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Functioning and quality of life in patients with somatic symptom disorder: The association with comorbid depression

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ABSTRACT

Objectives: Patients with somatic symptoms often have impaired functioning and reduced quality of life (QOL), but the factors identified as responsible for these impairments vary between studies. We examined functioning and QOL in patients with somatic symptom disorder (SSD), exploring their associations with demographic factors, personality traits and psychological features.
Methods: The sample comprised 107 SSD patients and 100 healthy controls. Several types of self-report instrument were administered. Group differences were assessed with independent *t*-tests. We used multiple linear regression to examine relationships between the independent variables and functioning and QOL. Finally, we used structural equation modeling (SEM) to perform path analysis and examine the fit of a model based on the earlier results.
Results: Most function scores were lower in SSD patients than in healthy controls. In SSD patients overall WHO Quality of Life-BREF (WHOQOL-BREF) score was correlated with exercise level and Beck Depression Inventory-II (BDI-II) score. There were also associations between Sheehan Disability Scale (SDS) score and age, novelty seeking, Cognitions About Body and Health Questionnaire (CABAH) score and BDI-II score. Family APGAR score was only related to BDI-II score. Path analysis revealed that BDI-II score was related to all three indices of functioning.
Conclusions: Depression is associated with functioning and QOL in SSD patients.
Trial registration information: The Research Ethics Committee of National Taiwan University National Taiwan University Hospital approved this study (approval number: 201507007RINB).

1. Introduction

Somatic symptom disorder (SSD) is the prototype diagnosis for somatic symptom and related disorders in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (DSM-5). Its features include somatic distress, a catastrophizing cognitive style, health anxiety and excessive responses to somatic discomforts [1]. It overlaps with somatization disorder, undifferentiated somatoform disorder and pain disorder in the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) and the *International Statistical Classification of Diseases and Related Health Problems*, tenth revision (ICD-10), but puts more emphasis on psychological features. SSD also overlaps with medically unexplained symptoms and functional symptoms in non-psychiatric fields [1,2]. SSD tends to be chronic. Patients frequently seek medical help and their symptoms may affect their job, life and interpersonal relationships [3]. Functioning and quality of life (QOL) are often the main concern of patients and should be the main targets of psychotherapy [4], so understanding determinants of level of functioning and QOL in SSD is of clinical importance.

Functioning and QOL are broad concepts relating to performance and feelings [5]. In general terms, functioning is related to performance and ability whereas QOL is related to subjective feelings, but there is overlap between the two concepts. Some studies have examined functioning in patients with SSD (or somatoform disorders or medically unexplained symptoms). It has been shown that both the somatic and psychological aspects of SSD interact with functioning [6–14]. Physical functioning and QOL have been shown to be related to SSD severity [13,14]. Pain and dizziness were found to affect QOL [6,11]. In one study individuals with medically unexplained symptoms had lower QOL than patients with medically explained symptoms [8]. In patients with fibromyalgia and somatoform pain disorder [10,15] QOL is negatively related to use of a catastrophizing cognitive style. Bodily weakness and somatic and psychological attribution are important

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predictors of functioning in these patients [16]. The illness behavior of patients with conversion disorder affects their QOL [12]. In hypochondriasis avoidance is negatively correlated with QOL [7]. In the Chinese population both somatic symptoms and health anxiety were found to have meaningful associations with functional impairment [9]. In summary, the somatic symptom constructs, the populations and tools used for evaluation vary between studies, making it difficult to interpret the extant evidence. Further investigation of the factors associated with functioning and QOL in SSD patients is necessary.

Comorbid anxiety and depression are common problems in SSD patients. Major depressive disorder, generalized anxiety disorder and panic disorder are common comorbidities of somatoform disorders [2]. Like SSD, anxiety and depression also affect functioning. Several studies have pointed out that the impact of the above emotional comorbidities is no less than that of the somatic symptoms [17–19]. Husain et al. [18] found that anxiety and somatic symptoms had a strong influence on QOL. Aigner et al. [17] pointed out that depression is related to QOL. A study of somatoform pain disorder in Chinese patients [19] found that pain, depression and anxiety all affected QOL. To our knowledge, however, most studies only investigated some of the complex of somatic and emotional features associated with SSD. Analysis of the comorbidities would provide us with a deeper understanding of functional impairment in SSD, so this was another goal of our study.

2. Materials and methods

2.1. Procedure

This cross-sectional study was performed during 2016–2017 in the Yun-Lin Branch of the National Taiwan University Hospital (NTUH). The Institutional Review Board of NTUH approved the study design. SSD patients (diagnosed by board-certified psychiatrists using DSM-5 criteria) were recruited from the psychiatric outpatient department of Yin-Lin Branch, NTUH and healthy individuals without a psychiatric history were recruited by posting advertisements in the hospital and nearby communities. Most SSD patients had self-referred to the psychiatric clinic because they were concerned about their somatic symptoms. All SSD patients that met the inclusion criteria were invited to participate. The following exclusion criteria were applied: (1) age <20 years or >70 years; (2) presence of reality disturbance; (3) presence of cognitive impairment or inability to complete the questionnaires used in this study; (4) presence of lethal physical disease. Data were collected from individuals after they had provided informed consent. We invited 114 SSD patients to participate, of whom 5 were unwilling to participate and 2 did not provide all required data, leaving a final sample of 107 SSD patients. There were 100 healthy controls.

We collected data on demographic variables, personality traits, psychological states, functioning and QOL. The Tridimensional Personality Questionnaire (TPQ) was used to assess personality. We distinguished between psychological states associated with SSD and with comorbid emotional disturbance. The former were assessed with the Patient Health Questionnaire-15 (PHQ-15), Health Anxiety Questionnaire (HAQ), Scale for the Assessment of Illness Behavior (SAIB) and Cognitions About Body and Health Questionnaire (CABAH); the latter were assessed with the Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory (BAI) and Penn State Worry Questionnaire (PSWQ). The WHO Quality of Life-BREF (WHOQOL-BREF), Sheehan Disability Scale (SDS) and Family Adaptability, Partnership, Growth, Affection, and Resolve (Family APGAR) score were used to assess functioning and QOL. Completion of the above questionnaires took about an hour. All data for a given subject were collected during a single day.

2.2. Psychological measurements

Three instruments were used to evaluate QOL and functioning: the WHOQOL-BREF (focuses on QOL); SDS (focuses on general functioning); Family APGAR (focuses on family functioning). The WHOQOL-BREF is the shortened version of the WHO Quality of Life-100 questionnaire and it evaluates multiple facets of QOL [20]. There are 26 items in the international version of WHOQOL-BREF; the Taiwanese version based on research by Yao et al. [21] comprises 28 items divided into two overall QOL questions and questions relating to four specific domains of QOL: physical, psychological, social, and environmental; responses are given using five-point Likert scales. A psychometric study in Taiwan revealed that the WHOQOL-BREF has good internal consistency (Cronbach's alpha = 0.91; Yao et al., 2002). The SDS is a tool for evaluating functional impairment and consists of three items, dealing with occupational/academic, social and family functioning that are scored on 0–10 scales, with higher scores representing greater functional impairment [22]. The SDS has been shown to discriminate between individuals with and without a psychiatric diagnosis [23]. Leu et al. [24] examined the validity and reliability of the Chinese version of the SDS. The family APGAR consists of five items relating to adaptability, partnership, growth, affection and resolve within the family [25]. It measures family functioning and can reflect the interaction of family members. Responses are given using a three-point Likert scale (0–2) and higher scores indicate better family functioning. Chau et al. [26] developed a Chinese version and analyzed its psychometric properties.

We used four questionnaires to evaluate the features of SSD. The PHQ-15 was designed by Kroenke et al. [27] for measurement of somatic distress, which relates to criterion A of SSD. It consists of 15 items scored on a 0–2 scale. The reliability and validity of the Chinese version have been examined [28]; its Cronbach's alpha was 0.86. The HAQ, SAIB and CABAH are all related to criterion B of SSD. The HAQ measures general health anxiety and hypochondriac ideation, whilst the SAIB and CABAH mainly assess behavioral and cognitive aspects of SSD, respectively. The HAQ was developed by Lucock and Morley [29]. It consists of 21 questions scored using a 0–3 scale. In our sample its Cronbach's alpha was 0.96. The SAIB (25 items) and CABAH (39 items) were both developed by Rief et al. [30,31] and responses are given using four-point Likert scales; in our sample both scales had a Cronbach's alpha of 0.87.

Three self-report inventories were used to evaluate the severity of comorbid anxiety and depression. The BDI-II was developed by Beck et al. [32,33] and is commonly used to measure depression. It consists of 21 questions scored using a 0–3 scale. The BDI-II evaluates vegetative and cognitive/affective depressive symptoms and Beck et al. [32] suggested 13/14 as a reasonable threshold for identification of clinically meaningful depression. The Chinese version of the BDI-II has good reliability (Cronbach's alpha = 0.94) and validity [34]. The BAI also consists of 21 items [35] and it mainly measures the somatic aspects of anxiety (panic-like symptoms); 7/8 is the threshold for differentiating between minimal and mild anxiety [35]. Che et al. [36] examined the psychometric properties of the Chinese BAI and reported a Cronbach's alpha of 0.95. Compared with the BAI, the PSWQ places more emphasis on cognitive worry (general anxiety disorder-like symptoms). The PSWQ consists of 16 questions scored using a 1–5 scale [37]; 44/45 are commonly used thresholds. The psychometric properties of the Chinese version have been investigated (Cronbach's alpha = 0.81–0.89) [38].

We used the TPQ to evaluate personality traits. The TPQ consists of 100 dichotomous questions. The original version had three main dimensions, novelty seeking, harm avoidance and reward dependence, that correspond to tendencies to behavioral activation, activation inhibition and maintenance of social interaction [39]. Later one of the subdimensions of reward dependence (persistence) was found to be an independent dimension and so it is usually scored independently of reward dependence. A psychometric study of the Chinese TPQ was completed by Chen et al. [40].

2.3. Statistical analysis

Group differences in demographic variables, TPQ, psychological states, functioning and QOL were assessed using independent-samples

t-tests (continuous variables) or chi-squared tests (categorical variables). We then used multiple linear regression (stepwise method) to clarify the relationships between the independent variables (demographic variables; TPQ; psychological states) and functioning and QOL. The associations between psychological states (dependents), demographic variables and TPQ were also analyzed with multiple linear regression. The above two series of multiple linear regression analyses were performed first on the SSD group and then on the sample as a whole, to confirm the effects of SSD. The influence of SSD severity and other anxiety and depression comorbidities (we separated subjects into two groups for each comorbidity using the thresholds: BDI-II 13/14, BAI 7/8, PSWQ 44/45) were estimated with independent-samples *t*-tests. The alpha value was set at 0.05 in the above analyses and the Bonferroni correction for multiple comparisons was applied. The analyses were performed using SPSS 25 (IBM, USA).

We also used SEM for path analysis (only for observed variables) of the indices of functioning in SSD subjects. The factors used in SEM and the hypothesized paths were based on the multiple linear regression results. The maximum likelihood method was used to estimate the model and modification indices were adopted to improve the fit. We used several indices to assess model fit: chi-squared, chi-squared/degrees of freedom, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the goodness of fit index (GFI) and the root mean square error of approximation (RMSEA). SEM was carried out with AMOS 25 (IBM, USA).

3. Results

Comparisons of SSD patients and healthy controls are presented in Table 1. Educational level was lower in the SSD group but there were no group differences in other demographic variables (age and exercise level). The only personality difference detected was lower harm avoidance in the SSD group. Scores on the PHQ-15, HAQ, CABAH, BDI-II, BAI and PSWQ were higher in the SSD group. As we predicted, functioning and QOL were different in the two groups. The SSD group had lower WHOQOL-BREF scores (overall score and scores for the physical, psychological, social domains) and Family APGAR scores, and higher SDS scores.

The multiple linear regression models of functioning and QOL are presented in Table 2 and Supplementary Table 1. In SSD patients there were associations between overall WHOQOL-BREF score and exercise level and BDI-II, between SDS score and age, novelty seeking, CABAH and BDI-II scores, and between Family APGAR score and BDI-I score. In the sample as a whole overall WHOQOL-BREF score and SDS score were both associated with SSD diagnosis. All WHOQOL-BREF domains were associated with the BDI-II, in the sample as a whole and in SSD patients specifically.

In order to build path diagrams we also analyzed the factors influencing psychological state scores. The complete results are presented in Supplementary Table 2. In SSD subjects the following associations between SSD psychopathologies and other variable were observed: PHQ-15 was associated with gender, exercise level and harm avoidance; HAQ with harm avoidance; SAIB with gender and age; CABAH with age and harm avoidance. The following associations involving comorbid emotional disturbances were observed: BDI-II was associated with harm avoidance and exercise level; BAI with body mass index, exercise level, harm avoidance and reward dependence; PSWQ with harm avoidance and reward dependence.

We then analyzed how SSD severity and comorbidities were associated with functioning and QOL in the SSD group. The results are shown in Table 3. The severity of SSD was not related to any of the functional

Table 1
Comparison of demographic variables, TPQ, psychological states and functioning in SSD patients and healthy individuals.

	Healthy subjects ($n = 100$)	SSD patients ($n = 107$)	Statistics	
	Mean (±SD) or *n* (%)	Mean (±SD) or *n* (%)	*t* or χ^2	*p*-Value
Demographic variables				
Gender (male)	24 (24.00%)	40 (37.38%)	4.335	0.037
Age (years old)	43.44 (±13.80)	46.70 (±12.02)	−1.808	0.072
Body mass index (kg/m^2)	23.46 (±3.33)	22.84 (±3.52)	1.290	0.198
Educational level (years)	14.58 (±3.11)	13.18 (±2.87)	3355	0.001*
Employment status (employed)	71 (71.00%)	61 (57.01%)	4.379	0.036
Marital status (married)	69 (69.00%)	80 (74.77%)	0.852	0.356
Exercise level (hours/day)	0.31 (±0.64)	0.25 (±0.44)	0.839	0.403
TPQ				
Novelty-seeking	14.57 (±4.34)	14.11 (±4.08)	0.781	0.436
Harm avoidance	14.88 (±6.93)	21.94 (±5.95)	−7.854	<0.001*
Reward dependence	13.53 (±2.82)	12.79 (±3.21)	1.756	0.080
Persistence	5.03 (±1.73)	5.47 (±1.72)	−1.808	0.072
Psychological state				
PHQ-15	3.85 (±3.41)	13.05 (±5.70)	−14.191	<0.001*
HAQ	11.10 (±8.21)	27.38 (±13.45)	−10.590	<0.001*
SAIB	34.84 (±13.74)	39.08 (±10.97)	−2.438	0.016
CABAH	53.77 (±14.07)	62.69 (±12.55)	−4.800	<0.001*
BDI-II	5.24 (±5.56)	19.56 (±11.58)	−11.523	<0.001*
BAI	4.11 (±4.77)	19.75 (±11.36)	−13.047	<0.001*
PSWQ	45.68 (±9.58)	56.04 (±11.69)	−6.900	<0.001*
Functional status				
WHOQOL-BREF overall	59.50 (±13.66)	38.43 (±15.80)	10.229	<0.001*
WHOQOL-BREF physical	66.61 (±11.88)	45.93 (±14.96)	11.048	<0.001*
WHOQOL-BREF psychological	59.85 (±13.90)	43.85 (±16.13)	7.598	<0.001*
WHOQOL-BREF social	62.05 (±12.18)	51.20 (±16.32)	5.311	<0.001*
WHOQOL-BREF environmental	62.14 (±12.46)	55.97 (±16.03)	3.076	0.002
SDS	2.99 (±4.33)	13.26 (±7.52)	−12.125	<0.001*
Family APGAR	9.80 (±3.38)	7.04 (±3.99)	4.952	<0.001*

df = 205.
TPQ, Tridimensional Personality Questionnaire; SSD, somatic symptom disorder; PHQ-15, Patient Health Questionnaire-15; HAQ, Health Anxiety Questionnaire; SAIB, Scale for the Assessment of Illness Behavior; CABAH, Cognitions About Body and Health Questionnaire; BDI-II, Beck Depression Inventory-II; BAI, Beck Anxiety Inventory; PSWQ, Penn State Worry Questionnaire; WHOQOL-BREF, World Health Organization Quality-of-Life Scale-BREF; SDS, Sheehan Disability Scale; Family APGAR, Family Adaptability, Partnership, Growth, Affection, and Resolve.
* $p < .002$ after Bonferroni correction.

Table 2
Multiple linear regression models for the indices of functioning in SSD patients.

	WHOQOL-BREF Overall		SDS		Family APGAR	
R^2	0.307		0.436		0.120	
	β	*p*-Value	β	*p*-Value	β	*p*-Value
Age	–	–	−0.157	0.042	–	–
Exercise level	0.170	0.047*	–	–	–	–
Novelty seeking	–	–	0.256	0.001**	–	–
CABAH	–	–	0.266	0.001**	–	–
BDI-II	−0.487	<0.001***	0.459	<0.001***	−0.347	0.001**

	WHOQOL-BREF Physical		WHOQOL-BREF Psychological		WHOQOL-BREF Social		WHOQOL-BREF Environmental	
R^2	0.580		0.444		0.270		0.282	
	β	*p*-Value	β	*p*-Value	β	*p*-Value	β	*p*-Value
Gender	–	–	–	–	−0.179	0.048*	–	–
Age	−0.120	0.050*	–	–	–	–	–	–
Body mass index	−0.169	0.012*	−0.160	0.033*	–	–	−0.175	0.044
Educational level	–	–	–	–	–	–	0.182	0.035*
Novelty seeking	–	–	–	–	–	–	–	–
Harm avoidance	−0.185	0.012	−0.191	0.020*	–	–	–	–
HAQ	−0.284	<0.001***	–	–	0.309	0.003*	–	–
BDI-II	−0.481	<0.001***	−0.556	<0.001***	−0.601	<0.001***	−0.464	<0.001***

SSD, somatic symptom disorder; WHOQOL-BREF, World Health Organization Quality-of-Life Scale-BREF; SDS, Sheehan Disability Scale; Family APGAR, Family Adaptability, Partnership, Growth, Affection, and Resolve.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

indices. The presence of comorbid depression discriminated effectively between subjects with high and low scores on all the indices of functioning and QOL. The BAI was closely associated with the SDS and overall WHOQOL-BREF score.

Finally, we combined the results of Table 2 and Supplementary Table 2 in order to build path diagrams of functioning and QOL. Fig. 1 is the result. The model had satisfactory fit ($\chi^2 = 20.382$, df = 16, *p*-value = .325, χ^2/df = 1.274, CFI = 0.988, TLI = 0.974, GFI = 0.974,

Table 3
Functioning scores in SSD patients by severity and comorbidity.

	SSD, mild ($n = 49$)	SSD, moderate and severe ($n = 58$)	Statistics	
	Mean (±SD)	Mean (±SD)	*t*	*p*-Value
WHOQOL-BREF overall	41.33 (±16.38)	35.99 (±15.01)	1.757	0.082
SDS	13.33 (±7.35)	13.21 (±7.73)	0.082	0.935
Family APGAR	6.87 (±3.94)	7.18 (±4.08)	−0.343	0.728
	BDI-II < 14 ($n = 36$)	BDI-II ≥ 14 ($n = 71$)	Statistics	
	Mean (±SD)	Mean (±SD)	*t*	*p*-Value
WHOQOL-BREF overall	50.35 (±11.76)	32.39 (±14.11)	6.563	<0.001*
SDS	8.67 (±4.73)	15.59 (±7.62)	−5.771	<0.001*
Family APGAR	8.69 (±3.67)	6.29 (±3.93)	2.636	0.010*
	BAI < 8 ($n = 15$)	BAI ≥ 8 ($n = 92$)	Statistics	
	Mean (±SD)	Mean (±SD)	*t*	*p*-Value
WHOQOL-BREF overall	50.00 (±118.90)	36.55 (±14.50)	3.186	0.002*
SDS	9.33 (±4.24)	13.90 (±7.76)	−3.359	0.002*
Family APGAR	5.75 (±3.77)	7.17 (±4.02)	−0.957	0.341
	PSWQ < 45 ($n = 18$)	PSWQ ≥ 45 ($n = 89$)	Statistics	
	Mean (±SD)	Mean (±SD)	*t*	*p*-Value
WHOQOL-BREF overall	44.44 (±16.73)	37.22 (±15.42)	1.787	0.077
SDS	10.83 (±6.91)	13.75 (±7.58)	−1.511	0.134
Family APGAR	7.21 (±4.32)	7.00 (±3.96)	0.182	0.856

df = 105.
SSD, somatic symptom disorder; BDI-II, Beck Depression Inventory-II; BAI, Beck Anxiety Inventory; PSWQ, Penn State Worry Questionnaire; WHOQOL-BREF, World Health Organization Quality-of-Life Scale-BREF; SDS, Sheehan Disability Scale; Family APGAR, Family Adaptability, Partnership, Growth, Affection, and Resolve.
* $p < .017$ after Bonferroni correction.

RMSEA = 0.034). The result provides evidence that depression, cognitive health anxiety, harm avoidance and exercise contribute to overall WHOQOL-BREF score, SDS score and Family APGAR score.

4. Discussion

This study produced three main findings. First, people with SSD function less well than healthy people and have lower QOL. The multiple regression suggests that SDS score and overall WHOQOL-BREF score capture the impact of SSD better than the other measures we used to assess functioning. Second, in SSD patients comorbid depression was associated with all the indices of functioning and QOL that we investigated, whereas anxiety has a relatively narrow impact. Third, in the SEM model, depression was an important contributor to variance in functioning and QOL, and exercise level also played a role. These results improve our understanding of functioning and QOL in SSD.

Like previous studies, we found that functioning and QOL are worse in SSD patients than in healthy people. This finding has been reported in studies looking at SSD, somatoform disorders and medically unexplained symptoms [8,19,41] and in samples of elderly people and adolescents as well as general adult samples [10,42]. Patients with functional somatic syndromes (such as fibromyalgia and irritable bowel syndrome) are also often found to have low QOL [43]. Some studies have reported lower QOL in patients with fibromyalgia than in patients with pain and rheumatological conditions [44]. Multiple linear regression indicated that SDS score and overall WHOQOL-BREF score to be associated with the diagnosis of SSD. One explanation for that is that the 'functional impairment' construct captured by the SDS and overall WHOQOL-BREF score corresponds closely to the features of SSD as defined in DSM-5. Other studies have also found that the SDS discriminates psychiatric disorders from subsyndromal symptoms [23].

In the multiple linear regressions BDI-II score and harm avoidance were associated with overall WHOQOL-BREF score, whereas BDI-II and CABAH scores were associated with the SDS. These data provide a clearer picture of the affective state of SSD patients. Depression seems to be generally related to functioning and QOL; this is a common finding in patients with somatic symptoms [45–47]. Aigner et al. [17] found that in patients with psychosomatic symptoms Beck Depression Inventory score was associated with QOL, which corresponds closely with our findings. The pattern of results is similar when BDI-II scores are dichotomized (presence or absence of clinically meaningful depression), as shown as Table 3.

CABAH and the personality feature harm avoidance were also associated with functioning and QOL. Harm avoidance is a personality dimension representing the tendency to behavioral inhibition [39]. Previous studies have shown that harm avoidance is associated with various types of negative experience (depression, anxiety, somatic symptoms, hypochondriac ideation) [48]. We also noted that as well as affecting function indirectly, through somatic and emotional disturbance, harm avoidance may affect functioning directly. The CABAH encompasses the cognitive domain of health anxiety, symptoms such as catastrophizing, bodily weakness and intolerance of bodily complaints [30]. A catastrophizing cognitive style can be corrected through cognitive behavioral therapy and so it can be viewed as a target for functional improvement [49].

In the SEM model there were associations between exercise level and depression and overall WHOQOL-BREF score. As exercise level is modifiable, this pattern of results implies that increasing exercise and activity might improve depression and enhance QOL, suggesting a potential therapeutic strategy for SSD. Similar principles have been used to treat other functional syndromes, such as fibromyalgia and chronic fatigue syndrome [50,51]. Graded exercise therapy is considered a treatment option for chronic fatigue syndrome and fibromyalgia patients may benefit from aerobic exercise, although the safety and effectiveness of graded exercise therapy have been challenged by some scholars [50–52]. It has been argued that lack of activity causes patients to pay more attention to their somatic distress and thus makes them feel worse [53].

Several limitations of this study should be noted. First, we only gathered cross-sectional data and so we are unable to analyze temporal changes. The directions of influence in the associations we observed may not correspond with our assumptions. For example, family

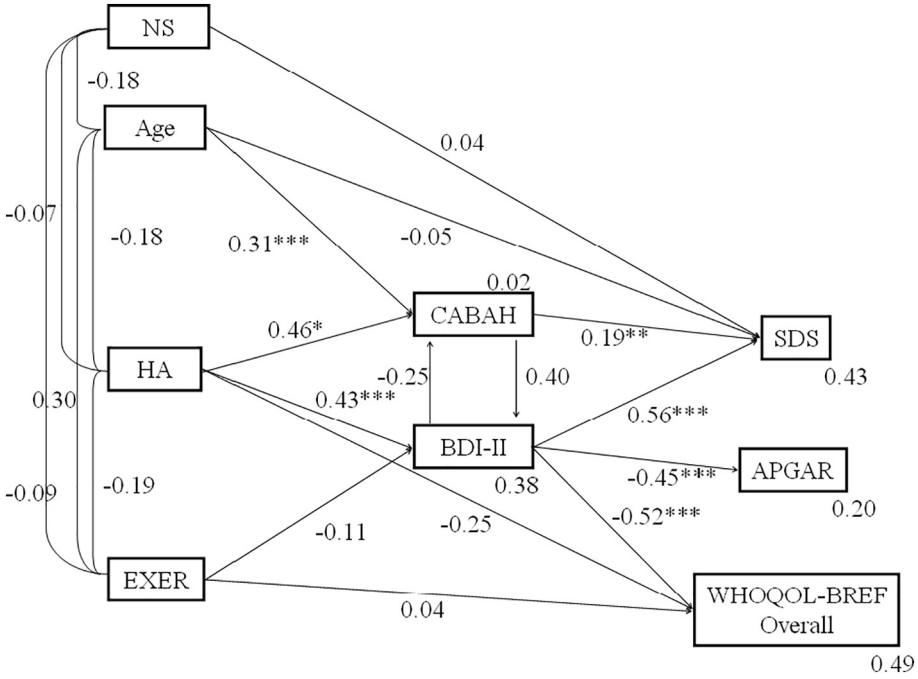

Fig. 1. Path diagrams for indices of quality of life and functioning in SSD patients. SSD, somatic symptom disorder; EXER, exercise level; HA, harm avoidance; NS, novelty seeking; BDI-II, Beck Depression Inventory-II; CABAH, Cognitions About Body and Health Questionnaire; WHOQOL-BREF, World Health Organization Quality-of-Life Scale-BREF; SDS, Sheehan Disability Scale; APGAR, Family Adaptability, Partnership, Growth, Affection, and Resolve; CFI, comparative fit index; TLI, Tucker-Lewis index; GFI, goodness of fit index; RMSEA, root mean square error of approximation. $\chi^2 = 20.382$, df = 16, p-value = .325, $\chi^2/df = 1.274$, CFI = 0.988, TLI = 0.974, GFI = 0.974, RMSEA = 0.034. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

functioning as captured by APGAR score could be the cause or outcome of psychological states (such as anxiety, depression or somatic symptoms). Second, our data on comorbid anxiety and depression came from self-report questionnaires and different results might have been obtained with diagnostic interviews. In addition SSD diagnoses were not based on structured interviews because there is as yet no Chinese version of this kind of tool. Third, our sample contained many more patients with mild to moderate SSD than with severe SSD. It is possible that severe SSD patients' QOL is more obviously affected by the core psychopathologies of SSD and this issue needs further investigation. Finally, although we tried to capture the various aspects of functioning and QOL by using a wide range of instruments, there are some indices of functioning and QOL that we did not include (e.g. quality-adjusted life years, 36-Item Short Form Health Survey) [54]. Their relationships with SSD await clarification. Several important psychosomatic constructs (such as alexithymia, dissociation, conversion, stress coping strategies; which have been found to be related to QOL in adults with psychogenic, non-epileptic seizures [55]) were not included, again because of a lack of suitable Chinese-language instruments for assessing them.

This study represents an attempt to construct a broad picture of functioning and QOL in SSD. Our results suggest that SSD patients have impaired functioning and low QOL, based on scores on the WHOQOL-BREF, SDS and Family APGAR. Of the various somatic and psychological questionnaires we used, only the BDI-II was associated with all QOL and functioning indices. Whether SSD patients' QOL and functioning would improve if their comorbid depression were treated is a question worthy of future investigation.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.comppsych.2019.02.004.

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