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## Best Practice & Research Clinical Obstetrics and Gynaecology

journal homepage: [www.elsevier.com/locate/bpobgyn](http://www.elsevier.com/locate/bpobgyn)



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### Sleep disorders in perinatal women



Sabra M. Abbott, MD, PhD, Instructor<sup>\*</sup>,

Hrayr Attarian, MD, Associate Professor, Phyllis C. Zee, MD,  
PhD, Benjamin and Virginia T. Boshes Professor of Neurology

*Department of Neurology, Feinberg School of Medicine, Northwestern University, Chicago, IL 60611, USA*

#### Keywords:

sleep  
obstructive sleep apnea  
restless legs syndrome  
insomnia  
narcolepsy  
circadian rhythm sleep disorders

Insufficient sleep is common in the general population, and can result from environmental and psychosocial factors, medical and psychiatric disorders, and sleep disorders, such as insomnia, circadian rhythm disorders, sleep apnoea and restless legs. Women are particularly at risk for sleep disorders, and complaints of sleep disturbance are more prevalent among women than men across the life span. During the perinatal period, many common sleep disorders, such as obstructive sleep apnoea or restless legs may be exacerbated, or in the case of insomnia or narcolepsy, treatment options may change. In addition, the role of circadian rhythms in fertility and perinatal health is just beginning to be appreciated. In this chapter, we provide an overview of the current knowledge of the unique aspects of diagnosis and treatment of sleep disorders during the perinatal period.

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#### Introduction

Sleep is an essential biological function in animals and humans. Sleep and wake cycles are governed by two major neural mechanisms: a sleep homeostatic process, which builds up as a function of time awake, and dissipates during sleep, and the daily circadian rhythm of sleep and wake propensity. Gonadotropic and sex hormones can also influence sleep quality and the risk for sleep disorders, such as insomnia and sleep-disordered breathing. Thus, a woman's ability to sleep is influenced by hormonal and physiologic changes, particularly during pregnancy and the postpartum period. It is

<sup>\*</sup> Corresponding author. Tel.: +1 312 908 8549; Fax: +1 312 695 5747.

E-mail address: [sabra.abbott@northwestern.edu](mailto:sabra.abbott@northwestern.edu) (S.M. Abbott).

estimated that 40% of pregnant women and 30% of postmenopausal women report only getting a good night's sleep a few nights a month or less [1].

Mounting evidence shows that adequate sleep and wake function is imperative for health, performance, and overall quality of life. Laboratory studies have shown that even short-term partial sleep restriction adversely affects mood, appetite regulating hormones, insulin sensitivity, inflammation and autonomic function [2,3]; data from epidemiologic studies have shown an association between short sleep duration and increased risk of obesity, diabetes, hypertension, and mortality [4–6]. In addition, specific sleep disorders, such as sleep-disordered breathing, insomnia, circadian rhythm disorders, and restless legs syndrome (RLS) have been linked with higher risk of developing depression, cardiovascular, and metabolic diseases [7–9]. In light of these findings and the high prevalence of sleep disturbances in the perinatal period, it is important for obstetricians and gynaecologists to enquire about sleep quality in general, and identify and treat sleep disorders in the perinatal period (Table 1). Sleep is potentially a modifiable risk factor that can improve the health of both mother and infant.

### Obstructive sleep apnoea and pregnancy

Pregnancy is a state of significant, albeit temporary, changes in respiratory physiology. Some of these alterations are conducive to the development of sleep-disordered breathing, whereas others are protective.

First, obvious anatomical alterations occur as a result of gravid uterus, shifting of intra-abdominal organs, elevation of diaphragm, and an increase in intra-abdominal pressure. Second, both oestrogen and progesterone change sleep microstructure and basic respiratory physiology.

Functional residual capacity gradually decreases by about 20% in the latter months of pregnancy, leading to an increase in minute ventilation and tidal volume, resulting in higher PaO<sub>2</sub> and lower PaCO<sub>2</sub> pressures [10]. This creates an O<sub>2</sub> and CO<sub>2</sub> differential gradient to shunt O<sub>2</sub> to the fetus and allow CO<sub>2</sub> excretion. This shunting leads to hypoxaemia and a drop in pulmonary oxygen stores [11]. Both of these phenomena exacerbate obstructive sleep apnoea (OSA). A decline also occurs in nocturnal oxygen saturation in normal late pregnancy, exacerbated by sleeping in the supine position, which may be related to upper airway collapse [12]. Finally, during pregnancy, there is a dramatic and rapid increase in weight, which can worsen preexisting OSA [13].

Rising oestrogen levels lead to upper-airway mucosal congestion and hyperaemia, leading to snoring. Up to 30% of women in their third trimester complain of nasal congestion [14], and oropharyngeal crowding increases in the third trimester compared with the first [15]. Oestrogen, however, decreases rapid eye movement sleep and progesterone increases non-rapid eye movement sleep, and OSA in young women is often worse in rapid eye movement sleep; therefore, reduction in time spent in that vulnerable state may be a protective mechanism [16]. Another potentially protective effect of progesterone is increased minute volume [17], which in itself is protective against airway occlusion.

Habitual snoring increases from 4% in non-pregnant women to 25% with gestation [18]; however, the association between habitual snoring and adverse fetal outcomes is unclear. A trial of 350 pregnant

**Table 1**

Common sleep disorders encountered during the perinatal period: recommended diagnostic testing and treatment options.

Disorder	Diagnosis	Non-pharmacologic treatment	Pharmacologic treatment
Obstructive sleep apnoea	Polysomnogram.	Auto-continuous positive airway pressure.	None.
Restless legs syndrome	Clinical history; ferritin (less useful in gestational restless leg syndrome).	Exercise; massage.	Iron and folate.
Insomnia	Clinical history.	Cognitive-behavioural therapy.	Diphenhydramine.
Narcolepsy	Polysomnogram with multiple sleep latency test.	Protected sleep; scheduled naps.	None.
Shift work sleep disorder	Clinical history.	Regular sleep-wake schedule; bright light therapy.	None.

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