

# Postpartum Depression: Comparison of Risk Factors between Women with and Without History of Substance Abuse

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## Abstract

**Context:** In the US, 12% of women report alcohol use during pregnancy with 1.9% reporting binge drinking. Overall, 12% of US women report postpartum depressive disorders with 6% reporting postpartum depression (PPD). In a California integrated managed care setting, pregnant women are routinely screened for substance abuse by a voluntary program called Early Start. PPD screening was routinely performed during the study period using the Edinburgh Postpartum Depression Screening questionnaire (EPDS).

**Methods:** A retrospective cohort study of 4011 postpartum women were evaluated for evidence of screening for substance abuse during pregnancy and for PPD. Using the EPDS scores, rates of PPD were compared between women with or without risk for substance abuse using Chi-square and Fisher Exact tests. Logistic regression models were used to evaluate other contributing risk factors for PPD.

**Results:** Out of 1888 women with an EPDS, 109 (5.8%) had scores of 14 or higher (high risk for PPD) and 1779 (94.2%) scored lower. PPD rates were higher but not significantly different in women at risk for substance abuse compared to women not at risk (8.2% vs. 5.6%, p=0.17). History of depression (OR 2.4) or Black race (OR 2.1) were significant predictors of PPD but age, income, marital status, substance abuse and education were not.

**Conclusion:** The PPD rate for this managed care cohort was similar to the reported national rate, with race and history of depression as significant predictors. The slightly higher rate of PPD among women with a history of substance abuse may also be clinically meaningful.

## Background

- Postpartum depressive disorders occurs in approximately 12% of new moms in the United States (US) with 6% reporting postpartum depression (PPD).<sup>1</sup>
- Since 1991, approximately 12% of US women have reported alcohol use during pregnancy with 1.9% reporting binge drinking.<sup>2</sup>
- Research has shown that the risk for PPD is increased if a woman has had prior incidences of postpartum depression, personal or family history of depression, complications during pregnancy, stressful life events (financial, partner-related, trauma or abuse) unplanned pregnancy, younger age, lower educational attainment, being of non-white race, tobacco use or being a single parent.<sup>2,3,4</sup>
- In Kaiser Permanente, Northern California, pregnant women are routinely screened for substance abuse (alcohol, tobacco and illicit drugs) by an integrated voluntary program called Early Start (ES). Improved neonatal outcomes have been found among babies whose mothers received substance abuse treatment integrated with prenatal care through the ES program.<sup>5</sup>
- PPD screening was routinely performed during the study period using the Edinburgh Postpartum Depression Screening questionnaire (EPDS).<sup>6</sup>
- There is a paucity in the literature about the association between substance use during pregnancy and the development of PPD.

## Research Question

Is there a higher risk for postpartum depression at 6 weeks post delivery in women who have substance use problems compared to women without substance use problems?

## Methods

**Study design:** Retrospective observational cohort study

**Study Subjects:** 4011 women attending a postpartum appointment in one of two KPNC ObGyn medical offices between 1/1/2008 and 9/30/2009 (Figure 1)

**Inclusion Criteria:** 1888 women with documented EPDS results at their 6 week postpartum visits and Early Start substance abuse screening (Figure 1)

## Analysis:

- Descriptive statistics on all clinical characteristics (age, race, educational attainment, marital status, substance abuse status, reported income, pregnancy intention, history of depression or other mental health disorders) (Table 1)
- Chi-square tests for each clinical characteristic and PPD

- Logistic regression models on PPD and substance history controlled for all significant clinical characteristics (Table 1)

## Results

Out of 1888 post partum women with documented EPDS:

- 159 (8.4%) were identified as Early Start Positive or At Risk for substance abuse compared to 1729 (91.6%) screened negative for substance abuse (Figure 1)
- 109 (5.8%) had a score of  $\geq 14$  (high risk for PPD) and 1779 (94.2%) scored  $< 14$  (Figure 1)
- PPD rates were not significantly higher when the pregnancy was reported as unplanned (Table 1)
- PPD rates were higher but not statistically different in women at risk compared to women not at risk for substance abuse (8.2% vs. 5.6%, p= 0.17) (Figures 1, 2)
- History of depression (OR 2.4) or Black race (OR 2.1) were significant predictors of PPD but age, income, marital status, substance abuse and education were not (Table 1)
- Women that were identified as Early Start Positive or At Risk for substance abuse, but declined treatment, were slightly more likely to be high risk for PPD compared to women that accepted treatment but the difference was not statistically significant (11.8% vs. 7.2%, p = 0.48) (Figure 2)

Figure 1  
PPD/ES Study Flow

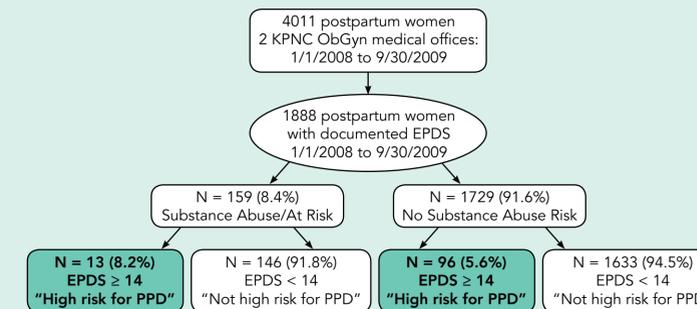
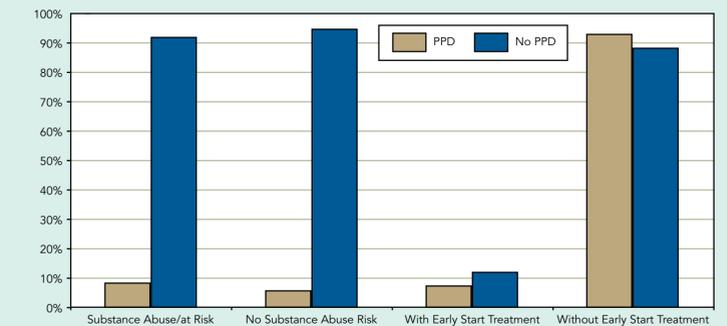


Figure 2  
Rates of Substance Abuse and Treatment by PPD Status



## Strengths and Limitations

### Strengths

- Diverse demographics of the cohort (age, race, marital status, education, income)
- KPNC population representative of California population
- Integrated managed care setting with electronic databases and medical record system
- History of depression documentation
- Substance abuse screening documentation

### Limitations

- Retrospective observational study design
- Generalizability of results:
  - All women in the cohort were from one geographic region in the US
  - All women in the cohort were insured (included employer-based group, individual and Medicaid covered plans)

## Conclusion

The PPD rate for women in this managed care cohort was similar to the reported national rate, with race and history of depression as significant predictors. The slightly higher rate of PPD among women with a history of substance abuse may also be clinically meaningful.

## References

1. Alcohol Use Among Pregnant and Nonpregnant Women of Childbearing Age --- United States, 1991-2005. MMWR, 2009; 58 (19): 529-532.
2. Prevalence of Self-Reported Postpartum Depressive Symptoms --- 17 States, 2004-2005. MMWR 2008; 57 (14): 361-366.
3. Leigh B, Milgrom J. Risk factors for antenatal depression, postnatal depression and parenting stress. BMC Psychiatry. 2008;8(24):1-11.
4. Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. Gen Hosp Psychiatry. 2004;26:289-295.
5. Armstrong MA, Osejo VG, Lieberman L, Carpenter DM, Patoja PM, Escobar G. Perinatal Substance Abuse Intervention in Obstetric Clinics Decreases Adverse Neonatal Outcomes. J of Perinatology, 2003; 23:3-9.
6. Cox, JL, Holden, JM, and Sagovsky, R. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. British Journal of Psychiatry, 1987; 150:782-786.

Table 1  
Clinical Characteristics and Predictors for PPD Risk

Clinical Characteristics	PPD: N (%)			PPD Risk Predictors		
	Yes	No	p-value	OR <sup>†</sup>	95% CI <sup>§</sup>	p-value
Substance Abuse/At Risk	13 (11.9%)	146 (8.2%)	0.18	0.93	0.46 - 1.87	0.84
Age (yrs) -- median (IQR)	31 (26-35)	31 (27-35)	0.64	1.01	0.97 - 1.04	0.7
Marital Status						
Married/w partner	75 (68.8%)	1380 (77.6%)	0.08	0.8	0.46 - 1.4	0.44
Not married*	25 (22.9%)	270 (15.2%)				
Unknown	9 (8.3%)	129 (7.3%)		0.52	0.18 - 1.51	0.23
Race/Ethnicity						
Asian	13 (11.9%)	367 (20.6%)	<0.001	0.72	0.34 - 1.5	0.37
Black	23 (21.1%)	183 (10.3%)		<b>2.13</b>	1.13 - 4.05	<b>0.02</b>
Hispanic*	22 (20.2%)	424 (23.8%)				
White	12 (11%)	317 (17.8%)		0.69	0.32 - 1.49	0.34
Others/Unknown	39 (35.8%)	488 (27.4%)		1.46	0.79 - 2.72	0.23
Education						
Greater than high school	72 (66.1%)	1206 (67.8%)	0.18	1.31	0.74 - 2.32	0.36
High school or less*	20 (18.4%)	391 (22%)				
Unknown	17 (15.6%)	182 (10.2%)		1.79	0.59 - 5.4	0.3
Income						
\$80,000 or more	28 (25.7%)	586 (32.9%)	0.21	0.88	0.52 - 1.48	0.63
<\$80,000*	57 (52.3%)	886 (49.8%)				
Unknown	24 (22%)	307 (17.3%)		1.01	0.46 - 2.2	0.98
Pregnancy Intention <sup>†</sup>						
Planned	50 (45.9%)	940 (52.8%)	0.28			
Unplanned	33 (30.3%)	430 (24.2%)				
Unknown	26 (23.9%)	409 (23%)				
History of Depression	26 (23.9%)	166 (9.3%)	<0.001	<b>2.36</b>	1.4 - 4	<b>0.001</b>
Other Mental Health Disorders	17 (15.6%)	125 (7%)	0.001	1.66	0.91 - 3.04	0.1

\* Referent group  
<sup>†</sup> Not included in the multivariate logistic regression model  
<sup>‡</sup> Odds ratio  
<sup>§</sup> Confidence interval