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## The correlation study on the living environment and children's health problem in Dalian

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### Abstract

In recent years, prevalence rate of children's allergic diseases gradually increases, children's health problems are not optimistic. Epidemiological cross-sectional survey method was used in this study. 120 school-age children of Grade Four and Five were selected to do the questionnaire on living environment and health problem in Dalian. Then 10 residents were selected to detect indoor environmental information. This study explored the correlation of living environment and children's allergic diseases by some hypothesis testing methods and analyzed exposure levels of various pollutants. Living in the surrounding road, re-decoration, updating ventilation equipment, moist sensation, milk feeding in lactation, usually light sleep were risk factors of certain allergic diseases. SVOC, planktonic fungi, accumulated fungi had a positive effect on disease group, while adherent fungi had a negative effect. The average level of exposure of diseases group is higher than control groups.

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### 1. Introduction

With the improvement of living standard, types of equipment and building materials are rich gradually inside the house, which brings convenience to people's lives. However, the quality of building materials and equipment varies greatly that gives healthy living environment potentially harmful. Staying in such living environment lurking high levels of dangerous environmental factors for a long time, children's health problems need attention.

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To find out the reasons that disease incidence of children's allergy symptoms increases year by year, researchers from various countries have making efforts on different directions. Tamay Z [1] conducted a questionnaire survey for 2500 children aged 6 to 12 in 2004, the results show that family history of allergies, sinusitis and other factors had a significant relationship with allergic rhinitis. Consumption of vegetables and fruits contribute to suppression of allergic disease. Sun Y and Sundell J [2] did a cross-sectional survey for children aged 1-8 years old, it found that lifestyle and home environmental exposures had a significant impact on allergy symptoms. Moist, air conditioning systems, passive smoking and some other factors were associated with children's health. In recent years, the scope of related researches in china has expanded, and influencing factors analysis has become diversified. Luo M H and Lai Z M. [3] selected asthmatic children aged 0-14 years old and the same number of non-patient children with the same age group to investigate. It found that smoke and cooking fumes were risk factor of childhood asthma. He J G., et al. [4] carried out the survey and did correlation analysis for 657 children. It shows that climate change、passive smoking、smoke and other environmental factors, history of eczema、fatigue and other physiological factors, family history of asthma and other family factors affected the incidence of childhood asthma. Although related researches on children's allergy problems have done from various aspects, this problem lacks detailed and reasonable solution because of the introduction of diversified and complicated environmental factors. The study analyzes the relevant factors affecting indoor air quality using epidemiological statistical methods, and conduct a detailed study of relevance between these factors and children's allergic diseases.

## 2. Questionnaire

The survey selected 120 school-age children of Grade Four and Five from two school in Dalian randomly. Questionnaire is divided into four sections:①Built Environment ②Building Equipment ③Building usage behavior ④Life behavior. Four sections contain 83 questions that most of them are closed questions and part of them are open questions. Specific questions of four sections: ①The questions of first section are about surrounding environment and housing-related②The questions of the second section are about heating and cooling, ventilation, humidity and lifestyle③The questions of third section are about the time of children's cough time, wheezing Tim, performance of breathing time, performance of disease onset, frequency of disease onset and history of allergies;④The questions of fourth section are about the reasons family members feel uncomfortable and the diseases that parents has suffered from so far.

## 3. Measurement

### 3.1 Measurement Objects

The combination of measurement Objects was the same or similar amount of children from disease group and the control group, and the children from the control group must be suffering from a children's allergic disease such as persistent cough, respiratory allergies and so on. Measurement Objects were numbered DT. The control groups were expressed as C and the diseases groups were expressed as D. Serial numbers are shown in Table 1.

Table 1 Serial numbers

Serial numbers	DT01	DT02	DT03	DT04	DT05	DT06	DT07	DT08	DT09	DT10
Number in Questionnaire	9	13	12	14	20	10	15	6	11	16
Category	C	C	D	C	D	D	D	C	C	C

### 3.2 Measurement item

The measurement contained 10 items divided into four areas: ① Living conditions index (temperature, humidity, CO<sub>2</sub>)② The concentration of chemical contaminants (formaldehyde, VOC, SVOC)③The concentration of biological contaminants (planktonic fungi, accumulated fungi, adherent fungi)④Particulate pollution. The distribution of measuring point and measurement equipments are listed as followed in table 2.

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