Validation of the Chinese Version of the Revised Clinical Interview Schedule: Findings from Hong Kong Mental Morbidity Survey

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CME

Abstract

This study aimed to assess the psychometric properties of the Chinese version of the Revised Clinical Interview Schedule (C-CIS-R), and explore its applicability as a diagnostic instrument for common mental disorders (CMDs) in Hong Kong. Its psychometric properties were evaluated among 140 patients and 161 healthy controls. In comparison to the diagnoses made by the Structured Clinical Interview for the DSM-IV, the C-CIS-R showed good criterion validity in diagnosing CMDs. The correlation of the total score of C-CIS-R with the 12-item General Health Questionnaire and Hospital Anxiety and Depression Scale was satisfactory, indicating favourable convergent validity as well. The inter-rater and test-retest reliability were also satisfactory. Receiver operating characteristic analyses suggested an optimal cut-off point of 11/12 for detecting diagnosable CMDs (sensitivity: 0.69; specificity: 0.93) and 17/18 for identifying a need for treatment (sensitivity: 0.70; specificity: 0.95). In conclusion, C-CIS-R is a valid diagnostic instrument for CMDs in a Chinese community. Its cut-off points for clinically significant symptoms and treatment needs among Chinese are identical to those adopted in the original English version.

Key words: *Anxiety; Depression; Interview, psychological*

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Introduction

Common mental disorders (CMDs) such as depressive and anxiety disorders constitute a significant disease burden. They are associated with psychosocial disability,[1] poorer physical health,[2] and loss of productivity.[3] Apart from increased morbidity, CMDs also lead to significant mortality. In a meta-analysis of 10 prospective cohort studies involving 68,222 adults, those with anxiety or depressive disorder were found to have a reduced life expectancy.[4] Changes in mortality demonstrated a strong dose-response effect that remained significant after adjusting for socio-demographic characteristics, alcohol and smoking habits, and social class.[4]

Given their immense burden,[5] there is a pressing need for updated prevalence data on CMDs. Large-scale community studies, which produce generalisable information on prevalence, are preferred to traditional

sources of data such as psychiatric hospital admission and attendance records.[6] Nonetheless conducting community surveys of psychiatric disorders was not possible until the 1980s when fully structured diagnostic interviews started to emerge. The development of diagnostic interviews like the Diagnostic Interview Schedule,[7] Composite International Diagnostic Interview,[8] and Revised Clinical Interview Schedule (CIS-R)[9] have made ascertainment of psychiatric diagnoses by trained lay interviewers in large-scale community studies possible.[6] These structured interviews have contributed to the international growth in the number of large-scale psychiatric epidemiological studies over the past 2 decades.

The CIS-R is one of the most widely used structured diagnostic assessments for CMDs. Developed from the Clinical Interview Schedule,[10] CIS-R has demonstrated concordance with the Schedules for Clinical Assessment in Neuropsychiatry[11] and the Structured Clinical Interview for the DSM-IV (SCID).[12] Compared with other fully structured diagnostic interviews, CIS-R requires less administration time, is user-friendly for lay interviewers, and is highly acceptable to the respondents. It retains adequate validity in assessing depressive and anxiety disorders in different age and ethnic minority groups.[13,14]

To further its use in large-scale psychiatric epidemiological studies, the CIS-R has been translated into various languages. Its original and translated versions have been used in European countries (United Kingdom, Greece, Italy, Romania, Spain, and France)[11,12,15-17] and beyond (Australia, Sri Lanka, Malaysia, Brazil, Tanzania, and Zimbabwe).[18-23] Validation studies of various versions of CIS-R are listed in Table 1.

To the best of our knowledge, there are no published data on the psychometric properties of the Chinese version of CIS-R (C-CIS-R). The present study aimed to examine the validity and reliability of C-CIS-R and identify its optimal cut-off points in the local population.

Methods

Participants

This study was conducted as preparation for the Hong Kong Mental Morbidity Survey, the first territory-wide psychiatric epidemiological study in Hong Kong.[24,25] A total of 301 participants (140 psychiatric patients and 161 healthy controls) took part in the study. Patients were recruited from psychiatric outpatient clinics at Alice Ho Miu Ling Nethersole Hospital, Castle Peak Hospital, and Tuen Mun Hospital in Hong Kong from September 2010 to April 2011. Inclusion criteria comprised: (1) Chinese ethnicity, (2) age 16 to 75 years, and (3) CMD diagnosis established by psychiatrists according to the ICD-10 criteria. Persons with severe mental illness such as schizophrenia and bipolar disorder, significant cognitive impairment or poor physical health were excluded. Age- and gender-matched control participants, who had no current or past psychiatric diagnosis as verified by SCID, were recruited from the community sources. The study protocol was approved by the Clinical Research Ethics Committees of the Chinese University of Hong Kong, the University of Hong Kong, and the participating hospitals. The study was carried out in accordance with the latest version of the Declaration of Helsinki.

Table 1. Validity studies of the Revised Clinical Interview Schedule in previous reports.

Author (year)	Country	Setting	Age (years)	No. of patients	Cut-off
Pez et al (2010)[12]	Italy	Primary care clinic	18+	120	–
Pez et al (2010)[12]	Romania	Primary care clinic	18+	120	–
Pez et al (2010)[12]	Spain	Primary care clinic	18+	119	–
Pez et al (2010)[12]	France	Primary care or specialist clinic	18+	141	–
Subramaniam et al (2006)[20]	Malaysia	Psychiatric hospital	16+	59	8/9
Taub et al (2005)[15]	UK	General population	16-74	612	–
Jordanova et al (2004)[11]	UK	Primary care clinic	16-65	105	11/12
Wickramasinghe et al (2002)[19]	Sri Lanka	Psychiatric clinic	15-19	131	–
Brugha et al (1999)[16]	UK	General population	16-64	205	–
Patton et al (1999)[18]	Australia	General population	14-15	157	–
Patel and Mann (1997)[23]	Zimbabwe	Primary care clinic	16-65	302	11/12
Botega et al (1995)[21]	Brazil	General hospital	14-81	78	–

Abbreviations: *CMD = common mental disorder; Sen = sensitivity; Sp = specificity.*

Instruments

The CIS-R[9] determines the presence of 14 non-psychotic symptoms in the past week, namely somatic symptoms, fatigue, concentration and forgetfulness, sleep problems, irritability, worry about physical health, depression, depressive ideas, worry, anxiety, phobias, panic, compulsions, and obsessions. Score for each symptom section ranges from 0 to 4 (except for 0-5 for depressive ideas). The total score of CIS-R indicates the overall severity of psychological symptoms. The ICD-10 diagnoses of CMDs, including depressive episode, generalised anxiety disorder, mixed anxiety and depressive disorder, phobias, panic disorder, and obsessive-compulsive disorder, can be derived from a standard algorithm based on the CIS-R responses.

Chinese-bilingual SCID is a semi-structured clinical interview designed to generate a psychiatric diagnosis. It is well validated and extensively used in the local Chinese population with an overall kappa for inter-rater reliability of 0.84 and rater-clinician reliability of 0.77.[26,27] In the present study, modules A and D (mood disorders) and F (anxiety disorders) were administered to participants.

The 12-item General Health Questionnaire (GHQ-12)[28] is a self-administered questionnaire that measures general mental health in both clinical and community settings. Each item is rated on a 4-point scale with a higher score representing greater psychological distress. The Chinese version gives satisfactory sensitivity and specificity.[29]

The Hospital Anxiety and Depression Scale (HADS)[30] includes 14 questions probing depression and anxiety. Each question is scored on a 4-point scale from 0 to 3, with a higher score representing a higher frequency of occurrence of a symptom. The scale includes 7 questions related to depression and 7 to anxiety. Score for each domain ranges from 0 to 21, with a maximum total score of 42. The Chinese version demonstrates good validity and reliability for screening psychiatric morbidity in the local population.[31]

The Social and Occupational Functioning Assessment Scale (SOFAS)[32] measures overall social and occupational functioning of an individual due to their physical limitations, general medical condition, and mental impairment. The global rating ranges from 0 to 100, where higher score indicates better functioning.

Procedures

Forward and Backward Translation

The CIS-R questionnaire was first translated into Chinese then back-translated into English by 2 independent teams of mental health professionals. To ensure conceptual equivalence, the teams comprised experienced bilingual psychologists and psychiatrists who had no prior knowledge of the scale. A consensus Chinese version was developed by comparing the original and back-translated versions. Disagreement and reconciliation were discussed in a focus group involving the principal investigator, translators, and psychiatrists in the research team. The consensus version was pilot tested in a sample of 5 patients (3 depression and 2 anxiety), and the questionnaire further refined as the final version of C-CIS-R.

Depressive disorder			Anxiety disorder			Any CMD			Symptom group
Sen	Sp	Kappa	Sen	Sp	Kappa	Sen	Sp	Kappa	Kappa
0.27	1.00	0.39	0.35	0.93	0.34	0.38	0.95	0.39	–
0.33	0.96	0.35	0.29	0.91	0.23	0.33	0.91	0.28	–
0.38	0.95	0.30	0.37	0.95	0.37	0.44	0.93	0.40	–
0.33	0.99	0.43	0.22	0.88	0.07	0.29	0.89	0.16	–
	–			–		0.88	0.96	–	–
0.35	0.95	0.28	0.49	0.87	0.23	0.63	0.88	0.39	–
0.38	0.93	0.27	0.45	0.99	0.52	0.41	0.97	0.41	–
	–			–			–		Overall agreement 0.11-0.88
0.31	0.94	0.23	0.46	0.86	0.26	0.49	0.81	0.25	–
0.18	0.97	–		–			–		–
	–			–		Overall agreement 55%			–
	–			–			–		Overall agreement 0.47-0.80

Validity and Reliability

The Chinese versions of CIS-R, GHQ-12, and HADS were evaluated by research assistants who underwent video training and supervised administration of the instruments. Psychiatrists who were blinded to previous assessment results then conducted SCID interviews to establish psychiatric diagnoses. All psychiatrists had more than 5 years of clinical experience and received training on SCID. The inter-rater reliability of C-CIS-R was evaluated by observer co-ratings of a random subsample of 35 participants. For test-retest reliability of C-CIS-R, another random subsample of 24 participants was reassessed by the same rater 2 weeks later.

Statistical Analyses

Statistical analyses were performed using STATA version 12.0 (StataCorp). Descriptive statistics were expressed as means, with standard deviations, percentages, or ranges. Criterion validity was evaluated by comparing diagnoses generated by C-CIS-R and SCID using kappa coefficients (κ) with standard errors. Spearman's correlations between total scores of GHQ-12, HADS, and C-CIS-R were calculated in the patient group (n = 140) to determine the convergent validity. Internal consistency of questions in each symptom section was measured by Cronbach's alpha. Intraclass correlation coefficients (ICC) of the C-CIS-R total score were computed for inter-rater and test-retest reliability. Two receiver operating characteristic (ROC) curves (sensitivity vs. 1-specificity) were generated. The first ROC curve was constructed to identify the optimal cut-off score for significant non-psychotic symptoms (i.e. diagnosable CMDs). By including patients and healthy controls in the analysis, the score that best differentiated those with CMDs from those without was decided using the patient-control criterion. The second ROC curve determined the cut-off score for symptoms that require clinical attention. As the vast majority of CMD patients in need of treatment suffer impaired function and had an

Table 2. Demographic characteristics of the study sample.*

	Patients with any common mental disorder (n = 140)	Healthy controls (n = 161)
Age (years)	47.5 ± 13.3	47.5 ± 13.9
Gender		
Male	47 (33.6)	57 (35.4)
Female	93 (66.4)	104 (64.6)
Educational level		
No schooling or primary	43 (30.7)	30 (18.6)
Lower secondary	30 (21.4)	19 (11.8)
Upper secondary	51 (36.4)	58 (36.0)
Post-secondary	16 (11.4)	54 (33.5)
Marital status		
Single	31 (22.1)	40 (24.8)
Married or cohabiting	68 (48.6)	110 (68.3)
Divorced or separated	32 (22.9)	4 (2.5)
Widowed	9 (6.4)	7 (4.3)
Employment status		
Working	44 (31.4)	112 (69.6)
Retired	13 (9.3)	22 (13.7)
Housewife	38 (27.1)	15 (9.3)
Student	4 (2.9)	10 (6.2)
Unemployed or not working	41 (29.3)	2 (1.2)
Diagnoses by clinician†		
Major depressive disorder	52 (37.1)	-
Generalised anxiety disorder	38 (27.1)	-
Panic disorder	13 (9.3)	-
Phobias	29 (20.7)	-
Obsessive-compulsive disorder	14 (10.0)	-
Mixed anxiety and depressive disorder	6 (4.3)	-

* *Data are shown as mean ± standard deviation or No. (%) of subjects.*

† *Psychiatric diagnoses of healthy controls were verified by Structured Clinical Interview for the DSM-IV.*

Table 3. Criterion validity of C-CIS-R.

	Depressive disorder			Anxiety disorder			Any CMD*		
	Yes	**No**		**Yes**	**No**		**Yes**	**No**	
C-CIS-R positive	33	17	PPV 66.0%	40	49	PPV 44.9%	75	33	PPV 69.4%
C-CIS-R negative	8	243	NPV 96.8%	18	194	NPV 91.5%	11	182	NPV 94.3%
	Sensitivity 80.5%	Specificity 93.5%		Sensitivity 69.0%	Specificity 79.8%		Sensitivity 87.2%	Specificity 84.7%	

Abbreviations: *C-CIS-R = Chinese version of the Revised Clinical Interview Schedule; CMD = common mental disorder; NPV = negative predictive value; PPV = positive predictive value.*

* *Any CMD means depressive disorder or anxiety disorder or both.*

SOFAS score of ≤ 70,[33] we defined the group needing clinical treatment as participants with SOFAS score of ≤ 70 when determining the corresponding threshold. Area under the curve (AUC)[34] was computed for each ROC curve. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and percentage of correct classification were compared across different cut-off points. The level of significance was set at two-sided $p < 0.05$.

Results

Validity and Reliability

Table 2 presents the demographic characteristics of the 140 patients and 161 healthy controls. Their mean (± standard deviation) age was 47.4 ± 13.6 years. Of them, 104 (34.6%) were men and 197 (65.4%) women. Among the patients, 60.7% had a current psychiatric disorder as confirmed by SCID (29.3% with depressive disorders, 40.7% with anxiety disorders). The criterion validity of C-CIS-R, as evident from the association between C-CIS-R– and SCID-generated diagnoses, was moderate (Table 3). Kappa values linking C-CIS-R– and SCID-generated diagnoses of depressive disorder, anxiety disorder, and any CMD were 0.68 (standard error, 0.06), 0.41 (0.06) and 0.67 (0.05), respectively.

The convergent validity of C-CIS-R was determined by its correlation with GHQ-12 and HADS scores in the patient group (n = 140). There was a significant and sizeable correlation between the C-CIS-R and GHQ-12 ($r = 0.71$, $p < 0.001$). The correlation between the C-CIS-R and HADS was also significant ($r = 0.76$, $p < 0.001$).

The internal consistency was high with Cronbach's alpha ranging from 0.685 to 0.931 in all sections. The inter-rater and test-retest reliability of the C-CIS-R were both satisfactory, in which the ICC were 0.997 ($p < 0.001$) and 0.894 ($p < 0.001$) respectively.

Optimal Cut-off Points

Receiver operating characteristic curve analyses were performed to determine the threshold points for the C-CIS-R. To detect significant non-psychotic symptoms (i.e. diagnosable CMDs) in the patient group, an ROC curve with AUC of 0.810 was constructed (Fig 1). A cut-off score of ≥ 12 gave an optimal sensitivity of 69.3% (95% confidence interval [CI], 60.9-76.8%) and specificity of 92.7% (95% CI, 87.6-96.2%).

To identify those participants who needed clinical attention (i.e. SOFAS score ≤ 70), an ROC curve with an AUC of 0.827 was constructed (Fig 2). A cut-off score ≥ 18 gave a sensitivity of 70.2% (95% CI, 59.9-79.2%) and

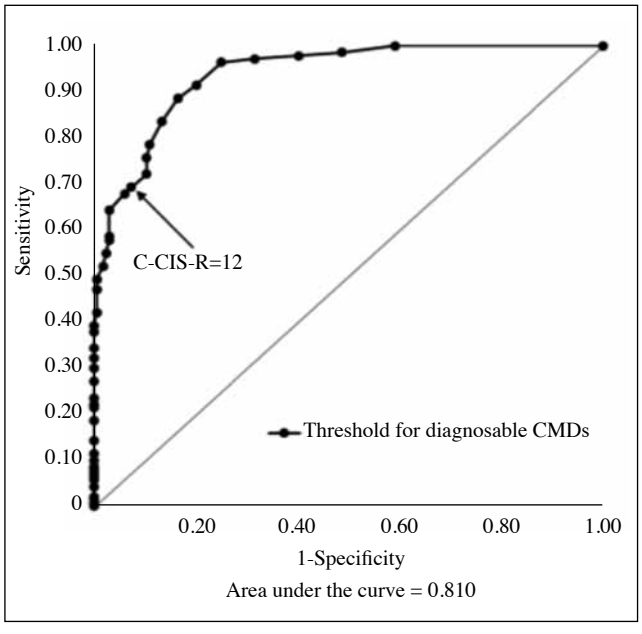

Figure 1. Receiver operating characteristic curve in detecting diagnosable common mental disorders (CMDs).

Abbreviation: *C-CIS-R = Chinese version of the Revised Clinical Interview Schedule.*

specificity of 95.2% (95% CI, 91.4-97.7%). The diagnostic accuracy at different cut-off points is listed in Table 4.

Discussion

In view of the significant morbidity and mortality associated with CMDs,[1-4] it is important for mental health providers to offer early identification and treatment for people with depressive and anxiety disorders. Developing validated structured diagnostic instruments for CMDs is therefore essential. It allows conduction of psychiatric epidemiological studies that provide accurate prevalence data of mental health problems in the community, and facilitates appropriate planning of service and formulation of mental health policies.

This paper reports the first study of the psychometric properties of the C-CIS-R. Compared with previous validity studies (Table 1), the overall agreement between C-CIS-R and SCID in our study was either fair or moderate (κ = 0.68 for depression, 0.41 for anxiety disorders and 0.67 for any disorder). The capacity of C-CIS-R to predict SCID-generated diagnoses was moderate to good. It performed well in identifying depression and any disorder (PPV = 66% and 69.4%, respectively) and moderately so for anxiety disorders (PPV = 44.9%). The high NPV of above 90% for any disorder also indicates the accurate detection of most non-CMD cases in the community. In addition, the C-CIS-R showed good convergent validity with GHQ-12 and HADS, and demonstrated excellent inter-rater and test-retest reliability.

The cut-off points of 11/12 indicated the presence of diagnosable CMDs and 17/18 a need for treatment and clinical attention. At both points, high specificity (11/12: 92.7% and 17/18: 95.2%) and moderate sensitivity (around 70%) were achieved. They concurred with the threshold points reported in the Adult Psychiatric Morbidity Survey in the United Kingdom.[35]

The strength of our study was the use of SCID, a gold standard in establishing psychiatric diagnosis, when validating the psychometric properties of C-CIS-R. Another

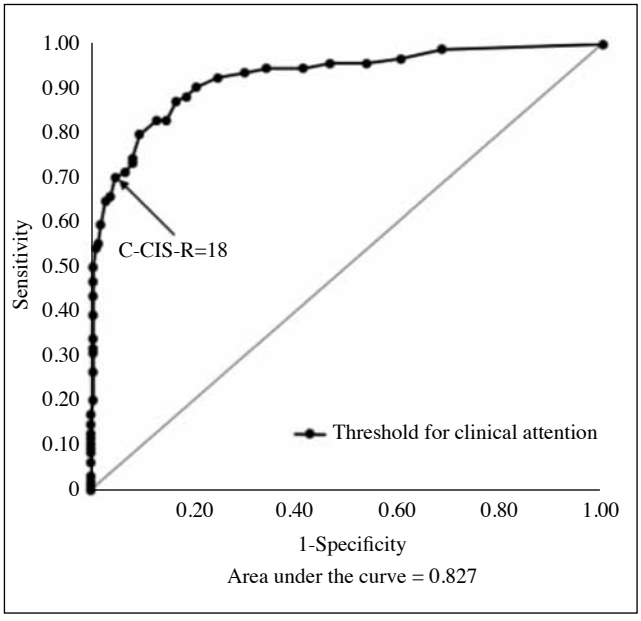

Figure 2. Receiver operating characteristic curve in detecting symptoms that require clinical attention.
Abbreviation: *C-CIS-R = Chinese version of the Revised Clinical Interview Schedule*.

Table 4. Diagnostic accuracy for various cut-off points of C-CIS-R in detecting diagnosable CMDs and symptoms that require clinical attention.

C-CIS-R cut-off point	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Detecting diagnosable CMDs				
10	75.7	89.6	86.9	80.8
11	72.1	89.6	86.3	78.6
12	69.3	92.7	89.0	77.9
13	67.9	93.9	90.5	77.4
14	64.3	97.0	94.7	76.1
15	58.6	97.0	94.3	73.3
Detecting the need for clinical attention				
16	73.4	91.9	80.2	88.5
17	71.3	93.3	82.7	87.9
18	70.2	95.2	86.8	87.7
19	66.0	96.2	88.6	86.3
20	64.9	97.1	91.0	86.1

Abbreviations: *C-CIS-R = Chinese version of the Revised Clinical Interview Schedule; CMDs = common mental disorders; NPV = negative predictive value; PPV = positive predictive value*.

strength of the study is the examination of a wide array of CMDs of different severities among psychiatric patients. Nonetheless there are a number of limitations worth noting. Firstly, the use of the self-reported questionnaires might render the results subject to recall bias. Second, the optimal cut-off points might differ with respect to age and gender, and were not investigated in the current study. The scale was also not tested on patients with severe psychiatric problems such as schizophrenia, major neurocognitive disorders, or substance use disorders. Finally, the study did not collect information on co-morbidity with physical illnesses and mental disorders other than CMDs. Further investigation is required to study the generalisability of our findings to other cohorts. Despite these limitations, the current study provides the first-ever evidence that the psychometric properties of C-CIS-R are satisfactory, and similar to CIS-R in other languages. This confirms the applicability of C-CIS-R as a diagnostic instrument of CMDs in Chinese communities.

Declaration

The authors declared no potential conflicts of interest with respect to the research, authorship, and / or publication of this article.

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