# Diabetic Patients Unaware of Heat's Effect

BY DOUG BRUNK

FROM THE ANNUAL MEETING OF THE ENDOCRINE SOCIETY

SAN DIEGO — Many adults with diabetes who live in a hot climate don't understand how hot weather affects their disease self-management, results from a survey of 152 patients demonstrated.

For example, 29% of respondents did not initiate personal protective measures until temperatures reached 101°F, and 37% left their diabetes medications and supplies at home rather than risking them to heat exposure.

**VITALS**

**Major Finding:** Nearly one-third of patients with diabetes who live in a hot climate (29%) did not initiate personal protective measures for self-management of their disease until temperatures reached 101°F, and 37% left their diabetes medications and supplies at home rather than risking them to heat exposure.

**Data Source:** A survey of 152 adult patients with diabetes at the Mayo Clinic, Scottsdale, Ariz.

**Disclosures:** Dr. Nassar said that she had no conflicts to disclose.

"This was quite concerning, because they wouldn't have the means to check their blood sugars if they began to feel faint if they got behind the wheel to start driving; or if they needed to seek medical attention, they wouldn't have the means to know if they should," Dr. Adrienne Nassar said during a press briefing.

Previous studies have shown that people with diabetes have higher rates of emergency room visits, hospitalizations, and deaths caused by heat illness during hot weather than during more temperate weather, but few published studies have assessed how patients manage their disease during extremely hot temperatures, said Dr. Nassar, a third-year resident in the department of internal medicine at Mayo Clinic, Scottsdale, Ariz.

"Furthermore, the number of diabetes cases is increasing in the Southwestern United States," she said. "From a physiologic standpoint, the primary way in which we cool ourselves is through sweating, and diabetes patients may have an impaired ability to do so."

In collaboration with the National Weather Service and the National Oceanic and Atmospheric Administration, Dr. Nassar and her associates surveyed 152 adults who attended the diabetes clinic at Mayo between Nov. 30, 2009, and Dec. 31, 2009, to assess the types of personal protective measures they take against the heat, as well as their knowledge of safe temperatures and exposure times.

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**On hot days, 37% of patients left their diabetes drugs and supplies at home.**

The mean age of respondents was 64 years, 51% were female, 58% were non-Hispanic white, 83% had type 2 diabetes, and 77% used insulin.

More than half of the patients (60%) reported staying indoors to protect themselves against the heat, 56% drank fluids frequently, 45% applied sunscreen, and 45% wore protective clothing. However, 23% reported drinking only when they became thirsty, suggesting that they "were starting to get behind on their fluid status," Dr. Nassar said.

Nearly three-quarters of patients (71%) reported spending less than 1 hour in the heat, but 29% did not initiate personal protective measures until temperatures reached 101°F. "Heat-related illness can take place at 80°-90° when you factor in the heat index," Dr. Nassar noted.

While 73% of patients said they had received information about the harmful effects of heat on insulin, fewer indicated that they had received information about extreme heat on glucose meters (41%), oral medications (39%), and glucose testing strips (38%), and 20% "did not know when to begin [taking precautions], although this information is included in the product information inserts [contained in packaging for] medications and glucose meters," she said.

In addition, 37% of patients left their diabetes medications and supplies at home during hot days, rather than risk them to heat exposure.

Patients reported television as their primary source for weather information (89%), followed by radio, the Internet, and newspapers.

"Overall, we found that many patients expose themselves to high temperatures before initiating protective measures," Dr. Nassar concluded. "We would like to repeat our survey in other populations, for example, outdoor laborers [who may employ unique protective strategies], adolescents, younger adults, and different socioeconomic groups."

The study is expected to appear in the September 2010 issue of the Journal of Diabetes Science and Technology. ■

# Weight, Fat Gain in Middle and Older Age Linked to Diabetes

BY MARY ANN MOON

FROM JAMA

Weight gain and fat accumulation in both middle and older age raise the risk of diabetes, according to a prospective cohort study.

The links between overweight and diabetes, and between central adiposity and diabetes, are well known in younger adults but have not been fully explored in older adults, said Mary L. Biggs, Ph.D., of the University of Washington School of Public Health and Community Medicine, Seattle, and her associates.

They examined these associations using data from 4,193 subjects who participated in the Cardiovascular Health Study, a prospective, longitudinal cohort study of people aged 65 years and older living in four communities in North Carolina, Maryland, Pennsylvania, and California. The subjects were enrolled beginning in 1989 and followed annually for a median of 12 years.

The mean age at baseline was 73 years; 59% of the subjects were women, and 10% were African American.

Changes in the participants' weight, body mass index, fat mass, waist circumference, waist-to-hip ratio, and waist-to-height ratio were documented from baseline onward, at ages 65 and older. The subjects also were asked to report body composition measures from when they were age 50, so that their BMI at age 50 could be calculated.

During follow-up, 339 subjects developed diabetes.

Measures of overall and of central adiposity at both middle age (50 years) and older age (at least 65 years) were significantly associated with the risk of developing diabetes in men and women. Subjects in the highest category of adiposity had a two- to sixfold greater risk of incident diabetes than did those in the lowest category.

Similarly, the risk of diabetes rose monotonically with the amount of weight gained between age 50 and baseline. "Compared with participants whose weight remained stable [during that interval], those who gained 9 kg or more between the age of 50 years and study entry had an approximately threefold greater risk of developing diabetes during follow-up," Dr. Biggs and her colleagues said (JAMA 2010;303:2504-12).

"Participants who were obese (BMI greater than or equal to 30) at 50 years of age and who experienced the most weight gain (greater than 9 kg) between the age of 50 years and study entry had five times the risk of developing diabetes, compared with weight-stable participants with normal BMI (less than 25) at 50 years of age," they added.

**VITALS**

**Major Finding:** Subjects in the highest adiposity category had a two- to sixfold greater risk of incident diabetes than those in the lowest category.

**Data Source:** Prospective, longitudinal cohort study of 4,193 subjects aged 65 and older.

**Disclosures:** Study was supported by the National Heart, Lung, and Blood Institute; the National Institute on Aging; the University of Pittsburgh Claude D. Pepper Older Americans Independence Center; and the National Institute of Neurological Disorders and Stroke. No financial conflicts of interest were reported.

Subjects in the highest categories of both BMI and waist circumference were more than four times as likely to develop diabetes as were subjects in the lowest categories of those measures, the investigators noted.

The increased risk associated with adiposity appeared to wane as subjects aged, but even among participants aged 75 and older, those in the highest category of BMI still had double the risk of developing diabetes, compared with those in the lowest category of BMI.

The reason that diabetes risk declines somewhat after age 75 is not known. It is possible that anthropomorphic measures may not adequately quantify body fat at that age because of age-related changes in body composition, such as decreased muscle mass and decreased height.

"A second possibility is that regional fat distribution is more important in the etiology of diabetes than absolute fat mass," the researchers wrote. Another reason may be that the pathology of diabetes in older adults differs from that in younger adults. Or it simply may be that people more susceptible to adiposity-related death do not survive into old age, resulting in selective survival of fitter people, Dr. Biggs and her colleagues said.

The investigators were somewhat surprised to note that the risk of diabetes did not decline in subjects who lost weight during follow-up. Again, the reason is not yet known.

"Older adults may lose proportionately more muscle mass with weight loss than younger ones, decreasing the accuracy of weight loss as a surrogate for loss of adipose tissue in older adults. Furthermore, the loss of skeletal muscle mass may decrease insulin sensitivity, negating the benefit derived from fat loss," they noted.

However, clinicians should note that the relation between weight loss and diabetes risk in older adults is complex, and "our results do not preclude the possibility that voluntary weight loss reduces the risk of diabetes in older adults," they added. ■

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