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Exploring associations between perinatal depression, anxiety, and urinary oxytocin levels in Latinas

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Abstract

Purpose: Perinatal depression has been associated with lower oxytocin (OT) levels. However, few studies have explored this topic in relation with Latinas, who are at high risk of perinatal depression. The objective of this study was to explore these associations in Latinas.

Methods: A total of 108 Latinas in the third trimester of pregnancy participated in the study. Depression and urinary OT levels were assessed at **in pregnancy** and six weeks postpartum. Nonparametric tests were implemented to test the proposed associations.

Results: Results revealed that 28% of the participants had **probable depression in pregnancy, and 23% six weeks postpartum**. OT levels significantly decreased from prenatal to postpartum in the whole sample; however, participants with **probable** prenatal depression did not exhibit a significant change in OT levels. Participants who were depressed or anxious at six weeks postpartum exhibited persistently higher mean OT levels over time.

Conclusions: A distinct pattern of higher levels of OT in depressed Latinas suggests that OT **levels** may be an important neuroendocrine factor contributing to depressive and anxious symptoms.

Keywords

Latinas; oxytocin; prenatal depression; postpartum depression; breastfeeding

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Informed consent: Informed consent was obtained from all individual participants included in the study.

Introduction

Latinas exhibit higher rates of perinatal depression (PND) than the general population (Bogue 2011; Vidal de Haymes and Kilty 2007; Walmer et al. 2015) **due to high exposure to psychosocial risk factors, such as poverty and adverse life event (**Lara et al. 2016; Linares 2014**).** PND, including both pre and postnatal depressive symptoms, can negatively affect mother-infant bonding, caretaking behaviors, and maternal well-being (Gress-Smith et al. 2011; Lefkovics et al. 2014; O'Hara and McCabe 2013; Provenzi et al. 2018); influence the likelihood of PND during future pregnancies and later depression (Chaudron et al. 2001; O'Hara and Swain 1996; Robertson et al. 2004); and is associated with altered physiological and hormonal profiles (Altemus et al. 2001; Bloch et al. 2003; Boufidou et al. 2009; Corwin et al. 2015). Approximately 6–9% of women experience major depression during pregnancy, with symptoms peaking in early pregnancy and declining over time into the postpartum period (Banti et al. 2011; Wu et al. 2010). However, the estimates for prenatal and postpartum depression for Latinas are substantially higher at 7–32% and 6–54%, respectively (Liu and Tronick 2013; Lucero et al. 2012). The reason behind these differences is unclear, but the role of varying neuroendocrine profiles related to postpartum depression, particularly those related to social bonding and maternal behaviors such as the prosocial hormone oxytocin (OT) may provide insights (Cox et al. 2015; Jobst et al. 2016).

Postpartum depression (PPD) is also associated with alterations in breastfeeding. Breastfeeding discontinuation and difficulties and negative experiences with breastfeeding have been associated with PPD (Dennis and McQueen 2009; Taveras et al. 2003). Although Latinas have high rates of breastfeeding initiation, their breastfeeding duration (both any and exclusive) falls short of the recommended levels (Ahluwalia et al. 2012; Eidelman 2012; Waldrop 2013; Wouk et al. 2016). Furthermore, US-born and acculturated Latinas are less likely to breastfeed than their immigrant and less-acculturated counterparts (Ahluwalia et al. 2012; Celi et al. 2005). Additional research is necessary to determine how other factors such as OT and depression may contribute to disparities in Latina mothers' breastfeeding **practices**.

Previous research suggests that PPD and early breastfeeding cessation may share a neuroendocrine mechanism involving OT (Cox et al. 2015; Stuebe et al. 2013). **Studies** suggest that depressive symptoms and diagnosis are associated with a dysregulated pattern of OT release and lower levels of plasma OT among women in the general population and in the perinatal period (Apter-Levy et al. 2013; Garfield et al. 2015; Massey et al. 2016; Moura et al. 2016; Skrundz et al. 2011; Stuebe et al. 2013). Higher levels of OT are contrastingly associated with exclusive breastfeeding (Grewen et al. 2010; Silber et al. 1991; Uvnas-Moberg et al. 1990). Furthermore, urinary OT has also been associated with stress in mothers (Feldman et al. 2011). However, few studies have **examined** OT **levels and associations with perinatal depression in** Latinas (Lara-Cinisomo et al. 2017), a population which is at particular risk for psychosocial stressors (Lara-Cinisomo et al. 2016), PPD (Howell et al. 2005), and suboptimal breastfeeding duration and exclusivity (Waldrop 2013).

Several factors are associated with changes in OT levels, including circadian rhythms and stimuli like stress (Cox et al. 2015; Lindow et al. 1996). OT concentrations vary considerably among women (Levine et al. 2007; Prevost et al. 2014), and have been found to be greater among pregnant women in their third trimester compared to non-pregnant controls (Altemus et al. 2004; Silber et al. 1991). However, findings on the distribution of OT levels throughout pregnancy and into the postpartum period are mixed (de Geest et al. 1985; Feldman et al. 2007; Jobst et al. 2016; Prevost et al. 2014). Variations in findings on the distribution of OT levels across the perinatal period may be **partly** due to variations in how OT levels are measured. Alternatively, they may simply be due to the wide differences in OT concentrations between pregnant women (de Geest et al. 1985; Levine et al. 2007).

To further understand the relationship between OT and depressive symptomology in Latinas, we attempt to identify the degree to which OT levels relate to the observance of perinatal depressive symptoms, as well as identify other factors, which may be impacting their OT levels, **such as breastfeeding. While Latinas are a heterogeneous group who trace their lineage to Latin America; self-identify as such regardless of race (**Kim and Dee 2017**) and have Cuban, Mexican, Puerto Rican, and South or Central American ancestry (**Humes et al., 2011; Lopez et al., 2013**); they are an important group to study because they are the prevailing ethnic minority group in the United States (**Census 2013**). They also have the highest fertility rate in the U.S. (**Passel et al. 2013**) and accounted for 24% of live births in the U.S. in 2010 (**Livingston and Cohn 2012**). However, they are understudied, particularly regarding the role of hormones in perinatal depression (**Lara-Cinisomo, Wisner & Meltzer-Brody, 2015**).** Thus far, only one small pilot study has addressed and identified the role of OT and breastfeeding with postpartum depression in Latinas (Lara-Cinisomo et al. 2017). **To address this gap**, this study aims to develop a descriptive picture of Latinas' perinatal depression and OT profiles and to explore associations between maternal mood and OT levels.

Methods

Sample

Participants were screened, enrolled and, assessed in late pregnancy (35–36 weeks) and six weeks postpartum. As described in a previous publication (Pedersen et al. 2016), 325 prenatal women were screened for the parent study, 216 completed all waves, and 153 self-identified as either Hispanic or Latina. Of those 153, 108 had complete hormone data and were included in the present study. Participants provided written consent to participate in the study and to provide biological specimens.

Procedures

Participants were recruited during routine prenatal visits following medical record reviews. Participants completed two home visit interviews with a bilingual (English and Spanish) trained research assistant. Interviews were conducted in the participant's primary language. **Self-reported demographic data collected at enrollment, including education, marital status, age, and health information are reported in** Table 1**.** Each of the two home

interviews included an assessment of depression and anxiety. Additionally, 24-hour urine samples were also collected to estimate OT levels.

Psychological Assessment.—Participants completed the Edinburgh Postnatal Depression Scale ((Cox et al. 1996); EPDS), a valid **screener** during the prenatal period (Kozinszky and Dudas 2015), using a Spanish or English validated version of the measure. **Scores range from 0 to 30 based on a 4-point scale, with a ≥10 cutoff for probable depression (**Cox et al, 1996**; Gaynes et al., 2005), which has been shown to be a reliable cut point for Latinas (**Howell et al., 2012**).** Because PND is also often comorbid with anxiety (Bernstein et al. 2008), participants also completed the trait subscale of the Spielberger State-Trait Anxiety Inventory (STAI-T; (Shahid et al. 2012);) and were classified into high and low anxiety groups according to the recommended cut-off score of 40 **(**Dennis et al. 2013**)**.

Oxytocin Assessment.—OT levels were evaluated using 24-hour urine samples collected by the participants. Research assistants trained participants on collection and storage procedures. Urinary OT samples were extracted with 1.5% trifluoroacetic acid, followed by 80% acetonitrile, dried and reconstituted with assay buffer. OT levels were then measured using an assay kit and protocol from Enzo Life Sciences, Ann Arbor, MI. The hormone content (pg/ml) was determined by plotting the OT of each sample against a standard curve. The sensitivity of the assay was 2.9 pg/ml with a standard range of 4.7 to 312 pg/ml. The intra- and **inter-assay** variations were 4.8% and 8% respectively. Enzo Life Sciences reports cross-reactivity for similar neuropeptides found in mammalian sera at less than 0.001. **To account for urine concentration and volume, creatinine was used to standardize OT levels across participants (**Reyes et al, 2014**).** Urinary creatinine concentration levels were measured using an assay kit and protocol from R&D Systems, Minneapolis, MN. The sensitivity of the assay was .07 mg/dL with a standard range of .3 to 20 mg/dL. The intra- and inter-assay variation were 3.2% and 5.3%, respectively. **Urinary OT levels is expressed as the ratio of OT to creatinine (pg OT/mg creatinine).**

Analysis Plan

The sample was characterized using descriptive statistics for continuous variables and percentages for categorical variables. **Associations between demographic characteristics and probable depression (EPDS ≥ 10) and anxiety status (high versus low) were tested using chi-square tests and Fisher's exact tests with categorical variables and Kruskal-Wallis tests with continuous variables.** Due to the non-normality of the data, Spearman's rank correlations were conducted for continuous variables (e.g., depressive symptoms, OT levels). Wilcoxon signed-ranks tests were conducted to determine changes from pregnancy to postpartum in all continuous outcomes of interest, including depressive symptoms and anxiety scores as well as OT levels. We also conducted Kruskal-Wallis tests to assess differences in OT levels by breastfeeding status, **probable** depression status, and high versus low anxiety. Similar comparisons of subgroups by **probable** depression status were also conducted. The analyses were conducted using SPSS 23 (IBM Corp. 2015).

Results

Sample characteristics

The sample characteristics are presented in Table 1. At enrollment, close to a third of the sample (28%) met the EPDS cutoff for **probable** depression, and 23% at six weeks postpartum. An examination of mean EPDS scores indicated that there was an average of one point decrease from prenatal to postpartum (M = 6.67, SD = 4.93 and M = 5.67, SD = 5.08, respectively). Results from the Wilcoxon signed-ranks test indicated that this **change** was statistically significant (Z = −2.77, p = .006). Of the participants, 18% **had probable depression** at enrollment and six weeks postpartum. **There was a significant association between marital status and probable prenatal depression (p = .014).** Just over a third of the sample (34%) met the STAI trait cutoff for high anxiety during the third trimester of pregnancy compared to 24% at six weeks postpartum; 19% had high anxiety at both time points. There was a reduction in mean STAI trait scores of 3.08 over time, which was statistically significant (Z = - 4.06, p < .001). **No significant associations between demographic characteristics and anxiety status were observed.**

Urinary OT levels, breastfeeding, and maternal mood

Mean urinary OT levels during pregnancy were **29.67 (SD = 36.69)** and **21.75 (SD = 18.90)** at six weeks postpartum. Results indicate that there was a significant decrease in OT levels from prenatal to postpartum (**Z = −3.15, p = .002)** in the whole sample. As Table 2 indicates, prenatal and postpartum depressed women as well as those classified as having high anxiety using the STAI-T exhibited higher mean OT levels at both time points compared to non-depressed or low-anxiety women. However, these differences were not statistically significant. Women whose depression persisted from the prenatal to the postpartum visit exhibited higher mean OT **in pregnancy and postpartum (M = 44.39, SD = 77.15 and M = 28.71. SD = 27.78, respectively)** compared to women who were never depressed **(M = 27.14, SD = 19.78 and M = 20.15, SD = 17.18, respectively)** or depressed at one time point **(M = 23.91, SD = 15.74 and M = 20.77, SD = 11.89, respectively)**, though these differences were not statistically significant. Additional analyses revealed a similar pattern in women who reported high anxiety (STAI-T ≥ 40) at both time points who had higher mean OT **(M = 41.92, SD = 74.03 and M = 28.27, SD = 26.72, respectively)** than women whose anxiety was never high (M = 27.03, SD = 20.73 and M = 19.46, SD = 16.59, respectively) or was high only once **(M = 25.73, SD = 11.30 and M = 22.43, SD = 15.50, respectively)**. Again, these differences were not statistically significant.

There were observed variations in prenatal OT levels **by breastfeeding status after birth and at** 6 weeks postpartum (Table 3). **With the exception of any breastfeeding at six weeks postpartum, mean postpartum OT levels were higher among those who did not report breastfeeding. However,** the differences were not statistically significant.

When comparing changes in urinary OT levels between depression subgroups (i.e., splitting the analysis by **probable** depression status), results revealed that participants who were classified as having **probable** prenatal depression (n = 30) did not exhibit a significant change in OT levels over time (**Z = −79, p = .43**) compared to the non-depressed group (n =

78; **Z = −3.28, *p* = 0.001**). Though there was a general decrease in OT levels from prenatal to postpartum among women classified as PPD at 6 weeks, these women exhibited persistently higher mean OT levels over time (n = 25, **Z = −1.01, *p* = .31**). In contrast, non-depressed postpartum women exhibited a significant decrease in OT levels over time (n = 83; **Z = −3.10, *p* = .002**). **Significant differences in OT levels by breastfeeding status were observed when splitting the data by probable depression subgroups. There was a significant difference within those with probable prenatal depression, with those who reported any breastfeeding immediately after birth (n = 25) exhibiting significantly lower mean prenatal (*Z* = 6.32, *p* = .012) and postpartum (*Z* = 5.86, *p* = .015) OT levels (*M* = 23.57, SD = 15.23 and *M* = 21.53, SD = 16.80, respectively) compared to depressed women who did not report any breastfeeding (n = 5; *M* = 102.99, SD = 141.87 and *M* = 51.46, SD = 36.00, respectively). Similarly, women with probable postpartum depression who reported any or only breastfeeding immediately after birth exhibited significantly (*Z* = 6.32, *p* = .012 and *Z* = 5.16, *p* = .023, respectively) lower mean postpartum OT levels (*M* = 19.59, SD =17.53 and *M* = 19.53, SD = 18.71, respectively) compared to those who did not (*M* = 51.42, SD = 36.04 and *M* = 39.60, SD = 32.29, respectively).**

Discussion

It is not clear why Latinas with postpartum or persistent depression or anxiety exhibited higher levels of OT compared to their counterparts in this study. This raises important questions about potential contributing factors to high OT levels that might be protective in women with depression or anxiety.

OT plays a role in the promotion of maternal behavior (Febo et al. 2005; Pedersen et al. 2006; Strathearn et al. 2009), which is often impaired in women with maternal depression (Lovejoy et al. 2000). Previous studies assessing plasma OT indicated higher maternal-fetal attachment-scores in women whose OT levels rise from early to late pregnancy relative to women whose OT levels remained constant or decreased (Levine et al. 2007). However, a drop in plasma OT levels from pregnancy to postpartum (Jobst et al. 2016) as well as lower prenatal OT levels alone (Skrundz et al. 2011) are both associated with increased postnatal depressive symptoms. In the current study, **urinary** OT levels decreased in all participants; however, OT levels were consistently higher in **women with probable** depression or **high anxiety** relative to non-depressed and non-anxious Latinas. While this finding seems contrary to findings from the general population, previous studies have mainly used one-time plasma measures of OT. The current study used a 24-hour urine sample of OT, which captured the circadian rhythms of OT as well as continual release over an extended period of time. **However, this work is consistent with other studies that have found ethnic differences in prenatal physiology above and beyond other demographic factors. This includes differences cortisol and corticotropin-releasing factor in the Latina and Black population relative to their White counterparts (**Glynn, Schetter, Chicz-DeMet, Hobel, & Sandman, 2007; Harville, Savitz, Dole, Herring, & Thorp, 2009**) and large incidences in preterm birth (**Goldenberg, Culhane, Iams, & Romero, 2008; Pearl et al., 2018**) and maternal mortality (**Creanga et al., 2015; Gyamfi-Bannerman et al., 2018**) amongst Black**

women. One likely interpretation is that ethnicity and/or race are proxies for class, opportunity, life experiences and stressors that different groups face may that shape physiology relevant for perinatal outcomes and long-life disease (i.e., allostatic load) (Chambers, Baer, McLemore, & Jelliffe-Pawlowski, 2018; Glynn et al., 2007; Kuzawa & Sweet, 2009; McEwen & Gianaros, 2010**). As such, aspects of Latino culture may be protective against the stressful effects of depression or anxiety and preserve high levels of OT or work to combat stress (**Grippo et al. 2012**).**

The decrease in postnatal depressive symptoms in Latinas exhibited in the present study has been replicated in other studies (Lara-Cinisomo et al. 2017), but studies in the general population show both increases (O'Hara and Swain 1996) and decreases in depressive symptoms (Banti et al. 2011) across the perinatal period. Human and animal models have also demonstrated improved anxiety in the postpartum period relative to gestation (Heron et al. 2004; Lonstein 2005). Researchers speculate that tactile and other interactions with offspring might account for those changes. In Latinas, improved mood may also be associated with the strong cultural significance of motherhood amongst Latinos. Motherhood is revered in Latino culture and considered a traditional gender role for women (Guendelman et al. 2001; Raffaelli and Ontai 2004). Adhering to traditional cultural value of gender roles is protective against the deleterious effects of acculturative stress on maternal depressive symptoms in pregnant Mexican-American women (D'Anna-Hernandez et al. 2015). Due to strong cultural family ties, social and/or intergenerational support is strong amongst Latina postpartum women (Campos et al. 2008; Negron et al. 2013). Interestingly, interactions between social support and OT are associated with coping with stress (Chen et al. 2011; Heinrichs et al. 2003). Given the cultural importance of motherhood and childrearing, even though depressed or anxious, mothers could still be interacting with their infants in ways associated with high OT levels. Bonding with infants could be a strong compensatory mechanism associated with Latino culture. Unfortunately, mother-child interactions were not quantified in this sample, but this hypothesis should be addressed in future work.

This is one of the first studies to address OT and perinatal depressive and anxious symptoms in Latinas. The only other previously published study similarly found low levels of OT in Latinas with postpartum depression who had ceased breastfeeding (Lara-Cinisomo et al. 2017), supporting a distinct lower OT profile in depressed Latinas. Other studies on non-pregnant minority populations have suggested ethnic differences in OT in response to stress as well (Grewen et al. 2008). For example, African-American women exhibited lower OT and greater pain sensitivity in a stress paradigm of acute ischemic pain compared with Whites (Grewen et al. 2008). In addition, amongst ethnic minorities with HIV, higher OT was associated with increased stress and a healthy immune system (Fekete et al. 2011). Others have also demonstrated an association between generalized social anxiety disorder and elevated OT levels compared to **healthy** controls (Hoge et al. 2008). However, there are limitations to the current work. First, the sample is relatively small, and while the sample is composed mainly of Latinas of Mexican descent due to the location of the study, there is no information available on other Latina subgroups. **These differences between subgroups may play a role in the heterogeneity of health and birth outcomes amongst Latinos**

(Matthews et al. 2015; Vega et al. 2009**) and should be addressed in future studies.** Second, data on acculturation, changes in cultural values, beliefs, and behavior as a result of cultural contact (Berry 2003; Sam and Berry 2010) were not collected in the current study. Acculturation has been shown to play a role in maternal depressive symptoms in some (Heilemann et al. 2004; Martinez-Schallmoser et al. 2003), but not all studies (Beck 2006; Beck et al. 2005; D'Anna-Hernandez et al. 2015). Given that motherhood plays such a critical role in Latino culture, parts of acculturation or cultural values may be more important during this perinatal period. Future work should explore adherence to cultural values and beliefs surrounding childbearing. Related, psychosocial stressors (e.g., low socioeconomic status, lack of social support due to migration, and other stressors) should be assessed to help explain why, despite the protective role of culture, high rates of postpartum depression persist among Latinas and to assess their association with OT levels during the perinatal period. Third, mother/child interactions were not addressed in the current study and may have had relationships with OT levels. Fourth, the OT levels collected in this study were via 24-hour urine while other studies were one-time plasma measures, which may account for many of the differences observed between the current and other studies. However, in the current study, urinary OT collection was a strength because OT is pulsatile, and a 24-hour urine measure is likely a better summation of diurnal OT activity. Fifth, the exclusive use of urinary OT without a comparison to plasma OT **or OT in breastmilk** limits our interpretations of the results. Correlations between urinary and plasma OT are equivocal, (Amico et al. 1987; Feldman et al. 2011). **Additionally, urinary OT levels have not been correlated with OT levels in breastmilk, which could be influenced by breastfeeding status.** Therefore, subsequent studies should assess both forms to provide a definitive answer and advance our understanding of how OT is associated with PPD. It is important to note that urinary OT has also been associated with stress in mothers **and breastfeeding practices,** which **are relevant** in the context of depression (Feldman et al. 2011). **Finally, while breastfeeding has been associated with higher OT (**Grewen et al. 2010; Silber et al. 1991; Uvnas-Moberg et al. 1990**), it is unclear why women in our study who had probable depression and breastfed had lower mean OT levels than women with probable depression who did not breastfeed. While our subgroup sample sizes were small and trends in OT levels by breastfeeding status mirror those found in the whole group, results should be interpreted with caution. Thus, future studies should include a larger sample of depressed Latinas with varying breastfeeding practices.**

The current results suggest that OT **levels** may be one of many neuroendocrine factors contributing to depressive and anxious symptoms in Latinas. It is possible that the OT system could be reorganized according to culture, which may account for the higher levels of OT seen in women with postpartum depression or anxiety and should be directly tested in future research.

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Table 1.

Descriptive Statistics of the Sample (N = 108)

	Percent/Mean (SD)
Age at enrollment	27.81 (5.37)
Education in years **at enrollment**	9.42 (3.37)
Pregnancy BMI[a]	32.65 (6.53)
Postpartum BMI[b]	26.93 (3.98)
Number of pregnancies	2.03 (1.52)
% Married or cohabitating	79%
% Employed at least part-time since becoming pregnant	47%
% Had C-Section	17%
Breast or bottle when infant was born	
Breast fed only	61%
Bottle fed only	15%
Both breast and bottle fed	24%
Any breastfeeding when born	
No	15%
Yes	85%
Breast or bottle at 6 weeks postpartum	
Breast feeding only	19%
Bottle feeding only	19%
Both breast and bottle feeding	62%
Any breastfeeding at 6 weeks postpartum	
No	19%
Yes	81%
EPDS pregnancy score	6.67 (4.93)
EPDS postpartum score	5.67 (5.08)**
STAI Trait pregnancy score	35.99 (9.77)
STAI Trait postpartum score	32.90 (9.19)***
% Prenatal depression (EPDS ≥ 10)	28%
% Postpartum depression (EPDS ≥ 10)	23%
% Depressed prenatal and postpartum	18%
% High STAI Trait (≥ 40) Anxiety Prenatal	34%
% High STAI Trait (≥ 40) Anxiety 6 weeks postpartum	24%

*** Note. < .001

** $p < .01$

[a] Based on 97 women

[b] Based on 103 women.

Table 2.

Mean (SD) Urinary Oxytocin levels by **Probable** Depression Status using the EPDS and Anxiety Level using the STAI (N=108)

	Prenatal		Postpartum		Prenatal		Postpartum	
	Depressed (n = 30)	**Non-depressed (n = 78)**	**Depressed (n = 25)**	**Non-depressed (n = 83)**	**High Anxiety (n = 37)**	**Low Anxiety (n = 71)**	**High Anxiety (n = 26)**	**Low Anxiety (n = 82)**
Prenatal Oxytocin (pg/mg)	36.81 (62.24)	26.92 (19.59)	39.57 (67.92)	26.69 (19.17)	35.23 (56.30)	26.77 (20.07)	38.35 (66.70)	26.92 (19.32)
Postpartum Oxytocin (pg/mg)	26.52 (23.26)	19.91 (16.74)	25.95 (25.07)	20.49 (16.59)	25.65 (22.86)	19.72 (16.28)	27.28 (24.48)	20.00 (16.55)

Table 3.

Mean (SD) Urinary Oxytocin Levels by Breastfeeding Status (N = 108)

	Any breastfeeding after birth		Only breastfeeding after birth		Any breastfeeding 6 weeks postpartum		Only breastfeeding 6 weeks postpartum	
	Yes (n = 92)	No (=16)	Yes (n = 66)	No (n = 42)	Yes (n =87)	No (= 21)	Yes (n = 20)	No (=88)
Prenatal Oxytocin (pg/mg)	26.04 (18.85)	50.55 (83.07)	25.34 (14.47)	36.47 (55.71)	27.71 (19.29)	37.76 (74.27)	26.98 (16.35)	30.28 (39.93)
Postpartum Oxytocin (pg/mg)	20.86 (17.32)	26.87 (26.37)	21.39 (19.31)	22.32 (18.46)	22.08 (19.79)	20.37 (15.00)	20.79 (24.30)	21.97 (17.61)

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