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ORIGINAL ARTICLE

Effect of foods and Mediterranean diet during pregnancy and first years of life on wheezing, rhinitis and dermatitis in preschoolers

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Abstract
Background: There is a conflictive position if some foods and Mediterranean diet (MedDiet) consumed by the mother during pregnancy and by the child during the first years of life can be protective for current wheezing, rhinitis and dermatitis at preschool age.
Methods: Questionnaires of epidemiological factors and food intake by the mother during pregnancy and later by the child were filled in by parents in two surveys at two different time points (1.5 yrs and 4 yrs of life) in 1000 preschoolers.
Results: The prevalences of current wheezing, rhinitis and dermatitis were 18.8%, 10.4%, and 17.2%, respectively. After multiple logistic analysis children who were low fruit consumers (never/occasionally) and high fast-food consumers (≥3 times/week) had a higher risk for current wheezing; while intermediate consumption of meat (1 or 2 times/week) and low of pasta by mothers in pregnancy were protected. For current rhinitis, low fruit consumer children were at higher risk; while those consuming meat <3 times/week were protected. For current dermatitis, high fast food consumption by mothers in pregnancy; and low or high consumption of fruit, and high of potatoes in children were associated to higher prevalence. Children consuming fast food >1 times/week were protected for dermatitis. MedDiet adherence by mother and child did not remain a protective factor for any outcome.

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Conclusion: Low consumption of fruits and high of meat by the child, and high consumption of potatoes and pasta by the mother had a negative effect on wheezing, rhinitis or dermatitis; while fast food consumption was inconsistent.

Introduction

It is well recognised that most allergic manifestations, e.g. asthma, rhinitis and dermatitis, usually appear during preschool age.[1] Perinatal life is a critical period of the immune system development, and maternal diet during pregnancy has been proposed to influence foetal immune responses that might predispose to childhood allergic manifestations.[2] Decreasing the intake of antioxidants (fruit and vegetables), increasing that of n-6 polyunsaturated fatty acid (PUFA) (in margarine or vegetable oil), and decreasing that of n-3 PUFA (oily fish) could have contributed to the recent increase in asthma and atopic diseases. Thus the role of diet during foetal (programming) and in early life (preschool) ages is an area for intense research.[3]

We previously showed that adherence to the Mediterranean diet [MedDiet] (in the univariate analysis) and to olive oil consumption (also after multivariate analysis) during pregnancy were protective factors for recurrent wheezing during the first year of life in Spanish infants.[4] Another study from Spain and Greece showed that high meat intake and processed meat intake during pregnancy were associated with an increased risk of wheeze in the first year of life; whilst a high intake of dairy products, but not MedDiet, was significantly associated with a decreased risk of infant wheeze.[5] However, a recent meta-analysis performed exclusively on maternal nutrition during pregnancy showed that MedDiet and higher maternal intake of vitamins D and E, zinc, copper, magnesium and vegetables during pregnancy are associated with a lower risk of wheeze and atopic diseases in childhood.[6]

On the other hand, we also reported previously that MedDiet adherence during preschool age was an independent protective factor for current wheezing in preschoolers, regardless of obesity and physical activity[7]; and for current severe asthma among girls at school-age (regardless of physical activity).[8] Furthermore, a meta-analysis on adherence to MedDiet in children showed a trend that this type of diet is associated with lower occurrence of current wheeze, current severe wheeze, or asthma ever. For current and current severe wheeze, the significance of the association was mainly driven by the results in Mediterranean populations.[9]

However, few studies have looked into the interaction between maternal diet, especially MedDiet consumed by the mother during pregnancy and by the offspring during preschool age, on asthma, dermatitis and rhinitis in the offspring. The objective of the present study was to investigate if MedDiet adherence by the mother during pregnancy and by the child had an influence on asthma, rhinitis or dermatitis in the offspring during preschool age. We hypothesised that MedDiet consumed by the mother and by the child is a protective factor for asthma and allergic disease.

Methods

Population

This longitudinal prospective study started as a part of the International Study of Wheezing in Infants (EISL) study performed in Cartagena, Spain. Children have been followed up afterwards.[10] Briefly, all primary care health centres monitoring children for nutrition, growth and development, and/or for vaccine administration from the health program in Cartagena were included as recruiting centres; and when the child attended to receive vaccination at 15 or 18 months of age (''survey 1.5''), parents or guardians were asked to complete the questionnaire, emphasising on nutritional aspects of the mother during pregnancy and respiratory/allergy symptoms in the offspring which occurred during the first 12 months. At age four years (''survey 4'') the participant families were contacted again to answer a similar questionnaire, emphasising nutrition and respiratory/allergy symptoms occurred in the offspring during the previous 12 months.

Questionnaires

At survey 1.5, a standardised and validated questionnaire,[10] including questions on epidemiological risk/protective factors, was completed. The questions were: age; gender; race; type of delivery; number of siblings; birth weight and height (by parental report); low birth weight (<2000 g or <2500 g); exclusive breastfeeding for six months (without any formula feeding or infant food); air pollution (living near to factories or roads with heavy traffic); mould stains on the household walls; dogs and cats at home, during pregnancy and at present; maternal age and educational level; oral contraceptive used before pregnancy; paracetamol used during pregnancy; number of colds during the first year of life; maternal smoking during pregnancy; paternal current smoking; parental asthma, rhinitis and eczema.

At survey 4, the data collected included: kindergarten attendance; parental current tobacco smoking; dogs and cats at home; mould stains on the household walls; type of fuel used in heating and cooking systems; physical exercises (hours/week); TV-video play watching (hours/day); and height and weight (by parental report).

Definitions of outcome variables

Current wheezing was defined as a positive answer to the question: ''Has your child had wheezing or whistling in the chest during the first 12 months of life?''. *Current rhinitis* was defined as a positive answer to the following question