

# Vitamin D Tied to Hypertension, Hyperglycemia

BY MITCHEL L. ZOLER

Low serum levels of vitamin D were linked to increased blood pressure, hyperglycemia, and obesity in an analysis of more than 3,500 American teenagers, a link previously seen in adults.

In addition, the prevalence of vitamin D deficiency has increased among all Americans, based on data collected in a national survey during 1988-2006 and presented in a separate report.

"Vitamin D plays a useful role in general human health. We are just now beginning to understand the role that vitamin D may play in cardiovascular health," said Dr. Jared P. Reis, who presented a poster on the associations between vitamin D levels and cardiovascular risk factors at a conference on cardiovascular disease epidemiology and prevention sponsored by the American Heart Association.

His study analyzed data collected from 3,528 adolescents aged 12-19 during 2001-2004 in the National Health and Nutrition Examination Survey (NHANES). Their average age was 15, and 52% were boys.

The average serum vitamin D level for all participants was about 25 ng/mL, but a quarter had a level less than 15 ng/mL, while another quarter had a level greater than 26 ng/mL.

The teens in the quartile with the lowest vitamin D level had an 11% prevalence of hypertension, 2.3-fold more common than those with the highest vitamin D levels. A fasting serum glucose level of 100 mg/dL or greater (impaired

fasting glucose) was seen in 6% of those with the lowest vitamin D levels, 2.5-fold more often than those with the highest levels. Adolescents in the low-vitamin quartile were greater than fivefold more likely to have a BMI in the 95th percentile or higher, compared with teens in the highest vitamin D quartile. All of the differences between the lowest and highest vitamin D quartiles were statistically significant, reported Dr. Reis, a researcher in the School of Public Health at Johns Hopkins University, Baltimore.

Those in the lowest vitamin D quartile also had a significantly higher rate of low levels of HDL cholesterol, high triglycerides, and metabolic syndrome, compared with the teens in the highest vitamin D quartile.

Vitamin D reduces activation of the renin-angiotensin system, thereby lowering blood pressure. It also reduces insulin release from pancreatic beta cells and raises insulin sensitivity. Low vitamin D levels produce opposite effects, activating renin-angiotensin to raise blood pressure, boosting insulin release, and lowering insulin sensitivity, he said.

Low vitamin D levels in blood are usually caused by lack of adequate sun exposure and poor diet. Another factor is obesity. Vitamin D is fat soluble, which means it tends to leave the blood and accumulate in fat, Dr. Reis said in an interview.

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Low dietary levels of vitamin D were linked to elevated percent body fat and visceral adipose tissue among teens in a separate talk given at the meeting. The study included 659 healthy teenagers, aged 14-19 years, who resided in or near Augusta, Ga. Their average age was 16, half were girls, and nearly half were African American. Vitamin D intake was calculated based on several 24-hour diet recall surveys for each participant.

The results showed an inverse relationship between the amount of vitamin D in the diet and both percent body fat and amount of visceral adipose tissue, reported Inger Stallmann-Jorgensen, a research dietitian at the Medical College of Georgia, Augusta.

"Other researchers have reported that dairy intake appears to have a stronger, negative relation with body fat and visceral fat than calcium intake alone. Thus, other constituents in dairy foods, such as vitamin D" are potentially involved in the relationship, she said in an interview. It's also possible that low dietary vitamin D is a marker for poor diet in general.

"Intervention studies giving vitamin D supplements to teens are needed to determine causality," Ms. Stallmann-Jorgensen said.

The time trend for vitamin D deficiency among American adults was tracked using serum specimens collect-

ed in several cycles of the NHANES. The analysis assessed specimens collected from more than 18,000 people during 1988-1994, and from about 8,000 people during each of three subsequent collection periods, 2001-2002, 2003-2004, and 2005-2006. There was an even balance of women and men; about 70% of those surveyed were white, about 12% were African American, and about 7% were Mexican American. About 45% were normal weight, about 30% were overweight, and about 25% were obese.

The prevalence of vitamin D deficiency depended on the serum-level cutoff applied. With a conservative cutoff of less than 11 ng/dL, the prevalence of deficiency rose from 3% in 1988-1994 to 7%, 6%, and 9% in the subsequent three sampling periods, reported Dr. Sandy Saintonge, a public health and pediatrics researcher at Cornell University, New York. With a higher cutoff of 20 ng/mL, the prevalence was about 20% in 1988-1994, and about 28%-40% during the three more recent sampling periods.

"Over time, the prevalence of vitamin D deficiency appears to be increasing," Dr. Saintonge said. "Over the past few decades, there has been a decrease in [vitamin D] fortified milk intake among children and adolescents. Generally, most adults don't drink milk regularly," she said in an interview. In addition, many factors interfere with cutaneous vitamin D production. The U.S. public needs a broad vitamin D fortification strategy, along with possibly routine serum monitoring of vitamin D levels, Dr. Saintonge said. ■

## USPSTF Recommends Depression Screening for All Teens

BY MARY ELLEN SCHNEIDER

A new recommendation from the U.S. Preventive Services Task Force endorses the need for routine screening of all adolescents for clinical depression.

The task force recommended that physicians screen adolescent patients aged 12-18 years for major depressive disorder provided that systems are in place to ensure further evaluation, psychotherapy, and follow-up. But the task force concluded that there was insufficient evidence to make a recommendation about screening younger children aged 7-11 years (*Pediatrics* 2009;123:1223-8).

In 2002, the task force examined depression screening in adolescents and found there was not enough evidence at that time to recommend for or against routine screening. However, new evidence on the effectiveness of medications and psychotherapy to treat depressed adolescents and the reliability of screening instruments to detect depression in this group prompted the task force members to recommend screening.

In its recommendation, the task force concluded that adolescents aged 12-18 years could be effectively treated for major depressive disorder with selective serotonin reuptake inhibitors or with a combination of SSRIs and either cognitive-behavioral therapy or interpersonal psychotherapy. But because of the suicide risks associated with the use of SSRIs, the task force recommended that they be prescribed only when the patient can be closely monitored.

The best approach is likely to be a combination of careful medication management and a referral for psy-

chotherapy, Dr. Tom DeWitt, a member of the task force and director of general and community pediatrics at Cincinnati Children's Hospital Medical Center, said in an interview.

Widespread screening is critical because of the high prevalence of depression among adolescents and the serious consequences of leaving the condition untreated, he said. It is estimated that about 6% of adolescents have major depressive disorder, with the lifetime prevalence among adolescents possibly as high as 20%, according to the report.

Although the recommendation is meant to apply to all teens, physicians should pay special attention to adolescents who have a parental history of depression, have comorbid mental health or chronic medical conditions, experience a major negative life event, or have other risk factors for depression.

Other professional organizations have already come out in favor of somewhat more limited screening of adolescents for depression. For example, the American Medical Association recommends screening adolescents for depression if they have risk factors such as a family history or substance abuse.

Despite support for screening adolescents for depression, most physicians don't have systems in place to ensure formal, routine screening. Instead, physicians might ask some general questions about the adolescent's mood or changes in behavior, Dr. DeWitt said.

Part of the reason for the failure to do routine preventive screening may be financial, said Dr. Ted Epperly, president of the American Academy of Family Physi-

cians. The current reimbursement system doesn't pay physicians for providing depression screening and when a service isn't paid for, it often doesn't get done, he said in an interview.

The payment system needs to be realigned to offer incentives for preventive screening, including depression screening, said Dr. Epperly of Boise, Idaho. That type of investment in prevention would have enormous clinical and systemwide financial benefits.

Most depression screening tools are questionnaires that can be filled out in the waiting room and quickly scored by the physician. Although this requires practices to invest time and energy in ensuring that screening occurs, the bigger challenge may be what to do when the screen raises a red flag. Currently, there are not enough adolescent psychiatrists to meet the demand. One option is to reach out to local psychologists to provide the psychotherapy component of treatment, Dr. Epperly said.

For primary care physicians who have the time and the interest, resources are available to help them provide more mental health treatment within their own practices, said Dr. Cathryn Galanter of the division of child and adolescent psychiatry at Columbia University in New York.

One resource is the REACH Institute's Mini-Fellowship in Primary Pediatric Psychopharmacology. As part of this program, Dr. Galanter trains primary care clinicians to screen, evaluate, diagnose, and treat adolescents with mental health problems in their practices. Another resource is the Guidelines for Adolescent Depression in Primary Care (GLAD-PC) toolkit. ■