

The Validity and Reliability of the Chinese Version Bipolar Spectrum Diagnostic Scale(BSDS)

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【Abstract】 Objective: The aim of this study was to investigate the validity and reliability of the Chinese version of Bipolar Spectrum Diagnostic Scale(C-BSDS). **Methods:** We have translated the English version BSDS into Chinese version with the agreement of the author of the scale. 114 consecutive patients with BD(61 patients with bipolar I disorder, 53 patients with bipolar II disorder) and 37 patients with UD in outpatients and inpatients departments diagnostically interviewed with DSM-IV were rated by C-BSDS. The test-retest reliability with interval of four weeks was investigated in 87 patients (57.62%). **Results:** A four-factor solution was preferred by the factors analysis. The Eigenvalues of the four factors were 2.35, 2.31, 2.21 and 1.80 respectively. The four factors together accounted for 48.24% of the total variance. The internal consistency (Cronbach's alpha) of the C-BSDS was 0.75. The test-retest reliability of the C-BSDS was 0.83($P<0.01$). A C-BSDS screening score of 13 or more was the optimal cutoff between the patients with BD and UD(sensitivity 0.74, specificity 0.54) by ROC curve analysis. C-BSDS could effectively differentiate BD-II patients with UD patients, but not with BD-I patients. **Conclusion:** The study demonstrated good psychometric properties of the C-BSDS, suggesting that the C-BSDS is an effective instrument to screen bipolar spectrum disorder in Chinese population.

【Key words】 Bipolar disorder; Unipolar depressive disorder; Scale; Validity; Reliability

中图分类号: R395.1 文献标识码: A 文章编号: 1005-3611(2014)03-0475-05

中文版双相谱系诊断量表效度与信度研究

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【摘要】 目的:探讨双相谱系诊断量表(Bipolar Spectrum Diagnostic Scale, BSDS)在中国的效度及信度。**方法:**在原作者授权下,根据量表翻译的原则,我们将英文版的BSDS翻译成中文并完成回译。按DSM-IV标准,连续入组的114例BD患者,双相I型(BD-I)61例、双相II型(BD-II)53例及37例单相抑郁(UD)患者,所有患者完成了中文版BSDS。87例患者(57.62%)在4周后重测。**结果:**BD组BSDS分(15.11 ± 4.25)显著高于UD组(11.89 ± 3.81)。BD-I组BSDS分(15.44 ± 4.94)与BD-II组BSDS分之间无显著差异,但均显著高于UD组。BSDS总分重测信度为0.83($P<0.01$)。主成分分析显示以前四因子解释BSDS的结构效度最佳(特征根值分别为2.35, 2.31, 2.21及1.80,对总体变量贡献度为48.24%)。BSDS的内部一致性(Cronbach's alpha)是0.75。ROC曲线分析显示BSDS可区分BD组与UD组,曲线下面积为0.70,13分为最佳划界分(敏感性0.74、特异性0.54)。中文版BSDS可区分BD-II组与UD组,但无法区分BD-I组与BD-II组($P=0.39$)。**结论:**本研究显示中文版BSDS对中国的心境障碍患者的效度及信度达到心理测量学的标准,可以在中国临床环境中使用。

【关键词】 双相障碍;单相抑郁障碍;量表;效度;信度

Clinically, it is very important to differentiate bipolar disorders(BD) from other mood disorders. Delayed diagnosis or misdiagnosis can prolong the suffer-

ing of the patients with BD^[1-4], but accurate and early diagnosis is difficult^[1-4]. As many as 40% of patients with bipolar disorder are initially misdiagnosed, and it can take as long as 10 years before these patients are diagnosed correctly^[2]. In China, 45.4% patients with BD were misdiagnosed in psychiatric outpatients de-

【基金项目】 深圳市科技计划项目(201202102);山东社会科学计划项目(13BJYJ03)

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partment^[4]. Bipolar patients often present in the depressive phase^[5], and many patients with BD are diagnosed as having unipolar depressive disorder(UD, major depressive disorder)^[1-5].

In recent years, many studies had demonstrated that some screening questionnaires were helpful to improve the efficacy and accuracy in diagnosis of BD. These screening tools, includes 32-item hypomania checklist (HCL-32)^[6], mood disorder questionnaire (MDQ)^[7] and bipolar spectrum diagnostic scale(BSDS)^[8]. HCL-32 and MDQ similarly have two factors to investigate manic or hypomanic symptoms. Differently, BSDS also includes several items on atypical depressive symptoms(such as extra sleep, weight gain) and some items on the shift or switch of the mood and/or energy levels. In the USA, the BSDS had sensitivity 75% and specificity 93% at the best cutoff 13, in screening the patients with BD in outpatients department^[8].

Comparing the contents of items in the three questionnaires mentioned above, BSDS is regarded as more comprehensive^[9]. More researchers in the world tended to use the HCL-32 and BSDS, or MDQ and BSDS as the combining tools in studies^[10, 11]. Some psychiatrists have studied the Chinese version HCL-32 and MDQ^[12, 13], however, the psychometric property of the Chinese version of BSDS still remains unclear.

1 Methods

1.1 Study participants and settings

The study was conducted in the outpatient and inpatient departments at Shenzhen mental health center from July of 2012 to June of 2013. The study was evaluated and approved by the ethics committees of the Shenzhen mental health center.

All the consecutive patients met the inclusion criteria were: patients diagnosed with major depressive disorder(unipolar depressive disorder, UD) or bipolar I disorder(BD-I) or bipolar II disorder(BD-II); age from 18 to 65 years; educated at least five years; and agree to provide written informed consent. The exclusion criteria were: patients under unstable or severe clinical status; patients can not cooperate with the study procedures; patients received electroconvulsive therapy (ECT) or modified electroconvulsive therapy(MECT) in

recent 4 weeks; mental retardation; dementia; or intellectual impairment due to other reasons. We did not require the subjects to have a certain clinical state in the study.

1.2 Assessments

The BSDS is composed of two parts. The first part is a paragraph containing 19 positively valenced sentences describing many of the symptoms of bipolar disorder. For instance, one sentence reads: "Some individuals, during these 'high' periods, take on too many activities at once." Each sentence is followed by an underlined space for subjects to place a checkmark if they feel that it applies to them. Each checkmark is worth one point. The second part of the BSDS is one simple multiple-choice question, asking subjects to rate how well the story describes them overall. There are four possible answers from which to choose: "This story fits me very well, or almost perfectly" (worth 6 points), "this story fits me fairly well" (4 points), "This story fits me to some degree" (2 points), and "This story does not really describe me at all" (0 points). Thus, the total score on the BSDS can range from 0 to 25.

After the consent of the author of the original BSDS, we translated the English version of the BSDS into a Chinese version BSDS(C-BSDS). The first two authors completed the translation. Backtranslation was performed by a bilingual psychiatrist unaware of the original BSDS. A preliminary translated version was administered to individuals without any psychiatric illness and some patients with mood disorder. The authors reviewed the results before producing the final version.

All patients with a positive screen or clinically suspected of having mood disorders were invited to sign the written informed consent. After the patients signed the consent, they were asked to complete the C-BSDS. The patients were interviewed with the mood disorder module of Structured Clinical Interview for DSM-IV Axis I Disorder, Clinician version(SCID-CV) after they completed the C-BSDS. The interviewers were blind to the BSDS results. All interviewers were psychiatrists with at least five years experience in psychiatric clinic. The first two authors supervised the diagnostic process. The kappa coefficient for diagnosis of

bipolar disorders of the first two authors was 0.85.

To investigate the relationship of patients' insight and the scores of BSDS, we used the Scale to Assess Unawareness of Mental Disorder(SUMD)^[14] to assess insight into their bipolar disorder. The SUMD is based on a semistructured interview and scoring is completed by the clinician. Higher scores of SUMD indicate more impaired insight. The basic SUMD items assessed awareness of mental disorder, awareness of achieved effects of medication, and awareness of social consequences of mental disorder.

1.3 Statistical analyses

We used principal component analysis with varimax rotation in the factor analysis to determine the construct validity of the C-BSDS. The internal consistency of the C-BSDS was determined by Cronbach's alpha. The receiver operating characteristic(ROC) curve was used to determine if the groups could be differentiated and to ascertain the sensitivity(SEN) and specificity (SPE) at various cutoffs. Probability values less than 0.05 were considered statistically significant. All statistical analysis was done using SPSS-16.0 for windows (SPSS, Chicago, IL, USA).

2 Results

2.1 Sample description

151 patients(65 patients from outpatients department, 86 patients from inpatients department) were enrolled in this study. The sample is described in Table 1. There were no significant differences in mean age and educated years between BD and UD patients. The percentage of female patients in UD was not significant higher than that of in BD($\chi^2=2.42$, $P>0.05$).

The mean score of SUMD in 114 patients with BD was 5.93 ± 2.89 . There were no significant correlations between insight scores and scores on the BSDS for the patients with BD($\gamma=-0.12$, $P=0.22$).

Table 1 Sample description

	UD	BD	BD-I	BD-II
N	37	114	63	51
% (female)	20/37(54.05%)	45/114(39.47%)	21/63(33.33%)	24/51(47.06%)
Age(yrs)	31.81 \pm 8.19	29.46 \pm 8.86	29.39 \pm 1.17	29.55 \pm 1.20
Education(yrs)	13.70 \pm 3.92	12.85 \pm 3.54	12.73 \pm 3.68	13.00 \pm 3.40

2.2 BSDS scores comparison between groups

The mean scores of BD、BD-I and BD-II were

higher than that of UD group, while no significant difference between BD-I and BD-II group(Table 2).

Table 2 BSDS scores comparison between groups

Groups	BSDS scores	<i>t</i>	<i>P</i>
BD vs UD	15.11 \pm 4.25 vs 11.89 \pm 3.81	4.10	<0.01
BD-I vs UD	15.44 \pm 4.94 vs 11.89 \pm 3.81	3.77	<0.01
BD-I vs BD-II	15.44 \pm 4.94 vs 14.69 \pm 3.19	0.95	0.35
BD-II vs UD	14.69 \pm 3.19 vs 11.89 \pm 3.81	3.74	<0.01

2.3 Test-retest reliability

Some subjects(N=87, 57.62%) retested the C-BSDS after 28 \pm 7 days. The test-retest correlative coefficient of C-BSDS was 0.83 ($P<0.01$).

2.4 Factor analysis

By the principal component analysis with varimax rotation, we found the item 9 did not belong to any factor at first time analysis(Table 3). After deleting the item 9, we analyzed at second time. The Eigenvalues of four factors were higher than 1 by the second analysis (Table 4). The Eigenvalues of four factors were 2.35, 2.31, 2.21 and 1.80 respectively. Four factors together explained 48.24% of the total variance. If all items suppress absolute factor loading less than 0.40, the factor-I comprised the 11th, 12th, 14th, 15th and 16th item. The factor-II comprised the 3th, 5th, 6th, 7th and 8th item. Factors-III comprised the 4th, 13th, 15th, 17th 18th and 19th item. Factors-IV comprised the 1th, 2th and 10th item.

By the contents of the items, Factor-I can be described as "active/elated", while the factor-II "features of bipolar depression", factor III "risk-take/irritable" and factor IV "switch of mood/energy".

2.5 Internal consistency

The internal consistency(Cronbach's alpha) of C-BSDS was 0.75(N=151). The Cronbach's alpha for factor I, II, III and IV were 0.69, 0.64, 0.66 and 0.61 respectively.

2.6 ROC curve analysis

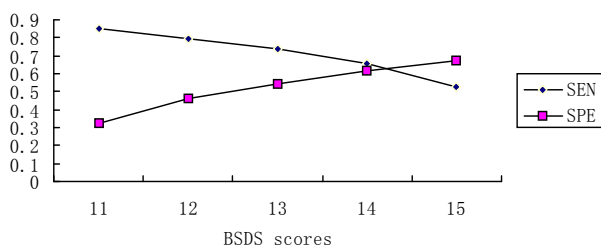
2.6.1 ROC curve analysis between BD and UD
By the receiver operating characteristics(ROC) curve analysis, the C-BSDS could differentiate between BD and UD($P<0.01$) and the area under the curve was 0.70. A C-BSDS screening score of 13(sensitivity 0.74, specificity 0.54) was the optimal cutoff between BD and UD. Sensitivity and specificity at various cutoffs between BD and UD can be seen in Figure 1.

Table 3 BSDS factor analysis(N=151)

Items	Factor I loadings	Factor II loadings	Factor III loadings	Factor IV loadings
1				0.70
2				0.65
3	0.62			
4			0.64	
5	0.64			
6	0.63			
7	0.61			
8	0.60			
10			0.60	
11		0.54		
12		0.70		
13			0.71	
14		0.68		
15		0.54		
16		0.67		
17			0.70	
18			0.67	
19			0.43	

Table 4 BSDS factor analysis
after deleting item 9(N=151)

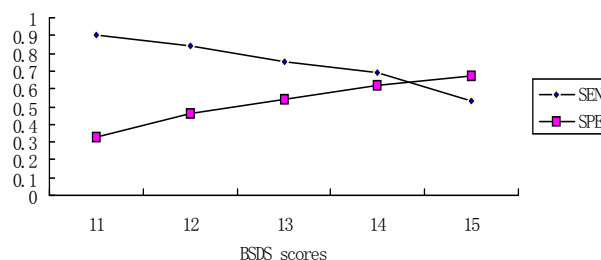
Items	Factor I loadings	Factor II loadings	Factor III loadings	Factor IV loadings
1				0.70
2				0.66
3		0.63		
4			0.45	
5		0.64		
6		0.62		
7		0.60		
8		0.61		
10				0.60
11	0.66			
12	0.68			
13			0.72	
14	0.68			
15	0.52			
16	0.62			
17			0.70	
18			0.66	
19			0.45	

Figure 1 Sensitivity and specificity at
various cut-offs between BD and UD

2.6.2 ROC curve analysis between BD-I and BD-II By the ROC curve analysis, the C-BSDS could differentiate between BD-I and BD-II($P=0.39$), and the area under the curve was 0.55.

2.6.3 ROC curve analysis between BD-II and UD By the ROC curve analysis, the C-BSDS could differ-

entiate between BD-II and UD($P<0.01$) and the area under the curve was 0.70. A C-BSDS screening score of 13(SEN 0.75, SPE 0.54) was the optimal cutoff between BD-II and UD. SEN and SPE at various cutoffs between BD-II and UD can be seen in Figure 2.

Figure 2 Sensitivity and specificity at
various cut-offs between BD-II and UD

3 Discussion

Bipolar disorder is a very common and severe psychotic illness with approximately 4.5% of the lifetime prevalence in the general population^[15]. Moreover, bipolar disorder is associated with substantial impairments in productive and social roles^[16, 17]. The BSDS is a convenient instrument for screening bipolar disorders and is helpful to the psychiatrists in practice. China is the most populated country in the world. Therefore, a study concerning the use of the BSDS in China is important.

The mean BSDS score of patients with BD(15.11 ± 4.25) was higher than that of UD(11.89 ± 3.81). There was no significant difference between BD-I patients and BD-II patients in the mean score of BSDS, but the mean scores of both two groups were higher than that of UD. Because the contents of the items in BSDS were the features of bipolar disorder, the higher scores of BD patients fit the purpose of developing the BSDS. There was no significant correlation between the scores of insight and scores of BSDS in the patients with BD. The BSDS can be used in the BD patients with poor insight or without insight. The test-retest reliability was 0.83 and reached the requirement of psychometrics.

There were four factors in BSDS by factor analysis. By the contents of the items, Factor-I can be described as "active/elated", while the factor-II "features of bipolar depression", factor III "risk-take/irritable" and factor IV "switch of mood/energy".

The item 4(weight gain during low periods) be-

longs to the factor III(risk-take/irritable), not the factor II(features of bipolar depression) as we assumed. The correlation between item 4 and the rest of items of factor III(item 13, 17, 18 and 19) was significant and positive(coefficient 0.23, $P<0.05$). The correlation between item 4 and the factor I and II were not significant(coefficient 0.06, 0.15). The “weight gain during low periods” was closer to the “risk-take/irritable”, not the “features or atypical symptom of bipolar depression” in the patients with BD. The “weight gain during low periods” in BD patients may be regarded as one symptom of risk-taking.

The Cronbach's alpha of C-BSDS(0.75) was good and satisfied the requirement of psychometrics.

The C-BSDS could differentiate between BD and UD. A C-BSDS screening score of 13 was the optimal cutoff(sensitivity 0.74, specificity 0.54). In the American study by Ghaemi and Pies, 13 was also the best cutoff between BD and UD. The sensitivities of two studies were near, but the specificity at the cutoff in American study is very high(0.93)^[8]. The C-BSDS could differentiate between BD-II and UD, while not between BD-I and BD-II. This character of C-BSDS was similar to the Chinese version HCL-32 which is also one screening tool for BD^[12]. (Acknowledgements and Funding: We thank the support of S. Nassir Ghaemi and Ronald W. Pies for this study. This study was supported by a grant from the grant[201202102 to Hai-chen Yang] from the scientific and technological bureau of Shenzhen city, and from the Shandong social science planning projects[13BJYJ03 to Juan Li, 2013].)

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(收稿日期:2014-01-14)