Too little sleep, disrupted internal clock means higher risk of diabetes and obesity

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A study by researchers at Brigham and Women's Hospital (BWH) reinforces the finding that too little sleep or sleep patterns that are inconsistent with our body's "internal biological clock" may lead to increased risk of diabetes and obesity. This finding has been seen in short-term lab studies and when observing human subjects via epidemiological studies. However, unlike epidemiological studies, this new study provides support by examining humans in a controlled lab environment over a prolonged period, and altering the timing of sleep, mimicking shift work or recurrent jet lag.

The study will be electronically published on April 11, 2012 in *Science Translational Medicine*.

Researchers hosted 21 healthy participants in a completely controlled environment for nearly six weeks. The researchers controlled how many hours of sleep participants got, as well as when they slept, and other factors such as activities and diet. Participants started with getting optimal sleep (approximately 10 hours per night). This was followed by three weeks of 5.6 hours of sleep per 24-hour period and with sleep occurring at all times of day and night, thereby simulating the schedule of rotating shift workers. Thus, during this period, there were many days when participants were trying to sleep at unusual times within their internal circadian cycle-the body's "internal biological clock" that regulates sleep-wake and many other processes within our bodies. The study closed with the participants having nine nights of recovery sleep at the usual time.

The researchers saw that prolonged sleep restriction with simultaneous circadian disruption decreased the participants' resting metabolic rate. Moreover, during this period, glucose concentrations in the blood increased after meals, because of poor insulin secretion by the pancreas.

According to the researchers, a decreased resting metabolic rate could translate into a yearly weight gain of over 10 pounds if diet and activity are unchanged. Increased glucose concentration and poor insulin secretion could lead to an increased risk for diabetes.

"We think these results support the findings from studies showing that, in people with a pre-diabetic condition, shift workers who stay awake at night are much more likely to progress to full-on diabetes than day workers," said Orfeu M. Buxton, PhD, BWH neuroscientist and lead study author. "Since night workers often have a hard time sleeping during the day, they can face both circadian disruption working at night and insufficient sleep during the day. The evidence is clear that getting enough sleep is important for health, and that sleep should be at night for best effect."

Provided by Brigham and Women's Hospital