OBSTRUCTIVE SLEEP APNOEA/HYPOPNOEA SYNDROME (OSAHS)

Tuesday 21st September 2021

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Content

Summary of Obstructive sleep apnoea/hypopnoea syndrome and obesity hypoventilation syndrome in over 16s NICE guideline – Updated August 2021.

With some elaboration from BMJ Best Practice Obstructive Sleep Apnoea in adults. Last updated 15 Oct 2020.

Definitions: Obstructive Sleep Apnoea/Hypopnoea syndrome (OSAHS)

is a condition in which the upper airway is narrowed or closes during sleep when muscles relax, causing under breathing (hypopnoea) or stopping breathing (apnoea). The person wakes or lightens sleep to stop these episodes, which can lead to disrupted sleep and potentially excessive sleepiness.

It is characterised by recurrent episodes of complete or partial upper airway obstruction during sleep resulting in dips in oxygen level, autonomic dysfunction and sleep fragmentation.

Definitions: Obesity Hypoventilation Syndrome (OHS)

OHS is a specific form of chronic ventilatory failure.

OHS occurs when people who are **obese** (BMI > 30) are **unable to breathe rapidly or deeply enough,** resulting in **low oxygen levels and high blood carbon dioxide levels.**

It is usually associated with OSAHS or nocturnal hypoventilation, and people with OHS often have cardiovascular complications and other comorbidities.

Definitions: COPD–OSAHS Overlap syndrome

occurs in people who have both chronic obstructive pulmonary disease (COPD) and obstructive sleep apnoea/hypopnoea syndrome (OSAHS).

The combined effect of these conditions on ventilatory load, gas exchange, comorbidities and quality of life is greater than either condition alone.

Why should we as GPs learn more about these conditions?[1]

- OSAHS is a **common**, but **frequently unrecognised** cause of serious disability that has important health and social consequences.

We probably need to screen for it more often!

- It is estimated that **5% of adults** in the UK have undiagnosed OSAHS. Recent estimates put the prevalence of OSAHS in the US as high as 14 % of men and 5 % of women.[2]

- Both COPD and OSAHS are common conditions and are estimated to coexist, as overlap syndrome, in about 1% of the adult UK population.

- OHS is of particular concern because of rising obesity; it is already estimated to affect 0.3% to 0.4% of the UK population, with prevalence likely to grow.
- These conditions can have a profound impact on people's lives, causing excessive sleepiness or sleep disturbance that affects social activities, work performance, the ability to drive safely and quality of life.
- Undiagnosed, these conditions are **closely associated** with serious health problems, including **hypertension, diabetes, stroke and heart disease**, and can **shorten life expectancy.**

As GPs, we have a key role to play in early detection of disease. Increasing our awareness of these conditions will lead to earlier referrals, diagnosis and ultimately more prompt treatment!

Aetiology[2]

Genetic and **environmental factors** are thought to have roles in OSAHS. Aggregation of OSAHS has been demonstrated in studies of families that included obese and non-obese adults and children.

In OSA, an episode of apnoea is caused by dynamic narrowing of the upper airway during sleep.

Airway narrowing may be triggered by **neuromuscular mechanisms** within an anatomically small upper airway.

Anatomical narrowing of the pharynx may be mediated by maxillomandibular anomalies or adenotonsillar hypertrophy.

Increases in lateral pharyngeal, soft palatal, and tongue tissue mass commonly seen with obesity may also reduce the pharyngeal cross-sectional area.

Symptoms/clinical features of OSAHS[1]

Think of the possibility of OSAHS if a patient has 2 or more of the following features:

- Snoring *(common – often audible beyond the bedroom[2])*
- Witnessed apnoeas
- Unrefreshing sleep
- Waking headaches
- Unexplained excessive sleepiness, tiredness or fatigue
- Nocturia (and even nocturnal enuresis – more so in children)
- Choking/episodic gasping during sleep
- Sleep fragmentation or insomnia *(more frequently experienced by women[2])*
- Cognitive dysfunction or memory impairment *(patients may report problems with attention, learning and memory[2])*

Symptoms/clinical features of OSAHS[2]

Other common symptoms include:

- Mood disorders: *Depression, anxiety, and irritability are commonly reported. Diagnosis of OSAHS may sometimes be delayed as patients could be treated for mood disorders.*
- Erectile dysfunction: *Possibly related to hypoxaemia. May respond to continuous positive airway pressure treatment.*
- Heartburn/dyspepsia: *Patients may complain about retrosternal burning or choking episodes at night due to laryngospasm.*
- Dry mouth: *Caused by mouth breathing.* Episodic swelling of the uvula may occur.
- Nocturnal sweating: May be noted by partner of adult patient. *Common symptom in paediatric patients.*

Key Risk Factors[2]

1. Obesity

A 10% gain in body weight has been found to increase the risk of OSAHS progression from mild to moderate or severe by 6-fold. However, after 60 years of age, higher BMI is not a risk factor

2. Male sex

3. Post-menopause (Women) Prevalence of OSA in women increases to a level similar to that seen in men

4. Large neck circumference A neck circumference of >40 cm has a sensitivity of 61% and specificity of 93% for OSAHS. Neck is measured at the level of the cricothyroid space. Patients are asked if neck collar size has increased over the last 6 to 12 months in association with increased symptoms.

Key Risk Factors[2]

5. Maxillomandibular anomalies (e.g., narrowing, retrognathia, and high, arched palate)

Have been associated with increased risk of OSAHS. Excessive protrusion of the upper over the lower incisors (overjet) is common.

6. Increased volume of soft tissues (includes tonsils, adenoids, and tongue)

Anatomical studies using MRI to compare soft tissue volumes of patients with OSAHS versus control patients found greater volume of soft palate, tongue, and lateral pharyngeal walls in patients with OSAHS.

Key Risk Factors[2]

7. Family history of OSAHS

8. Polycystic ovary syndrome Combination of high levels of androgenic hormones and obesity increases risk of OSAHS by 30-fold.

9. Hypothyroidism Treatment of hypothyroidism may improve OSA, but outcome must be verified using sleep study.

10. Down's syndrome In a Down's syndrome paediatric population study, OSAHS was found to have a prevalence of 55%, and was higher in male than in female patients.

11. Increasing age Has been associated with increased risk: per 10-year increment, the adjusted odds ratio for OSAHS has been found to be 1.76.

Key Risk Factors[2]

12. Black, Hispanic, and Asian ethnicity Prevalence may be higher in Black, Hispanic, and Asian populations

13. Tobacco smoking Active smokers have an odds ratio of 4.4 for moderate to severe OSAHS and heavy smokers (≥40 cigarettes/day) have an odds ratio of 40.5.

14. Mucopolysaccharidoses Significant increase in prevalence in this population may be due to skeletal and soft tissue factors.

Associated conditions[1]

Be aware that there is a higher prevalence of OSAHS in people with the following conditions:

- Obesity or overweight
- Obesity or overweight in pregnancy
- Treatment-resistant hypertension
- Type 2 diabetes
- Cardiac arrhythmia, particularly atrial fibrillation
- Stroke or transient ischaemic attack
- Chronic heart failure

Associated conditions[1]

- Moderate or severe asthma
- Polycystic ovary syndrome
- Down's syndrome
- Non-arteritic anterior ischaemic optic neuropathy
- Hypothyroidism
- Acromegaly

Assessment scales for suspected OSAHS[1]

- Use the **Epworth Sleepiness Scale** in the preliminary assessment of sleepiness.

- Consider using the **STOP-Bang Questionnaire** as well as the Epworth Sleepiness Scale

- Do not use the Epworth Sleepiness Scale alone to determine if referral is needed, because not all people with OSAHS have excessive sleepiness.

Epworth sleepiness scale

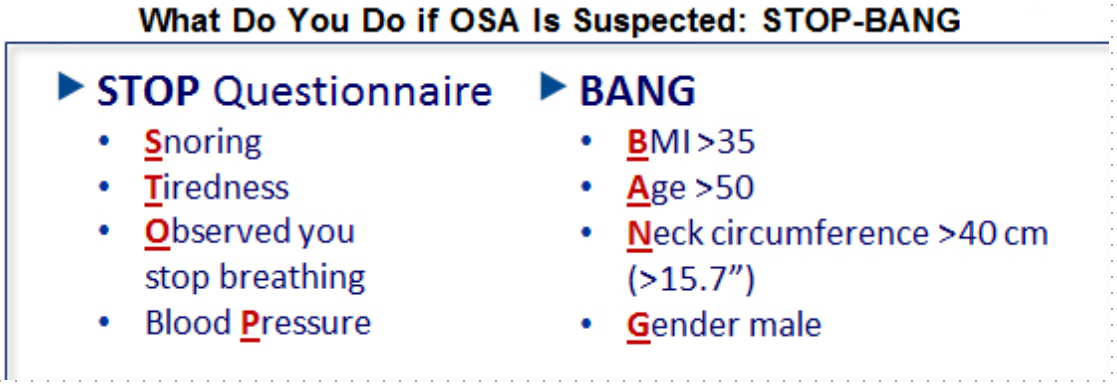
https://epworthsleepinessscale.com/about-the-ess/

https://www.omnicalculator.com/health/epworth-sleepiness-scale

This method is an effortless and cheap way of evaluating **how easy it is for you to fall asleep throughout the day**. The ESS consists of 8 short questions that serve as a **screening test** that may be applied to the majority of the population over the age of 18.

STOP-BANG Questionnaire

http://www.stopbang.ca/osa/screening.php



For general population

OSA - Low Risk : Yes to 0 - 2 questions

OSA - Intermediate Risk : Yes to 3 - 4 questions - **Refer**

OSA - High Risk : Yes to 5 - 8 questions **– Refer**

or Yes to 2 or more of 4 STOP questions + male gender

or Yes to 2 or more of 4 STOP questions + BMI > 35kg/m^2

or Yes to 2 or more of 4 STOP questions + neck circumference 16 inches / 40cm

Urgent referral criteria[1]

Prioritise those who:

- have a vocational driving job
- have a job for which vigilance is critical for safety
- have unstable cardiovascular disease, for example, poorly controlled arrhythmia, nocturnal angina or treatment-resistant hypertension
- are Pregnant
- are undergoing preoperative assessment for major surgery
- have non-arteritic anterior ischaemic optic neuropathy.

Diagnosis of OSAHS[2]

Attended polysomnography is the definitive test but it has not been validated for sensitivity and specificity for diagnosis of OSA.

The diagnosis of OSA may be confirmed if the **Apnoea-Hypopnoea Index** (the sum per hour of episodes of apnoeas and hypopnoeas) or **Respiratory Distress Index** (the sum per hour of episodes of apnoea, hypopnoea, and respiratory effort-related arousals) established with polysomnography or portable sleep test is **≥15 episodes/hour.**

However, **5 episodes/hour** is considered sufficient for diagnosis in a symptomatic patient or in a patient with hypertension, ischaemic cardiac disease, history of stroke, excessive daytime sleepiness, insomnia, mood disorder, or cognitive dysfunction.

Polysomnography commonly includes[2]

- **Electroencephalographic** (EEG) array to determine sleep from wake and to stage sleep.
- **Electro-oculographic** recording to help determine sleep/wake, and especially rapid eye movement(REM) staging.
- **Sensors to assess air flo**w (expiratory: nasal pressure sensor and/or oronasal thermistor sensor)and respiratory effort (expiratory: thoracic and abdominal piezo sensors). This is used to determine whether flow cessation is due to obstruction versus absence of effort.
- **Electromyographic recording** of limb activity and chin muscle activity. Used primarily to determine the presence of periodic limb movements and assist with sleep/wake stage determination.

- **Capnography** (end tidal or transcutaneous) and **oesophageal manometry** are sometimes used to assess hypoventilation and breathing effort, respectively.
- **ECG and heart rate**: to assess for cardiac dysrhythmias and autonomic (sympathetic) activation.
- **Pulse oximetry**: needed to score hypopnoeas and assess for hypoxaemia. The properties of the oximeter and its setting, such as the sampling rate, may significantly affect the sensitivity of the test. The number of hypopnoeas scored may be increased in the setting of pulmonary disease

If a full night study is performed to diagnose OSA, the patient may return for CPAP titration. During the CPAP titration study, the therapeutic CPAP level is determined, and proper interface fitting and troubleshooting is performed. In a split study, the diagnosis and CPAP titration are performed on the same night.

Severity of OSAHS[1]

This is determined using the AHI (Apnoea-Hypopnoea Index) value, as follows:

Mild OSAHS: AHI of 5 or more to less than 15

Moderate OSAHS: AHI of 15 or more to less than 30

Severe OSAHS: AHI of 30 or more.

Lifestyle advice for all severities of OSAHS

Discuss appropriate lifestyle changes with all people with OSAHS.

Provide support and information on losing weight, stopping smoking, reducing alcohol intake and improving sleep hygiene, tailored to the person's needs.

Treatments

- **Lifestyle advice** only
- **Continuous positive airway pressure** (CPAP) (can worsen or cause rhinitis and nasal congestion. Changing from a nasal to orofacial mask and adding humidification can help)
- **Mandibular advancement splints** as an alternative to CPAP if they are aged 18 or over and have optimal dental and periodontal health.
- **Positional modifiers** for people with mild or moderate OSAHS. This is an intervention to encourage patients not to sleep on their backs. There are several devices available such as the tennis ball technique, lumbar or abdominal binders, semi-rigid backpacks, full-length pillows and electronic sleep position trainers. (unlikely to be effective in severe OSAHS)
- **Surgery** Consider tonsillectomy for people with OSAHS who have large obstructive tonsils and a body mass index (BMI) of less than 35.

DVLA guidance

Excessive sleepiness means that you have had difficulty concentrating and have found yourself falling asleep - for example while at work, watching television or when driving.

You must tell DVLA if you have:

- Confirmed moderate or severe obstructive sleep apnoea syndrome with excessive sleepiness
- either narcolepsy or cataplexy or both
- any other sleep condition that has caused excessive sleepiness for at least 3 months – including suspected or confirmed mild OSAS

You must not drive until you're free from excessive sleepiness or until your symptoms are under control and you're strictly following any necessary treatment.

Patient Resources

https://sleep-apnoea-trust.org/

https://thesleepcharity.org.uk/

Obesity Hypoventilation Syndrome[1]

Suspect in those who have a BMI of 30 or more with:

- Features of OSAHS **or**

- Features of nocturnal hypoventilation such as:

    1. Waking headaches
    2. Peripheral Oedema
    3. Hypoxaemia (arterial oxygen saturation <94 % on air)
    4. Unexplained polycythaemia

Assessment scales for OHS

- Use the Epworth Sleepiness Scale in the preliminary assessment of sleepiness in people with suspected OHS.

- Do not use the Epworth Sleepiness Scale alone to determine if referral is needed, because not all people with OHS have excessive sleepiness.

Referrals[1]

When referring people with suspected OHS to a sleep service, include the following information in the referral letter to facilitate rapid assessment:

- results of the person's sleepiness score
- how sleepiness affects the person
- BMI
- comorbidities
- occupational risk
- oxygen saturation and blood gas values, if available
- any history of emergency admissions and acute non-invasive ventilation.

Urgent referral criteria[1]

Prioritise those who:

- have a vocational driving job
- have a job for which vigilance is critical for safety
- have unstable cardiovascular disease, for example, poorly controlled arrhythmia, nocturnal angina or treatment-resistant hypertension
- are Pregnant
- are undergoing preoperative assessment for major surgery
- have non-arteritic anterior ischaemic optic neuropathy.

Treatments for OHS[1]

People with OHS who do not have acute ventilatory failure:

- Offer **continuous positive airway pressure** (CPAP) to people with OHS and severe OSAHS as first-line treatment.
- Offer **non-invasive ventilation** as an alternative to CPAP for people with OHS and severe OSAHS if symptoms do not improve, hypercapnia persists, apnoea–hypopnoea index (AHI) or oxygen desaturation index (ODI) are not sufficiently reduced or CPAP is poorly tolerated.
- Consider non-invasive ventilation for people with OHS and nocturnal hypoventilation who do not have OSAHS, or in whom OSAHS is not severe.

Treatments for OHS[1]

People with OHS and acute ventilatory failure

Offer non-invasive ventilation to people with OHS with acute ventilatory failure:

- If hypercapnia persists, consider continuing and further optimising non-invasive ventilation.
- If hypercapnia resolves, consider stopping non-invasive ventilation and monitoring the response.

Once stable consider stopping non-invasive ventilation and carrying out respiratory polygraphy and a trial of CPAP in people with frequent episodes of obstructive apnoea and minimal hypoventilation.

If the person decompensates after stopping non-invasive ventilation, offer to restart non-invasive ventilation.

Treatments for OHS[1]

Oxygen Therapy

Consider supplemental oxygen therapy with CPAP or non-invasive ventilation for people with OHS who remain hypoxaemic despite optimal control of nocturnal hypoventilation and AHI on CPAP or non-invasive ventilation, and address any additional underlying causes of hypoxaemia where possible.

Key take home messages…

- Obstructive Sleep Apnoea/Hypopnoea syndrome, Obesity Hypoventilation Syndrome, COPD-OSAHS overlap syndrome are common yet under-recognised conditions. *We need to be thinking about them in our differential diagnoses more often!*

- Whilst Obesity is a strong risk factor for OSAHS, those who are non-obese can be affected. *Do not assume that a slim patient couldn't have OSAHS!*

- Not all patients with these conditions will present with excessive sleepiness. *Consider screening patients with other symptoms such as nocturia, insomnia, erectile dysfunction, cognitive impairment and mood disorders.*

- Prevalence may be higher in Black, Hispanic and Asian populations. *Think about the possibility in patients from these ethnic backgrounds.*

- Consider screening for OSAHS in a patient that has a condition with a higher prevalence associated with it e.g. *PCOS, Hypothyroidism, Treatment-resistant hypertension.*

- Consider the possibility of nocturnal hypoventilation in patients with peripheral oedema, waking headaches or unexplained polycythaemia

- *Do not be overly reliant on assessment scales such as the Epworth score. If you suspect OSAHS, OHS or COPD-OSAHS overlap syndrome refer to a sleep clinic for further investigation!*

References

1. Obstructive sleep apnoea/hypopnoea syndrome and obesity hypoventilation syndrome in over 16s NICE guideline

Published: 20 Aug 2021

https://www.nice.org.uk/guidance/ng202

2. BMJ Best Practice Obstructive Sleep Apnoea in adults. Last updated 15 Oct 2020. Last reviewed 20 Aug 2021.

https://bestpractice.bmj.com/topics/en-gb/215