

# The effectiveness of forest honey toward symptoms of atrophy patients: Study of ear nose and throat-head neck and dermatology venereology

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## ABSTRACT

The effectiveness of forest honey in Total Nasal Symptom Score (TNSS) improvement in allergic rhinitis patients and index Scoring Atopic Dermatitis (SCORAD) in Atopic Dermatitis (AD) patients were discovered. It was an experimental study with a pretest–posttest design. A total of 20 people with atopy (15 people with allergic rhinitis and five people with AD) were given forest honey in the morning (1 ml × 10 ml dose) for 8 weeks and 20 atopy patients without forest honey. TNSS and SCORAD index were evaluated before the intervention, week 2, week 4, and after the intervention (week 8). The mean TNSS before treatment was higher in the honey group, namely 7.73, and a significant decrease after 8 weeks of intervention, namely 2.73 with  $P = 0.000$ . The nonhoney group showed that there was no significant difference after 8 weeks with  $P = 0.888$ . The SCORAD values of the honey and nonhoney groups had significantly different values from week 0 to week 4 ( $P = 0.003$ ) and week 0 to week 8 ( $P = 0.003$ ). Forest honey can give as an additional therapy for patients with allergic rhinitis and AD.

**Key words:** Allergic rhinitis, atopic dermatitis, forest honey

## INTRODUCTION

Atopy is the tendency for a person and/or family to be sensitized and produce immunoglobulin E (IgE) in response to allergens, usually in the form of protein.<sup>[1,2]</sup> Atopy affects a large proportion of the population, an estimated 10%–30% in developed countries. About 80% of atopy individuals have a family history of allergies.<sup>[3]</sup> Atopy is a mild disease common in children, but it can affect the degree of health, quality of life, and mortality in its course. Atopy refers to the development

of allergy-related diseases such as asthma, dermatitis, and rhinitis, which are chronic and have a high recurrence rate.

Allergic Rhinitis (RA) is inflammation of the nasal mucosa mediated by IgE-mediated hypersensitivity reactions to allergens with symptoms of nasal itching, pruritus, rhinorrhea, sneezing, and nasal congestion.<sup>[4-6]</sup> The prevalence of RA in children is 10%–40% of the world population and increases yearly.<sup>[7]</sup> RA cases in Indonesia variety as happened in Semarang City, it was found 11.5% in children aged 6-7 years, 17.3% at 13-14 years old,<sup>[8,9]</sup> and in Surabaya City was about 23.05% among school-aged children.<sup>[10]</sup>

Atopic dermatitis (AD) is an itchy chronic skin disease characterized by ill-defined erythema, edema,

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vesicles, and madidans in the acute stage and skin thickening (lichenification) at the chronic stage.<sup>[11]</sup> The International Study of Asthma and Allergies in Childhood stated that AD in children varies in different countries. Based on the data in the URJ skin disease for children, Dr. Soetomo Hospital, AD patients have increased every year. The number of new cases in 2006 was 116 patients (8.14%); in 2007, there were 148 patients (11.05%); and in 2008, there were 230 patients (17.65%).<sup>[12]</sup>

Prevention of atopy can be done by avoiding contact with allergens and using chemical drugs. However, this only reduces the symptoms that are added to traditional medicine.<sup>[13]</sup> One companion treatment for allergies is honey,<sup>[14]</sup> a nutritional-conventional medicine product for various clinical conditions. It provides antioxidant, anti-inflammatory, antimicrobial, anticancer, antimetastatic, and antiproliferative effects.<sup>[15]</sup>

Several studies have shown that honey use affects atopy associated with allergic rhinitis and AD. One of the mechanisms of honey against atopy is suppressing IgE-mediated hypersensitivity.<sup>[16]</sup> However, using honey is still a matter of debate in reducing allergies. Based on this, it is necessary to test honey's potential for symptom improvement in atopy sufferers, especially forest honey of Central Sulawesi.

## MATERIALS AND METHODS

The research subjects were patients with allergic rhinitis and AD at UNDATA Hospital. This research was quasi-experimental with a pretest-posttest design. The research subjects were 40 people divided into two groups randomly: the control group without giving forest honey and the treatment group with providing honey. A total of 20 people with atopy (15 allergic rhinitis and 5 AD) were given forest honey orally in the morning (dose: 1 × 10 ml/day) for 8 weeks and 20 people with atopy without given forest honey. The variables observed were clinical symptoms examined at the beginning of the study/pretest (0 weeks), 2 weeks, 4 weeks, and the end of the study/posttest (8 weeks).

Assessment of changes in clinical symptoms used the Total Nasal Symptom Score (TNSS) for allergic rhinitis and the scoring of atopic dermatitis (SCORAD) for AD, analyzed with a *t*-test to identify the significance of differences between control and treatment groups.

## RESULTS

Table 1 shows the subject's characteristics, including gender, age, and occupation. A total of 24 female subjects (60%) were more than a total of men (40%). Most of the study subjects were over 18 years old (by the older age of 45 years), and

the youngest was 8 years old. Most research subjects (35%) were civil servants/police/military.

Table 2 shows that the mean TNSS before treatment was higher in the honey group, namely 7.73, and a significant decrease after 8 weeks of intervention, namely 2.73 with  $P = 0.000$ . The nonhoney group showed that there was no significant difference after 8 weeks with  $P = 0.888$ .

Research on patients with AD was conducted using and without giving honey. We performed four times of data collections, namely weeks 0, 4, and 8 [Table 3]. Patients were measured using the SCORAD index, which consists of the area affected by the rule of nine, the intensity consisting of erythema, edema, crusting, excoriation, lichenification, and dryness, which is scored with points 0–3, as well as itching disorders and sleep disorders measured subjectively by the patient with a value of 0–10. The AD score was adjusted according to the SCORAD formula which was then categorized into 3, namely values > 50 mean heavy AD, 25-50 AD moderate, and < 25 AD light.

The number of samples is very limited, consisting of 5 people with atopy by consuming honey and 5 people with atopy without honey. Patients were followed-up on the 1<sup>st</sup> day and then on weeks 2, 4, and 8.

The comparison test results between the two treatment groups showed  $P = 0.00$  or significantly different, where the

**Table 1: Characteristics of respondents with atopy (n=40)**

| Characteristic                | n (%)   |
|-------------------------------|---------|
| Gender                        |         |
| Male                          | 16 (40) |
| Female                        | 24 (60) |
| Age (years old)               |         |
| <18                           | 6 (15)  |
| >18                           | 34 (85) |
| Occupation                    |         |
| Civil servant/police/military | 14 (35) |
| Private employee              | 12 (30) |
| Student                       | 12 (30) |
| Housewife                     | 2 (5)   |

**Table 2: Mean Total Nasal Symptom Score for honey and nonhoney groups at week 0 and week 8**

| Treatment | Treatment time |     |        |      | P     |
|-----------|----------------|-----|--------|------|-------|
|           | Week 0         |     | Week 8 |      |       |
|           | Mean           | SD  | Mean   | SD   |       |
| Honey     | 7.73           | 3.8 | 2.73   | 2.01 | 0.000 |
| Nonhoney  | 6.80           | 3.4 | 6.66   | 2.74 | 0.888 |

SD: Standard deviation

**Table 3: Mean index score of atopic dermatitis for honey and nonhoney groups at week 0, week 4, and week 8**

| Treatment | Treatment time |      |        |       |        |       | P        |          |
|-----------|----------------|------|--------|-------|--------|-------|----------|----------|
|           | Week 0         |      | Week 4 |       | Week 8 |       | Week 0-4 | Week 0-8 |
|           | Mean           | SD   | Mean   | SD    | Mean   | SD    |          |          |
| Honey     | 44.84          | 9.29 | 32.32  | 10.31 | 29.02  | 10.59 | 0.068    | 0.074    |
| Nonhoney  | 39.14          | 8.34 | 31.34  | 10.22 | 27.54  | 5.58  | 0.25     | 0.13     |

SD: Standard deviation

TNSS score was lower than the nonhoney group [Table 4]. It showed that honey effectively reduced the TNSS score in patients with allergic rhinitis.

Table 4 shows that at weeks 0, 4, and 8 in AD patients who used honey and non-honey gave insignificant results on their SCORAD with  $P < 0.05$ . However, the honey and nonhoney group treatment obtained significant results from week 0 to week 4 and week 0 to week 8 [Table 5]. This result indicates that forest honey's daily consumption can be used as an additional treatment for AD.

Giving forest honey to patients with AD did not significantly improve the patient's SCORAD index. However, based on Figures 1 and 2, shows an improvement in atopic dermatitis from week 0 to week 8.

## DISCUSSION

Evaluated signs used TNSS and SCORAD index. This research obtained the mean TNSS score at week 0 or pretest was 6.5 in the honey group and 6.5 in the nonhoney group. TNSS is a way of assessing the quality of allergic rhinitis symptoms in sufferers. TNSS was calculated by adding up the scores for 4 signs of allergic rhinitis in the form of nasal congestion, itchy nose, sneezing, and runny nose. Each symptom is given a 4-rating scale from 0 to 3. A score of 0 indicates no signs; a score of 1 indicates tolerable mild symptoms; a score of 2 disturbing symptoms/moderate but bearable; and a score of 3 if the symptoms are severe and interfere with daily activities. TNSS will have the highest and lowest scores of 12 and the lowest score of 0.<sup>[17]</sup>

The consumption of honey in allergic rhinitis sufferers will accelerate the improvement of allergic rhinitis symptoms.<sup>[18]</sup> The progress of allergic rhinitis symptoms in patients who consume honey is thought to pass through several mechanisms. First, honey can suppress IgE-mediated hypersensitivity reactions. Several animal studies have shown the effect of honey on immune reactions. Mast cells are known to form a lot when an allergic reaction occurs and release many mediators, one of which is histamine, which is involved in many symptoms of allergic rhinitis. The second mechanism, honey, will induce the body's ability to tolerate aeroallergens to reduce the formation of hypersensitivity reactions. The third mechanism is the disruption of the

**Table 4: The results of the Total Nasal Symptom Score comparison test for the honey and nonhoney groups at week 8**

| Treatment time | Treatment |      |          |      | P     |
|----------------|-----------|------|----------|------|-------|
|                | Honey     |      | Nonhoney |      |       |
|                | Mean      | SD   | Mean     | SD   |       |
| Week 8         | 2.73      | 2.01 | 6.66     | 2.74 | 0.000 |

SD: Standard deviation

**Table 5: The comparison test results from the atopic dermatitis index score in the honey and nonhoney groups from week 0 to week 4 and week 0 to week 8**

| Treatment time | Treatment        | P     |
|----------------|------------------|-------|
| Week 0-4       | Honey + nonhoney | 0.003 |
| Week 0-8       | Honey + nonhoney | 0.003 |

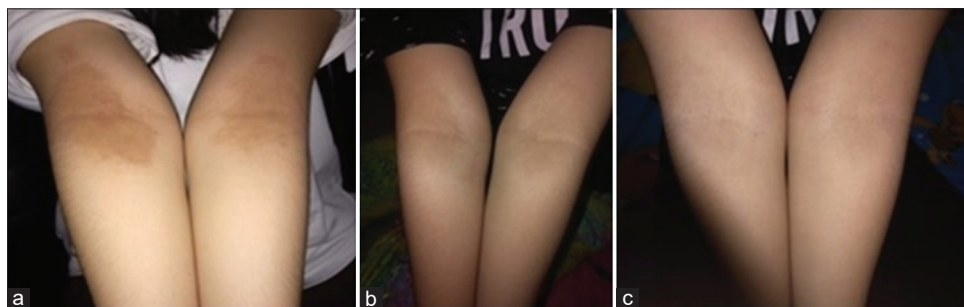
allergy cascade due to honey's anti-inflammatory effect. Besides having an anti-inflammatory effect, honey is also proven to have antibacterial effects, especially *Staphylococcus aureus* and *Pseudomonas aeruginosa* bacteria, which can produce biofilms that can be used as additional therapy in rhinosinusitis sufferers.<sup>[19]</sup>

In AD, the consumption of honey has no significant effect. It can make up for inadequate sample sizes and the available honey used topically for AD. However, regular consumption of honey showed decreased SCORAD index at week 4 and until week 8, although it was not normal in this study. The decrease in SCORAD value in patients with AD is influenced by several factors based on AD's risk factors. The forest honey mechanism in reducing the score resembles the previously described allergic rhinitis mechanism.

Honey can influence immune reactions in dermatitis by stopping cell activation, which is mediated by IgE. Alangari et al.'s study showed that degradation of mast cells was significantly inhibited after giving honey.<sup>[20]</sup> In preclinical studies, bee products improve the immune response through the modulation of B- and T-lymphocytes function and chemotaxis.<sup>[21]</sup> The antibacterial properties of honey are generally related to the following two main mechanisms: (i) inhibition of the microbial growth by hydrogen peroxide ( $H_2O_2$ ), which is formed by enzymatic activity (for example,



**Figure 1:** A 21-year-old male patient with moderate-grade atopic dermatitis at week 0 (a); week 4 (b); week 8 (c)



**Figure 2:** A 15-year-old female patient with moderate atopic dermatitis at week 0 (a); week 4 (b); week 8 (c)

glucose oxidase) and (ii) inhibition of microbial growth through nonperoxide activities.<sup>[22,23]</sup>

Besides that it can also cause low tolerance to allergens or desensitization, which can also function as an anti-inflammatory. Honey also provides antioxidant, antimicrobial, antiproliferative, anticancer, and antimetastatic effects.<sup>[24]</sup> However, the impact of the consumption of forest honey still needs further research. This study used forest honey, which type of content is different from livestock honey. Forest honey has a darker color, and the types of flora consumed by forest honey can be more diverse. Flavonoids and phenols in darker honey and polyfloral were higher than in light honey and monofloral, so they are effective antioxidants.<sup>[15,25,26]</sup> Further research is needed to assess forest honey content in the Central Sulawesi region.

## CONCLUSIONS

The decrease in the value of TNSS in allergic rhinitis patients and SCORAD in AD patients in subjects using honey suggests that consuming forest honey regularly can be an additional therapy in managing allergic rhinitis and AD. Further research on forest honey in Central Sulawesi and its use as an atopic treatment, including allergic rhinitis and AD, still needs to be done.

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## Conflicts of interest

There are no conflicts of interest.

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