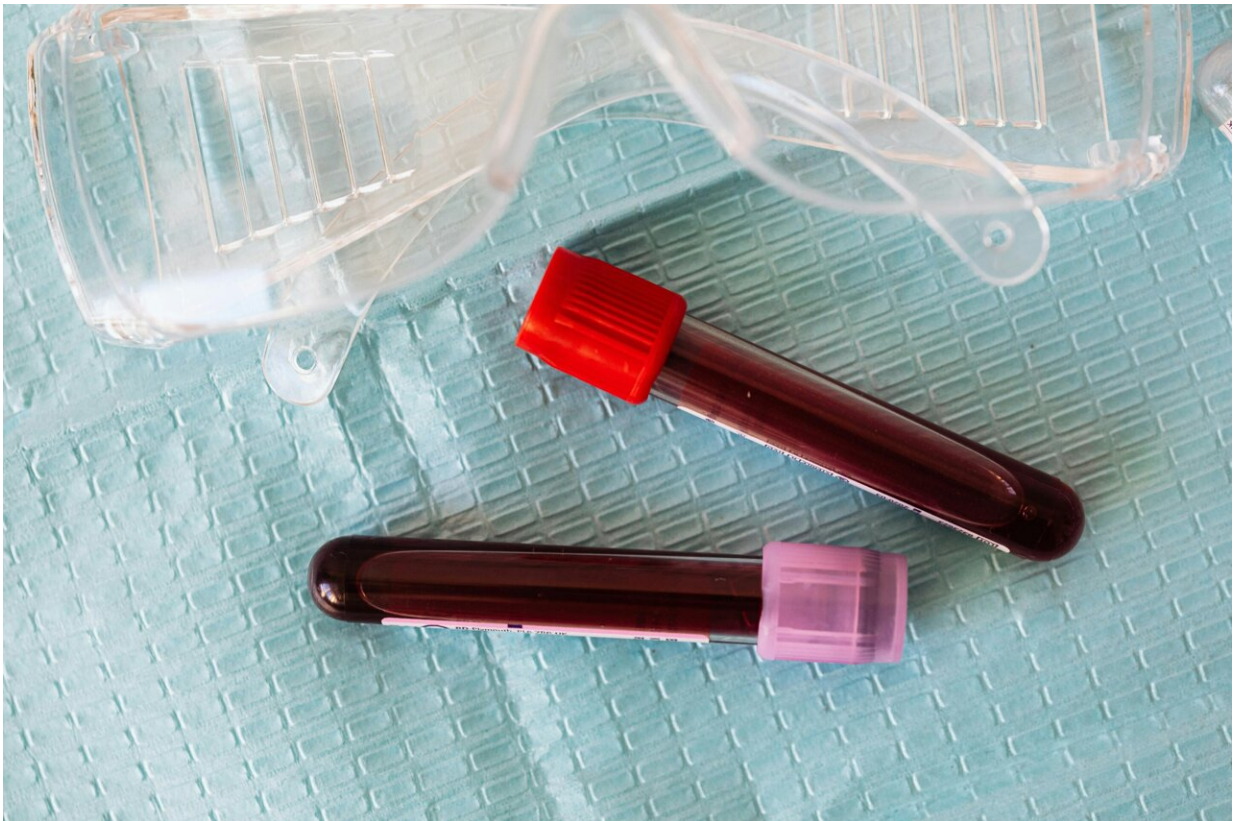# Blood test can help predict risk of obstructive sleep apnea

July 1 2024, by Karina Toledo

Credit: Karolina Grabowska from Pexels

Measuring the level of homocysteine—an amino acid—in the blood can help predict a person's risk of developing obstructive sleep apnea, a disorder characterized by recurrent interruptions in breathing due to

relaxation of the throat muscles during sleep. This simple blood test can also help clinicians gauge whether a patient with the mild or moderate form of the disorder is likely to develop the severe form, according to a study conducted in Brazil by researchers at the Sleep Institute and the Federal University of São Paulo (UNIFESP).

The study is published in the *European Archives of Oto-Rhino-Laryngology*.

"We don't yet know whether apnea causes the rise in blood levels of homocysteine or the rise in levels of this amino acid causes severe apnea. Our hypothesis is that it's a two-way correlation," says Monica Levy Andersen, a professor at UNIFESP and the last author of the article.

"It would be a good idea for more physicians in all specialties to include a homocysteine test in the blood work prescribed for checkups of people over 40. It's simple and low-cost for the SUS [Sistema Único de Saúde, Brazil's public health service]. The results could provide more information on this correlation, at the very least."

Homocysteine has long been a concern for cardiologists since there is strong evidence that abnormally high levels of the amino acid (hyperhomocysteinemia), i.e. more than 15 micromoles per liter of blood (μmol/l), can cause alterations in blood vessel walls and favor the development of coronary disease, thrombosis, heart attacks and strokes.

"A deficiency of B-complex vitamins, especially B6, B9 and B12, predisposes a person to hyperhomocysteinemia. Eating food that contains these vitamins or taking them as supplements can be a strategy to modulate blood levels of the amino acid," explains Vanessa Cavalcante-Silva, a postdoctoral researcher at UNIFESP and first author of the article.

Epidemiology of sleep

The Epidemiological Study of Sleep ("Episono") has been led for more than 15 years by Sergio Tufik, also a professor at UNIFESP, to learn more about sleep quality and the influence of sleep disorders on the health of people living in São Paulo city.

Data for 2007, published by the group in another article, showed that 42% snored three times per week or more, and almost 33% had sleep apnea.

Besides complaints from family members about loud snores, apnea impairs concentration and memory. It also accelerates cellular aging and increases the risk of several ailments, such as high blood pressure, diabetes and heart failure.

To investigate the correlation between sleep apnea and blood levels of homocysteine, the team coordinated by Andersen selected a sample of Episono volunteers who had taken a polysomnography test to measure their apnea-hypopnea index (AHI), which indicates the severity of sleep apnea by counting the number of times breathing slows or stops during an average hour of sleep.

"Up to five events per hour is considered normal. Between five and 15 is classed as mild apnea, 15-30 is moderate, and more than 30 is severe," Cavalcante-Silva says.

The team first measured the AHI of 854 volunteers who took part in the 2007 round of the Episono survey, diagnosing no apnea in 54.4%, mild apnea in 24.4%, moderate apnea in 12.4% and severe apnea in 8.8%. The same subjects were also classified according to blood levels of homocysteine, with up to 10 μmol/l being considered normal, 10–15 μmol/l moderate, and more than 15 μmol/l high.

"When we cross-tabulated the data, we saw that subjects with high levels of homocysteine also had a higher AHI. Those with more than 15 μmol/l had an AHI that was 7.43 higher on average than those with less than 10 μmol/l," Cavalcante-Silva says. The influence of factors such as weight, biological sex and age was corrected by statistical methods.

In a second stage, the researchers analyzed data for the same volunteers in the 2015 round of the survey, although the sample size fell to 561 as some of them were unable to participate in this round. The proportions were now as follows: no apnea in 29.8%, mild apnea in 31.2%, moderate apnea in 19.4%,and severe apnea in 19.6%.

"In this stage, the aim was to find out whether homocysteine was a risk factor for the development of apnea, so we excluded participants who had apnea in 2007 and analyzed the data for those who were then sleeping normally. In this subgroup, a rise of 1 μmol/l in the 2007 level of homocysteine represented a rise of 0.98% in the risk of a diagnosis of apnea in 2015," Cavalcante-Silva says.

"It's a low risk, but it exists. The fact is that we presented a novel factor which is easy to measure and has clinical and practical applicability," Andersen notes. "Now it would be interesting to conduct a study with a different format, in which the participants are assessed annually and we could obtain more extensive data."

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