Screening for Depressive and Anxiety Disorders among Adolescents in Indonesia:
Formal validation of the CESD-R and the Kessler psychological distress scale

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Disclosure

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Introduction

• 10-20% of adolescents in the world have at least one mental health problem
• Depressive and anxiety disorders account for up to 17% of the disability-adjusted lifeyears (DALYs) lost among 15–19 year-old adolescents
The Role of Screening Test

- Large-scale epidemiological studies
  Provide magnitude of and risk and protective factors for mental health problem
- Increase recognition and early detection
- Improving prognosis, reducing disability
• Burden of mental health problems is unclear in Indonesia
• No locally validated tool available for use to screen for common mental disorders among adolescents in Indonesia
Centre for Epidemiologic Studies Depression Scale (CES-D)

• Self-report tool, integration from:
  • Zung's Depression Scale, Beck Depression Inventory, Minnesota Multiphasic Personality Inventory (MMPI)
  • Revised CES-D (CESD-R): reflect DSM-IV definition of Major Depressive Disorder
• Screen for depression among adults
• Has been used in many studies of adolescent mental health
Kessler Psychological Distress Scale – 10 items (K10)

• Relatively short
• Designed to screen for psychological distress
• Screening instruments among general adult population in various countries
• Have been used in many studies of adolescent mental health
AIM

Culturally verify and establish the empirical psychometric properties of the Indonesian versions of the CESD-R and the K10/K6 and their overall performance in detecting depressive and anxiety disorders among older adolescents in Indonesia.
Study design

Translation and cultural verification & Validation study

Nested within a study of non-communicable disease and associated risks among Indonesian adolescents (main study)

Samples

627 adolescents (16–18 years old) attending senior high schools in Jakarta

Multiple stage sampling method
## Translation and Cultural Verification

<table>
<thead>
<tr>
<th>Step 1: translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Two bilingual research and clinical psychiatrists</td>
</tr>
<tr>
<td>• All difficulties and differences in translations were discussed among the two translators and the Indonesian investigators to obtain consensus on the content of Version 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2: discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 6 health workers and psychiatric researchers discuss the meaning and comprehensibility</td>
</tr>
<tr>
<td>• Reviewed all suggestions raised in small group discussion, made necessary adaptation of language to obtain Version 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3: pilot test</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Among 8 adolescents to evaluate comprehensibility and acceptability of Version 2</td>
</tr>
<tr>
<td>• Adaptation of feedback to generate Version 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4: back translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Back translation of Version 3, checked by JF, identified any items that required specific verification</td>
</tr>
</tbody>
</table>
**Study design**

**Formal Validation Study**

196 students randomly selected → interviewed with Mini International Neuropsychiatric Interview for Children and Adolescents (MINI KID)

- Severe mental health problems → referred to Cipto Mangunkusumo Hospital
- Minor mental health problems → recommendation to counselling
Data management and statistical analysis

• The internal consistency of the scales was evaluated using Cronbach's alpha coefficients with a cut-off of 0.8: high internal reliability

• ROC Curves Analysis
  • To identify the overall performance of the scales to detect a mental health problem
    optimal cut-off point to detect a mental health problem was identified using Youden's index
## Results

| Table 1 |
|------------------|------------------|
| Socio-demographic characteristics of 196 Indonesian students aged 16–18. | Statistics |
| Age in years – Mean [SD] | 16.5 [0.67] |
| Grade level – n (%) | |
| 10 | 64 (32.6%) |
| 11 | 84 (42.9%) |
| 12 | 48 (24.5) |
| Gender | |
| Boy | 86 (43.9%) |
| Girl | 110 (56.1%) |
| Religion | |
| Islam | 171 (87.2%) |
| Christianity | 16 (8.2%) |
| Others | 9 (4.6%) |

SD: standard deviation.
Results

Table 2
Distributions of CESD-R, K10, and K6 scores of 196 Indonesian students aged 16–18.

<table>
<thead>
<tr>
<th></th>
<th>CESD-R 60</th>
<th>CESD-R 80</th>
<th>K10</th>
<th>K6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of participants</td>
<td>189</td>
<td>189</td>
<td>196</td>
<td>196</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>10 (5–20)</td>
<td>10 (5–21)</td>
<td>14 (10–21)</td>
<td>10 (7–13)</td>
</tr>
<tr>
<td>Range {min; max}</td>
<td>{0; 52}</td>
<td>{0; 63}</td>
<td>{2; 33}</td>
<td>{2; 21}</td>
</tr>
</tbody>
</table>

CESD-R 60: The Center for Epidemiologic Studies Depression Scale – Revised Indonesian Version ‘CES-D style score’ ranging from 0 to 60; CESD-R 80: The Center for Epidemiologic Studies Depression Scale – Revised Indonesian Version, scoring from 0 to 80; IQR: interquartile range; K10: The Kessler Psychological Distress Scale – 10 items; K6: The Kessler Psychological Distress Scale – 6 item; SD: standard deviation
### Result

**Table 3**


<table>
<thead>
<tr>
<th></th>
<th>Depression</th>
<th>Anxiety disorder</th>
<th>Any depression or anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CESD-R 60</td>
<td>CESD-R 80</td>
<td>K10</td>
</tr>
<tr>
<td>AUC (95% CI)</td>
<td>0.87 (0.81; 0.91)</td>
<td>0.86 (0.80; 0.90)</td>
<td>0.79 (0.72; 0.84)</td>
</tr>
<tr>
<td>Optimal cut-off</td>
<td>≥ 20</td>
<td>≥ 22</td>
<td>≥ 18</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>75.0%</td>
<td>75.0%</td>
<td>90.5%</td>
</tr>
<tr>
<td>Specificity</td>
<td>79.9%</td>
<td>82.7</td>
<td>68.0%</td>
</tr>
<tr>
<td>LR+</td>
<td>3.72</td>
<td>4.09</td>
<td>2.83</td>
</tr>
<tr>
<td>LR-</td>
<td>0.31</td>
<td>0.31</td>
<td>0.14</td>
</tr>
</tbody>
</table>

AUC: The Area Under the ROC Curve; CESD-R 60: The Center for Epidemiologic Studies Depression Scale Revised Indonesian Version ‘CES-D style score’ ranging from 0 to 60; CESD-R 80: The Center for Epidemiologic Studies Depression Scale Revised Indonesian Version, scoring from 0-80; K10: The Kessler Psychological Distress Scale – 10 items; K6: The Kessler Psychological Distress Scale – 6 item; LR+: positive likelihood ratio; LR-: negative likelihood.
The CESD-R was validated against MINI depressive disorder.

The K10 and K6 were validated against MINI depressive disorder, anxiety disorder, and any depressive or anxiety disorder.

**Result**

**CESD-R**

Chroma Alpha: 0.9 (excellent internal consistency)

Sensitivity 75.0% and specificity 79.9% (cutoff: 20)

**K-10 AND K-6**

Chroma Alpha: 0.83 (good internal consistency)

K10: sensitivity 85.7% and specificity 74.7% (cutoff: 18)

K6: sensitivity 81.0% and specificity 76.6% (cutoff: 12)
Discussion

- This is the first study to describe the performance and identify the optimal cut-off points of the CESD-R, K10 and K6 to detect depressive and anxiety disorders among adolescents in Indonesia.
- These scales have good internal consistency and discriminant ability to detect any depressive disorder or any depressive/anxiety disorder.
- CESD-R Indonesian version is a comprehensible and sensitive tool for screening for depressive disorder.
- Both the K10 and K6 Indonesian versions are for screening for any depressive or anxiety disorder.
Discussion

• CESD-R cut-off value of $\geq 20$ to detect any depressive disorder among adolescents in Indonesia

• Heterogeneity of optimal cut-offs
  • $\geq 16$ (were reported in 22 studies)
  • 20 (in 12 studies)
  • 22 (in 7 studies)
  • among general adult populations in different settings including the USA, England, the Netherlands, Germany and Columbia

Vilagut et al.'s review (2016)
Discussion

• **K10’s optimal cut-off value is ≥18** to detect depressive disorders, anxiety disorders, or any depressive or anxiety disorder among Indonesian adolescents → lower than that for adults in America

• **Cut-off of K6 is ≥12** is slightly lower than the cut-off of ≥13 for American adults
Discussion

This study suggest

• **Both K10 and K6 can be used to screen** for depressive or anxiety disorders, each with high sensitivity and specificity

• **K6 is preferable for use in school settings or primary health care** because it is shorter and has similar good psychometric properties

• **The CESD-R** was constructed to screen for depressive disorders only. → for **programs or epidemiological studies**
Discussion

Strength of study
The scales were validated against the MINI Kid, psychiatrist-administered structured diagnostic interviews permits confident identification of the performance and the optimal cut-off values to detect the common mental health problems.

Limitations of study
School based sample limits the generalizability of the findings
Validation study of translated MINI-Kid have not been published
Grade and gender distribution of sample: not properly balanced
Conclusion

- CESD-R is a useful tool for screening for depressive disorders.
- K10 and K6 are useful for screening for any depressive or anxiety disorder among Indonesian adolescents.
- Future studies can verify the findings of this study among younger adolescents and out-of-school adolescents in Indonesia.
Screening for depressive and anxiety disorders among adolescents in Indonesia: Formal validation of the centre for epidemiologic studies depression scale – revised and the Kessler psychological distress scale

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ABSTRACT

Background: This study aimed to culturally verify and examine the empirical psychometric properties of the Indonesian versions of the Centre for Epidemiologic Studies Depression Scale – Revised (CESD-R), the Kessler Psychological Distress Scale – 10 items (K10) and a subset of 6 items of the K10, the K6 to detect depressive and anxiety disorders among older adolescents in Indonesia.

Methods: The empirical psychometric properties were examined formally among students aged 16–18 years attending high schools in Jakarta. The scales were validated against the Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-Kid) modules for major depressive episode, dysthymia, panic disorder, separation anxiety disorder, and generalized anxiety disorder.

Results: In total, 196 students contributed complete data. All of the scales had Cronbach's alpha > 0.8. The areas under the ROC Curve of CESD-R against MINI depressive disorders and K10/K6 against MINI depressive and anxiety disorders were at moderate to high accuracy levels (0.78 to 0.86). The optimal cut-off value of CESD-R (scores ranging: 0–60) to screen for any depressive disorder is ≥20 (sensitivity 75.0%; specificity 79.9%). The optimal cut-off value of K10 to detect any depressive/anxiety disorders is ≥18 (sensitivity 85.7%; specificity 74.7%); and K6 is ≥12 (sensitivity 81.0%; specificity 76.6%).

Limitations: The school-based sample limits the generalisability of the findings to this group.

Conclusions: This study suggests that the CESD-R I is a useful tool for screening depressive disorders and both the K10 and K6 I are effective for screening for any depressive or anxiety disorders among Indonesian adolescents.


References
References


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