# OSA in Hospitalized Patients: Early Diagnosis and Management

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# CONFLICT OF INTEREST

No conflicts of interest to declare.

# OBJECTIVES

- ❏ Highlight that OSA is under-recognized  in hospitalized patients and its impact on morbidity and mortality.
- ❏ Recognize at risk population in the inpatient setting and evaluate techniques for early diagnosis and management.
- ❏ Discuss future potential of inpatient sleep testing for better outcomes.

# Prevalence

**Global prevalence:**

1 billion people

Adults aged 30–69 years (men and women)

936 million : mild to severe OSA

425 million : moderate to severe OSA

17 studies from 16 countries

*Benjafield et al; Lancet Respir Med 2019, Aug*

**US disease burden:**

Nearly 30 million (AASM)

Wisconsin Sleep Cohort Study (1988–1994 and 2007–2010)

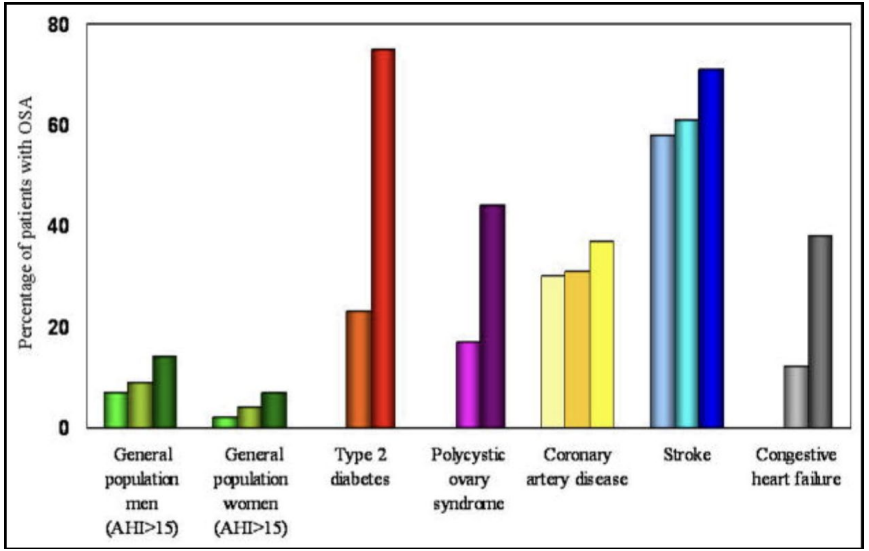
Adults 30–70 years of age:

~9% of men ,~4% of women :AHI ≥15.

~24% of men , ~ 9% of women :AHI ≥5

*Peppard PE et al; Am J Epidemiol 2013 May*

# Prevalence of OSA in various medical disorders

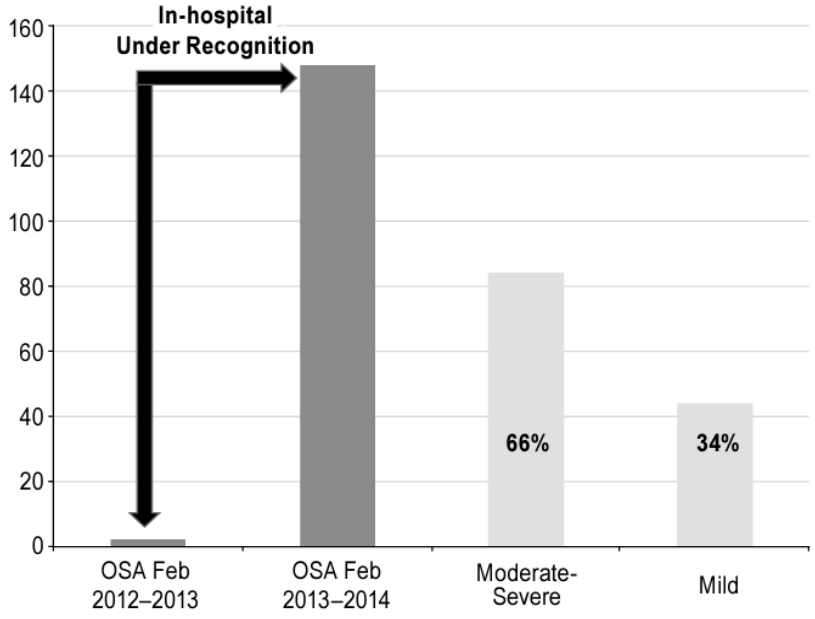



*Lee W, Expert Rev Respir Med. 2008*

**Inpatient disorders with HIGH OSA risk:**

Acute CHF
Afib
ACS
Acute CVA
Acute COPD exacerbation
Type 2 DM
Obesity
OHS
Elective surgery

# OSA is under recognized in hospitals




*Sharma et al, JCSM 2015*

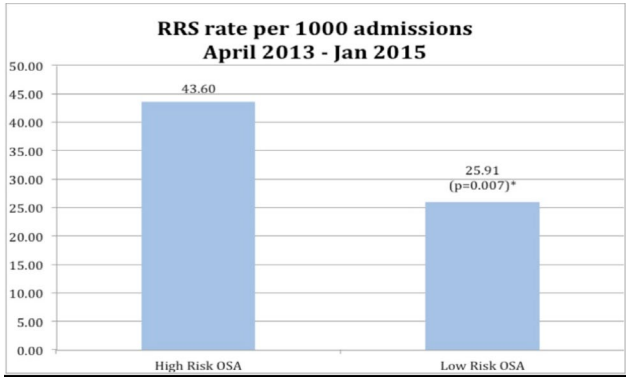
754 patients screened

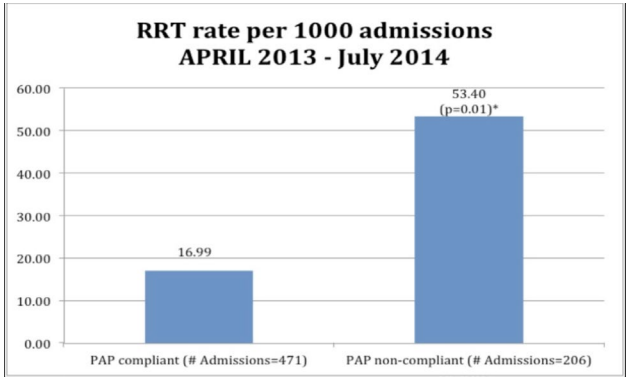
410 had PSG w/in 4w of discharge

87% had OSA

65% mod to severe AHI

# OSA associated health impact in hospitalized patients




*Sharma S, Chowdhury A,PLoS One. 2016 May*

## Moderate to severe OSA

- ❏ Increased the incidence of ACS recurrence, MACE
- ❏ Newly necessitated PCI for myocardial ischemia-related progressive lesions
- ❏ Plaque vulnerability and the progression of coronary atherosclerosis.

*Nakashima, Euro Heart J 2015*

# CVA and OSA

- SDBP after stroke : OSA or central sleep apnea (CSA) or both.
- OSA is more common than CSA after stroke *Lyons OD,Can J Cardiol. 2015*
- Increase mortality
- Risk of recurrent stroke and other vascular disease
- Worsen cognition and functional outcome
- Prolong hospitalization

<u>Benefits of PAP</u>

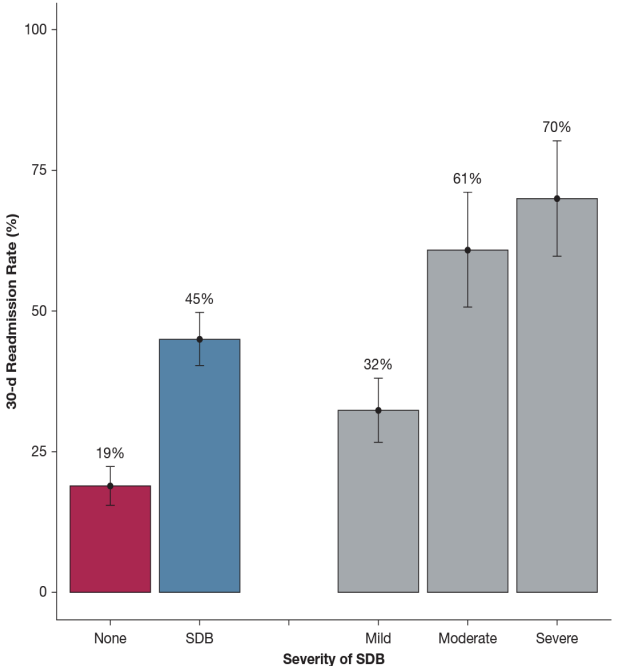
- Improved outcome;attention and executive function, depression and delirium
- Early nasal CPAP therapy has a positive effect on long-term survival/5 year survival in ischaemic stroke patients and moderate–severe OSA

# Overlap Syndrome

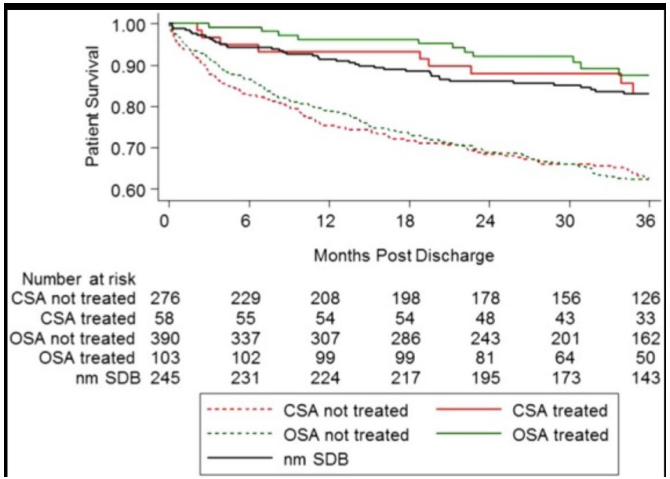
COPD+OSA

Undiagnosed OSA significantly affects outcomes in adults admitted for COPD in an Inner-City Hospital

*Naranjo CHEST 2020, Sep*



# OSA and Post Discharge Outcomes




*Khayat et al , Euro Heart J 2015*

# Hospital Sleep Medicine

Concept of inpatient sleep testing was introduced by Khayat et al 2009

COMPONENTS:

Screening

Diagnostic testing

Interventions: PAP, O2 or other

Post Discharge Follow Up

# Who to screen?

**High risk patients:**

ADCHF

Acute CVA

AFib,ACS

Chronic opioids

Morbid obesity , AE OHS

AE copd

COVID-19

Type 2 DM

# Indicative Signs

**SYMPTOMS**

- ❑ Nonrestorative sleep or fatigue
- ❑ Loud snoring
- ❑ Witnessed apneas by bed partner
- ❑ Awakening with choking or gasping
- ❑ Nocturnal restlessness
- ❑ Insomnia (initiation, maintenance, frequent awakenings)
- ❑ Lack of concentration, cognitive deficits
- ❑ Morning headaches
- ❑ Nocturia

**EXAM**

- ❑ Narrow or "crowded" oropharynx (eg, Mallampati 3 or 4; macroglossia, tonsillar enlargement, narrow palate)
- ❑ Obesity
- ❑ Large neck circumference (eg, >17 inches [males]; >16 inches [females])
- ❑ Craniofacial abnormalities (eg, retrognathia)

# SCREENING TOOL

## STOP-BANG

| | | |
|---|---|---|
| ☐ Yes | ☐ No | **Snoring?**<br>Do you **snore loudly** (loud enough to be heard through closed doors, or your bed partner elbows you for snoring at night)? |
| ☐ Yes | ☐ No | **Tired?**<br>Do you often feel **tired, fatigued, or sleepy** during the daytime (such as falling asleep during driving or talking to someone)? |
| ☐ Yes | ☐ No | **Observed?**<br>Has anyone **observed** you **stop breathing** or **choking/gasping** during your sleep? |
| ☐ Yes | ☐ No | **Pressure?**<br>Do you have or are being treated for **high blood pressure**? |
| ☐ Yes | ☐ No | **Body mass index more than 35 kg/m$^2$?** |
| ☐ Yes | ☐ No | **Age older than 50 years old?** |
| ☐ Yes | ☐ No | **Neck size large? (measured around Adam's apple)**<br>Is your shirt collar 16 inches or larger? |
| ☐ Yes | ☐ No | **Gender (biologic sex) = Male?** |

Low risk: 0-2

Intermediate risk: 3 or 4

High risk 5 or more

STOP-Bang questionnaire with a score ≥3 as the cut-off consistently demonstrates a high sensitivity to detect OSA

Higher score, higher probability

*Nagappa M, Liao P, Wong J et al PLoS One. 2015 Dec 14*

# Inpatient Diagnostic Testing

- **Attended Polysomnogram:**
- Gold standard
- Limitations

  -Ongoing Inpatient care

  -Acute illness (O2 requirements, instability)

  -Resource requirements

  -Logistics

  -Issues of reimbursement

❑ **Portable Monitoring/HST**

- Type III, 4 channels

- Validated outpatient settings

- Reasonably accurate in inpatient settings

- PAT devices (Watch PAT)

# Role of Overnight Oximetry

## Sleep Overnight Monitoring for Apnea in Patients Hospitalized with Heart Failure (SOMA-HF Study)

Sunil Sharma, MD[1]; Paul J. Mather, MD[2]; Anindita Chowdhury, MD[1]; Suchita Gupta, MD[1]; Umer Mukhtar, MBBS[1]; Leslee Willes, MS[3]; David J. Whellan, MD[4]; Atul Malhotra, MD[5]; Stuart F. Quan, MD[6]

Simultaneous testing with Portable Monitor (PM/HST) and High resolution pulse oximetry (HRPO) was performed on hospitalized patients with CHF

HRPO derived ODI vs REI comparison

ODI showed high accuracy with specificity for detecting moderate to severe SDB

# Overnight Oximetry

**Advantages**

Risk stratifying tool

Mass screenings

Minimal training

Cost effective

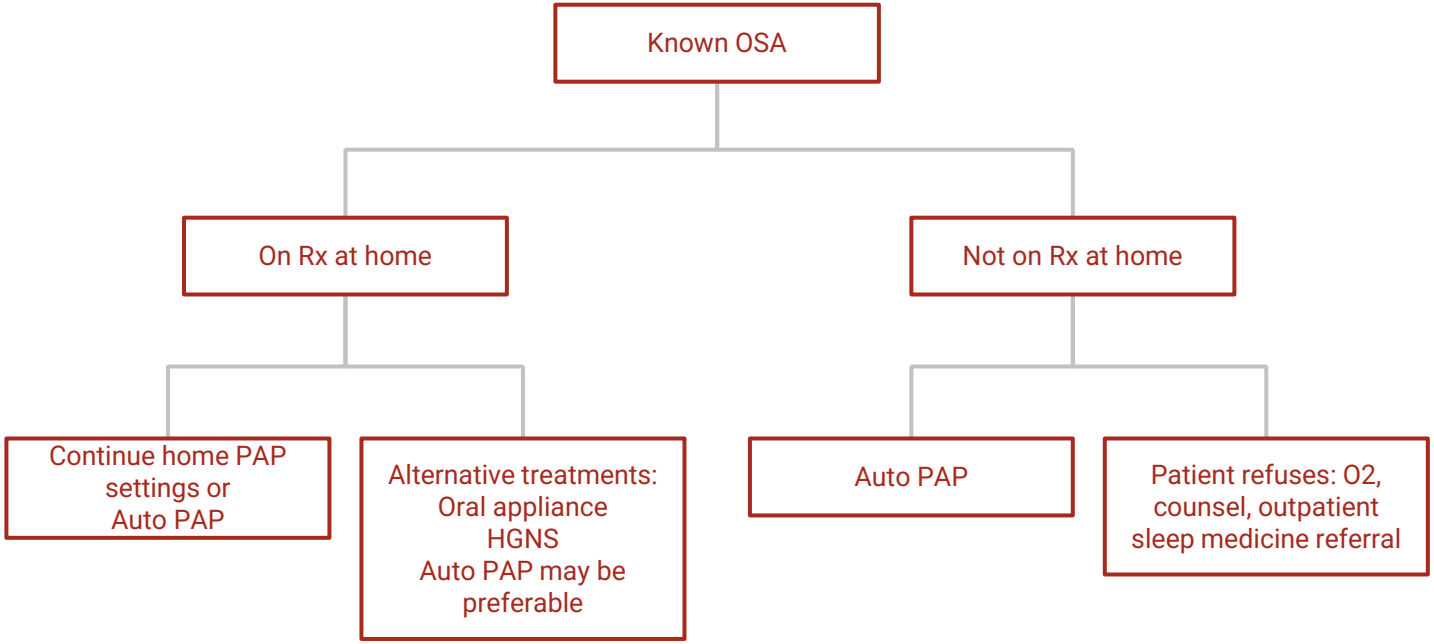
**Limitations**

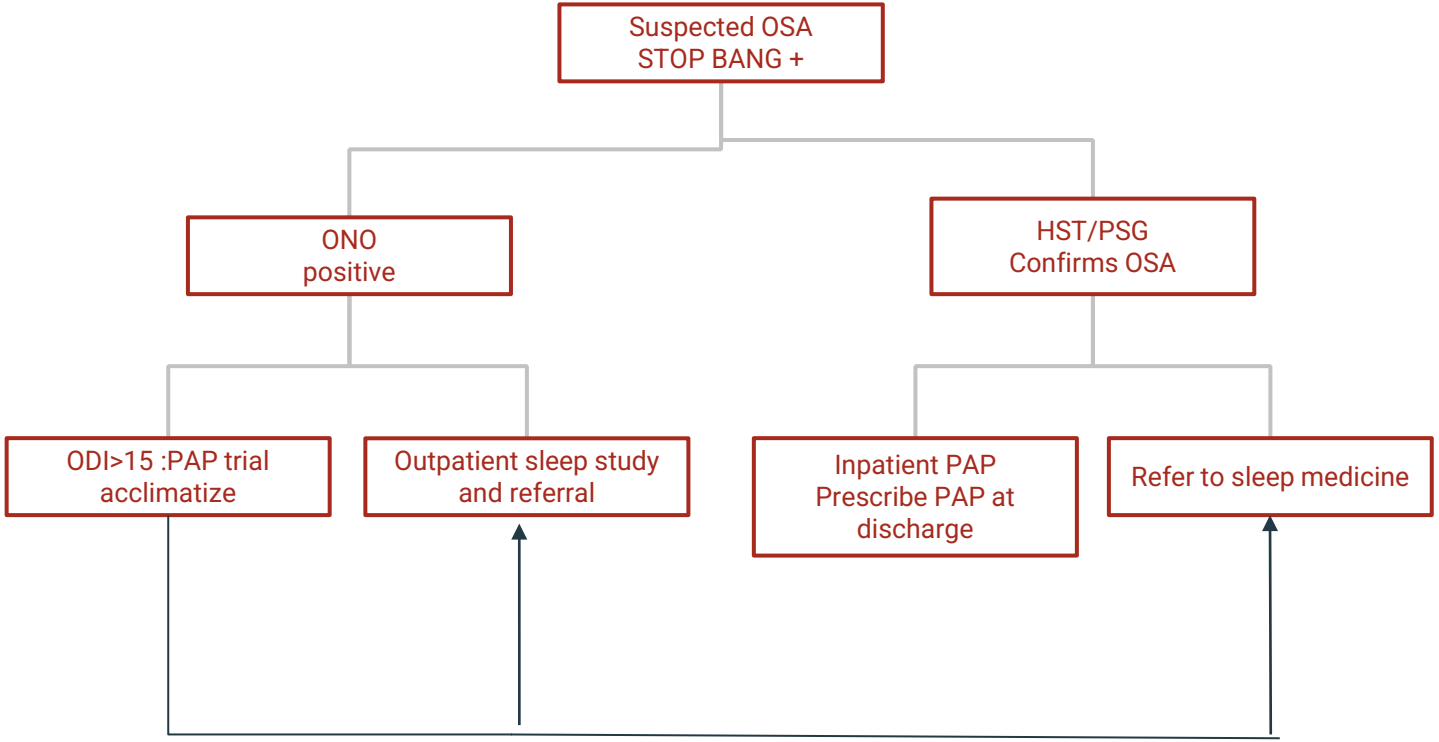
Acute illness, O2 requirements

Cannot reliably differential b/w OSA and CSA

Cannot use for PAP prescriptions

# Management


Known OSA
On Rx at home
Not on Rx at home
Continue home PAP settings or Auto PAP
Alternative treatments: Oral appliance HGNS Auto PAP may be preferable
Auto PAP
Patient refuses: O2, counsel, outpatient sleep medicine referral


Suspected OSA
STOP BANG +
ONO
positive
HST/PSG
Confirms OSA
ODI>15 :PAP trial
acclimatize
Outpatient sleep study
and referral
Inpatient PAP
Prescribe PAP at
discharge
Refer to sleep medicine

# Proposed inpatient model (SEAT-COM)

Sharma et al, Chest 2022

| Component | Description |
|---|---|
| **S**creening | Use of EMR-generated reports and using STOP/STOP-BANG questionnaire for initial assessment in appropriate patients. Explain significance of OSA. |
| **E**valuation | Individuals with positive screening findings undergo high-resolution pulse oximetry or portable sleep monitor assessment. Reports are downloaded and prepared for review. Results and recommendations made to primary service. |
| **A**cclimatization | Education on OSA and treatment with positive airway pressure (PAP) therapy. Appropriately introduce individuals to the PAP device and interface. |
| **T**reatment | Develop a plan with individuals to meet adherence guidelines for PAP therapy. Interrogate PAP devices to ensure therapy is optimized. Debrief and adjust PAP therapy based on individual's feedback. |
| **Com**munications | Final recommendations communicated to members of the multidisciplinary team, including the discharge navigator, primary care team, sleep laboratory, and pulmonary/sleep team. Information is placed in an appropriate database for quality improvement and possible research purposes. |

# Role of Oxygen

O2 therapy significantly improves oxygen saturation in patients with OSA

May also increase the duration of apnea-hypopnea events.

Mehta V, review of the literature and meta-analysis. J Clin Sleep Med. 2013 Mar 15

# Advantages of early diagnosis

Decreased risk of readmissions

Decreases In-Hospital Mortality

Decreased Length of Stay

(Decreased proportion of 30-day hospital readmission for HF in compliant CPAP users vs. non-compliant. Kauta 2014

# Further Considerations

Lack of provider awareness

Limited availability of inpatient sleep testing

No standardized guidelines to diagnose and treat SDB in hospital

Provider and Sleep tech staffing issues

Cost analysis : DRG patients by CMS, bundled costs

Weigh economic challenges against long term cost effectiveness (savings with expedited discharge, decreased LOS, prevent or decrease readmission)

Challenges with post discharge follow up and adherence: Require more investigation

THANK YOU