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ORIGINAL RESEARCH

The prevalence of house dust mite (HDM) allergy and the use of HDM-impermeable bed covers in a primary care population of patients with persistent asthma in the Netherlands

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Summary
Background: House dust mite (HDM) allergen is one of the most common allergens to which asthma patients are sensitised. Prevalence of HDM allergy varies in the literature. Use of HDM-impermeable bed covers reduces exposure to HDM allergen. The aim of this study was to assess the prevalence of HDM allergy in a primary care population of asthma patients, as well as the use of HDM-impermeable bed covers by these patients.
Methods: A random sample of asthma patients between 16 and 60 years old was taken from general practices. Allergy was assessed with a radio allegro sorbent test (RAST). A questionnaire was used to identify demographic characteristics and the actual use of bed covers.
Results: 534 patients were invited and 160 patients participated. 53 patients not willing to participate were randomly selected to test the external validity of our findings. The sample was representative for the primary care asthma population. 48.8% of the asthma population was sensitised to HDM allergen. 25.6% of the HDM-allergic asthma patients were using HDM-impermeable bed covers.
Conclusion: Almost half of the patients with asthma were sensitised to HDM allergen. Only a minority of the patients used HDM-impermeable bed covers.

Introduction

House dust mite (HDM) allergen is one of the most common allergens to which asthma patients are

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sensitised [1,2]. Exposure to HDM allergen can result in bronchoconstriction and an inflammatory reaction of the airways [3]. Up to 85% of atopic asthmatic patients may have HDM allergy, but these figures vary widely in the literature from 45 to 85% [1,4,5].

HDM allergen avoidance measures are available in daily care. People spend approximately one third of their lives in bed. Therefore, HDM in mattresses, bedding and pillows contribute considerably to total HDM exposure [6,7]. Use of HDM-impermeable bed covers results in a considerable reduction in concentration of HDM allergen levels in bed [8—11]. Although the clinical efficacy of covers is still under debate [12] and some studies do not find a clinical benefit from covers [11,13], other studies show promising effects [10,14—16]. These differences in study outcomes may be partially explained by differences in study population, duration of follow up, baseline exposure to allergens, and medication use. In some studies assessing the efficacy of bed covers, patients were included who were not sensitised to HDM allergen. HDM avoidance measures seem especially effective as an early prevention measure in allergic patients who do not yet have a clinical diagnosis of asthma [17,18].

Health policy and various guidelines support the use of HDM-impermeable covers in different countries [19—21]. In several countries, including the Netherlands, insurance companies are reimbursing the cost of bed covers when HDM allergy is diagnosed. As a consequence, this ought to encourage widespread use of bed covers by allergic asthmatic patients in the Netherlands. However, it is uncertain to what extent HDM-allergic asthmatic patients are using these covers at the moment.

The aim of this study was to assess the prevalence of HDM allergy in a primary care population of adult asthmatic patients in the Netherlands. In addition, the use of HDM-impermeable covers in this asthma population was determined.

Methods

Asthma patients aged between 16 and 60 who were using inhaled steroids were selected from 15 general practices in the Netherlands. All subjects were invited to participate in a trial to test the effect of HDM-impermeable covers. With the invitation letter they received a questionnaire about the use of HDM-impermeable covers. If they were willing to participate, a radio-allergosorbent test (RAST) for specific immunoglobulin E (IgE) to HDM allergen was performed to test if subjects were sensitised to HDM. IgE levels above 0.35 kU/l were considered to be positive for HDM allergy. Moreover, patients received a questionnaire on their educational and employment level, smoking habits and medication use. Socio-economic status (SES) was derived from educational and employment level. Both educational level and employment level were divided into the categories low, middle and high. SES was calculated as the mean of employment and educational level and also divided into the categories low, middle and high. Smoking was defined as current smoking, ex-smoking or never smoking.

This questionnaire was also sent to a sample of patients not willing to participate in the trial, to compare characteristics between the study group and non-participants in order to assess the external validity of the sample studied. A random sample of 10% of the total number of patients invited to the trial was produced with assistance from a randomisation program. The two groups were compared on the following variables: gender; age; smoking status; and socio-economic status.

The Medical Ethical Committee of the University Hospital Maastricht approved the trial, and all responders willing to participate gave written informed consent. A sample of patients who were originally not willing to participate in the trial, volunteered to complete the patient characteristics questionnaire.

Statistical analysis

The percentages of patients sensitised to HDM allergen and patients using HDM-impermeable bed covers were calculated. The patient characteristics of participants and non-participants are presented as percentages or mean with 95% confidence intervals. Variables were compared by means of a Student's t-test or a chi-square-test, depending on the type of variable, to see whether there were any significant differences between participants and non-participants. Statistical significance was defined as p-value < 0.05. Statistical analyses were performed with SPSS for Windows, Version 11.0.

Results

HDM sensitisation

Five hundred and thirty four asthma patients from 15 practices were invited to participate in the trial. 160 patients were willing to participate. From the group of patients not willing to participate a random sample of 53 patients completed the

Table 1 Patient characteristics of the participants and a random sample of non-participants

	Participants ($N = 160$)	Non-participants ($N = 53$)	p-value
Age in yrs (SD)	41.5 (13.2)	35.4 (12.6)	0.004
Gender M/F in (%)	47.8/52.2	41.5/58.5	0.448
Smoking (%)			
Current smoking	43 (26.9)	10 (18.9)	0.115
Ex-smoking	48 (30.0)	12 (22.6)	
Never smoking	66 (41.3)	31 (58.5)	
Missing	3 (1.9)	0	
SES (%)			
Low	63 (39.4)	17 (32.1)	0.292
Middle	66 (41.3)	29 (54.7)	
High	27 (16.9)	7 (13.2)	
Missing	4 (2.5)	0	

SD: standard deviation, M: male, F: female, SES: socio economic status.

patient characteristics questionnaire. The results of the comparison on patient characteristics between the participants and non-participants are shown in Table 1.

There was a statistically significant difference in age between participants and non-participants (p-value 0.004). The other variables did not differ significantly.

The RAST test was performed in 160 patients. 78 patients (48.8%) had a positive test for HDM allergens (95% CI 41.1–56.5).

Use of covers

In the total group of responders the use of HDM-impermeable bed covers was 12.5% (95% CI 9.3—15.7). With our prevalence figure for HDM allergy of 48.8%, this implies that the use of HDM-impermeable covers is 25.6% (95% CI 18.8—32.4) in the HDM-allergic asthma patients. If the data on the use of HDM-impermeable covers and prevalence of HDM allergy are extrapolated to the total asthmatic population, this would suggest that almost 75% of asthmatic patients allergic to HDM do not use HDM-impermeable bed covers.

Discussion

This study shows that 48.8% of this population of asthma patients is sensitised to HDM. In the literature, 45 to 85% of asthmatic patients have been shown to be HDM allergic [1,4,5]. Accordingly, our figure of 48.8% is at the lower end of the range. In a population of more severe asthma patients a higher prevalence might be expected, and also in asthmatic children a higher prevalence is to be expected.

We found the estimated use of HDM-impermeable bed covers by HDM-sensitised asthma patients to be 25.6%. Several HDM-impermeable covers have been tested before with promising results on reduction of HDM allergen exposure [16,17,22—24]. Therefore it is likely that the covers patients are using are actually reducing allergen exposure. This study shows that there is room for improvement in HDM-impermeable bed cover use in asthmatic patients with HDM allergy. These numbers were extrapolated from the use of bed covers in the whole group of responders together with the prevalence of sensitisation to HDM allergen, assuming that only patients sensitised to HDM allergen are using bed covers. It could be that in the total group of responders patients not sensitised are using covers. Furthermore, patients could possess covers but not be using them. The estimated figure of 25.6% could therefore be an overestimation, suggesting that there is even more room for improvement. An underestimation seems very unlikely.

Nevertheless, at least 75% of HDM-allergic asthmatic patients using inhaled steroids are not using HDM-impermeable bed covers, even though the use of these covers could lead to better lung function and less symptoms [10,14,16,25]. A wide range of reasons for not using these covers can be assumed. Patients may not be aware of the benefits of HDM-impermeable covers or the effect covers might have on their asthma. Furthermore, patients might have had negative experiences with uncomfortable covers. As manufacture techniques progress this reason should be a passing concern.

Moreover, patients may not be aware of the fact that insurance companies compensate the cost of the covers.

In addition, doctors might not prescribe HDM-impermeable bed covers because of various reasons: firstly, not all patients are examined for the presence of HDM allergy; and secondly, although possible benefits of HDM-impermeable bed covers are described in the literature, there are also studies showing no benefit from covers, as summarized in a Cochrane Review [12]. The negative effects might be explained by the fact that in some studies patients not sensitised to HDM allergens were included, or that other sensitising allergens were present and patients were actually exposed to these allergens; for example, patients sensitised to cat dander allergen, with a cat in the house, participating in a trial investigating the effects of HDM-impermeable covers. Apart from exposure to HDM allergen, exposure to other triggers or allergens can cause symptoms [26,27]. In this study we focused specifically on HDM allergen.

The patients who were willing to participate were representative with regard to gender, smoking status and socio-economic status of the average asthmatic population in primary care. However, the participants were older than the sample of non-participants (average age 41 years compared to 35 years.) In younger patients one could expect a higher prevalence of HDM allergy. However, we think that any prevalence differences between two groups with mean ages 41 and 35 will be minimal, and that the group of patients in which we assessed the prevalence of HDM allergy is representative for patients with mild to moderate asthma between the ages of 16 and 60.

In conclusion, the prevalence of HDM allergy in this group of asthma patients in primary care was almost 50%, which is at the lower end of the range compared to other studies. The actual use of HDM-impermeable covers in these HDM-allergic asthmatic patients was around 25%.

Conflicts of interest

None declared.

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