

# **Sensitivity and specificity of depression screening tools among adults with intellectual and developmental disabilities (I/DD)**

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IT'S HOW MEDICINE

SHOULD BE

# Depression

- Leading cause of disability
- Often not detected and treated
- USPSTF recommends
  - Screening in primary care setting
  - Combined with treatment

# Previous research: Depression in I/DD

- At least as common as general population
- Diagnosed with standard diagnostic criteria (mild or moderate)

# Previous research

- **Point prevalence 2-6% with clinical interviews (in population studies)\***

\*Deb, Thomas & Bright (2001)

# Previous research

- 32% (N=100 Down syndrome) health promotion program; Children's Depression Inventory Short form (CDI-S)\*
- 28.4% (N=120) community based services - Beck Depression Inventory (BDI)\*\*
- 39.1%, (N=151) vocational services using Beck Depression Inventory II (BDI II)\*\*\*

\*Ailey et al., 2006

\*\* Powell, 2003

\*\*\*McGillivray & McCabe, 2007

# Gaps in research I/DD

- Sensitivity & specificity not addressed

## Making it:

- Difficult to carry out recommendations of USPSTF
- Difficult to recruit subjects for research

# Purpose

- Address sensitivity & specificity
  - Beck Depression Inventory II (BDI II)
  - Glasgow Depression Scale for People with a Learning Disability (GDS-LD)
  - Compare to results clinical interview Psychiatric Assessment Schedule-Adults with Developmental Disabilities (PAS-ADD 10)
- Evaluate psychometric properties

# Design

- Methodological study
  - Descriptive & psychometric data
    - BDI II
    - GDS-LD
  - Sensitivity & specificity
    - BDI-II
    - GDS-LD



# BDI II\*

- Widely used
- Reflects DSM IV TR criteria
- 21 items - 4 point Likert scale
- Higher scores greater depression
- Cronbach alpha 0.91
- Score of 18
  - sensitivity 0.94
  - specificity 0.92 (in primary care sample)\*\*

\*Beck, et al., 1996

\*\* Arnau et al., 2001

# GDS-LD\*

- Designed for individuals with I/DD
- Learning Disability includes I/DD in United Kingdom
- 20 items - 3 point Likert scale
- Higher scores greater depression
- Development:
  - Review of common depression tools
  - Diagnostic criteria
  - Focus groups (mild and moderate I/DD)

\*Cuthill et al., 2003

# Setting cut points

- Tested 38 adults - 19 with & 19 without depression
- Cronbach alpha 0.90, test/retest 0.97
- Score 13
  - sensitivity 96%
  - specificity 90%
- Recommended larger studies:
  - sensitivity and specificity
  - ability to detect change in depression\*

# PAS-ADD 10\*

- Semi structured clinical interview
- Derived from SCAN
- Based on ICD 10
- Standardized prompts
- Language & rating levels simplified
- Has client and informant interview

\*Moss et al., 1996

# Data collection

- Consent obtained
- Social workers & nurses
  - Read BDI-II and GDS-LD
  - Obtained verbal responses
- APN Nurse trained in PAS-ADD10
  - Interview participant & informants
- Nurse blinded to results of BDI II & GDS-LD until after data collection

# Data analysis

- Descriptive statistics
- Receiver Operating Characteristic Curve (ROC)
- Rasch psychometric analysis

# Demographics

Participant with I/DD	Male	Female	Total
Caucasian	22	25	47
African-American	10	3	13
Hispanic	5	8	13
Asian		2	2
Total	37	38	75
Mild (I/DD)	31	34	65
Moderate (I/DD)	6	4	10
Depression (PAS-ADD10)	7	11	18
Age	41.4 (SD 13.46)	44.5 (SD 14.74)	

# Descriptive statistics

## Mean scores

	BDI II	GDS-LD
Male	9.74 (SD 9.93)	9.80 (SD 6.93)
Female	9.51 (SD 11.19)	10.45 (SD 8.46)

## Cronbach alpha

- BDI II 0.91
- GDS-LD 0.90



# ROC Curve

- Plot of sensitivity against false-positive error (1-specificity)
- Accuracy measured area under curve:
  - 1 = perfect test
  - 0.5 = worthless test

# ROC Curve

- Area under the ROC curve
  - BDI II 0.90
  - GDS-LD 0.90
- BD II score 11
  - sensitivity 89%
  - specificity 82.1%
- GDS-LD score 14
  - sensitivity 89%
  - specificity of 83.9%

## Responses to BDI II items

<b>BDI-II items</b>	<b>Score <math>\geq 11</math></b>	<b>Score <math>&lt; 11</math></b>
Loss of energy	80.8%	16.7%
Guilty feelings	80.8%	16.7%
Agitation	76.9%	22.9%
Sadness	74.1%	25%
Tiredness or fatigue	73.1%	37.5%
Pessimism	69.2%	8.3%
Indecisiveness	69.2%	12.5%
Suicidal ideation	42.3%	0%

## Responses to GDS-LD items

<b>GDS-LD items</b>	<b>Score <math>\geq 14</math></b>	<b>Score <math>&lt; 14</math></b>
Becomes upset	96%	47.1%
Tiredness	92%	61.2%
Difficulty making decisions	92%	26.5%
Feeling worried	92%	38.8%
Bad mood	88%	44.9%
Think bad things will happen	84%	14.3%
Hard to sit still	76%	24.5%
Difficulty sleeping	76%	40.6%
Feel other people looking at you	76%	26.5%

# Clinical interview agreement: Participant & informant

- 68.9% overall agreement depressed/not depressed
- 64.3% agreement depressive episode
- 83.9% agreement no depressive episode

# Rasch psychometric analysis

- BDI
  - Person reliability 0.78
  - Person separation 1.86\*
  - Item reliability 0.67
  - Item separation 1.43\*
- GDS-LS
  - Person reliability 0.85
  - Person separation 2.34\*
  - Item reliability 0.94
  - Item separation 3.90\*

Separation should be  $\geq 2$

# Rasch psychometric analysis

- BDI II items representing highest levels of depression
  - Suicidal ideation (9)
  - Loss of interest (12)
  - Worthlessness (14)
  - Loss of pleasure & crying (4,10)

# Rasch psychometric analysis

- GDS-LD items representing highest levels of depression
  - Not maintaining hygiene (5)
  - Suicidal ideation (14)
  - Social withdrawal, feelings of worthlessness, and loss of pleasure (4,9,20)



# Conclusions

- Sensitivity & specificity good
  - BDI II
  - GDS-LD
- GDS-LD comparable to BDI II

# Conclusions

- Rasch analysis reveals
  - GDS-LD has greater person & item reliability than BDI-II
  - GDS-LD more clearly separates
    - Participants in levels of depression
    - Items as reflecting differing levels of depression

# Implications: Practice & research

- Participant & informant interviews important
- Not rely on informant interview alone
- 35.7% participants with depressive episode (clinical interview) not diagnosed clinical interview of informant

# Implications: Practice & research

- Individuals mild or moderate I/DD-  
evaluate similar to the general  
population
- Research needed:
  - BDI II & GDS-LDS useful in assessing effects  
of depression treatment
  - Comparison of tools in assessing effects of  
treatment