Maternal Depression and Food Insecurity During Pregnancy Among Oregon Women

Jacqueline T. Yates

Thesis Defense

MPH Candidate

April 25, 2008

Outline

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- Questions and Comments

Background

- Food insecurity
  - “Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable food in socially acceptable ways”—USDA
- 35.5 million were food insecure in 2005
- Effects on Health
  - Disease management
  - Obesity
  - Nutritional deficiencies
- Women and food insecurity
- Possible effects on mental health

Background

- Preliminary analysis of PRAMS data
  - Examined potential risk factors for food insecurity
  - A simple measure of antenatal depressive symptoms was significantly associated with food insecurity

- Pregnancy and Antenatal Depression
  - Between 8.5% and 11% will experience depressive disorder during pregnancy
  - Possible effects on health
    - Poor weight gain
    - Substance use
    - Low birth weight neonates

Background

- Food insecurity and antenatal depression
  - Few existing studies
  - Increased risk in Low and Middle-Income women
  - Associated with depressive symptoms in mothers of young children
- 2005 Oregon Pregnancy Risk Assessment Monitoring System
  - Measures of food insecurity and antenatal depressive symptoms
  - Additional risk factors

Specific Aims

- Hypothesis:
  - Women who report antenatal depressive symptoms will be more likely to experience food insecurity than those without symptoms

- Determine what other risk factors are associated with food insecurity in Oregon women

Methods

- 2005 Oregon PRAMS
  - 80-item mailed questionnaire or telephone interview
  - Cross-sectional
  - Stratified random sample from birth certificate files
    - Non-Hispanic White, normal birth weight (≥ 2500 g)
    - Non-Hispanic White, low birth weight (< 2500 g)
    - Non-Hispanic African American
    - Non-Hispanic American Indian/Alaska Native
    - Non-Hispanic Asian/Pacific Islander
    - Hispanic
  - Eligibility
  - Weighting Methodology
    - Sampling Weight
    - Non-Response Weight
    - Non-Coverage Weight

Primary Outcome

- Food insecurity was assessed by a single measure:
  - "During the 12 months before your new baby was born, did you ever eat less than you felt you should because there wasn't enough money to buy food?"
  - Those who answered "Yes" were considered food insecure
  - US Household Food Security Survey
  - This measure addresses reduction in food intake
    - **One aspect of food insecurity**

Predictor Variables

- Antenatal depressive symptoms:
  - While you were pregnant, how often did you feel down, depressed, or hopeless?
  - While you were pregnant, how often did you have little interest or pleasure in doing things?
  - "Yes" to either question was considered positive for symptoms

PRAMS Measure	Responses	Final Categories
Depressed Mood	**Always** **Often** **Sometimes** **Rarely** **Never**	**Always/Often = Y** **Sometimes/Rarely/Never = N**
Loss of Interest or Pleasure		

Predictor Variables

- From Oregon PRAMS:
  - Annual household income, % FPL
  - WIC participation, during pregnancy
  - Pregnancy intention
  - Body Mass Index (BMI), pre-pregnancy
  - Smoking during pregnancy
  - Alcohol consumption during pregnancy
  - Intimate partner violence during pregnancy
    - By a former husband/partner
    - By a current husband/partner
  - Prenatal care adequacy
  - Stressful life circumstances (13 items)

Predictor Variables

- From birth certificate information:
  - Maternal age (5 categories)
  - Maternal race/ethnicity
    - Non-Hispanic White
    - Non-Hispanic African American
    - Non-Hispanic AI/AN
    - Non-Hispanic Asian/PI
    - Hispanic
  - Maternal education
  - Marital status
  - County type

Methods

- Cross-tabulations, descriptive statistics
- Simple logistic regression analysis ($p < 0.05$)
- Multivariate analysis
  - Hierarchical regression
    - Predictor variables organized into groups
    - Assigned rank
    - Entered into model and tested ($p< 0.10$)
    - Remaining individual variables subjected to backwards selection ($p <0.10$)
  - Assessment for confounding
  - No assessment for interactions

- Software
  - SPSS 15.0
  - SUDAAN 9 (stand-alone)
  - STATA 10.0

Results

- Sample characteristics:
  - 1915 respondents, weighted response rate: 75.6%
  - Less than 35 yrs old: 85.6%
  - ≥ 12 yrs of education: 75.6%
  - Married: 58%
  - Income less than 185% FPL: 52.5%
  - Lived in urban counties: 76.4%

  - Antenatal depressive symptoms: 18.1%
    - Postpartum depressive symptoms: 11.3%
    - 97.3% of respondents
  - Food Insecurity: 10.5%
    - 96.8% of respondents

Results—Univariate Analysis

Characteristic	Odds Ratio (95% CI)	p-value
Antenatal Depressive Symptoms		
Symptoms	3.56 (2.18, 5.80)	<0.001
No symptoms	Referent	
Maternal Age		
<22 y	11.66 (4.80, 28.29)	<0.001
22—25 y	9.09 (3.87, 21.35)	<0.001
26—29 y	4.36 (1.75, 10.90)	0.002
30—34 y	3.95 (1.56, 9.96)	0.004
35+	Referent	
Maternal Race/Ethnicity		
American Indian/Alaska Native, non-Hispanic	7.25 (3.46, 15.19)	<0.001
African American, non-Hispanic	6.13 (2.88, 13.07)	0.007
Hispanic	4.72 (2.29, 9.75)	<0.001
White, non-Hispanic	2.8 (1.32, 5.93)	<0.001
Asian/Pacific Islander, non-Hispanic	Referent	
Maternal Education		
<12 y	4.33 (1.41, 13.20)	0.680
12 y	4.06 (1.31, 12.57)	0.015
13—16 y	1.28 (0.40, 4.20)	0.011
17+ y	Referent	
Marital Status		
Unmarried	4.67 (2.88, 7.58)	<0.001
Married	Referent	

Results—Univariate Analysis

Characteristic	Odds Ratio (95% CI)	p-value
Household Income		
0%—99%	30.01 (9.82, 91.65)	<0.001
100%—184%	22.53 (6.98, 72.64)	<0.001
185%+ FPL	Referent	
County type		
Rural	1.76 (1.05, 2.94)	0.031
Urban	Referent	
Pregnancy Intention		
Unintended	2.16 (1.35, 3.47)	0.001
Intended	Referent	
Prenatal Care Adequacy		
None/Inadequate/Intermediate	2.00 (1.25, 3.21)	0.004
Adequate/Intensive	Referent	
Body Mass Index		
Underweight	2.25 (0.64, 7.95)	0.207
Overweight	1.36 (0.75, 2.49)	0.307
Obese	1.53 (0.80, 2.94)	0.198
Normal	Referent	
WIC Participation		
Participant	8.50 (4.62, 15.62)	<0.001
Non-Participant	Referent	
Tobacco Use		
Any use	3.15 (1.79, 5.55)	<0.001
No use	Referent	
Alcohol Consumption		
Any use	1.22 (0.48, 3.11)	0.42
No use	Referent	

Results—Univariate Analysis

Characteristic	Odds Ratio (95% CI)	p-value
IPV—By Ex-Husband/Partner		
Violence	4.25 (1.24, 14.60)	0.022
No violence	Referent	
IPV—By Husband/Partner		
Violence	2.42 (0.63, 9.36)	0.20
No violence	Referent	
Stressful Life Circumstances		
Separation or divorce		
Yes	5.31 (2.99, 9.45)	<0.001
No	Referent	
Moved to a new address		
Yes	2.36 (1.48, 3.77)	<0.001
No	Referent	
Homeless		
Yes	7.16 (3.86, 13.25)	<0.001
No	Referent	
Husband/Partner lost job		
Yes	5.28 (3.15, 8.85)	<0.001
No	Referent	
Respondent lost job		
Yes	4.80 (2.72, 8.49)	<0.001
No	Referent	
Argued more frequently		
Yes	4.20 (2.60, 6.80)	<0.001
No	Referent	
Husband/Partner didn't want pregnancy		
Yes	4.55 (2.47, 8.38)	<0.001
No	Referent	

Results—Univariate Analysis

Characteristic	Odds Ratio (95% CI)	p-value
Difficulty paying bills		
Yes	8.56 (5.12, 14.30)	<0.001
No	Referent	
Physical fights		
Yes	6.47 (2.69, 15.59)	<0.001
No	Referent	
Respondent or Husband/Partner went to jail		
Yes	6.83 (3.34, 13.96)	<0.001
No	Referent	
Someone close had a drug/alcohol problem		
Yes	4.82 (2.88, 8.07)	<0.001
No	Referent	
Someone close died		
Yes	2.49 (1.46, 4.26)	0.001
No	Referent	
A family member was ill		
Yes	1.36 (0.79, 2.35)	0.27
No	Referent	

Univariate Analysis

- Antenatal depressive symptoms
  - Significantly associated with food insecurity
  - OR 3.56, 95% CI 2.18—5.80 ($p < 0.001$)

- No significant association with food insecurity:
  - BMI
  - Alcohol Consumption
  - IPV, Current husband or partner
  - A family member was ill

Multivariate Analysis

Rank	Variable Grouping
1	Maternal Age Maternal Race/Ethnicity Maternal Education
2	Marital Status County Type
3	Household Income WIC Participation
4	Pregnancy Intention Prenatal Care Adequacy Smoking During Pregnancy
5	Intimate Partner Violence (ex-partner) Stressful Life Circumstances

Multivariate Analysis

Characteristic	Multivariate Odds Ratio (95% CI)	p-value
Antenatal Depressive Symptoms		
Symptoms	1.84 (0.92, 3.67)	0.084
No Symptoms	Referent	
Household Income		0.021
0%—99% FPL	6.05 (1.62, 22.61)	
100%—184% FPL	3.67 (1.62, 14.50)	
185% + FPL	Referent	
WIC Participation		
Yes	2.84 (1.20, 6.74)	0.018
No	Referent	
County Type		
Rural	2.14 (1.03, 4.42)	0.041
Urban	Referent	
Intimate Partner Violence (ex-husband or partner)		
Yes	0.31 (0.79, 1.18)	0.086
No	Referent	
Homelessness		
Yes	1.94 (0.85, 4.44)	0.115
No	Referent	
Husband/Partner Lost Job		
Yes	2.23 (1.09, 4.56)	0.029
No	Referent	
Frequent Arguments		
Yes	1.78 (0.94, 3.34)	0.075
No	Referent	

Multivariate Analysis

Characteristic	Multivariate OR (95% CI)	p-value
Difficulty Paying Bills		
Yes	3.59 (1.75, 7.37)	0.001
No	Referent	
Respondent or Husband/Partner Went to Jail		
Yes	2.90 (1.03, 8.12)	0.043
No	Referent	
Someone Close Died		
Yes	2.09 (0.96, 4.51)	0.062
No	Referent	
Maternal Age		0.081
< 22 y	3.14 (0.98, 10.05)	
22—25 y	4.18 (1.51, 11.59)	
26—29 y	1.81 (0.63, 5.22)	
30—34 y	2.32 (0.81, 6.65)	
35+ y	Referent	
Education		0.41
<12 y	0.36 (0.093, 1.43)	
12 y	0.40 (0.10, 1.54)	
13—16 y	0.29 (0.07, 1.25)	
17+ y	Referent	
Race/Ethnicity		0.76
African American	1.39 (0.49, 3.99)	
American Indian/Alaska Native	1.27 (0.45, 3.55)	
White	0.98 (0.38, 2.54)	
Hispanic	1.50 (0.57, 3.94)	
Asian/Pacific Islander	Referent	

Results—Multivariate Analysis

- Association between food insecurity and antenatal depressive symptoms:
  - Not statistically significant (OR: 1.84, 95% CI 0.92—3.67, p = 0.084)
- Age, race, and education
  - Group originally dropped from model
  - Age marginally significant when re-introduced
- Household Income
  - Strongest association with food insecurity

Discussion

- Comparison with previous literature:
  - Prevalence of food insecurity
    - Oregon PRAMS: 10.5%
    - National estimate: 11%
  - Prevalence of antenatal depressive symptoms
    - **18.1% in Oregon PRAMS sample**
    - **Similar to estimates of antenatal depressive symptoms in previous studies**
      - **17% in late pregnancy (Sweden)**
      - **18.9%—22.1% throughout pregnancy (Hong Kong)**

Discussion

- Risk factors for food insecurity
  - Race and Education not significant
  - Many stressful life indicators
  - Rural vs. Urban counties

- Association between food insecurity and depressive symptoms
  - Odds of food insecurity 84% greater in women with symptoms
  - Although not statistically significant in multivariate analysis, findings support hypothesis that women with antenatal depression are at greater risk of being food insecure

Discussion

- This study examined cross-sectional data
- Differing views about the association between food insecurity and depression
  - Depression as a risk factor for food insecurity
    - Harder to work and stay employed
    - Income diverted to other expenses or services
    - Less motivation to seek out help or services for food
    - Poorer coping behaviors, less ability to plan

Discussion

- But…
  - Food insecurity as a risk factor for depression
    - Acts as a stressful life event?
      - Reduced self-mastery
    - Nutrient deprivation
      - Especially vitamins C and D

Strengths and Limitations

- **Strengths:**
  - Population-based, representative sample of state population
  - Consistent with previous results
  - Ability to control for a wide variety of predictor variables

- **Limitations:**
  - Cross-sectional data
  - Incomplete measure of food insecurity
    - Cannot address nutritional and psychological aspects
  - Conflict in time for food insecurity and depressive symptom measures
  - Cannot assess for previous history of mental illness or antidepressant use

Public Health Implications

- Programs that address food insecurity should be aware that depression may be an issue for women who are pregnant
  - Referrals to mental health professionals
  - Counseling services
- Similarly, health professionals should be aware that pregnant women may also have difficulties accessing food
  - Efforts should be made to ensure that clinicians are aware of the burden of food insecurity, as well as the resources available to alleviate these difficulties
- More funding should be devoted to developing and improving food programs, especially in rural communities

Public Health Implications

- Expansion of eligibility for the food stamp program
  - 2007 OCPP estimate—increasing eligibility by 5 percentage points would make food stamps available for 26,000 additional low income individuals
- Similarly, expansion in eligibility for the WIC program has the potential to address food insecurity during pregnancy on a larger scale
- Increased support for the Oregon Food Bank would improve the availability of emergency food resources for regional food banks throughout the state

Future Studies

- Further examination of antenatal depression in US women
  - Longitudinal studies of food insecurity and antenatal depression
- Further examine the impact of stress on the food insecurity/depression relationship
- Potential effect on birth outcomes
  - Birth Defects
  - Low birth weight
  - Evidence of adverse health outcomes for children of women who were poorly nourished during pregnancy
- Early childhood development
  - Behavioral differences in children of food insecure mothers

Thank You!

- Thesis Committee:
  - Kenneth Rosenberg, Chair
  - Elizabeth Adams
  - Dawn Peters
- Oregon DHS, Office of Family Health
  - Al Sandoval
- Friends and family

Questions?