

# Sleep Apnea May Be Risk Factor for Type 2

BY SUSAN LONDON

SEATTLE — The risk of type 2 diabetes increased with the severity of obstructive sleep apnea, even after obesity was taken into account, researchers reported at the annual meeting of the Associated Professional Sleep Societies.

"Few studies have shown a relationship between OSA and type 2 diabetes," said Dr. Sonia Togeiro, the study's lead author. Moreover, the role of obesity in this association is not yet clear, she noted.

Dr. Togeiro and her colleagues conducted a population-based study of OSA and diabetes among 1,042 men and women aged 20-80 years living in São Paulo, Brazil.

All study participants underwent full-night polysomnography and were classified according to their apnea-hypopnea index as having no OSA (index less than 5), mild OSA (index 5-15), or moderate

or severe OSA (index greater than 15).

Participants were defined as having type 2 diabetes if they had a fasting plasma glucose level of 126 mg/dL or higher, took antidiabetic medication, or reported a previous diagnosis of the disease.

Study results indicated that 62% of participants did not have OSA, whereas 21% had mild OSA, and 17% had moderate or severe OSA, reported Dr. Togeiro, an endocrinologist at Federal University of São Paulo. A total of 7% overall had diabetes. In addition, 38% were overweight, and 21% were obese.

Compared with their counterparts who did not have OSA, participants with mild OSA and participants with moderate or severe OSA alike were older (mean age 37 years vs. 48 years and 53 years, respectively), had a higher body mass index (25 kg/m<sup>2</sup> vs. 28 and 30 kg/m<sup>2</sup>), and were more likely to have diabetes (3% vs. 9% and 21%).

The presence and severity of OSA were also associated with a more unfavorable metabolic profile, Dr. Togeiro noted. Both OSA groups had higher levels of total cholesterol, triglycerides, fasting glucose, and fasting insulin, and a higher homeostasis model assessment index, compared with the unaffected group.

In a multivariate analysis adjusted for age, sex, and body mass index, participants with mild OSA had a nonsignificant increase in the risk of diabetes relative to their counterparts who did not have OSA (odds ratio 1.07), and participants with moderate or severe OSA had a significant near doubling of risk (odds ratio 1.97).

Conversely, OSA was much more prevalent in participants with diabetes, she said. A total of 73% of individuals with diabetes had the condition, compared with 36% of those without diabetes.

"The severity of OSA was a highly significant predictor of type 2 diabetes in this population-based survey of São Paulo residents, independent of obesity, age, and gender," Dr. Togeiro said. Furthermore, nearly three-fourths of participants with type 2 diabetes had comorbid OSA.

Discussing the findings and possible explanations for them, Dr. Togeiro noted that laboratory research suggests that the severity of hypoxemia (as opposed to the frequency of arousals) appears to be the component of the apnea-hypopnea index linking OSA to type 2 diabetes.

"Our data suggest that clinicians should be attentive for OSA among diabetic patients and vice versa," she concluded.

Dr. Togeiro reported that she had no conflicts of interest in association with the study. ■

## Overweight, Obesity Account for 46% of Gestational Diabetes Cases

BY MIRIAM E. TUCKER

NEW ORLEANS — The proportion of gestational diabetes cases attributable to overweight and obesity totaled 46% in a population-based study of more than 20,000 women from seven states.

The data, from the Centers for Disease Control and Prevention's Pregnancy Risk Assessment Monitoring System (PRAMS), were used to generate a population-based estimate of the contribution of prepregnancy overweight and obesity to the development of gestational diabetes mellitus (GDM). The results were reported by Shin Y. Kim at the annual scientific sessions of the American Diabetes Association.

"If we assume that the relationship between GDM and obesity and overweight is causal and no other confounders exist, then a large proportion of GDM cases are potentially preventable," said Dr. Kim of the CDC's Division of Reproductive Health.

She and her associates analyzed PRAMS data from the seven states that had implemented the 2003 revised birth certificate, which distinguishes GDM from diabetes that existed prior to pregnancy. The surveillance system collects data via a questionnaire from mothers of newborns 2-6 months after delivery.

A total of 22,767 women with complete chart information who did not have pre-existing diabetes were included.

The overall GDM prevalence

was 4%, ranging from 3.1% in Florida to 5% in Ohio. (The other five states were Nebraska, South Carolina, Utah, Washington, and New York, excluding New York City.)

More than 70% of the women with GDM had a prepregnancy body mass index greater than or equal to 25 kg/m<sup>2</sup>, compared with 45% of the women who did not have GDM during pregnancy, Ms. Kim said.

The GDM prevalence was 0.7% for women classified as un-

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derweight (BMI 13-18.4 kg/m<sup>2</sup>) prior to pregnancy, 2.3% for those with normal weight (BMI 18.5-24.9), 4.8% for overweight women (25-29.9), 5.5% for those who were obese (30-34.9), and 11.5% for extremely obese women (35-64.9).

With normal weight used as the reference group, the unadjusted relative risks of developing GDM were 2.1, 2.4, and 5 for women who were overweight, obese, and extremely obese, respectively.

"The probability of GDM increases with increasing BMI, with no clear BMI threshold below which a dose-response relation-

ship was not evident," Ms. Kim said.

The relative risks did not change after adjustment for maternal age, race/ethnicity, marital status, or parity. Once adjusted, the proportions of gestational diabetes cases attributable to overweight, obesity, and extreme obesity were 15%, 10%, and 21%, for a total of 46%.

"In other words, if all women with a BMI of 25 or greater had a GDM risk equal to that of women in the normal BMI category, nearly half of GDM cases could be prevented. Lifestyle interventions to reduce BMI have the potential to lower GDM risk," she said.

There are a few possible reasons for why overweight/obesity contributed to only about half of GDM cases, Ms. Kim said in a follow-up interview.

"First, prepregnancy weight was self-reported, and women tend to underreport their weight. This may have led us to underestimate the contribution of overweight and obesity to the fraction of GDM attributable to weight. Also, there may be a race/ethnic difference in the relationship between BMI and GDM risk, and our analysis overrepresents non-Hispanic white women compared to the general population," she noted.

Ms. Kim indicated that she had no conflicts of interest to disclose. ■

## Set Higher BMD Threshold For Women With Diabetes

BY DOUG BRUNK

NEW ORLEANS — A femoral neck T score predicts hip fracture risk in women with type 2 diabetes, but the risk is higher for a given T score and age compared with women who do not have diabetes, a multicenter study has shown.

"These findings indicate that bone mineral density T score is useful for clinical evaluation of hip fracture risk in women with type 2 diabetes, but a higher bone mineral density threshold is appropriate for diagnosis of osteoporosis compared with nondiabetic women," researchers led by Ann V. Schwartz, Ph.D., of the department of epidemiology and biostatistics at the University of California, San Francisco, noted in a poster session at the annual scientific sessions of the American Diabetes Association.

Established methods for predicting fracture from BMD T score and age "may not apply to patients with type 2 diabetes," the researchers wrote, because older adults with the disease "have increased risk of hip fracture in spite of higher average bone mineral density."

To compare the fracture risk prediction in older women with and without type 2 diabetes, Dr. Schwartz and her associates used data from the National Institutes

of Health-funded Study of Osteoporotic Fractures, a longitudinal cohort trial of white women aged 65 and older at four clinical centers in the United States. At the first follow-up visit, dual-energy x-ray absorptiometry ascertained hip bone mineral density in 7,917 women, including 520 with self-reported type 2 diabetes.

The mean age of those without diabetes was 73 years. Their mean femoral neck score was -1.77, and 563 (7.6%) had more than one hip fracture. The mean age of those with type 2 diabetes was 74 years. Their mean femoral neck score was -1.45, and 47 (9%) had more than one hip fracture.

A Cox regression model that controlled for age and femoral neck T score was used to estimate the 10-year risk of hip fracture, using fractures that occurred after the BMD measurement. This amounted to 68,582 person-years of follow-up.

The researchers found that age-stratified femoral neck T score underestimated the hip fracture risk in women with type 2 diabetes, and determined that the T score should be set 0.6% points higher for women with type 2 diabetes than for their peers who do not have type 2 diabetes.

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