The impact of Bipolar Disorder on labour market outcomes in Canada: Preliminary Results

Anna Sarnocinska-Hart,
Centre for Addiction and Mental Health, Toronto

ACKNOWLEDGEMENTS

- Acknowledgments – Dr. William Gnam my supervisor – inspired, encouraged and advised throughout the process
- Co-investigators: Drs. William Gnam, John Cairney

OUTLINE

- BACKGROUND
- METHODS
- RESULTS
- LIMITATIONS
- CONCLUSIONS

BACKGROUND

- Significance:
  - Consensus about high social costs of BD [Hakkaart-van Roijen, Kleinman, Gardner]
  - BD the 6th leading cause of disability worldwide (WHO)
  - Most studies related to unipolar depression – not much research on independent impact of BD on labour market outcomes

BACKGROUND

- Mixed evidence in literature about the labour market impact of BD:
  - Kessler et al 2006 – in the employed population many more missed work-days attributable to BD than to unipolar depression
  - Ettner et al 1997 – no employment impact, income consequences only for women; 12mo measure of BD

BACKGROUND

Limitations in Literature:

- Few Canadian studies focusing on the BD and labour market outcomes
  - Wilkins et al 2004
- No explicit modelling of income effect
- No Canadian studies contrast the labour market outcomes for persons with and without BD taking into account co morbidities
- Co morbidity may be important because persons with BD have high rates of comorbid conditions that could contribute to disability effect [Schaffer et al 2006, McIntyre et al 2006]

BACKGROUND

- BD could affect labour market success in several ways:
  - Early onset and HC formation
  - During work – lower productivity (absenteeism, presenteeism) leading to lower wages
  - Labour market conditions for those with lower productivity might lead to either voluntary or involuntary unemployment

METHODS -- Hypotheses

- Based on the literature and theoretical considerations, we hypothesized that lifetime BD should result in lower employment rates and income
- We also hypothesized that the magnitude of these effects would be attenuated when taking into consideration comorbid psychiatric disorders and other medical conditions

METHODS – Data Source and Definitions

- Analysis based on cross-sectional data from the CCHS c1.2: a national population-based survey of 36,984 persons residing in households in Canada
- Determination of seven common mental disorders based upon the WMH-CIDI (unipolar depression, BD, agoraphobia, social phobia, panic disorder, alcohol and drug dependence)
- Measure of lifetime BD – determined from CIDI, if the respondent reported one or more manias/hypomanias over lifetime

METHODS – Data Source and Definitions

- Also recorded were self-reported other mental disorders (OCD, ADD, AHDD, eating disorders, Alzheimer's, dementia) and chronic medical conditions (migraine, arthritis, asthma, gastric ulcer, hypertension, chronic bronchitis, thyroid disease, multiple chemical sensitivities, heart disease, diabetes, Crohn's disease, chronic fatigue syndrome, fibromyalgia, cataract and cancer)
- The CCHS 1.2 also measured of labour force participation, income, and socio-demographic characteristics based upon questions from the Labour Force Survey

METHODS – Analytical Approach

- Cross-sectional analyses, separately by gender
- Labour market outcomes: 12-month employment, personal income in the preceding year
- Personal income log transformed for regression analysis to reduced skewness
- Missing personal income imputed using mean imputation

METHODS – Analytical Approach

- Outcomes analyzed descriptively and by multivariate (logistic and linear regression) modeling
- To assess contribution of comorbidity, multivariate models formally assessed for goodness-of-fit:
  - restricted (no co-morbid conditions included)
    vs.
  - unrestricted (controlling for co-morbid mental disorder and other self-reported conditions)

METHODS – Model Specification

- All multivariate models included as covariates:
  - (age, agesq, education, marital status, provinces and regions, number of children aged 6-11 and number of children under 5)
- We assumed that other comorbid conditions could be added to the effect of BD on outcomes
- We did not control for possible reverse causation – use of lifetime BD may attenuate any effect

Baseline characteristics of Men with BD

	BD (st.error) (N=299)	No BD (st.error) (N=8404)	p value for ttest
Age	40.07 (0.7915)	39.82 (0.0978)	P=0.7458
Primary education	22.1% (0.0441)	14.4% (0.0058)	P=0.0803
Secondary education	17.7% (0.0339)	19.3% (0.0066)	P=0.6351
Some postsecondary educ.	10.5% (0.0219)	6.6% (0.0038)	P=0.079
University education	**49.7% (0.0446)**	**59.7% (0.0082)**	**P=0.0257**
Married	**47.7% (0.0455)**	**73.6% (0.0064)**	**P<0.0001**

Baseline characteristics of Women with BD

	BD (st.error) N=328	No BD (st.error) N=9399	p value for ttest
Age	39.2 (0.7428)	39.9 (0.0928)	P=0.3445
Primary education	**22.1% (0.0367)**	**12.8% (0.0055)**	**P=0.0126**
Secondary	**14.2% (0.0229)**	**21.1% (0.0067)**	**P=0.0038**
Some postsecondary	**11.9% (0.0263)**	**6.5% (0.0034)**	**P=0.0466**
University	51.9% (0.041)	59.6% (0.0079)	P=0.0678
Married	**50.7% (0.0421)**	**74.7% (0.0064)**	**P<0.0001**

Descriptive Outcomes, Lifetime BD for Men

	BD	No BD	p value for ttest
Employment, % (S.E.)	85.8 (0.026)	94.3 (0.0035)	P=0.0013
Income, dollars $ (S.E.)	38,225 (2189.489)	49,850 (652.9)	P=0.0009
Log (income) (S.E.)	10.29 (0.09)	10.57 (0.016)	P=0.001

Descriptive outcomes, Lifetime BD for Women

	BD	No BD	p value for ttest
Employment, % (S.E.)	73.6 (.0346)	82.9 (.006)	P=0.008
Income, dollars $ (S.E.)	25,851 (1688.4)	31,640 (421.2)	P=0.001
Log (income) (S.E.)	9.66 (0.235)	10.03 (0.02)	P=0.119

Employment for Women with lifetime BD

Adj Rsq=0.12	OR	p value
Intercept	0.56	P=0.5572
Lifetime BD	**0.67**	**P=0.0486**
Age	1.12	P=0.021
Agesq	1	P=0.008
Secondary	2.34	P<0.0001
Some post-secondary	2.72 (0.1686)	P<0.0001
University	3.78 (0.1084)	P<0.0001
Together	0.86 (0.0939)	P<0.1189
Number of kids 6-11	0.75 (0.0635)	P<0.0001
Number of kids under 5	0.54 (0.0817)	P<0.0001
Provincial dummies – only AB significant	Only AB significant, at 7%	
SMI	0.46 (0.3435)	P=0.0222
Anxiety disorder lifetime	1.06 (0.1109)	P=0.6128
Major depressive disorder lifetime	1.11 (0.1314)	P=0.4406
Alcohol dependence last 12 mo	1.34 (0.3316)	P=0.3734
Drug dependence last 12 mo	0.32 (0.5906)	P=0.0564
Number of chronic mental conditions	0.59 (0.0911)	P<0.0001
Number of chronic physical conditions	0.89 (0.0272)	P<0.0001

Employment for Men with lifetime BD

Adj Rsq=0.14	OR (Std.error)	p value
Intercept	29.41	P=0.035
Lifetime BD	**0.65**	**P=0.1215**
Age	0.95	P=0.5704
Agesq	1	P=0.8301
SMI	0.15	P=0.0091
Anxiety life algorithm	0.75	P=0.0926
Depression life algorithm	0.72	P=0.0444
Alcohol dependence 12 mo	2.3	P=0.0032
Drug dependence 12 mo	0.48	P=0.0744
Chronic mental	0.76	P=0.0144
Chronic physical	0.76	P<0.0001

Impact of BD on employment and income for Women - Model comparison

	Model without Comorbid Conditions	**Model with Comorbid Conditions**
Employment (OR)	0.53 (P<0.001)	0.67 (P=0.0486)
Income (beta)	-0.0487 (P=0.7041)	-0.0541 (P=0.5628)

Impact of BD on employment and income for Men - Model comparison

	Model without Comorbid Conditions	**Model with Comorbid Conditions**
Employment (OR)	0.5 (P=0.0173)	0.65 (P=0.1215)
Income (beta)	-0.2461 (P=0.0023)	-0.172 (P=0.0417)

Discussion

- The strong and significant employment effect of BD for both men and women in the restricted models disappears for men once comorbid conditions are included.
- This suggests that there may be important gender differences in the impact of comorbid conditions on persons with BD, as well as differences in the degree of selection out of the labour market.

Discussion

- No income effect for women - might result from selection out of the labour market at an earlier stage
- Significant independent income effect of BD for men even after controlling for co-morbid conditions – on average, men's income decreases by $7,512

Limitations

- Self-reported educational attainment only crudely controls for human capital formation
- We have assumed an additive relationship for the impact of comorbid conditions
- Relationship between BD and labour market outcomes complex but not all complexities can be addressed by this dataset

Limitations

- Personal income not earnings
- Simple method used for imputing missing income
- No explicit correction for possible reverse causation

CONCLUSIONS

- The relationship between BD and labour market outcomes is complex and varies by gender
- Selection of persons with BD out of the labour market must be considered in interpreting BD's impact on income
- Controlling for co-morbidities appears to be justified and allows an estimate of the unique impact of BD independent of other comorbid conditions
- Longitudinal datasets, larger samples of person with BD, and independent severity measures are needed.