

Correlation Between Density of House Dust Mites and Recurrence of Urticaria

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Abstrak

Beberapa kasus urtikaria pada paparan debu dan diantaranya menghubungkan sensitivitas Tungau Debu Rumah (TDR) dengan urtikaria berdasarkan riwayat pasien dan pemeriksaan uji intradermal. **Tujuan:** Menentukan korelasi antara kepadatan TDR dan rekurensi urtikaria. **Metode:** Jumlah sampel pada penelitian ini 30 orang. Kepadatan TDR dari tiap kamar sampel dihitung dengan mengumpulkan debu dan sampel dinilai sensitivitas terhadap TDR dengan pemeriksaan *Skin Prick Test* (SPT). Diagnosis urtikaria berdasarkan anamnesis, kemudian ditanyakan rekurensinya dalam tiga bulan terakhir. **Hasil:** studi menunjukkan dari 30 sampel, terdiri dari tujuh (23,3%) sampel memiliki kepadatan TDR sedang sementara 23 (76,7%) memiliki kepadatan rendah. Sebanyak 15 sampel positif SPT terhadap alergen TDR. Dari anamnesis, 12 (40%) sampel didiagnosis urtikaria dan diantaranya, 11 orang (91,67%) positif terhadap SPT. Tidak ada sampel yang memiliki rekurensi urtikaria dalam tiga bulan terakhir. **Simpulan:** penelitian ini tidak menunjukkan korelasi yang signifikan antara kepadatan TDR dan tingkat kekambuhan urtikaria ($p > 0,05$), TDR memang bisa memicu eksaserbasi. Disarankan penelitian selanjutnya dengan jumlah sampel lebih besar.

Kata kunci: urtikaria, kepadatan tungau debu rumah

Abstract

Several patients have been reported who have urticaria on exposure to dust and there are few reports associating house dust mite (HDM) sensitivity with urticaria, based on the patient's history as well as intradermal skin testing. **Objectives:** To investigate the correlation between density of HDM and the recurrence of urticaria. **Methods:** In this study, there were thirty participants. The density of HDM was calculated by collecting dust from each bedroom while the participants were checked their sensitivity of HDM by skin prick test (SPT). We established the diagnosis of urticaria based on anamnesis. Each participant was also asked about the recurrence of urticaria in the last three months. **Results:** Out of thirty participants, seven (23.3%) samples had moderate density of HDM while 23 (76.7%) had low density of HDM. Fifteen participants were positive against HDM allergen. From anamnesis, twelve (40%) individuals were diagnosed with urticaria and out of twelve, eleven (91.67%) were positive to SPT. There is no one of participants with urticarial history that had relapse within last three months. Out of twelve samples diagnosed with urticaria, one (8.3%) had moderate density of HDM in bedroom ($p > 0.05$). Nevertheless, eleven of them have sensitivity towards HDM. **Conclusions:** This study do not show a significant correlation between density of HDM and recurrence rate of urticaria, HDM allergen indeed could be the trigger of exacerbation of disease. This study needs further investigation with larger samples size.

Keywords: urticaria, house dust mite density

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INTRODUCTION

Urticaria is defined as a skin lesion consisting of a wheal-and-flare reaction in which localized intra cutaneous edema (wheal) is surrounded by an area of redness (erythema) that is typically pruritic.¹ Urticaria

is characterized by the rapid appearance of wheals and/or angioedema.^{1,2} Immediate hypersensitivity where mast cells as major effector cells is believed by some to be involved in the pathogenesis of urticaria.¹⁻² Skin Prick Testing (SPT) which detects the presence of allergen-specific IgE on a patient's mast cells, has been used by some researchers and practitioners in the investigation of urticaria.²

Several factors contribute in provocation of the symptoms and they include food, food additives, inhalants (pollen, moulds, animal dander and house-dust mites (HDM)), etc.³ Mites are a common aeroallergen, colonizing beds, sofas, carpets, and any woven material.² House dust mites can trigger immunological process through ingestion, inhalation or inoculation. These mite allergens are resistant to high temperatures, and do not lose their antigenic property even on cooking.⁴ Mites sensitize and induce atopic disease, such as rhinitis and asthma, in predisposed individuals. House dust mites are an important deteriorating factor in patients with allergic rhinitis, asthma and atopic dermatitis. Avoidance of mites can effectively reduce symptoms in some of these patients.²

Occasional patients had been reported who have acute urticaria on exposure to dust and were found to be allergic to HDM.⁵ Several studies showed various results. A number of studies have shown that between 25–58% of chronic urticaria patients had a positive cutaneous reaction and/or evaluated serum specific IgE antibodies against HDM, suggesting a possible association between HDM sensitivity and a subgroup of chronic urticaria.^{2,6}

Even though there were many studies that have reported a relationship between mite sensitization and urticarial, there are still no clear investigation about relevance of density HDM in an area to incidence of urticaria and HDM sensitivity in a person. The purpose of recent study, therefore, to find any correlation between the density of HDM with recurrence of urticarial, confirmed with sensitivity test toward HDM allergen.

METHODS

The study sample comprised 30 children and adolescent of Al Falah and Aisyiyah Reformatory Padang, aged below 25 year old. All the participants were explained about the purpose of the study and also were informed about the each step of SPT and informed consent was obtained from each of the participant. The following data were collected: age, sex, personal and family history of atopy, and history of urticaria.

Calculation of HDM Density

Dust was collected with a vacuum cleaner. The suction was done for 3 minutes on each mattress and then dust inserted to plastic containers. The container was labeled according to where the dust was taken. The dust samples were then taken to the Parasitology Laboratory of the Faculty of Medicine, University of Andalas for examination.

Dust in a plastic container that had been labeled was filtered using a sieve. Strained dust was put in a petri dish that has been previously weighed to determine the weight of an empty petri dish. Dust was weighted and noted each weight. Weighted dust was put into a container containing 100 ml of 5% sodium chloride solution. The solution was put into a reaction tube. This solution was centrifuged for 4 min at 600 rpm for separating mites from debris. A saturated NaCl solution is added to the reaction tube until it was full and the surface of the convex solution appears. Then covered with cover glass (deck glass) and left for 30 minutes. Cover glass was taken and placed on the object glass. Samples were examined using a 40x light magnification microscope. The number of HDM found was calculated.

Skin Prick Test (SPT)

Volar of the forearms were cleaned and sites for placing the allergens were marked using a marker 2-3 cm away from the wrist and ante cubital fossae. Distance between two allergens was ± 2 cm. A drop of each allergen was placed on the skin and was pricked

with a lancet to introduce the allergen. Equal pressure was applied for all the allergens. Histamine dichloride (10 ng/ml or 0.1%) was used as a positive control and saline as negative control. Results were read after 15-20 minutes. Wheal at the HDM allergen were compared with the wheal produced at the positive control site. Largest diameter of the wheal was measured. A wheal of 50% of diameter positive control or bigger was considered as positive. Negative control was used to rule out any dermatographism.

RESULTS

We conducted thirty participants which twelve of them have a history of urticaria. Seven dust samples had moderate density of HDM and other 23 samples with low density of HDM. From seven samples of moderate density of HDM, only one that have a history of urticarial ($p > 0.05$). fifteen participants were sensitive to HDM (positive SPT), and three of them had moderate density of HDM ($p > 0.05$).

Table 1. Correlation between HDM density with incidence of urticaria

| HDM DENSITY | INCIDENCE OF URTICARIA | | P value |
|-------------|------------------------|---------------|---------|
| | YES | NO | |
| HIGH | 0 (0%) | 0 (0%) | p 0.193 |
| MODERATE | 1 (8.3%) | 6 (33.3%) | |
| LOW | 11 (91.7%) | 12 (66.7%) | |
| TOTAL | 12 (100%) | 18 (100%) | |

Table 2. Correlation between HDM density with sensitivity of HDM

| HDM DENSITY | SKIN PRICK TEST | | P value |
|-------------|-----------------|---------------|---------|
| | POSITIVE | NEGATIVE | |
| HIGH | 0 (0%) | 0 (0%) | p 1.000 |
| MODERATE | 3 (20%) | 4 (26.7) | |
| LOW | 12 (80%) | 11 (73.3%) | |
| TOTAL | 15 (100%) | 15 (100%) | |

DISCUSSION

Urticaria is a common dermatologic symptom and impair quality of life in many patients.⁹ the etiology of urticaria remains uncertain in most of the patients. The infections, ingestants, inhalants, injectants, implants, irritants can provoke urticaria symptoms.⁶

The house dust mites are the most common environmental allergens. Mites sensitize and induce allergic disorders such as perennial rhinitis and asthma in predisposed individuals. In addition, house dust mites are important deteriorating factors in patients with atopic dermatitis. Although there is no clear published data indicating that mite sensitivity leads to urticaria, our results proposed that mite allergens may cause urticaria in some mite sensitive patients.^{9,10}

CONCLUSION

To our knowledge, there is no conclusive study that indicates mite elimination is useful in urticaria.

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