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Factors Associated with Clinically Significant Insomnia Among Pregnant Low-Income Latinas

Rachel Manber,[1] PhD, Dana Steidtmann, PhD,[1] Andrea S. Chambers,[1] PhD, William Ganger, MA,[2,3] Sarah Horwitz, PhD,[1,4] and Cynthia D. Connelly, PhD[2,5]

Abstract

Background: Poor sleep, common during pregnancy, is associated with negative health risks. The study aimed to identify predictors of clinically significant insomnia among pregnant Latinas.
Methods: A total of 1289 pregnant Latinas recruited from obstetric clinics completed the Insomnia Severity Index (ISI) and questions about demographics and sleep.
Results: Clinically significant insomnia (ISI ≥ 10) was present among 17% of participants. Significant correlates of clinically significant insomnia were higher scores on the Edinburgh Postnatal Depression Scale (EPDS) after removing the sleep item (47% of women with EPDS ≥ 9 and 9% with EPDS < 9), completing measures in English (rather than Spanish: 26% versus 13%), and income but not pregnancy week, age, highest education level, or marital status. The highest percentage of clinically significant insomnia (59%) was experienced by women with EPDS ≥ 9 who completed measures in English. The lowest percentage of clinically significant insomnia (6.2%) was experienced by women with EPDS < 9 who completed measures in Spanish.
Conclusions: In this sample of low-income, mostly Spanish-speaking pregnant Latinas, rates of clinically significant insomnia appear to be higher than rates among nonpregnant Latinas. Rates of clinically significant insomnia are particularly high among Latinas with elevated depressive symptom severity, a known risk for insomnia. Acculturation, as indicated by completing measures in English, may be another risk specific to Latinas, possibly owing to loss of some ethnicity-specific protective factors (e.g., social support, strong family ties, and group identity). It will be important to directly test this explanation in future research.

Introduction

Poor sleep, common during pregnancy, is associated with a number of potential negative health risks, such as increased circulating levels of inflammatory markers[1,2] and adverse pregnancy outcomes (e.g., intrauterine growth restriction, preterm delivery, prolonged labor, and cesarean deliveries).[3–16] A recent survey of 214 pregnant women concluded that sleep duration may also impact maternal mental health during pregnancy. The study reports that, after controlling for maternal age, body mass index (BMI), and income level, a 1-hour increase in sleep per 24 hours reduced the likelihood of having ≥10 days of poor mental health by 29%.[17] During the third trimester of pregnancy, insufficient and poor sleep may place women at increased risk for prolonged labor and cesarean deliveries (odds ratio [OR] = 4.5 for insufficient sleep and 5.2 for disturbed sleep)[14,15] and for having an infant small for gestational age (OR: 1.75).[16] Poor and insufficient sleep during pregnancy also places women at risk for depression later in pregnancy[18] and during the postpartum period.[19–23]

For most women, the disruptions to sleep continuity are caused by pregnancy factors (e.g., frequent need for urination).[24] However, between 29% and 46% of pregnant women attribute sleeplessness to factors that are not pregnancy specific, such as "thoughts,"[25] which likely refers to the experience of being unable to shut off their thoughts and fall asleep, common in insomnia.[26,27] For some women, difficulties initiating sleep are unrelated to physical pregnancy factors, and/or they experience difficulties returning to sleep after a trip to the bathroom.[28] Whereas poor sleep during pregnancy is common, associated distress is much less common. For example, in one study, 97% of the women stated that they had middle-of-the-night awakenings by the end of pregnancy, but

[1]Stanford University, Stanford, California.
[2]Child and Adolescent Research Center at Rady Children's Hospital, San Diego, California.
[3]San Diego State University, San Diego, California.
[4]New York University, New York, New York.
[5]University of San Diego, Hahn School of Nursing and Health Sciences, San Diego, California.

less than a third considered the sleep disruption to be a problem.[25] Therefore, it is likely that fewer women meet criteria for an insomnia disorder diagnosis, which requires that nocturnal sleep disturbances be associated with clinically significant distress or impairment of performance and other aspects of functioning.

Little is known about the sleep of Latinas in the United States, and even less is known about insomnia among pregnant Latinas. In fact, we are not aware of any research on insomnia and its correlates among pregnant Latinas, despite the fact that the birth rate among Latinas is approximately 50% higher than among women from other major ethnic groups in the United States.[29] Therefore, the aim of the present study was to assess clinically significant insomnia and its associated demographic and clinical characteristics among pregnant Latinas. Using established cutoffs for the Insomnia Severity Index (ISI)[30] to define clinically significant insomnia, we examined factors that have been previously identified as associated with poor sleep or insomnia disorder in the general population. These factors include depressive symptom severity,[31,32] income and education levels,[33–37] marital status, and language, an index of acculturation.[38] Acculturation has been previously related to sleep duration and complaints among Hispanics.[39–41] We also included pregnancy week as a potential correlate because a consistent body of literature documents increases in sleep complaints during the third trimester.[25,42–44] We have tested the hypotheses that each of these variables will predict clinically significant insomnia among pregnant Latinas and explored potential interactions using receiver operator characteristic (ROC) analysis.

Materials and Methods

The analytical sample was taken from a cross-sectional survey of women receiving perinatal services in 10 community obstetric/gynecologic clinics serving the greater San Diego, California, area. Recruited from August 2009 through January 2012, the participants were referred by clinic staff to bilingual, bicultural research assistants who described the study while the women were waiting to see the healthcare provider. Of the 1992 women approached, 1626 (81%) agreed to participate in the study. Of those who participated, 1289 endorsed Latina ethnicity and were included in the current analysis.

Participants

Exclusion criteria were being a surrogate mother and inability to provide informed consent. Minors who were receiving reproductive health services were considered to be emancipated and thus able to provide legal consent to participate. Participants provided written informed consent and subsequently completed study measures in either English or Spanish (participant's preference). In order to allow inclusion of participants of all levels of literacy, items were read verbatim and responses were recorded by the research assistants. Of the 1992 women referred by the clinic staff, 274 declined participation, 47 were unavailable to initiate and/or complete the measures during the healthcare visit (e.g., healthcare provider ready to see woman, busy with children, or parking about to expire), 37 were not eligible, and 8 had missing data. Of the remaining 1626 women, 298 were non-Latina, and 39 were not pregnant (postpartum) and were therefore not included in the current analyses. Thus, the final sample consisted of 1289 pregnant Latinas. All procedures were approved by the appropriate clinic and university Institutional Review Board for the Protection of Human Subjects.

Measures

The seven-item ISI[45] is a self-administered questionnaire on which participants rate current (past 2 weeks) severity of difficulties falling asleep, staying asleep, waking up too early, level of satisfaction with sleeping patterns, the extent to which sleeping patterns are interfering with daily functioning, how noticeable to others sleep problems are in terms of impairing quality of life, and the degree of worry or distress about sleeping patterns. Each item is rated from 0 to 4, with higher scores reflecting greater disturbance, and a total score is derived as the sum of the seven items. Spanish translation of the ISI was performed by bilingual/bicultural research team members. Translation-back translation procedure was used to achieve translation equivalence (translation process should be appropriate), linguistic equivalence (each item retains same meaning), conceptual equivalence (instrument measures the same concept in different cultures), and measurement equivalence (similar scores on the instrument mean the same thing).[46] The Spanish and English versions had an equivalent reading level and were pretested prior to administration. Morin *et al.*[30] recommended that a cutoff score of 10 and above be used in community-based samples to ascertain probable diagnosis of insomnia disorder; they reported that the cutoff of 10 and above yielded 86% sensitivity and 88% specificity for detecting insomnia disorder as determined by other self-report measures and a structured interview.[30]

The Edinburgh Postpartum Depression Scale (EPDS)[47] is a 10-item self-report scale assessing depressive symptoms. It was developed for assessing postpartum depression but has been validated for assessing depressive symptom severity during pregnancy[48] and across multiple community, cultural, and ethnically diverse populations.[49–51] Spanish versions have been validated[52,53] and used to identify the prevalence of depression among pregnant[53,54] and postpartum Latinas living in the United States.[55,56] The EPDS does not include items related to physical symptoms of depression that may be affected by the perinatal period rather than by mood. It is not a diagnostic tool but a screening tool that asks about depressive symptoms in the past 7 days. Scores range from 0 to 30, with a higher score representing greater depressive symptom severity. Because poor sleep is a symptom of depression, a modified total EPDS score was calculated that included all EPDS items except the insomnia item (scores range from 0 to 27). In this sample, Cronbach's alpha was 0.84 for the full scale and 0.82 for the modified scale.

Analysis

Continuous descriptive characteristics of the sample were compared using *t*-tests and one-way analysis of variance (ANOVA) for parametric comparisons, along with Mann-Whitney and Kruskal-Wallis tests for nonparametric comparisons. Chi-square tests were used to compare categorical descriptive variables. Logistic regression was used to evaluate predictors of clinically significant insomnia based on ISI score. Clinically significant insomnia status was the outcome variable, which by definition was dichotomous. Pregnancy week,

language of measure completion (English versus Spanish), household income, modified total score on the EPDS, marital status (married or living together versus other), age, and educational level were entered simultaneously as predictors.

In the absence of *a priori* hypotheses about interactions among these variables,[57] ROC analysis[58] using the ROC4 program (available at http://www.stanford.edu/~yesavage/ROC.html) was used to explore potential cutoffs and interactions among predictors. For each predictor variable, the ROC4 program identifies a cut point that optimally predicts the outcome of interest (i.e., clinically significant insomnia). Once the best predictor and optimum cut point are identified, the group with the success criterion is tested against a stopping rule (cut point significance set at $p < 0.01$ level). If the group fails the stopping rule, no further action is taken. If the group passes the rule, the sample is divided into two subgroups on the basis of the predictor variable. The analyses are then restarted for each of the two subgroups in an iterative process until the stopping rule is encountered (either a subgroup has fewer than 10 participants or the optimal test is not statistically significant at the 0.01 level).

The ROC approach is exploratory and was selected because earlier literature does not enable specific predictions regarding interaction of predictor variables. Thus, ROC enabled examination of a large number of possible interactions between variables and was used to identify interactions that most optimally distinguish those with clinically significant insomnia. Subgroups identified in ROC analyses were compared using chi-square tests for categorical variables and one-way ANOVA for continuous variables.

Results

Sample characteristics

Of the 1289 pregnant Latinas, 217 (16.8%) women met criteria for clinically significant insomnia based on an ISI score of 10 or above. Descriptive characteristics of the sample overall and by clinically significant insomnia status appear in Table 1. The sample included 386 women in the first trimester (weeks 1–12), 492 women in the second trimester (weeks 13–26), and 411 women in the third trimester of pregnancy (weeks ≥27). ISI descriptive data by trimester appear in Table 2.

Correlates of clinically significant insomnia

Logistic regression analysis showed that depressive symptom level, language in which measures were completed, pregnancy week, marital status, age, household income, and

Table 1. Descriptive Characteristics of the Sample

	Clinically significant insomnia n=*217*	*No clinically significant insomnia* n=*1072*	χ^2, t, *or* z-*value*	*Overall sample* n=*1289*
Age in years *M(SD)*	27.2 (6.9)	26.4 (6.7)	1.5	26.5 (6.7)
Total ISI score *M(SD)*	13.8 (3.5)	2.5 (2.6)	44.5***	4.4 (5.1)
Highest level of education %			12.8*	
Less than 6th grade	3.2	7.9		7.1
6th–12th grade	39.6	42.3		41.8
High school or GED diploma	24.4	26.1		25.8
Some college or trade school	21.7	14.6		15.8
2-year college degree	4.6	4.3		4.3
4-year college degree or higher	6.5	4.8		5.0
Married/living with partner %	30.9	38.3	4.31*	37.1
Employment status %			1.82	
Working full-time	8.3	11.1		10.6
Working part-time	14.7	15.8		15.6
Not currently working	77.0	73.1		73.8
Yearly household income %			2.94	
Less than $14,999	52.1	42.7		58.6
$15,000–$29,999	21.7	24.2		31.4
$30,000–$54,999	6.0	5.4		7.3
$55,000–$99,999	1.4	1.3		1.7
$100,000+	.5	.7		.9
Missing/don't know	18.4	25.7		24.4
Pregnancy week, *M(SD)*	21.5 (10.6)	20.9 (10.0)	.72	21.0 (10.1)
Lived in United States all of life %	53.5	37.0	20.3***	39.8
Completed measures in English %	44.2	25.0	33.0***	28.2
EPDS total score *M(SD)*	10.4 (5.6)	4.2 (4.2)	15.7***	5.3 (5.0)
EPDS total score median	10.0	3.0	14.9***	4.0
EPDS modified total score[a] *M(SD)*	9.2 (4.8)	3.9 (3.8)	17.7***	4.8 (4.4)
EPDS modified total score[a] median	9.0	3.0	14.4***	4.0

[a]Total of all items, excluding insomnia item.

*$p < 0.05$; ***$p < 0.001$.

EPDS, Edinburgh Postpartum Depression Scale; GED, General Educational Development; ISI, Insomnia Severity Index; *M(SD)*, mean (standard deviation).

Table 2. Mean ISI Scores in Pregnant Latina Women

	First trimester 1–12 weeks n = *386*	*Second trimester 13–26 weeks* n = *492*	*Third trimester 27+ weeks* n = *411*	χ^2 *or* F-*value*	*Overall*
Total ISI, *M(SD)*	4.52 (5.44)	3.84 (4.75)	5.00 (5.00)	6.05***	4.41 (5.07)
Total ISI, median	2.0	2.0	3.0	19.54***	3.0
Difficulty falling asleep *M(SD)*	.72 (1.05)	.61 (.93)	.96 (1.09)	13.58***	.75 (1.03)
Difficulty staying asleep *M(SD)*	.62 (.97)	.54 (.91)	.75 (.96)	5.57***	.63 (.95)
Early awakening *M(SD)*	.62 (1.05)	.49 (.90)	.55 (.92)	1.87	.55 (.96)

***$p < 0.001$.

educational level explained 32% of the variance in clinically significant insomnia status based on Nagelkerke R2. The model correctly classified 96% of those without clinically significant insomnia and 30% of those with clinically significant insomnia. Significant predictors of clinically significant insomnia were higher modified EPDS total scores (excluding the insomnia item), completing the measures in English, and household income. Results of the logistic regression appear in Table 3; rates of clinically significant insomnia by categories for each of the significant predictors appear in Table 4.

Potential interactions among predictor variables

ROC analysis identified modified EPDS score as the best predictor variable of probable insomnia and identified a cut point of greater than or equal to 9 ($\chi^2 = 217.1$, $p < 0.001$, Cohen's kappa = 0.41) for optimally predicting clinically significant insomnia. This modified EPDS score cut point was 58% sensitive and 86% specific in identifying those with clinically significant insomnia. Among the 270 participants with high depression (i.e., modified EPDS > 9), 126 (46.7%) had clinically significant insomnia. Among the 1019 participants with low depression (i.e., modified EPDS < 9), 91 (9.0%) had clinically significant insomnia. Depression score was a robust predictor of clinically significant insomnia and was again identified as the secondary predictor for high- and low-depression groups. Because this finding obscured the ability to examine interactions as originally intended, we conducted separate ROC analyses for the subgroups with modified EPDS > 9 and < 9, excluding modified EDPS as a predictor variable. The language in which measures were completed (English versus Spanish) emerged as a secondary predictor. Among those with high depressive symptom severity (modified EPDS > 9), 51 of 86 (59.3%) who completed the measures in English met criteria for clinically significant insomnia compared to 75 of 184 (40.8%) who completed the measures in Spanish ($\chi^2 = 8.09$, $p < 0.01$, Cohen's kappa = 0.17). Among those with low depressive symptom severity (modified EPDS ≤ 9), 45 of 278 (16.2%) who completed the measures in English met criteria for clinically significant insomnia compared to 46 of 741 (6.2%) who completed the measures in Spanish, $\chi^2 = 24.8$, $p < 0.001$, Cohen's kappa = 0.14. Descriptive characteristics of the four subgroups identified in the ROC analyses appear in Table 5.

Table 3. Logistic Regression Model for Predicting Clinically Significant Insomnia

						95% CI for OR	
	β	*SE*	*df*	p-*value*	*OR*	*Lower*	*Upper*
Pregnancy week	.02	.01	1	.09	1.02	1.00	1.05
Completed measures in English	.96	.19	1	.001	2.61	1.80	3.79
Income	−.11	.05	1	.02	.89	.82	.98
Modified EPDS score	.26	.02	1	.001	1.30	1.25	1.35
Married or living together	−.17	.19	1	.38	.84	.58	1.23
Age	.02	.01	1	.09	1.02	1.00	1.05
Educational level	.13	.07	1	.06	1.14	.99	1.31

CI, confidence interval; df, degrees of freedom; OR, odds ratio; SE, standard error.

Discussion

The present study found that 17% of the participants met the ISI-based criterion for clinically significant insomnia. Significant predictors of clinically significant insomnia were greater severity of depression, completing measures in English rather than Spanish, and income. Pregnancy week and marital status were not significant predictors. The ROC analysis revealed that in this sample of low-income pregnant Latinas, most of whom chose to complete measures in Spanish, the highest percentage of probable insomnia (59%) was experienced by women with modified EPDS scores of 9 or above who completed the measures in English (51 of 86); the

Table 4. Rate of Clinically Significant Insomnia by Predictor Categories

	Total n *in category*	*Prevalence of clinically significant insomnia %*	*ISI score Mean (SD)*
Income			
Less than $14,999	571	19.8	4.5 (5.3)
$15,000–$29,999	306	15.4	4.5 (5.3)
$30,000–$54,999	71	18.3	4.5 (4.6)
$55,000–$99,999	17	17.6	3.8 (4.0)
$100,000+	9	11.1	4.7 (3.7)
Missing/don't know	315	12.7	4.1 (4.5)
Language			
English	364	96 (26.4%)	5.8 (5.6)
Spanish	925	121 (13.1%)	3.9 (4.7)
EPDS total score[a]			
<9	1019	91 (8.9%)	3.1 (4.0)
≥9	270	126 (46.7%)	9.2 (5.8)

[a]Categories presented based on median modified EPDS score in this sample.

Table 5. Descriptive Characteristics of Subgroups Identified in ROC Analysis

	High depression (modified EPDS ≥ 9)		*Low depression (modified EPDS < 9)*		
	Measures in English n = *86*	*Measures in Spanish* n = *184*	*Measures in English* n = *278*	*Measures in Spanish* n = *741*	χ^2 *or* F-*value*[a]
Age in years *M(SD)*	26.0 (6.3)	27.2 (6.8)	23.7 (5.9)	27.5 (6.7)	23.6***
Total ISI score *M(SD)*	10.6 (5.2)	8.6 (6.0)	4.3 (4.8)	2.7 (3.5)	151.8***
Highest level of education %					102.6***
Less than 6th grade	2.3	10.3	0	9.6	
6th–2th grade	30.2	45.7	33.8	45.2	
High school or GED diploma	25.6	25.5	25.2	26.2	
Some college or trade school	27.9	12.0	28.4	10.7	
2-year college degree	5.8	2.2	4.7	4.6	
4-year college degree or higher	8.1	4.3	7.9	3.8	
Married/living with partner %	30.2	30.4	29.1	42.5	22.1***
Employment status					2.7
Working full-time	12.8	9.2	10.4	10.8	
Working part-time	14.0	14.1	14.0	16.7	
Not currently working	73.3	76.6	75.5	72.5	
Yearly household income					66.8***
Less than $14,999	41.9	51.1	37.1	45.6	
$15,00–$29,999	20.9	17.9	26.6	24.4	
$30,000–$54,999	4.7	6.0	5.8	5.4	
$55,000–$99,999	3.5	0	5.0	0	
$100,000 +	1.2	0	2.2	.3	
Missing/don't know	27.9	25.0	23.4	24.3	
Pregnancy week *M(SD)*	20.9 (10.0)	19.7 (9.7)	20.9 (10.8)	21.4 (9.9)	1.4
Modified EPDS score *M(SD)*	12.1 (3.2)	11.8 (2.7)	3.0 (2.5)	2.9 (2.5)	865.8***

[a]χ^2 and *F*-values reflect analyses comparing all four subgroups.
***$p < 0.001$.

lowest percentage of probable insomnia (6.2%) was experienced by women with modified EPDS scores below 9 who completed the measures in Spanish (46 of 741).

The prevalence of clinically significant insomnia among pregnant women with modified EPDS scores 9 or above in our study was 47% but only 9% among women with modified EPDS scores < 9. The observed rate of clinically significant insomnia in the presence of a high level of depressive symptom severity (46.7%) is comparable to that reported by Swanson *et al.,*[59] who found that 45% of pregnant women in a university-affiliated outpatient psychiatry clinic had clinically significant insomnia, which the researchers defined as ISI scores above 14. At the same time, the observed rate of clinically significant insomnia among pregnant women with low depression scores (8%) in our study was similar to rates observed in the general population.[60] This suggests that, although complaints of sleep disruptions increase during pregnancy compared to pre-pregnancy, the rate of insomnia disorder during pregnancy does not increase. Insomnia may be important to treat during pregnancy because, even after controlling for current depressive symptom severity, it is a significant and consistent risk for a future depressive episode.[61]

Choosing to complete the measures in Spanish was associated with reduced risk for clinically significant insomnia, particularly among those with elevated depression scores. The choice to complete measures in Spanish may be an index of acculturation, as language items explain most of the variance of acculturation scales.[38] We found only two studies that are directly related to the issue of the relationship between acculturation and poor sleep or insomnia.[62] Similar to our study, one study found that higher acculturation and higher depressive symptom severity were associated with poorer sleep among young (21- to 40-year-old) Latina of Mexican origin.[63] The second study found lower rates of clinically significant insomnia among Mexican American ninth-grade students born in Mexico than among Mexican American students who were born in the United States (8% versus 14%).[62] Ours and these two studies are consistent with the "Hispanic health paradox,"[64,65] which refers to the fact that first-generation Latinos in the United States tend to have equal or better health outcomes than U.S.-born Hispanics and non-Hispanic whites, despite lower incomes, insufficient healthcare access, and fewer education and employment opportunities.[66,67]

Generational effect also has been found among pregnant Latinas.[68] This effect includes increases in depression, anxiety, and perceived stress, all of which are associated with disturbed sleep. Several factors have been offered to explain the observed increase in poor physical and mental health with increased acculturation in Hispanic communities in the United States. Most relevant to insomnia are increases in alcohol[69,70] and tobacco use,[71,72] physiological adaptation to stress,[68] and the distress associated with sociocultural changes.[73–75] Cultural factors, including social support, strong family ties, and group identity,[64,76] may be protective, countering the potentially detrimental effects of low socioeconomic attainment and minority status.[77] However, acculturation is probably only one of many factors relevant to the sleep health of Hispanics living in the United States.[40] For example, Heilemann *et al.* found that personal factors, such as mastery and resilience,[78] protect Latinas from poor mental health.

Very little sleep research has been done in Latinas in the United States,[40] which makes it difficult to compare the observed estimate of clinically significant insomnia in pregnant Latinas to that of Latinas in general or to pregnant non-Latinas. Further complicating such comparisons are a multitude of definitions of clinically significant insomnia. Most relevant to the present study are four studies that, in addition to sleep difficulties, also assessed some indices of distress or impairment (the perception that sleep is insufficient[41] or endorsement of at least one symptom of daytime functional impairment[79–81]). Two of these studies[79,80] focused only on Hispanic adults. However, one was conducted in Spain,[79] which is less relevant to our study of a Latina sample drawn from a metropolitan area bordering Mexico. The second study[80] used the National Institute of Heart Lung and Blood definition of insomnia (difficulty initiating or maintaining sleep or nonrestorative sleep combined with at least one functional impairment) and found that Mexican-born immigrants to the United States had a decreased likelihood of insomnia when compared with non-Mexican-born Latino immigrants (OR = 0.4, 95% confidence interval [CI]: [0.2–0.7]). These researchers found that among 853 nonpregnant women, the proportion of women with clinically significant insomnia experienced more than 15 nights a month was 6% among Mexican-born Latina immigrants and 14% among non-Mexican-born Latina immigrants. Because our sample was drawn from San Diego, a California city that borders Mexico, and 60% were not born in the United States, it is likely that the majority of our sample was of Mexican origin. It appears that the prevalence of clinically significant insomnia among pregnant Latinas, which in our study was 17%, may be higher than among the nonpregnant population of Mexican-born female immigrants (6%). Because past research found reduced risk of insomnia symptoms (poor sleep) among Hispanic/Latina women compared to non-Hispanic/Latina women,[41] it is possible that the prevalence of clinically significant insomnia is even higher than 17% among non-Latina pregnant women. However, these assertions will need to be tested in future research by directly comparing the prevalence of insomnia among pregnant Latinas to nonpregnant Latinas and to pregnant non-Latinas.

To the best of our knowledge, the present study is the first to evaluate clinically significant insomnia and its correlates among pregnant Latinas. Because the sample consisted primarily of low-income Spanish-speaking women, results may not generalize to pregnant Latinas from other socioeconomic strata or to pregnant non-Latinas. Because we have no information about the 321 women who refused participation or were otherwise not available to provide data, we are unable to estimate the potential for sample bias. In addition, because only a quarter of our sample was English speaking, generalizability to English-speaking Latinas may be limited. Further limitations are the absence of a clinical diagnostic interview to diagnose insomnia disorder and depression and the fact that our estimation of clinically significant insomnia was based on the ISI, which has been validated in the general population but not, to the best of our knowledge, in a pregnant sample. General-population-based ISI cutoffs might be too sensitive, identifying possible insomnia in women with sleep disruption who do not have clinical insomnia. In interpreting the results, it should be noted that we did not have data on parity and comorbid sleep disorders, such as sleep apnea or its correlates, such as BMI and restless legs syndrome, that increase in frequency during pregnancy[82,83] and may contribute to insomnia.

Completion of measures verbally allowed for inclusion of participants regardless of literacy level. However, it is possible that it may have also increased socially desirable response bias relative to a paper-and-pencil method. Although this method was used with all participants and with all measures, it is possible that, among other factors, Spanish- and English-speaking women may exhibit bias differently when reporting on paper versus verbally. Therefore, the possibility that the results will not generalize to settings in which depression and insomnia are assessed in writing cannot be ruled out. On the other hand, the standard assessment of insomnia and depression in clinical settings is typically verbal. Finally, we note that we used only a proxy measure of the complex construct of acculturation; language is but one aspect of acculturation.

Conclusions

Insomnia rates during pregnancy among Latinas are considerable and may be even higher among non-Latina pregnant women.[41] Rates are particularly high among women with elevated depressive symptom severity. The possibility that acculturation may uniquely contribute to insomnia among Latina women with elevated depressive symptom severity deserves further study. Specifically, future research could determine the unique effects of acculturation, separate from depressive symptom severity; identify specific acculturation factors that may need to be targeted in treatment; and examine the impact of parity on insomnia during pregnancy.

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Address correspondence to:
Rachel Manber, PhD
Stanford University School of Medicine
Department of Psychiatry and Behavioral Sciences
401 Quarry Road
Stanford, CA 94301-5597

E-mail: rmanber@stanford.edu