

# Sublingual immunotherapy for treating adult patients with allergic rhinitis induced by house dust mite among Chinese Han population

## A retrospective study

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### Abstract

The objective of this retrospective study was to evaluate the efficacy and safety of sublingual immunotherapy (SLIT) for treating adult patients with allergic rhinitis (AR) induced by house dust mite (HDM) among Chinese Han population.

A total of 201 adult patients with AR induced by HDM were included. All of them received SLIT treatment. The outcomes consisted of AR symptoms, and quality of life. In addition, any adverse events were also recorded in this study.

Compared with the AR symptoms and quality of life before the treatment, significant differences were found after 1-year treatment ( $P < .01$ ), and 2-year treatment ( $P < .01$ ). Additionally, only mild and acceptable adverse events were observed in this study.

This study demonstrated that SLIT may be efficacious and safety for adult patients with HDM induced by AR among Chinese Han population.

**Abbreviations:** AR = allergic rhinitis, HDM = house dust mite, RQLQ = Rhinoconjunctivitis Quality of Life Questionnaire, SLIT = sublingual immunotherapy.

**Keywords:** allergic rhinitis, sublingual immunotherapy, house dust mite, efficacy, safety

## 1. Instruction

Allergic rhinitis (AR) is one of the most common health problems that affect more than one-third population all around the world.<sup>[1,2]</sup> In China, it has been reported that its prevalence varies from 9.6% to 23.9%.<sup>[3]</sup> Previous studies also reported that the house dust mite (HDM) is the most probable inhalant allergen, and cause to the AR.<sup>[4–7]</sup> Moreover, patients with such condition can also lead to chronic or more severe AR or even asthma when they are exposed to the HDM for long time.<sup>[8–10]</sup> Additionally, the symptoms of AR are often associated with poor quality of life, sleep disorder, and even emotional issues.<sup>[11,12]</sup>

The treatment for this condition is costly and imposes a large amount of economic burdens for individuals, families, and the society.<sup>[13,14]</sup> Most treatments still focus on the symptoms relief for patients with AR, and often suffer from efficacy limitation for long time. Fortunately, more promising treatment of allergen immunotherapy is used as a guideline-recommended treatment

for patients with AR.<sup>[15–18]</sup> It has been reported that this kind of therapy can not only manage the transform of AR to severer condition, but also can prevent AR to develop into asthma with the early treatment.<sup>[19,20]</sup>

Although sublingual immunotherapy (SLIT) is used to treat AR effectively under the recommendation of the World Allergy Organization,<sup>[21]</sup> limited data of SLIT for the treatment of AR among adult Chinese Han population has been reported. In this study, we retrospectively analyzed the efficacy and safety of SLIT in patients with AR induced by HDM among Chinese Han adult population specifically.

## 2. Patients and materials

### 2.1. Design

This study was approved by the Medical Ethical Committee of Affiliated Hospital of Yan'an University. All patients provided the written informed consent. It was conducted at Affiliated Hospital of Yan'an University between January 2011 and December 2016. All patients received SLIT drops for a total of 2 years. All the outcomes were measured after 1-year, and 2-year treatment.

### 2.2. Patients

In this retrospective study, 201 adult patients with the diagnosis of persistent AR induced by HDM were included. The moderate-to-severe HDM-induced AR was confirmed diagnosed according to the criteria of diagnosis and the classification of the Allergic Rhinitis and its Impact on Asthma guidelines.<sup>[22]</sup> It specifically defined as an AR symptom score  $\geq 7$ , and patients experienced for periods longer than 4d/wk and for  $>4$  consecutive weeks. Additionally, inclusion criteria also included patients'

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**Table 1****Characteristics of included patients.**

Characteristics	Value
Age, y	
Mean	35.7 (6.8)
Range	20–49
Gender	
Male	138 (68.7)
Female	63 (31.3)
Ethnicity (Asian Chinese)	201 (100.0)
HDM-induced AR duration, y	11.4 (5.5)
Type of AR	
Moderate persistent	14 (7.0)
Severe persistent	187 (93.0)

Note: Data are present as mean  $\pm$  standard deviation or number (%). AR=allergic rhinitis, HDM=house dust mite.

ages >18 years. Furthermore, all patients had moderate to severe persistent AR for at least 1 year with positive nasal provocation test result, and a positive serum HDM-specific IgE level of 3.5 kU/L, according to the *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*.

Exclusion criteria consisted of patients with any kinds of asthma or history of asthma; systematic immunologic disorders; allergic to food, atopic dermatitis, or animal hairs; a specific IgE level of  $\geq 50$  kU/L for any other allergic reasons, such as cedar, muwort, and so on; a history of chronic rhinosinusitis, anaphylactic shock; pregnancy; psychological, or neurological diseases that may affect the outcome assessments; and previously treated with SLIT,  $\beta$ -blockers, or corticosteroids 6 months before the study.

### 2.3. Treatment schedule

SLIT was conducted with standard extract of drops for SLIT (*D farinae* drops; Wolwopharma Biotechnology, Zhejiang, China) as sublingual drops, according to the schedules, recommended by the manufacturer.<sup>[23]</sup> All patients received 1 drop of SLIT (333  $\mu$ g/mL) once daily within the first month, then added to 2 drops of SLIT (1000  $\mu$ g/mL) once daily for a total of 2 years. All adverse events were recorded during the period of treatment.

### 2.4. Outcome measurements

The outcomes included AR symptoms,<sup>[24]</sup> and quality of life, as measured by Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ).<sup>[25]</sup> AR symptoms consists of 6 allergic symptoms, and 4 rhinitis symptoms, with each item scale ranging from 0 (no symptoms) to 3 (severe symptoms). RQLQ includes 28 items, and

distributed in 7 domains. Each item presents as a 7-point scale (0 to 6). Higher score indicates poor quality of life. The minimal clinically important difference for the change of each item and overall quality of life is 0.5.<sup>[26]</sup> Additionally, the safety was also recorded during the period of treatment. All the patients were asked to visit the clinical investigators to conduct all the outcome measurements within 1 month after 1-year, and 2-year treatment, respectively. All the outcome measurements were assessed before the study, and after 1-year, and 2-year treatment.

### 2.5. Statistical analysis

All data were analyzed by using IBM SPSS Statistics 19.0 (IBM Corp., Armonk, NY). One-sample Kolmogorov-Smirnov test was used to check the distributions of the samples. Quantitative data were analyzed by paired samples *t* test. The statistical significance was defined as  $P < .05$ .

## 3. Results

The characteristics of all eligible patients are summarized in Table 1. Patients aged from 20 to 49 years, with mean age of 35.7 years. Of them, 138 (68.7%) patients are men. The mean duration of the HDM-induced AR were 11.4 years. Fourteen patients (7.0%) were moderate persistent AR, and 187 (93.0%) patients were severe persistent AR.

The outcome data of symptoms scores are presented in Table 2. When compared with the symptom scores before treatment, significant differences of all symptoms scores were found after 1-year ( $P < .01$ ) and 2-year treatment ( $P < .01$ ).

The scores of quality of life are showed in Table 3. After 1-year treatment, the SLIT showed promising enhancement in quality of life, compared with those before the treatment ( $P < .01$ ). This promising trend contributed throughout to the end of 2-year treatment ( $P < .01$ ).

The adverse events related treatment is listed in Table 4. No severe adverse events were recorded during the treatment period. The mainly adverse events were local symptom, gastrointestinal reactions, and aggravation of AR symptom, fever, eye swelling, and skin rash.

## 4. Discussion

Previous studies have explored the efficacy and safety of SLIT for the treatment of adults with AR induced by HDM.<sup>[27–34]</sup> Four trials focused on the Korea adult population and found that SLIT significantly improved the symptoms and medication scores in patients with AR induced by HDM.<sup>[27–30]</sup> One retrospective study conducted in Italy and evaluated whether SLIT exerts a long-lasting effect and the association to its duration. The results

**Table 2****Symptoms of all included patients between pretreatment and posttreatment.**

Outcome measurements	Before	After 1-year treatment	<i>P</i> value	After 2-year treatment	<i>P</i> value
Runny nose	2.23 (0.41)	1.58 (0.55)	<.01	1.02 (0.48)	<.01
Blocked nose	2.05 (0.52)	1.39 (0.63)	<.01	0.89 (0.44)	<.01
Sneezing	2.10 (0.45)	1.46 (0.54)	<.01	0.98 (0.51)	<.01
Itchy nose	2.11 (0.47)	1.40 (0.52)	<.01	0.95 (0.47)	<.01
Gritty feeling/red/itchy eyes	1.52 (0.69)	0.84 (0.71)	<.01	0.57 (0.49)	<.01
Watery eyes	2.75 (0.74)	0.62 (0.56)	<.01	0.36 (0.33)	<.01

Note: Data are present as mean  $\pm$  standard deviation.

**Table 3****Quality of life of all included patients between pretreatment and posttreatment.**

Outcome measurements	Before	After 1-year treatment	P value	After 2-year treatment	P value
Activities	3.55 (1.47)	2.61 (1.55)	<.01	1.26 (1.17)	<.01
Sleep	2.51 (1.82)	1.58 (1.73)	<.01	0.94 (1.01)	<.01
General problems	1.80 (1.58)	1.12 (1.26)	<.01	0.77 (0.86)	<.01
Practical problems	3.61 (1.70)	2.49 (1.82)	<.01	1.31 (1.28)	<.01
Nasal symptoms	3.93 (1.67)	2.55 (1.71)	<.01	1.36 (1.12)	<.01
Eye symptoms	2.95 (1.84)	2.01 (1.78)	<.01	0.92 (0.69)	<.01
Emotions	3.07 (1.46)	1.96 (1.54)	<.01	1.02 (0.83)	<.01
Overall quality of life	2.97 (1.33)	1.88 (1.39)	<.01	1.20 (0.75)	<.01

Note: Data are present as mean  $\pm$  standard deviation.

showed that after 4 years SLIT treatment, the symptoms and bronchial reactivity significantly improved, and even last 7 to 8 years after the treatment.<sup>[31]</sup> The other trial performed in France, and assessed the efficacy and safety of SLIT in patients with chronic AR related to sensitization to HDM.<sup>[32]</sup> It is found that SLIT can both improve efficacy criteria, measured by rhinitis score and objective criteria, measured by skin reactivity.<sup>[33]</sup> Another 2 trials conducted in Japan and Bulgaria to assess the SLIT for treating patients with HDM induced-AR. The results also showed that SLIT can enhance both symptoms and quality of their life in patients with such condition.<sup>[33,34]</sup> However, no studies specifically focused on exploring the efficacy and safety of SLIT in patients with AR induced by HDM among Chinese Han adult population specifically.

The results of this study are consistent with the previous studies.<sup>[27-34]</sup> Our study found that the efficacy of SLIT in patients with AR induced by HDM among Chinese Han population is promising with acceptable adverse events. It can not only relieve the symptoms of AR, but also can improve the quality of life in patients with HDM induced by AR.

There are 3 limitations in this retrospective study. First, this study did not consist of a control group for the treatment of SLIT in patients with AR induced by HDM. Second, the other concomitant diseases may affect the outcome assessments of quality of life. Third, this study only included Chinese Han population, which might affect our results generalized to other population. Fourth, this study did not involve the blind procedure to the patients and investigators because of the retrospective study, which may increase the risk of selection.

## 5. Conclusion

The results of this retrospective study demonstrated that SLIT may be effective in adult patients with AR induced by HDM among Chinese Han population.

**Table 4****Adverse events related to the treatment.**

Adverse events	After 1-year treatment	After 2-year treatment
Local symptom	6 (2.9)	21 (10.4)
Gastrointestinal reactions	2 (1.0)	5 (2.5)
Aggravation of AR symptom	3 (1.5)	9 (4.5)
Fever	2 (1.0)	4 (2.0)
Eye swelling	1 (0.5)	3 (1.5)
Skin rash	2 (1.0)	5 (2.5)

Note: Data are present as number (%); AR=allergic rhinitis.

## Author contributions

**Conceptualization:** Miao Han, Yan Chen, Mi Wang.

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