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Pregnant Patient Perceptions of Provider Detection and Treatment of Insomnia

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Abstract

Objective: To survey patients about whether their prenatal care providers assessed insomnia, the types of treatment recommendations providers made, and the types of treatments patients utilized.

Participants: Participants were 423 English-speaking pregnant women.

Methods: In this cross-sectional study, participants self-reported insomnia symptoms on the Insomnia Severity Index and indicated whether they discussed their sleep with a health care provider, whether they received any recommendations to improve their sleep, and whether they utilized any interventions or aids to improve their sleep during their current pregnancy.

Results: Approximately one-third (39%) of participants reported that they discussed their sleep with a health care provider at some point during their pregnancy. Among participants who reported moderate to severe insomnia symptoms (Insomnia Severity Index > 14), 57% reported that they had discussed their sleep with a health care provider, and only 28% reported receiving an insomnia diagnosis. Over-the-counter medication was the most commonly recommended (53%) and utilized (39%) sleep intervention among women with moderate to severe insomnia symptoms.

Conclusions: According to patient report, insomnia may be under-detected during pregnancy. When insomnia is recognized, treatment recommendations do not match clinical practice guidelines or women's preferences for receiving cognitive behavior therapy for insomnia. Taken together with previous research on the prevalence and consequences of prenatal insomnia, these findings suggest the need for an increased focus on the importance of sleep during pregnancy.

Keywords

pregnancy; insomnia; sleep; treatment recommendations; treatment utilization

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Disclosure statement

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Introduction

Many pregnant women experience poor sleep quality, often due to pregnancy-related symptoms such as nocturia or physical discomfort (Mindell, Cook, & Nikolovski, 2015). However, a significant proportion of pregnant women report more severe sleep problems, such as insomnia (Dorheim, Bjorvatn, & Eberhard-Gran, 2012). Insomnia represents a severe, distressing, and impairing presentation of sleep disturbance, and is defined as a persistent difficulty falling or staying asleep, or waking earlier than intended. Approximately one in seven pregnant women experience elevated insomnia severity (Mindell et al., 2015) and it is associated with adverse maternal-fetal health outcomes, such as preterm birth (Felder, Baer, Rand, Jelliffe-Pawlowski, & Prather, 2017).

Despite the prevalence and consequences of insomnia, there is a paucity of research examining whether health care providers assess insomnia symptoms during pregnancy, and how they treat clinically significant symptoms. It is possible that insomnia is under-detected and under-treated due to beliefs that it is a normal and harmless symptom of pregnancy. In this descriptive study, we recruited pregnant participants to examine the following questions: Did you discuss your sleep with a health care provider? What recommendations did your provider make to improve sleep? What treatments did you utilize to improve sleep? Additionally, although this is a descriptive study, we explored whether responses varied by insomnia symptom severity.

Materials and methods

Participants and procedures

Participants were recruited via online advertisements placed on ResearchMatch, Craigslist, NextDoor, and a large university listserv. Additionally, pregnant women who participated in the screening process for a separate study evaluating a digital intervention for insomnia and who consented to being contacted for other research studies were invited to participate. To be eligible to participate, women had to be pregnant and fluent in English. A total of 423 pregnant women participated. Detailed participant characteristics are presented in Table 1. On average, participants were in their early thirties, and the majority were Caucasian, White, or European American. It was a highly educated sample: nearly half had completed professional or graduate school. The majority were married or living with a partner, and approximately half reported a yearly household income of \$100,000 or more. Participants were from 41 different states in the United States of America, and over one-quarter were from California (n=118, 28%). One participant was from Puerto Rico and three were from an unknown location. On average, participants were in the second trimester of pregnancy, and about half were primiparous. After consenting to participate, participants completed a brief online survey using the Qualtrics platform. Participants were entered into a raffle to win one of ten \$50 gift cards. The study protocol received exempt certification by the University of California, San Francisco institutional review board, and participants provided electronic informed consent.

Measures

Sleep measures.—The Insomnia Severity Index (ISI) is a measure of insomnia symptom severity that is frequently used in clinical practice and in research (Morin, 1993). Seven items assess symptom severity, satisfaction with sleep, impairment caused by symptoms, distress caused by symptoms, and the extent to which others have noticed symptoms over the last two weeks. A total score is computed by summing all items. Scores ≤ 7 indicate no clinically significant insomnia, 8-14 indicate subthreshold insomnia, 15-21 indicate moderate severity insomnia, and ≥ 22 indicate severe insomnia. Cronbach's alpha was 0.89, indicating adequate internal consistency.

The Sleep Condition Indicator (SCI) is another self-report measure used to identify possible cases of DSM-5 insomnia disorder (Espie et al., 2014). The SCI was developed to address the shortcomings of existing insomnia measurements: namely, a lack of 1) insomnia specificity and 2) assessment utilizing the latest (DSM-5) diagnostic criteria. Large validation studies ($n= 30,941$) have revealed that the SCI has strong content validity, internal consistency, sensitivity to change, and concurrent validity with existing measures (e.g., ISI; Espie et al., 2014). Scores for this 8-item measure range from 0-32, with lower scores indicating more severe insomnia and scores ≥ 16 indicating possible insomnia disorder. Cronbach's alpha was 0.82, indicating adequate internal consistency. By adding a ninth item to assess early-morning awakening, the Sleep Condition Indicator can also be used to identify possible cases of DSM-5 insomnia disorder (e.g., see Espie, Kyle, Hames, Cyhlarova, & Benzeval, 2012).

Restless legs symptoms were measured using a validated, single-item measure (“When you try and relax in the evening or sleep at night, do you ever have unpleasant, restless feelings in your legs that can be relieved by walking or movement?”) (Ferri et al., 2007). Another single item measure was used to assess whether participants were night shift workers.

Patient-reported provider assessment of sleep.—Participants were asked whether they had discussed their sleep with a health care provider during their current pregnancy, and whether they were told they had insomnia, sleep apnea, restless legs syndrome, periodic limb movement, parasomnia, narcolepsy, and/or other sleep disorder, or none.

Patient-reported provider treatment recommendations.—Participants who reported that they had discussed their sleep with a provider were asked whether they were given education or information, a prescription for medication, a recommendation for over-the-counter medication, a recommendation for counseling or therapy, and/or another recommendation to improve sleep. Participants who reported that their provider recommended prescription or over-the-counter medications were asked the type of medication that was recommended.

Patient treatment utilization.—Participants reported whether they used prescription medication, over-the-counter medication, counseling or therapy, or another method to improve sleep, as well as the type of prescription and over-the-counter medications they used to improve their sleep.

Data analysis

Rates of sleep assessment, treatment recommendations, and treatment utilization were examined descriptively (frequency and percentage for categorical data; mean and standard deviation for continuous data). Data are presented for the overall sample and for each ISI range (i.e., no insomnia, subthreshold insomnia, moderate insomnia, severe insomnia). Chi-square tests were utilized to explore whether rates of sleep assessment, treatment recommendations, and/or treatment utilization were related to ISI range. Fisher's tests for exact count data were used when 20% cells had expected count <5.

Results

On average, participants experienced insomnia symptoms in the subthreshold range. Approximately 40% (n=171) experienced insomnia symptoms of at least moderate severity, as indicated by the Insomnia Severity Index (Table 1). Insomnia symptoms on the ISI did not vary by pregnancy trimester ($F(2, 420)=0.173, p=.84$). Insomnia symptoms varied by parity, such that women with children had higher symptom severity (ISI M(SD) = 14.15 (5.94)) compared to women without children (ISI M(SD) = 12.39 (5.51); $t(421)=3.16, p=.002$). According to the Sleep Condition Indicator, nearly 40% met the case definition for DSM-5 insomnia disorder. Over one-third of participants experienced restless legs symptoms. Night shift work was rare in this sample.

Patient-reported provider assessment of sleep

Rates of sleep assessment, treatment recommendations, and treatment utilization for the full sample and by ISI range are displayed in Table 2. Across the full sample, a minority of participants (39%) reported that they had talked about their sleep with a health care provider during their current pregnancy. Participants reported that they discussed their sleep with an OB/GYN doctor (30%, n=129), midwife (7%, n=30), nurse (4%, n=16) or other (n=3%, 14). Although this rate was higher in participants with higher ISI scores, less than two-thirds of pregnant women (63%) with severe insomnia reported that they had talked with a health care provider about their sleep. Among participants who had talked about their sleep with a provider, 24% were told that they had a sleep disorder, and insomnia was the most common diagnosis (17%). Provider diagnoses of insomnia was higher for participants with higher ISI scores, yet 83% and 42% of pregnant women with moderate and severe insomnia, respectively, did not receive an insomnia diagnosis from a health care provider during their current pregnancy.

Patient-reported provider treatment recommendations

Among participants who talked about their sleep with a health care provider, approximately one-half (51%) reported receiving education or information aimed specifically at improving their sleep. Over-the-counter medication (46%) and 'other' (42%, e.g., warm shower, more pillows) were also common provider recommendations for improving sleep during pregnancy. Therapy/counseling was recommended as often as prescription medication for improving sleep (12%). Provider treatment recommendations did not vary significantly by ISI scores. As displayed in Table 3, the most common medications that providers prescribed

were non-benzodiazepine sedatives (33%) and antihistamines (33%). Antihistamines were also the most common recommendation for over-the-counter medications (60%).

Patient treatment utilization

Across the full sample, participants rarely utilized prescription medication (7%) or therapy or counseling (5%) to improve their sleep; however, over-the-counter medication (28%) and other methods (30%) were more common. Utilization rates for both over-the-counter and prescription medication were significantly related to ISI scores, such that utilization rates were higher among women with more severe insomnia symptoms (Table 2). Utilization rates for therapy or counseling did not vary significantly by ISI scores. The most commonly utilized prescription and over-the-counter medications were non-benzodiazepine sedatives (29%) and antihistamines (67%) (Table 3).

Discussion

There is increasing recognition that poor sleep during pregnancy is associated with adverse maternal-fetal and psychological outcomes, such as gestational diabetes (Cai et al., 2016), preterm birth (Blair, Porter, Leblebicioglu, & Christian, 2015; Felder et al., 2017; Okun, Schetter, & Glynn, 2011), caesarean birth (Lee & Gay, 2004; Li et al., 2016), depression (Skouteris, Germano, Wertheim, Paxton, & Milgrom, 2008; Tomfohr, Buliga, Letourneau, Campbell, & Giesbrecht, 2015), suicidal ideation (Gelaye et al., 2016), and anxiety (Yu et al., 2017). Despite this, our findings indicate that the majority of participants had not discussed their sleep with a health care provider at any point during their current pregnancy. Additionally, results suggest that insomnia may be under-detected during pregnancy: among the subset of women with moderate to severe insomnia, only 57% reported that they had discussed their sleep with a health care provider, and only 28% received an insomnia diagnosis.

A similar pattern of findings is evident among the general population. For example, moderate to severe insomnia symptoms are common (10-28%) (Ohayon, 2002) and an investigation of insomnia treatment trends found that, despite high rates of insomnia symptoms, only 13% of individuals had consulted a health care professional for insomnia in their lifetimes. Use of prescription sleep medication was slightly lower in the current study (7%) than in studies in the general population (11%) (Morin, LeBlanc, Daley, Gregoire, & Merette, 2006). Nevertheless, there may be unique barriers to the detection of insomnia symptoms during the prenatal period. First, the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics do not address the importance of sleep in their Guidelines for Perinatal Care (American Academy of Pediatrics & American College of Obstetricians and Gynecologists, 2012). Thus, providers may be less likely to prioritize assessment and treatment of sleep disturbances among the myriad other issues to address during prenatal care. Second, one of the criteria for DSM-5 insomnia diagnosis is that the symptoms are not better explained by coexisting medical conditions. It is possible that providers view pregnancy and normal pregnancy symptoms (e.g., nocturia, discomfort) as an explanatory medical condition for insomnia, thus driving down diagnosis rates. Third, historically there has been a paucity of research on effective treatment options for insomnia

during pregnancy, and providers may be reluctant to assess a problem for which there are not well-studied treatment options.

Although the current study did not evaluate treatment preferences, previous research indicates that pregnant women report a preference for non-pharmacological treatment approaches, such as cognitive behavior therapy (Sedov, Goodman, Buliga, & Tomfohr, 2015). Cognitive behavior therapy is recommended by the American College of Physicians as the first line treatment for insomnia among adults generally (Qaseem et al., 2016), but findings from the present study indicate that provider recommendations for improving sleep did not match pregnant women's preferences for cognitive behavior therapy or current practice guidelines. Providers rarely recommended therapy or counseling for treating insomnia symptoms (16%). One possible explanation for this is that cognitive behavior therapy has only recently been studied in pregnant populations (Manber et al., 2019; [ClinicalTrials.gov](#) Identifier: NCT02805998). Our data indicate that only 37% (n=7/19) of women who received a recommendation for therapy or counseling utilized this treatment approach, and future research should examine barriers and facilitators of treatment.

Sleep hygiene education is the most commonly recommended treatment among non-pregnant populations (Moss, Lachowski, & Carney, 2013), but there is limited evidence about its efficacy during pregnancy. Pharmacotherapy is another frequently used treatment approach, but it is hard to draw conclusions about efficacy and safety because few randomized clinical trials include pregnant women. One small randomized trial found that pregnant women with an insomnia diagnosis who received trazodone or diphenhydramine experienced significantly longer sleep time and higher sleep efficiency after six weeks of treatment relative to participants randomized to placebo (Khazaie, Ghadami, Knight, Emamian, & Tahmasian, 2013). However, data from a population-based observational study indicates that Zolpidem is associated with higher odds of adverse birth outcomes, but analyses did not adjust for insomnia symptom severity (Wang, Lin, Lin, Chen, & Lin, 2010). Evidence on the risks of benzodiazepines is mixed (Ban et al., 2014; Calderon-Margalit, Qiu, Ornoy, Siscovick, & Williams, 2009; Yonkers, Gilstad-Hayden, Forray, & Lipkind, 2017).

Limitations

In this survey study, we did not examine insomnia diagnoses using a clinical interview, and instead utilized well-validated self-report measures of insomnia symptom severity. We did not validate women's reports about whether their provider discussed their sleep and made any treatment recommendations against the electronic health record or provider reports. The sample was predominantly wealthy, highly educated, and Caucasian. Therefore, our findings may not generalize to populations among whom sleep disturbances may be particularly prevalent, such as pregnant women of color and/or of low socioeconomic status (Amyx, Xiong, Xie, & Buekens, 2017). The current study did not evaluate depressive or anxiety symptoms, and future studies should investigate whether providers recommend sleep treatments for women with elevated depressive or anxiety symptoms. Finally, it is important to note that this was a convenience sample and a subset of participants were recruited after completing the screening process for a study investigating a digital intervention for

insomnia. Thus, the prevalence of elevated insomnia symptoms in this sample is likely higher than among pregnant women more generally.

Clinical recommendations

Because it may be challenging to distinguish sleep problems that warrant further assessment and treatment from normative sleep problems, we offer a few assessment suggestions. As a first step, providers can assess sleep disturbances informally using language such as “How are you sleeping lately? How severe are your sleep problems? Have your sleep problems interfered with your life? How distressed are you by your sleep problems?” For sleep disturbances described as severe, persistent, impairing, or distressing and that do not have a clear medical cause (e.g., gastroesophageal reflux disease), providers can conduct further assessment using brief, validated screening tools such as the Insomnia Severity Index⁵. For patients who report snoring or the tendency to gasp for breath in the middle of the night, follow-up assessment may also include the Facco pregnancy-specific screening tool for sleep apnea.²⁸ Of note, disturbed sleep can be a symptom of depression, stress, anxiety, or trauma; therefore, assessing sleep may provide a less-stigmatized entry point to learning about a woman’s psychological functioning. Moreover, treating insomnia is shown to improve depression symptoms among adults with comorbid insomnia and depression (Carney et al., 2017).

It is important for providers and patients to know that there is a range of options for improving insomnia symptoms (Chaudhry & Susser, 2018), including non-pharmacological interventions like cognitive behavior therapy. CBT is recommended as the first line of treatment among adults generally, and given the sensitivity of the fetus to external factors and chemicals, it is even more important to adhere to this safe recommendation before suggesting pharmacological approaches. Research indicates that CBT is effective for pregnant women with insomnia disorder (Manber et al., 2019), and research is also underway to investigate whether a digital CBT intervention is effective for pregnant women with insomnia symptoms ([ClinicalTrials.Gov](https://clinicaltrials.gov/ct2/show/study/NCT02805998) Identifier: NCT02805998).

Conclusions

Although sleep disturbances are normative during pregnancy, a subset of women experience clinically significant insomnia symptoms, which are shown to be associated with increased risk of adverse birth and psychological outcomes. Thus, insomnia symptoms should not be dismissed or ignored during pregnancy. Assessing insomnia symptoms during pregnancy provides the opportunity to identify and treat a potentially modifiable risk factor.

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References

- American Academy of Pediatrics, & American College of Obstetricians and Gynecologists. (2012). Guidelines for perinatal care, *7th Edition*. Retrieved from
- Amyx M, Xiong X, Xie Y, & Buekens P (2017). Racial/ethnic differences in sleep disorders and reporting of trouble sleeping among women of childbearing age in the United States. *Matern Child Health J*, 21(2), 306–314. doi:10.1007/s10995-016-2115-9 [PubMed: 27439422]
- Ban L, West J, Gibson JE, Fiaschi L, Sokal R, Doyle P, ... Tata LJ (2014). First trimester exposure to anxiolytic and hypnotic drugs and the risks of major congenital anomalies: a United Kingdom population-based cohort study. *Plos One*, 9(6), e100996. doi:10.1371/journal.pone.0100996 [PubMed: 24963627]
- Blair LM, Porter K, Leblebicioglu B, & Christian LM (2015). Poor sleep quality and associated inflammation predict preterm birth: Heightened risk among African Americans. *Sleep*, 38(8), 1259–1267. [PubMed: 25845693]
- Cai S, Tan S, Gluckman PD, Godfrey KM, Saw SM, Teoh OH, ... group, G. s. (2016). Sleep quality and nocturnal sleep duration in pregnancy and risk of gestational diabetes mellitus. *Sleep*.
- Calderon-Margalit R, Qiu C, Ornoy A, Siscovick DS, & Williams MA (2009). Risk of preterm delivery and other adverse perinatal outcomes in relation to maternal use of psychotropic medications during pregnancy. *Am J Obstet Gynecol*, 201(6), 579 e571–578. doi:10.1016/j.ajog.2009.06.061 [PubMed: 19691950]
- Carney CE, Edinger JD, Kuchibhatla M, Lachowski AM, Bogouslavsky O, Krystal AD, & Shapiro CM (2017). Cognitive Behavioral Insomnia Therapy for Those With Insomnia and Depression: A Randomized Controlled Clinical Trial. *Sleep*, 40(4). doi:PII zsx019 10.1093/sleep/zsx019
- Chaudhry SK, & Susser LC (2018). Considerations in Treating Insomnia During Pregnancy: A Literature Review. *Psychosomatics*, 59(4), 341–348. doi:10.1016/j.psych.2018.03.009 [PubMed: 29706359]
- Dorheim SK, Bjorvatn B, & Eberhard-Gran M (2012). Insomnia and depressive symptoms in late pregnancy: a population-based study. *Behav Sleep Med*, 10(3), 152–166. doi:10.1080/15402002.2012.660588 [PubMed: 22742434]
- Espie CA, Kyle SD, Hames P, Cyhlarova E, & Benzeval M (2012). The daytime impact of DSM-5 insomnia disorder: comparative analysis of insomnia subtypes from the Great British Sleep Survey. *J Clin Psychiatry*, 73(12), e1478–1484. doi:10.4088/JCP.12m07954 [PubMed: 23290331]
- Espie CA, Kyle SD, Hames P, Gardani M, Fleming L, & Cape J (2014). The Sleep Condition Indicator: a clinical screening tool to evaluate insomnia disorder. *BMJ Open*, 4(3), e004183. doi:10.1136/bmjopen-2013-004183
- Felder JN, Baer RJ, Rand L, Jelliffe-Pawlowski LL, & Prather AA (2017). Sleep disorder diagnosis during pregnancy and risk of preterm birth. *Obstet Gynecol*, 130(3), 573–581. doi:10.1097/AOG.0000000000002132 [PubMed: 28796676]
- Ferri R, Lanuzza B, Cosentino FI, Iero I, Tripodi M, Spada RS, ... Zucconi M (2007). A single question for the rapid screening of restless legs syndrome in the neurological clinical practice. *Eur J Neurol*, 14(9), 1016–1021. doi:10.1111/j.1468-1331.2007.01862.x [PubMed: 17718694]
- Gelaye B, Addae G, Neway B, Larrabure-Torrealva GT, Qiu C, Stoner L, ... Williams MA (2016). Poor sleep quality, antepartum depression and suicidal ideation among pregnant women. *J Affect Disord*, 209, 195–200. doi:10.1016/j.jad.2016.11.020 [PubMed: 27930912]
- Khazaie H, Ghadami MR, Knight DC, Emamian F, & Tahmasian M (2013). Insomnia treatment in the third trimester of pregnancy reduces postpartum depression symptoms: a randomized clinical trial. *Psychiatry Res*, 210(3), 901–905. doi:10.1016/j.psychres.2013.08.017 [PubMed: 23993464]
- Lee KA, & Gay CL (2004). Sleep in late pregnancy predicts length of labor and type of delivery. *Am J Obstet Gynecol*, 191(6), 2041–2046. doi:10.1016/j.ajog.2004.05.086 [PubMed: 15592289]

- Li R, Zhang J, Zhou R, Liu J, Dai Z, Liu D, ... Zeng G (2016). Sleep disturbances during pregnancy are associated with cesarean delivery and preterm birth. *J Matern Fetal Neonatal Med*, 1–6. doi:10.1080/14767058.2016.1183637
- Manber R, Bei B, Simpson N, Asarnow L, Rangel E, Sit A, & Lyell D (2019). Cognitive Behavioral Therapy for Prenatal Insomnia: A Randomized Controlled Trial. *Obstet Gynecol*, 133(5), 911–919. doi:10.1097/AOG.0000000000003216 [PubMed: 30969203]
- Mindell JA, Cook RA, & Nikolovski J (2015). Sleep patterns and sleep disturbances across pregnancy. *Sleep Medicine*, 16(4), 483–488. doi:10.1016/j.sleep.2014.12.006 [PubMed: 25666847]
- Morin CM (1993). *Insomnia: Psychological assessment and management*. New York: Guilford Press.
- Morin CM, LeBlanc M, Daley M, Gregoire JP, & Merette C (2006). Epidemiology of insomnia: Prevalence, self-help treatments, consultations, and determinants of help-seeking behaviors. *Sleep Medicine*, 7(2), 123–130. doi:10.1016/j.sleep.2005.08.008 [PubMed: 16459140]
- Moss TG, Lachowski AM, & Carney CE (2013). What all treatment providers should know about sleep hygiene recommendations. *The Behavior Therapist*, 36(4), 76–83.
- Ohayon MM (2002). Epidemiology of insomnia: what we know and what we still need to learn. *Sleep Medicine Reviews*, 6(2), 97–111. doi:10.1053/smr.2002.0186 [PubMed: 12531146]
- Okun ML, Schetter CD, & Glynn LM (2011). Poor sleep quality is associated with preterm birth. *Sleep*, 34(11), 1493–1498. doi:10.5665/sleep.1384 [PubMed: 22043120]
- Qaseem A, Kansagara D, Forcica MA, Cooke M, Denberg TD, & Clinical Guidelines Committee of the American College of Physicians. (2016). Management of chronic insomnia disorder in adults: A clinical practice guideline from the American College of Physicians. *Ann Intern Med*, 165(2), 125–133. doi:10.7326/M15-2175 [PubMed: 27136449]
- Sedov I, Goodman S, Buliga E, & Tomfohr LM (2015). Insomnia treatment preferences among pregnant women. Paper presented at the Sleep.
- Skouteris H, Germano C, Wertheim EH, Paxton SJ, & Milgrom J (2008). Sleep quality and depression during pregnancy: a prospective study. *Journal of Sleep Research*, 17(2), 217–220. doi:10.1111/j.1365-2869.2008.00655.x [PubMed: 18482110]
- Tomfohr LM, Buliga E, Letourneau NL, Campbell TS, & Giesbrecht GF (2015). Trajectories of sleep quality and associations with mood during the perinatal period. *Sleep*, 38(8), 1237–1245. doi:10.5665/sleep.4900 [PubMed: 25845691]
- Wang LH, Lin HC, Lin CC, Chen YH, & Lin HC (2010). Increased risk of adverse pregnancy outcomes in women receiving zolpidem during pregnancy. *Clin Pharmacol Ther*, 88(3), 369–374. doi:10.1038/clpt.2010.97 [PubMed: 20686480]
- Yonkers KA, Gilstad-Hayden K, Forray A, & Lipkind HS (2017). Association of panic disorder, generalized anxiety disorder, and benzodiazepine treatment during pregnancy with risk of adverse birth outcomes. *JAMA Psychiatry*, 74(11), 1145–1152. doi:10.1001/jamapsychiatry.2017.2733 [PubMed: 28903165]
- Yu YX, Li MC, Pu LY, Wang SJ, Wu JH, Ruan LL, ... Jiang W (2017). Sleep was associated with depression and anxiety status during pregnancy: a prospective longitudinal study. *Archives of Womens Mental Health*, 20(5), 695–701. doi:10.1007/s00737-017-0754-5

Table 1

Participant characteristics

Participant Characteristic (n=423)	M (SD) or % (N)
Age	32.32 (5.50)
Race and Ethnicity	
Asian or Pacific Islander	10% (42)
Latina, Latin American, or Hispanic	6% (24)
Bi- or multi-racial/ethnic	5% (20)
Caucasian, White, or European American	63% (267)
African American or Black	14% (60)
Native American, American Indian, Alaskan Native, or Indigenous Person	0.2% (1)
Other	2% (9)
Education	
Less than a high school degree	1% (6)
High school graduate, GED, or equivalent	5% (22)
Some college, junior college, or vocational school	18% (75)
College graduate	27% (114)
Professional or graduate school	49% (206)
Relationship status	
Married or living with partner	90% (382)
Significantly involved with a partner, but not living together	6% (24)
Single or not significantly involved with a partner	4% (17)
Yearly household income before taxes	
Under \$25,000	11% (45)
\$25,000-49,999	12% (52)
\$50,000-99,999	23% (96)
\$100,000-199,999	35% (147)
\$200,000 or higher	18% (78)
Don't know	1% (5)
Gestational age (weeks)	25.58 (8.99)
Trimester of pregnancy	
First	13% (54)
Second	38% (162)
Third	49% (207)
Primiparous	50% (212)
Insomnia Severity Index	
Mean	13.27 (5.79)
No insomnia (0-7)	16% (67)
Subthreshold insomnia (8-14)	44% (185)
Moderate insomnia (15-21)	31% (130)
Severe insomnia (22-28)	10% (41)
Sleep Condition Indicator ^a	

Participant Characteristic (n=423)	M (SD) or % (N)
Mean	14.78 (6.36)
Possible insomnia disorder	39% (167)
Restless legs syndrome	38% (160)
Shift worker	4% (18) ^b

^aMean scores are based on the 8-item measure of the Sleep Condition Indicator, and possible insomnia disorder is based on the 9-item measure.

^bData are missing for 1 participant.

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Table 2
Rates of sleep assessment, treatment recommendations, and treatment utilization

	ISI Score				$\chi^2(3)$	
	Full Sample	No insomnia	Subthreshold insomnia	Moderate insomnia	Severe insomnia	
Patient talked about sleep with a provider	39% (164/423)	16% (11/67)	30% (55/185)	55% (72/130)	63% (26/41)	46.08, p<.001
Provider sleep disorder diagnoses ^a						
None	76% (125/164)	91% (10/11)	91% (50/55)	75% (54/72)	42% (11/26)	24.41, p<.001
Insomnia	17% (28/164)	0	2% (1/55)	17% (12/72)	58% (15/26)	p<.001 ^b
Restless legs syndrome	8% (13/164)	9% (1/11)	2% (1/55)	7% (5/72)	23% (6/26)	p=.01 ^b
Sleep apnea	5% (8/164)	0	2% (1/55)	4% (3/72)	15% (4/26)	p=.08 ^b
Other	2% (4/164)	9% (1/11)	4% (2/55)	1% (1/72)	0	p=.32 ^b
Provider recommendations for improving sleep						
Education or information	51% (83/164)	36% (4/11)	53% (29/55)	49% (35/72)	58% (15/26)	1.63, p=0.65
Over-the-counter medication	46% (74/162)	27% (3/11)	37% (20/54)	52% (37/71)	54% (14/26)	5.01, p=.17
Prescription medication	12% (19/162)	0	5% (3/55)	14% (10/71)	24% (6/25)	p=.06 ^b
Therapy or counseling	12% (19/162)	9% (1/11)	5% (3/55)	16% (11/70)	15% (4/26)	p=.25 ^b
Other	42% (67/161)	45% (5/11)	34% (18/53)	42% (30/71)	54% (14/26)	2.96, p=0.40
Multiple recommendations	49% (80/164)	27% (3/11)	45% (25/55)	49% (35/72)	65% (17/26)	5.15, p=0.16
Patient utilization of treatments to improve sleep						
Over-the-counter medication	28% (116/421)	13% (9/67)	22% (41/184)	36% (47/129)	46% (19/41)	21.60, p<.001
Prescription medication	7% (28/419)	0	4% (8/183)	10% (13/130)	18% (7/40)	p=.02 ^b
Therapy or counseling	5% (19/416)	2% (1/66)	3% (6/184)	6% (7/126)	13% (5/40)	p=.06 ^b
Other	30% (123/416)	20% (13/67)	29% (54/184)	34% (43/126)	33% (13/40)	5.52, p=.21

Note. Only participants who reported that they talked about their sleep with a health care provider completed items about their provider's diagnosis and provider's treatment recommendations. All participants completed items about treatment utilization.

^aNo participants were told they had periodic limb movement, parasomnia, or narcolepsy.

^bChi-square tests were not valid because 20% cells have expected count < 5; therefore the [stata.com](http://www.stata.com) Fisher's test for exact count data calculator was used to calculate p values.

Table 3

Prescription and over-the-counter medications recommended by providers and utilized by patients

	Provider recommendations		Patient utilization	
	Prescription Medication (n=15)	Over-the-counter (n=65)	Prescription Medication (n=14)	Over-the-counter (n=109)
Antihistamine	33%	60%	21%	67%
Non-benzodiazepine sedative	33%		29%	
Anti-hypertensive	7%		7%	
Antihistamine and supplement	7%	11%	7%	6%
Benzodiazepine	7%			
Supplement	7%	19%		17%
Trazodone	7%			
Antihistamine, acetaminophen		8%		7%
Antihistamine, acetaminophen, supplement		2%		1%
Naproxen sodium, antihistamine		2%		
Sedative			21%	
Non-benzodiazepine sedative, trazodone, antihistamine, sedative			7%	
SSRI			7%	
Nyquil				2%
Antihistamine, ibuprofen				1%