Overdiagnosis of major depression based on lay-administered fully structured diagnostic interviews: an individual patient data meta-analysis

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Brooke Levis, MSc, PhD Candidate

Hôpital général juif
Jewish General Hospital

McGill University
Presenter disclosure

I am a doctoral student at McGill University, in the Department of Epidemiology, Biostatistics and Occupational Health

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• **Speakers Bureau/Honoraria**: None
• **Consulting Fees**: None
• **Other**: None
Comparison of diagnostic interview methods for major depression

<table>
<thead>
<tr>
<th>Semi-Structured</th>
<th>Fully Structured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinician Interviewer ($$$)</td>
<td>Lay interviewer ($)</td>
</tr>
<tr>
<td>Standardized list of questions but flexibility in follow-up</td>
<td>Completely standardized</td>
</tr>
<tr>
<td>Clinical judgment</td>
<td>No clinical judgment</td>
</tr>
<tr>
<td>More valid</td>
<td>More reliable, but validity may be compromised</td>
</tr>
</tbody>
</table>

Examples:
- SCID
- SCAN
- DISH

Examples:
- CIDI
- CIS-R
- DIS
- MINI
Gap in the literature

• Are different diagnostic interviews associated with different probabilities of depression diagnosis?

• Only 5 studies have compared semi- and fully structured interviews in the same population
  • Very small sample sizes
    • Semi-structured interviews: ≤ 22 cases
    • Fully structured interviews: ≤ 61 cases

• No studies have randomized patients to receive semi- or fully structured interviews and compared prevalence across groups
A possible alternative

• **Individual participant data (IPD) meta-analysis**
  • Participant-level data from many studies are synthesized into a large dataset
    • Where each study uses only 1 interview method
  • Can control for factors that may be associated with classification, including depressive symptom severity
Objectives

- To evaluate the association between interview method and major depression classification, controlling for depressive symptom severity and patient characteristics.
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• To evaluate the association between interview method and major depression classification, controlling for depressive symptom severity and patient characteristics

• Specifically, compare odds of major depression:
  • Among various semi-structured interviews
  • Among various fully structured interviews
  • Among fully structured vs. semi-structured interviews
  • Considering a potential interaction between interview method and depression symptom severity
Methods – Data Source

Data accrued for an individual patient data (IPD) meta-analysis on the diagnostic accuracy of the **Patient Health Questionnaire-9 (PHQ-9)** depression screening tool.

**Data source:** Studies published between January 2000 and December 2014 that included PHQ-9 scores and current major depression status based on a semi-structured or fully structured interview.

**Data extraction and synthesis:**

- **Study-level:** Methodological characteristics of studies (country, clinical setting, language, diagnostic interview) were extracted from published reports.
- **Patient-level:** Investigators contributed de-identified primary data, including PHQ-9 scores, major depression diagnostic classification, and demographic data.
Methods - Variables

• **Outcome:**
  • *Major Depression Status* (case or non-case)

• **Predictor:**
  • *Diagnostic interview assessment method*

• **Covariates:**
  • *Depressive symptom severity* (PHQ-9 total score)
  • *Age*
  • *Sex*
  • *Human development index* (low-medium, high, or very high)
  • *Patient setting* (nonmedical, primary care, inpatient specialty care or outpatient specialty care)
Methods - Model

• Binomial Generalized Linear Mixed Model (GLMM) with logit link function
  • Basically, a glorified logistic regression
  • Major depression ~ assessment method\textsuperscript{1} + covariates
  • Random intercept for each primary study

\textsuperscript{1}Either specific interview, or interview category, depending on the analysis
Methods – Statistical Analyses

1. GLMM among **semi-structured** studies only (SCID, SCAN, DISH)

2. GLMM among **fully structured** studies only (CIDI, CIS-R, DIS, MINI)

3. GLMM of **fully structured studies vs. semi-structured studies**

4. GLMM of fully structured studies vs. semi-structured studies, considering an **interaction with depressive symptom severity**
   - Investigating interaction
     1. Assessment method * PHQ-9 score category (0-6, 7-15, 16-27)
     2. Assessment method * Continuous PHQ-9 score
Results

Obtaining datasets

• 57 of 73 eligible datasets obtained and included in the present analyses
  • 17,158 participants
  • 2,287 major depression cases

➢ 78% of eligible studies
➢ 80% of eligible patients*

*could not determine % of eligible cases
## Availability of data

<table>
<thead>
<tr>
<th>Diagnostic Interview</th>
<th>N Studies</th>
<th>N Participants</th>
<th>Major Depression N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semi-structured</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCID</td>
<td>26</td>
<td>4,732</td>
<td>785 (17)</td>
</tr>
<tr>
<td>SCAN</td>
<td>2</td>
<td>1,891</td>
<td>130 (7)</td>
</tr>
<tr>
<td>DISH</td>
<td>1</td>
<td>100</td>
<td>9 (9)</td>
</tr>
<tr>
<td><strong>Fully structured</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIDI</td>
<td>11</td>
<td>6,271</td>
<td>554 (9)</td>
</tr>
<tr>
<td>CIS-R</td>
<td>2</td>
<td>402</td>
<td>64 (16)</td>
</tr>
<tr>
<td>DIS</td>
<td>1</td>
<td>1,006</td>
<td>221 (22)</td>
</tr>
<tr>
<td>MINI</td>
<td>14</td>
<td>2,756</td>
<td>524 (19)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>57</td>
<td>17,158</td>
<td>2,287 (13)</td>
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## Semi-structured interviews

<table>
<thead>
<tr>
<th>Diagnostic Interview</th>
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<th>Adjusted(^1) odds ratio OR (95% CI)</th>
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<tr>
<td>SCID</td>
<td>26</td>
<td>-- Reference --</td>
</tr>
<tr>
<td>SCAN</td>
<td>2</td>
<td>0.56 (0.18, 1.78)</td>
</tr>
<tr>
<td>DISH</td>
<td>1</td>
<td>1.13 (0.19, 6.80)</td>
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\(^1\)Adjusted for PHQ-9 score, age, sex, human development index, and clinical setting
## Fully structured interviews

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<td>1.53 (0.48, 4.91)</td>
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<td>4.32 (0.95, 19.62)</td>
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MINI removed from subsequent analyses
Probability of major depression by PHQ-9 score for different interviews

![Graph showing the probability of major depression by PHQ-9 score for different interviews.](image-url)
Semi- vs. fully structured interviews

• Overall, the odds of depression using semi-structured interviews and fully structured interviews were not statistically significant.

• However, there was a **significant interaction** between interview method and depression symptom severity.

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<tr>
<th>Sample</th>
<th>OR(^1) (95% CI) for interview method fully vs. semi-structured</th>
</tr>
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<tr>
<td>Entire sample</td>
<td>0.90 (0.51, 1.57)</td>
</tr>
<tr>
<td>Stratified by depressive symptom level</td>
<td></td>
</tr>
<tr>
<td>Low (PHQ-9 scores 0-6)</td>
<td>3.13 (0.98, 10.00)</td>
</tr>
<tr>
<td>Moderate (PHQ-9 scores 7-15)</td>
<td>0.96 (0.56, 1.66)</td>
</tr>
<tr>
<td>High (PHQ-9 scores 16-27)</td>
<td>0.50 (0.26, 0.97)</td>
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\(^1\)Excluding MINI and adjusted for PHQ-9 score, age, sex, human development index, and clinical setting.
Summary of results

1. The MINI leads to substantially more diagnoses of major depression than the CIDI

2. Fully structured diagnostic interviews classify more people with low-level symptoms as depressed, but classify fewer people with high-level symptoms as depressed
Interpretation

• **MINI:**
  • The MINI should not be used to make diagnostic classifications

• **Semi- vs. fully structured interviews:**
  • Semi-structured and fully structured interviews appear to perform differently
  • Caution should be used when deciding which to use
  • They should not be considered interchangeable
Follow-up projects

- **IPD meta-analysis of PHQ-9 diagnostic accuracy**
  - Estimate sensitivity and specificity across a range of possible cutoff thresholds
  - Remove the MINI and stratify by diagnostic interview category (semi- or fully structured)

- **Prediction model for major depression**
  - Create user-friendly online tool that generates likelihood of major depression for a given patient based on their screening score and patient characteristics
  - Remove the MINI and adjust for diagnoses made using other fully structured interviews
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