Various Approaches for Detecting Substance Use Disorders among Adults with Schizophrenia

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Severe Mental Illness & Substance Use Disorders

• Epidemiological estimates suggest that almost half of adults with severe mental illness (SMI) evidence a lifetime substance use disorder
  – A rate 3x higher than general population

• Research converges on finding that adults with SMI at increased risk
  – Estimates range from 10-70% depending on assessment method
  – Relatively few approaches validated for use in this population
Diagnostic Approaches

• Formal diagnosis requires use of (semi) structured interview, such as *Structured Clinical Interview for DSM-IV Disorders* (SCID)
  – Recognized gold standard

• Other approaches
  – Alcohol and Drug Use Scales (AUS/DUS)
  – Self-report
  – Collateral reports
  – Biological tests

• Measures of substance *use* may over-identify *disordered use*
The Present Study

• Summary of literature to date:
  – No consensus regarding ‘best’ assessment approach.
  – Comprehensive, multi-indicator approach?
  – Discrimination between abuse & dependence?

• Purpose of present study:
  1. Relative accuracy of various approaches compared to SCID diagnoses
  2. Ability to discriminate between abuse and dependence
  3. Benefits of using multiple indicators to identify substance use disorders
Participants

• Data drawn from baseline assessments of 1,460 adults with schizophrenia who participated in NIMH CATIE study
  – Only 7% of screened patients excluded

• Descriptive characteristics
  – 73.9% male
  – 60% white
  – 74.3% had completed high school
  – 81.0% not married nor cohabitating with a partner
  – $M$ age = 40.56 years ($SD=11.10$)
Measures & Procedures

- **SCID**
  - criteria for current (past month) substance use disorders

- **AUS/DUS**
  - Ratings (1=abstinent, 2=use without impairment, 3=abuse, 4=dependence, 5=dependence with institutionalization) regarding previous 3 months

- **Self-report**
  - Alcohol and drug use over previous 3 months

- **Collateral informant ratings**
  - Ratings (0=never, 1=rarely, 2=occasionally, 3=often) of problems with excessive use in prior month by family member/caregiver

- **Biological tests**
  - *Hair specimens* analyzed by radioimmunoassay (RIA)
  - *Drug urinalysis* performed with rapid multiple immunoassay
Statistical Analyses

• Prevalence
  – Prevalence of drug use disorders and alcohol use disorders
  – Detection ratios for assessments compared to SCID diagnoses, compared using McNemar tests

• Accuracy and discrimination
  – Sensitivity, specificity, positive predictive values, negative predictive values, % classified correctly, and AUCs
    • Z-scores to identify statistically significant differences in accuracy
  – Cohen’s kappas to evaluate agreement with SCID

• Incremental validity
  – Direct entry hierarchical logistic regression analyses
Prevalence

- **SCID**
  - 7.8% drug abuse and 5.5% drug dependence
  - 4.6% alcohol abuse and 4.2% alcohol dependence
- **Other approaches**
  - AUS/DUS
    - 7.3% drug abuse and 2.4% drug dependence
    - 5.1% alcohol abuse and 2.5% alcohol dependence
  - Collateral ratings
    - 7.9% for drug abuse and 3.8% for drug dependence
      - 10.1% for alcohol abuse and 4.4% for alcohol dependence
  - Self-report
    - 22.2% drug use
    - 34.6% alcohol use
  - Biological tests
    - Urine tests positive for 15.6%
    - Hair assays positive for 27.7%
Accuracy – Drug Use Disorders

• Assessment accuracy good across methods
  – Most AUCs > .70

• DUS ratings demonstrated greatest accuracy,
  – Followed by self-report, collateral ratings, biological tests

• AUCs for DUS ratings and self-report > biological tests
  \((zs > 3.07, ps < .005)\)
  – EXCEPTION: self-report \(\approx\) hair in identifying dependence

• All better at identifying abuse than dependence

• % classified correctly:
  – Low = 74.3% (hair identifying dependence)
  – High = 94.8% (DUS ratings \(\geq 4\) identifying dependence)

• Fair to moderate agreement \((\kappa = .22 - .42)\)
  – EXCEPTION: urine \((\kappa = .19)\) and hair \((\kappa = .15)\)
Accuracy – Alcohol Use Disorders

• Assessment accuracy good across methods
  – Most AUCs > .75
• No method outperformed other method (ps>.391)
• Mixed ability to identify specific SCID diagnoses
  – AUS better for dependence (AUC = .81) than abuse (AUC = .74)
  – Collateral ratings better for abuse (AUC = .76) than dependence (AUC = .64)
  – Self-report ≈ for abuse (AUC = .77) & dependence (AUC = .79)
• % classified correctly:
  – Low = 68.4% (AUS ratings ≥2 identifying dependence)
  – High = 96.6% (AUS ratings ≥4 identifying dependence)
• Poor to moderate agreement (κ = .13 - .46)
Abuse vs. Dependence

- Self-report, biological tests and collateral ratings performed \( \approx \) in detecting abuse and dependence
- Mismatch between DUS labels and SCID diagnoses
  - 3 on DUS labeled “drug abuse”, but less accurate than ratings of 2 or 3 \((z=3.11, p=.002)\)
  - 4 or 5 on DUS labeled “dependence”, but less accurate than ratings \( \geq 3 \) \((z=2.11, p=.035)\)
- Also mismatch between AUS labels and SCID diagnoses
  - 4 or 5 on AUS labeled “dependence”, but less accurate than ratings \( \geq 3 \) \((z=2.13, p=.033)\)
  - However, AUS=3 more accurate than ratings \( \geq 4 \) for identifying abuse \((z=3.89, p<.001)\)
### Incremental Validity of Multiple Indicators for Drug Use Disorders

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<th>Model fit $\chi^2(2)=152.96^{***}$, $R^2=.30$</th>
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*Notes.* *p*<.05. **p**<.01. ***p***<.001. $R^2$ values are Nagelkerke.
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<td>Urine</td>
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<tr>
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Multi-Indicator Indices

• Combined test results
  – If positive result on one of DUS, collateral rating, self-report, biological test → drug use disorder
  – If positive result on one of AUS, collateral rating, self-report → alcohol use disorder

• Over-identified disorders compared to SCID
  – drug use disorder = 27.4%  vs. 11.6%
  – alcohol use disorders = 35.7%  vs. 7.6%

• Indices no more accurate than AUS/DUS ratings, collateral ratings or self-report
  – More accurate than biological tests (zs>2.77, ps<.006)
Summary of Findings

• All approaches performed reasonably well
  – AUS/DUS ratings, designed to detect disordered use, performed best in this function
  – Self-report often performed as well as AUS/DUS ratings
  – Biological tests demonstrated the lowest accuracy

• Limited evidence for discrimination between abuse and dependence

• Limited evidence for benefits of using multiple indicators
Limitations

• No information on interrater reliability of:
  – SCID assessments
  – AUS/DUS ratings

• Data missingness
  – Collateral interviews for subset of participants only
  – Biological test results not available for all participants

• Biological tests of drug but not alcohol use

• Timeframes differed slightly across approaches
Conclusions & Next Steps

• How to select ‘best’ diagnostic assessment approach?
  – Consider practical issues and purpose, rather than ‘most accurate’

• But,
  – Why lack of discrimination between abuse and dependence?
  – Does knowledge of biological testing affect self-report accuracy?
  – Why poor performance of biological tests?
Acknowledgement

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