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The psychometric properties of the Quick Inventory of Depressive Symptomatology-Self-Report (QIDS-SR) in patients with HBV-related liver disease

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Background: Comorbid depression in Hepatitis B virus (HBV) is common. Developing accurate and time-efficient tools to measure depressive symptoms in HBV is important for research and clinical practice in China.

Aims: This study tested the psychometric properties of the Chinese version of the 16-item Quick Inventory of Depressive Symptomatology (QIDS-SR) in HBV patients.

Methods: The study recruited 245 depressed patients with HBV and related liver disease. The severity of depressive symptoms was assessed with the Montgomery-Asberg Depression Rating Scale (MADRS) and the QIDS-SR.

Results: Internal consistency (Cronbach's alpha) was 0.796 for QIDS-SR. The QIDS-SR total score was significantly correlated with the MADRS total score (r=0.698, p<0.001). The QIDS-SR showed unidimensional measurement properties in exploratory factor analysis.

Conclusions: The QIDS-SR (Chinese version) has good psychometric properties in HBV patients and appears to be useful in assessing depression in clinical settings.

Key words: Depressive symptoms, psychometric properties, QIDS-SR, Hepatitis B Virus

1. Introduction

Chronic hepatitis B virus (HBV) infection affects around 300-400 million people worldwide.[1,2] In China, there are approximately 93 million HBV carriers and about 30 million suffer from chronic hepatitis B.[3] HBV infection is progressive and may lead to cirrhosis, liver failure and hepatocellular carcinoma, causing significant personal suffering and considerable socioeconomic burden.[4]

In the past decade psychiatric comorbidity in HBV-infection has gained increasing attention. Preliminary evidence indicates that comorbid depression is common in Chinese HBV patients,[5] which could be mediated by a variety of factors including antiviral medications, disease-related physical symptoms and the socio-economic consequences of high treatment costs.[6,7] HBV-related diseases are associated with fatigue,

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loss of appetite, abdominal pain and psychological disturbances, such as low self-esteem.[29] Furthermore, discrimination and stigma related to HBV disease often affects patients and their families.[30,31] All these factors could increase the risk of psychiatric comorbidities, particularly depression.[32,33] As depression is eminently treatable, particularly when detected early, routine depression screening would be important in the medical management of HBV patients.

Numerous studies have examined comorbid depression in HBV.[8-14] The measures on depression included the Beck Depression Inventory and its short version,[15] the Hospital Anxiety and Depression Scale [16] and the Zung Self-Rating Depression Scale [17].

The 16-item Quick Inventory of Depressive Symptomatology–Self-Report (QIDS-SR) is a widely used, self-report instrument with well-established psychometric properties.[18] The QIDS-SR can reliably assess depressive symptoms in the previous week in a time-efficient manner in physically healthy psychiatric patients.[19,20] However, its psychometric properties have not been assessed in medically compromised HBV patients.

The current study set out to examine the psychometric properties of the Chinese version of the QIDS-SR in patients with HBV and related liver diseases.

2. Methods

2.1 Settings and subjects

The study was conducted between June 1, 2014 and January 31, 2015 in Beijing YouAn Hospital, which is an 800-bed university affiliated teaching hospital for infectious diseases. Both inpatients and outpatients were consecutively screened to participate. Study entry criteria were as follows: (1) age 18 years or above; (2) diagnosis of HBV carrier, chronic hepatitis B (CHB), hepatitis B cirrhosis or HBV-related Hepatocellular Carcinoma (HCC) according to the Guidelines of Prevention and Treatment for Chronic Hepatitis B (2010 version) [21] and the Recommendations of the Asian Pacific Association for the Study of the Liver (APASL) for the management of hepatocellular carcinoma;[22] (3) a total score of 7 or above on the Montgomery-Asberg Depression Rating Scale (MADRS) indicating at least mild depression;[34] (4) ability to communicate, understand the purpose of the study and tolerate a one-hour interview. The study protocol was approved by the Beijing YouAn Hospital Clinical Research Ethics committee. All patients provided written informed consent.

2.2 Instruments and assessment

The Chinese version of the QIDS-SR [18,23] was used to measure the severity of depressive symptoms within the past week. A total score was computed by adding scores of its nine symptom domains: (1)low mood;

(2) concentration/decision-making; (3) self-outlook; (4) thoughts of death or suicide; (5) involvement; (6) energy level; (7) sleep (the highest score on any one of the four relevant items – sleep onset insomnia, mid-nocturnal insomnia, early morning insomnia and hypersomnia); (8) appetite/weight change (the highest score on any one of the four relevant items – weight increase, weight decrease, appetite increase and appetite decrease) and (9) agitation/retardation (the highest score on any one of the two relevant items – psychomotor slowing or psychomotor agitation). The total score ranges between 0 and 27, with higher scores indicating more severe depressive symptoms. The MADRS–Chinese version [24,25] was used to measure the severity of depressive symptoms within the past week as the reference standard for sensitivity to change of depressive symptoms measured by the QIDS-SR. The MADRS is a generic measure of severity of depressive symptoms and widely used in the general population and with patients with medical conditions.[24,25] Higher MADRS scores indicate more severe depression.

2.3 Statistical analysis

Data were analyzed with SPSS version 20.0. Cronbach's alpha was calculated to determine internal consistency. Internal consistency was regarded acceptable if the Cronbach's alpha was greater than 0.6.[26] The item-scale correlations of the QIDS-SR were tested using Pearson correlation coefficients. Convergent validity was calculated by Pearson correlation between the QIDS-SR and MADRS if the scores on the QIDS-RS and the MADRS were normally distributed, otherwise the Spearman correlation was used. The dimensionality of the QIDS-SR was measured by Principal Component Analysis to obtain the most meaningful original factor structure of the QIDS-SR. The scale was unidimensional in patients with HBV, if the percentage of total variance explained by the first principal component was above 20%.[27]

3. Results

Altogether, 689 patients were screened; 245 met study entry criteria and participated in the study. All of them completed the assessment with the QIDS-SR and the MADRS. Table 1a shows the basic demographic and clinical characteristics of the participants. There was no significant difference in demographic and clinical characteristics among the different HBV groups. Cronbach's alpha for the QIDS-SR was 0.796, indicating good internal consistency. All domains, if deleted, consistently decreased the total scale alpha (Table 1b). The QIDS-SR was highly correlated with the MADRS (r=0.698, p<0.001), indicating good convergent validity for the QIDS-SR. Principal component analysis was carried out to examine whether the QIDS-SR was unidimensional. The percentage of total variance explained by the first principal component for the QIDS-SR was 27.4%, thus indicating unidimensionality of the QIDS-SR.[27]
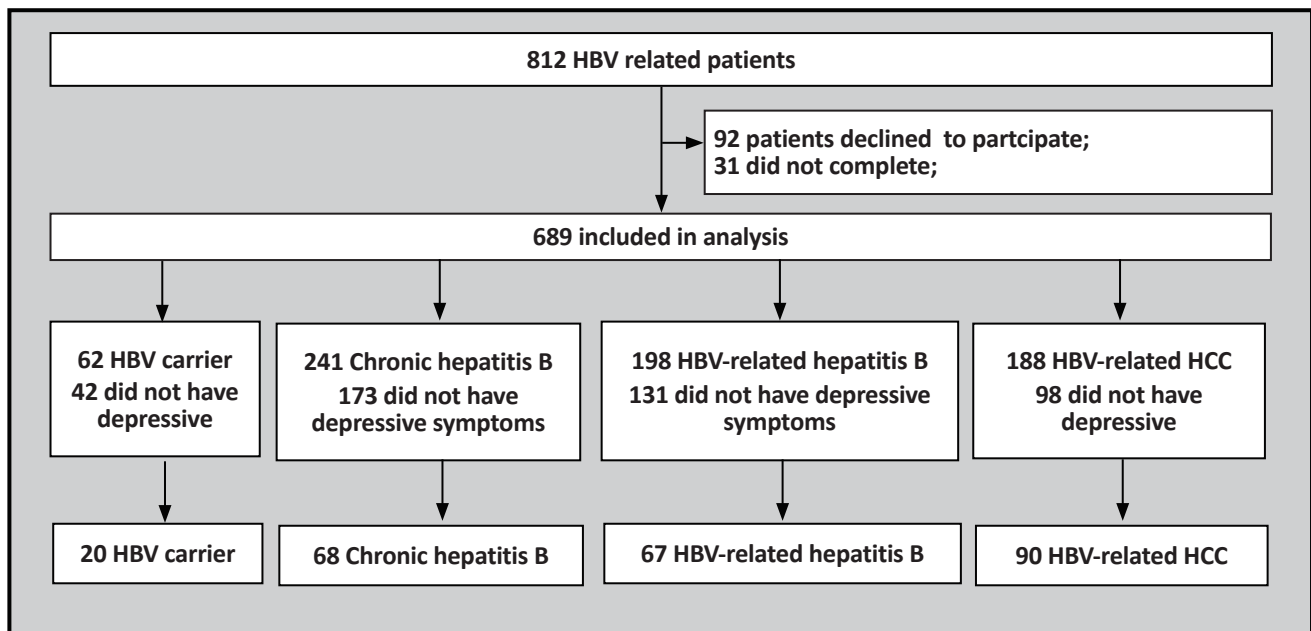
Figure 1. Flowchart of study

Figure 1. Flowchart of study

812 HBV related patients

92 patients declined to partcipate;
31 did not complete;

689 included in analysis

62 HBV carrier 42 did not have depressive	241 Chronic hepatitis B 173 did not have depressive symptoms	198 HBV-related hepatitis B 131 did not have depressive symptoms	188 HBV-related HCC 98 did not have depressive
20 HBV carrier	68 Chronic hepatitis B	67 HBV-related hepatitis B	90 HBV-related HCC

Table1a. Basic demographic and clinical characteristics of the study sample (n=245)

	whole sample	HBV carrier (n=20)	Chronic hepatitis B (n=68)	HBV-related cirrhosis (n=67)	HBV-related HCC (n=90)
	N(%)	N(%)	N(%)	N(%)	N(%)
Inpatients	157(64.1)	0(0)	0(0)	67(100.0)	90(100)
Male	179(73.1)	8(40)	40(58.8)	54(80.6)	77(85.6)
Married	205(83.7)	14(70)	54(79.4)	59(88.1)	78(86.7)
Local residents	104(42.4)	7(35)	23(33.8)	25(37.3)	49(54.4)
Living alone	12(4.9)	1(5)	1(1.5)	7(10.4)	3(3.3)
Personal income <3000 yuan	87(35.5)	6(30)	18(26.5)	23(34.3)	40(44.4)
Having health insurance' to 'Health insurance coverage	4(1.6)	0(0)	0(0)	2(3)	2(2.2)
Family history of psychiatric disorders	8(3.3)	0(0)	5(7.4)	1(1.5)	2(2.2)
Current alcohol use	47(19.2)	2(10)	18(26.5)	13(19.4)	14(15.6)
	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
Age (years)	48.3(13.7)	34.4(10.4)	37.2(11.0)	51.0(10.6)	57.7(9.0)
Education (years)	10.8(3.8)	11.5(4.3)	11.6(3.3)	9.9(4.5)	10.8(3.3)
Age of onset of HBV (years)	34.1(15.0)	20.9(8.0)	27.0(14.2)	37.6(13.9)	39.8(13.8)
Duration of HBV-related liver disease (years)	14.3(11.4)	13.6(8.9)	10.3(8.8)	13.9(12.4)	17.7(11.9)
Number of hospitalizations	2.6(4.1)	0.1(0.3)	0.4(0.7)	3.2(5.9)	4.3(3.4)
MADRS total	14.8(7.3)	14.8(10.5)	14.3(6.7)	15.7(6.7)	14.5(7.2)
QIDS-SR total	8.7(3.9)	8.8(4.3)	7.6(3.8)	10.2(4.1)	8.5(3.6)

1 USD=6 Yuan; HCC=Hepatocellular Carcinoma; MADRS=Montgomery-Asberg Depression Scale; QIDS-SR= Quick Inventory of Depressive Symptomatology–Self-Report; SF-12=Medical Outcomes Study Short Form 12

Table 1b. Quick Inventory of Depressive Symptomatology (QIDS-SR) scores in HBV patients

	n=245			
	Mean(Standard Deviation)	Item-total correlation	p	Alpha if item deleted
Sleep	2.1(0.8)	0.27**	p<0.001	0.79
Low mood	1.2(0.7)	0.52**	p<0.001	0.75
Appetite / weight	1.3(0.9)	0.35**	p<0.001	0.78
Concentration / Decision making	0.7(0.6)	0.59**	p<0.001	0.74
Self outlook	0.8(0.8)	0.48**	p<0.001	0.75
Thoughts of death or suicide	0.3(0.6)	0.49**	p<0.001	0.75
Involvement	0.8(0.8)	0.57**	p<0.001	0.74
Energy level	1.0(0.5)	0.47**	p<0.001	0.76
Agitation / retardation	0.6(0.7)	0.52**	p<0.001	0.75
Total score		---		---

*<0.05; **<0.001

4. Discussion

4.1 Main findings

To the best of our knowledge, this was the first study that examined the psychometric properties of the QIDS-SR in patients with HBV. The findings indicate that QIDS-SR is a reliable and valid instrument for screening depressive symptoms in HBV patients.

Acceptable internal consistency (>0.65) was found for the QIDS-SR in testing HBV patients, which is consistent with the findings in clinically depressed samples.[23] Item-to-total score correlations showed that the sleep and appetite/weight domains had the lowest correlation, confirming other findings in depression.[18,28] Moreover, item-to-total score correlations of sad mood and involvement had the highest correlation, which is also consistent with the results found in depression.[19] Compared to the MADRS, the QIDS-SR showed good convergent validity. This is consistent with initial structure obtained in depression where the the Hamilton Depression Rating Scale (HAMD) was used as the comparator rating instrument.[18] Principal component analysis identified one major factor from the QIDS-SR, suggesting that the factorial structure of the QIDS-SR in HBV patients is the same as found in depression.[18,19]

4.2 Limitations

Due to the following limitations, the results of this study need to be viewed with caution. First, only patients in one hospital were included, therefore the findings are not applicable to all areas of China. Second, test-retest reliability was not measured because most depressed patients were treated once they were identified. Finally, useful information, such as use of antidepressants and other medications or comorbid anxiety or other physical complications, were not recorded.

4.3 Implications

In conclusion, the Chinese version of the QIDS-SR is an effective tool with good validity and reliability in a clinical sample. Considering that the QIDS-SR could provide independent information about depressive symptoms in a time-efficient manner, it could be useful in assessing depression in patients with HBV infection.

Conflict of interest statement

Authors do not have any conflict of interest in conducting this study and preparing the manuscript.

Ethical approval

This study was approved by the Ethics Committee of the Beijing YouAn Hospital (No. 22 (2014)).

Informed consent

All patients provided written informed consent.

Authors' contribution

Study design: Mei Liu, Zhong-Ping Duan, Yu-Tao Xiang.

Data collection, analysis and interpretation: Mei Liu, Yuan-Yuan Wang, Jing Zhao.

Drafting of the manuscript: Yuan-Yuan Wang.

Critical revision of the manuscript: Su-Jun Zheng, Gabor S. Ungvari, Chee H. Ng.

Approval of the final version for publication: all co-authors.

抑郁症状快速评定量表自评版（**QIDS-SR**）应用于 **HBV** 相关肝脏疾病患者的心理测量学特性

刘梅，王园园，赵景，郑素军，Gabor S. U，Chee H. N，段钟平，项玉涛

背景： 乙型肝炎病毒（HBV）感染伴发抑郁症是一种常见的现象。建立精确并且有时效的工具，用以评估 HBV 患者抑郁症状，对研究和临床实践是非常重要的。

目的： 这项研究测试了抑郁症状快速评定量表自评版（QIDS-SR）在乙型肝炎患者中使用的心理测量学特性。

方法： 这项研究招募了 245 名患有乙型肝炎病毒和相关肝病的抑郁症患者。采用蒙特玛莉抑郁评定量表（MADRS）和 QIDS-SR 评估抑郁症状的严重程度。

结果： QIDS-SR 的内部一致性（(Cronbach α）为 0.796. 其总分与 MADRS 总分显著相关 r=0.698, *p*<0.001）。探索性因素分析的 QIDS-SR 显示一维测量性能

结论： QIDS-SR（中文版）在乙型肝炎患者中有良好的心理测量学特性，并且在评估临床抑郁症方面是有用的。

关键词： 抑郁症状，心理测量学特性，QIDS-SR，乙型肝炎病毒

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