

Early Life Factors Affecting Allergy Development in Japanese Children

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Abstract

Background: Increasing trend of allergy among children is a public health issue in Japan. Early life immune modulatory factors are thought to be protective for the development of allergic diseases supported by the hygiene hypothesis. This study aims to examine the risk factors for the development of allergic diseases and evaluate potential effect modification between these factors in Japanese children.

Methods: We used the Health Diary Study comprising a nationally representative cross-sectional sample of community-dwelling children in Japan in 2013. We obtained data using a self-administered questionnaire for a wide range of early life factors and history of diagnosed allergic diseases. Multivariate logistic regression analyses were conducted to evaluate the effects of delivery method, infant feeding method, infectious disease history during the first year of life, presence of siblings, and daycare attendance on the risk of any allergy, as well as bronchial asthma and allergic rhinitis specifically. A series of stratified analyses were conducted to examine the potential role of effect modification among these early life factors.

Results: Overall, 744 children were analyzed. Two or more siblings showed a suggestive decrease in risk of any types of allergy and allergic rhinitis specifically. At least six months of exclusive breastfeeding also showed a suggestion of a decreased risk of asthma and allergic rhinitis. Infection before age 1 was associated with an increased risk of asthma (adjusted odds ratio [aOR]: 1.77, 95% confidence interval [CI]: 1.09 - 2.85) especially related to bronchitis and ear infection, and results showed a dose-response effect with increasing number of infections ($p = 0.04$). Having at least one older sibling appeared to modify the effect of infections before age 1 and risk of asthma (p interaction = 0.11). There was effect modification by other early life factors in the association between infection and asthma risk.

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Conclusion: Early life factors did not protect against the development of allergies in children but infection before age 1, especially pneumonia and ear infection, increased the risk of asthma.

Keywords: allergy, asthma, allergic rhinitis, children, epidemiology