

Screening for Depressive Symptoms

Validation of the Center for Epidemiologic Studies Depression Scale (CES-D) in a Multiethnic Group of Patients With Diabetes in Singapore

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OBJECTIVE — We determined the reliability and validity of the Center for Epidemiologic Studies Depression Scale (CES-D) against the DSM-IV–based diagnostic inventory, Schedule for Clinical Assessment in Neuropsychiatry (SCAN), in a multiethnic sample of adult subjects with diabetes attending a diabetes center in Singapore.

RESEARCH DESIGN AND METHODS — A total of 522 subjects (74.7% Chinese, 11.1% Malay, and 14.2% Indian) completed culturally adapted versions of the CES-D; 291 subjects were administered the SCAN inventory.

RESULTS — The CES-D (cutoff score 16) showed high negative predictive values of more than 90% in all three ethnic groups. The prevalence of depressive symptoms (CES-D) and depression (SCAN) was significantly different between the Chinese and Indian subjects (CES-D 27.4 vs. 43.2%, $P = 0.006$); (SCAN 15.0 vs. 31.1%, $P = 0.01$).

CONCLUSIONS — The CES-D proved to be a reliable instrument for identifying patients with depressive symptoms in the multiethnic setting of this study.

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A recent meta-analysis showed that diabetes doubles the odds of comorbid depression (1). Comorbid depression is associated with adverse diabetes outcomes and increased health care use and expenditure. Even though effective treatment for depression in patients with diabetes is available, there is evidence that individuals with depression are underdiagnosed and undertreated. Screening for depression is therefore recommended in diabetes guidelines.

The Center for Epidemiologic Studies Depression Scale (CES-D) has been used in patients with different disorders including diabetes. However, less is known about its use in depression screening across diverse ethnic groups of patients with diabetes (2–3).

Singapore has three main ethnic groups (Chinese, Malay, and Indian) and a relatively high prevalence of diabetes (8.2%) (4). An earlier community-based study indicated that the prevalence of depression was 5.6, 4.1, and 8.6% among adult Singaporean Chinese, Malays, and Indians, respectively (5). The aim of this study was to validate culturally adapted versions of the CES-D in different languages in a multiethnic group of patients attending a diabetes center in Singapore.

RESEARCH DESIGN AND METHODS

Adult outpatients attending the Alexandra Hospital Diabetes Centre who had their annual complications screen performed within the last 6 months were invited to participate in this

study. After subjects gave informed consent, sociodemographic and clinical data were collected and depressive symptoms were assessed for all participants using the CES-D. Participants were also invited to a diagnostic interview using the Schedule for Clinical Assessment in Neuropsychiatry (SCAN) within the same week.

The CES-D is a 20-item, self-report, depressive symptom–based scale for depression (6). Each participant chose from English, Chinese (3), or Malay versions of the scale according to his language proficiency and cultural background. The Malay version of the CES-D was developed by using back-translation technique (7).

The SCAN uses a diagnostic inventory approach to assess and classify the psychopathology and behavior associated with major psychiatric syndromes in adults according to DSM-IV guidelines, and has been found to be generally acceptable and reliable across cultures and settings (8). It has been previously used in Singapore (9). The inter-rater reliability of the multilingual SCAN interviewers was good (κ 0.63).

Statistical analyses were performed using SPSS, version 15.0. Reliability of the CES-D was verified using Cronbach's coefficient α . To determine the screening performance of the CES-D and to identify optimal cutoff scores, receiver operating characteristic curve analysis was used. Statistical significance was set at $P < 0.05$.

RESULTS — A total of 537 subjects (3.5% of whom were type 1 diabetic; mean \pm SD age 54.5 ± 13.3 years) agreed to participate in the study; 72.6% were Chinese, 10.8% were Malay, 13.8% were Indian, and 2.8% were of other ethnicity (Caucasian, Eurasian, Japanese, etc.). The nonparticipation rate was 6.1%. Only data from 522 Chinese, Malay, and Indian subjects who completed the CES-D were further analyzed, and 291 subjects agreed to a SCAN interview. Socioeconomic and clinical parameters (data not shown) between those who completed both the CES-D and the SCAN and those who completed the CES-D only were not different.

Cronbach's coefficient α was 0.72 for Chinese subjects, 0.70 for Malay subjects,

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Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; SCAN, Schedule for Clinical Assessment in Neuropsychiatry.

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Table 1—Receiver operating characteristic curve analysis of CES-D (cutoff score 16) versus SCAN and prevalence of depressive symptoms (CES-D) and depression (SCAN) in different ethnic groups

	Chinese	Malay	Indian
<i>n</i>	207	39	45
AUC	0.822	0.636	0.823
Sensitivity	96.8	66.7	100
Specificity	67.6	60.6	64.5
PPV	34.5	23.5	56.0
NPV	99.2	90.9	100
CES-D	107 (27.4%)	21 (36.2%)	32 (43.2%)*
<i>n</i>	390	58	74
CI	23.1–32.2	24.0–49.9	31.8–55.3
SCAN	31 (15.0%)	6 (15.4%)	14 (31.1%)*
<i>n</i>	207	39	45
CI	10.4–20.6	5.9–30.5	18.2–46.7

Data are percent or *n* (%) unless otherwise indicated. *Chinese vs. Indian $P < 0.05$. AUC, area under curve; NPV, negative predictive value; PPV, positive predictive value.

and 0.79 for Indian subjects. The area under the curve values between ethnic groups were not statistically different. Using a cutoff score of 16, the negative predictive value was >90% across all ethnic groups (Table 1). Only three participants (two Malay and one Chinese) who scored <16 with the CES-D were categorized by the SCAN as having mild depressive disorder. The proportion of people who had a CES-D score ≥ 16 and the proportion fulfilling SCAN criteria for clinical depression were different between the Chinese and Indian ethnic groups (CES-D 27.4 vs. 43.2%, $P = 0.006$); (SCAN 15.0 vs. 31.1%, $P = 0.01$).

CONCLUSIONS— The internal consistency of a scale is as much a characteristic of the population in which it is utilized as it is of the scale itself. The internal consistency of the CES-D had not previously been assessed in a multiethnic group of patients with diabetes. Our study demonstrates that the CES-D is a reliable scale for our multiethnic patient sample.

This study, together with others (1,10), demonstrates that the prevalence of depression using a depressive symptom approach such as the CES-D differs from the prevalence of depression using a diagnostic inventory approach such as the SCAN. However, the high negative predictive value of the CES-D (>90% in all ethnic

groups) provides confidence in the CES-D as a screening tool for clinical depression.

It might be argued that short questionnaires such as the CES-D assess depressive symptoms rather than clinical depression. In a study on a multiethnic North American sample, Fisher et al. (10) suggested that a high score on the CES-D in people with diabetes may reflect difficulty in coping with a demanding chronic disease. In any case, several studies utilizing such scales to study depression have documented the negative effect of depressive symptoms in patients with diabetes and the benefit of treatment of depressive symptoms to diabetes control, providing empiric evidence for the direct clinical utility of scales such as the CES-D over and above that of being a mere screening tool for clinical depression. Hence, patients who test positive on the CES-D and negative on the SCAN may still benefit from increased attention to their psychosocial needs.

Our study suggests that the CES-D and its culturally adapted versions are reliable instruments to help identify subjects with depressive symptoms in a multiethnic group of patients with diabetes. The high negative predictive value of the CES-D in our sample makes it a valuable screening tool for clinical depression. Hence, utilizing the CES-D in our setting is likely to facilitate streamlining of resources to cater to the individual patient's

psychosocial needs. There are significant differences in the prevalence of depressive symptoms and that of depression among the different ethnic groups. Ethnocultural differences may contribute to these differences, and analysis of this possibility will be the subject of future reports.

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