Obstructive Sleep Apnea (OSA) is a major concern for occupational health professionals who treat those with on-the-job sleepiness and transportation workers whose sleepiness could jeopardize public safety such as:

- Truck drivers/ holders of CDL license
- Pilots
- Train operators
- Bus drivers
- Hazardous chemical handlers
- Air Traffic Control
- Manufacturing
- Taxi drivers
- Delivery drivers

The US Department of Transportation’s Federal Motor Carrier Safety Administration found that almost 1/3 of truck drivers had OSA.

**Why should Occ Health Professionals Screen for OSA?**

Untreated sleep apnea has been associated with:

- Impairment of motor skills
- Reduced daytime alertness
- Inability to focus the eyes
- Reduced reaction times
- Reduced concentration

One study specifically found impairment of driving skill in patients with OSA. Using a simulation known as the Divided Attention Driving Test (DADT), it was found that over half of those with OSA performed worse than all of those in the control group. Other studies have shown that those with untreated OSA are significantly more likely to have motor vehicle accidents than those without OSA. Those with moderate to severe apnea can have up to a fifteen-fold increase in risk of accidents. Because not only can screening for and treating OSA prevent workplace accidents, it can improve a number of other comorbid conditions, screening for OSA should be viewed as part of preventive medicine.

**Why Should Businesses Screen their Employees?**

Business can both improve the health of their employees and save money by diagnosing and treating OSA. This assumption is borne out in case studies:

The Schneider National trucking company began a program in 2006 to diagnose and treat its drivers with OSA. After one year, among the drivers who were diagnosed with and treated for sleep apnea, medical costs were cut in half (a savings of $6456/yr per affected employee). The company also saw a 91% reduction in drivers sent to the hospital. In another study, there was a 37% reduction in medical costs for those treated for apnea for a year. In addition, there was a 72% reduction in short-term disability days absent in the first year.

**How to Screen for OSA?**

Many patients may be resistant to screening because they fear they will be unable to work with an OSA diagnosis. However, as long as patients are successfully treated and compliant with therapy, typically they are considered “medically qualified to drive” so it should not interfere with their ability to earn a living.

The first step in screening for OSA is usually a subjective questionnaire, which can be completed by all patients. The most researched one available is the STOP-BANG questionnaire. The questionnaire consists of 8 questions, and ‘STOP-BANG’ is a mnemonic device for describing each question included. The questions included are as follows:

<table>
<thead>
<tr>
<th>STOP-BANG questionnaire*</th>
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<tbody>
<tr>
<td><strong>STOP</strong></td>
</tr>
<tr>
<td>Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?</td>
</tr>
<tr>
<td><strong>T</strong> (tired)</td>
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<tr>
<td>Do you often feel tired, fatigued, or sleepy during daytime?</td>
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<tr>
<td><strong>O</strong> (observed)</td>
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<tr>
<td>Has anyone observed you stop breathing during sleep?</td>
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<tr>
<td><strong>P</strong> (blood pressure)</td>
</tr>
<tr>
<td>Do you have or are you being treated for high blood pressure?</td>
</tr>
<tr>
<td><strong>B</strong> (body mass index [BMI])</td>
</tr>
<tr>
<td>BMI &gt; 35 kg/m²?</td>
</tr>
<tr>
<td><strong>A</strong> (age)</td>
</tr>
<tr>
<td>Age ≥ 50 years?</td>
</tr>
<tr>
<td><strong>N</strong> (neck)</td>
</tr>
<tr>
<td>Neck circumference &gt; 40 cm?</td>
</tr>
<tr>
<td><strong>G</strong> (gender)</td>
</tr>
<tr>
<td>Gender male?</td>
</tr>
</tbody>
</table>

If a person answers 3 or more questions with a ‘yes’, then they are at risk for OSA, and are a good candidate for the next step in screening; high resolution pulse-oximetry. Pulse oximetry provides objective data at a low cost. With pulse-oximetry, the patient takes home an oximeter, sleeps with it overnight, and then returns to the office. The oximeter will record the patient’s pulse and oxygen saturation levels. The clinical staff can then download the oximetry report and print it out for the physician to review.
The oximetry report will give a good indication of whether a patient suffers from OSA. It includes several important pieces of information. Perhaps most importantly for OSA screening, it shows the patient’s RDI, or respiratory disturbance index. In the case of an oximetry report, the RDI is the total number of desaturations that are 2% or greater. While it is not possible to know for certain, without information on respiratory flow, whether all of these desaturations are indeed due to respiratory events, pulse-oximetry is generally quite accurate in screening for OSA.

What if a patient screens positive for OSA?

If the oximetry report indicates the likely presence of OSA, then the next step is to get a diagnosis, so that the appropriate treatment can begin. This can be done either with in-lab polysomnography (PSG) or a home sleep test (HST). The PSG has been considered the “gold standard” for diagnosing sleep disorders, but it has its drawbacks. The patient must leave their home to attempt sleeping in a foreign environment and a PSG is much more expensive than an HST.

Once a diagnosis of OSA is made, treatment can begin. Generally, treatment will take one of two forms. The traditional treatment is continuous positive airway pressure (CPAP). When using CPAP, the patient will wear a mask during sleep. The mask is attached to a pump which will blow air into the patient’s airway to keep it open. While CPAP is very effective when used on a regular basis, it has about 50% compliance rate, due to the discomfort and inconvenience.

Therefore, given the need for successful treatment in this population, oral appliance therapy (OAT), custom made by dentists, may be a good option for transportation workers. OAT moves the lower jaw forward during sleep. This opens up the airway, reducing the occurrence of sleep-disordered breathing. When accounting for the low compliance rate of CPAP, OAT is generally considered as effective as CPAP for the treatment of mild to moderate OSA. The American Academy of Sleep Medicine recommends OAT as a first line treatment for mild to moderate OSA if the patient prefers OAT to CPAP. OAT is also recommended for those with severe apnea who are unable or unwilling to use CPAP.

It is clear that effectively treating OSA can have positive benefits not only on an individual’s health, but also on workplace safety and businesses’ health care costs. More effective screening of those in the transportation industry, in particular, could lead to a significant drop in deaths and injuries caused by motor vehicle accidents. Health care providers can begin screening for OSA for relatively little cost or effort by using the STOP-BANG questionnaire and high resolution pulse-oximetry.

References


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