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The distribution of somatic symptom disorder and bodily distress syndrome in general hospital outpatients in China: A multicenter cross-sectional study

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ABSTRACT

Objective: To investigate the distribution of somatic symptom disorder (SSD) and bodily distress syndrome (BDS) and analyze the differences in psychosocial characteristics of patients with the two diagnoses.
Methods: A total of 694 general hospital outpatients completed the diagnostic interviews for SSD and BDS, and a set of questionnaires evaluating their psychosocial characteristics. A secondary analysis of these data is done.
Results: SSD and BDS had a moderate overlap (kappa value = 0.43). Patients who fulfilled both SSD and BDS diagnosis showed significantly higher levels of symptom-related psychological distress (SSD-12), somatic symptom severity (PHQ-15), depression (PHQ-9), and general anxiety (GAD-7), as well as lower mental and physical quality of life (SF-12) compared to patients with neither diagnosis and patients with only one diagnosis. Patients with either diagnosis were associated with significantly higher psychosocial impairments as compared to those with neither diagnosis. Patients who only met SSD had higher SSD-12 scores, whereas those with only BDS had higher PHQ-15 scores ($p < 0.001$).
Conclusions: SSD and BDS appear to represent somewhat different psychopathologies, with SSD more associated with psychological distress and BDS associated with greater experience of somatic symptoms. Patients fulfilling both diagnosis show higher symptom severity in various psychosocial aspects.

1. Introduction

Medically unexplained symptoms or functional somatic syndromes are common in general hospital outpatients. Patients often report multiple somatic symptoms and different symptom groups could be identified [1,2]. Regardless of the etiology, the quality of life and functional level of patients can be significantly affected by the persistent physical symptoms. This results in repeated visits to hospitals, excessive examination and treatment, difficult doctor-patient relationships and high socio-economic costs [3]. Different attempts have been developed to unify the perspective on the understanding and management of somatic symptoms [4–6]. In 1980, the 3rd version of Diagnostic and Statistical Manual of Mental Disorders (DSM)-III firstly introduced the concept of "somatoform disorders" to unify the different diagnostic criteria in

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specialized medicine [7]. Due to conceptual, philosophical, experiential and practical issues, the concept of somatoform disorders has been reconceptualized in recent years [8].

In 2013, the DSM-5 introduced the concept of somatic symptom disorder (SSD), which was defined as having one or more bothersome somatic symptoms (A criterion), persisting for at least 6 months (Criterion C) and accompanied by excessive thinking, feeling, and/or behaviors (Criterion B) [9]. With this new diagnosis, the distinction between medically explained (organic disorder) and medically unexplained symptoms (functional disorder) was eliminated. Concurrently, bodily distress syndrome (BDS) was first proposed by Fink et al., aiming to unify a diagnostic category that could cover majority of functional symptoms and diseases [10]. The BDS has been proven to capture the majority of functional somatic syndromes, such as fibromyalgia syndrome, functional gastrointestinal disease and chronic fatigue syndrome [11]. >90% of patients suffering from functional somatic syndromes or somatoform disorders met the diagnostic criteria of BDS [12]. The SSD concept explicitly includes psychological criteria and deemphasizes the central role of symptoms per se [13], whereas BDS focuses on the assessment of borthersome somatic symptoms and lack the assessment of additional psychological and behavioral characteristics [14].

The prevalence of SSD was reported in a wide range from 5% to 93.1% [15]. The prevalence is dependent on different settings and different definitions of the specification of SSD severity [13,16]. In our former study, the prevalence of SSD was 40.2%, 19.0% and 42.1% in the modern biomedical settings, Traditional Chinese Medicine (TCM) departments and psychosomatic departments, respectively [13]. An early study found that for one B criterion, the prevalence of SSD in the medical disease subgroup was 5.8%, whereas 7.3% for >1 B criterion [17]. As to BDS, only few studies used BDS-checklists to investigate its prevalence. In our former study, the prevalence of single-organ BDS was 5.8% and 20.9% for multi-organ BDS [18]. Petersen and colleagues investigated the prevalence of BDS in the Danish general population, found 16.1% fulfilled the criteria for BDS [11]. Previous researches on the distribution of SSD and BDS in the sample of general population found a small overlap between them [19,20]. There is currently a lack of clinical study to evaluate SSD and BDS in the same clinical sample.

Psychosomatic medicine in China has been growing fast in the recent years [21]. We launched a validation study to explore the frequency of SSD and BDS in China [22]. We have validated the diagnostic criteria for SSD and BDS [23,24]. In our former study in general hospital outpatients, both SSD and BDS were investigated and had a prevalence of 33.9% and 26.8% respectively [13,18]. Studies suggested the need to distinguish between SSD and BDS [19,20,25]. One meta-analysis has emphasized the interoceptive inaccuracy in patients with functional somatic syndromes (which have high convergence with BDS), whereas unchanged in patients with SSD [26,27]. The SSD diagnosis on the other hand focuses on psychological characteristics, as showing by the fact that health anxiety (which may have slight or no physical symptoms) is included in the "somatic symptom and related disorders" category [9]. So although there is an consensus on the biopsychosoical approach to both BDS and SSD [28], we hypothesize that these two diagnosis may capture different psychopathologies. An investigation of the distribution of SSD and BDS is therefore meaningful. In the present study, a secondary analysis is done: (1) to investigate the distribution of SSD and BDS in the same sample of general hospital outpatients; (2) to analyze the differences of psychosocial characteristics between patients fulfilling different diagnoses; (3) to predict the occurrence of SSD and BDS and explore the cutoff points of SSD-12 and PHQ-15 for case finding in clinical settings.

2. Materials and methods

2.1. Participants

All patients were admitted between May 2016 and March 2017 in the outpatient clinics of nine tertiary hospitals in Beijing, Jincheng, Shanghai, Wuhan, and Chengdu (located in North, North-Central, East, Central, and West of China). Among them, gastroenterology and neurology departments were selected to represent the modern biomedical settings. The TCM departments represented the TCM settings. The psychological medicine departments represented the psychosomatic medical settings. Participants ≥18 years old, having reading and writing abilities, visiting for treatment voluntarily and having signed informed consent form were included. Participants presenting language barriers, limited writing skills, cognitive impairment and psychosis or acute suicidal tendency were excluded. The study design was approved by the Ethics Committees of Peking Union Medical College Hospital and the University Medical Centre Freiburg, Germany.

2.2. SSD and BDS diagnoses

2.2.1. SSD diagnosis

SSD diagnose was confirmed face-to-face by trained clinical researchers using the DSM-5 versions of the Structured Clinical Interview (SCID-5). The SCID-5 interview section of SSD was translated into Chinese and has demonstrated good discriminative validity in Chinese general hospital outpatients [23].

2.2.2. BDS diagnosis

BDS was diagnosed with a combination of the BDS-25 checklist and research interview for functional somatic disorders and health anxiety (RIFD). RIFD was first proposed by Petersen [29], using a two-step method that combines self-reported questionnaires and clinical interviews to evaluate physical symptoms. It has been proven to be a feasible tool for large-scale epidemiological research. And the RIFD has been combined with BDS-25 checklist for the diagnosis of BDS in a general population sample [30].

The BDS-25 checklist is a self-report questionnaire consisting of 25 items assessing physical symptoms. It can be divided into 4 symptom clusters (cardiopulmonary, gastrointestinal, musculoskeletal, and general symptoms). The Chinese version of the BDS checklist used in present study has been validated in clinical practice and research [24].

The RIFD was a semi-structured interview designed to assess whether participants have physical symptoms, the severity of physical symptoms, and whether the symptoms can be explained by another medical condition [29]. It was translated into Chinese and conducted by trained clinical researchers through face-to-face interview.

Detailed descriptions of these procedures can be found in our former studies [13,18].

2.3. Measures

A battery of instruments was applied: Somatic Symptom Disorder–B Criteria Scale (SSD-12) for symptom-related psychological distress [31], Somatic Symptom Severity Scale of the Patient-Health Questionnaire (PHQ-15) for somatic symptom severity [32], Patient-Health-Questionnaire-9 (PHQ-9) for depressive symptoms [33], General Anxiety Disorder-7 (GAD-7) for general anxiety [34], and Short-Form Health Survey (SF-12) for mental and physical health-related quality of life [35].

2.4. Statistical analysis

Continuous variables were presented as means and standardized deviations. Categorical variables were presented as percentages. ANOVA and partial eta squared (η^2; small = 0.01, medium = 0.06, large = 0.14) were adopted to test the difference between groups. Post hoc analysis was adjusted by Bonferroni. The Chi-squared test was used for categorical variables. Statistical significance was set at $p < 0.05$.

To predict the occurrence of SSD and BDS, the binary logistic regressions and ENTER procedures were used. All psychosocial

characteristics (SSD-12, PHQ-15, PHQ-9, GAD-7, SF-12) were included in the binary logistic regressions. Receiver operating characteristic (ROC) curves were plotted to explore the potential cutoff points of SSD-12, PHQ-15 for the diagnoses of SSD and BDS.

3. Results

3.1. Distribution of SSD and BDS

In total, 1269 participants were approached, and the response rate was 55.08%. A total of 697 participants were presented in our former study, as 3 of them had missed questionnaire data, a total of 694 participants who completed both the interview and the questionnaires of this study are presented in this study (see Supplementary Fig. 1). Two hundred twenty-four participants came from the gastroenterology/neurology department, 239 from the psychosomatic medicine department, and 231 from the TCM department. Among them, 126 met the criteria of both diagnoses, 109 met the criteria of only SSD, 60 met the criteria of only BDS, and 399 met the criteria of neither SSD nor BDS. Of patients meeting SSD criteria, 53.6% (126/235) met BDS criteria. Of patients diagnosed with BDS, 67.7% (126/186) met SSD criteria. There is a moderate overlap between SSD and BDS (kappa value = 0.43, see Fig. 1).

3.2. Psychosocial characteristics of patients under different diagnoses

There were no significant differences in sociodemographic and lifestyle characteristics among patients diagnosed with neither SSD nor BDS, only SSD, only BDS and both two disorders (see Table S1).

Patients who fulfilled both SSD and BDS showed significantly higher levels of symptom-related psychological distress (SSD-12), somatic symptom severity (PHQ-15), depression (PHQ-9), general anxiety (GAD-7), as well as lower mental and physical quality of life (SF-12) compared to patients who met neither SSD nor BDS diagnosis and patients who met only SSD or BDS diagnosis. Patients with either diagnosis showed more severe physical, psychological and quality of life impairment than those with neither diagnosis. Among patients who only met one diagnosis, patients who only met SSD diagnosis had higher SSD-12 scores, whereas patients who only met BDS diagnosis had higher PHQ-15 scores ($p<0.001$, η^2 SSD-12 = 0.386; η^2 PHQ-15 = 0.266; η^2 PHQ-9 = 0.236; η^2 GAD-7 = 0.214; η^2 SF- 12 PCS = 0.137; η^2 SF- 12 MCS = 0.179, see Table 1).
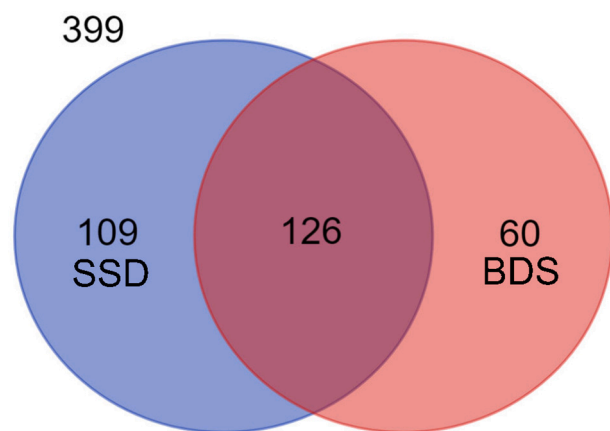

Fig. 1. Venn diagram. Overlap of SSD (Somatic Symptom Disorder) and BDS (Bodily Distress Syndrome) in a sample of the general hospital outpatients in China ($N = 694$). 126 met the criteria of both diagnoses, 109 only SSD, 60 only BDS, and 399 neither.

3.3. Predictor variables for SSD and BDS

3.3.1. SSD

In binary logistic regression, symptom-related psychological distress (SSD-12) and somatic symptom severity (PHQ-15) were found to be predictor variables of SSD. The explained variance was Nagelkerke $R^2 = 0.41$ (see Table 2).

3.3.2. BDS

In binary logistic regression, psychological symptom related distress (SSD-12), somatic symptom severity (PHQ-15) and depression (PHQ-9) were found to be predictor variables of BDS. The explained variance was Nagelkerke $R^2 = 0.42$ (see Table 2).

3.4. The cutoff points of SSD-12 and PHQ-15 for the diagnoses of SSD and BDS

The cutoff points of SSD-12 for SSD and BDS were both ≥16. The cutoff points of PHQ-15 for the diagnoses of SSD and BDS were found to be ≥8 and ≥11 respectively (see Table 3 and Supplementary Fig. 2).

4. Discussion

Our study compared SSD and BDS within a multicenter general hospital outpatient sample. The diagnosis of SSD was made face-to-face by trained clinical researchers using the SCID-5 interviews and the diagnosis of BDS was made through a combination of the BDS-25 checklist and the RIFD interviews. We found only a moderate overlap between SSD and BDS. Of patients meeting SSD criteria, 53.6% met BDS criteria. Of patients diagnosed with BDS, 67.7% met SSD criteria. In the analysis of psychosocial characteristics, we found that patients who fulfilled both SSD and BDS showed highest levels of symptom-related psychological distress, somatic symptom severity, depression, general anxiety, as well as lowest mental and physical quality of life, then are patients with only one diagnosis, then are patients with neither diagnosis. This indicates that SSD diagnosis and BDS diagnosis may capture partially different psychopathologies, so that populations that fit both diagnoses exhibit higher and broader psychosocial impairment.

Previous studies investigated the distribution of SSD and BDS with telephone interviews or self-report questionnaires within the sample of general population. These results were not all in line with ours. Häuser and colleagues used cut-off diagnoses by self-report questionnaires and compared the distribution and psychological characteristics of SSD and BDS in general population. Participants complained about one or more very much bothering somatic symptoms on the Somatic Symptom Scale-8 and cut-off ≥1 on the Whiteley Index-7 were diagnosed with SSD. The diagnosis of BDS was made through the BDS-25 checklist. Participants who met at least four somatic symptoms in one or two of the symptom category and in three or four of the symptom categories were diagnosed as single-organ and multi-organ BDS respectively. They found that the prevalence of SSD was 4.5%, that of BDS was 11.8%, and there was a small overlap between them: of participates fulfilling SSD criteria, 75.1% fulfilled BDS criteria; of participates fulfilling BDS criteria, 28.8% can be diagnosed SSD [19]. Schumacher and colleagues compared SSD and BDS in the sample of the German general population by telephone interviews and self-report questionnaires. SSD diagnosis was based on DSM-5: participants with one or more physical symptoms that persist for at least 6 months and at least one of the three psychological features of the B criterion were diagnosed as SSD. Participants who met at least three physical symptoms in one symptom category or at least four symptoms in four symptom categories were diagnosed with BDS. They found that 34% of the participants fulfilled the SSD diagnosis, 9% the BDS diagnosis, and 5.3% both diagnoses [20]. In our study, the general hospital outpatients were studied, so the prevalence of SSD or BDS should be higher than that in general population. In the study by Shumacher and et al., SSD was much more prevalent, while in the study by

Table 1
Psychosocial characteristics of patients under different diagnoses.

	only SSD $N = 109$	only BDS $N = 60$	SSD and BDS $N = 126$	no SSD no BDS $N = 399$	F	p-value	η^2
SSD-12	18.39 ± 10.36^3	14.25 ± 9.30^2	28.07 ± 10.45^4	8.29 ± 9.16^1	144.719	<0.001	0.386
PHQ-15	9.24 ± 4.29^2	12.23 ± 5.21^3	14.40 ± 5.38^4	7.32 ± 4.36^1	83.252	<0.001	0.266
PHQ-9	8.65 ± 5.83^2	10.53 ± 6.33^2	14.60 ± 6.33^3	6.18 ± 5.49^1	70.870	<0.001	0.236
GAD-7	6.86 ± 5.21^2	6.83 ± 5.65^2	12.14 ± 5.75^3	4.81 ± 5.02^1	62.497	<0.001	0.214
SF-12 PCS	41.58 ± 8.69^2	41.13 ± 8.52^2	36.99 ± 8.76^1	45.77 ± 8.41^3	36.421	<0.001	0.137
SF-12 MCS	38.97 ± 11.55^2	42.07 ± 12.67^3	31.17 ± 9.76^1	45.02 ± 11.35^3	49.743	<0.001	0.179

PCS: physical composite score of SF-12; MCS: mental composite score of SF-12. SSD: somatic symptom disorder; BDS: body distress syndrome. Only SSD: patients diagnosed with SSD; only BDS: patients diagnosed with BDS; SSD and BDS: patients diagnosed with both SSD and BDS; no SSD no BDS: patients diagnosed with neither SSD nor BDS. The Bonferroni method was adopted for multiple comparisons: values with[4] were significantly higher than values with[3], values with[3] were significantly higher than values with[2], and values with[2] were significantly higher than values with[1] in multi-group comparison.

Table 2
Results of binary regression analysises to predict SSD and BDS.

Variables	β	SE	Wald	p-value	Exp (β)	95%CI
SSD-12 (SSD)	0.100	0.012	67.109	<0.001	1.106	1.079–1.132
PHQ-15 (SSD)	0.052	0.023	5.010	0.025	1.053	1.006–1.102
PHQ-9 (SSD)	−0.025	0.027	0.855	0.355	0.975	0.925–1.028
GAD-7 (SSD)	−0.002	0.028	0.004	0.951	0.998	0.944–1.055
SF-12 PCS (SSD)	−0.017	0.013	1.828	0.176	0.983	0.959–1.008
SF-12 MCS (SSD)	−0.014	0.012	1.470	0.225	0.986	0.964–1.009
SSD-12 (BDS)	0.062	0.012	25.034	<0.001	1.064	1.038–1.090
PHQ-15 (BDS)	0.162	0.025	40.742	<0.001	1.176	1.119–1.236
PHQ-9 (BDS)	0.060	0.028	4.732	0.030	1.062	1.006–1.122
GAD-7 (BDS)	−0.007	0.029	0.056	0.813	0.993	0.938–1.052
SF-12 PCS (BDS)	−0.015	0.013	1.221	0.269	0.985	0.959–1.012
SF-12 MCS (BDS)	0.018	0.013	1.994	0.158	1.019	0.993–1.045

SSD-12, PHQ-15, PHQ-9, GAD-7, physical and mental score of SF-12 were analyzed in the binary logistic regressions.

Table 3
The cutoff points of SSD-12 and PHQ-15 for the diagnoses of SSD and BDS.

	Cutoff Point	Sensitivity	Specificity	Youden Index	AUC	p-value
SSD-12 (SSD)	16	0.76	0.80	0.57	0.84	<0.001
SSD-12 (BDS)	16	0.75	0.75	0.50	0.80	<0.001
PHQ-15 (SSD)	8	0.80	0.52	0.32	0.72	<0.001
PHQ-15 (BDS)	11	0.67	0.83	0.49	0.81	<0.001

Häuser and et al., BDS prevalence was much higher. In our study, SSD prevalence was significantly higher. But as different diagnostic methods were used, there may be low comparability.

In the present study, symptom-related psychological distress (SSD-12) and somatic symptom severity (PHQ-15) were both found to be predictors for the diagnoses of SSD and BDS. SSD-12 was developed as a direct measure of the B criteria of SSD and used to assess the feeling and thinking toward to somatic symptoms [36]. The PHQ-15 focuses on the assessment of 15 somatic symptoms, such as pain, dizziness, gastrointestinal and cardiopulmonary symptoms [37]. The cutoff points of SSD-12 for the diagnosis of SSD and BDS were both ≥16. The cutoff points of PHQ-15 for the diagnoses of SSD and BDS were ≥ 8 and ≥ 11 respectively. This is a relatively big gap for PHQ-15 score (ranging from a minimum of 0 to a maximum of 30). So, generally BDS diagnosis encompasses a higher physical symptom burden. This difference of somatic symptom burden requirement may partly explain the relatively lower prevalence of BDS as to SSD.

Previous studies have found that female sex, lower education levels, poor social-economic status, living alone, unemployment, family history of chronic illness, and childhood physical and psychological abuse were risk factors of medically unexplained symptoms or related diseases [38–40]. Gender, health insurance, residence, marital status, family income, occupation, education, smoking history, alcohol consumption and exercise habits were included in our study, but no significant differences in these sociodemographic data between patients with the diagnosis of SSD or BDS, or both, or none. History of childhood negative events and family history were not studied in our study.

In summary, our findings suggest that SSD and BDS definitions capture partially different psychopathologies [41]. But both SSD and BDS showed a good validity in differentiating patients suffering from physical, psychological and social impairments from controls. A wider conception encompassing both SSD and BDS may be considered in the future.

This study has the following limitations: (1) Patients with depression, anxiety or other mental disorders were not screened for and excluded. These psychiatric comorbidities may also increase somatic symptom burdens. (2) Only neurology and gastroenterology departments were chosen for biomedical settings. Different departments such as surgical departments, obsterics/gynecology department and pediatric department, may have their own characteristics. (3) All participants in this study were recruited from outpatient clinics. Considering the limitations of outpatient treatment management, patients with cognitive impairment or acute suicidal tendencies, as well as psychosis were not recruited in our study.

5. Conclusions

The greatest contribution of our work is that the results support the hypothesis that SSD and BDS seem to capture different psychopathologies: SSD shows higher psychological and behavioral symptom severity, whereas BDS has much higher physical symptom severity. SSD and BDS only have a moderate overlap. Patients fulfilling both diagnosis tend to show higher symptom severity in various psychosocial aspects than patients with only one diagnosis. This suggests an adding or compounding effect of different psychopathologies. So attention should be paid in the evaluation of patients with somatic symptoms.

If this hypothesis is further confirmed in other studies, a wider diagnostic conception encompassing both SSD and BDS may also need to be considered in future diagnostic systems.

Statement of ethics

The study was approved by the ethics committees of Peking Union Medical College Hospital (PUMCH) and the University Medical Centre, Freiburg, Germany (Protocol Number: S—K276).

Author contributions

JW and KF designed this study. JW, TL, LZ, YZ, HW, XM, HC, WLi, and JR coordinated the study. DM and JC made the drafting and statistics analysis. JC, JW, KF, AT and RL made critical reviews and improvement of the draft. All authors approved the submitted version.

Declaration of Competing Interest

Author Jie Ren is employed by General Hospital of Jincheng Anthracite Coal Mining Group Co. Ltd. The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data availability

The data used in this study are not publicly available due to their sensitive nature. Data sharing for some of the included datasets may be possible depending on ethical approval. Further enquiries can be directed to the corresponding author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.genhosppsych.2023.10.017.

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