The adjuvant effect of phthalate exposure on IgE sensitisation in early childhood - DTU Orbit (10/01/2019)

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Background: Dust phthalate concentrations have previously been shown to be weakly associated with parentally reported allergic diseases, but the validity of the results have been questioned. Our aims were to investigate the association between phthalate diester exposure from two environments and IgE sensitization in children.

Method: A cross-sectional case-cohort study (n = 500) based on 2835 children, aged 3–5 years, responding to a questionnaire in the Danish Indoor Environment and Children’s Health study consisted of 300 subjects randomly selected and 200 cases with at least two parentally reported doctor diagnosed allergic diseases (asthma, allergic rhinoconjunctivitis or atopic dermatitis). The same physician conducted a clinical examination of all the 500 children including a structured interview on allergic heredity, clinical and medical history Specific serum-IgE against inhalant and food allergens was determined. Samples of settled dust were collected from the children’s bedroom and daycare center for analyses of five phthalates (DEP, DnBP, DiBP, BBzp & DEHP). Phthalate intakes through three different exposure routes were calculated. The diagnosis of allergic disease was based on internationally accepted criteria.

Result: In the group of randomly selected children IgE sensitization was associated with the total phthalate exposure (P <0.05) with adjusted OR’s = 3.26. There was a clear dose-response relationship between total phthalate exposure in the homes and IgE sensitization in children with asthma, allergic rhinoconjunctivitis or atopic dermatitis (P < 0.05, aOR = 2.59) and DEHP exposure (P < 0.05, aOR =3.45). IgE sensitization in children with asthma was associated with DnBP exposure (P < 0.05). IgE sensitization in the cases were associated (P < 0.05) with DnBP and BBzP exposure in the daycare centers, while analysis for the allergic diseases separately demonstrated an association with DEP, DnBP, DiBP and BBzP (P < 0.05). The association between IgE sensitization and DEP, DnBP, DiBP and BBzP was also found in the calculated phthalate intakes from the different exposure pathways, particularly in asthma (aOR > 18).

Conclusion: We found significant associations between IgE sensitization and both phthalate dust concentrations and calculated phthalate intakes. Such an association has previously been indicated in animal studies, but this is the first demonstration of such an association in human studies.

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