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Scoping review update on somatic symptom disorder that includes additional Chinese data

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ABSTRACT

Somatic symptom disorder (SSD) is a new diagnosis introduced into the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), which is expected to solve the diagnostic difficulties of patients with medically unexplained symptoms.

Based on the previous work, this review aims to comprehensively synthesise updated evidence related to SSD from recent years in English publications and, more extensively, from data published in Chinese language journals.

The scoping review update was based on an earlier scoping review and included Chinese language publication data from China National Knowledge Internet (CNKI), WANFANG and WEIPU between January 2013 and May 2022 and data from PubMed, PsycINFO, and Cochrane Library between June 2020 and May 2022.

Initially, 2 984 articles were identified, of which 63 full texts were included for analysis. In China, SSD is mainly applied in scientific research, but it also shows good predictive validity and clinical application potential.

The mean frequency of SSD was 4.5% in the general population, 25.2% in the primary care population and 33.5% in diverse specialised care settings. Biological factors, such as brain region changes and heart rate variability, are associated with the onset of SSD.

Psychological impairment related to somatic symptoms is the best predictor of prognosis. While adolescent SSD was significantly associated with family function, SSD overall is associated with an increased dysfunction of cognition and emotion, decreased quality of life, and high comorbidity with anxiety and depressive disorders. Further research is needed on suicide risk and cultural and gender-related issues.

Updating the data of Chinese language studies, our research enriches the evidence-based findings related to the topics addressed in the text sections of the SSD chapter of DSM-5. However, research gaps remain about SSD reliability, population-based prevalence, suicide risk, and cultural and gender-related issues.

INTRODUCTION

The diagnostic term somatic symptom disorder (SSD) first appeared in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)[1] in 2013, replacing the former concept of somatoform disorders (SFDs) in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-4).[2] The former criteria overemphasised the centrality of medically unexplained symptoms. In contrast, the new classification defines SSD based on positive symptoms, namely, distressing somatic symptoms plus abnormal thoughts, feelings and behaviours in response to these symptoms.[1 3] It is important to note that these individuals do not intentionally produce the symptoms or lie about their existence; they are not 'faking' the symptoms. These symptoms are real and often worsen because they cannot be scientifically explained. More importantly, their symptoms may or may not accompany an actual or identifiable medical illness. Thus, the diagnoses of SSD and a concurrent medical condition are not mutually exclusive and may frequently occur together.[1 4]

In China, the International Classification of Disease, Tenth Revision diagnostic system, mainly used for clinical practice, continues to use the SFD criteria. However, diagnosing and treating patients with medically unexplained symptoms are challenging because of difficulties determining the SFD diagnosis, low diagnostic rates and strained doctor–patient relationships. These challenges occur because of limited reliability for establishing that the somatic symptoms are medically unexplainable[1] and because the SFD diagnosis requires a series of medical examinations to exclude parenchymal diseases, thus, resulting in a low detection rate of SFD. Moreover, the notion of this somewhat nebulous SFD disorder makes those with the diagnosis appear challenging and frustrating, inducing feelings of stigmatisation among these patients and straining doctor–patient relationships. On the other hand, the SSD criteria, which includes more psychological aspects of the disorder, can more readily identify patients who manifest these psychological

burdens, thereby having positive implications for clinical work. Since the publication of DSM-5, research on SSD has been carried out throughout the world. The earlier scoping review conducted in Germany[5] did not include data from Chinese language journals. To fill this gap of excluded data, we contacted the authors from the earlier SSD scoping review and obtained their support to conduct this review. Therefore, this paper aims to update the existing SSD review by adding more recent publications and incorporating data from Chinese language publications. We hope to provide more comprehensive information, including cultural influences, which can guide further clinical and research work in SSD worldwide.

METHODS

The scoping review search was conducted from May to July 2022. After consulting the previous scoping review,[5] we drafted a review protocol to define the database and search terms. We determined the result domains according to subheadings of specific DSM-5 text sections, ie, diagnostic features, prevalence, development and course, risk and prognostic factors, culture-related diagnostic issues, gender-related diagnostic issues, suicide risk, functional consequences of SSD, differential diagnosis and comorbidity. Table 1 summarises the general inclusion and exclusion criteria and specific criteria for each DSM-5 text section. Following the exact research terms of the previous review,[5] to identify all potentially relevant studies, we accessed the following bibliographic databases for systematic reviews: PubMed, PsycINFO, Cochrane Library, China National Knowledge Internet (CNKI), WANFANG and WEIPU (see online supplemental file). Then we identified the data written in English between June 2020 and May 2022, which were entirely updated according to the retrieval method of previous work,[5] and included the Chinese language data between January 2013 and May 2022 discovered by using Chinese search terms: “Somatic Symptom Disorder”, “Somatoform Disorder” and “Bodily Distress Disorder”. This scoping review analysed the data from Chinese language publications and the more recent English publications on SSD that were identified since the prior scoping study.

All identified records were collected, and duplicates were removed using EndNote. All titles and abstracts were screened for relevance to the DSM-5 text sections (see figure 1 for the flowchart). Selected articles were evaluated based on the full text and reviewed by at least two researchers trained by a senior researcher. The evaluation of the articles was done independently. Differences were dealt with by online discussions, and the majority opinion was accepted regarding inclusion. Researchers also examined the reference list of included studies to detect any additional studies that met inclusion criteria. Evaluations were conducted separately for each DSM-5 text section on SSD, and the number of identified studies was documented.

RESULTS

The initial literature search identified 2 961 articles, and additional 23 studies were found in the reference lists of the included papers. After removing the duplicates, 891 articles were screened based on abstracts and titles. Finally, after determining eligibility, 63 articles were included in the analyses (see figure 2 for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flowchart). Table 2 provides an overview of the included full texts with language, study design, sample size and assessment of SSD criteria.

Diagnostic features

Reliability and validity of the SSD criteria

One of the main controversies regarding the current DSM-5 SSD diagnostic criteria is the problem of overdiagnosis. The typical argument is that the new criteria are too lax and that removing the ‘medically unexplained symptoms’ condition might expand the diagnosis to include people with actual medical conditions. However, studies have indicated that the psychological criteria of SSD can significantly improve the validity of diagnostic predictions. One study determined that the Somatic Symptom Disorder–B Criteria Scale (SSD-12) has good reliability (Cronbach a=0.953). The optimal cut-off value for detecting SSD in this study was 17 when the Structured Clinical Interview for DSM-5 (SCID-5) diagnosis of SSD was the gold standard (Youden Index=0.595, sensitivity=0.757, specificity=0.838), with 82% of patients correctly diagnosed.[6] Another study showed that the combination of the Patient Health Questionnaire-15 (PHQ-15) or the Somatic Symptom Scale-8 (SSS-8) with the SSD-12 improved the diagnostic accuracy of SSD (PHQ-15+SSD-12: area under the curve (AUC)=0.77, 95% CI: 0.72 to 0.82; SSS-8+SSD-12: AUC=0.79, 95% CI: 0.74 to 0.84).[7] A psychometric evaluation suggested that the new version of the Whiteley Index-8 is a reliable and valid screening tool for health anxiety.[8]

One study of outpatients (n=120) from gastroenterology, Chinese traditional medicine, and psychology departments in Chinese tertiary hospitals used the Mini-International Neuropsychiatric Interview and the SCID-5, Research Version (SCID-5-RV) to diagnose SFD and SSD. Results showed that the detection rate for SSD was 30.0%, and the detection rate for SFD was 56.7%. In addition, SSD had low diagnostic overlap with SFD (Cohen’s kappa=0.335); patients with SSD showed heavier somatic symptom burdens, higher degrees of disabilities, and poorer physical and mental health qualities compared with patients with SFD.[9–11] An additional study showed that the severity of anxiety, depression and alexithymia in patients with SSD was higher than in patients with digestive diseases. Patients with SSD also presented poorer quality of life than patients with gastrointestinal disease.[12] Regrettably, we found no new studies regarding SSD reliability within our search range, but the previous review established that SSD diagnosis has good reliability.[13–17]

Table 1 Inclusion and exclusion criteria for literature search within each DSM-5 SSD text section

	Inclusion criteria	Exclusion criteria
General		
	► Manuscripts are written in English or Chinese. ► Manuscripts in English published in peer-reviewed journals during June 2020–May 2022 and manuscripts in Chinese published in peer-reviewed journals during January 2013–May 2022. ► Manuscripts that dealt with the DSM-5 SSD and at least one of the below-mentioned text sections. ► DSM-5 SSD B criteria are operationalised either through diagnostic interviews, self-report measures (eg, symptom measure+SSD-12, WI) or clinical judgement.	► *Study protocols.* ► *Studies on questionnaire development.* ► *Reviews without new data.* ► *Studies on syndromes other than SSD (eg, SFDs, functional syndromes and irritable bowel syndrome).*
DSM-5 text sections		
Diagnostic features	► Any type of study addressing the diagnostic criteria of SSD by presenting or referring to empirical data. ► Any type of study that primarily investigated SFDs or illness anxiety disorder but did so with regard to the new SSD criteria. ► Studies that aimed to evaluate diagnostic and/or therapeutic interventions, if implications were drawn with regard to the diagnostic features of SSD.	
Prevalence	► Observational studies, that is, prospective and retrospective cohort studies, case–control studies and cross-sectional studies, reporting any point or period prevalence estimates from the general population or any kind of clinical population. ► Any type of study reporting the prevalence, frequency or occurrence of SSDs. Studies were classified as level 1 if the report data of representative studies were from the general population and level 2 for reports on prevalence or frequency in defined populations (eg, general medicine, other secondary or tertiary care settings or specific patient programmes).	Studies with preselected patients with SSD patient groups (where SSD was defined as an inclusion criterion)
Development and course	► Any type of study reporting on the aetiology and development of SSD in a defined sample. ► Any type of study reporting the particular aspects of SSD in particular age groups, such as children, adolescents, adults or older aged people. ► Any type of study reporting on remission and response of SSD in a defined sample.	Intervention studies without reference to remission or response
Risk and prognostic factors	► Any longitudinal/ prospective study relating to risk factors for SSD. ► Any type of study reporting on prognosis, that is, the course of the SSD diagnosis and to further associated outcomes like health-related quality of life, physical and psychological symptom burden.	Paediatric studies and review studies
Culture	Any type of study reporting on cultural aspects in light of SSD (ie, culture-bound syndrome) in any kind of setting in patients with SSD.	
Gender	Any type of study reporting on gender-specific aspects in light of SSD in any kind of setting in patients with SSD.	
Suicide risk	Any type of study reporting the prevalence and impact of risk factors for any kind of suicidal thoughts or behaviour (ie, suicidal thoughts, ideation, attempt and completed suicide) in any kind of setting in patients with SSD; suicidal thoughts or behaviour could be assessed via self-report or observed outcomes (eg, attempted suicide).	Studies reporting self-harm without suicidal intention
Functional consequences	► Any type of study reporting functional consequences in the defined sample. ► Functional consequences are defined as the impact of SSD on health-related physical or mental quality of life, physical functioning, mental functioning, impairment, disability, social functioning, work ability, psychological distress and ability to participate in relevant activities. ► Any type of study reporting the impact of psychological features of SSD on functional consequences.	
Differential diagnosis	► Any type of study reporting on SSD and differential diagnosis in any kind of setting.	
Comorbidity	► Observational studies investigating comorbid mental and physical diseases of SSD or comorbidity of any condition with SSD. ► Any type of study examining associations between self-reported symptoms of SSD and self-reported symptoms of other mental diseases in different population-based and clinical samples.	

DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; SFD, somatoform disorder; SSD, somatic symptom disorder; WI, Whitley Index.

Figure 1 Study flowchart for scoping review. Displayed are the number of articles per DSM-5 text section. Some articles were used in multiple DSM-5 text section. DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; SSD, somatic symptom disorder.

Clinical utility of the new criteria

SSD diagnostic criteria were mainly proposed for scientific purposes. However, studies have concluded that compared with the SFD diagnostic criteria of DSM-4, the inclusion of psychological symptoms enhances the predictive validity and clinical utility of SSD in DSM-5. The use of SSD diagnostic criteria in DSM-5 was better able to identify psychological symptoms in impaired patients than the SFD diagnostic criteria in DSM-4.[9]

Associated features

Many new studies addressed some prospective additional features of SSD. Two of these studies investigated the association between mentalisation and SSD. Patients with SSD showed particularly low scores in the theory of mind performance.[18] Moreover, higher levels of childhood trauma appeared to be associated with more excessive mentalisation deficits in patients with SSD.[19]

Some controlled studies suggested local structural changes in multiple brain regions in patients with SSD, for example, limbic lobe, thalamus, frontal lobe, cingulate gyrus and left anterior cingulate cortex.[20–22] Also, there were significant functional connectivity abnormalities in patients with SSD, for example, between white matter and white matter regions in the whole brain and between white matter and grey matter in the posterior cerebellar lobe. The authors concluded that these brain structural and functional changes may be closely related to the pathology of SSD.[23 24] A mediation analysis revealed that grey matter density of the bilateral medial Brodmann area 8 mediated the relationship between catastrophising

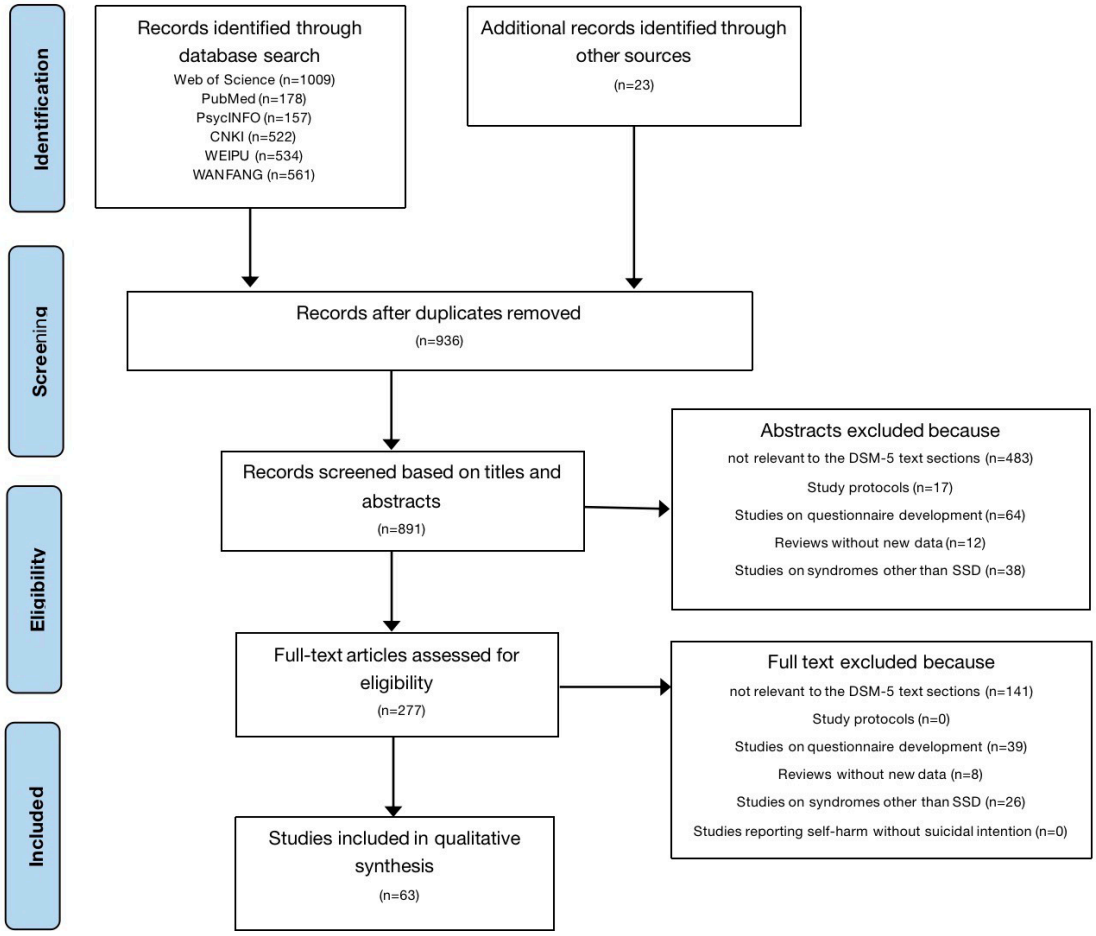

Figure 2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flowchart of studies identified for inclusion in scoping review about SSD. DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; SSD, somatic symptom disord;CNKI, China National Knowledge Internet.

and anxiety in SSD.[25] One study suggested that some brain-evoked components can partially affect or predict diseased cognition levels of patients with SSD, potentially providing significant guidance for predicting impaired cognition and carrying out targeted interventions earlier.[26]

Another study suggested that heart rate variability (HRV) is reduced in patients with SSD and correlates with disease severity: the more severe the SSD, the lower the parasympathetic function and the higher the sympathetic function. They also suggested that the HRV index has clinical potential as a biological marker of SSD.[27] On the contrary, Huang and colleagues indicated that the association between SSD and HRV is insignificant.[28] One study showed that the HRV index differs in patients with SSD in different age and gender groups.[29] In addition, a study of only women demonstrated that the Emotion Stroop Task and HRV could be used to differentiate female patients with SSD from healthy women.[30]

Patients with SSD also showed intestinal dysbiosis, elevated levels of interleukin-6, high-sensitivity C creative protein (hsCRP), reduced levels of cortisol and increased γ-aminobutyric acid/total creatinine levels in the medial prefrontal cortex.[31–34]

Prevalence

Only five studies used semistructured clinical interviews based on DSM-5 criteria to diagnose SSD,[35–39] and none was conducted in general or primary care populations. All other studies used proxy diagnoses operationalised by a combination of self-report questionnaires or by clinical determination of SSD. One of these studies was conducted in the general population,[40] and two were carried out on primary care patients.[41 42] Significantly, prevalence studies on the general population using diagnostic criterion standard interviews are lacking, though needed. A cross-sectional nationally representative population survey performed in Germany (2020) reported prevalence data using SSS-8 as the diagnostic tool; they found that 4.5% of the participants (n=2531) met the criteria of SSD.[40] One study investigated the prevalence of SSD in residents in Ya'an, a city in Sichuan Province, after the 2013 Lushan earthquake; the authors reported that the adjusted 12-month prevalence of SSD was 6.82%.[40] In primary care population studies, the frequency of proxy diagnosis for SSD has varied between 17.8% and 32.5% (mean frequency 25.15%).[41 42] In a study conducted in non-specialised general medicine settings, the prevalence of SSD was 27.1%.[36] In diverse specialised care settings

Table 2 Overview of included studies

Authors, year, country (language)	N	Population	Study design	Assessment of SSD	DSM-5 text section
Cui *et al*, 2017, China (Chinese)[6]	150	Outpatients with SSD	Cross-sectional	Structured clinical interview (SCID-5-CV)	Diagnostic features, development and course, functional consequences, risk and prognostic factors
Toussaint *et al*, 2020, Germany (English)[7]	372	Psychosomatic clinic outpatients	Cross-sectional	Semistructured clinical interview	Diagnostic features
Chen *et al*, 2021, China (English)[8]	696	TCM, biomedicine, and psychosomatic medicine outpatients in tertiary hospitals	Cross-sectional	SCID-5-RV	Diagnostic features
Li *et al*, 2019, China (Chinese)[9]	197	Outpatients from a psychological hospital	Cross-sectional	Structured clinical interview (MINI, SCID-5-CV)	Diagnostic features, gender-related diagnostic issues
Luo *et al*, 2018, China (Chinese)[11]	120	Patients from general hospital outpatient settings	Cross-sectional	SCID-5-RV	Diagnostic features
Cui *et al*, 2017, China (Chinese)[6]	101/100/95	Patients with SSD/MDD/PU or RE	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Diagnostic features, functional consequences
Cetin *et al*, 2020, Turkey (English)[18]	48/50/50	Patients with SSD/MDD/healthy controls	Cross-sectional	Sociodemographic data form/ SCL-90-R	Diagnostic features
Seitz *et al*, 2022, Germany (English)[19]	36/33/33	Patients with SSD/MDD/PTSD	Cross-sectional	SCID-5-RV	Diagnostic features
Cui *et al*, 2021, China (Chinese)[20]	45/43	Right-handed patients with SSD/right-handed healthy controls	Cross-sectional	SCID-5-RV	Diagnostic features
Cui *et al*, 2022, China (Chinese)[21]	45/43	Patients with SSD/healthy controls	Cross-sectional	SCID-5-RV	Diagnostic features
Ji *et al*, 2021, China (English)[22]	30/32	Patients with SSD/healthy controls	Cross-sectional	Clinical judgement oriented on DSM-5 SSD diagnostic criteria	Diagnostic features
Chen *et al*, 2020, China (Chinese)[23]	21/25	Patients with SSD/healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD diagnostic criteria	Diagnostic features
Liang *et al*, 2020, China (English)[24]	37/37	Patients with SSD/healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD diagnostic criteria	Diagnostic features
Pan *et al*, 2021, China (English)[25]	28/29	Patients with SSD/healthy controls	Cross-sectional	Clinical judgement oriented on DSM-5 SSD diagnostic criteria	Diagnostic features

Continued

Table 2 Continued

Authors, year, country (language)	N	Population	Study design	Assessment of SSD	DSM-5 text section
Yang *et al*, 2020, China (Chinese)[26]	130	Inpatients with SSD	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Diagnostic features, Functional consequences
Wang *et al*, 2022, China (Chinese)[27]	33/33	Psychosomatic outpatients with SSD/ healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD diagnostic criteria	Diagnostic features
Huang *et al*, 2021, China (English)[28]	104/100	Patients with SSD/healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Diagnostic features, gender-related diagnostic issues
Huang *et al*, 2020, Taiwan, China (English)[29]	79/59/106	Patients with SSD and PS/patients with SSD and without PS/healthy controls	Retrospective	Clinical judgement based on DSM-5 SSD diagnostic criteria	Diagnostic features
Qiu *et al*, 2019, China (Chinese)[30]	186	Patients with SSD in a neurology outpatient clinic	Retrospective	Clinical judgement based on DSM-5 SSD criteria	Diagnostic features, gender-related diagnostic issues
Dong *et al*, 2022, China (Chinese)[24]	25/25	General hospital outpatients with SSD/ healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD diagnostic criteria	Diagnostic features
Mewes *et al*, 2022, Austria (English)[33]	29/29	Female patients with SSD/female patients with depressive disorder	Cross-sectional	Clinical interview based on DSM-5 SSD diagnostic criteria	Diagnostic features
Delli Pizzi *et al*, 2020, Italy (English)[34]	23/14/19/19	Patients with SSD+PD/SSD/PD/healthy controls	Cross-sectional	Semistructured interviews	Diagnostic features, comorbidity
Xu *et al*, 2021, China (Chinese)[35]	8 876	General population	Cross-sectional	SCID-5-RV	Prevalence, risk and prognostic factors
Zhao *et al*, 2019, China (Chinese)[71]	210	General hospital outpatients with SSD	Cross-sectional	SCID-5-RV	Prevalence
Gu *et al*, 2020, China (Chinese)[37]	181	Patients in a cardiology outpatient clinic	Cross-sectional	SCID-5-RV	Prevalence
Li *et al*, 2022, China (English)[38]	246	Patients with breast cancer	Cross-sectional	SCID-5-RV	Prevalence, comorbidity
Axelsson *et al*, 2020, Sweden (English)[39]	140	Patients with fibromyalgia	Cross-sectional	Health Preoccupation Diagnostic Interview	Prevalence

Continued

Table 2 Continued

Authors, year, country (language)	N	Population	Study design	Assessment of SSD	DSM-5 text section
Häuser *et al*, 2020, Germany (English)[40]	2 531	General population	Cross-sectional	SSS-8	Prevalence
Alalawi *et al*, 2022, Oman (English)[41]	3 383	General population	Cross-sectional	Arabic version of SSS-8	Prevalence
Nazzal *et al*, 2021, North Palestine (English)[42]	400	Patients attending primary healthcare clinics	Cross-sectional	The Somatisation Scale of the Four-Dimensional Symptom Questionnaire	Prevalence, risk and prognostic factors
Chen *et al*, 2022, China (Chinese)[43]	9 186	Community hospital patients	Cross-sectional	Self-report questionnaires (SSS ≥6)	Prevalence, gender-related diagnostic issues, comorbidity
Chen *et al*, 2021, China (Chinese)[8]	5 473	Community hospital patients	Cross-sectional	Self-report questionnaires (SSS ≥6)	Prevalence, gender-related diagnostic issues, comorbidity
Chen *et al*, 2022, China (Chinese)[43]	236	Perimenopausal female patients from a community hospital	Cross-sectional	SSS	Prevalence
Gershfeld-Litvin *et al*, 2021, Israel (English)[46]	50	Patients of a medical psychology outpatient clinic	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Development and course
De Nardi *et al*, 2021, Italy (English)[47]	160	Italian adolescents aged 13–18	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Development and course
Ibeziako *et al*, 2020, USA (English)[48]	219	Patients with SSRD in a tertiary paediatric hospital	Retrospective	Semistructured interviews, several patient and parent self-report measures	Development and course
Vassilopoulos *et al*, 2021, USA (English)[49]	243	Inpatients with SSRD in a paediatric hospital	Retrospective	Clinical judgement based on DSM-5 SSD criteria	Development and course
Wiggins *et al*, 2022, Germany (English)[50]	123	Patients with SSRD	Cross-sectional	na	Development and course
Wiggins *et al*, 2020, Germany (English)[51]	123	Patients with SSRD	Retrospective	na	Development and course

Continued

Table 2 Continued

Authors, year, country (language)	N	Population	Study design	Assessment of SSD	DSM-5 text section
Wu *et al*, 2022, China (English)[52]	9 020	General population	Retrospective cross-sectional	The SSS-CN	Development and course, risk and prognostic factors
Behm *et al*, 2021, Germany (English)[53]	360	Psychosomatic outpatients with SSD	Longitudinal	Semistructured clinical interview	Development and course, risk and prognostic factors
Wu *et al*, 2021, China (Chinese)[54]	236	Patients with SSD in general hospital outpatient clinics	Cross-sectional	Structured clinical interview (SCID-5-CV)	Development and course, functional consequences, risk and prognostic factors
Kim *et al*, 2021, Korea (English)[55]	54	Psychosomatic outpatients with SSD	Retrospective cross-sectional	Structured clinical interview (SCID-5-CV)	Risk and prognostic factors
Tu *et al*, 2021, Taiwan, China (English)[56]	122	Patients with SSD	Cross-sectional	Structured clinical interview (SCID-5-CV)	Risk and prognostic factors
Naskar *et al*, 2020, India (English)[57]	62/41	Psychosomatic outpatients/ rheumatology outpatients	Cross-sectional	Structured clinical interview (MINI V.7.0.2)	Risk and prognostic factors
Cheng *et al*, 2020, China (English)[58]	1	Patients with SSD	Case report	Clinical judgement based on DSM-5 SSD criteria	Culture-related diagnostic issues
Yang *et al*, 2019, China (Chinese)[59]	15	Inpatients with SSD	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Gender-related diagnostic issues, functional consequences
Geng *et al*, 2018, China (Chinese) [60]	199	Patients with SSD in a neurology outpatient clinic	Retrospective	Clinical judgement based on DSM-5 SSD criteria	Gender-related diagnostic issues, functional consequences
Bo, 2019, China (Chinese)[61]	54	Patients with SSD in a neurology department	Retrospective	Clinical judgement based on DSM-5 SSD criteria	Gender-related diagnostic issues, comorbidity
Torres *et al*, 2020, USA (English)[62]	na	Patients with SSD	Review	na	Suicide risk
He 2019, China (Chinese)[63]	68	Outpatients with SSD	Cross-sectional	Structured clinical interview (SCID-5-CV)	Functional consequences
Meng, 2018, China (Chinese)[64]	100	Patients with SSD dominated by pain	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Functional consequences
Yang, 2019, China (Chinese)[65]	110	Patients with SSD	Longitudinal	Clinical judgement based on DSM-5 SSD criteria	Functional consequences

Continued

Table 2 Continued

Authors, year, country (language)	N	Population	Study design	Assessment of SSD	DSM-5 text section
Liang, 2019, China (Chinese) [66]	25/25	Patients with SSD/healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Functional consequences
Jang *et al*, 2021, Korea (English)[67]	44/30	Patients with SSD/healthy controls	Prospective cohort investigation	Clinical judgement based on DSM-5 SSD criteria	Functional consequences
Okur Güney *et al*, 2022, Germany (English)[68]	13/16	Patient couples with SSD/ Healthy couples	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Functional consequences
Tu *et al*, 2020, China (English)[70]	123	Patients with SSD	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Comorbidity
He *et al*, 2019, China (Chinese)[71]	80/25	Patients with SSD+MDD/healthy controls	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Comorbidity
Liu *et al*, 2017, China (Chinese)[72]	160	Patients with SSD/SSD+MDD	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Comorbidity
Liu *et al*, 2016, China (Chinese)[73]	89/71	Patients with SSD/SSD+MDD	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Comorbidity
Ionescu *et al*, 2021, Romania (English)[74]	na	Patients with SSD	Review	na	Comorbidity
Ionescu *et al*, 2021, Romania (English)[74]	103/77	Hospitalised patients with SSD as a major diagnosis and anxiety and depression disorders as comorbid diagnoses	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Comorbidity
Zhong *et al*, 2021, China (Chinese)[75]	54	Patients with SSD	Cross-sectional	Clinical judgement based on DSM-5 SSD criteria	Comorbidity

DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; MDD, Major Depressive Disorder; MINI, Mini-International Neuropsychiatric Interview; na, not available; PD, Parkinson's disease; PS, persistent somatisation; PTSD, post-traumatic stress disorder; PU/RE, digestive ulcer/reflux oesophagitis; SCID-5-CV, Structured Clinical Interview for DSM-5, Clinician Version; SCID-5-RV, Structured Clinical Interview for DSM-5-Research Version; SCL-90-R, Symptom Checklist-90, Revised; SSD, somatic symptom disorder; SSRD, Somatic symptom and related disorders; SSS, Somatic Self-rating Scale; SSS-8, Somatic Symptom Scale-8; SSS-CN, Somatic Symptom Scale-China; TCM, traditional Chinese medicine.

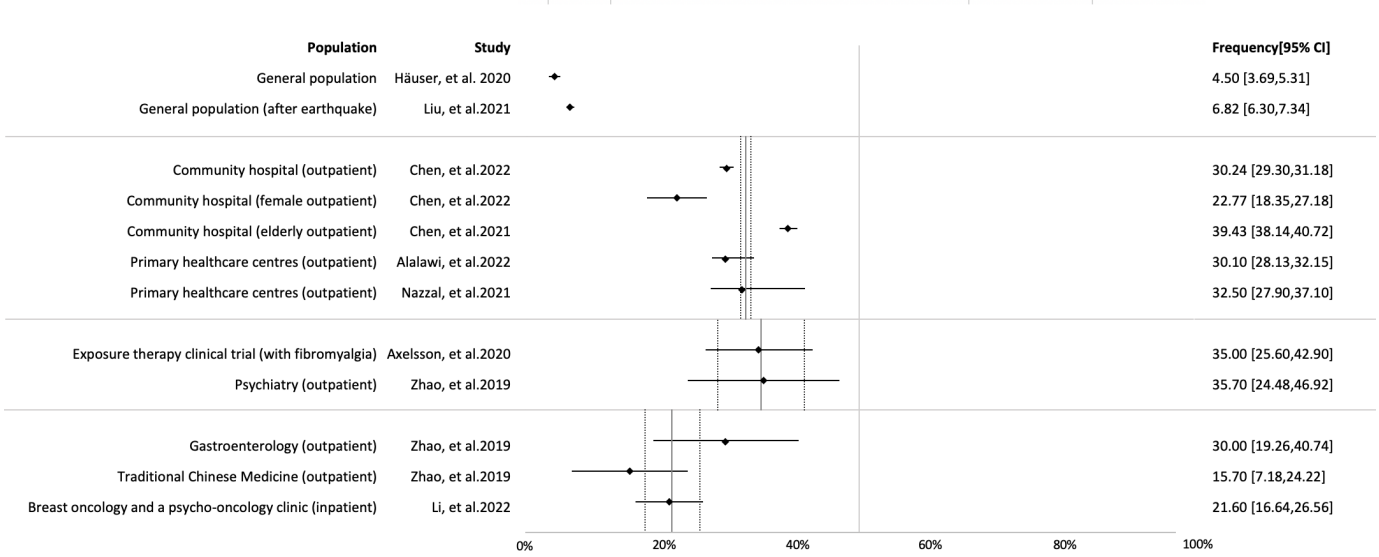

Figure 3 Forest plot of frequency estimates on somatic symptom disorder (with 95% CI).

(eg, endocrinology, cardiology, obstetrics and gynaecology, oncology and rheumatology), SSD frequency ranged between 21.6% and 45.3% (mean frequency of 33.45%).[37–39 43–45] SSD frequency rates in different medical and non-medical populations are summarised in figure 3.

Development and course of SSD

Characteristics of adolescent SSD

A cross-sectional study reported that the gastrointestinal distress of adolescents with SSD might be associated with anxiety states, depression, trait anxiety and family accommodation.[46] On the contrary, another cross-sectional observational study in Italy showed that during an 8-week coronavirus disease 2019 (COVID-19) lockdown, female adolescents with SSD had lower depression and anxiety tendencies than healthy controls and significantly fewer physical symptoms.[47]

Some studies have been conducted on adolescents with somatic symptoms and related disorders (SSRD). A retrospective study conducted in a tertiary paediatric hospital reported that 97% (n=213) of 219 SSRD patients had pain symptoms, and of those reporting pain, 48% reported widespread pain; this latter group also had greater rates of comorbid depression, trauma and stress-related disorders, neglect, sexual abuse, emotional abuse, family psychiatric history, diagnostic tests/procedures, prescribed opioid use and prior child protective service involvement.[48] Adolescents with SSRD who had severe school absenteeism had higher somatisation and functional disability scores, higher suicidal ideation and attempt rates, greater psychotropic medication use, more psychiatric sessions during hospital admission and higher rates of discharge to higher levels of psychiatric care.[49] Total acceptance of the SSRD diagnosis by at least one parent was associated with complete functional recovery in the adolescent. In contrast, there was no significant association between adolescent patients' total acceptance of the SSRD diagnosis and their recovery.[50] In addition, one study conducted in Australia found a low frequency of multidisciplinary team family meetings compared with inter-speciality consultations regarding adolescents with SSRD.[51]

Characteristics of late-life SSD

A prospective multicentre study in China revealed that with a higher prevalence of common physical problems (including hypertension, diabetes mellitus and cardiovascular/cerebrovascular disease), older adults in Shanghai are more vulnerable to having SSD, suffer more severe SSD and are 1.560 (95% CI: 1.399 to 1.739, p<0.001) times more likely to have the disorder than younger adults.[52]

Course of SSD

A semistructured interview was used to investigate the natural course of SSD in a 4-year follow-up study in patients from a psychosomatic outpatient clinic. They reported that SSD is highly prevalent and persistent in patients in a psychosomatic setting. The study also indicated that psychological and behavioural factors contribute to the maintenance of SSD. In addition, the critical predictor of SSD persistence was a high psychological burden due to somatic symptoms and general anxiety.[53]

Risk and prognostic factors

Risk factors for SSD

One prospective multicentre study and two cross-sectional studies found that female gender, middle-aged/older age, and chronic medical conditions—including depression and anxiety—were risk factors for SSD.[35 42 52]

Prognostic factors for SSD remission

A 4-year follow-up study in patients from a psychosomatic outpatient clinic reported that, after comparing four groups (SSD persistence, SSD remission, SSD incidence and SSD no), the SSD remission group had the highest

scores for depression (Patient Health Questionnaire-8, PHQ-8) and anxiety (Generalized Anxiety Disorder-7, GAD-7) at baseline; however, this group also had high levels of psychotherapy engagement.[53]

Prognostic factors for SSD-associated outcomes

In a controlled Chinese study, Pearson and multiple linear regression analyses showed that the quality of life in patients with SSD was strongly correlated with depressive symptom severity and symptom-related cognitive behaviours, which could explain 61.7% of the variance in the quality of life. The findings indicated that the severity of depressive symptoms and the cognitive behaviours towards somatic symptoms in patients with SSD were important prognostic factors of their quality of life impairment.[54] Another study indicated that the SSD-12 total score, symptom severity in the past week, treatment in the past 6 months, anxiety and depression levels, and the number of doctor visits made by patients with SSD were the influencing factors of health-related quality of life, while somatic symptoms had little effect on health-related quality of life and disability.[6] Results from a retrospective, cross-sectional study showed that the Korean-Symptom Checklist 95-Somatization (SCL-95-SOM) score was directly influenced by working memory (b=−0.326, p=0.032), which was significantly influenced by body mass index (BMI) (b=−0.338, p=0.009). However, BMI did not directly affect the SCL-95-SOM score.[55] Among patients with SSD, those who describe themselves as having 'autonomic dysregulation' tend to have higher levels of physical distress and health anxiety than those who do not.[56] A controlled study showed that patients visiting the rheumatology clinic had higher levels of somatosensory magnification, hypochondriasis, alexithymia, higher stigmatising attitudes towards mental illness, poorer quality of life and higher disability than patients visiting the psychiatric clinic.[57]

Culture-related diagnostic issues

In the theory of traditional Chinese medicine (TCM), there is a relationship between emotional activities and organ function, so some symptoms of SSD may correspond to the 'deficiency syndrome' of the organs as described by TCM. For example, a case study from China reported that a patient with SSD attributed his sexual dysfunction symptoms caused by SSD to the traditional Chinese disease of 'kidney deficiency'.[58]

Gender-related diagnostic issues

Eight studies have reported sex differences in SSD. Two of these studies found a higher proportion of female patients with SSD than male patients.[9 59] Two studies identified the female gender as a risk factor for SSD.[43 44] Four studies suggested that women had more severe clinical manifestations, such as stronger anxiety and depressive symptoms, more sensitivity to negative somatic cues, more severe degrees of autonomic dysfunction and worse HRV.[28 30 60 61]

Suicide risk

A recent systematic review showed that SSD is associated with an increased risk of suicidal ideation and suicide attempts, with approximately 24%–34% of patients with current suicidal ideation and 13%–67% with a history of suicide attempts.[62]

Functional consequences

Functional impairment compared with healthy controls

A total of 12 studies have reported on the functional consequences of SSD. Six studies suggested that patients with SSD had poor quality of life, high levels of anxiety and depression, and low medical trust and satisfaction.[6 12 54 60 63 64] Researchers have a general concern for cognitive function, and five studies showed that patients with SSD have worse attention, memory and diseased cognition.[26 59 65–67] Regarding emotional regulation, one study found that patients with SSD and their partners were dysregulated in dealing with each other's negative emotions[68]; another study[63] showed that patients with SSD had a lower ability to distinguish between their own emotions and somatic feelings than healthy controls, but showed no significant differences compared with healthy controls in identifying others' emotions, emotional arousal and responses.

Comparisons with former diagnostic classifications

Three studies compared SSD with SFD, and all suggested that patients with SSD have more severe clinical impairments, such as a heavier physical symptom load, stronger beliefs about health anxiety and disease, higher anxiety and depression levels, more impaired daily function, lower physical and mental quality of life, and worse self-evaluation of treatment effect and treatment satisfaction.[9 11 69]

Relation with SSD severity

A study suggested that SSD severity was associated with somatic distress, health anxiety and anxiety/depression but was not associated with help-seeking attitudes and behaviours.[70]

Health anxiety and somatic symptom burden as predictors

Three studies reported the predictive capacity of health anxiety and somatic burden. A 4-year follow-up study in patients with SSD from a psychosomatic outpatient clinic found that psychological impairment and anxiety symptoms associated with somatic symptoms were predictors of a persistent course of illness. In contrast, depression and somatic symptom severity at baseline did not predict the ongoing course of SSD.[53] Two studies found that psychobehavioural responses related to somatic symptoms were a significant predictor of quality of life,[11] and the severity of somatic symptoms itself was not affected too much.[6]

Differential diagnosis

We haven't found any new studies about differential diagnosis. SSD is often differentiated from illness anxiety

disorder (IAD) and panic disorder, but there are still questions about the utility of IAD differentiation from SSD. In addition, there is controversy about whether panic symptoms are a separate panic disorder or part of SSD.[5]

Comorbidity

Comorbidity with mental disorders

Depression was the most studied comorbidity in SSD and was included in six studies. Five studies found that in patients with SSD with comorbid depression, the degree of depression was correlated with SSD severity, quality of life, social functioning, family function, cognitive and emotional regulation, and personality traits.[60 70–73] Another study found that elevated hsCRP may suggest the risk of comorbid depression in patients with SSD.[32]

The recent review suggests that the comorbidity rate of sleep disorders in patients with SSD is between 20.4% and 48%.[74] Comorbid sleep disorders can lead to more severe, longer, disability-generating symptoms, and a higher number and greater severity of psychiatric comorbidities. However, a study in patients with SSD combined with generalised anxiety disorder and depressive disorder showed that sleep quality was associated with the psychological impact of somatisation, but no significant correlation with anxiety or depression was found.[75]

A study of 54 patients with SSD showed that the incidence of alexithymia was 57.4% and found that patients with alexithymia have more pronounced somatic symptoms and higher levels of thyroid-stimulating hormone (TSH).[76]

Comorbidity with physical conditions, including functional somatic syndromes

A large community study demonstrated an SSD prevalence of 39.13% in patients with type 2 diabetes.[43] Another study of the same sample found an SSD prevalence of 45.3% in older patients with essential hypertension.[44] Furthermore, both studies found more severe somatic symptoms in diabetic, older hypertensive patients with comorbid SSD.

A multicentre cross-sectional study found that 21.6% of patients with breast cancer were diagnosed with SSD. The patients with breast cancer combined with SSD showed higher cancer-related emotional distress and dysfunctional disease perception and behaviour.[38]

Another study showed elevated aminobutyric acid/total creatine levels in the medial prefrontal cortex of patients with Parkinson's disease combined with SSD compared with patients without SSD.[34]

Comorbidity in children and adolescents

We found no new studies in this area. Children and adolescents with SSD may present with comorbid psychogenic and functional breathing disorders.[5]

DISCUSSION

This scoping review summarised the updated data in English between June 2020 and May 2022. It also included data published in the Chinese language between January 2013 and May 2022. Our key research findings are discussed further.

Consistent with the results of the previous review,[5] our research demonstrated that the new diagnosis of SSD has better reliability and validity than its predecessor, SFD. SSD also showed good clinical utility. We found no available updated data regarding individual diagnostic criteria. However, many recent studies demonstrated some potential diagnostic features for SSD, for example, structural and functional changes in the brain, irregular HRV, intestinal dysbiosis and other biomarkers. Unfortunately, these studies have small sample sizes, inconsistent results and conclusions, and are only in the research phase. Thus, whether they can be used as diagnostic criteria in the next few years requires further investigation.[9–11]

In our findings, the prevalence of SSD in the general population was 4.5%.[40] One study using SCID-5-RV as a diagnostic tool reported that after adverse stress events (an earthquake), the prevalence of SSRD was 6.95%.[35] Only one study reported age-related prevalence using the Somatic Symptom Scale-China as the diagnostic tool. This study reported that the prevalence of SSD in older adults (≥60 years) was 63.2%.[52] All other studies reported data from specific clinical settings, most of which were limited by small sample sizes. In these studies, the frequency coverage was wide, ranging from 21.6% to 45.3%.[37–39 43–45] Most of these studies used self-report questionnaires and clinical assessments, which can often lead to an overestimation of the prevalence of mental disorders compared with diagnostic interviews. Much of this data might likely be overestimated. Finally, no study has reported any prevalence data based on SSD severity specifics or other age-adjusted and sex-adjusted prevalence estimates.

There is limited evidence on SSD development, its course and risk factors. Three small sample-sized studies suggested that the female gender, middle and older ages, chronic medical conditions and emotional distress, such as depression and anxiety, might be risk factors for SSD.[35 42 52] Another study showed that patients' willingness to attend a psychiatric clinic was associated with better quality of life and lower disability.[57] Also, the severity of depressive symptoms and the cognitive behaviours related to somatic symptoms in patients with SSD are prognostic factors of quality of life impairment.[54]

Only one systematic review showed that SSD is associated with an increased risk of suicidal ideation and suicide attempts.[62] However, we have found no research-supported evidence regarding suicide risk in SSD. Moreover, there remains no reliable method to differentiate patients at high risk of suicide from those who are at lower risk.[77]

TCM has established a set of theories focusing on the whole body, such as 'syndrome differentiation of eight principles', 'viscera theory' and 'emotional theory', which can give significance to various clinical phenomena and the relationships between them. They also affect the clinical manifestations and disease attributions of

patients with SSD. A primary care-based study[78] found that Chinese patients were more likely to complain of the somatisation attribution of fatigue compared with non-Chinese patients. Therefore, when Chinese patients with SSD present with negative emotions, they tend to describe them as physical discomfort rather than as viewed from a psychological perspective.[79 80] However, the characteristics of SSD in different cultural settings need further study. For example, the female gender may be one of the risk factors for SSD, with women being more likely to develop SSD and having higher SSD severity.[9 28 30 43 44 59 62 64]

In reality, psychological aspects are involved not just in mental disorders but also in many functional disorders and organic diseases that are comorbid with SSD. These psychological symptoms are more clinically valuable than somatic symptoms.[81] Patients' misperceptions and stigma about SSD can influence care-seeking behaviours, such as refusal of psychiatric services.[26 57] In addition, patients' emotional regulation deficits in the medical environment may cause strained doctor–patient relationships.[82] Furthermore, psychological impairments may lead to a persistent disease course and low quality of life.[53] A previous study of patients with fibromyalgia syndrome (FMS) has also found that psychological symptoms of SSD were simultaneously and prospectively associated with the severity indicators of FMS and that the psychological B criteria of the SSD criteria in the DSM-5 were clinically relevant for diagnosis, prognosis and intervention purposes.[83] However, other studies also proposed that the B standard criteria for SSD were unrelated to help-seeking attitudes and behaviours.[70] These discrepancies may be related to the different study samples.

Patients with SSD also commonly have comorbid psychiatric disorders and medical conditions. Researchers have begun to explore the intrinsic biological associations, such as C reactive protein and TSH, associated with comorbid depression and alexithymia, respectively.[32 76] At the same time, studies have found that the prevalence of SSD is 21.6%–45.3% in patients with somatic diseases such as hypertension, diabetes and breast cancer,[38 43 44] which indicates the necessity of screening for SSD in various clinical departments.

CONCLUSION

The DSM-5, published in May 2013, reclassified SFD as SSD. This new diagnostic criterion aims to clarify the reason for the replacement, which is to remove the dualistic implications of its predecessor, reduce diagnostic overlap, improve the sensitivity and specificity of diagnosis, and reduce patient omissions. Like the previous review of SSD, our research findings also indicate that the new DSM-5 diagnosis does have good validity and clinical utility. However, a research gap remains regarding SSD reliability, population-based prevalence, suicide risk, etc. Furthermore, future changes in the ICD-11 diagnoses, specifically bodily distress disorder, will require further scientific research.

According to findings of the previous scoping review and this updated result, research in recent years has led to a better understanding of the new diagnosis of SSD. The revision and evaluation of the diagnostic criteria are based on clinical practice. The use of diagnostic criteria derived from local clinical practice in various cultural backgrounds requires more practical testing, as somatisation and functional somatic symptoms are inextricably linked to culture. To develop the SSD diagnosis for China, researchers within the country can draw on the advanced experience of foreign countries, integrate local clinical practice experiences, and create or reform the diagnostic criteria that have been adapted to the local cultural background.

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