

Sleep-Disordered Breathing in Pregnancy



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KEYWORDS

- Obstructive sleep apnea • Pregnancy • Sleep-disordered breathing • Snoring • Preeclampsia
- Gestational diabetes

KEY POINTS

- Sleep-disordered breathing manifests predominantly with snoring and/or obstructive sleep apnea during pregnancy.
- The gold standard for diagnosis in pregnancy is overnight, attended, in-laboratory polysomnography.
- Continuous positive airway pressure therapy is the preferred first-line therapy for obstructive sleep apnea.
- Untreated sleep-disordered breathing has been associated with preeclampsia, gestational hypertension, gestational diabetes, and severe maternal morbidity.
- Early identification and treatment are key factors in improving maternal and fetal outcomes.

INTRODUCTION

Sleep and pregnancy are 2 unique states with dynamic and characteristic physiologic changes. Sleep physiology renders the body vulnerable to the occurrence of breathing impairment in rapid eye movement sleep but is protected during slow-wave sleep. The physiologic changes that evolve during pregnancy pose an increased risk to the development of respiratory impairment with consequences that will ultimately affect pregnancy and its outcome.

Sleep-disordered breathing (SDB) is a group of respiratory abnormalities that occur as a result of impaired airflow and gas exchange due to upper airway narrowing or inefficiency of the ventilatory systems. Obstructive SDB is a spectrum of respiratory impairment due to partial narrowing or complete collapse of the upper airway. Sleep-related breathing disorders are categorized in the latest version of International Classification of Sleep Disorders-3 into snoring, obstructive sleep apnea

(OSA), central sleep apnea, and sleep-related hypoventilation.¹ SDB is a common disorder in both men and women but remains underdiagnosed, especially in women.²

Although the respiratory physiologic changes and sleep state instability associated with pregnancy might suggest an increased risk for central sleep apnea, the prevalence of central sleep apnea in the pregnant population is low.³ Preexisting sleep-related hypoventilation can impose an additional stress on the pregnant patient and the fetus. This article focuses on snoring and OSA in pregnancy and their impact on maternal and fetal health.

Clinically, OSA is manifested by the occurrence of daytime sleepiness, loud snoring, witnessed breathing interruptions, or awakenings due to gasping or choking. The diagnosis is confirmed by the presence of at least 5 obstructive respiratory events (apneas, hypopneas, or respiratory effort-related arousals) per hour of sleep in the presence of sleep-related symptoms or comorbidities or 15 or more obstructive respiratory events per hour of sleep.⁴

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Sleep Med Clin 13 (2018) 349–357

<https://doi.org/10.1016/j.jsmc.2018.04.005>

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SDB can worsen during pregnancy or can be induced by pregnancy-related changes of the upper airway, lung mechanics, and control of breathing.⁵ In addition, there is increasing prevalence of obesity in women of reproductive age, which in turn increases the risk of developing OSA. SDB has been consistently associated with adverse pregnancy outcomes, including gestational hypertensive disorders and gestational diabetes.⁶ Therefore, a timely diagnosis and management is crucial in improving maternal and fetal outcomes.

EPIDEMIOLOGY

The exact prevalence of SDB in pregnancy, diagnosed by polysomnography (PSG), is not well defined. Large prospective studies with precise definitions and estimates are lacking.

Several studies report that snoring steadily increases during pregnancy.^{7,8} The prevalence of snoring has been estimated to be between 10% and 46%.^{9,10} This wide range is mainly because of variability in study designs and objective or self-report measures of snoring, because women are less likely to report snoring than men.¹¹ Longitudinal studies have shown that habitual snoring (3 or more nights per week) increases from 7% to 11% in the first trimester to 16% to 25% in the third trimester.¹² The limited self-reporting of habitual versus occasional snoring and body position may limit the reliability of snoring as a presenting symptom of SDB in pregnant women.

Prevalence of OSA with daytime sleepiness is estimated to be approximately 3% to 7% for adult men and 2% to 5% for adult women. These estimates are similar when compared between different continents.¹³ In pregnant women, the prevalence of OSA with apnea-hypopnea index (AHI) greater than 5 has been reported to be 3.6% in early pregnancy and 8.3% in midpregnancy.¹⁴

PATHOPHYSIOLOGY

Several physiologic changes in pregnancy are likely to predispose to development of SDB (**Box 1**). On the other hand, concurrent protective factors are also present (**Box 2**) that probably account for the overall low incidence of OSA in pregnancy.^{5,15} It remains unclear as to what ultimately tips the balance toward development of clinically significant SDB in a pregnant woman.

Increasing age and obesity remain independent risk factors for development of SDB. Hypertensive pregnant women who snore are at increased risk for unrecognized SDB.¹⁶ Moreover, high-risk women with chronic hypertension, gestational diabetes, a history of preeclampsia, and/or a twin

Box 1

Potential risk factors for sleep-disordered breathing in pregnancy

Reduction in upper airway size^{60,61} likely due to

- Increased fluid retention
- Weight gain

Nasal obstruction^{62,63}

- Increased edema from high estrogen
- Nasal congestion/rhinitis

Lung mechanics²¹

- Reduced functional residual capacity and residual volume
- Increased minute ventilation

Fragmented sleep

- Frequent awakenings due to pregnancy-related discomfort lowering arousal threshold

gestation are at increased risk for developing SDB that continues to increase during the course of their pregnancy.¹⁷ Active and passive smoking have also been associated with snoring, breathing problems, and sleep disturbances.¹⁸

The effect of body position on sleep during pregnancy is worth noting. Left lateral sleep is the preferred sleep position for pregnant women mainly because of relief of pressure of the gravid uterus on the inferior vena cava and resulting favorable hemodynamic effects. In general, SDB is worse in the supine position, and severity

Box 2

Protective factors for sleep-disordered breathing in pregnancy

High progesterone level leading to

- Increased upper airway dilator muscle activity
- Enhanced chemo-responsiveness

Improved delivery of oxygen leading to

- Right-shifted oxyhemoglobin dissociation curve
- Increase in maternal heart rate and stroke volume

Less time in supine position

Adapted from Facco FL, Parker CB, Reddy UM, et al. Association between sleep-disordered breathing and hypertensive disorders of pregnancy and gestational diabetes mellitus. Obstet Gynecol 2017;129(1):31-41; and Bourjeily G. Sleep disorders in pregnancy. Obstet Med 2009;2(3):100-6; with permission.

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