

Atopic Dermatitis and the Indoor Climate

Preventive Measures Related to the Indoor Climate

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Atopic dermatitis (AD) is a disease, which may be caused by many factors. As a previous investigation concerning the increasing cumulative incidence rate of AD concluded that newer and presumably still relatively unheeded elements in the environmental must have affected the occurrence of the disease we tried to evaluate the atopic skin condition in a population of AD patient when moving to houses with the best indoor climate according to WHO i.e. a high air exchange rate, low humidity, and a subsequently lower allergen burden.

MATERIALS AND METHODS

Houses

In 1984 111 houses were built in Skejby, Jutland, Denmark. The houses were so-called "mini-risk" houses as the construction and choice of building materials were in accordance with present knowledge concerning best indoor environment. The buildings were equipped with a mechanical ventilation system which reduced the relative humidity by changing the indoor air once every hour. It removed the air from lavatories, kitchens and the sculleries, and supplied fresh prewarmed air to the living- and bedrooms.

Patients

Two groups of patients with various degrees of AD according to Hanifin, were selected from the out-patient clinic. One group composed of 9 AD patients (7 females, 2 males) were prepared to move house in October 1984. Their mean age was 23 years (range 3-47).

The other group consisted to the remaining AD patients who were not able to move to the "mini-risk" houses. Among these we selected the control group which was composed of 10 patients with AD (6 females, 4 males), mean age 24 years (range 3-43) matched according to age and degree of eczema. These control patients accepted not to move during the observation period (1984-1986) and they were instructed to keep the same furnishings during the investigation period. None of the patients had pets.

In general no changes in occupation or occupational environment took place within the observation period.

Evaluation

Both groups of patients were clinically evaluated in April 1984, 1985 and 1986 at the Department of Dermatology. At the evaluation in April 85 and 86 the mean time after changing residences was 4.2 and 15.8 months, respectively.

At the annual clinical evaluations the patients were checked weekly four times by the same investigator, who recorded localization, degree (mild, moderate, severe) and the extent of eczema. Erythema, vesicles, itching and lichenification were registered on a visual analog scale (VAS) ranging from no symptoms (0 mm) to severe symptoms (100 mm).

For one month each year, all patients made a daily overall VAS registration of their general subjective condition.

Indoor climate investigation

One day in April 1984, 1985 and 1986 we measured the concentration of particles (suspended and respirable), the air exchange rate, the relative indoor humidity, the temperature and the concentration of house dust mites (*Dermatophagoides pteronyssinus*) at the mattresses and bedroom floor.

For the "movers" the first indoor climate measurements were performed in the old houses in 1984 and thereafter in the "mini-risk" houses in 1985 and 1986.

RESULTS

Indoor climate investigation

All parameters measured in the dwellings ("movers" and controls) were within the limits recommended by WHO.

The indoor climate compared to the previous dwellings especially improved for air exchange rate and relative humidity (Table I).

The concentration of house dust mites were normal among the movers (median 2/0.1 g dust), but increased in the control group (median 21-25/0.1 g dust) (normal < 10/0.1 g dust). Temperature and concentration of dust (suspended, respirable) particles showed small variations.

PATIENTS

The clinical evaluation/subjective evaluation of the skin among the movers compared to the controls showed that the skin condition improved significant in the last part of the 16 months observation period after leaving the old dwellings. Itching of the dry atopic skin was expected to increase in the "mini-risk" houses where the humidity was lower, but 70%

Table I

	Movers		Controls		
	1984	1986	1984	1986	
Median value					
Air exchange rate/h	0.11	1.21 ($p < 0.0005$)	0.22	0.29 ($p < 0.05$)	($p < 0.02$)
Relative humidity (%)	44	38 ($p < 0.01$)	43	48 NS	($p < 0.05$)

of the "movers" reported that the itching even decreased. The consumption of emollients was unchanged in 1984–1985 and decreased in 1985–1986. This may be due to a better general condition of the skin due to removal of irritants and allergens in the indoor climate.

The present investigation showed improvement in subjective symptoms and clinical status of AD pa-

tients after moving to "mini-risk" houses with an increased air exchange rate and low indoor humidity. No single factor in the indoor environment could directly be related to changes in the skin symptoms. The observations support the opinion that AD may be a multifactorial disease and that the indoor climate may be one of many factors governing the skin condition.