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Also a factor in gum disease …

Cardiometabolic prevention targets sleep disorders

Earlier treatment could stave off host of issues

By Dr. Liana Groza
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Health insurance costs per employee have risen by close to two-thirds over the past 10 years, and employers have more reasons than ever to try to control health care expenses. Indeed, for a long time, many of them have understood the importance of implementing health screenings and disease management programs to help achieve that goal.

While most of the national and employer-based wellness initiatives have focused on diet and exercise, one key aspect of preventive medicine has remained largely below the radar of policymakers and employers—sleep health.

A perfect storm of rising obesity rates, increasingly demanding employee schedules, shift work, and digital technology intruding on more daily activities has pushed Americans of all age groups into a state of chronic sleep deprivation, with 30 percent of American adults reporting six hours or less of sleep per night. Less than a third of high school students are getting at least eight hours of sleep on an average school night, while obstructive sleep apnea (OSA) is now estimated to affect 25 million Americans, including a third of adult males and 17 percent of adult females.

That silent sleep crisis has profound implications on the health outcomes that our other wellness initiatives are trying to address. Extensive research demonstrates that sleep apnea and insufficient or poor-quality sleep significantly increase the risk of obesity, insulin resistance, diabetes, hypertension, heart disease, and stroke. Recent studies also show that sleep apnea promotes earlier cognitive impairment in Alzheimer's-prone patients.

Sleep-disordered breathing is present in 70 to 83 percent of patients with drug-resistant hypertension, 70 percent of patients with Type 2 diabetes, 76 percent of individuals with congestive heart failure, and approximately two-thirds of patients with a history of stroke.

Untreated, obstructive sleep apnea triples the risk of developing hypertension and is associated with a twofold increase in the risk of stroke and a fivefold increase in cardiovascular mortality risk. According to a recent Harvard University analysis, employees suffering from untreated sleep apnea consume two times more health care resources in the two years prior to diagnosis, are five to six times more likely to take sick days, and are six times more likely to demonstrate lower productivity than their counterparts.

Other consistent effects include impaired judgment, memory and concentration, and increased rates of depression, burnout, divorce, and work and traffic accidents. From an employee perspective, the same Harvard study shows that sleep apnea is associated with a fourfold increase in the odds of a negative or stagnant career path.

Obstructive sleep apnea is a chronic progressive disease characterized by repetitive episodes of airway obstruction that occur during sleep, which lead to drops in blood oxygen saturation and sleep disruption. The condition might present as loud snoring, choking, gasping, or interrupted breathing during sleep. It can cause excessive daytime sleepiness or other related symptoms.

Current estimates from the American Academy of Sleep Medicine show that only 10 to 20 percent of the 25 million adult OSA patients have been diagnosed, a statistic that has barely changed over the past decade, in spite of the massive quantities of research published on the subject in the same interval.

The total economic cost of sleep apnea is staggering—$65 billion to $165 billion annually—compared to only $2 billion to $10 billion to treat the condition. In a recent Sleep Review article, industry experts found that most patients didn't raise the issue with their physician until the disease became severe. They estimated that if OSA was properly identified and treated five to 10 years early, associated health care costs could be reduced by 50 percent.

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However, the Harvard analysis concluded that those changes are unlikely to happen without better communication among the various stakeholders, including employers and health-care providers, and an increased awareness about various treatment alternatives.

Why is it important to understand the impact of sleep apnea on overall health? Because in the absence of proper sleep, patient efforts and employer costs to control weight, blood sugar, hypertension, and other cardiovascular risk factors are to a large degree undermined by the physiological changes associated with sleep-disordered breathing.

Research shows that patients suffering from sleep apnea undergo changes in the hormones controlling appetite, which make it difficult to lose weight. They tend to gravitate toward calorie-rich foods, have no energy to exercise during the daytime, and they tend to accumulate abdominal fat.

Since a 10 percent weight gain has been shown to increase the obstructive sleep apnea severity index by about a third, many patients find themselves fighting an uphill battle, unable to control their weight or blood sugar despite their best efforts.


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At the root of these physiological changes is chronic inflammation. That occurs when a constant stress factor, such as oral bacteria present in the blood stream or the nightly struggle to breathe, triggers a persistent activation of the immune system, which can damage internal organs and body systems.

About half of all heart attacks occur in people with normal cholesterol levels. It's now well recognized that the risk of heart attack and stroke increases not only with the accumulation of cholesterol plaques inside the walls of blood vessels, but also with the level of vascular inflammation, which acts to rupture those plaques, leading to massive clots.

The other major contributor to chronic inflammation is the presence of periodontal disease, which affects a majority of the adult population with various degrees of severity. Indeed, studies show that the odds of a heart attack increase with the severity of periodontitis and the presence of certain bacterial species. Patients with severe periodontitis have three times the chance of experiencing a stroke compared to their peers. Of final concern in this systemic equation is Alzheimer's disease, where research shows that early periodontal disease more than triples the risk while untreated sleep apnea accelerates the onset of cognitive impairment by as much as 10 years.

Tools and strategies

How can we turn this vicious cardiometabolic cycle into a virtuous one? One option may be to recognize that we now have simple, inexpensive, and time-efficient interventions that can control some of the fundamental physiological processes feeding it.

At Spokane Sleep Apnea & Oral Systemic Dentistry, we try to help patients understand the basic mechanism of systemic inflammation, so that they can take steps to control risk from various sources, including sleep apnea and periodontal biofilm.

Using simple salivary genetic tests (OralDNA) and conservative antimicrobial technologies (Perio Protect), we now can assess a patient's genetic predisposition for excessive inflammatory responses, customize periodontal treatment based on the type and quantity of bacteria present in a patient's tissues, and then monitor progress. In collaboration with the patient's physician, we also can track the effect of our treatment on key inflammatory markers predictive of heart attacks and strokes.

With a CPAP device, which stands for continuous positive airway pressure and is the most common apnea treatment, noncompliance has historically hovered around 40 to 50 percent.

Consequently, it's important for patients and primary-care providers to understand alternative treatment strategies, which include dental appliances (that now can monitor compliance using Braebon's DentiTrac technology), electronic positional devices, oropharyngeal exercises, combination therapies, surgery, and orthodontics.

Another trend that we have incorporated into our practice and that we are likely to see accelerate in coming years is the use of inexpensive trial dental appliances and MATRx protocols, which can predict treatment outcomes, controlling insurance and patient costs.

Finally, new apps such as SleepMapper or MySleep101 have been hitting the market in increasing numbers, helping patients track adherence to treatment, troubleshoot common problems, and provide much-needed sleep education to both paptients and primary care providers.

The entire sleep medicine field is in the middle of a digital revolution, with more and more Internet-based diagnostic and therapeutic platforms that should make these treatments more accessible to patients and employers, while improving provider communication, follow-up and co-management protocols.

As U.S. medicine moves toward a more sustainable, outcomes-oriented model, physicians and hospital networks will need to get closer to the root of chronic diseases and to identify both the technologies and the large-scale strategies required to start unraveling this cardiometabolic vicious cycle.

The business community has an opportunity to play a key role in the implementation of this approach, incentivizing early detection of risk factors before they lead to irreversible changes, and in the process both share the cost-reduction benefits and help change the culture responsible for these risks.

Liana Groza owns Sleep Apnea & Oral Systemic Dentistry in Spokane Valley and is the founder/coordinator of Spokane Sleep Apnea Network.