Vitamin D Levels and Food and Environmental Allergies in the United States: Results From the National Health and Nutrition Examination Survey 2005–2006


PURPOSE OF THE STUDY. To examine the relationship between serum 25-hydroxyvitamin D (25(OH)D) levels and the prevalence of food and environmental allergies.

STUDY POPULATION. The study used the National Health and Nutrition Examination Survey 2005–2006, composed of a population of civilian noninstitutionalized US residents, which deliberately oversampled non-Hispanic black and Mexican American people to obtain accurate prevalence data in those subpopulations. All participants 1 year of age or older with available 25(OH)D levels and allergy-test results were included. Included in the final analysis were 3136 children and 3454 adults (>21 years old).

METHODS. Information about vitamin D supplements, milk intake in the previous month (daily, less than daily but more than weekly, and once weekly or less), and television, computer, and videogame time (“screen time”) (none, <2 hours/day, 2–4 hours/day, and >4 hours/day) was collected. Allergy was determined by a questionnaire, and serum was obtained for total immunoglobulin E (IgE) and for specific IgE to dust mites, cat, dog, Alternaria, peanut, egg, and milk. Subjects 6 years of age or older also had ImmunoCAP (Phadia, Uppsala, Sweden) levels measured for German cockroach, selected tree, grass, and weed pollens, and shrimp. Allergy was defined as any positive IgE test result (≥0.35 kU/L) or a total IgE level in the top quintile (>191 kU/L). Seasonal and perennial allergies were defined as a positive ImmunoCAP level to a pollen or perennial allergen, respectively. 25(OH)D levels were classified as deficient (<15 ng/mL), insufficient (15–29 ng/mL), or sufficient (≥30 ng/mL).

RESULTS. Deficient 25(OH)D levels were associated with being non-Hispanic black or Mexican American, having a low socioeconomic status, >4 hours/day of screen time, lower frequency of milk-drinking, and not taking vitamin D supplements. Children and adolescents deficient in 25(OH)D had a higher prevalence of sensitization to most individual allergens, to any allergen, and to any seasonal or perennial allergen than those with insufficient or sufficient levels. The same trends were not seen in adults. Questionnaire data also revealed an association between deficient and insufficient 25(OH)D levels and prevalence of allergy symptoms in general but not to specific symptoms in children and adolescents.

CONCLUSIONS. Vitamin D deficiency is associated with a higher rate of allergic sensitization and self-reported allergy in children and adolescents.

Nutrients and Foods for the Primary Prevention of Asthma and Allergy: Systematic Review and Meta-analysis


PURPOSE OF THE STUDY. Results of several individual studies have suggested an association between specific nutrient and food intake and the development of atopic disease. This study aimed to systematically review and analyze the published literature.

STUDY POPULATION. This was a systematic review and meta-analysis of published literature. Reviewed studies included pregnant women, infants, and children younger than 16 years.

METHODS. Eleven databases were systematically reviewed for studies that investigated the role of nutrients and foods for the primary prevention of atopic disorders in children.

RESULTS. There were 62 eligible reports identified from cohort, case-control, and cross-sectional studies. Serum vitamin A levels were lower in children with asthma compared with controls (odds ratio [OR]: 0.25 [95% confidence interval (CI): 0.1–0.4]). High maternal dietary...
intake of vitamin D and E during pregnancy was protective for the development of wheezing (OR: 0.56 [95% CI: 0.42–0.73] and 0.68 [95% CI: 0.52–0.88], respectively). Adherence to a Mediterranean diet was protective for persistent wheeze and atopy (OR: 0.22 [95% CI: 0.08–0.58] and 0.55 [95% CI: 0.31–0.97], respectively). The authors of most (17 of 22) fruit and vegetable studies reported beneficial associations with asthma and allergic outcomes.

CONCLUSIONS. The available evidence is supportive with respect to vitamins A, D, and E; zinc; fruits and vegetables; and a Mediterranean diet for the prevention of atopic disease.

REVIEWER COMMENTS. Although the study was observational in nature, its results highlight the importance of dietary exposures in the development of atopic disease. Controlled interventional studies are warranted to determine if it is possible to prevent atopic disease with dietary modification.

Partial Protein-Hydrolyzed Infant Formula Decreased Food Sensitization but Not Allergic Diseases in a Prospective Birth Cohort Study


PURPOSE OF THE STUDY. To determine whether feeding a partially protein-hydrolyzed formula in the first 6 months of life would decrease the incidence of future allergic diseases.

STUDY POPULATION. Taiwanese newborns who had at least 1 first-degree family member with a history of atopy and who were not breastfeeding participated.

METHODS. A total of 679 participants were exclusively fed with partially hydrolyzed whey formula (HF) (n = 345) or cow’s milk infant formula (CM) (n = 334) for at least 6 months via an open-label protocol. They were prospectively assessed at 6, 18, and 36 months of age to determine allergic sensitization (immunoglobulin E [IgE] > 0.7 kU/L) and clinical presence of eczema, food allergy, asthma, or allergic rhinitis.

RESULTS. At 36 months, cow’s milk protein sensitization in the HF group was significantly lower than that in the CM group (12.7% vs 23.4%; P = .048). There was no difference with sensitization to egg or peanut between the 2 groups. Aeroallergen sensitization and serum total IgE levels were not significantly different. Occurrence of allergic disease was significantly correlated with allergen sensitization but not to food-allergen sensitization, parental atopy, or feeding types.

CONCLUSIONS. The authors concluded that although HF feeding during the first 6 months of life helped to lower cow’s milk protein sensitization, it alone is not enough to decrease the development of allergic disease.

Association Between Short Sleep Duration and the Risk of Sensitization to Food and Aero Allergens in Rural Chinese Adolescents


PURPOSE OF THE STUDY. To explore the association between sleep duration and sensitization to food allergens and aeroallergens.

STUDY POPULATION. There were 1534 rural Chinese adolescent twins aged 12 to 21 years drawn from an ongoing prospective study on precursors of metabolic syndrome in children in a large Chinese twin cohort. Any participant aged 12 to 21 years at a follow-up visit for the main study with complete information on sleep questionnaires and skin-prick-test (SPT) results was included.

METHODS. Subjects completed standard sleep questionnaires and SPTs to 9 food allergens and 5 aeroallergens. Total sleep time was defined as the interval from bedtime to wake-up time minus sleep latency. Sensitization was defined as having at least 1 positive SPT result. Percentage body fat was calculated, because previous studies have suggested that sleep duration and allergic sensitization are associated with adiposity.

RESULTS. Compared with subjects in the highest tertile of sleep duration, those who slept less were more likely to be sensitized to any food allergen (odds ratio [OR]: 1.9 [95% confidence interval (CI): 1.3–2.7] and 1.4 [95% CI: 1.0–1.9] for the first and second tertiles [trend test P(trend) = 3 × 10^{-4}], respectively). The corresponding ORs for sensitization to any aeroallergen were 1.5 (95% CI: 1.1–2.0) and 1.3 (95% CI: 1.0–1.7) (P(trend) = 8 × 10^{-3}). These associations were independent of percentage body
Nutrients and Foods for the Primary Prevention of Asthma and Allergy: Systematic Review and Meta-analysis
Jessica Savage and Corinne Keet

*Pediatrics* 2011;128;S98
DOI: 10.1542/peds.2011-2107J

Updated Information & Services
including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/128/Supplement_3/S98.2

Subspecialty Collections
This article, along with others on similar topics, appears in the following collection(s):
**Allergy/Immunology**
http://classic.pediatrics.aappublications.org/cgi/collection/allergy:immunology_sub

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
https://shop.aap.org/licensing-permissions/

Reprints
Information about ordering reprints can be found online:
http://classic.pediatrics.aappublications.org/content/reprints

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2011 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005.
Nutrients and Foods for the Primary Prevention of Asthma and Allergy: Systematic Review and Meta-analysis
Jessica Savage and Corinne Keet

*Pediatrics* 2011;128;S98
DOI: 10.1542/peds.2011-2107J

The online version of this article, along with updated information and services, is located on the World Wide Web at:

http://pediatrics.aappublications.org/content/128/Supplement_3/S98.2