

# Obstructive Sleep Apnoea in Pregnancy

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## Abstract

The self reported snoring reported to occurs in about 27 percent of pregnant women during third trimester. Self reported snoring is associated with an increase in the occurrence of obstructive sleep apnea (OSA) but the occurrence of OSA might be expected to be higher as most of the pregnant women underreport symptoms of disturbed breathing disorder during sleep, including snoring.

**Keywords:** Obstructive sleep apnea, Pregnancy

## Introduction

Obstructive sleep apnea (OSA) characterized by upper airway obstruction and nocturnal hypoxemia during sleep and occurs in 2% of women in the general population. Women with sleep apnea during pregnancy are at increased risk for complications in pregnancy and for birth defects. OSA in pregnancy was first reported in 1978<sup>2</sup>.

## Prevalance of OSA in Pregnancy

The exact prevalence of sleep-disordered breathing during pregnancy is unknown. But it is clear that fetal growth and development may be impaired by maternal hypoxemia, whether it occurs as a primary obstetric event or as a consequence of respiratory abnormalities, such as sleep apnea<sup>3</sup> or poorly controlled asthma<sup>4</sup>.

## Impact of Sleep Disorder in Pregnancy

Sleep in women of childbearing age has been investigated by various authors. Total sleep time ranges from 7 to 9

hours between the ages of 18 to 45 years<sup>5-6</sup>. of this time, about 80% is spent in non-REM sleep and about 20% in REM sleep<sup>7</sup>. Several studies have been performed in normal pregnancy by using questionnaires, sleep logs, and polysomnographic studies<sup>8-10</sup>.

Most pregnant women (66% to 94%) report alteration in sleep<sup>9</sup>. During the first trimester, total sleep time, daytime sleepiness, insomnia, and nocturnal awakening increase and overall sleep quality decreases. Sleep appears to normalize in the second trimester, although sleep disturbances continue in about 19% of patients. In the third trimester, women awaken three to five times per night 11-12, nap daily for an average of 65 minutes, and experience worsening insomnia and diminished daytime alertness. The most common reasons given for third-trimester sleep disturbances are urinary frequency, backache, fetal movement, general abdominal discomfort, leg cramps, and heartburn<sup>8-9,13</sup>.

## Pathophysiology of OSA in Pregnancy

Pregnancy induces changes in the respiratory system through mechanical and biochemical mechanisms. Changes in the airway mucosa consisting of hyperemia, hypersecretion, and mucosal edema, especially in the third trimester<sup>14</sup>. Those may predispose to snoring and upper-airway obstructive events.

Large-airway function is preserved<sup>15-16</sup>, but a high incidence of small-airway closure at lung volumes greater than functional residual capacity itself decreases because

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of a reduction in expiratory reserve volume<sup>15-18</sup>, a reduced functional residual capacity reduces oxygen stores and makes changes in arterial oxygen more likely to accompany respiratory disturbances, such as those that may occur during sleep.

Another factors that both protects against and is conducive to sleep-disorder breathing is the hyperventilation that occurs during pregnancy. The increase in ventilation at term is greater than the increase in basal metabolic rate and is attributed to the six fold increase in circulating progesterone, which enhances respiratory center sensitivity to CO<sub>2</sub><sup>19-20</sup>. This hyperventilation reduces arterial PCO<sub>2</sub> to a nadir of about 30 mm Hg, but blood pH remains normal<sup>18</sup>. The heightened respiratory drive protects against upper-airway occlusion by enhancing responsiveness of upper-airway dilator muscles to chemical stimuli during sleep<sup>21-22</sup>., progesterone itself has been shown to increase upper-airway dilator muscle (genioglossal) electromyographic activity<sup>23</sup>. However, this heightened respiratory drive may induce obstructive sleep-disordered breathing by increasing suction pressure on hyperemic upper-airway structures<sup>24</sup>.

### Other Sleep Disorder in Pregnancy

Other sleep disorder that have been reported to occur and in some cases were triggered or worsened by pregnancy are periodic leg movements<sup>25</sup>, sleepwalking<sup>26</sup>, night terror<sup>27</sup>, and narcolepsy.

Although the true incidence of periodic leg movements during sleep and the restless legs syndrome is unknown, they are acknowledged to be the most common movement disorders during pregnancy<sup>28</sup>. In one study, all 10 mothers with multiple pregnancy had periodic leg movements during sleep, and 4 mothers developed the restless legs syndrome during pregnancy<sup>25</sup>. Questionnaire surveys cite leg cramps as a primary reason for sleep disruption during pregnancy<sup>8,13</sup>. Thus, the possibility that periodic leg movements cause insomnia in pregnancy must be considered.

Sleepwalking (somnambulism) and night terrors occurring during pregnancy and exacerbated by the condition have also been reported. Sleepwalking and night terrors are complex behaviors occurring in stage 3 and 4 non-REM sleep. Their occurrence is facilitated either by an increase in time spent in these sleep stages or by forced arousals from them<sup>29</sup>. Pregnancy especially

in the third trimester, could predispose to these sleep disorders by the latter mechanism. This is probably exemplified by a women with a childhood history of sleepwalking who had recurrence during her two pregnancies<sup>26</sup>. She received no treatment, and in both instances, sleepwalking ceased after delivery. Another report concerned a woman with sleep terror who experienced worsening during the third week of pregnancy, necessitating the use of diazepam and imipramine<sup>27</sup>. She experienced a spontaneous abortion, after which her sleep terror ceased.

Narcolepsies during pregnancy are, probably because narcolepsy is common in women of childbearing age<sup>30</sup>. interactions between pregnancy and narcolepsy in which one condition influences the course of the other have not been reported, although in theory the REM-inhibiting effects of estrogen and, to a lesser extent, cortisol should be beneficial.

### Risk Factor for OSA in Pregnancy

These risks included

- Growth retardation of the fetus (low birth weight)
- Pre-eclampsia (pregnancy-induced hypertension)
- Placenta abruptia (tearing of the placenta from the uterine wall)
- Premature delivery
- Respiratory-induced acidosis

### Diagnosis of OSA in Pregnancy

To diagnosis and manage OSA, sleep physiciance routinely use diagnostic tests that require the sleep laboratory for evaluation of the patients. The sleep-related breathing disorders generally require PSG for evaluation. PSG is the recording of multiple physiologic signals during sleep. The standard PSG recording montage includes channels of electroencephalography, electrooculography, and chin electroencephalography that are required for sleep staging as well as recordings of respiratory effort, airflow, pulse oximetry, snoring, sleep position electroencephalography, and video monitoring. Additional channels are sometimes used including end-tidal or transcutaneous CO<sub>2</sub> and additional electroencephalography channels if potential nocturnal seizure disorders are being evaluated. In evaluating the

sleep-related breathing disorders, a split-night protocol is often used in which a therapeutic treatment or “titration” portion of the PSG is added after at least 120 minutes of diagnostic sleep time. The scientific rationale for split night polysomnography is that AHI in the first half of night is highly indicative of split night polysomnography is effective in 78% of patients with OSA. Diagnostic criteria for OSA<sup>31</sup> are given in Table 1.

### Management of OSA in Pregnancy

Once obstructive sleep apnea is diagnosed in a pregnant woman, treatment is indicated, especially in the presence of maternal hypoxemia. Conservative measures are avoidance of excessive weight gain; use of position

monitors and alarms to minimize time spent in the supine position; elevation of the head of the bed by about 30 degrees<sup>32-33</sup>. Nasal continuous positive airway pressure (CPAP) is the therapy of choice for obstructive sleep apnea<sup>34</sup>. Although this therapy carries theoretical concerns about diminished cardiac output and placental blood flow, it is safe pregnancy for both mother and fetus<sup>35</sup>. the level of nasal CPAP should be titrated during polysomnography.

If the patient cannot tolerate nasal CPAP, an oropharyngeal appliance can be used<sup>36</sup>. Upper-airway surgery (uvulopalatopharyngoplasty) is less effective and carries additional surgical risk from upper-airway hyperemia; it is thus not recommended in the pregnant women<sup>37</sup>. tracheostomy has been performed to treat

Table 1

A.	At least one of the following applies:
1.	The patients complain of unintentional sleep episodes during wakefulness, daytime sleepiness, unrefreshing sleep, fatigue, or insomnia.
2.	The patient wakes holding his/her breath, gasping, or choking.
3.	The bed partner reports loud snoring or breathing interruptions during the patient's sleep .
B.	Polysomnographic recording shows the following:
1.	Five or more scoreable respiratory events occur per hour. These events can include any combination of obstructive apneas, hypopneas, or respiratory-associated arousals.
2.	There is evidence of respiratory effort during all or a portion of each respiratory vent.
C.	This disorder is not better explained by another sleep, medical, or psychiatric disorder, substance abuse, or medication.
D	Associated features
•	Snoring
•	Obesity
•	Systemic hypertension
•	Pulmonary hypertension
•	Congestive heart failure
•	Sleep fragmentation
•	Recurrent awakening from sleep
•	Sleep-related cardiac dysrhythmias
•	Nocturnal angina
•	Gastroesophageal reflux
•	Impaired quality of life
•	Impaired concentration
•	Diabetes
•	Metabolic syndrome

severe obstructive sleep apnea in pregnancy<sup>38</sup>. but this procedure is clearly unnecessary in most cases. Although administration of oxygen has been reported to prolong the duration of apnea, even patients with sleep apnea have higher end-apnea SaO<sub>2</sub> while breathing oxygen<sup>39</sup>.

## Conclusion

Pregnancy induce physiology alterations that in result in changes to sleep respiration. Sleep in pregnancy complicated by hypertension, such as preeclampsia and pregnancy-induced hypertension; in overweight pregnant women who snore; and in women who have delivered infants with unexplained intrauterine growth restriction. It has been noted that previous birth of a growth unexplained intrauterine growth restriction. It has been noted that previous birth of a growth-restricted infant is the obstetric factor also appear to be indicated in women with significant insomnia and leg cramps or witness apneas. The effects of sleep-disorder breathing, chronic insomnia, and, perhaps, narcolepsy on fetal outcomes need to be determined.

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