Neuropsychiatric Disease and Treatment

Dovepress
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ORIGINAL RESEARCH

Prevalence and Clinical Correlates of Anxiety in Chinese Outpatient Population with Somatic Symptom Disorder

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Background: Anxiety is highly prevalent among patients with Somatic Symptom Disorder (SSD) and is strongly associated with adverse outcomes. However, its associated factors remain largely unexplored. This study aimed to investigate the incidence of anxiety and its related factors in patients with SSD.

Methods: A total of 899 patients with SSD were recruited. Anxiety levels were assessed using the 17-item Hamilton Anxiety scale (HAMA-17). Clinical features, including depressive and psychiatric symptoms, were measured alongside physiological measures, such as fasting blood glucose, blood pressure, lipid profiles, and thyroid levels. Binary logistic regression models were used to identify independent correlates of anxiety.

Results: The prevalence of anxiety symptoms in Chinese patients with SSD is 67.41%. Compared to patients without anxiety, patients with anxiety symptoms had higher Hamilton Depression (HAMD) score, higher suicide attempt rate, psychotic symptoms, and higher levels of some physiological indicators. Binary logistic analysis indicated that HAMD score, suicide attempts, antithyroglobulin (A-TG), and diastolic blood pressure (DP) levels were correlated with anxiety symptoms in patients with SSD.

Conclusion: This study highlights the high prevalence of anxiety in patients with SSD. Anxiety is associated with depression, suicide attempts, A-TG, and DP levels in patients with SSD. While causality cannot be established due to the cross-sectional design, these findings highlight potential clinical markers that may help identify patients at higher risk of anxiety and provide a basis for future longitudinal studies to explore underlying mechanisms.

Keywords: somatic symptom disorder, anxiety, depression, blood pressure, thyroid function

Introduction

Somatic symptom disorder (SSD) is a disorder in the DSM-5 category of "Somatic Symptom and Related Disorders," replacing the former somatoform disorder.[1] It is characterized with somatic distress, cognition catastrophizing, health anxiety, and excessive reaction to somatic discomfort.[2] As the DSM-5 criteria are still new, SSD prevalence in different countries is not well known. Therefore, estimates of SSD prevalence are mainly based on the literature on somatoform disorders. In western countries, somatoform disorders have a substantial presence in primary care, with prevalence estimates ranging 11.7–30.3%.[3–6] A recent scoping review reported a mean frequencies of 12.9% for SSD in the general population.[7] In China, using DSM-5 criteria, Cao et al found that 33.8% of enrolled general hospitals outpatients were diagnosed with SSD.[8] It has been reported that SSD was associated with functional impairment, such as poor quality of life,[9,10] poor neurocognitive performance,[11] lower physical and mental health, and a higher incidence of disability pensions relative to the reference group.[12]

https://doi.org/10.2147/NDT.S548264
Received: 8 July 2025
Accepted: 13 January 2026
Published: 20 January 2026

Somatic symptoms are often considered as a defense mechanism against emotional distress.[13] The DSM-5 has updated the diagnostic criteria to focus not only on the somatic symptoms but also on the impact on an individual's emotions, thinking, and behavior.[14] Multiple studies demonstrate a strong correlation between anxiety and somatic symptoms. For instance, a study reported that children with generalized anxiety disorder had greater somatic symptoms than those without generalized anxiety disorder.[15] In addition, a large cross-sectional study demonstrated a high overlap between depression, anxiety, and somatoform disorders.[16] The prevalence of somatic symptoms is significantly higher in patients with depression or anxiety disorders compared to healthy controls.[17] Specifically, according to a survey, 52.9% of individuals with SSD exhibited anxiety symptoms.[18] Similarly, Leiknes et al reported that 45% of severe SSD cases were comorbid with anxiety or depression.[19] Previous studies consistently show high comorbidity between SSD and anxiety, but data on Chinese SSD patients remain limited. Moreover, somatic symptoms are a culturally normative way of expressing distress in Eastern, interdependent cultures. Individuals in these cultures often report physical complaints rather than psychological or emotional experiences, in contrast to Western populations.[20] Consequently, Eastern populations tend to be more prone to experience and express pain via somatic pathways. For example, in Chinese patients with chronic fatigue, the most troublesome symptoms mentioned were pain, insomnia and worries.[21] Together, these findings suggest a bidirectional relationship in which anxiety may exacerbate somatic symptoms, and somatic symptoms may in turn increase anxiety, collectively reinforcing the clinical burden of SSD. This highlights the the need to pay attention to the psychological distress of SSD patients, as well as the necessity of further clarification of the prevalence of these comorbid conditions, especially in the Chinese population.

Moreover, the maladaptive psychological factors, such as health-related anxiety, were considered transdiagnostic factors in the development and treatment of somatic symptoms.[22] A study conducted in Taiwan compared anxiety levels across different disorders and found that somatoform disorders and panic disorder exhibit higher anxiety levels than other depressive or anxiety disorders.[23] Clinical evidence consistently shows that comorbid conditions (versus only a single disorder) aggravate quality of life impairments.[24] These comorbidity patterns exacerbate both psychological and physical symptoms, resulting in a greater burden on both the individual and healthcare systems. Thus, while causality cannot be established in cross-sectional studies, addressing anxiety in SSD patients is likely to be clinically beneficial, as reducing anxiety could potentially improve functional outcomes and reduce symptom severity. Patients with SSD and comorbid anxiety experience higher stress and greater functional and physical impairment than those with somatoform disorder alone.[25,26] Specifically, patients with SSD and comorbid anxiety but not depression show significantly higher rates of outpatient and emergency department visits.[27] These severe clinical outcomes highlight the necessity for early detection and treatment of anxiety in SSD. In addition, although previous studies have consistently found high comorbidity between SSD and anxiety, specific factors contributing to this relationship have not been thoroughly examined.

Recent studies in Chinese hospital settings have provided important insights into the comorbidity between SSD and anxiety. Xiong et al reported that psychological distress was more prevalent in patients with high somatic symptom burden, with women and frequent health-care utilizers being particularly vulnerable.[28] More recently, Fu et al showed that SSD was more common among women and individuals with lower educational levels, and was strongly comorbid with anxiety and depression in cardiology outpatients.[29] Xu et al further showed across multiple clinical settings that depressive symptoms, anxiety, and stress significantly increase the risk of psychosomatic illnesses, with women and low education levels being key susceptibility factors.[30] While these studies have improved understanding of the comorbidity of SSD and anxiety in China, their focus remains largely on psychosocial and demographic factors.

Additionally, significant evidence links thyroid hormone levels and metabolic dysfunctions to anxiety. Recent studies indicated that anxiety was associated with an increased risk of thyroid diseases[31] and metabolic syndrome.[32] Consistent with this, a large population-based study in China reported that elevated thyroid-stimulating hormone (TSH), indicative of subclinical hypothyroidism, was significantly associated with higher levels of depressive and anxiety symptoms[33] The risk of developing an anxiety disorder is markedly higher in patients with autoimmune thyroiditis compared to healthy controls, supporting the involvement of immune mechanisms in anxiety.[34] Specifically, patients with autoimmune thyroiditis characterized by elevated anti-thyroglobulin antibodies (A-TG) show a substantially increased risk of anxiety disorders, further implicating thyroid autoimmunity as a biological contributor to anxiety.[34] A cross-sectional study highlighted a concerning prevalence of metabolic syndrome among psychiatric patients, regardless of their specific

diagnoses.[35] Meanwhile, a systematic review and meta-analysis found a positive association between anxiety and hypertension.[36] Anxiety and hypertension often co-exist, and the underlying mechanisms of this comorbidity include gut dysbiosis, inflammatory mediators such as interleukin-6, overactivation of the HPA axis, and central nervous system pathways.[37] Moreover, elevated blood pressure remains significantly correlated with anxiety symptoms even in healthy individuals without cardiovascular or metabolic disease, suggesting that hypertension may be an early physiological risk marker for anxiety.[38] However, there is a lack of information concerning the relationship between thyroid hormone levels or metabolic function and anxiety in Chinese patients with SSD.

While our previous studies with this patient group have examined psychotic symptoms and their psychological risk factors,[39] and explored the interconnectedness of anxiety, depression, and suicidality through network analysis,[40] the prevalence of comorbid anxiety in SSD within Chinese cultural context and its biological correlates remain uncharacterized. To address this gap, we aim to contextualize anxiety comorbidity within the Chinese cultural background and pioneer research into thyroid and metabolic markers as potential correlates of anxiety. Specifically, our current study aimed to (1) investigate the prevalence and clinical profiles of anxiety and (2) identify relevant factors significantly correlated with comorbid anxiety in Chinese outpatients with SSD.

Methods

Study Design and Participants

The study was conducted in Ganzhou, Jiangxi Province, China, at the First Affiliated Hospital of Gannan Medical University, Third People's Hospital of Ganzhou, and Ganzhou People's Hospital. Participants were recruited from the outpatient psychiatry departments of these three hospitals. Between January 2023 and April 2024, a total of 1068 patients who visited the psychiatry outpatient clinics were screened for eligibility. This study involved enrolling 1068 patients between January 2023 and April 2024. All respondents provided basic demographic data and provided laboratory test results. Demographic factors included age, gender, marital status, education level, age of onset, duration of illness, BMI, suicide attempts, and psychotic symptoms. The Third People's Hospital of Ganzhou's Institutional Review Board approved this study (No. gzsyy2024044). Before participating in this trial, all patients gave informed consent, and the data was kept anonymous.

The inclusion criteria for the study were: (1) Chinese Han nationality, determined by participants' self-report; (2) 18–60 years of age; (3) diagnosed with SSD by two experienced psychiatrists with specialized training, according to DSM-5 criteria;[1] and (4) provide written informed consent. Before making definitive diagnoses, they were discussed in our weekly team meeting and double-checked by a supervising senior physician with many years of clinical experience. A total of 997 patients met the inclusion criteria, and 73 patients were excluded due to the following health-related conditions: (1) pregnancy or lactation (n = 23), (2) substance use disorder (n = 25), (3) severe personality disorder (n = 13), and (4) debilitating physical diseases (n = 12). Additionally, 20 patients refused to participate, and 5 were excluded for other unknown reasons, totaling 98 exclusions.

Clinical Assessment

The 17-item HAMD scale was used to assess the severity of depression in patients with SSD,[41] which has been widely confirmed to have good validity and dependability in China. The total HAMD score was used to assess the presence and severity of depression.

The 14-item HAMA was used to assess the patient's anxiety symptoms, with a total score of 56 and Cronbach's $\alpha = 0.92$. Each item was scored 0–4 (none, mild, severe, and extremely severe). It has been confirmed that the Chinese version of the scale has good validity and reliability. According to Hamilton's study, total scores of 18–24 and 25–30 were rated as mild-to-moderate and moderate-to-severe anxiety, respectively.[42] Participants in this study were divided into groups based on the presence or absence of anxiety symptoms, using a cut-off point of 18.

A suicide attempt is an action wherein an individual aims to induce death but does not succeed. In this study, the researchers inquired whether the patients had ever attempted suicide during their lifetime.[43] Individuals who had

attempted suicide were classified as having a history of suicide attempts. When the answer seemed ambiguous, family members were contacted to provide specifics.

The psychotic symptoms were assessed by the Positive and Negative Syndrome Scale (PANSS) positive subscale.[44] The scores for the seven questions ranged from 1 to 7, with 49 being the highest. The criterion for a patient with psychotic symptoms was a score of ≥15, with Cronbach's $\alpha = 0.94$.[45]

Two skilled and specially trained psychiatrists who had no prior knowledge of the subject's clinical data conducted structured clinical interviews to assess HAMD, HAMA, psychotic symptoms, and history of suicide attempts. Demographic information (age, gender, education, marital status, etc.) was self-reported by patients. To ensure reliability, HAMD and HAMA assessments were independently rated by two psychiatrists, with inter-rater correlation coefficients for total scores consistently exceeding 0.8.

Blood Samples and Measurements

Blood samples were taken between 6:00 and 8:00 a.m. following an overnight fast to ensure uniformity of clinical biomarkers, and all measurements were completed on the same day before 11:00 a.m. After the blood samples were sent to the hospital testing center, biochemical indicators, such as total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), anti-thyroid peroxidase (A-TPO), free T3 (FT3), free T4 (FT4), anti-thyroglobulin (A-TG), and thyrotropin (TSH) were analyzed from the blood samples. Additionally, the patient's systolic blood pressure (SBP), diastolic blood pressure (DBP), and body mass index (BMI) were also measured.

Statistical Analysis

Frequencies and percentages represented categorical data, whereas the mid-quartile range was utilized for non-normally distributed continuous variables. To screen for independent variables associated with anxiety in SSD patients, we first performed univariate analysis in which Mann–Whitney *U*-test and chi-square test were used, as appropriate, to compare between-group differences in the variables of interest. The multi-comparison was adjusted using the Bonferroni correction. Variables that differed significantly in the univariate analysis were subsequently included in a binary logistic regression. Relevant variables used in this procedure included socio-demographic and clinical characteristics (age, gender, marital status, education level, age of onset, duration of illness, BMI, HAMD, suicidal attempts, psychotic symptoms), and metabolic and cardiovascular characteristics (TSH, A-TG, A-TPO, FT3, FT4, FBG, TC, TG, HDL-C, LDL-C, SP, DP). SPSS 29.0 was used to statistically analyze the data using a two-tailed approach with $p < 0.05$ as a significance threshold. GraphPad Prism 9 was used to plot graphs.

Results

Anxiety Prevalence in Patients with SSD

In this study, 67.41% (696/899) of patients with SSD had anxiety symptoms, of which 83.33% (580/696) had mild-to-moderate and 16.67% (116/696) had moderate-to-severe anxiety symptoms.

Demographic and Clinical Characteristics of SSD Patients with and without Anxiety

As shown in Table 1, patients with SSD and anxiety had higher HAMD ($Z = -11.694$, $p < 0.001$) than the group without anxiety. In addition, the group with anxiety had greater suicide attempts ($\chi^2 = 42.271$, $p < 0.001$) and psychotic symptoms ($\chi^2 = 25.731$, $p < 0.001$) compared to the group without anxiety.

Patients with anxiety had higher levels of TSH ($Z = -5.298$, $p < 0.001$), A-TG ($Z = -4.138$, $p < 0.001$), A-TPO ($Z = -5.341$, $p < 0.001$), FBG ($Z = -3.227$, $p = 0.001$), TC ($Z = -6.969$, $p < 0.001$), HDL-C ($Z = -3.476$, $p = 0.001$), LDL-C ($Z = -5.48$, $p = 0.001$), SP ($Z = -4.667$, $p = 0.001$), and DP levels ($Z = -4.925$, $p < 0.001$) than those without anxiety. All significances passed the Bonferroni correction (Bonferroni corrected $p < 0.05/23 = 0.0022$). However, no significant differences existed in any demographic variables, including age, gender, marital status, and education level ($p > 0.05$).

Table 1 Demographic and Clinical Characteristics in SSD Patients with and without Anxiety

Variables	NA-SFD (n=203)	A-SFD (n=696)	Z/χ2	*p*
Age (years, Median/IQR)	30(23,43)	33(24,45.75)	−1.414	0.157
Gender, n (%)			1.262	0.261
Male	79 (38.9)	241 (34.6)		
Female	124 (61.1)	455 (65.4)		
Marital status, n (%)			0.315	0.575
Unmarried	69 (34)	222 (31.9)		
Married	134 (66)	474 (68.1)		
Education level, n (%)			1.476	0.224
Bachelor below	142 (70)	455 (65.4)		
Bachelor above	61 (30)	241 (34.6)		
Age at onset(onset (years, Median/IQR)	30(23,43)	33(24,45)	−1.449	0.147
Llness duration (months, Median/IQR)	11(9,14)	11(9,14)	−0.319	0.75
BMI (kg/m2)	24.22(23.2,25.46)	24.195(23.15,25.6)	−0.103	0.918
HAMD	21(19,23)	24(22,26)	−11.694	<0.001
Attempted suicide, n (%)			42.271	<0.001
No	197 (97)	523 (75.1)		
Yes	6 (3)	173 (24.9)		
Psychotic symptoms, n (%)			25.731	<0.001
No	202 (99.5)	605(86.9)		
Yes	1 (0.5)	91 (13.1)		
TSH (uIU/mL, Median/IQR)	4.27(2.72,5.53)	5.215(3.1325,7.1875)	−5.298	<0.001
A-TG	18.61(12.69,25.44)	21.64(15.125,57.9125)	−4.138	<0.001
A-TPO	13.56(11.31,21.81)	18.85(12.52,37.2625)	−5.341	<0.001
FT3 (pmol/L, Median/IQR)	4.94(4.36,5.41)	4.885(4.38,5.3775)	−0.295	0.768
FT4 (pmol/L, Median/IQR)	16.53(14.52,19.1)	16.585(14.3425,18.7475)	−0.625	0.532
FBG (mmol/L, Median/IQR)	5.19(4.84,5.58)	5.38(4.9225,5.81)	−3.277	0.001
TC (mmol/L, Median/IQR)	4.56(4.18,5.37)	5.31(4.545,6.1175)	−6.969	<0.001
TG (mmol/L, Median/IQR)	1.25(1.03,1.44)	1.23(1,1.42)	−1.364	0.173
HDL-C (mmol/L, Median/IQR)	1.7(1.29,2.48)	2.02(1.43,2.815)	−3.476	0.001
LDL-C (mmol/L, Median/IQR)	2.55(2.13,3.2)	3(2.4,3.5875)	−5.48	<0.001
SP (mmHg, Median/IQR)	118(110,123)	120(112.25,128)	−4.667	<0.001
DP (mmHg, Median/IQR)	74(70,78)	76(72,80)	−4.925	<0.001

Abbreviations: BMI, body mass index; HAMD, 17-item Hamilton Rating Scale for Depression; HAMA, 14-item Hamilton Anxiety Rating Scale; TSH, thyroid-stimulating hormone; A-TG, antithyroglobulin; A-TPO, thyroid peroxidase antibody; FT3, free triiodothyronine; FT4, free thyroxine; FBG, fasting blood glucose; TC, total cholesterol; TG, triglyceride; HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; SP, systolic blood pressure; DP, diastolic blood pressure.

The Risk Factors of Anxiety in Patients with SSD

A binary logistic analysis was performed to analyze the anxiety risk factors among patients with SSD. The group with or without anxiety was used as the dependent variable, and the variables that differed significantly in the univariate analysis were used as independent variables. As shown in Figure 1, higher A-TG levels (B = 0.002, $p = 0.031$, OR = 1.002), higher DP levels (B = 0.044, $p = 0.028$, OR = 1.045), higher HAMD scores (B = 0.361, $p < 0.001$, OR = 1.435), and a history of suicide attempts (B = 1.67, $p < 0.001$, OR = 0.188) were independently associated with an increased likelihood of comorbid anxiety in SSD patients. The OR < 1 for suicide attempts indicates a higher risk of anxiety, as the variable was coded as 0 = "yes" and 1 = "no".

Given the higher prevalence of SSD in women, we conducted a gender-stratified analysis. The results showed distinct predictors by gender: for men, significant predictors in the binary logistic regression were DP levels, suicide attempt, and HAMD scores, as shown in Supplementary Table 1; for women, significant predictors were A-TG, suicide attempt, and HAMD scores, as detailed in Supplementary Table 2.

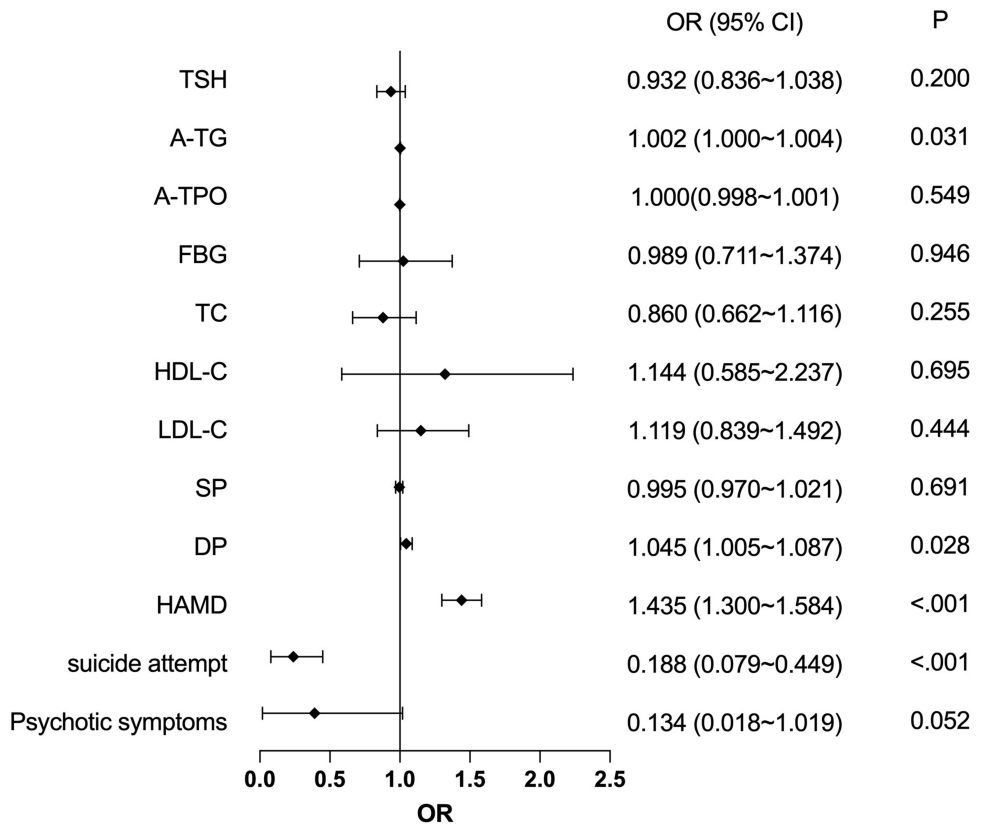

Figure 1 Factors associated with anxiety symptoms of patients with SSD.

Discussion

To the best of our knowledge, this study is the first to explore the clinical correlates of anxiety in Chinese outpatients with SSD. The principal findings of our research are: (1) the prevalence of anxiety symptoms among Chinese outpatients with SSD is 67.41%; (2) participants exhibiting anxiety symptoms demonstrated elevated scores on HAMD, a higher rate of suicide attempts, increased psychotic symptoms, and elevated levels of TSH, A-TG, A-TPO, FBG, TC, HDL-C, LDL-C, SP, and DP compared to subjects without anxiety, with no differences in demographic variables; and (3) subsequent binary logistic analysis corroborated that HAMD score, suicide attempts, A-TG, and DP levels were correlated with anxiety symptoms.

Our study revealed that anxiety incidence in patients with SSD was as high as 67.41%. A study conducted in Finland reported that 65.7% of patients with somatic symptom and related disorders had anxiety,[11] and another study also reported a 63.8% anxiety prevalence in adult outpatients with SSD and associated disorders.[46] These findings suggest that the comorbidity rate of anxiety in SSD patients is relatively consistent across different cultural contexts, showing no marked cross-cultural differences. Although previous research indicates that Eastern populations often express distress somatically rather than verbally describing their emotions,[47] such differences in expression do not imply the absence of underlying emotional distress. However, another study conducted in Taiwan showed lower prevalence of comorbidity; only 6.57% of patients with SSD had anxiety.[27] An important reason for this inconsistency may be related to sample selection. In the Taiwan study, participants were selected from general population, whereas our study recruited hospital outpatients, who opting to seek care only when symptoms are severe due to stigma.[48] Therefore, the incidence of anxiety in our study is higher, and 16.67% of them had moderate-to-severe anxiety symptoms, indicating a need for routine assessment of anxiety in patients with SSD.

In the present study, no significant differences were identified in any demographic characteristics between subjects with and without anxiety. Even though we found that among SSD patients with comorbid anxiety, 64.4% were female and 35.6%

were male, which was in agreement with multiple studies showing that women are more likely to report somatic symptoms,[3,16] no significant gender difference was found between SSD patients with and without comorbid anxiety, which was in line with a study conducted in Norway that found an association between somatic symptoms and anxiety in both genders.[49] Although group differences in HAMD score, suicide attempts, psychotic symptoms, TSH, A-TG, A-TPO, FBG, TC, HDL-C, LDL-C, SP, and DP levels were evident in univariate analysis, these differences were not significant in further binary logistic regression analysis, except for HAMD score, suicide attempts, A-TG, and DP levels.

In the binary logistic regression analysis, we found that the HAMD score was recognized as an independent risk factor for anxiety symptom in patients with SSD. Studies have consistently found that anxiety and depression are highly correlated with each other, as they share genetic risk, such as a personality trait of neuroticism.[50,51] They also share non-genetic risk factors, such as parenting style, trauma or neglect, and current stress exposure, which are also associated with somatic symptoms.[52,53] Our findings indicate that depressive and anxiety symptoms often co-occur, highlighting the increased complexity and challenges associated with treating such multifaceted manifestations of somatoform disorders.

According to our study, a history of suicide attempts was associated with comorbid SSD and anxiety. Several factors may explain this finding. First, significant anxiety symptoms are a common indicator of poorer clinical outcomes across psychiatric disorders. For example, a cross-national study found that patients with anxious major depressive disorder, compared with patients with non-anxious major depressive disorder, were found to have more suicidal ideation.[54] Second, a comprehensive study showed that somatization is linked to risky and disruptive behaviors like drinking and smoking when it is accompanied by anxiety, depression, and withdrawal. This association might reflect problems in emotion and anger regulation.[53] Third, previous research indicates that SSD with comorbid anxiety places a greater burden on both patients and their caregivers' daily lives.[26,55] Therefore, this added burden may lead to increased feelings of guilt, which can increase the risk of suicide attempts. Furthermore, compared to general population, patients with SSD have lower self-compassion, which is related to more physical symptoms and lower quality of life.[56] This lack of self-compassion may also exacerbate suicide risks when they cannot tolerate serious distress.[57] However, the exact mechanisms linking anxiety and suicide attempts in patients with SSD remain unclear, warranting further research.

Our study is the first to show that higher A-TG levels were associated with comorbid SSD and anxiety. Many studies have examined the association between thyroid dysfunction and anxiety. A systematic review noted that nearly all 20 eligible studies found that comorbidity between anxiety and thyroid disorders was significant.[58] Thyroid hormones play a crucial role in regulating mood and mental health. A study reported that A-TG and A-TPO levels were significantly positively correlated with HAMA in FEDN patients with MDD.[59] Elevated A-TG levels indicate an autoimmune response against the thyroid gland; this autoimmune activity may lead to subclinical thyroid dysfunction, which may cause anxiety.[60] Meanwhile, abnormal thyroid function is also closely related to somatization. A cross-sectional study discovered a correlation between thyroid gland function abnormalities and the onset of somatic symptoms in thyroid disease outpatients.[61] We observed a significant, albeit small, association between elevated A-TG levels and anxiety symptoms. Our finding suggests a potential role of thyroid autoimmunity in anxiety among SSD patients. Small effect sizes are common in complex psychological phenomena and should not be dismissed, as they may reflect reliable, distributed contributions rather than isolated effects,[62] while future longitudinal studies are needed to clarify whether monitoring thyroid function or thyroid-targeted interventions could benefit patients.

Another finding of our study was that hypertension was a risk factor for anxiety in patients with SSD. Patients with SSD and anxiety have higher DP levels. Previous studies have demonstrated that BP and anxiety are closely related.[36,63] Moreover, hypertension was linked to multiple psychiatric disorders. For example, in depressive disorders, there is a bidirectional risk relationship between depression and hypertension.[64] In somatoform disorders, an investigation reported that hypertension is a common comorbidity in the somatoform group.[65] This association may be because negative emotions are a common etiological factor for both hypertension and somatic symptoms. A study on middle-aged and older people showed negative affectivity was significantly associated with higher systolic and diastolic blood pressure.[66] Negative affectivity had a higher risk of suffering from a somatoform disorder 1–4 years later.[67] Thus, we speculate that higher DP and negative emotions interact and cumulatively increase the anxiety risk in patients with SSD.

Limitations

This study had many limitations. First, we used static data from a single time point, making it impossible to infer causality and capture dynamic associations and mechanisms. As evidence showed that medically unexplained symptoms have dynamic trajectories and volatility,[68] it would be better to collect longitudinal data in future. Secondly, we gathered data on suicide primarily through interviews with patients and/or their relatives, encompassing a substantial time frame, specifically their lifetime, which could be affected by recall bias, and it was impossible to evaluate suicide quantitatively. Third, numerous factors may influence thyroid hormone and metabolic indicator levels, which could fluctuate over time. Furthermore, information on medication use was not collected, which may have influenced the severity of anxiety. And the participants were sourced only from three hospitals in Ganzhou, Jiangxi province. Hence, the findings of this study must be regarded with caution when extrapolated to other populations or regions.

Conclusions

In conclusion, our study found that the anxiety rate in patients with SSD was 67.41%, suggesting the importance of regular assessment and early intervention of anxiety. Moreover, the findings highlight the high prevalence of anxiety, emphasizing its significant correlation with HAMD scores, suicide attempts, and levels of A-TG and DP in Chinese SSD patients. While the cross-sectional design precludes causal inferences, the results underscore the potential relevance of monitoring anxiety symptoms and associated clinical and biological characteristics in SSD patients and provide a foundation for future longitudinal studies to explore the underlying mechanisms.

Data Sharing Statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics Approval and Consent to Participate

The ethical review of this study is strictly enforced in accordance with the *declaration of Helsinki*. The studies involving human participants were reviewed and approved by the *Ethics Committee of the Institute of Third People's Hospital of Ganzhou*. The patients/participants provided their written informed consent to participate in this study. (IRB: Ethics Committee of the Institute of Third People's Hospital of Ganzhou, Ethical code: gzsyy2024044).

Acknowledgment

We acknowledge all study participants and all mental health professional in selected clinic for their support and help.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This work was supported by the Federation of Social Sciences of Jiangxi Province (H.T., grant number, 23ZXSKJD51).

Disclosure

The authors declare no conflicts of interest in this work.

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