

Validation of the Kessler's psychological distress scale among the Sinhalese population in Sri Lanka

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Abstract:

Objective: Kessler's psychological distress scales, K10 and K6 are short rating scales designed to screen psychiatric morbidity in the population. Despite being increasingly popular elsewhere, they have not been validated in Sri Lanka. We examined the validity of these scales among the Sinhala speaking population in the Gampaha district of Sri Lanka.

Design: The English language version of the K10 and K6 questionnaire were translated into Sinhala using standard methods. The K10 and K6 scores for 27 healthy and 37 psychiatrically ill individuals were compared with the Structured Clinical Interview for DSM disorders (SCID) outcome categories.

Results: The K10 and K6 were sensitive and specific in detecting mental illness, especially depression. Those with schizophrenia had scores similar to healthy individuals. We suggest cut-offs of 12 for K10 and 7 for K6 having 90% sensitivity and 81% specificity for both scales.

Interpretation: K10 and K6 are valid screening tools for non-psychotic psychiatric illness among the Sinhala speaking population in Sri Lanka. They can be used in psychiatric epidemiological studies.

Background

The long (K10) and short (K6) versions of the Kessler's psychological distress scale have been widely used to screen populations for psychiatric morbidity and are becoming increasingly popular in psychiatric epidemiology (Kessler et al., 2002; Baillie, 2005; Andrew and Slade, 2001).

The Kessler's psychological distress scale has been validated in various regions and different cutoff values have been suggested and used in different settings with sensitivities and specificities ranging from 51% to 96% (Andrew and Slade, 2001; Kessler et al., 2003). The aim of this study was to validate the long (K10) and the short (K6) versions of the Kessler's psychological distress scale to screen for psychiatric morbidity

among the Sinhala speaking population of Sri Lanka.

Method

The K10 and K6 are brief ten-item and six-item questionnaires, respectively, to measure the extent and the severity of generalized distress in the preceding month. They assess selected symptoms including "tired out for no good reason", "nervous" and "sad or depressed" with five response categories ranked on a five-point scale. The total score is the sum of these responses, 0–40 for the K10 and 0–24 for the K6. The likelihood of mental ill health is greater with a higher score.

Kessler's psychological distress scale was translated to Sinhala by linguistic experts. Three psychiatrists were consulted to obtain common terms used by the population to describe technical terms. The Sinhala version was back translated to English by an independent bilingual person who was not acquainted with the original English version of the questionnaire. The two English versions of the scales were comparable. The scales were then pre-tested, piloted on a sample, and modified accordingly.

Thirty seven patients were randomly selected from the inpatient psychiatry unit and the outpatient psychiatry clinic of the North Colombo Teaching Hospital, Ragama, Sri Lanka. These patients were clinically diagnosed of having a psychiatric disorder based on the ICD 10 criteria by two independent consultant psychiatrists. The diagnoses of the patients ranged from generalized anxiety disorder and major depression to schizophrenia. Informed written consent was obtained from all patients after explaining the objectives of the study and ensuring confidentiality of information. Only patients who were conversant in Sinhala were included in the study. Patients who were too disturbed to participate in the study and those who did not give consent were excluded.

A random sample of 27 apparently healthy individuals from the community who were part of an ongoing epidemiological study was used as a comparison (control) group. Informed written consent was obtained from these participants.

The Sinhala translations of the K10 and K6 were administered to all subjects. The Structured Clinical Interview for DSM disorders (SCID) was administered to each participant to confirm the diagnosis according to the DSM IV by one of the authors blinded to the K10 and K6 scores. On the SCID assessment, none of the controls had a positive diagnosis of any psychiatric disorder.

The data were analysed using SPSS version 11 software package. The cut off values for the Sinhala translations of the K10 and K6 were decided based on sensitivities and specificities by ROC curve analysis.

Results

Thirty seven individuals with mental illness and 27 healthy individuals were administered the scale. Of those with mental illness, 17 had moderate to severe depressive disorder, 11 had schizophrenia, 7 had bipolar affective disorder (BPAD) with the current episode being moderate to severe depression, and 1 each had BPAD (current episode being hypomanic) and adjustment disorder.

The mean ages of those with mental illness and the control population were 47 years (SD 12.6) and 49 years (SD 7.9), respectively. Sixty seven percent (25/37) of those with mental illness were female and 55% (15/27) of the healthy subjects were female.

K10 scores

The mean K10 scores were significantly different (mean difference 13.5; 95% CI 9.3 -17; $p < 0.001$); the mean for those with mental illness was 20.4 (SD 9.72), and the mean for those without mental illness was 6.9 (SD 5.51). Among the subjects with mental illness, those with scores of < 9 included 6 subjects with schizophrenia and 1 with BPAD currently having an episode of hypomania.

K6 scores

The mean K6 score for those with mental illness was 12.4 (SD 6.04) and for those without mental illness was 4.2 (SD 3.64), the difference being statistically significant (mean difference 8.2; 95% CI 5.5 – 10.8; $p < 0.001$). The 7 subjects who scored < 9 in K10, scored < 6 in the K6.

There were no significant differences in the K10 or K6 scores between males and females in groups with and without mental illness.

Sensitivity and specificity

The K10 had moderate sensitivity and good specificity to detect mental illness. A cut off score of > 12 had a sensitivity of 76% and a specificity of 81%. The K6, with a cut off score of > 7 , had a sensitivity of 72% and specificity of 81%.

Using the same scores and excluding patients with schizophrenia, the sensitivity increased to

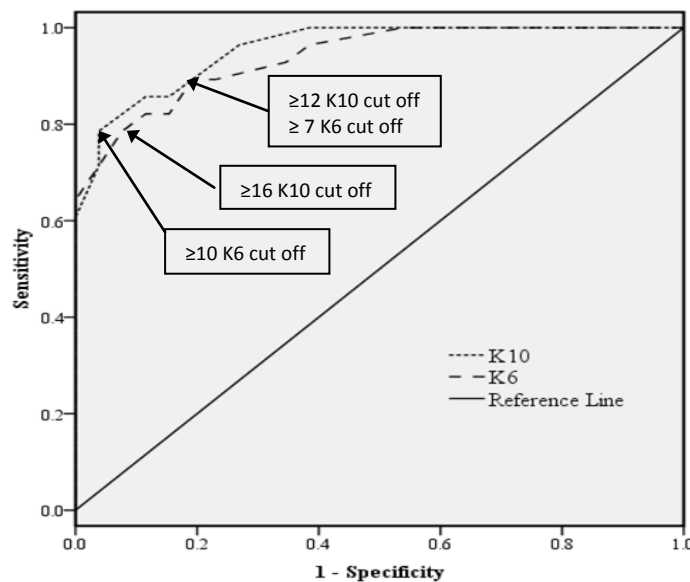
Table 1 - K10 and K6 scores by subject group

Scale	Scores					
	Subjects with mental illness			Healthy subjects		
	N	Mean	SD	N	Mean	SD
K10 (including Schizophrenia)	36	20.38	9.72	27	6.86	5.51
K6 (including Schizophrenia)	36	12.44	6.04	27	4.22	6.64
K10 (excluding Schizophrenia)	28	23.57	7.51	27	6.86	5.51
K6 (excluding Schizophrenia)	28	14.39	4.90	27	4.22	3.64

Table 2 - Potential cut-off values for K10 and K6 excluding schizophrenia

Scale	Cut-off value	Sensitivity (%)	Specificity (%)
K 10	7.0	100	61.5
	9.0	96.4	73.1
	10.5	92.9	76.9
	12.0	89.3	80.8
	13.5	85.7	84.5
	14.5	85.7	88.5
	15.5	82.1	92.3
K 6	3.0	100	46.2
	4.5	96.4	61.5
	5.5	92.9	65.4
	6.5	89.3	76.9
	7.5	89.3	76.9
	8.5	82.1	84.6
	9.5	82.1	88.5
	10.5	78.6	92.3
	12.0	71.4	96.2
	13.5	64.3	100

Figure 1 - Receiver operating characteristic (ROC) curves for the K10 and K6 scores predicting mental illness excluding schizophrenia



90% on both scales with a specificity of 81%. In the same group (excluding schizophrenia) when the cut-off scores were increased to 16 for the K10 and 10 for K6, the sensitivities increased to 79% and 80%, respectively, with specificities increasing to 96% and 91%, respectively. The areas under the curves for both K10 and K6 were similar.

Discussion

There is a scarcity of studies on the prevalence of psychiatric disorders in Sri Lanka. The gold standard tools for detecting psychiatric disorders such as SCID are not feasible for large-scale epidemiological studies in developing countries such as Sri Lanka due to the lack of professional expertise and the time commitment involved. Screening tools which can be administered swiftly and easily are, therefore, preferred.

A number of screening questionnaires for psychiatric disorders are in use. These include the General Health Questionnaire (12 item GHQ), the Primary Health Questionnaire (9 item PHQ) the Self-Reporting Questionnaire (20 item SRQ) and the Kessler's psychological distress scale. The K10 scale has been shown to be superior to some of its counterparts (Kessler et al., 2003; Patel et al., 2008). These scales have not been validated in Sri Lanka.

The brevity, strong psychometric properties, and ability to discriminate DSM-IV cases from non-cases have made the K10 and K6 popular epidemiological tools in the USA, Canada and the WHO World Mental Health Surveys (Furukawa et al., 2003; Gureje et al., 2006).

In our study, patients diagnosed with schizophrenia had low scores as compared to controls in contrast to subjects with other psychiatric diagnoses such as depressive disorder and adjustment disorder. In fact, the scores of the majority with schizophrenia were outliers that were not within the 2 SD range as observed in other studies (Kubiak et al., 2009; Swartz and Lurigio, 2005).

This validation study suggests that the Sinhala versions of the K10 and K6 questionnaires are good screening tools for non-psychotic psychiatric illnesses, particularly depression, among the

Sinhalese speaking population in Sri Lanka. The cutoff values of the K10 and K6 scores for depression we obtained are similar to those recommended in similar settings in other developing countries (Swartz and Lurigio, 2005; Baggaley et al., 2007).

Although a cut-off of 12 for the K10 performed better in the ROC analysis, a value of 16 may be preferable considering the high positive predictive value (PPV) without a considerable compromise on sensitivity when using the latter. A higher cut-off is recommended in resource-limited primary-care settings. Similarly, a value of 10 is recommended as the cut-off for the K6. However when the scale is used to monitor prevalence of psychiatric illnesses in epidemiological surveys, achieving higher levels of sensitivity needs to be weighed against having high PPV.

These cut-offs provide categorical assessment of psychiatric illnesses by dividing the population into those who are more or less likely to have psychiatric illnesses. The mean K10 and K6 scores offer dimensional assessment which is recommended for epidemiological studies (Kessler et al., 2002). An easily administered scale with high sensitivity and specificity such as the Kessler's psychological distress scale can be immensely useful in mental health epidemiological studies in Sri Lanka.

The areas under the curve for K10 and K6 were similar implying that the K6 performs as well as K10. This has implications for their use as screening tools for non-psychotic psychiatric illness in that the simpler one performs as well. In a country such as Sri Lanka, which has an extensive primary health care infrastructure with field level public health midwives assigned to a population of approximately 3000 persons, these tools can be easily administered in the field as a screening tool for non-psychotic psychiatric disorders. As K6 performs as well as the K10, the K6 may be the preferred tool to be used in such settings with minimal training of staff required.

Declaration of interests

None

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