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## **Lowering the Threshold of Hypoxemia in Sleep-Disordered Breathing as a Predictor of Impaired Metabolic Function**

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Sleep-disordered breathing is based on identifying breathing interruptions during sleep that are accompanied by an oxygen desaturation of at least 4%. There are no data to indicate whether desaturations less than 4% are associated with adverse outcomes. Data from the Sleep Heart Health Study (SHHS) were used to investigate whether less extreme degrees of sleep-related hypoxemia are associated with prevalent metabolic dysfunction. Participants from the SHHS were examined if metabolic function was measured within a year of the sleep study (n=2,656). Sleep-disordered breathing was defined by the hypopnea index at three levels of oxyhemoglobin desaturation (3-4%, 2-3% and 0-2%). Fasting glucose levels were used to classify individuals into normal (<100 mg/dl), impaired fasting glucose (100 to 125 mg/dl), and diabetic (>126 mg/dl) groups. Ordinal logistic regression was used to determine whether the odds of worsening glucose function increased across quartiles of the hypopnea index, independent of confounders such as age, gender, body mass index, waist circumference, usual sleep duration, alcohol consumption, and smoking status. In addition, adjustments were made for the frequency of hypopneas associated with desaturations greater than the predictor.

The prevalences of impaired fasting glucose and diabetes were 32.9% and 5.8%, respectively (mean age, 67.6 years). The covariate-adjusted relative odds of worsening glucose metabolism in the highest compared to the lowest quartile of the hypopnea index (HI) was 2.22 (95% CI=1.61, 3.05) at a desaturation level of 3-4%, 1.56 (95% CI=1.19-2.05) at the 2-3% desaturation level, and 1.18 (95% CI=0.93-1.51) at the 0-2% desaturation level.

The results of this study indicate that disordered breathing events during sleep accompanied by oxygen desaturation of 2-4% are associated with hyperglycemia. These cross-sectional findings suggest that the current definition of abnormal breathing during sleep misses individuals with milder sleep-disordered breathing which may predispose to adverse outcomes. Furthermore, other disease states, such as obstructive lung disease, that are associated with minor fluctuations in oxygen saturation during sleep may also contribute to metabolic dysfunction.