier to deliver these treatments if patients currently receiving various diagnostic labels are given the same diagnosis. At the same time, the bodily distress syndrome subtypes may allow further research into the pathophysiological mechanisms and neurobiological disturbances underlying different types of symptoms such as fatigue, muscle pain or abdominal discomfort [54]. In summary, the bodily distress syndrome diagnosis represents a balanced approach to the discussion on whether there is only one functional somatic syndrome [2,55], because it suggests that it is not a question of "either-or", but rather "and" as the condition is both a common phenomenon and has distinct sub-syndromes.

Limitations

The generalizability of this study may be diminished by two potential limitations. First, we explored the overlap of bodily distress syndrome with existing functional somatic syndromes and somatoform disorder diagnoses in the same sample in which the bodily distress syndrome diagnosis

was established. This may enhance the performance of the bodily distress syndrome construct in this specific sample due to statistical over-fitting. The diagnostic criteria need therefore to be tested in other clinical samples including patients diagnosed with various syndromes. However, to explore overlap and define boundaries between diagnostic constructs, it is vital to study unbiased populations that have not been sampled based on the phenomenon under scrutiny. Therefore, following the first step of our previous study [12], the current study is an essential second step in the construction of a novel, unifying diagnosis [56], but new epidemiological studies are needed to finally prove our hypothesis.

Second, functional somatic syndrome diagnoses were provided post-hoc on the basis of diagnostic algorithms translating diagnostic criteria into the symptom list of the SCAN diagnostic interview (Appendix A). Our choice of syndrome definitions may be questioned, as may the explored time period of the preceding two years, which contrasts the diagnostic criteria of some functional somatic syndromes [33,35]. We defined this time period to reduce artificial differences between the diagnostic categories that would be explained solely by arbitrarily defined time periods. For the same reason, we added the criterion of impairing illness to all diagnostic algorithms, thereby ensuring that our study was focused on clinically relevant cases, i.e., patients who were bothered by their symptoms and/or were in need of medical care. Although our algorithms hence may have captured slightly more or less cases with, e.g., IBS or fibromyalgia than would have been the case if we had been able to apply exact research criteria, it is very unlikely that patients captured by our algorithms differed largely from "representative" patients with IBS or fibromyalgia. Even within the fields of specific functional syndromes, the applied diagnostic criteria differ across studies, and while, e.g., the currently used Rome III criteria are not even validated [35], leading rheumatologists argue for the validity of a fibromyalgia diagnosis based on questionnaires [34]. Our study does not go so far beyond the clinical situation as many other epidemiological studies that use questionnaires or laymen interviews, since we established diagnoses of functional somatic syndromes by means of a semistructured interview carried out by trained physicians, who were able to interpret patients' physical complaints in their context [57]. Therefore, we were not forced to exclude patients with (comorbid) physical or mental diseases, which is a major strength of our study. If bodily distress syndrome is a disorder of its own as we hypothesize, it may occur together with both organic conditions and psychiatric disorders. However, a more detailed analysis of these comorbidity patters would require a new study.

We do not provide data on the feasibility of the new bodily distress syndrome diagnosis. However, we have used these criteria at our specialized university department for about 5 years, and it is our clinical experience that the diagnosis is well accepted by patients as well as physicians of various specialties. One of the great advantages is that the concept is balanced and easy to explain to both patients and health professionals.

Implications

Unifying the functional somatic syndromes and the somatoform disorders presenting with physical symptoms into one, single diagnostic category, would have wide consequences for research, teaching and patient management. It would imply acknowledgement of bodily distress syndrome as a distinct disorder of its own that is neither a subtype of anxiety or depression, nor a psychological phenomenon or a social process that may be relevant for all kinds of illness. To date, the efforts to improve the assessment and treatment of patients suffering from functional/somatoform disorders are fragmented across research branches and medical specialties [1,21]. We believe that the bodily distress syndrome concept, as an empirically derived, balanced approach, may have the potential to help bridging the gap between medicine and psychiatry. Nevertheless, we acknowledge that abolishing the various functional somatic syndromes and somatoform disorder diagnoses and merging them into one diagnostic construct may prove difficult to achieve as strong academic and economic interests are involved [58,59]. A first step in this process is to provide physicians with a good and feasible non-stigmatizing alternative. We believe that bodily distress syndrome has the potential of being just that.

Conclusion

The empirically established bodily distress syndrome diagnosis covered the whole range of functional somatic syndromes and somatoform disorders explored in this study and may have the potential to replace numerous overlapping diagnostic labels and to reduce the diagnostic confusion that currently prevails in the field of functional somatic syndromes. The bodily distress syndrome concept offers a common language and ground for the understanding of functional somatic symptoms. This may open up for unifying the efforts of functional somatic syndrome research across research branches and may facilitate the delivery of evidence-based care across medical specialties.

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Appendix A. Operational definition of bodily distress syndrome* and of the explored functional somatic syndromes†

	Musculoskeletal symptoms subtype	General symptoms subtype	Gastrointestinal symptoms subtype	Cardiopulmonary symptoms subtype	Bodily distress syndrome, single-organ type	Bodily distress syndrome, multiorgan type
Included symptoms§ (SCAN items)/ included subtypes (criteria)	Pains in arms or legs (2.014) Muscular aches and pains (2.013) Pains in the joints (2.015) Feelings of paresis or localized weakness (2.055) Back ache (2.012) Pain moving (2.023) Unpleasant numbness or tingling sensations (2.058)	Concentration difficulties (7.001), Impairment of memory (2.066), Excessive fatigue (2.087 OR 2.088), Headache (2.010), Dizziness (2.063)	Abdominal pains (2.017) Frequent loose bowel movements (2.029) Feeling bloated/ full of gas/ distended (2.027) Regurgitations (2.026) Constipation (2.028) Diarrhea (2.030) Nausea (2.024) Vomiting (2.025) Burning sensation in chest or epigastrium (2.034)	Palpitations/heart pounding (2.037 OR 2.074) Precordial discomfort (2.038) Breathlessness without exertion (2.039) Hyperventilation (2.041) Hot or cold sweats (2.075) Trembling or shaking (2.076) Dry mouth (2.077) Churning in stomach/ "butterflies" (2.079) Flushing or blushing (2.078)	MS-subtype (≥3 MS symptoms) GS-subtype (≥3 GS symptoms) GI-subtype (≥3 GI symptoms) CP-subtype (≥3 CP symptoms)	MS-subtype (≥3 MS symptoms) GS-subtype (≥3 GS symptoms) GI-subtype (≥3 GI symptoms) CP-subtype (≥3 CP symptoms)
Diagnostic algorithm	At least three of the above symptoms and impairment (2.123)	At least three of the above symptoms and impairment (2.123)	At least three of the above symptoms and impairment (2.123)	At least three of the above symptoms and impairment (2.123)	1 or 2 of the above symptom groups, or at least 4 of all listed symptoms and impairment (2.123)	3 or 4 of the above symptom groups and impairment (2.123)

* The Bodily distress syndrome algorithms are based on an explorative statistical approach [12].

† The functional somatic syndrome algorithms were previously developed to establish syndrome diagnoses on the basis of the SCAN for a clinical trial, i.e., independently from the Bodily distress syndrome algorithms (unpublished data).

	Fibromyalgia (Survey criteria)	CFS (Fukuda 1994)	IBS (Rome I)	Non-cardiac chest pain (Clinical criteria)	Hyperventilation syndrome (Clinical criteria)	Pain syndrome (Global rating)
Main criterion§ (SCAN-items)	Persistent muscular aches and pains (2.013)	Persistent fatigue (2.087 OR 2.088 OR 2.089)	Abdominal pain (2.017)	Chest pains (2.016 OR 2.034 OR 2.038)	Hyperventilation (2.041)	Pain syndrome¶ (2.098)
Additional criteria§ (SCAN-items)	Persistent aches and pains in other non-articular regions (2.016 OR 2.018 OR 2.029) Non-restorative sleep (2.087 OR 2.088 OR 2.089)	Impaired memory or concentration (2.066 OR 7.002) Sore throat (2.022) Tender lymph nodes (2.073) Muscle pain (2.013) Multi-joint pain (2.015) Headaches (2.010 OR 2.011) Unrefreshing sleep (8.012) Post-excertion malaise (2.089)	Altered stool frequency (2.028 OR 2.029 OR 2.030) Altered stool form (2.028 OR 2.029) Altered stool passage (2.029 OR 2.030) Passage of mucus per rectum (2.031) Bloating or distention (2.027)	—	Heart pounding (2.037 OR 2.074) Dizziness/Fainting (2.063 OR 2.064) Numbness/tingling sensations (2.058) Trembling (2.076)	—
Diagnostic algorithm	Muscular pains and pains in other regions and non-restorative sleep and impairment (2.123)	Persistent fatigue and at least four additional criteria and impairment (2.123)	Abdominal pain and at least two additional criteria and impairment (2.123)	Chest pain and impairment (2.123)	Hyperventilation and at least two additional criteria and impairment (2.123)	As indicated by the interviewer and impairment (2.123)

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Notes to Appendix A:

[§] According to the SCAN rules, symptoms were rated as: 0/missing=not present; 1=functional, i.e. present and not attributable to a well-defined medical condition; 9=attributable to a well-defined medical condition; 8=unable to make this distinction. Interviews were performed by trained physicians. Only symptoms rated as functional (code 1) were used by the algorithms.

[¶] The predominant symptom of persistent and distressing pain. This diagnosis is mainly based on the interviewers' judgment, and not on additional criteria, and hence covers several sub-syndromes such as low back pain or chronic pelvic pain.

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