

**Stressful Life Events in Pregnancy and Postpartum Depressive Symptoms among Women
in Washington State**

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Abstract

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Background: Stressful life events (SLEs) such as job loss or death of a loved one are common in pregnancy. Studies have shown that women with SLEs during pregnancy are more likely to develop postpartum depressive symptoms (PDS). This study examined the association between stressful life events (SLEs) experienced one year before delivery and postpartum depressive symptoms (PDS) among women in Washington (WA) State and whether perceived availability of social support modified this association.

Methods: A retrospective cohort study of post-partum women who participated in the WA State Pregnancy Risk Assessment Monitoring System (PRAMS) survey from 2009-2013 was performed. Women were classified as having any SLE (≥ 1 SLEs) if they reported experiencing at-least one of 12 SLEs one year before delivery. Women were categorized as having PDS if they responded “always” or “often” to at least one of two questions and classified as not having

PDS if they responded “never”, “rarely” or “sometimes” to all questions on depressive symptoms. Women having any perceived availability of financial, physical or emotional help were classified as having any social support. Multivariable Poisson regression was performed to estimate relative risks with 95% confidence intervals (CI), adjusting for maternal age, race, education and insurance status. Effect modification by perceived availability of social support was assessed using the Wald test.

Results: Among 6,415 women, 68% reported one or more SLEs (financial=75.5%, partner-related=40.2%, emotional=39.1% and traumatic=25.8%). Nineteen percent of mothers experienced PDS out of whom 79% had ≥ 1 SLEs one year before delivery. Among women with any SLE, most (94.2%) reported having at least one form of social support; 72.3% had all 4 types. Compared to women with no SLEs, women with any SLE were 1.7 times more likely (95% CI 1.4, 2.0) to report PDS. Perceived availability of social support did not modify the association between SLEs experienced one year before delivery and PDS.

Conclusions: Our study suggests that women should be screened for SLEs during prenatal visits to identify those at increased risk of developing PDS.

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INTRODUCTION

Prenatal stress may occur due to stressful life events (SLEs) such as loss of job or death of a loved one. A population-based study using estimates from 2010 data from 27 states participating in the Pregnancy Risk Assessment Monitoring System (PRAMS) found that 70% of women reported at least one SLE in the year preceding the birth of a live infant [1]. In Washington (WA) State, 67% of women reported experiencing at least one SLE in the year before live birth [1] with approximately 7% reporting 6-13 SLEs in 2010 [2]. Studies have shown that prenatal stress experienced due to SLEs impacts both the health of the mother and her infant [3]. It is known that SLEs are associated with adverse pregnancy outcomes including preterm birth, low birth weight [4-6] and maternal postpartum depression [7,8].

Postpartum depression defined as a depressive episode within the first year after birth is a common public health problem in the U.S. In 2012, 10.1% of women reported having postpartum depressive symptoms (PDS), defined as feelings of sadness, depression or hopelessness since the birth of their infant in WA State [9,10]. Depressed mothers in the postpartum period are less likely to breast feed their child, less likely to follow safe infant sleep practices, less responsive to their infants and also less likely to seek help or support [11,12]. The US Preventive Services Task Force (USPSTF) recommends implementation of screening along with adequate support systems for perinatal depression to ensure early detection, effective interventions and appropriate referral to alleviate depressive symptoms and improve functioning as well as reduce economic burden to the individual and society [13,14].

Recent studies examining the association between SLEs and PDS found that mothers experiencing at least 1 SLE one year before delivery were nearly twice as likely to develop PDS [15-17]. Social support during pregnancy may attenuate the association between SLEs and development of PDS. The American College of Obstetrics and Gynecology (ACOG) considers lack of or low levels of social support as a risk factor for perinatal depression [18]. Prior studies that examined social support and postpartum depression found that presence of social support during pregnancy reduces the development of postpartum depression [19-21]. While these studies have examined stress or social support as individual risk factors for postpartum depression, they have not simultaneously considered social support during pregnancy in the context of prenatal stressors in pregnancy and postpartum depression. Studying social support during pregnancy as an effect modifier of the SLE-PDS association may help better understand its role and help identify the strata of women with SLE who have low social support during prenatal visits and provide referral to social support services. To our knowledge, the only study addressing effect modification of prenatal stress and PDS relationship by social support was performed by Coburn and colleagues who examined perceived availability of social support as a moderator of prenatal stress on PDS in low-income Mexican American women and found that moderate and high levels of social support were associated with reduced risk of depression due to family stressors [22]. We would like to build on this knowledge and therefore, aimed to understand the relationship between SLEs experienced one year before delivery and development of PDS among women in WA State and evaluate whether perceived availability of social support would modify this association. We hypothesized that women in WA State experiencing SLEs one year before delivery were more likely to have PDS and that women with

SLEs having perceived availability of social support were less likely to experience postpartum depression.

METHODS

Study Population and Data Sources

We performed a retrospective cohort study to examine the relationship between SLEs and PDS and evaluate whether perceived availability of social support would modify this association using data from the WA State Pregnancy Risk Assessment Monitoring System (PRAMS) survey for the years 2009-2013 [23]. The PRAMS sample includes women participating in phase 6 (2009-2011) and phase 7 (2012-2013) survey. Study subjects included women who reported a live, singleton birth and excluded women with multiple births greater than triplets, stillbirths, abortions, infants aged less than 2 months or greater than 6 months, and adoptions.

Data Collection

PRAMS is a multistate, population-based joint project funded by the Centers for Disease Control and Prevention (CDC) in partnership with state health departments that collects information about maternal attitudes and experiences before, during and after pregnancy [23]. The core questions address topics relating to maternal health that include attitudes about the most recent pregnancy, barriers to and type of prenatal care received, maternal knowledge of pregnancy-related health issues such as tobacco/alcohol use, prenatal stress, infant care and availability of social support before and during pregnancy. The PRAMS data collection uses the mixed-mode methodology in which a written self-administered questionnaire is mailed to a stratified sample of new mothers 2-4 months after delivery. An interviewer-administered questionnaire is used via telephone phase for the non-responders. The PRAMS sample is stratified by race/ethnicity. Non-white groups, especially Black and American Indian/Alaska Native women are over-sampled to increase reliability of estimates and weighting is applied during the analysis phase. WA State

samples approximately 2,100 women/year. For 2012, WA State PRAMS' weighted response rate was 68%.

Exposure

The exposure of interest was self-reported SLEs experienced by mothers during 12 months before the most recent delivery, measured by 12 questions. The questions concern: *partner related stressors* such as arguing with her partner more than usual, her partner did not want pregnancy, or separation from her partner; *traumatic stressors* include being homeless, partner went to jail or someone close had alcohol/drug problems; *financial stressors* include partner or woman lost a job, woman could not pay her bills or moved to a new address; *emotional stressors* include sickness or death of a close family member. SLEs were categorized as any SLE (≥ 1 SLE) versus none based on previous studies [1,15,16].

Outcome

The outcome of interest was PDS. In order to measure PDS, the PRAMS survey uses a Likert-like scale with questions that are based on the Patient Health Questionnaire-2 (PHQ-2) depression model, a validated and reliable screening tool that is easy to use [24,25] with a specificity of 100% and sensitivity of 79% when compared to the Edinburgh Postnatal Depression Scale [26]. The questions in phase 6 asked women how often they felt: (a) down, depressed, or sad, (b) hopeless, (c) slowed down compared to the questions in phase 7 which asked women how often they felt: (a) down, depressed, or hopeless, (b) had little interest or little pleasure in doing things. Response options were “always”, “often”, “sometimes”, “rarely” and “never”. Based on previous study [16], we classified women as having PDS if they responded

“always” or “often” to at least one question and women not having PDS if they responded “never”, “rarely” or “sometimes” to all questions.

Perceived availability of social support experienced by mothers during their pregnancy was examined as an effect modifier and was measured by four PRAMS questions that included whether it was possible that the woman would have had the kinds of social support enumerated if she needed them during her most recent pregnancy. The questions involved: (a) someone to loan her \$50, (b) someone to help her if she was sick and had to be in bed, (c) someone to take her to the clinic or doctor’s office if she needed a ride and (d) someone to talk with about her problems. Perceived availability of social support was classified as none versus any (≥ 1 social support) as well as by levels of social support as high (all 4 types), medium (2-3 types) or low (0-1 type) by summing up the number of types of social support available and categorizing them based on prior studies [27,28].

Data analysis

We compared maternal characteristics by the presence versus absence of any SLE. Maternal characteristics included age in years (< 20, 20-24, 25-29, 30-34, ≥ 35); race (White, African American, Hispanic, American Indian/Alaska Native, Asian/Pacific Islander); education (< high school diploma, high school diploma, some college, completed college); insurance status (Medicaid, non-Medicaid); married (no/yes); smoking during last 3 months of pregnancy (no/yes); alcohol during last 3 months of pregnancy (no/yes); parity (primipara, multipara); plurality (single, twin); gestational age at delivery (< 37 weeks, ≥ 37 weeks); mode of delivery (vaginal, cesarean delivery, forceps or vacuum); adequacy of prenatal care (inadequate,

intermediate, adequate, adequate+); weight gain during pregnancy (<recommended, recommended, > recommended); social support (none, any) and levels of social support (low, medium, high). We used the WA State birth certificate data (2009-2013) that had been linked to PRAMS to examine select covariates such as age, education, insurance and marital status, plurality, gestational age, mode of delivery, weight gain during pregnancy and adequacy of prenatal care. We classified adequacy of prenatal care as inadequate, intermediate, adequate and adequate plus based on the Kotelchuck Adequacy of Prenatal Care Utilization (APNCU) Index [29]. We classified recommended amount of weight gain during pregnancy as recommended, less than, or greater than recommended based on the Institute of Medicine guidelines for weight gain derived from the pre-pregnancy BMI [30]. We examined all the variables for differential missingness between any SLE versus no SLE groups. Missingness was less than 10% for all variables except for the variable “married” that we dropped from the analyses. We performed complete case analyses. We examined the frequency of types of SLEs (partner-related, traumatic, financial and emotional) and SLE number (1-2, 3-5, ≥ 6) among women with one or more SLEs.

We examined the association between any SLE and risk of PDS using multivariable Poisson regression with a robust variance estimator to estimate the relative risk and 95% confidence interval, adjusting for confounders such as maternal age, race, education and insurance status determined *a priori* based on prior literature and directed acyclic graphs (DAGs). We used Poisson regression for relative risk estimates to account for the fact that our outcome was common. We used survey commands and survey weights to account for the sampling frame, and missing data. All analyses were performed using Stata 13 [31]. We performed stratified analyses to examine the association between any SLE and PDS by perceived availability of social support

(none, any) and also by levels of social support that included high (all 4 types), medium (2-3 types) and low (0-1 type) levels. Effect modification of the association between any SLE and PDS by perceived availability of social support was also assessed using the Wald test. As PRAMS phase 6 differed from phase 7 on the measurement of PDS, we performed sensitivity analyses to compare our results for the two phases.

RESULTS

Of the 7,805 women who participated in both the phases of WA-PRAMS survey, 6,415 women (82.2%) completed the survey. Among the 6,415 women, 68% reported one or more SLEs. Compared to women with no SLE, women with any SLE were more likely to be younger, single, American Indian/Alaska Native, less educated, received Medicaid or smoked during the last 3 months of pregnancy (Table 1).

Among 4,440 mothers with one or more SLE, financial problems were the most common SLE (75.5%) followed by partner-related (40.2%), emotional (39.1%) and traumatic (25.8%) (Table 2). More than half (52.0%) reported moving to a new address and nearly a third (31.9%) reported arguing with their partner more than usual or inability to pay their bills (31.4%). Nearly 8% of women in WA State reported 6 or more SLEs during pregnancy, with a third (31.5%) reporting 3-5 SLEs while the majority (60.6%) reported experiencing one or two SLEs.

PDS was common in our study cohort with approximately 19% of mothers reporting symptoms of depression in the postpartum period. Overall, women with any SLE were 1.7 times more likely (95% CI: 1.4, 2.0) to report PDS compared to women with no SLEs after adjusting for maternal age, race, education and insurance status (Table 3). Examining the association of SLE and PDS by social support, we found that among women with any perceived availability of social support, women with any SLE were 1.7 times more likely (95% CI: 1.4, 2.0) to report PDS compared to women with no SLE, while, among women with no social support, women with any SLE were approximately 1.7 times more likely (95% CI: 1.0, 3.1) (Table 3). We found that among women with a high level of perceived availability of social support, women with any SLE

were 1.5 times more likely (95% CI 1.3, 1.9) to report PDS compared to women with no SLEs whereas among women with medium and low levels of perceived availability of social support, women with any SLE were 1.9 times (95% CI 1.3, 2.9) and 1.8 times (95% CI 1.2, 2.9) more likely to report PDS, respectively, compared to women with no SLEs after adjusting for confounders. We found no evidence that perceived availability of social support modified the association between any SLE and PDS. Sensitivity analyses performed to examine the association between any SLE and PDS using data for phase 6 (Table 4) and phase 7 (Table 5) separately noted results similar to our analyses combining the two phases.

DISCUSSION

Our study of the association between SLEs experienced one year before delivery and PDS found that more than two-thirds of women reported experiencing at least one SLE during this period, with 75% experiencing a financial SLE. Women with any SLE were 71% more likely to report PDS compared to women with no SLE. Regardless of social support classification (none versus any, medium/high versus low), perceived availability of social support did not modify the association between SLEs and PDS.

Our finding that the majority of women experience SLEs one year before delivery is consistent with previous population based studies and local reports using the PRAMS data. While data from 11 states participating in the 1990–1995 PRAMS found that 64% of women experienced at least one SLE in the year preceding the birth of a live infant [32], recent estimates suggest that the prevalence of SLEs has increased with 70% of women reporting one or more SLE in 2010 [1,2]. Financial types of SLEs were the most common with 75.5% of women experiencing this type in our study. This finding may be explained by the fact that the unemployment rates during 2009 to 2012 were almost twice as high compared to those reported during 2000-2008 and this may have resulted in job loss, inability to pay bills or changing housing during pregnancy [33]. Lu and Halfon suggested that SLEs during pregnancy not only affect the health of the mother but also impact the growth of her fetus with long term implications on the life-course of an individual [3]. It is known that prenatal stress impacts pregnancy outcomes through various pathways. SLEs may culminate in both physical and psychological stress that may directly reduce the uterine blood flow and indirectly lead to increased cortisol production, thereby priming the fetus for early delivery and leading to complications in labor and delivery [34]. Prenatal stress not only

affects the woman and the life course trajectory of her infant, but also impacts birth outcomes across generations [35]. These consequences of SLEs during pregnancy may have significant societal impact incurring heavy individual, family and societal costs [36,37].

Our study showed that PDS was quite common with 19% of women in WA State experiencing PDS. It is known that SLE experienced one year before delivery is a risk factor for PDS [15-17]. In 2000, Herrick examined the North Carolina PRAMS data to study the impact of SLEs on postpartum depression and found a dose response with a higher percentage of women reporting postpartum depression with an increasing number of SLEs [38]. Women who experienced at least 6 or more SLEs one year before delivery were 4.5 times more likely to develop postpartum depression [38]. Consistent with earlier studies, our study found that women who experienced any SLE one year before delivery, compared to women with no SLE, were 71% more likely to report PDS. Postpartum depression is a treatable condition and is often unrecognized and undertreated, as the symptoms are attributed to the normal changes in the postpartum period [39]. A developmental objective of *Healthy People 2020* is to decrease the proportion of women who experience PDS [40]. Screening for depressive symptoms and identifying them especially in women with SLEs during prenatal visits and providing appropriate interventions may help prevent the progression to a clinical diagnosis of postpartum depression. Decline in depressive symptoms postpartum may help improve maternal-infant bonding, provide better quality of life for the mother and her family, reduce developmental disabilities and improve the life course of the child, thus saving millions of dollars in societal mental health and health care costs [37].

We found no evidence to suggest that perceived availability of social support in the form of financial, physical or emotional support during pregnancy modified the association between SLE experienced one year before delivery and development of PDS. However, Coburn and colleagues found that social support played a key role in mitigating the effects of prenatal stress on PDS consistent with the “Buffering Model of Stress” by Cohen and Willis that posits that social support factors help in coping up with stress thereby reducing the psychosocial effects of stressful experiences [41]. Although our study did not show modification of our main finding by social support, we believe that social support may modify the SLE-PDS association. There may be several reasons to explain our lack of findings. PRAMS questions on social support include the woman’s perception of social support that may have been available if she needed them and may not translate into tangible support that the person actually received. Therefore, we may not be able to comment on the quality or quantity of social support. Moreover, the specific type of social support may not match the context, type or timing of SLEs which may be needed to show a strong buffering effect. Several studies have used a multidimensional scale of perceived social support (MSPSS) to measure social support factors [22,42-44]. We operationalized social support factors using 4 questions from the PRAMS survey that may not adequately capture perceived availability of social support as used in other studies [22,42-44]. However, our study is the first to examine social support factors in the context of SLEs and PDS.

Our study had several limitations. First, the delay between the occurrence of the SLEs in the preceding 12 months and their reporting at 2-4 months after childbirth may have resulted in recall bias and differential misclassification of the exposure. Women who were depressed or having depressive symptoms may have been more likely to have recalled the occurrence of SLEs

compared to women with no PDS resulting in an overestimation of the relative risk. However, except for several partner-related SLEs, most SLEs (10 out of 12) were objective events such as divorce or job loss and less likely to contribute to recall bias. Second, self-reporting of data for the PRAMS survey, especially via the telephone phase, may have resulted in some social desirability bias that may lead to differential misclassification of both exposure and outcome. Women who experienced SLEs during pregnancy and postpartum depressive symptoms are less likely to report the outcome as well as the exposure compared to women who did not experience SLEs, which may lead to biased estimates of the relative risk. The staffs administering the PRAMS survey undergo training to administer questions using standard approach which may help reduce this bias. Moreover, PRAMS survey is also administered by mail that provides anonymity and may reduce social desirability bias. Third, we were unable to include other confounders of SLE-PDS association such as prior history of mental illness as this variable was not collected in the PRAMS survey which may result in unmeasured confounding inducing bias in the risk estimates. Despite being collected in the PRAMS survey, we chose not to include intimate partner violence (IPV) as a confounder as these concepts were closely associated or measured as part of the SLE questions. Last, despite detailed follow up at regular intervals via different modes of administering the PRAMS survey (telephone or mail) during the design phase to address the issue of non-response and using non-response adjustment factors in the analyses phase, there may still be some bias in the risk estimates.

In conclusion, we found that the burden of SLEs experienced one year before delivery in WA State mothers is quite high. Our study also found that women with SLEs were 71% more likely to report PDS which suggests that women should be screened for SLEs during prenatal visits to

identify those at increased risk of developing postpartum depressive symptoms. Findings from our study may provide support for the American College of Obstetricians and Gynecologists (ACOG) antepartum care guidelines that recommend that physicians screen women for psychosocial risks and presence of social support during their prenatal visits and provide referrals to appropriate counselling or supportive services [45]. This additional screening, especially in women with SLEs, may help reduce the risk of developing PDS and promote a healthy and nurturing mother-infant relationship. Future studies should focus on examining the association of individual type of SLE with PDS by context specific social support factors using datasets that may reliably quantify them during pregnancy.

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Table 1: Maternal Characteristics by Presence of Any Stressful Life Event (SLE) using WA-PRAMS Data (2009-13).

Maternal characteristics	Any SLE (≥ 1 SLE) (N = 4,440)		No SLE (N = 1,975)	
	N	Weighted %	N	Weighted %
Age (years)				
<20	356	7.8	88	3.6
20-24	1,081	24.6	288	13.6
25-29	1,312	29.6	564	30.3
30-34	1,055	23.8	616	32.0
≥ 35	633	14.2	419	20.5
Maternal race				
White	1,323	64.4	637	63.5
African American	803	4.9	290	3.8
Hispanic	854	18.9	365	18.3
American Indian/Alaska Native	722	2.3	181	1.2
Asian Pacific Islander	738	9.5	502	13.2
Maternal education				
<High school diploma	803	15.9	335	14.2
High school diploma	1,100	24.8	366	18.5
Some college	1,069	23.7	314	15.5
Completed college	1,433	35.7	948	51.8
Insurance status				
Medicaid	2,700	54.9	829	35.8
Non-Medicaid	1,733	45.1	1,144	64.2
Married				
No	1,933	41.9	484	23.7
Yes	1,890	58.1	1,097	76.3
Smoking during last 3 months of pregnancy				
No	3,944	89.1	1,862	96.9
Yes	475	10.9	71	3.1
Alcohol during last 3 months of pregnancy				
No	4,073	90.8	1,791	90.9
Yes	341	9.2	133	9.1
Parity				
Primipara	1,915	43.3	797	40.3
Multipara	2,490	56.7	1,161	59.7
Plurality				
Single	4,361	98.6	1,939	98.1

Twin	79	1.4	36	1.9
<i>Gestational age at delivery</i>				
Preterm (< 37 weeks)	384	7.4	141	6.2
Term (≥ 37 weeks)	4,044	92.6	1,824	93.8
<i>Mode of delivery</i>				
Vaginal birth	2,899	67.2	1,316	68.5
C-section	1,346	28.6	572	27.6
Forceps or vacuum	195	4.2	87	3.9
<i>Adequacy of prenatal care*</i>				
Inadequate	488	13.6	165	9.2
Intermediate	478	15.7	253	17.7
Adequate	1,346	45.4	677	48.3
Adequate+	750	25.3	343	24.9
<i>Weight gain during pregnancy**</i>				
<Recommended	1,012	22.3	413	18.0
Recommended	1,197	28.4	642	36.1
>Recommended	1,933	49.3	776	45.9
<i>Social support[‡]</i>				
None	292	5.8	233	8.5
Any	4,148	94.2	1,742	91.5
<i>Levels of social support[±]</i>				
Low	503	9.9	286	10.5
Medium	959	17.8	315	11.7
High	2,978	72.3	1,374	77.9

*Adequacy of prenatal care is coded based on the Kotelchuck Adequacy of Prenatal Care Utilization (APNCU) Index [29].

**Weight gain during pregnancy is calculated based on the 2013 Institute of Medicine guidelines for weight gain that is based on pre-pregnancy BMI [30].

[‡] Perceived availability of social support as reported by women participating in WA PRAMS (2009-13).

[±] Categorized as low (0-1 type), medium (2-3 types), high (all 4 types) levels of perceived availability of social support.

Table 2: Frequency of Stressful Life Event (SLE) Type among Mothers with Any SLE using WA-PRAMS Data (2009-13).

	Total (N = 4,440) N (%)[*]
<i>SLE type</i>	
<i>Partner-related</i>	1,786 (40.2)
Argued with partner more than usual	1,417 (31.9)
Partner did not want pregnancy	441 (9.9)
Separation/divorce	536 (12.0)
<i>Traumatic</i>	1,148 (25.8)
Homeless	354 (8.0)
Partner/woman went to jail	309 (7.0)
Someone close had alcohol/drug problem	842 (19.0)
<i>Financial</i>	3,354 (75.5)
Partner lost job	833 (18.8)
Woman lost job	647 (14.6)
Could not pay my bills	1,395 (31.4)
Moved to new address	2,310 (52.0)
<i>Emotional</i>	1,736 (39.1)
Close family member very sick	1,293 (29.1)
Someone close to the woman died	1,011 (22.8)

^{*}% is calculated as a proportion of 4,440 women with any SLE.

Table 3: Association between Any Stressful Life Event (SLE) and Postpartum Depressive Symptoms (PDS) Overall and by Perceived Availability of Social Support in WA-PRAMS (2009-13) Mothers (N = 6,415).

	Any SLE (N = 4,440) N (Weighted %)	No SLE (N = 1,975) N (Weighted %)	Adjusted RR[‡] (95% CI)
<i>Overall</i> <i>N = 6,415</i>			
No PDS	3,416 (77.7)	1,735 (87.4)	1.0
PDS present	1024 (22.3)	240 (12.6)	1.7 (1.4, 2.0)
<i>Social support[‡]</i>			
<i>None</i> <i>N = 525</i>			
No PDS	231 (79.8)	207 (88.3)	1.0
PDS present	61 (20.2)	26 (11.7)	1.7 (1.0, 3.1)
<i>Any</i> <i>N = 5,890</i>			
No PDS	3,185 (77.5)	1,528 (87.3)	1.0
PDS present	963 (22.5)	214 (12.7)	1.7 (1.4, 2.0)
<i>Levels of social support[‡]</i>			
<i>High (all 4 types)</i> <i>(N=4,352)</i>			
No PDS	2,364 (79.7)	1,206 (87.5)	1.0
PDS present	614 (20.3)	168 (12.5)	1.5 (1.3, 1.9)
<i>Medium (2-3 types)</i> <i>(N=1,274)</i>			
No PDS	674 (69.6)	278 (85.7)	1.0
PDS present	285 (30.4)	37 (14.3)	1.9 (1.3, 2.9)
<i>Low (0-1 type)</i> <i>(N=789)</i>			
No PDS	378 (76.5)	251 (87.7)	1.0
PDS present	125 (23.5)	35 (12.3)	1.8 (1.2, 2.9)

[‡]Models adjusted for maternal age, race, education and insurance status.

[‡] Perceived availability of social support as reported by women participating in WA PRAMS (2009-13).

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Table 4: Association between Any Stressful Life Event (SLE) and Postpartum Depressive Symptoms (PDS) Overall and by Perceived Availability of Social Support using Phase 6 WA-PRAMS (2009-11) Mothers only (N = 4,327).

	Any SLE (N = 2,955) N (Weighted %)	No SLE (N = 1,372) N (Weighted %)	Adjusted RR[‡] (95 % CI)
<i>Overall</i> <i>N = 4,327</i>			
No PDS	2,138 (70.8)	1,174 (83.3)	1.0
PDS present	817 (29.2)	198 (16.7)	1.7 (1.4, 2.1)
<i>Social support[‡]</i>			
<i>None</i> <i>N = 292</i>			
No PDS	124 (78.9)	118 (87.6)	1.0
PDS present	34 (21.1)	16 (12.4)	1.8 (0.9, 3.7)
<i>Any</i> <i>N = 4,035</i>			
No PDS	2,014 (70.5)	1,056 (83.0)	1.0
PDS present	783 (29.5)	182 (17.0)	1.7 (1.4, 2.1)
<i>Levels of social support[‡]</i>			
<i>High (all 4 types)</i> <i>N = 2,959</i>			
No PDS	1,475 (72.6)	822 (82.8)	1.0
PDS present	512 (27.4)	150 (17.2)	1.6 (1.3, 1.9)
<i>Medium (2-3 types)</i> <i>N = 897</i>			
No PDS	446 (62.4)	197 (83.8)	1.0
PDS present	228 (37.6)	26 (16.2)	2.2 (1.4, 3.5)
<i>Low (0-1 type)</i> <i>N = 471</i>			
No PDS	217 (75.4)	155 (87.4)	1.0
PDS present	77 (24.6)	22 (12.6)	1.9 (1.1, 3.5)

[‡]Models adjusted for maternal age, race, education and insurance status.

[‡]Perceived availability of social support as reported by women participating in WA PRAMS (2009-13).

Table 5: Association between Any Stressful Life Event (SLE) and Postpartum Depressive Symptoms (PDS) Overall and by Perceived Availability of Social Support using Phase 7 WA-PRAMS (2012-13) Mothers only (N = 2,088).

	Any SLE (N = 1,414) N (Weighted %)	No SLE (N = 674) N (Weighted %)	Adjusted RR[‡] (95 % CI)
<i>Overall</i> <i>N = 2,088</i>			
No PDS	1,219 (87.9)	620 (93.2)	1.0
PDS present	195 (12.1)	54 (6.8)	1.5 (1.0, 2.2)
<i>Social support[‡]</i>			
<i>None</i> <i>N = 233</i>			
No PDS	104 (80.4)	92 (88.6)	1.0
PDS present	25 (19.6)	12 (11.4)	1.8 (0.7, 4.2)
<i>Any</i> <i>N = 1,855</i>			
No PDS	1,115 (88.6)	528 (93.8)	1.0
PDS present	170 (11.4)	42 (6.2)	1.5 (1.0, 2.3)
<i>Levels of social support[‡]</i>			
<i>High (all 4 types)</i> <i>N = 1,393</i>			
No PDS	842 (90.5)	431 (95.0)	1.0
PDS present	94 (9.5)	26 (5.0)	1.6 (0.9, 2.6)
<i>Medium (2-3 types)</i> <i>N = 377</i>			
No PDS	221 (84.5)	88 (86.8)	1.0
PDS present	55 (15.5)	13 (13.2)	1.0 (0.5, 2.0)
<i>Low (0-1 type)</i> <i>N = 318</i>			
No PDS	156 (77.5)	101 (88.0)	1.0
PDS present	46 (22.5)	15 (12.0)	1.8 (0.9, 3.7)

[‡]Models adjusted for maternal age, race, education and insurance status.

[‡] Perceived availability of social support as reported by women participating in WA PRAMS (2009-13).