

# Role of obesity and depression in excessive daytime sleepiness

May 7 2015

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Credit: George Hodan/Public Domain

Obesity and depression—not only lack of sleep—are underlying causes for regular drowsiness, according to Penn State College of Medicine researchers. They say these findings could lead to more personalized sleep medicine for those with excessive daytime sleepiness (EDS).

As much as 30 percent of the general population experiences

EDS—daytime drowsiness or sleepiness occurring throughout the day that can include irresistible sleep attacks. Feeling overly tired during the day can reduce job productivity and increase errors and absenteeism and may lead to more serious issues like automobile accidents.

Previous research has associated EDS with obesity, depression and sleep apnea, but the new study is the first to use physiologic sleep data to infer causation and investigate mechanisms. It is also the first observational study of EDS over several years.

The researchers measured self-reporting of EDS at baseline and again an average of 7.5 years later in 1,395 men and women. Study participants completed a comprehensive sleep history and physical examination and were evaluated for one night in a sleep laboratory. The researchers also recorded sleep, physical and mental health problems and substance use and determined whether participants were being treated for physical and mental health conditions.

"Obesity and weight gain predicted who was going to have [daytime sleepiness](#)," said Julio Fernandez-Mendoza, assistant professor of psychiatry at the Sleep Research and Treatment Center at Penn State College of Medicine. "Moreover, weight loss predicted who was going to stop experiencing daytime sleepiness, reinforcing the causal relationship."

The association between body mass index and sleepiness was independent of [sleep duration](#), meaning [obese people](#) may be tired during the day no matter how much they sleep at night.

Obesity is also associated with sleep apnea, a condition in which breathing pauses occur during sleep. A hallmark of sleep apnea is daytime sleepiness. Although it may seem logical to assume that sleep apnea causes fatigue in obese people, the study refutes this. Researchers

published their findings in the journal *Sleep*.

"Body weight predicted EDS better than sleep apnea," Fernandez-Mendoza said. "This data is also consistent with studies showing that CPAP (continuous positive airway pressure) machines greatly reduce the number of apneas, or pauses in breathing, that a person with [sleep apnea](#) experiences during the night, but don't effectively reduce daytime sleepiness, probably because CPAP does not help reduce weight," Fernandez-Mendoza explained.

The primary underlying mechanism that makes obese people feel overly tired is likely low-grade chronic inflammation. Fat cells, particularly from abdominal fat, produce immune compounds called cytokines that promote sleepiness, among other effects. Depressed individuals in the study also had high incidence of EDS. Physiologic sleep disturbances, including taking longer to fall asleep and waking up in the middle of the night, explained their daytime drowsiness.

"People with depression typically ruminate, they have difficulty shutting their minds off and they are more likely to have elevated stress hormones," Fernandez-Mendoza said. "The mechanism that we believe is playing a role here is hyperarousal, which is simply going to bed and being too alert; in other words, people with depression feel fatigued but do not necessarily fall asleep during the day."

The researchers also found that a minority of people with EDS have a physiologic sleepiness disorder of the central nervous system. They actually sleep longer than average at night, in part because they fall asleep faster than normal.

"Excessive daytime sleepiness has huge implications for public health and policy," Fernandez-Mendoza said. "Fatigue and sleepiness are the most common causes of poor work productivity and fatal car crashes. In

our study we were able to causally link obesity and depression—disorders of epidemic proportions—with daytime sleepiness through different mechanisms; in fact, we found that individuals who lost weight did not complain of daytime sleepiness anymore."

Taken together, the findings indicate that a one-size-fits-all approach to treating EDS—most often a prescription for sleeping pills and more sleep—will fail in the long term.

"In the medical field, there is a widespread belief that if you feel sleepy during the day, it's because you didn't get enough sleep," Fernandez-Mendoza said. "We need to start abandoning this idea. If we continue to believe that the only cause of [excessive daytime sleepiness](#) is people sleeping too little, we are missing the vast majority of the population. The main causes of a sleepy society are an obese society, a depressed society and, to some extent, people who have a physiological disorder. By looking at our patients more closely, we can start personalizing [sleep medicine](#)."

Provided by Pennsylvania State University

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