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Challenges in assessing depressive symptoms in Fiji: A psychometric evaluation of the CES-D

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Abstract

Background and Aim—The CES-D is a commonly used self-report assessment for depressive symptomatology. However, its psychometric properties have not been evaluated in Fiji. The study aims to evaluate the reliability and validity of English language and Fijian vernacular versions in ethnic Fijian adolescent schoolgirls.

Methods—As part of the HEALTHY Fiji Study, ethnic Fijian female adolescents (n=523) completed the CES-D. Participants selected to respond in English or the local vernacular. Reliability (internal consistency, item-total score correlation, and test-retest estimates), validity (associations with other proxies for depression), and factor structure were assessed. Evaluations considered differences between language versions.

Results—In this sample, the CES-D had a Cronbach's alpha of 0.81 and item-total score correlation coefficients ranged between 0.2–0.63. One week test-retest reliability (ICC(2)) was 0.57. CES-D scores were higher among individuals who endorsed feelings of depression and suicidality compared to those who did not. ROC analyses of the CES-D vs. binary depression and suicidality variables produced AUCs around 0.70 and did not support a discrete cutoff for significant disturbance. Findings were similar across the two language groups.

Conclusions—The CES-D has acceptable reliability and validity among ethnic Fijian female adolescents in English and in the Fijian vernacular language. Findings support its utility as a dimensional measure for depressive symptomatology in this study population. Further examination of its clinical utility for case finding for depression in Fijian school-based and community populations is warranted.

Keywords

CES-D; Fiji; Validity; Reliability; Cross-Cultural

Introduction

One of the top contributors to the global burden of disease (WHO, 2008), depression has been linked with increased risk of and poor outcomes for communicable and non-communicable diseases (Prince, 2007). Depression in adolescence is also associated with low educational achievement, violence, and substance use and abuse (Patel et al, 2007). Recognizing the unmet needs for responding to the high burden of neuropsychiatric disorders, The Lancet Mental Health Group (2007) has called for the scale-up of services for mental disorders in low and middle income countries (LMICs). An effective response within individual LMICs will require a robust empirical base with data on local prevalence and distribution of depression. LMICs require locally valid assessments of depression for population health planning, facilitation of case-finding and referrals to mental health services, and evaluation of effectiveness of preventive and therapeutic interventions (Kessler et al, 2010). Cross-national comparative data are also essential to inform an understanding of root causes, risk and protective factors, a high priority in addressing the global burden of disease (Collins et al, 2011).

Among many available assessments for depressive disorders and symptoms, the Center for Epidemiologic Studies Depression Scale (CES-D) has characteristics that render its use valuable in LMICs. The CES-D was developed to measure current levels (within the past week) of depressive symptomatology in the general population (Radloff, 1977). Because it measures interval changes in depressive symptoms, it can be used both to identify risk factors and evaluate treatments (e.g. Luppá et al, 2012; Ginsburg et al, 2012). Furthermore, the scale is a promising tool for cross-cultural evaluation of depression (Perreira, 2005). Since its original validation among adults in U.S. community samples (Radloff, 1977), the CES-D has been evaluated in community samples from many of the world's regions, including Asia, the Middle East, and South America, and has been successfully translated for use in multiple languages (e.g., Iwata and Roberts, 1996; Wada et al, 2007; DaSilveria and Jorge, 2002; Gubash et al, 2000). The scale can be used as either a dimensional measure of depressive symptomatology with a continuous score or as a categorical measure of major depressive disorder based upon a cut-off score. Although developed for research purposes, it also has potential clinical application as a screener in a two-stage diagnostic process (Garrison et al, 1991).

Fiji is a nation located in the Western Pacific region. Indigenous (ethnic) Fijians comprise approximately half of Fiji's population. As a lower middle income economy (World Bank,

2012), Fiji shares many of the challenges to scaling-up treatment of depression and other mental disorders that characterize other LMICs. In particular, low allocation of public sector funding for mental health services and few trained mental health clinicians who are centralized in urban locations impede adequate mental health services access in Fiji (Saxena et al, 2007; Roberts et al, 2007). Although English is the official national language of Fiji, many ethnic Fijians do not speak it as a first language. However, population-based assessment of mental disorders in local vernacular languages is problematic given numerous dialects and communalects that differ from the Standard Fijian language.

Few data are available to illuminate the local burden of depressive disorders in Fiji's indigenous population. Although indigenous illness categories have been described that share characteristics with Major Depressive Disorder (MDD) (Becker, 1998), there is no clear indigenous nosologic correlate. Moreover, the prevalence of depressive disorders has not been formally assessed in a representative community sample. However, suicide rate estimates in Fiji range as high as 34.8 per 100,000 (Aghanwa, 2000) and a recent school-based assessment found prevalent suicidal ideation among young adolescents across ethnic groups in Fiji (WHO, 2010). Thus, available evidence supports the urgent need to measure the burden of mental disorders among Fiji's youth.

To our knowledge, there is no previous translation and corresponding validation of the CES-D suitable for the Fijian or any other indigenous Pacific Islander population. Application and interpretation of diagnostic criteria for mental disorders (e.g., those in the ICD-10 or the DSM-IV) in populations for which they were not developed have uncertain validity. Although there is evidence that MDD can be identified across diverse social and cultural contexts, phenomenologic variation across cultures has been well-documented and suggests that rigid universal diagnostic criteria cannot be assumed. Emotional distress may, for example, be preferentially expressed in a somatic idiom in some cultural contexts. Second, language to describe and express affect includes highly idiomatic expressions in English. Thus, non-native English speakers may not adequately or reliably understand nuance captured by items developed for Euro-American populations. Third, local factors such as health literacy, perceived stigma of mental illness, formulation of emotional distress as a health problem, and patterns of help-seeking may introduce unknown cultural bias in the self-report assessment of mental disorders. Implementation of a community-based assessment for depression in Fiji illustrates several potential threats to valid assessment of MDD across diverse cultural contexts.

The present psychometric study of the CES-D aims to: (1) evaluate validity and reliability--and by extension, potential clinical utility--of English language and local vernacular versions of the CES-D in a large, representative school-based study population of ethnic Fijian school-going adolescent girls in Fiji; and (2) evaluate threats to validity in assessment of depressive symptoms using both vernacular and English language versions of the CES-D administered in a school-based setting to inform a discussion of best practices for cross-national and cross-cultural assessment of mental disorders.

Methods

Data were collected as part of a larger study on social transition and health risk behaviors in Fiji: **Health-risk and Eating attitudes and behaviors in Adolescents Living through Transition for Healthy Youth in Fiji Study** (The HEALTHY Fiji Study; Becker et al., 2008). Parental or guardian informed consent and participant assent was obtained for each study participant. The protocol was approved by the Fiji National Research Ethical Review Committee, the Partners HealthCare Human Subjects Committee, and the Harvard Medical School Committee on Human Studies.

Study Sample

The study population comprises ethnic Fijian adolescent girls between the ages of 15 and 20 years, inclusive, who were enrolled in forms three through six at one of the twelve secondary schools identified within an administrative region by Fiji's Ministry of Education. This administrative region was selected because it includes schools distributed across rural and peri-urban locations, but resident ethnic Fijians also share a common indigenous language and culture.

Self-report data were collected in 2007. Participants were given the option of completing the questionnaire in one of two languages – English, the language of formal instruction, or the local vernacular language—a dialect of Fijian. Study enrollment required self-reported capacity to read and speak at least one of these languages. Study data were collected during proctored sessions at the participants' respective schools. Further details of the study protocol are described elsewhere (Becker et al, 2010).

Instructions to students included direction that they could decline responding to any of the questions; they were encouraged to leave a question blank if they felt they would not answer truthfully. Participants missing data for more than two of the CES-D items were excluded from analyses. We addressed missing data by imputing numeric values corresponding to the mean score for the remaining completed CES-D items for each respective study participant.

Test-retest sub-sample—Study participants from three of the original twelve schools were invited to participate in a retest reliability study. These sites were selected to maximize the regional geographic and linguistic diversity represented within the sub-sample. These participants responded to the same questionnaires within approximately one week in the same language they had previously chosen.

Study Measures

CES-D—The CES-D is a 20 item self-report questionnaire with a frequency-based four-point Likert scale (Figure 1). Sixteen items assess symptoms *consistent* with depressed mood and associated neurovegetative symptoms. The remaining items ask about feelings *inconsistent* with a state of depression (*good, hopeful, sleep, and enjoyed*; referred to as positive items in the literature (Radloff, 1977)). After reverse coding positive items, scores are summed, and total scores range from 0–60, with higher scores intended to correspond to increased type and/or frequency of symptoms.

Although the CES-D was developed to estimate current levels of depressive symptomatology in a general population, subsequent studies suggested a score of 16 or over to identify “possible” cases of MDD (Radloff and Locke, 1986). However, studies from the U.S. suggest that scores from 22 to 24 for female adolescents represent a more clinically relevant cut point, and caution that differences other than age (e.g., gender, race) may also influence the optimal cutoff score (Garrison et al, 1991; Roberts et al, 1990; Roberts et al, 1991).

Global School-based Student Health Survey (GSHS) content—The GSHS was developed by the World Health Organization to support systematic assessment of youth health risk behaviors to inform both within country use and cross-national comparisons (details at www.cdc.gov/gshs/). Modular content can be adapted to optimize local cultural acceptability and salience and also local public health relevance. The HEALTHY Fiji Study utilized content from the GSHS mental health core questionnaire and the expanded version among other modules selected (Becker et al., 2010). Possible depression was assessed with an item that asked, “During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing your usual activities?” Suicidal ideation, plans, and attempts were each assessed with separate items. For this study, a categorical suicidality variable was created that reflected an affirmative response to any one or more of these three suicide-related items.

Fijian language versions—For the present study, the CES-D and GSHS item content were translated into the local (regional) vernacular (Fijian) dialect by a bilingual native speaker (Figure 2). The process aimed to yield comparable, but locally familiar, idiomatic expressions, rather than a literal translation. After the initial translation, the measures were edited for syntax and backtranslated into English. These two versions were compared and the study team – which included a native speaker – modified the Fijian language version in consultation with a Fijian language scholar to render it as grammatically correct, locally comprehensible, and conceptually similar as possible. In previous reported findings from the HEALTHY Fiji study, the translated GSHS depression proxy item had fair test-retest reliability (Cohen’s kappa=0.41) (Becker et al, 2010).

Analyses

Distributions—The distribution of total CES-D scores was summarized with the mean, standard deviation, and percent with a score of 16 or higher. Linear regression examined the association between language groups (i.e., respondents in either English or Fijian) and CES-D score. Item-specific means were also compared across language groups using regression modeling. Models adjusted for peri-urban/rural school location (dichotomous).

Reliability—Reliability was evaluated by internal consistency, item-total score correlations, and a test-retest study. Each measure was calculated for the overall study sample and each language group. Internal consistency was estimated with Cronbach’s alphas. One week test-retest reliability was estimated by calculating total and item-specific interclass correlations (ICC(2)) between the original and repeated questionnaires (Shrout and Fleiss, 1979).

CES-D Modifications—A modified version of the CES-D was created to improve upon the reliability of the original version by removing items that reduced the internal consistency or did not correlate with the total score. Only one modified version was created across the language groups, thus all changes were considered for their effect in the sample as a whole and in each language group.

Validation—Mean CES-D scores were calculated and compared, with a t-test, after stratifying on the GSHS item used as a proxy for depression and the suicidality variable created for this study. Logistic regression assessed the association of CES-D total scores with the depression proxy and suicidality proxy; these analyses were conducted for the overall sample and each language group, adjusted for peri-urban/rural school location.

Receiver operating characteristics (ROC) were used to evaluate the CES-D's ability to discriminate between students who endorsed the depression proxy (for content validity) or suicidality proxy (for convergent validity) from those who did not. Areas under the ROC curve (AUC) were calculated for the total group and for each language group.

Factor Analysis—An exploratory factor analysis, with oblique rotation, of the original and modified version of the CES-D was conducted for the total group and also within each language group. An eigenvalue above 1.0 was set as the criterion for determining the number of separate factors and a loading of 0.40 was used as the cutoff for deciding whether an item loaded on a factor.

Because of multiple comparisons, we considered a p-value of 0.01 or less to be statistically significant to avoid type I errors (incorrectly rejecting a null finding). All statistical analyses were performed with SAS 9.2.

Results

Study Sample

Of 734 prospective study participants identified, 523 met eligibility criteria, provided parental (or guardian) informed consent as well as assent, and were enrolled (71% response rate). Six participants were excluded from the analysis because of missing CES-D items, yielding an analysis sample of 517 for the present study. The majority of participants (71.6%) chose to respond to the assessments in the Fijian language, and 28.4% chose the English language version (Table 1).

Test-retest Sub-sample—The sub-sample who participated in the test-retest study consisted of 81 students (100% response rate). One individual was excluded due to missing items on the CES-D. Age and language distribution within this sub-sample were similar to the total sample, but more students attended a school in rural than in peri-urban areas (57% vs. 50%).

Distributions—The mean CES-D score in the total sample was 19.8 (SD=7.63). Whereas eleven individual items (*bothered, blues, good, mind, depressed, effort, hopeful, failure, talk, lonely, and crying*) had significant between-language group differences in mean values for

responses, mean scale scores were similar across the two language groups (Table 1). In addition, mean scale scores were similar across peri-urban and rural school groups (19.4 and 20.3, respectively).

Reliability

Internal Consistency—Cronbach's alphas indicated a high internal consistency for the total group and for each language version (Table 2). Removing the four positive items modestly increased both language versions' respective alphas. The additional omission of the items *effort* and *talk* further improved the English version's alpha, but reduced the Fijian version's alpha.

Item-Total Score Correlations—In the overall sample, each positive item, after reverse coding, had only a weak correlation coefficient with the total score (<0.30). Remaining items were moderately correlated with the total score (0.33–0.65). After language stratification, similar item-total score correlations were observed in the Fijian version as observed in the overall sample. In the English version, only two of the reverse coded positive items, *good* and *hopeful*, correlated weakly with the total score (0.21 and 0.06, respectively), as did *effort* (0.16). All other items had moderate correlation (0.32–0.68).

Test-Retest Reliability—Total score intraclass correlation coefficients (ICC(2)s) were 0.57 in the overall sample, and demonstrated fair test-retest reliability in the Fijian language group (ICC(2)=0.56) and good test-retest reliability in the English group (ICC(2)=0.61). These values are comparable to prior results (Roberts et al, 1990) and within a generally acceptable range for epidemiologic research (Cicchetti, 1994) (Table 2). Item-specific coefficients for the overall sample ranged from 0.12 for *good* to 0.54 for *effort*, but varied widely by language (data not shown). The items with the weakest coefficients (<0.20) in the English group were *eating*, *blues*, and *failure*, and in the Fijian language group were *good* and *mind*. The item with the strongest coefficient for the English group was *dislike* (0.61). No item had a coefficient above 0.50 in the Fijian language group.

Modified Version

We developed a modified version of the CES-D by omitting six items (*happy*, *enjoy*, *good*, *hope*, *effort*, and *talk*) that reduced internal consistency and did not correlate with the total score. Possible total scores range from 0–48. The mean score of the modified CES-D for the overall sample was 12.48 (SD=6.97) and there was no significant difference between the language groups.

Validation

The original version of the CES-D produced significantly higher mean scores among those individuals who endorsed either the GSHS depression proxy (23.24 vs. 17.50) or suicidality proxy (23.52 vs. 18.62) compared with those who did not. As expected, there was incomplete overlap of endorsement of proxies for suicidality and depression. However, mean CES-D scores were highest in those who were positive for both proxies (24.23), and lowest in those positive for neither (16.69). The same monotonic pattern was observed with the modified version (data not shown).

Higher total CES-D scores also related significantly to endorsement of both depression and suicidality proxies (Table 3). Each point increase of the original CES-D score was associated with a 12% increase in the odds that the student endorsed the proxy for depression and 9% increase in the odds that the student was positive for the suicidality proxy. Findings were consistent within each language group. The modified version of the CES-D did not meaningfully alter this relationship. Adjusting for age and peri-urban/rural status did not change the estimates for the original or modified CES-D.

ROC analyses (Figure 3) produced AUCs indicating that the original and modified versions of the CES-D performed similarly well in discerning those who endorsed the proxies for depression and suicidality from those who did not. The two language groups did not have appreciably different AUCs for either proxy (data not shown).

Factor Analysis

Radloff (1977) estimated the CES-D had an underlying structure with four components, but three-factor structures have previously been reported in other ethnic populations (Edwards et al, 2010). Our factor analysis on the original CES-D version in the overall sample supported a three factor structure with four items (*good, failure, sleep, and talk*) failing to load. Language stratification resulted in unique structures; the English version yielded a three-factor solution and the Fijian language version yielded a two-factor solution. *Good* and *talk* did not load onto a factor in either language group. Additional items (*mind, hopeful, and sleep*) did not load onto a factor in the English version. Repeating the factor analysis for the modified version supported a single-factor solution for the overall sample and in each language group.

Discussion

Our study is the first to evaluate the reliability and validity of a depression assessment in Fiji, and also describes the first Pacific Island language version of the CES-D of which we are aware. Our findings support that the CES-D has adequate reliability and validity as a measure of depressive symptoms in this study sample. Our examination of the modified version—developed to maximize internal consistency reliability—suggested that it did not differ appreciably with respect to our tests of validity and its internal consistency was only marginally improved by our changes. We therefore suggest that the CES-D in its original form, offered in either English or the Fijian language version, has potential clinical and research utility in Fiji as a dimensional measure of depressive symptoms.

Establishing the validity of the CES-D in assessing depressive symptoms in this study population rests on a number of assumptions that must be considered in the interpretation of our findings and their limitations. In particular, the conceptual equivalence of depressive symptoms—as well as their clinical and social relevance—across distinct cultures and languages is uncertain. Although the present study grounds this discussion in a particular social context: ethnic Fijian school-going adolescent girls in Fiji, the challenges inherent to reliable and valid community-based assessment of depressive symptoms are not unique, but rather common to other LMICs. With limited representation of populations outside of Europe and North America in high impact scientific journals in the field of psychiatry (Patel

and Sumathipala, 2001), critical knowledge gaps remain and reliable and valid assessments for mental disorders, including depression, across diverse cultural settings are essential to public health planning.

These challenges are due in part to the well-established cross-cultural variation in idioms of distress (Kleinman, 1987; Rubio-Stipec et al, 2008). For example, depression presents in a more somatic idiom in some contexts, and a more psychological idiom in others. Moreover, the language that expresses complex and nuanced affective or somatic experience may be idiomatic or draw from symbols and metaphors with particular cultural resonance. Some of the CES-D item content, such as “crying spells,” “shake off the blues,” or “could not get ‘going’” are examples of the non-literal use of language in articulating emotional experience. Meaningful in one context, the unique cultural referents may be opaque in another. In addition, socio-cultural contexts that structure expectations about agency and social relations will variably impact responses to item content relating to hopefulness, or the perception of loneliness or unfriendliness.

Indeed, Radloff (1977) cautioned that the scale’s wording may be problematic for individuals who speak languages other than English, and anticipated a need for “removal of colloquial expressions.” Despite similar total CES-D scale scores in each of the two language groups, it is noteworthy that item response patterns varied between the languages. For example, eleven items had significantly different mean scores. In addition, in our factor analysis items did not cluster together similarly within the two language groups. Our study was not designed to evaluate whether these between-group differences were attributable to how each language might differentially influence a response or to detect differences in risk for depressive symptoms among study participants with a preference for one language over another. That said, the findings suggest that conventional approaches to translation and backtranslation of depression items may be insufficient to establish conceptual equivalence across languages. Similarly, item specific estimates of test-retest ranged widely across items and between language groups. The low ICC(2)s may be due to unreliability of the measure or to temporal instability of the individual symptoms themselves and/or the underlying construct. Notwithstanding these differences in single items, our study found both language versions of the CES-D performed similarly in aggregate. Further, that a majority of our sample preferred to respond in their vernacular language supports the importance of offering language choice in settings where respondents are multi-lingual.

Estimating the CES-D’s ability to identify individuals who suffer from depression is further complicated by the absence of an available universally agreed gold standard for ascertaining depression. Although the GSHS has been implemented for surveillance of youth risk behaviors in numerous countries outside of Europe, North America, and Australia, we are not aware of any published studies establishing the validity of the individual depression and suicidality items used here, or to their relationship to the diagnostic category of MDD. Furthermore, the GSHS derived depression proxy we used is specific to symptoms within affective and cognitive domains, sadness and hopelessness, whereas the CES-D encompasses a broader range of symptoms, including neurovegetative signs such as poor appetite, sleep, and low energy. Further disparity would be expected between the GSHS and

the CES-D given that they assess very different time periods (past year and past week, respectively).

Another major challenge to evaluating the validity of the CES-D for measuring depressive symptoms in this Fijian population is the uncertainty of whether similar constructs are being assessed across these distinct cultural settings. Moreover, it has been suggested that the CES-D is a better measure of “demoralization”, or general mental distress, than MDD per se (Dohrenwend, 1990). Indeed, the CES-D may still have good clinical utility for identifying general mental distress, setting aside its local validity for ascertaining a diagnosis of MDD. Similar AUCs for the depression and suicidality proxies support that CES-D mean scores do correspond to emotional distress, even if not precisely matched to Euro-American-specific expressions of MDD. Although related constructs, depression and suicidality are also distinct from each other; this is perhaps even more pronounced in regions outside of Europe and North America (Bertolote et al, 2003). For that reason, using suicidality as a second validator establishes a broader range of mental distress measured by the CES-D, thus further supporting the CES-D as a measure of general mental distress, rather than depression specifically.

Consistent with concerns about language and cultural limitations, our analyses demonstrated that CES-D responses from this ethnic Fijian study does not replicate the original factors described for the CES-D: “depressed affect”, “somatic and retarded activity”, “interpersonal”, and “positive affect.” Although different factor structures may suggest dissimilar constructs are being measured and limit cross-group comparisons, Radloff (1977) argued against “undue emphasis on separate factors” due to the high internal consistency of the CES-D, which was also observed in the present study. Likewise, the CES-D is often reported and modeled as a single total score, under assumptions of unidimensionality (Edwards et al, 2010). In an adult population from the USA, findings from Edwards et al (2010) supported a strong single factor when positive items, and *unfriendly*, were excluded. Removal of items that did not correlate with the total score or reduced internal consistency strengthened the unidimensionality of our modified scale, as expected. Similarly, removing positive items improved the CES-D’s psychometrics in other ethnically distinct populations, such as Japanese (Iwata and Roberts, 1996), Mexican-Americans (Garcia and Marks, 1989), and Korean immigrants in Toronto (Noh et al, 1998).

Our finding that a modified version of the CES-D had marginally superior psychometric properties suggest caution may be warranted in utilizing an assessment for depressive symptoms in a population with distinct language and cultural traditions from the population for which it was developed. Even if depressive disorders share common features and high prevalence across diverse social contexts, the assessment of depressive symptoms should be approached with appropriate local contextualization. The reliability and validity of the CES-D cannot be assumed without local evaluation such as that presented here. However, these modifications would also potentially undermine the CES-D’s utility for cross-national comparisons. If each population used its own modified version of the CES-D it would be unclear how to compare prevalence estimates. On the other hand, using the original version likely obscures real differences in how the instrument performs across cultural contexts.

Our study design also imposed limitations on generalizability of these results from our female adolescent school going study population to other demographic strata of ethnic Fijians within Fiji. Studies of adolescents in the United States that stratified by gender show that the CES-D has stronger measures of reliability (Roberts et al, 1990) and validity (Garrison et al, 1991) for females compared to males. Because we did not evaluate male ethnic Fijians, we cannot rule out the possibility that this would be true in Fiji as well. Likewise, these results may not be generalizable to adult Fijians. Studies from the United States have found that while the CES-D is valid and reliable for adult and adolescent populations, appropriate cut-off scores are higher for the latter group (Garrison et al, 1991; Roberts et al, 1990; Roberts et al, 1991).

In summary, study findings support adequate reliability and validity of the CES-D in this female ethnic Fijian adolescent study population and also suggest its potential clinical utility as a screening tool for both depressive symptoms and suicidality. Because the ROC analysis does not indicate a discrete cutoff marking the presence or absence of depression, we suggest the scale be further evaluated as a dimensional—but not a categorical—measure of depressive symptomatology in this study population. Further evaluation in other ethnic Fijian socio-demographic strata is necessary prior to extrapolating from this female adolescent study population to other Fijians. The monotonic relationship between the CES-D and the depression and suicidality proxies support that individuals who score higher may be in greater need of further evaluation and care. Further, the CES-D's design and scoring allows for quick and inexpensive screening without requiring specialized clinicians (Radloff, 1977). The CES-D potentially identifies depressive symptoms not captured by the GSHS-derived depression proxy's categorical and narrow scope of symptomatic assessment. In contrast to these proxies, the CES-D also provides dimensional assessment of symptoms specific to the present week. In Fiji, as in other regions with low mental health literacy, limited mental health care access, and low capacity for community-based psychiatric diagnostic assessment, such assessments have promise for case finding and evaluation of interval change.

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Please tell me how often you have felt this way during the past week:

Response Options: Rarely or none of the time (Less than 1 day), Some or a little of the time (1-2 days), Occasionally or a moderate amount of time (3-4 days), or Most or all of the time (5-7 days)

1. I was **bothered** by things that usually don't bother me.
2. I did not feel like **eating**; my appetite was poor.
3. I felt that I could not shake off the **blues** even with help from my family or friends.
4. I felt I was just as **good** as other people.
5. I had trouble keeping my **mind** on what I was doing.
6. I felt **depressed**.
7. I felt that everything I did was an **effort**.
8. I felt **hopeful** about the future.
9. I thought my life had been a **failure**.
10. I felt **fearful**.
11. My **sleep** was restless.
12. I was **happy**.
13. I **talked** less than usual.
14. I felt **lonely**.
15. People were **unfriendly**.
16. I **enjoyed** life.
17. I had **crying** spells.
18. I felt **sad**.
19. I felt that people **dislike** me.
20. I could not **get "going"**.

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The CES-D Scale: A self-report depression scale for research in the general population.

Applied Psychological Measurement, 1(3), 385-401. Sage Publications.

**Bold emphasis added by authors and indicates names used for items in the text

Figure 1.

The CES-D Items

Eri volai koto i ra e yavalu na i juvaki ni lemu cola o a dau vakilasia he hotaqea. Kerevia mo varaitakinia na levu ni gauna o vakilasia he hotaqea ke na vikwa okwe i na macawa a osi.
 [Response Options:] Hukai vahila he vagauna (hewahewa mai 1 na higa), Ri valu na gauna (1-2 na higa), Vayahila he varausia (3-4 na higa), [or] Valevu he vigauna taucoko (5-7 na higa)

1. A racia qu yalo mai na kwa eri tabu dau raciau.
2. Qu jua na kana; a dranudranusiau na cawa.
3. A qu vakilasia ni qu tabu rewa ni vaosinia na yalo lubita, vitalia nira vivuke ma o kuru na lequ itokani he na lequ vuniwere.
4. A qu vakilasia ni qu vina me kodaki ru valu tale.
5. A dredre me dei na lequ vakahama ina kwa qu tara koto.
6. Qu yalo lubita koto.
7. A dredresiau na kwa koko.
8. Qu vanuinitakinia na gauna hi bere ma.
9. Qu numia ni maumau ho na lequ cola.
10. Qu matakau.
11. Qu moce yadrayadra.
12. Qu ciqa.
13. Qu tasi voha valevu kodaki i vihiga.
14. Qu gwalili koto.
15. Ara tamu vikawaitaki na ecola.
16. Qu taleitakinia na cola.
17. Valu na gauna qu tagi ke.
18. Qu yalo rarawa koto.
19. Qu vakilasia nira tabu taleitaki niau na ecola.
20. A dredre mequ sekivunia e hila na kwa.

Figure 2.
 The CES-D Items (Fijian Language)

Figure 3.
ROC Curves for Depression and Suicidality Proxies: Comparing Original and Modified CES-D Scales for total sample

Table 1

Description of Study Participants and CES-D Distributions

	<u>Total</u>	<u>English</u>	<u>Fijian Language</u>
N	517	147 (29%)	370 (71%)
Age: mean (SD, range)	16.7 (1.1, 15–20)	16.7 (1.0, 15–19)	16.7 (1.1, 15–20)
% Attending a school in a peri-urban area	50	66	44
CES-D Score: Mean (SD)	19.8 (7.63)	20.6 (8.3)	19.5 (7.3)
CES-D scores 16: N (%)	346 (67)	104 (71)	242 (65)

Table 2

Estimates of reliability of CES-D

	Total Group	Fijian Language	English
Internal Consistency (Cronbach's Alpha)			
All Items	0.81	0.81	0.83
Without Positive Items	0.87	0.89	0.85
Without Positive Items, <i>effort, talk</i>	0.87	0.86	0.88
Test-retest (ICC(2))			
Total CES-D Score	0.57	0.61	0.56

Table 3

Adjusted odds ratios* and 95% confidence intervals comparing original and modified total CES-D scores with GSHS-derived proxies for depression and suicidality for the overall sample and each language group.

	<u>Total</u>	<u>English</u>	<u>Fijian</u>
	OR (95% CI)	OR (95% CI)	OR (95% CI)
<u>Depression</u>			
Original:	1.12 (1.09, 1.16)	1.12 (1.07, 1.18)	1.12 (1.08, 1.16)
Modified:	1.12 (1.10, 1.14)	1.15 (1.08, 1.22)	1.14 (1.10, 1.18)
<u>Suicidality</u>			
Original:	1.09 (1.06, 1.12)	1.09 (1.04, 1.14)	1.09 (1.05, 1.13)
Modified:	1.11 (1.07, 1.14)	1.11 (1.05, 1.18)	1.11 (1.06, 1.15)

* Adjusted for age and peri-urban/rural location