Research team refining at-home sleep apnea detection device to help with more efficient diagnosis, treatment

June 25 2024

In continuing research, West Virginia University researchers will put a sleep apnea detection device at the fingertips or wrists of patients, facilitating early diagnosis and treatment of the disease.

Dr. Sunil Sharma, N. Leroy Lapp Professor and division chief of the Pulmonary, Critical Care and Sleep Medicine Fellowship Program in the WVU School of Medicine has worked with other WVU researchers to develop prototypes and secure a patent.

"It's about taking technology from the lab to the bedside," Sharma said.

The prototypes include a watch and a fingertip clip, similar to a pulse oximeter that patients wear while sleeping at home. Both use artificial intelligence technology to measure and analyze data collected via an app on a smartphone or tablet.

"What the devices do is collect information from your bloodstream regarding the certain way the oxygen is delivered and circulated in the blood," Sharma explained. "Based on those oxygen signals and the algorithms which we have fed in—the way we designed it and calibrated it—they can accurately reflect what may be happening in the body without having to go through very expensive testing."

Sharma pointed out that results go beyond positive or negative. The
technology can also show severity of the disorder, an indicator of whether patients should be treated with continuous positive airway pressure, CPAP, or simple lifestyle changes.

Obstructive sleep apnea, or OSA, is a common condition in which the airways partially or completely collapse, resulting in a decrease in oxygen saturation. Although symptoms include loud snoring and excessive daytime sleepiness, many people are asymptomatic. About 80% of OSA cases throughout the world are undiagnosed.

"A delayed diagnosis can lead to worsening of underlying comorbid conditions such as heart failure, stroke and atrial fibrillation because OSA acts like a fuel to other diseases," Sharma said.

The idea for development of the at-home device follows a five-year study Sharma and colleagues conducted at WVU Medicine J.W. Ruby Memorial Hospital that focused on screening patients hospitalized for general medical and heart failure conditions to determine whether they should be tested further for OSA.

Those who were diagnosed after additional testing received PAP (positive airway pressure) therapy and were instructed to use it for a minimum of four hours nightly 70% of the time. Assessing patients over six months, researchers found those who were non-adherent to the PAP therapy as prescribed had significantly higher hospital readmissions and emergency room visits for cardiovascular and pulmonary treatment than those who adhered to therapy.

"The above data complimented by similar findings at other institutions strongly suggest that if we catch OSA earlier, the treatment may facilitate the control of their comorbid conditions," Sharma said.

The resulting study, published in Journal of Clinical Sleep Medicine, also
examined health care spending and hospital resources. Findings show early detection and treatment resulted in lower costs for patients and health care facilities in both the hospital and ambulatory settings. In addition, with fewer people requiring hospitalization, more beds were available for patients with other conditions.

While reasons the disorder goes undetected vary, Sharma said the lack of availability of sleep physicians and sleep lab testing facilities along with low awareness and associated costs to patients play a role.

"Sleep labs are so booked that sometimes it takes weeks to months to get an appointment. In that amount of time, they're possibly seeing readmission to the hospital and a significant escalation of their condition," he said.

At-home testing is also more appealing to patients not wanting to spend the night being monitored in an unfamiliar setting, which Sharma said can affect their sleep quality.

The devices may also be of special benefit to people living in rural areas who may have a great distance to travel to a testing site or who need to rely on family members for transportation.

Sharma said he hopes the study raises awareness that early detection of OSA can improve the outcome of patients with comorbid diseases and prevent others from developing more serious conditions.

"We are just learning more and more about this disease, how it drives other conditions and how patients can be very asymptomatic and yet have the disease still going on in their system," he said. "We do know we can't treat it if we can't detect it."

**More information:** Sunil Sharma et al, Early recognition and

Provided by West Virginia University

Citation: Research team refining at-home sleep apnea detection device to help with more efficient diagnosis, treatment (2024, June 25) retrieved 26 July 2024 from https://medicalxpress.com/news/2024-06-team-refining-home-apnea-device.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.