Obese adolescents lacking vitamin D

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A new study from Hasbro Children's Hospital has found that most obese adolescents are lacking in vitamin D. The researchers call for increased surveillance of vitamin D levels in this population and for further studies to determine if normalizing vitamin D levels will help to lower the health risks associated with obesity. The study is published in the May edition of the *Journal of Adolescent Health* and is now available online in advance of print.

Obesity in children and adolescents has reached epidemic proportions, with a prevalence of 16.4 percent among 10 to 17 year olds as of 2007. The increased prevalence of obesity may lead to increased risk of diabetes, hypertension, and cardiovascular disease, as well as to an increased risk of cancer. Some of these health consequences of obesity have also been associated with vitamin D deficiency or insufficiency. In addition, vitamin D status is significantly associated with muscle power/force, and therefore, a deficiency may interfere with the obese adolescent's ability to increase physical activity.

Lead author Zeev Harel, M.D., a pediatrician specializing in adolescent medicine at Hasbro Children's Hospital, reports that screening obese adolescents for vitamin D status by measuring their blood 25 OH D level has become a routine protocol at the Adolescent Health Center of Hasbro Children's Hospital in Providence, R.I. since 2007.

For this retrospective study, Harel and his co-authors explored the prevalence of low vitamin D status among 68 obese adolescents, and examined the impact of treatment of low vitamin D status in these patients.

The study found that low vitamin D status was present in all of the girls (72 percent deficient and 28 percent insufficient) and in 91 percent of the boys (69 percent deficient and 22 percent insufficient). Of those with vitamin D deficiency or insufficiency, 43 patients had a repeat measurement of vitamin D level after treatment.

While there was a significant increase in vitamin D levels following treatment, serum vitamin D levels normalized in only 28percent of these patients. Repeat multiple courses of vitamin D treatment in the patients who did not normalize their vitamin D levels after initial course, failed to normalize their low vitamin D status.

Harel says, "The prevalence of low vitamin D status among obese adolescents in this study is greater than previously reported for this age group. It is concerning to us that only 28 percent of the adolescents were able to reach normal vitamin D levels through one course of treatment of the recommended dose of vitamin D, while the other 72 percent failed to normalize their levels even with repeat treatments". Vitamin D may be sequestered in body fat and this likely is the major reason for the lack of response.

The main source of vitamin D is production in the skin; a process that is stimulated by exposure to sunlight. In addition, small amounts are derived from certain foods like oily fish, eggs, and from fortified foods such as dairy products and breakfast cereals. The researchers state, "It is possible that the association between obesity and low vitamin D status is indirect, arising from obese individuals having fewer outdoor activities than lean individuals, and therefore, less exposure to sun. Likewise, is it also possible that obese individuals do not consume enough foods that contain vitamin D".

The researchers question whether a higher daily vitamin D intake than the one recently recommended by the Institute of Medicine (600 international units of vitamin D/day) may be required as part of treatment in obese adolescents, in an attempt to increase their vitamin D status. Harel says, "It also remains to be determined in future studies whether certain conditions such as obesity require a higher cut-off of vitamin D blood levels in an attempt to prevent health consequences of obesity."

"Based on the findings from this study, we are calling for increased surveillance of obese adolescents whose vitamin D levels do not normalize after initial course of treatment. In addition, prospective studies are needed to evaluate whether normalizing vitamin D levels in obese adolescents will help lower the health risks associated with obesity," says Harel.

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