

Predicting risk for early infantile atopic dermatitis by hereditary and environmental factors

H-J. Wen, P-C. Chen,* T-L. Chiang,† S-J. Lin,‡ Y-L. Chuang§ and Y-L. Guo¶

Departments of Environmental and Occupational Health and ‡Pediatrics, College of Medicine, National Cheng Kung University, Tainan, Taiwan

*Institute of Occupational Medicine and Industrial Hygiene and †Institute of Health Policy and Management, National Taiwan University, Taipei, Taiwan

§Bureau of Health Promotion, Department of Health of Taiwan, Taichung, Taiwan

¶Department of Environmental and Occupational Medicine, College of Medicine, National Taiwan University (NTU) and NTU Hospital, Room 339, 17 Syujhou Road, Taipei 100, Taiwan

Summary

Correspondence

Yueliang Leon Guo.

E-mail: leonguo@ntu.edu.tw

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Background Hereditary and environmental factors contribute to the occurrence of atopic dermatitis (AD). However, the interaction of these two factors is not totally understood.

Objectives To evaluate the early risk factors for infantile AD at the age of 6 months and to develop a predictive model for the development of AD.

Methods In 2005, a representative sample of mother and newborn pairs was obtained by multistage, stratified systematic sampling from the Taiwan national birth register. Information on hereditary and environmental risk factors was collected by home interview when babies were 6 months old. Multivariate regression analysis was applied to determine the risk factors for AD in the infants.

Results A total of 20 687 pairs completed the study satisfactorily. AD was diagnosed in 7.0% of 6-month-old infants by physicians. Parental asthma, atopic dermatitis and allergic rhinitis, and maternal education levels were risk factors for AD in infants. Among environmental factors, fungus on walls at home and renovation/painting in the house during pregnancy were significantly associated with early infantile AD. Using these factors, the probability of having infantile AD was estimated and grouped into low, high and very high. With five runs of tests in mutually exclusive subsets of this population, the likelihood of AD for 6-month-old infants was consistent in all the groups with the predictive model. The highest predicted probability of AD was 70.1%, among boys with maternal education levels > 12 years, both parents with AD, renovation and painting of the house during pregnancy and fungus on walls at home. The lowest probability was 3.1%, among girls with none of the above factors.

Conclusions This investigation provides a technique for predicting the risk of infantile AD based on hereditary and environmental factors, which could be used for developing a preventive strategy against AD, especially among those children with a family history of atopy.

Atopic dermatitis (AD) is the most common skin disorder in children and is often the first step in the atopic progression.^{1–3} About 50% of children with AD develop asthma and allergies.^{3,4} Approximately 50% of children with AD develop symptoms within the first 6 months of life and nearly 85% of individuals with eczema have onset of symptoms by the age of 5 years.⁵ The quality of life of children with AD and their families is obviously affected, especially in those children with moderate and severe symptoms.^{6–8}

The prevalence of AD has increased in the past two decades worldwide, including Taiwan.^{9–13} In previous surveys of

schoolchildren in Taiwan, the prevalence of AD was 1.57% in 1995–96 and 2.79% in 2001.¹⁴ Although genetic and environmental factors may interact in the development of AD,^{15–17} environmental factors probably play a more important role than genetic effects in the change in prevalence of AD over a short period.

Most of the previous epidemiological studies on AD have focused on preschool or school children.¹⁸ However, as symptoms of AD start early in human life, important life and environmental factors cannot be studied in detail if the participants are preschool children or older. A birth cohort study therefore