ECHO
Environmental influences on Child Health Outcomes
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IDeA States Pediatric Network

Study Summary

How much vitamin D do children with asthma and increased body weight need to correct low vitamin D levels?

Study title: Pharmacokinetics of Oral Vitamin D in Children with Obesity and Asthma

Author(s): Jason E. Lang, Rodrigo Gonzalez Ramirez, Stephen Balevic, Brian O'Sullivan, Scott Bickel, Christoph P. Hornik, J. Marc Majure, Saranya Venkatachalam, Jessica Snowden, Laura James

Why was this study conducted?

Among children with asthma, children who also have increased body weight for their height (body mass index (BMI) of ≥85 percentile) tend to have more severe asthma symptoms than their healthy weight peers. Children with asthma and increased body weight also tend to have lower vitamin D levels than other children. Helping children with asthma and increased body weight reach higher vitamin D levels may help their asthma symptoms by lowering inflammation in the lungs. However, there is not enough information on how much vitamin D children with asthma and increased body weight should take to safely raise their vitamin D levels.

What was done?

ECHO ISPCTN research teams in 15 states enrolled children ages 6-18 years with asthma and increased body weight in a clinical trial. The children took vitamin D capsules for 16 weeks and gave blood samples every month so researchers could check their vitamin D levels. The goal of the study was to find a vitamin D dose that helped children raise their vitamin D levels in their blood to 40 ng/mL, a level that might lower inflammation.

There were two parts of the study. In the first part, children were split into four groups that each took one of four different doses of vitamin D to find a dose that raised children's vitamin D levels over 16 weeks without causing side effects. All four dosing options were higher than what is usually recommended to raise vitamin D levels. Then, researchers compared the vitamin D dose from part 1 that raised vitamin D levels quickly and safely to the usually recommended daily vitamin D dose to confirm that the higher dose could safely help children reach vitamin D levels that may decrease inflammation. This study was approved by the Institutional Review Board and all participants consented to participate in the study.

What was found?

The first part of the study found that taking a 50,000 international units (IU) vitamin D dose on the first day of treatment and then an 8,000 IU vitamin D dose every day for 16 weeks was most effective at raising vitamin D levels safely. In the second part of the study, researchers confirmed that using this

approach raised vitamin D levels in most children to the recommended level while avoiding undesired higher levels. In contrast, no children who followed the current standard-of-care dosing of 600 IU each day achieved the target vitamin D level sufficient to potentially reduce inflammation.

What do the results mean?

Most children with asthma and increased body weight who take vitamin D the vitamin D dose used in this study (50,000 IU vitamin D on day one, then 8,000 IU each day) can safely raise their vitamin D level in a short period of time. The newly determined dose is much greater than the typically recommended dose. This study shows how important it is that children and adolescents with increased body weight get enough vitamin D in their diet or in vitamin supplements every day since the higher the body weight, the faster vitamin D was processed and removed from the body. The results of this study may help children with asthma or other illnesses if having enough Vitamin D lowers inflammation.

Who sponsored this study?

This research was supported by the Environmental influences on Child Health Outcomes (ECHO) program, Office of The Director, National Institutes of Health.

Appreciation: All of the families in ECHO ISPCTN trials help study teams across the country learn more every day about how to bring rural and underserved families into research studies. This is critical to ensure that families that are not near large academic centers still get the benefits of research and that the “answers” research studies find are meaningful for children and families across all parts of the country, not just those who live in large cities.

You may learn more about this publication here: https://link.springer.com/article/10.1007/s40262-023-01285-9