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SHORT COMMUNICATION

Efficacy of Herbal Nasal Spray in the Management of Allergic Rhinitis in Children: A Pilot Study

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ABSTRACT
Allergic rhinitis (AR) is a prevalent condition among children, significantly impacting their quality of life. This pilot study evaluated the efficacy of a herbal nasal spray formulated with Shigru Twak (Moringa oleifera), Daruharidra (Berberis aristata), Yashtimadhu (Glycyrrhiza glabra), and Pippali (Piper longum) in managing AR symptoms in children. Ten children aged 3 to 12 years with AR symptoms were enrolled as per ARIA guidelines. A herbal nasal spray, prepared using Arka (aqueous extract) of the mentioned herbs, was administered as one spray in each nostril every 6 hours for 3 days. Total Nasal Symptom Score (TNSS) was assessed to evaluate symptom changes. Significant reductions in TNSS were observed during the treatment period. By Day 3, 80% of patients reported noticeable improvement, and by Day 5, 90% achieved TNSS ≤ 3 (mild or asymptomatic). Mild nasal irritation was reported in two patients, which resolved spontaneously. The herbal nasal spray demonstrated significant efficacy in reducing AR symptoms in children. Further large-scale randomized controlled trials are warranted to validate these findings.
Keywords: *Ayurveda, allergic rhinitis, herbal nasal spray, Shigru Twak, Daruharidra, Yashtimadhu, Pippali, TNSS*

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INTRODUCTION

Allergic rhinitis (AR) is a common IgE-mediated inflammatory disorder of the nasal mucosa affecting children worldwide and is characterized by sneezing, rhinorrhoea, nasal obstruction, and nasal itching [1]. It contributes significantly to healthcare burden and adversely affects sleep, school performance, and quality of life in the paediatric population [16,18]. In Central Gujarat, the prevalence of allergic rhinitis among school-going children has been reported to be 27.10%, indicating a considerable regional disease burden [2].

The clinical features of allergic rhinitis closely resemble *Pratishyaya* as described in Ayurvedic classical texts such as *Charaka Samhita* and *Sushruta Samhita*, where nasal discharge (*Nasa Srava*), sneezing (*Kshavathu*), nasal obstruction (*Nasa Avarodha*), and itching are attributed mainly to the vitiation of *Vata* and *Kapha Dosha* [3,4,13]. Conventional treatment options, including antihistamines and intranasal corticosteroids, may provide symptomatic relief but are often associated with adverse effects, especially during long-term use in children [15,19].

Ayurvedic herbal formulations with anti-inflammatory, anti-allergic, and *Vata-Kapha Shamana* properties may offer a safer and effective alternative approach in paediatric allergic rhinitis [21,22]. To evaluate the efficacy of a herbal nasal spray prepared using *Arka* of *Shigru Twak, Daruharidra*, *Yashtimadhu*, and *Pippali* in the management of allergic rhinitis in children aged 3–12 years.

MATERIAL AND METHODS

Ethical Permission

Ethical permission was obtained from the Institutional Ethics Committee of Parul Institute of Ayurveda, Parul University, Vadodara. Written informed consent was obtained from the parents or legal guardians of all participating children.

Study Design and Participants

This pilot study included 10 children aged 3 to 12 years with allergic rhinitis symptoms such as nasal discharge, nasal obstruction, sneezing, and nasal itching, diagnosed clinically as per ARIA guidelines [1]. Participants were recruited irrespective of gender, religion, and socio-economic status.

Exclusion criteria included children outside the 3–12 year age range, those with chronic illnesses such as bronchial asthma, systemic infections, nasal polyps, tuberculosis, chronic obstructive pulmonary disease, pneumonia, deviated nasal septum, and children currently using antihistamines.

Herbal Nasal Spray Preparation

The herbal nasal spray was prepared using the *Arka* method described in *Arka Prakasha* [10]. Equal quantities of *Shigru Twak* (*Moringa oleifera*), *Yashtimadhu* (*Glycyrrhiza glabra*), *Daruharidra* (*Berberis aristata*), and *Pippali* (*Piper longum*) were taken in coarse powdered form. The powdered drugs were soaked overnight in eight parts of potable water.

On the following day, the soaked mixture was subjected to distillation using a conventional *Arka Yantra*. The distillation process was continued until the distillate was reduced to half of the initial volume. The obtained *Arka* was filtered under aseptic conditions.

To improve viscosity, stability, and nasal retention of the formulation, 0.5% methyl cellulose, 0.25% polyethylene glycol (PEG-400), and 0.5% glycerine were added [11,12]. The final preparation was filled aseptically into sterile 15-ml nasal spray bottles.

Table 1. Active constituents and proposed mechanisms of action of herbs in the management of allergic rhinitis

Herb	Active Constituents	Mechanism of Action in Allergic Rhinitis
Yashtimadhu (*Glycyrrhiza glabra*) [5]	Glycyrrhizin, Flavonoids, Saponins	Inhibits mast cell degranulation, reduces inflammation, mimics corticosteroid effects.
Daruharidra (*Berberis aristata*) [6]	Berberine, Alkaloids, Tannins	Reduces inflammatory cytokines (TNF-α, IL-6), mitigates hypersensitivity reactions.
Pippali (*Piper longum*) [7]	Piperine, Essential Oils, Lignans	Acts as an antihistamine, enhances the bioavailability of other compounds, mucolytic properties.
Shigru Twak (*Moringa oleifera*) [8], [9]	Quercetin, Flavonoids, Polyphenols, Ethyl-(E)-undec-6-enoate, 3,5,6-trihydroxy-2-(2,3,4,5,6-pentahydroxyphenyl)-4H-chromen-4-one	Modulates immune response, reduces airway inflammation, acts as an antioxidant, inhibits mast cell degranulation, blocks histamine release, and suppresses IL-4 and TNF-α.

Treatment Protocol

Participants received one spray in each nostril every 6 hours for 3 days.

Outcome Measures

The primary outcome measure was the change in Total Nasal Symptom Score (TNSS), assessing sneezing, nasal discharge, nasal obstruction, and itching [16]. Patient response and tolerability were also assessed.

Statistical Analysis

As this was a pilot study with a small sample size, descriptive statistical methods were employed. Clinical outcomes were assessed by calculating mean values and percentage changes in Total Nasal Symptom Score (TNSS) before and after treatment. Results were presented in the form of tables and graphical representations. No inferential statistical tests were applied due to the limited sample size.

RESULT

Participant Demographics

(Figure 1: Age-wise distribution of patients; Figure 2: Gender-wise distribution of patients)

Participant Demographics

A total of 10 children diagnosed with allergic rhinitis were enrolled in the study.

Figure 1: depicts the age-wise distribution of participants, showing that the majority of children belonged to the 6–10 years age group, followed by the 3–5 years and 11–12 years groups.

Figure 2: illustrates the gender-wise distribution, indicating a higher proportion of male participants compared to females.

TNSS Assessment

The Total Nasal Symptom Score (TNSS) was assessed to evaluate changes in the severity of allergic rhinitis symptoms during the treatment period.

Figure 3: shown a consistent and progressive reduction in TNSS was observed from baseline through Day 5 of treatment, indicating gradual improvement in nasal symptoms, including sneezing, nasal discharge, nasal obstruction, and nasal itching.

By **Day 3**, **80% of the patients** demonstrated noticeable clinical improvement with a marked reduction in symptom severity. Continued improvement was observed over the subsequent days, and by **Day 5**, **90% of the patients** achieved a TNSS ≤ 3, suggesting mild or absence of symptoms.[16]

Figure 4: Patient response and tolerability are illustrated. The herbal nasal spray was well tolerated by the majority of participants. Mild nasal irritation was reported in **two patients** immediately after administration; however, the irritation was transient and resolved spontaneously within a few minutes, without requiring any medical intervention.

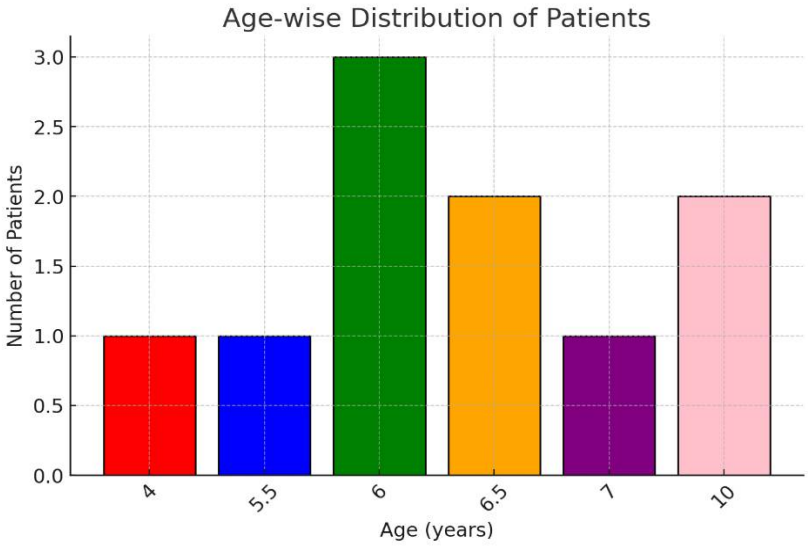

Figure 1: Age wise distribution of 10 patients of allergic rhinitis

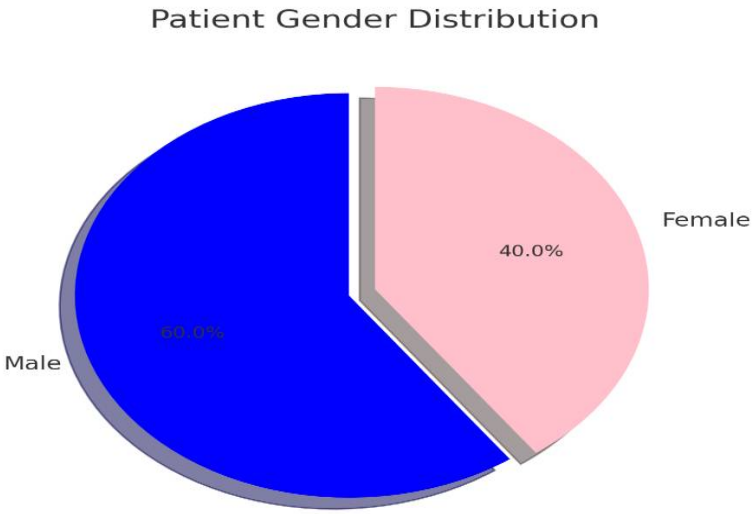

Figure 2: Gender wise distribution of patients of allergic rhinitis

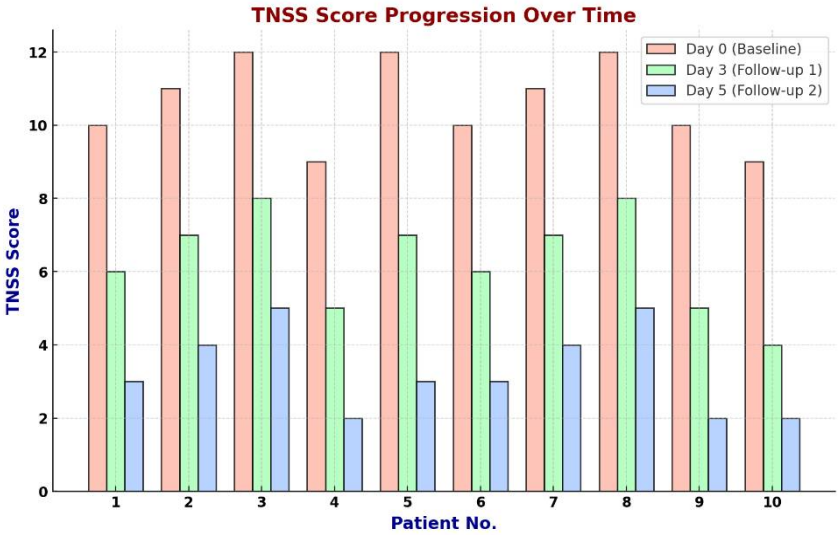

Figure 3 TNSS Score Progression Over time Day wise

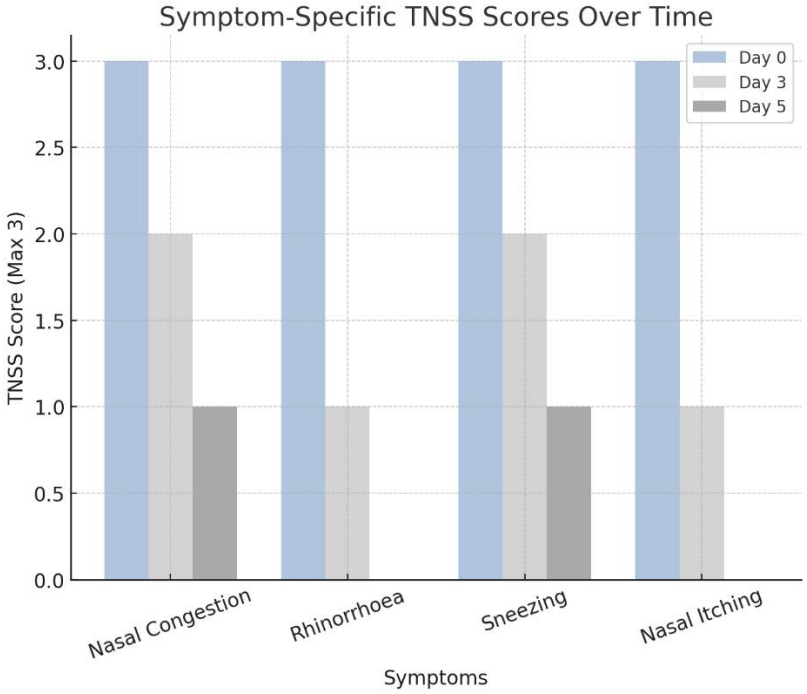

Figure 4: TNSS Score Progression Over Time Symptoms wise

DISCUSSION

The findings of the present pilot study demonstrate that the herbal nasal spray produced a significant reduction in the symptoms of allergic rhinitis in children, as evidenced by a progressive decline in Total Nasal Symptom Score (TNSS) during the treatment period. Similar outcomes have been reported in previous studies evaluating herbal and complementary therapies in allergic rhinitis, where reduction in sneezing, nasal discharge, and nasal obstruction was attributed to anti-inflammatory and antihistaminic effects of plant-based formulations [21,22].

From an Ayurvedic perspective, allergic rhinitis can be correlated with *Vataja* and *Kaphaja Pratishyaya*, in which vitiated *Vata* and *Kapha Dosha* lead to symptoms such as *Kshavathu* (sneezing), *Nasa Srava* (nasal discharge), *Nasa Avarodha* (nasal obstruction), and itching. [3,4,13] The selected herbs possess *Vata-Kapha Shamana*, *Shothahara*, and *Rasayana* properties, thereby addressing the underlying *Dosha Dushti* and providing symptomatic relief.

The efficacy of the formulation can be explained by the pharmacological actions of its individual components. Yashtimadhu (*Glycyrrhiza glabra*) has been shown to inhibit mast cell degranulation and

exert corticosteroid-like anti-inflammatory effects [5]. Daruharidra (*Berberis aristata***)** contains berberine, which suppresses pro-inflammatory cytokines such as TNF-α and IL-6 and reduces hypersensitivity reactions [6]. Pippali (*Piper longum*) exhibits antihistaminic, mucolytic, and bioavailability-enhancing properties, which may potentiate the effects of other drugs in the formulation [7]. Shigru Twak (*Moringa oleifera*) demonstrates immunomodulatory, antioxidant, and mast cell-stabilizing activity, along with inhibition of histamine release, thereby reducing airway inflammation [8,9].

The use of the *Arka* preparation method, as described in *Arka Prakasha*, enhances the extraction of volatile and water-soluble active principles, improving bioavailability and therapeutic efficacy [10]. Intranasal administration allows rapid drug absorption through the nasal mucosa while bypassing hepatic first-pass metabolism, resulting in early symptom relief [11,12]. The nasal spray dosage form ensures uniform drug distribution and good patient compliance, particularly in children.

The rapid improvement in TNSS within five days highlights the potential of this herbal nasal spray as an effective and safe alternative to conventional management of allergic rhinitis in children. The mild and transient nasal irritation observed in a few patients further supports the favourable safety profile of the formulation.

LIMITATIONS

This study has limitations, including a small sample size and short treatment duration. Future large-scale randomised controlled trials with longer follow-up periods are necessary to validate these findings and assess the long-term efficacy and safety of this herbal nasal spray.

CONCLUSION

The herbal nasal spray, formulated with *Shigru Twak*, *Daruharidra*, *Yashtimadhu*, and *Pippali,* demonstrated significant efficacy in reducing AR symptoms in children. This pilot study suggests that this Ayurvedic formulation may serve as an effective alternative to conventional AR treatments. Further research is warranted to confirm these findings.

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CONFLICT OF INTEREST

Authors have no conflicts of interest in the present research article.

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