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

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Presenter disclosure

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

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Comparison of diagnostic interview methods for major depression

Semi-Structured	Fully Structured
Clinician Interviewer ($$$)	Lay interviewer ($)
Standardized list of questions but flexibility in follow-up	Completely standardized
Clinical judgment	No clinical judgment
More valid	More reliable, but validity may be compromised

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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- **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[1] + covariates**
  - Random intercept for each primary study

[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

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

Semi-structured interviews

Diagnostic Interview	N studies	Adjusted[1] odds ratio OR (95% CI)
SCID	26	-- Reference --
SCAN	2	0.56 (0.18, 1.78)
DISH	1	1.13 (0.19, 6.80)

[1]Adjusted for PHQ-9 score, age, sex, human development index, and clinical setting

Fully structured interviews

Diagnostic Interview	N studies	Adjusted[1] odds ratio OR (95% CI)
CIDI	11	-- Reference --
CIS-R	2	1.53 (0.48, 4.91)
DIS	1	4.32 (0.95, 19.62)
MINI	14	2.10 (1.15, 3.87)

[1]Adjusted for PHQ-9 score, age, sex, human development index, and clinical setting

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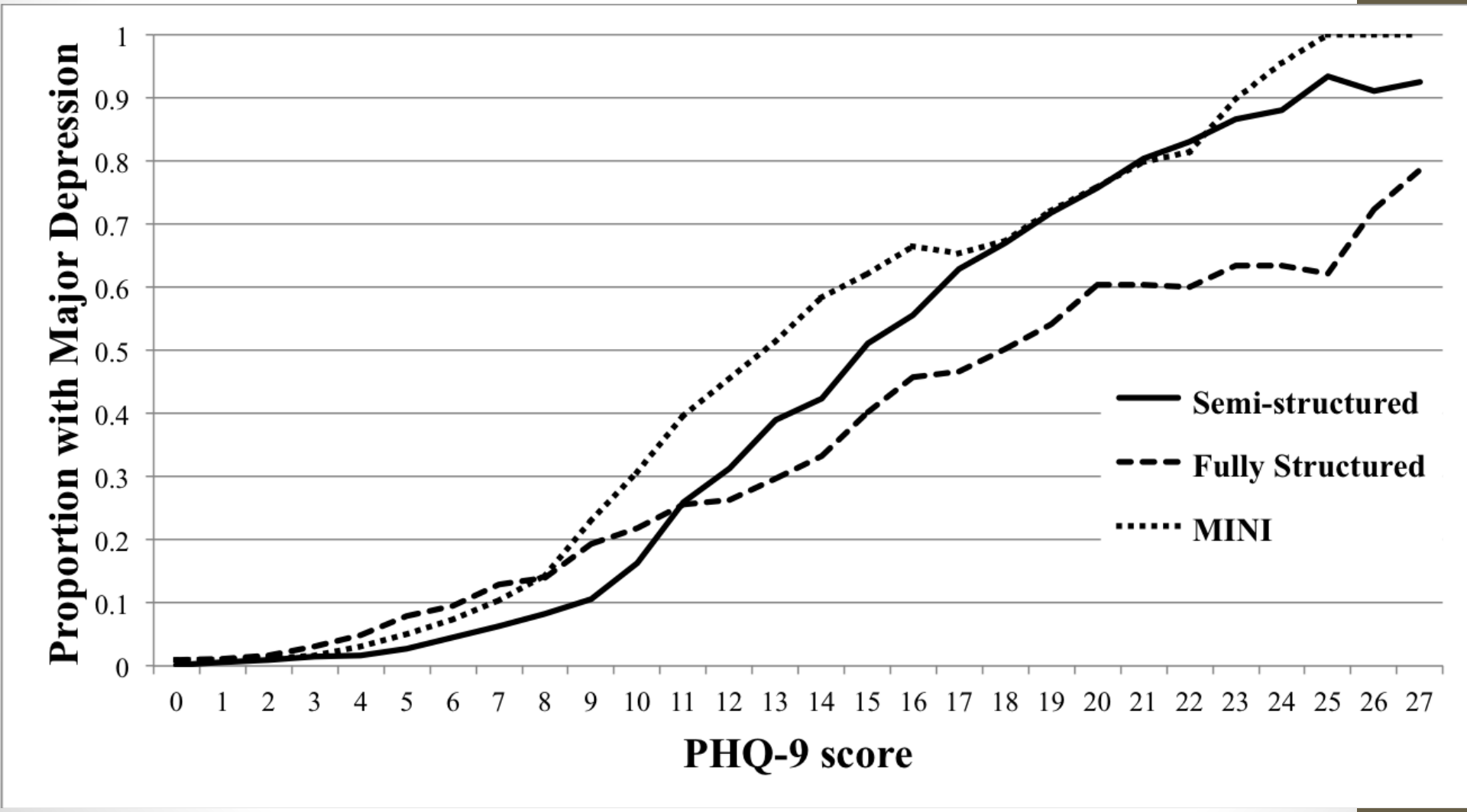
MINI removed from subsequent analyses

Probability of major depression by PHQ-9 score for different interviews



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

Sample	OR[1] (95% CI) for interview method fully vs. semi-structured
Entire sample	0.90 (0.51, 1.57)
Stratified by depressive symptom level	
Low (PHQ-9 scores 0-6)	3.13 (0.98, 10.00)
Moderate (PHQ-9 scores 7-15)	0.96 (0.56, 1.66)
High (PHQ-9 scores 16-27)	0.50 (0.26, 0.97)

[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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