The Effects of Sex Steroid Manipulation on Anhedonia In Women With and Without a History of Postpartum Depression

Danielle A. Swales[1], Lauren Schiff[2], David Rubinow[1], & Crystal Edler Schiller[1]

[1]Department of Psychiatry, University of North Carolina at Chapel Hill; [2]Department of Obstetrics and Gynecology, University of North Carolina at Chapel Hill

Background

- Sex steroid changes during the perinatal period can trigger depression in vulnerable women.
- Less work has explored whether pregnancy related hormone changes trigger anhedonia in women at risk for postpartum depression (PPD).
- Elucidating the biological underpinnings of anhedonia in PPD is important because women experiencing this symptom may feel less interested in things that would typically bring pleasure, including their infant.

Objective

In the current study, we investigated the effects of **experimentally controlled** reproductive steroid exposure on anhedonia in women **with a history of postpartum depression (PPD+) and those without such a history (PPD-).**

Method

- Participants included 23 healthy, euthymic, non-pregnant women with a history of PPD (PPD+; n = 11) and those with no history of PPD (PPD-; n = 12).

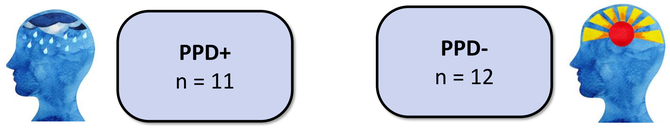


Table 1. Descriptive statistics

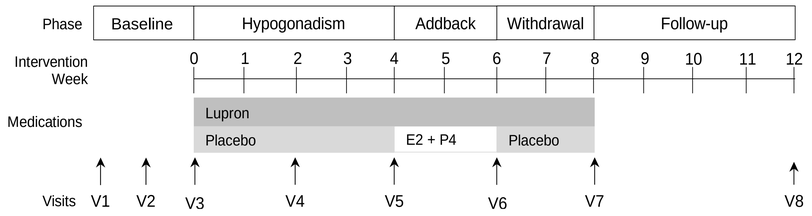
Participant Characteristics	Descriptive Statistics
Age, in years (*M* ± SD; Range)	35.3 ± 5.3; 22-43
Parity (*M* ± SD; Range)	2.3 ± 1.3; 1-5
Race/Ethnicity (*N*; %)	
Asian	2; 8.7
Black or African American	1; 4.3
White	20; 87.0
Ethnicity (*N*; % Latinx/Hispanic)	3; 13.0
Household Income (*N*; %)	
<$69,000	3; 13.0
$70,000-$99,999	6; 26.1
>$100,000	14; 60.1
Years of education (*M* ± SD; Range)	16.5 ± 4.2; 0-20

Study Design

- The hormone states of pregnancy and parturition were simulated in the following study phases:

1. Hypogonadism	Administration of gonadotropin-releasing hormone (GnRH) agonist, leuprolide acetate (Lupron)
2. Addback	Supraphysiologic doses of estradiol (E2) and progesterone (P4)
3. Withdrawal	Withdrawal of E2 and P4

Figure 1. Overview of study design



Measures

- Inventory of Depression and Anxiety Symptoms (IDAS)
  - ➢ General Depression scale and Wellbeing scale (reverse scored)
- Behavioral Inhibition System and Behavioral Activation System (BIS/BAS) scales
  - ➢ BIS, BAS Drive, BAS Fun Seeking, BAS Reward Response

Results

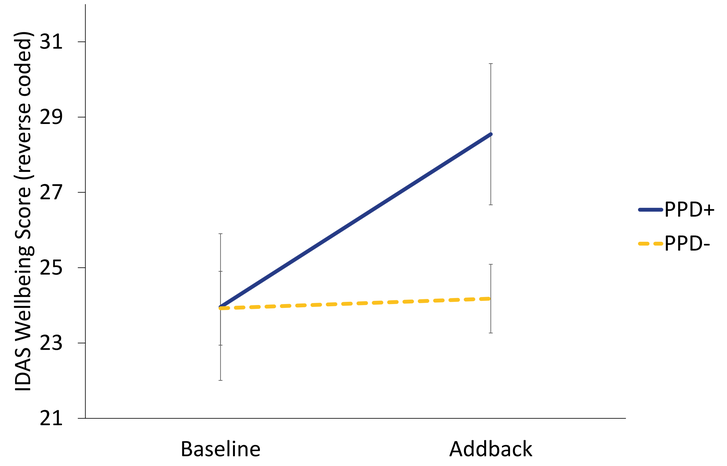
- PPD+ and PPD- participants did not differ on general depression symptoms (t = -0.94, p = .360) or anhedonia measures at baseline (all p's > .250).

Table 2. Depression and anhedonia measures at baseline

Measure	*M* ± SD		*t*	*p*
	PPD+	PPD-		
IDAS General Depression Scale	34.1 ± 5.6	31.7 ± 5.6	-0.94	.360
IDAS Wellbeing Scale (reverse scored)	24.0 ± 6.5	23.9 ± 3.4	-0.02	.988
BIS Scale	21.0 ± 3.1	21.6 ± 2.2	0.55	.591
BAS Drive Scale	10.7 ± 1.8	10.3 ± 1.8	-0.63	.533
BAS Fun Seeking Scale	10.6 ± 2.3	10.8 ± 2.2	0.14	.888
BAS Reward Response Scale	17.1 ± 1.5	17.0 ± 1.6	-0.17	.867

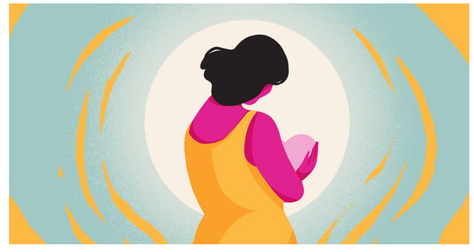
- Women with a history of PPD reported an increase in depression and anhedonia from baseline to hormone addback on the IDAS general depression scale *(t* = -2.3, *p* = .032), the IDAS reverse-coded wellbeing scale *(t* = -2.8, *p* = .011), and the BAS Drive scale (*t* = 2.4, *p* = .026).
- Anhedonia levels did not change from baseline to addback for control participants with no PPD history (all *p*'s > .250).

Figure 2. Change in anhedonia scores from baseline to hormone addback for PPD+ and PPD- participants



Discussion

- Findings support the role of sex steroids in perinatal-onset depression and suggest that sex-steroid changes can trigger anhedonia in susceptible women.
- Findings have important clinical implications, as the onset of anhedonia in the perinatal period can increase risk for postpartum depression and adversely impact the mother-infant relationship.



Acknowledgements

This research was funded by NIMH R21 MH119615-01; Schiller, PI). D.A.S. receives support from the National Institute of Mental Health (T32 MH093315).