



Obstructive sleep apnea in high-risk pregnancy: An anesthesia update

Jennifer E. Dominguez, MD, MHS

Assistant Professor of Anesthesiology

Program Director, Obstetric Anesthesiology Fellowship Program

Division of Women's Anesthesia, Department of Anesthesiology

Duke University School of Medicine

Durham, North Carolina



Disclosures

**ResMed and Itamar Medical Ltd have loaned home sleep devices
for use in our research studies.**



Learning objectives

- Discuss the importance of OSA screening for high-risk groups of patients.
- Review the data regarding the adverse outcomes associated with OSA in pregnancy
- Compare the data regarding prevalence of OSA in pregnancy in higher risk populations to those in lower risk populations
- Discuss the known risk factors for OSA pregnancy
- Convey some strategies for optimizing care for these challenging patients.

How do we provide the best care for women with high risk conditions?

Morbid obesity

Advanced maternal age

Cardiac disease

Pulmonary hypertension



Chronic hypertension

40 years old; BMI = 73 kg/m²
 37 weeks for repeat cesarean due to worsening maternal heart failure.

Airway exam: Mallampati class 4, thick neck with limited extension, adequate mouth opening.

PMH:

CHTN; **severe OSA on BiPAP**; Diastolic dysfunction; IDDM; Asthma

Anesthetic: Continuous lumbar spinal catheter – 10 mg bupivacaine

Positioned at 45 degrees for surgery due to dyspnea

Intraoperative BiPAP

Total surgical time: 240 minutes

Estimated blood loss: 3000 mL

Post-operative: SICU for monitoring and recovery; thoracic PCEA



Polin et al. 2015 *IJOA*, 24(3):276-80

Anesthesiology 2007; 106:1096-104

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A Series of Anesthesia-related Maternal Deaths in Michigan, 1985–2003

Jill M. Mhyre, M.D.,* Monica N. Riesner, M.D.,* Linda S. Polley, M.D.,† Norah N. Naughton, M.D., M.B.A.‡

***OSA and obesity:
 Risk factors for anesthesia-related
 maternal mortality!***

Obstructive Sleep Apnea and Severe Maternal-Infant Morbidity/Mortality in the United States, 1998-2009

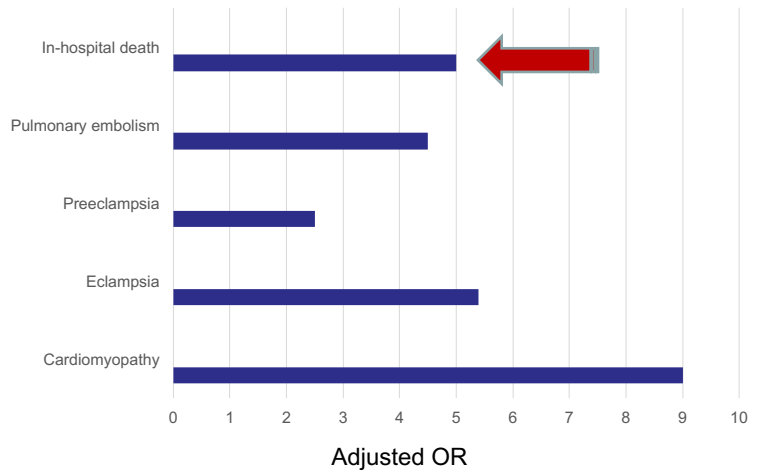


Judette M. Louis, MD, MPH¹; Mulubrhan F. Mogos, PhD²; Jason L. Salemi, MPH²; Susan Redline, MD, MPH³; Hamisu M. Saliyu, MD, PhD^{1,2}

¹Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Morsani College of Medicine, University of South Florida, Tampa, FL; ²Maternal and Child Health Comparative Effectiveness Research Group, Department of Epidemiology and Biostatistics, College of Public Health, University of South Florida, Tampa, FL; ³Division of Sleep Medicine, Department of Medicine, Harvard Medical School, Brigham and Women's Hospital and Beth Israel Deaconess Medical Center, Boston, MA

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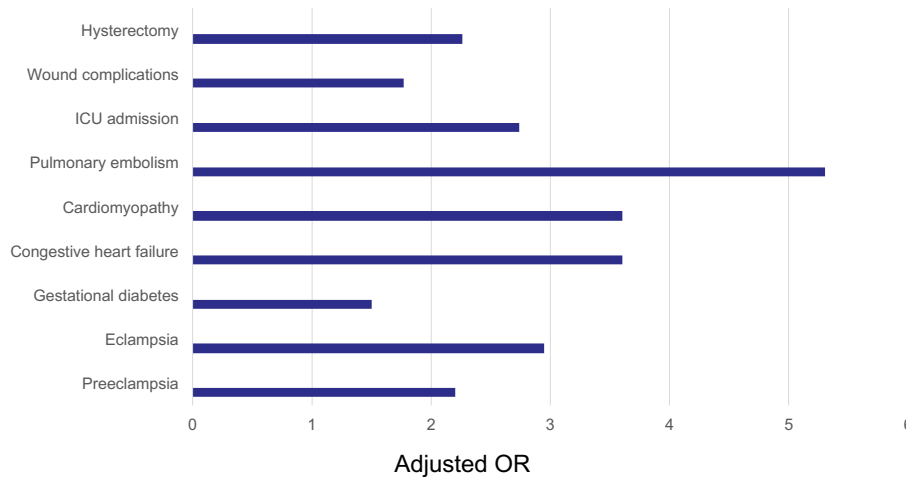
After controlling for obesity, women with OSA in pregnancy had increased risk of:



Obstructive sleep apnea in pregnancy is associated with adverse maternal outcomes: a national cohort



Ghada Bourjeily ^{a, b, *}, Valery A. Danilack ^{c, d, e}, Margaret H. Bublitz ^{a, b, f}, Heather Lipkind ^g, Janet Muri ^h, Donna Caldwell ^h, Iris Tong ^{a, b}, Karen Rosene-Montella ^a
Sleep Med. 2017 October; 38: 50–57.



Prevalence of OSA in Pregnancy

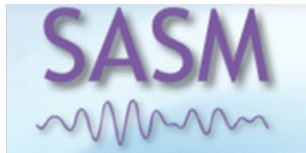
	Facco et al. 2017	Louis et al. 2012	Facco et al. 2012	Pien et al. 2014	Lockhart et al. 2015	Dominguez et al. 2018	Dominguez et al. unpublished
Cohort	N = 3600 NuMom2B	N = 182 BMI > 30	N = 114 BMI ≥ 30 or other high risk	N = 108 Mean BMI = 32	N = 248 Mean BMI = 30	N = 80 BMI ≥ 40	N = 100 50 CHTN; 50 normotensive; BMI = 38
Prevalence							
Early gestation	3%	15%	28%	11%	--	--	cHTN: 64% Controls:38%
Third trimester	8%	--	--	27%	12%	24%	--

Louis J et al. *Obstet Gynecol* 2012;120(5):1085-92
 Facco et al. *JCSM* 2012, 8(4).
 Lockhart et al. *Obstet Gynecol* 2015, 126(1).

Pien G et al. *Thorax* 2014;69:371-377
 Dominguez et al. *AJOG* 2018, 219 (6):613.e1–613.e10.
 Facco et al. *Obstet Gynecol* 2017, 129 (1): 31-41.



Cesarean delivery rate is HIGH in this population!



**Practice guidelines for general surgical patients—
 Preoperative evaluation and treatment of OSA is optimal.**

American Society of Anesthesiologists Task Force on Perioperative Management of patients with obstructive sleep apnea. *Anesthesiology* 2014; 120: 268-286.

Chung F et al. Society of Anesthesia and Sleep Medicine Guideline on Preoperative Screening and Assessment of Patients With Obstructive Sleep Apnea. *Anesth Analg* 2016.

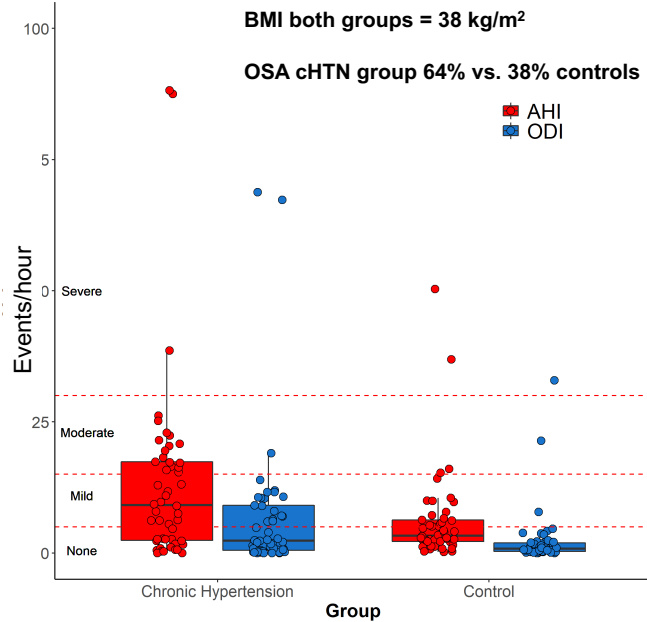
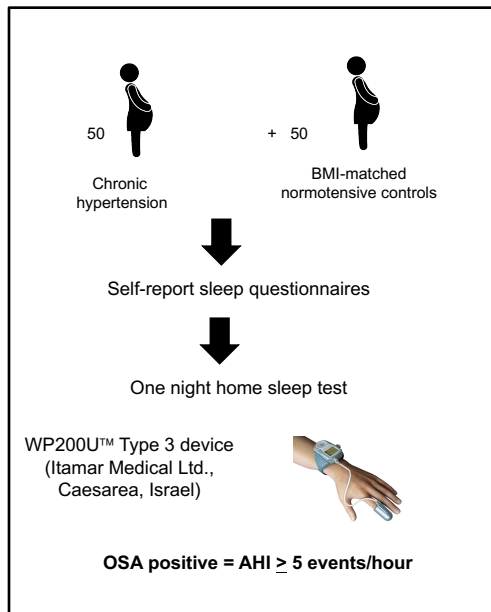


Risk factors for OSA in Pregnancy

	Louis et al. 2012	Facco et al. 2012	Pien et al. 2014	Lockhart et al. 2015	Dominguez et al. 2018	Louis et al. 2018	Dominguez et al. unpublished
Cohort	BMI > 30	BMI ≥ 30 or other high risk	Mean BMI = 32	BMI > 35	BMI ≥ 40	NuMom2B	CHTN
BMI	+	+	+	+	+	+	+
AGE	+	+	+		+	+	+
CHTN	+	+		+			+
Freq Snoring		+				+	
Witnessed apneas					+		
Fall asleep while talking				+			
Fall asleep while driving					+		
Neck circum					+		+

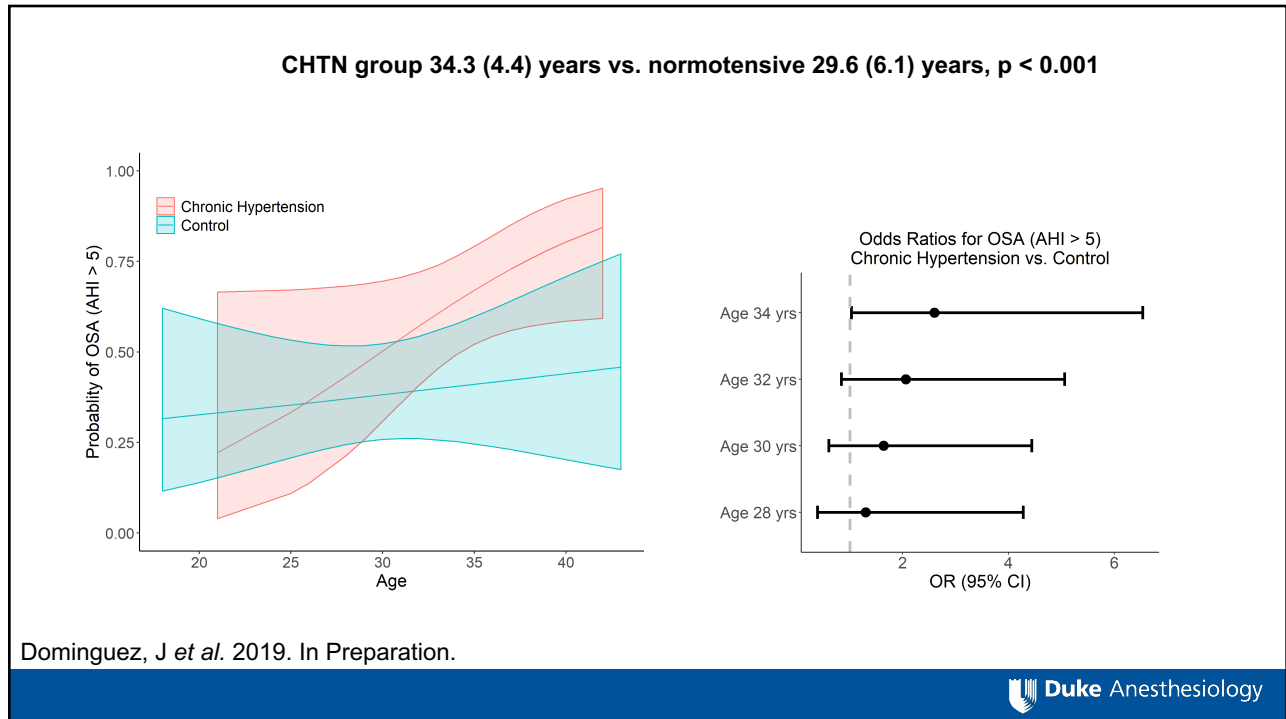
Louis J et al. *Obstet Gynecol* 2012;120(5):1085-92
 Facco et al. *JCSM* 2012, 8(4).
 Lockhart et al. *Obstetrics & Gyn* 2015, 126(1).

Pien G et al. *Thorax* 2014;69:371-377
 Dominguez et al. *AJOG* 2018, 219 (6):613.e1-613.e10.
 Louis et al. *AJOG* 2018, 218 (5): 521.e1 – 521.e12.



Dominguez, J et al. 2019. In Preparation.





How to screen?

- Validated approach still needed
- What's the best evidence for what is likely to be helpful?
 - **AGE**
 - **BMI**
 - Chronic Hypertension
 - +/- Frequent snoring

Barriers to screening?

- **Still no data to suggest that treatment can mitigate associated adverse outcomes --> Buy in can be challenging.**
- **Limitations on the availability and timeliness of sleep medicine referrals and treatment during pregnancy.**
- **Variable patient cooperation with diagnosis and treatment.**

Peripartum management:

Pre-anesthesia consult clinic visit for obstetric patients with known or suspected OSA

- **History and medical records**
- **History of difficult airway or perioperative complications**
- **OSA screening and possible referral**
- **Physical exam**
- **Discussion with patient regarding delivery recommendations**
- **Encourage to bring CPAP to hospital for delivery admission**

III. Peripartum management

- **Encourage early epidural**
 - Avoid intravenous narcotics
 - Avoid sedatives/hypnotics
 - Decrease need to intubate for emergency CD
- **45-degree HOB elevation**
- **Home CPAP**
- **Multi-modal analgesia/opiate sparing post-op pain strategies**
- **Continuous pulse oximetry**
- **Consider post-op ICU/step-down depending on your institution for patients with severe OSA**

Future directions

- ▣ **Validated screening approach for OSA in pregnancy**
- ▣ **Prospective studies of the impact of OSA treatment on maternal and fetal outcomes**
- ▣ **Studies to support clinical care pathways re: safe use of opiates for post-operative pain**
- ▣ **Non-opioid based analgesic modalities**
- ▣ **Consensus guideline**

SASM Obstetrics Subcommittee

CONSENSUS GUIDELINE IN PROGRESS

Working group:

Ghada Bourjeily

Jennifer Dominguez

Ashraf Habib

Suzie Karan

Ellen Lockhart

Judette Louis

Alice Mischkovic

Jacob Nadler

Mahesh Nagappa

Louise O'Brien

Christine Won



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Duke Division of Women's Anesthesia

Our study subjects

Clinical research staff

Duke Sleep Research Clinic

My family

Mentors:

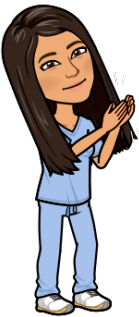
Ashraf Habib, M.B.B.Ch., MSc, MHSc, FRCA

Andrew D. Krystal, MD

Collaborators:

Chad Grotegut, MD, MHS

Statistician: Mary Cooter, MS





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