
**“ASSESSING EFFICACY OF LOCAL
APPLICATION OF 15% SILVER NITRATE IN
TREATMENT OF ALLERGIC RHINITIS”**

BY

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ABSTRACT

Title: ASSESSING EFFICACY OF LOCAL APPLICATION OF 15% SILVER NITRATE IN TREATMENT OF ALLERGIC RHINITIS

Objectives:

To assess the efficacy of local application of 15% silver nitrate in treatment of allergic rhinitis

Methods:

A one year study was undertaken and Local application of 15% Silver nitrate was on bilateral inferior turbinates of 63 patients who were later evaluated for improvement in symptoms of Allergic Rhinitis.

Results:

A total of 63 patients participated in the Prospective Interventional study. The mean age of patients was 31-40 years. 55 patients showed improvement in symptoms of Allergic Rhinitis. After 6 months, a maximum of 87.30% of patients are symptom-free, while 12.70% still show no improvement. Considerable enhancement in the reduction of nasal discharge as a symptom was observed, dropping from 98.41% before the procedures to 12.70% six months post-procedure. This finding is statistically significant ($p=0.0001$). Notable enhancement in the reduction of recurrent sneezing episodes as a symptom, from 95.24% before the procedure to 7.94% six months post-procedure, with this change being statistically significant ($p=0.0001$). Noteworthy enhancement in the reduction of eye watering as a symptom, decreasing from 95.24% before the procedures to 7.94% after six months post-procedure; this

change is statistically significant ($p=0.0001$). In summary local application of silver nitrate has shown significant improvement of symptoms of Allergic Rhinitis.

Conclusion:

The study shows that a single local application of 15% silver nitrate achieves excellent control of symptoms of allergic rhinitis like multiple episode of sneezing, nasal discharge and watering of eyes, these symptoms were controlled for a period of 6 months. The study also showed that patient compliance for this modality of treatment was excellent, with no side effects and low cost of treatment. Considering all these factors this modality of treatment can be considered as one of the mainstay treatment for Allergic Rhinitis.

Keywords: Allergic Rhinitis, Silver Nitrate, Inferior Turbinate, Nasal discharge, Sneezing

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INTRODUCTION

Clinically, Allergic Rhinitis is defined as the presence of two or more symptoms—such as anterior or posterior rhinorrhoea, sneezing, nasal blockage, and/or nasal itching—for over 6 months, with inflammatory changes in the nasal mucosa resulting from exposure to inhaled allergens.^{1,2,3}

A study demonstrated that while the overall prevalence of allergic rhinitis rose from 12.4% in 1992 to 15% in 2000, aligning with global trends, 23.1% of individuals who had allergic rhinitis in 1992 were symptom-free by 2000. In general, symptoms of rhinitis lessen with age and skin prick tests reveal reduced reactivity in older adults.⁴

The reported incidence of allergic rhinitis in India also falls between 20% and 30%. Research has demonstrated that the occurrence of allergic rhinitis in India has been on the rise over the recent years. The International Study from Asthma and Allergies in Childhood (ISSAC) reported that nasal symptoms were seen in 12.5% of children aged 6 to 7 years and in 18.6% of those aged 13 to 14 years in India.² Allergic rhinitis represents substantial portion of the global burden, accounting for approximately 55% of all allergies. Symptoms of Allergic Rhinitis include nasal pruritus, itching in the throat, mouth, or eyes, multiple episodes of sneezing and nasal discharge. There exists a complex and reciprocal relationship between allergic rhinitis and problems regarding mental health, including depression, anxiety, stress, and sleep problems. Often caused by allergic rhinitis, nasal congestion can disrupt sleep patterns, cause fragmented sleep, and make it harder to breathe at night.⁵

For treating Allergic Rhinitis, various methods are commonly employed, such as Antihistaminics like Promethazine and Chlorpheniramine. However, Fexofenadine can lead to systemic side effects with prolonged use such as constipation, problems with urination, and in certain instances, low blood pressure, sedation, reduced alertness and concentration, dizziness, lack of coordination in movement, and exhaustion. Intranasal Glucocorticoids like beclomethasone dipropionate, budesonide, flunisolide have side effects like dryness, crustiness, itchiness, redness, swelling and nosebleeds which makes it difficult for the patients to complete the course of the treatment. Budesonide nasal sprays are difficult to use for pediatric children because of their unpleasant taste and smell, burning sensation in nose, coughing, and sneezing. Immunotherapy is also one of the most recent and advanced forms of treatment but has drawbacks like high cost and multiple followups.⁶

This research examines the local use of 15% silver nitrate for allergic rhinitis, representing a rare investigation into a novel and uncommon treatment method that utilizes local application of 15% silver nitrate. This technique is easy, efficient, and well-liked by patients. This technique is useful for patients with allergic rhinitis as this procedure can be done on an outpatient basis, providing faster relief with fewer follow-ups, greater compliance, cost-effectiveness and no systemic adverse effects like unpleasant taste and smell, irritation, cough, sneezing, dizziness, poor motor coordination, exhaustion, headache, constipation, blurry vision, dry mouth and reduced coordination. This research examines the local use of 15% silver nitrate for allergic rhinitis, representing a rare investigation into a novel and uncommon treatment method that utilizes local application of 15% silver nitrate.^{7,8,9,10}

AIMS AND OBJECTIVES

Objective-

- To assess the efficacy of local application of 15% silver nitrate in treatment of allergic rhinitis

REVIEW OF LITERATURE

Allergic Rhinitis is characterized by the occurrence of two or more symptoms—either anterior or posterior rhinorrhoea, sneezing, nasal congestion, and/or nasal itching—for a duration exceeding 6 months, accompanied by inflammatory alterations in the nasal mucosa caused by inhaled allergens.¹

Etiology of Allergic Rhinitis -

The etiology comprises of early and late allergic responses. Mechanism initiates upon contact with allergens like pollen, mites, and/or animal dander, which are identified by IgE receptors on mast cells and basophils in patients who have been presensitised. Allergic rhinitis is characterized by inflammatory changes in the nasal mucosa caused by exposure to inhaled allergens. Mast cell degranulation is a hallmark of the early-phase reaction. During this phase, acute nasal symptoms (such as sneezing and rhinorrhoea) quickly develop within minutes. The symptoms result from the release of histamine, especially from mast cells located in the mucosa of nose. The release of histamine in the early phase, along with the effects of leukotrienes, prostaglandins and kinins, raises permeability of blood vessels and results in edema.

Several hours after allergen exposure, the late-phase reaction starts. Marked by the staffing of basophils, neutrophils, T-lymphocytes, monocytes, and eosinophils, along with the launch of various mediators such as cytokines, prostaglandins, and leukotrienes that initiate a response of inflammation. The inflammatory response in the late phase is associated with tissue remodelling, further tissue oedema, and the emergence and persistence of nasal congestion. Patients consider this congestion to be one of the most bothersome symptoms of Allergic Rhinitis. Mucosal inflammation leads to the priming of tissues and an intensified reaction to allergen exposure.

Reactions and changes in tissue responsiveness during the late phase contribute to bronchial hyper-responsiveness.^{11,12}

Following are the symptoms of Allergic Rhinitis:

Patients complaining of more than 6 months for itching in the eyes, palate, or throat irritation. Sneezing paroxysms: While some patients experience fatigue while sneezing, others experience a "tickling" sensation without sneezing. Nasal discharge is characterized by a clear, watery discharge that might be extremely abundant for more than 6 months. Although less frequent than in infectious rhinitis, a postnasal "drip" could happen. Mucosal edema and venous stasis of the inferior turbinates are the causes of bilateral nasal stuffiness. Polyp obstruction is typically persistent.

Patients suffering from allergic rhinitis frequently report sleep disturbances, fatigue, and cognitive difficulties. All of these symptoms can exacerbate mental health problems or contribute to their development. Mental health conditions such as depression, anxiety, stress, and sleep difficulties have a complex and mutual relationship with allergic rhinitis. As an example, the sleep disruption and ongoing inflammation linked to allergic rhinitis could contribute to the risk of various mental health disorders.

Moreover, these issues are frequently made worse by side effects of drugs used to treat allergic rhinitis. Despite having a significant influence on daily life at home, at school, and even when sleeping, allergic rhinorrhea is often dismissed as a common and unimportant illness. As a result, it does not get the attention it merits from medical experts, patients, and families, particularly in poor nations like India.

There are a number of processes that link allergic rhinitis to sleep issues, including psychological variables and nasal blockage. Nasal congestion, which is frequently brought on by allergic rhinitis, can interfere with sleep architecture, create fragmented sleep, and make it difficult to breathe at night. The brain's sleep regulation systems may be directly impacted by the inflammatory process associated with allergic rhinitis. Symptoms can lead to anxiety and pain, which may increase the likelihood of sleep disorders such as insomnia and poor sleep quality.

Patients frequently experience depression. Given that mental illness has been associated with various chronic conditions, such as chronic respiratory diseases and allergic rhinitis might be associated with a heightened risk of psychiatric disorders.

Furthermore, there is a connection between seasonality, the severity of allergies, and signs of depression.^{11,12}

Signs of Allergic Rhinitis:

An external examination of the nose may reveal an Allergic Salute, which is marked by a transverse nasal crease at the midpoint of the nasal dorsum.

Dennie-Morgan line that is caused by pressing one's nose repeatedly upward to imitate a salute. The anterior rhinoscopy shows inferior turbinate hypertrophy, although in extreme cases, venous congestion and vascular engorgement can cause the mucosa to appear pale, swollen, or blue-tinged. The normal mucosa of inferior turbinate is pinkish but turbinates of Allergic Rhinitis become purplish in hue due to vascular dilatation and stasis. Edema secondary to intercellular transudation of tissue fluid, is brought on by capillary endothelium degradation and cellular cement

deterioration. Watery, thin nasal discharge due to seromucinous glands heightened activity is the cause of it.⁶

Diagnosis:

Many patients can be confidently diagnosed with allergic rhinitis with a detailed history that fits the condition and a corresponding nasal examination. Following tests are used for the diagnosis of Allergic Rhinitis:

Serum IgE levels- For patients exhibiting signs and symptoms of rhinitis, IgE levels exceeding 140 IU/ml and eosinophil counts over 80 cells/ml indicate a probable atopic cause.

Skin Prick Test- As part of the routine workup, skin prick tests are typically performed. Allergy testing ought to be carried out if the diagnosis is unclear or if the potential allergy's effects are significant (for example, a pet allergy). Test is said to be positive if wheal size is of 2 mm or more than the negative control.

Radioallergosorbent testing- Skin prick test or measurement of specific IgE in the blood (known as Radioallergosorbent testing or RAST) would typically be employed. The recommended method is often skin prick testing since it enables the patient to view the results immediately and provides time for patient education regarding preventative measures if required. RAST testing is often saved for individuals who need a diagnosis but for whom SPTs are either unsuitable or unavailable. Anti-IgE that has been radio or enzyme labeled is added to serum after a blood sample is obtained. A positive result is shown by an IgE level of 0.35 kU/l or greater.

Nasal allergen challenge- Although the nasal allergen challenge is the gold standard for diagnosing allergies, it is rarely needed or accessible. When the history indicates a specific allergen as the source of symptoms, but the skin prick tests yield negative results, it may be beneficial. After an allergen is applied on mucosa of nose or patient is exposed to an airborne allergen, both objective measures (such as sneeze count, peak nasal inspiratory flow, rhinomanometry, and pulmonary peak flow) and subjective measures (such as symptom scores) are collected. Using lysine aspirin administered to the nose, this test technique can also be utilized in patients suspected of having salicylate sensitivity and may be an alternative to an oral salicylate challenge.^{13,14}

Treatment options-

ANTIHISTAMINES

Most commonly used method of treatment for symptoms like running, sneezing and nasal itching in patients who have no problem with nasal obstruction is antihistaminics. They have little effect on nasal blockage. Atropine, which serves as the prototype for this class of drugs, shows a strong selectivity for muscarinic receptors. Nevertheless, a handful of its synthetic alternatives also exhibit remarkable nicotinic blocking characteristics. This group of drugs prevent histamine from binding to its receptors on nerves, smooth muscle, endothelium, glandular cells, and mast cells through competitive inhibition. Histamines induce vasodilation and elevate vascular permeability, leading to fluid leakage from capillaries into the adjacent tissues. By preventing these actions, antihistamines halt inflammation and other allergy symptoms.

They act quickly (typically in under an hour) and will reduce symptoms with daily use. These drugs provide better symptomatic control when used regularly over a longer period of time instead of as needed. Azelastine and other topical antihistamines can be used intranasally for quick symptom control, and they can also be combined with a topical nasal steroid. A lot of expressions of immediate hypersensitivity (type I reactions) are limited.

First generation antihistaminics include Brompheniramine, Dimenhydrinate, Diphenhydramine, Doxylamine which have side effects like drowsiness, a decrease in focus and alertness, dizziness, poor motor coordination, exhaustion.

Second generation antihistaminics include Cetirizine, Fexofenadine, Desloratadine which have side effects like dry mouth, altered bowel movements, reluctance when urinating, and blurred eyesight.

Third generation antihistaminics include Desloratadine, Fexofenadine, Loratadine which have side effects like drowsiness, dizziness, and headache, constipation, blurry vision, and dry mouth reduced coordination.

INTRANASAL GLUCOCORTICOSTEROIDS

Immunological competency is hampered by glucocorticoids.

They inhibit all forms of allergic reactions and hypersensitivity. At elevated levels because they have been demonstrated to disrupt almost every stage of the immune response in vitro; nevertheless, at therapeutic dosages, neither complement nor antibody formation are hampered in vivo. The clinical effect appears to be caused by a decrease in leukocyte recruitment at the site of antigen interaction and a reduction in the inflammatory response to immunological insult.

The most well-liked and effective therapies for allergic rhinitis are topical nasal steroids and oral or topical antihistamines. It should be emphasized that these drugs are not meant to treat allergies; rather, they are meant to help manage symptoms. Patients also complain of antihistaminics' sedative effects like sedation. Usually, they must be taken for as long as symptoms are being caused by allergen exposure.

Beclomethasone dipropionate, budesonide, flunisolide, fluticasone propionate, mometasone furoate and triamcinolone acetonide are commonly used Glucocorticoids. Majority of steroids will not produce a significant effect symptoms may persist for several hours or days, and it can take up to two weeks to fully observe the benefits. While the side effects of intra-nasal steroids are few, one of them is epistaxis. Even with prolonged use, this could result in nasal mucosal atrophy. These drugs have low systemic bioavailability. While children receiving intranasal beclomethasone treatment have exhibited slight growth retardation, such effects have not been observed with fluticasone or mometasone. These medications are usually quite inexpensive and can be purchased without a prescription in numerous countries.

Glucocorticoids can lead to various side effects, such as Cushing's habitus, fragile skin, purple striae usually found on the thighs and lower abdomen, hyperglycaemia, and foetal abnormalities. Side effects of beclomethasone nasal spray include burning, stinging, dryness, crustiness, itchiness, redness, swelling, nosebleeds. Budesonide nasal sprays include unpleasant taste and smell, irritation, cough, sneezing due to which it is difficult to be used for paediatric patients.^{15,16,17,18,19}

LEUKOTRIENE RECEPTOR ANTAGONISTS (LTRAS)

Cysteinyl leukotrienes, which include LTC₄, LTD₄, and LTE₄, are a group of eicosanoid inflammatory mediators formed by leukocytes, mast cells, eosinophils, basophils, and macrophages through oxidation of arachidonic acid by enzyme arachidonate 5-lipoxygenase. They result in enhanced vascular permeability and the attraction of inflammatory cells, thus playing a role in the mechanisms that lead to allergic rhinitis.

Montelukast (an antagonist of leukotriene receptors) is utilized to treat allergic rhinitis. Research has shown that its effectiveness in alleviating nasal symptoms such as sneezing, discharge from nose, and itching in the nose is comparable to that of loratadine, but it is inferior to that of a topical nasal steroid. One study indicated that using cetirizine and montelukast together did not enhance symptom control beyond that achieved by each drug alone, while another study found the combination to be more effective. Responsiveness to LTRAs varies considerably, and for some patients, a carefully supervised treatment trial may be beneficial. It has now been included in the revised ARIA treatment guidelines.

Montelukast is not helpful in conditions where patients present with acute episodes of Allergic Rhinitis like sneezing and rhinorrhea. These drugs have to be started way before the symptoms persist. The side effects include Headaches, Abdominal pain, Cough, Dyspepsia, Diarrhea, Nausea, Vomiting, Fever, Fatigue, and Itchy skin or rash.²⁰

SODIUM CROMOGLYCATE

Nasal spray containing sodium cromoglicate only has a slight effect on rhinitis symptoms. However, as it needs to be applied four times a day, this limits the likelihood of adherence. There are no side effects associated with it, and it can be used on small children. Cromoglicate eye drops may work against itching in the eyes.

Sodium chromoglycate, in a 2% solution, can be found as nasal drops or spray and as an aerosol powder. While cromolyn does not work for every patient, it can be safely used due to its minimal side effects and large safety margins. Additionally, there is a high-dose oral form of cromolyn sodium, but its effectiveness is restricted by poor oral absorption.¹⁶

IPRATROPIUM BROMIDE

Topical ipratropium bromide spray effectively manages watery rhinorrhea and can be a beneficial supplement to a topical steroid when rhinorrhea is inadequately controlled. Side effects are infrequent but include prostatic symptoms and worsening of glaucoma.

IMMUNOTHERAPY

Immunotherapy (also known as desensitization) is a technique used to create tolerance toward an allergen, thereby diminishing undesirable symptoms. It has the potential to alleviate the symptoms of allergic rhinitis and provide a long-lasting decrease in symptoms (even after treatment has ceased) and can avert the advancement of allergic disease.. It involves repeated exposure of the patient to the allergen usually, but not always, with a gradual increase in allergen dose. It can be

given subcutaneously by injection (SCIT) or sublingually in drops or tablets (SLIT). Studies have shown similar efficacy for SCIT and SLIT.

It is effective in reducing symptoms in adults and older children though the results are less clear for children under five. There are several guidelines regarding the selection of patients and treatment protocols, one of which is published by the British Society for Allergy and Clinical Immunology.

It's drawbacks include the high cost for treatment and unable for the patients for follow ups. Regular follow-up appointments allow for the assessment of treatment progress and the need for any adjustments or modifications to the treatment plan. Local application of allergens to the nasal mucosa leads to irritation making it difficult for the patient for repeated applications. Intralymphatic, epicutaneous and local nasal administration of immunotherapy have been also investigated and have shown not much improvement in symptoms in patients of Allergic Rhinitis. The full benefits may take several months to years of consistent treatment, and the treatment duration varies for each individual. Even after regular followup the patients find no relief in symptoms.^{20,21,22,23,24}

Anti IgE ANTIBODY (OMALIZUMAB)

Omalizumab (a monoclonal antibody) binds to IgE in circulation, preventing it from attaching to mast cells and triggering degranulation. It alleviates all nasal symptoms but carries the risk of inducing anaphylaxis and is expensive. It is given through a monthly injection.

This group may be larger than generally supposed with up to 40% of patients in general practice stating that symptom control of their rhinitis was poor. The

diagnosis of an IgE mediated response should be confirmed by skin prick tests and measuring the IgE levels before treatment and correlated with the patient's history to ensure the correct allergen is used. The main allergens used in Europe are for the main causes of allergic rhinitis – dust mite, pollens, cat, dog and tree pollen. These extracts are all available in standardized doses. Treatment is usually continued over a 3-year period to achieve a long lasting tolerance after treatment has stopped.

The side effects include arthralgia, generalized body aches, pain in the legs, fatigue, dizziness, pain in the arms, generalized itching all over the body, dermatitis, and earache which makes difficult for the patient to complete the full course of medications and inability for follow ups.

Allergen-specific immunotherapy is the only curative approach for allergic rhinitis. This entails a methodical administration of doses of an allergen that increase in size, with the aim of suppressing symptoms upon subsequent exposure to that allergen. It has been reported that immunotherapy targeting specific allergens is highly allergic rhinitis effectiveness in a Cochrane systematic review.

Some patients will resort to self-medication, while others disregard their own symptoms resembling a URTI that they just endure. It is quite easy to overlook the considerable effects of their illness. The Endoscopic nose examination is mandatory which can show typical signs of congestion of mucosa, including a pale, sticky exudate. This is characteristic of the acute presentation; however, in more chronic cases, generalized congestion and prominent engorged turbinates may be less obvious findings.

Local Application of 15% Silver Nitrate-

It was discovered that applying 15% silver nitrate locally is simple and successful, and patients willingly accept the treatment. They are beneficial even for individuals who have received systemic or local corticosteroid treatment, and they can be used on children older than eight.

Silver nitrate has a local astringent effect through the coagulation of albumin. This measure appears to diminish the sensitivity and excitability of the mucous membrane that has been treated with silver nitrate. The front portions of the nasal septum and that the inferior turbinates seem to be the 'trigger zones' that, when stimulated, result in sneezing and rhinorrhoea. Silver nitrate diminishes the sensitivity and excitability of these 'trigger zones', resulting in relief. Controlling the nasal allergy prevents spread to the lower respiratory tract. Free silver ions precipitate proteins by forming silver chloride through a reaction with chloride present in the tissue. causes cellular protein to coagulate, resulting in an eschar or scab.

This study, which focuses on a novel and uncommon therapeutic approach employing 15% local application of silver nitrate, examines the use of silver nitrate for allergic rhinitis. This method is simple, effective, and popular with patients. Patients with allergic rhinitis can benefit from this technique because it can be performed as an outpatient procedure, which offers faster relief with fewer follow-ups, increased compliance, no systemic adverse effects, and cost-effectiveness without systemic side effects like headache, constipation, blurred vision, dry mouth, blurred taste and smell, irritation, coughing, sneezing, dizziness, poor motor coordination, exhaustion, and headache. The method, applications, and outcomes of

applying 15% silver nitrate to the inferior turbinate for individuals suffering from allergic rhinitis are detailed in this paper.²⁵

The following are the benefits of using a local application of 15% silver nitrate compared to other treatment methods:

1. The local application of 15 percent silver nitrate is an easy and effective method for alleviating symptoms.
2. Impact of the treatment endures over an extended period.
3. If symptoms return, it can be repeated easily.
4. Negligible systemic side effects.
5. Patients readily accept the treatment because it does not require sophisticated equipment or surgery.
6. Due to the high prevalence of the disease, it can be applied in many situations.²⁵

MATERIALS AND METHODS

METHODOLGY-

Source of Data- Patients diagnosed with Allergic Rhinitis in age group of 18 – 65 years presenting in ENT OPD

Study Design – Prospective Study

Study Period- 1 Year (2022 to 2023)

Sample Size- 63

Inclusion Criteria:

1. All patients presenting with clinical features suggestive of Allergic Rhinitis with serum IgE levels more than 300 UI/ml.
2. Patients within age group 18-65 years.
3. Patient is willing to be a part of the study.

Exclusion Criteria:

1. Patients with Diabetes Mellitus.
2. Patient with immunocompromised state.
3. Patient with serum IgE less than 300 UI/ml.
4. Patient who has undergone Nasal surgery in the past

Sample Size-

N = 63

$$n = \frac{N \times Z_{1-\alpha}^2 \times p \times (100-p)}{d^2 \times (N-1) + Z_{1-\alpha}^2 \times p(100-p)}$$

p = 66.7

N = 200 = ESTIMATED PATIENTS

α = 5%, $Z_{\alpha/2} = 2$

d = 15% of p = 10

$$n = \frac{200 \times (2)^2 \times 66.7 \times 33.3}{(10)^2 + 199 + (2)^2 \times 66.7 \times 33.3}$$

Data collection Procedure-

1. Patient coming to ENT OPD with clinical features of Allergic Rhinitis were sent for serum IgE levels to the pathology lab and patients with serum IgE levels more than 300 IU/ml were selected for the study.
2. Bilateral Nasal cavity was packed with 4% Lignocaine soaked ribbon gauze
3. Nasal packs removed after 5 minutes.
4. 15% Silver Nitrate is applied to anterior part of bilateral inferior turbinates.
5. Whitish discoloration of mucosa of inferior turbinate is noted where silver nitrate applied
6. Patient asked to follow up after 1 week, 3 months and 6 months and results noted.
7. Patient was assessed based on presence or absence of following symptoms- nasal discharge, multiple episodes of sneezing and watering of eyes.

Result-

A total of 63 patients participated in the Prospective Interventional study. The mean age of patients was 31-40 years. 55 patients showed improvement in symptoms of Allergic Rhinitis. After 6 months, a maximum of 87.30% of patients are symptom-free, while 12.70% still show no improvement. Considerable enhancement in the reduction of nasal discharge as a symptom was observed, dropping from 98.41% before the procedures to 12.70% six months post-procedure. This finding is statistically significant ($p=0.0001$). Notable enhancement in the reduction of recurrent sneezing episodes as a symptom, from 95.24% before the procedure to 7.94% six months post-procedure, with this change being statistically significant ($p=0.0001$). Noteworthy enhancement in the reduction of eye watering as a symptom, decreasing from 95.24% before the procedures to 7.94% after six months post-procedure; this change is statistically significant ($p=0.0001$). In summary local application of silver nitrate has shown significant improvement of symptoms of Allergic Rhinitis.

RESULTS**Table 1: Age wise distribution**

Age groups	Number	%
<=20yrs	11	17.46
21-30yrs	16	25.40
31-40yrs	19	30.16
41-50yrs	13	20.63
>=51yrs	4	6.35
Total	63	100.00
Mean	33.14	
SD	11.25	

The mean age of the participants is 33.14 ± 11.25 yrs

Table 2: Gender wise distribution

Gender	Number	%
Male	34	53.97
Female	29	46.03
Total	63	100.00

The most of the participants are males (53.97 % followed by 46.03 % were female participants)

Table 3: Symptoms before procedure

Symptoms before procedure	Number	%
Nasal discharge	62	98.41
Recurrent episodes of sneezing	60	95.24
Recurrent episodes of sneezing	48	76.19

A maximum of 98.41% of patients have Nasal discharge as a symptom as compared to 95.24% are have Recurrent episodes of sneezing and 76.19% have Recurrent episodes of sneezing symptom before procedure.

Table 4: Symptoms before procedure by gender

Symptoms before procedure	Male	%	Female	%	Total	%	p-value
Nasal discharge	34	100.00	28	96.55	62	98.41	1.0000
Recurrent episodes of sneezing	33	97.06	27	93.10	60	95.24	0.9999
Watering of eyes	27	79.41	21	72.41	48	76.19	0.9856

- Before procedure, no significant difference was observed between male and female patients with nasal discharge as symptom ($p=1.0000$). It means that, the male and female patients have similarity in Nasal discharge as symptom.
- Before procedure, no significant difference was observed between male and female patients with Recurrent episodes of sneezing as symptom ($p=0.9999$). It means that, the male and female patients have similarity Recurrent episodes of sneezing as symptom.
- Before procedure, no significant difference was observed between male and female patients with Watering of eyes as symptom ($p=0.9856$). It means that, the male and female patients have similarity Watering of eyes as symptom.

Table 5: Symptoms after 3 months

Symptoms after 3 months	Number	%
Nasal discharge	8	12.70
Recurrent episodes of sneezing	7	11.11
Watering of eyes	7	11.11
Nil	55	87.30

Table 6: Symptoms after 3 months by gender

Symptoms after 3 months	Male	%	Female	%	Total	%	p-value
Nasal discharge	3	8.82	5	17.24	8	12.70	0.3172
Recurrent episodes of sneezing	3	8.82	4	13.79	7	11.11	0.5316
Watering of eyes	3	8.82	4	13.79	7	11.11	0.5316
Nil	31	91.18	24	82.76	55	87.30	0.3172

- After 3 months procedure, no significant difference was observed between male and female patients with nasal discharge as symptom (p=0.3172). It means that, the male and female patients have similarity in Nasal discharge as symptom after 3 months procedure.
- After 3 months, no significant difference was observed between male and female patients with Recurrent episodes of sneezing as symptom (p=0.5316).

It means that, the male and female patients have similarity Recurrent episodes of sneezing as symptom after 3 months procedure.

- After 3 months, no significant difference was observed between male and female patients with Watering of eyes as symptom ($p=0.5316$). It means that, the male and female patients have similarity Watering of eyes as symptom after 3 months procedure.

Table 7: Symptoms after 6 months

Symptoms after 6 months	Number	%
Nasal discharge	8	12.70
Recurrent episodes of sneezing	5	7.94
Watering of eyes	5	7.94
Nil	55	87.30

A maximum of 87.30% have no symptoms after 6 months procedure as compared to 12.70% of patients have Nasal discharge as a symptom as compared to 7.94% are have Recurrent episodes of sneezing and 7.94% have Recurrent episodes of sneezing symptom after 6 months procedure.

Table 8: Comparison of different treatment time points with status of symptom

Symptoms	Before procedure		After 1 week		After 3 months		After 6 months		P-value
	No	%	No	%	No	%	No	%	
Nasal discharge	62	98.41	7	11.11	8	12.7	8	12.7	0.0001*
Recurrent episodes of sneezing	60	95.24	5	7.94	7	11.11	5	7.94	0.0001*
Watering of eyes	48	76.19	3	4.76	7	11.11	5	7.94	0.0001*

*p<0.05

- A significant improvement in reduction of nasal discharge as a symptom from before procedures (98.41%) to after 6 months procedure (12.70%), which was statistically significant (p=0.0001)
- A significant improvement in reduction of Recurrent episodes of sneezing as a symptom from before procedures (95.24%) to after 6 months procedure (7.94%), which was statistically significant (p=0.0001)
- A significant improvement in reduction of Watering of eyes as a symptom from before procedures (95.24%) to after 6 months procedure (7.94%), which was statistically significant (p=0.0001)

Table 9: Outcome

Outcome	Number	%
Improved	55	87.30
Not improved	8	12.70
Total	63	100.00

A maximum of 87.30% have no symptoms after 6 months procedure as compared to 12.70% of patients have no improvement even after 6 months procedure.

Figure 1: Age wise distribution

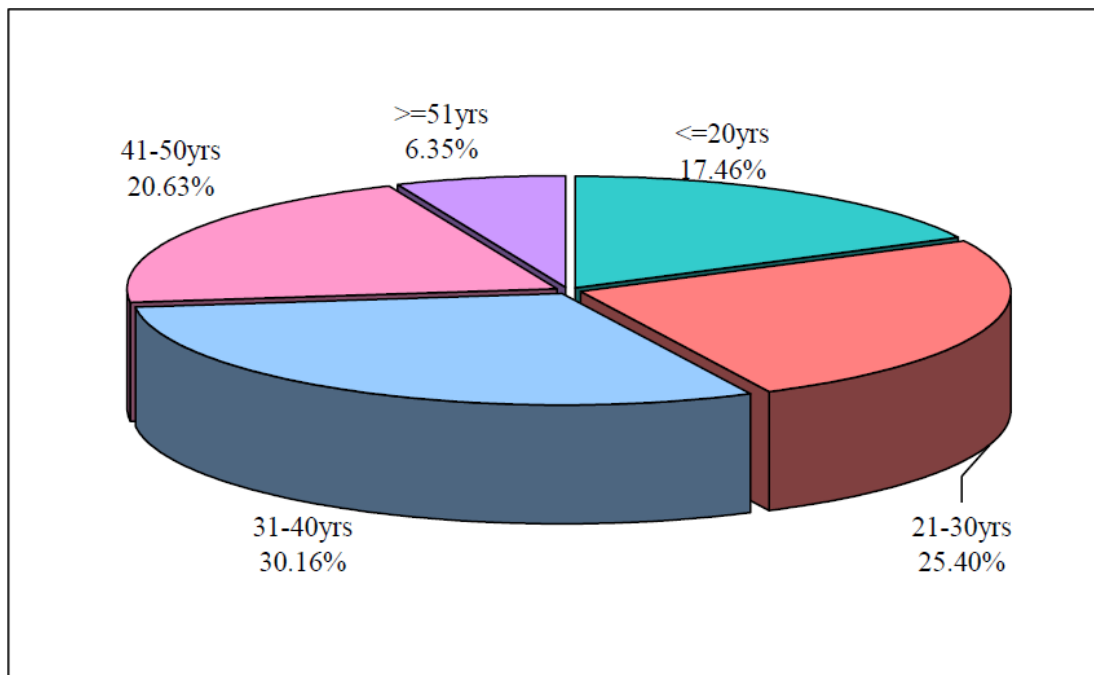


Figure 2: Gender wise distribution

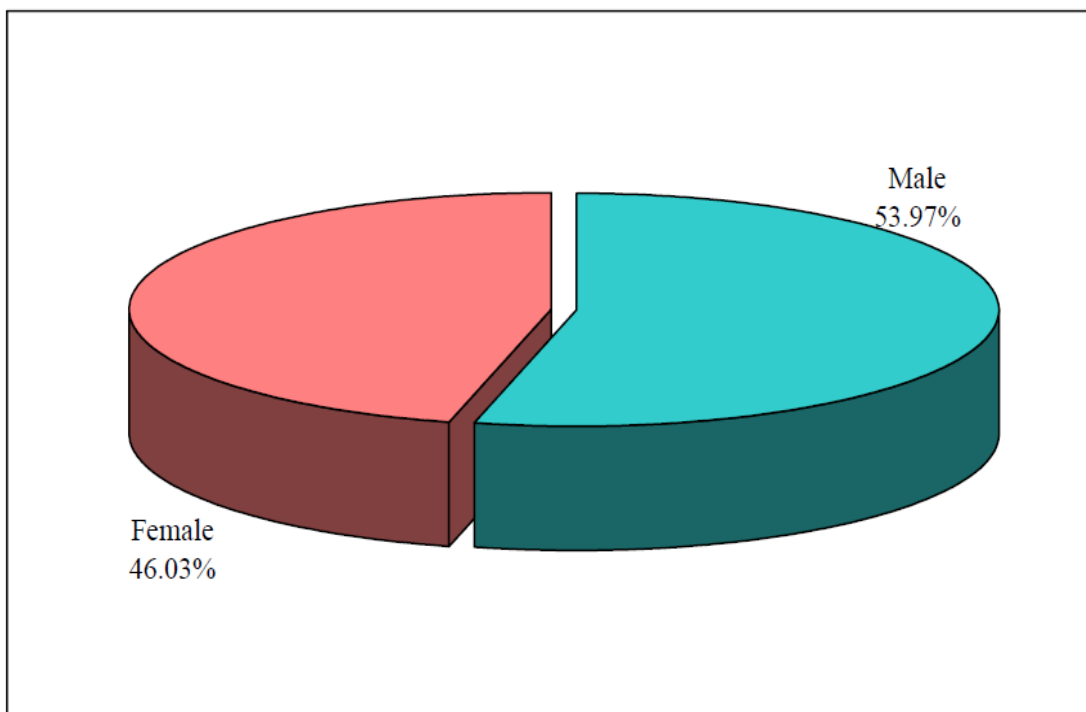


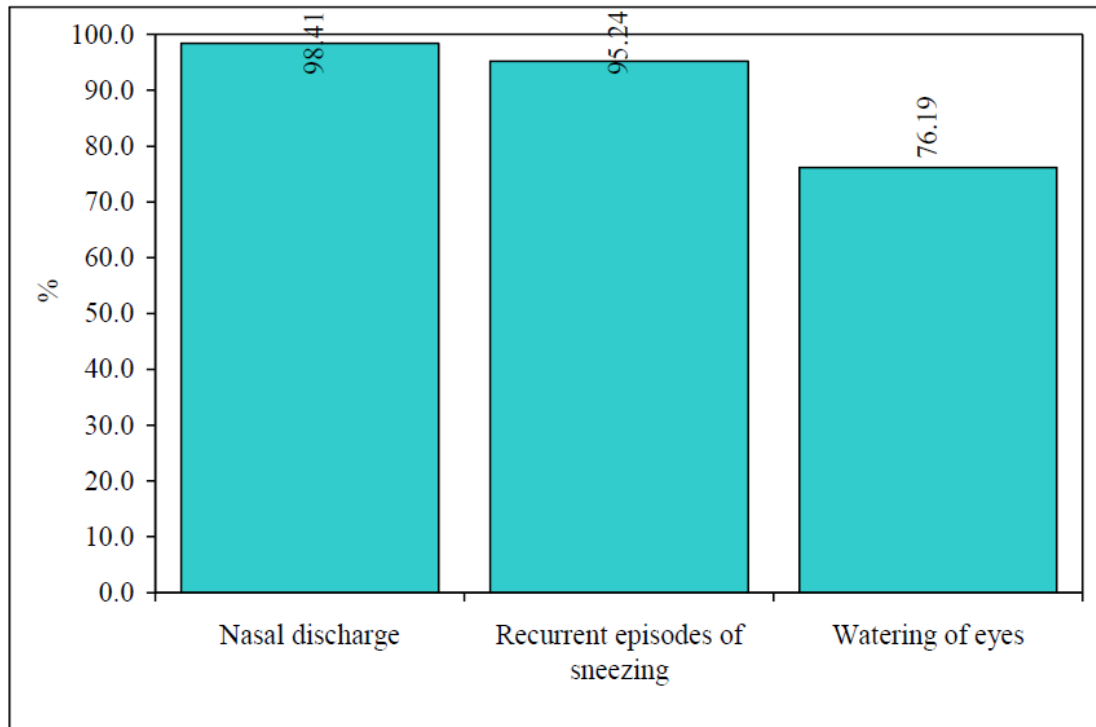
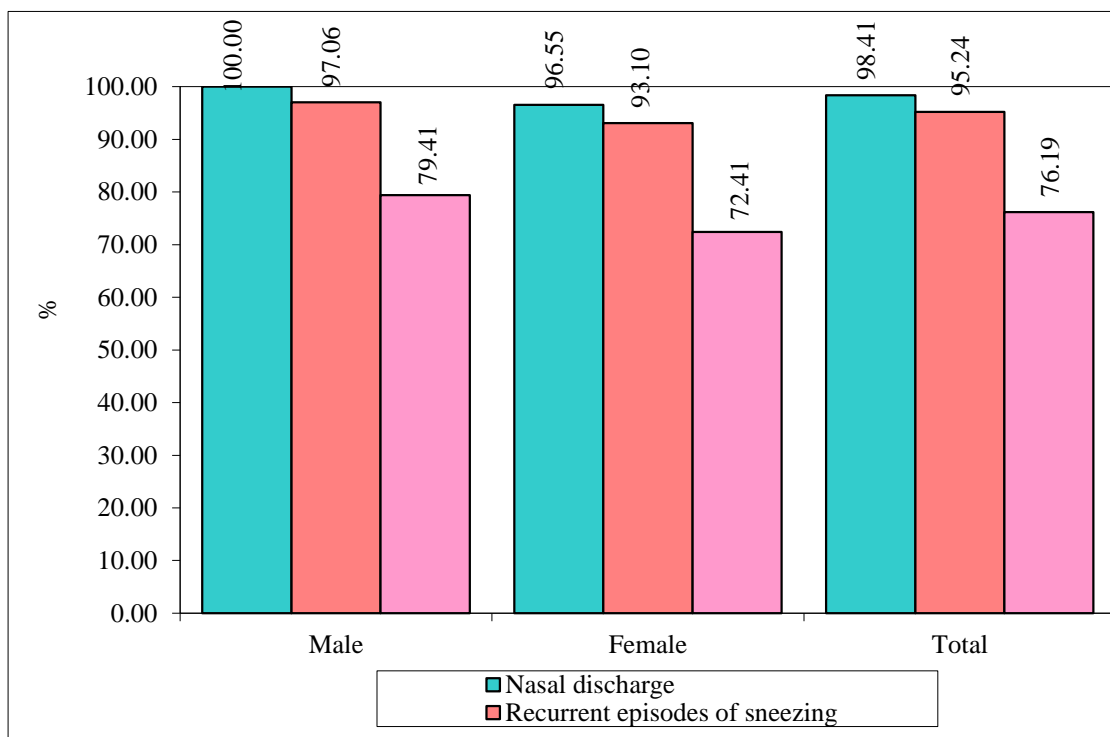
Figure 3: Symptoms before procedure**Figure 4: Symptoms before procedure by gender**

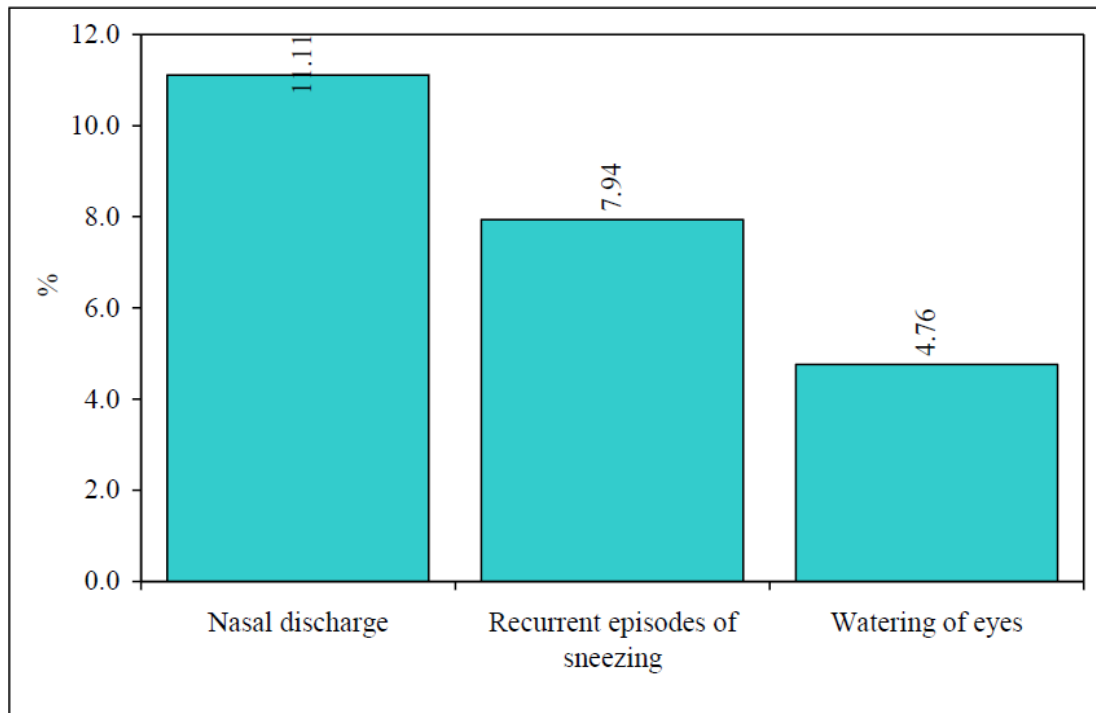
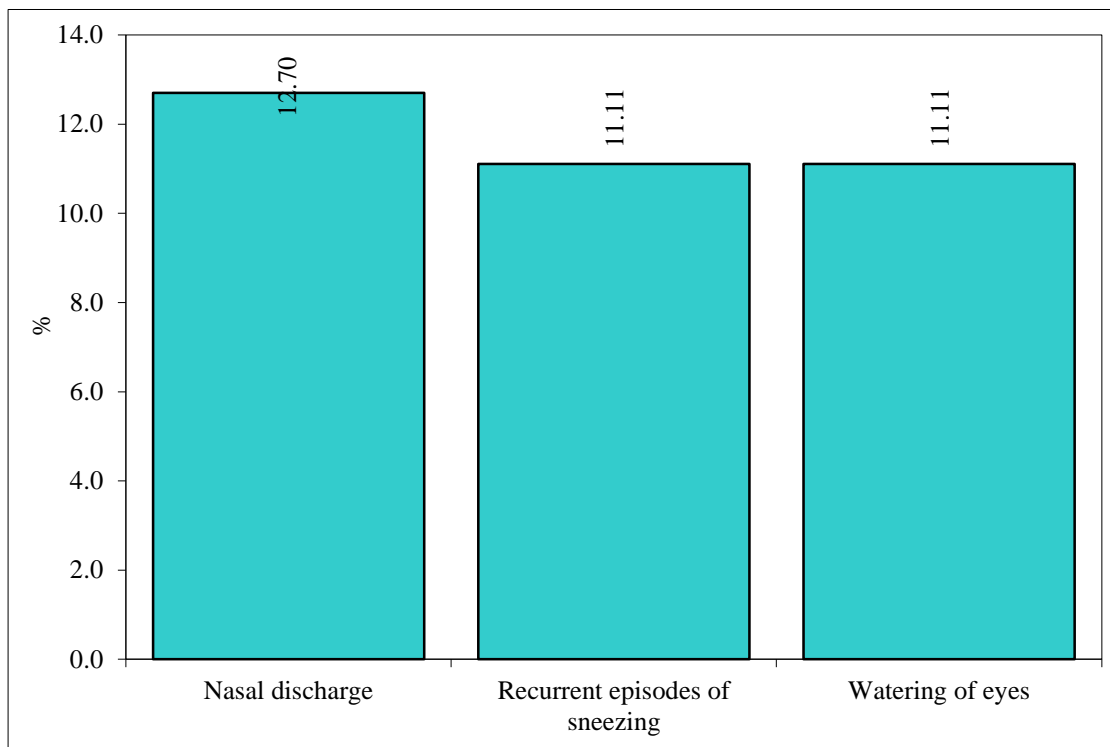
Figure 5: Symptoms after 1 week**Figure 6: Symptoms after 3 months**

Figure 7: Symptoms after 3 months by gender

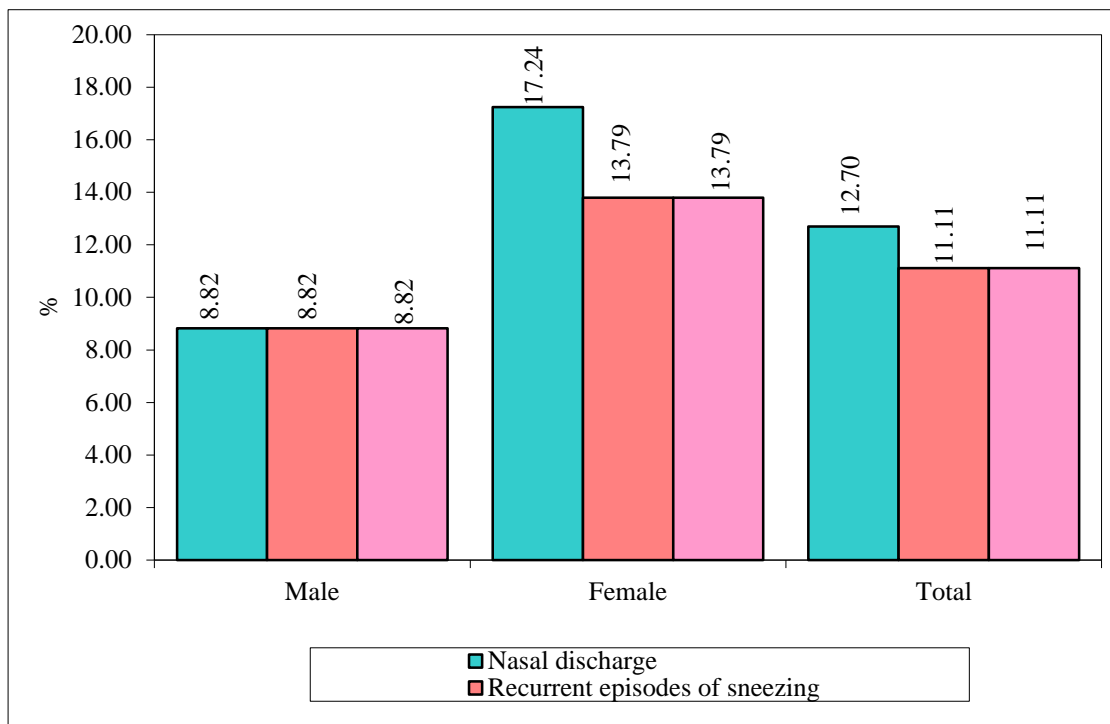


Figure 8: Symptoms after 6 months

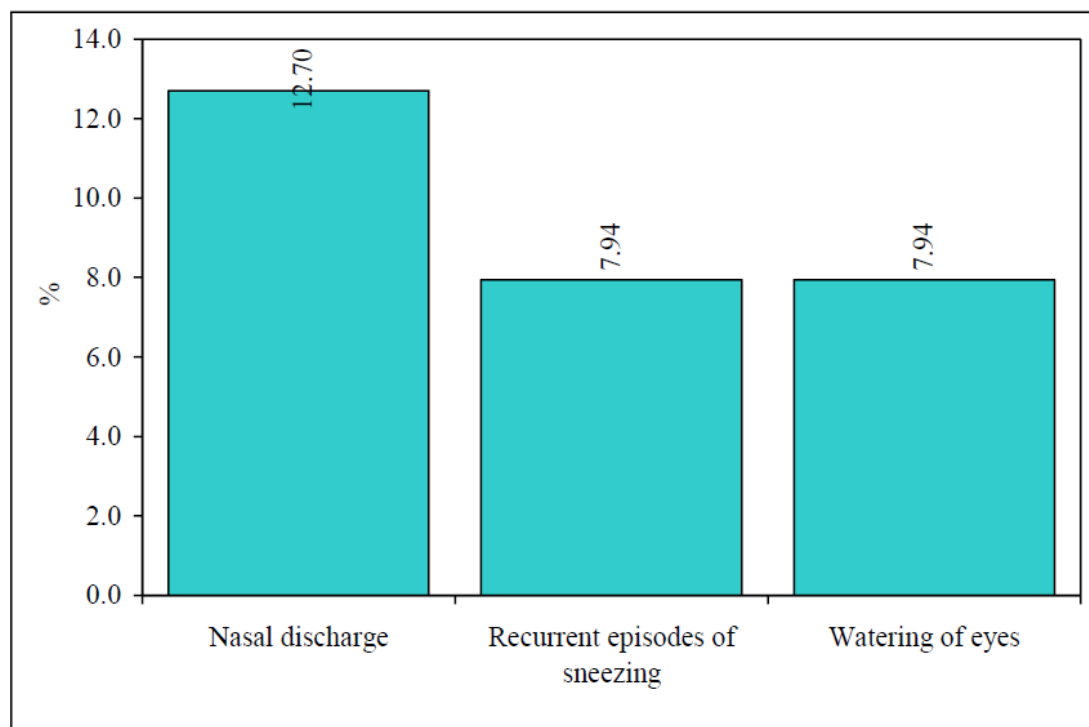


Figure 9: Comparison of different treatment time points with status of symptom

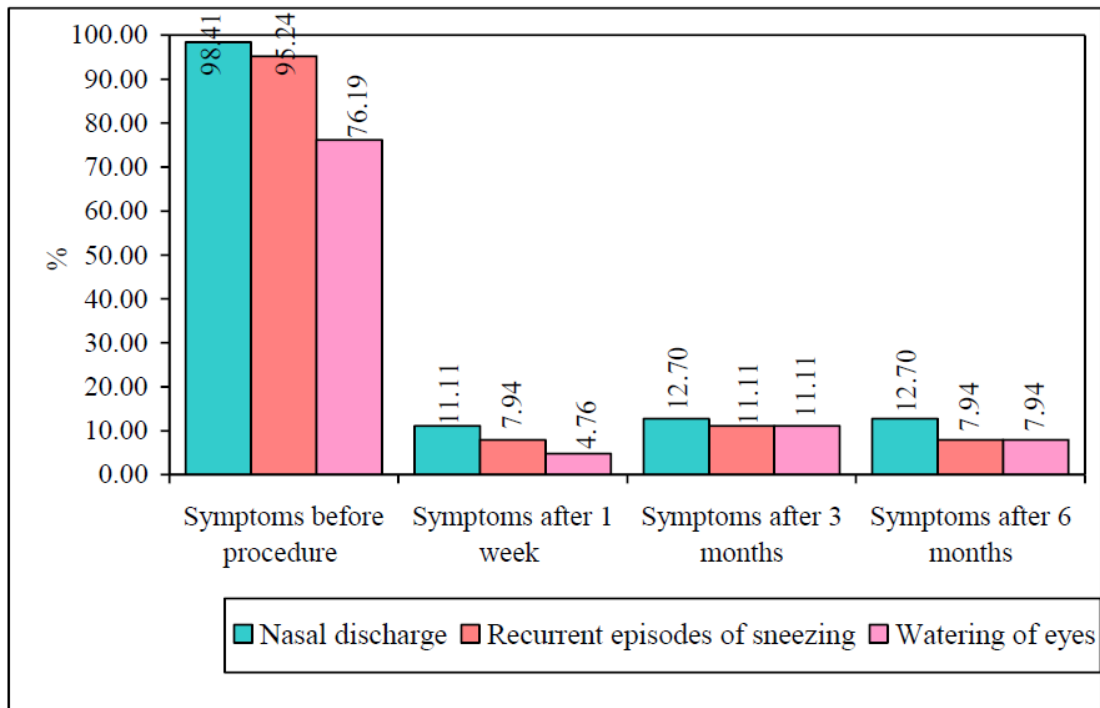
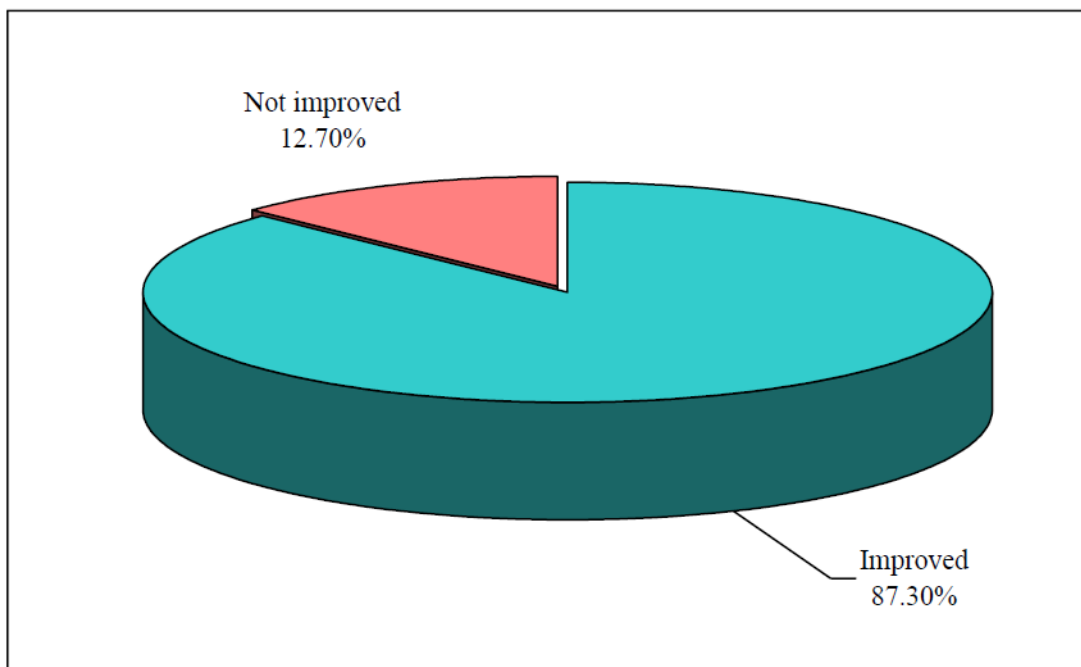


Table 10: Outcome



DISCUSSION

Allergic rhinitis represents a substantial portion of the global burden, accounting for approximately 55% of all allergies. The reported incidence of allergic rhinitis in India also falls between 20% and 30%. Our Study has demonstrated that the occurrence of allergic rhinitis in India has been on the rise over the last few years.²⁶

From a clinical standpoint, Allergic Rhinitis is defined by the occurrence of two or more of the following symptoms: anterior or posterior rhinorrhoea, sneezing, nasal blockage, and/or nasal itching or posterior rhinorrhoea for over 6 months, marked by inflammatory changes in the nasal mucosa due to inhaled allergens. Symptoms of Allergic Rhinitis encompass nasal itching, irritation in the throat, mouth, or eyes, frequent sneezing, and nasal discharge. There is a complex, reciprocal relationship between allergic rhinitis and mental health issues like depression, anxiety, stress, and sleep problems. Nasal congestion, frequently triggered by allergic rhinitis, can interfere with sleep patterns, lead to fragmented sleep, and complicate night time breathing.^{5,27} Testing serum sIgE is a highly important examination that can assist in identifying the cause of allergic disease and selecting an effective strategy to prevent it.²⁸

There are various treatment options typically employed for Allergic Rhinitis, including Antihistamines such as Promethazine and Chlorpheniramine. However, these can lead to systemic side effects with prolonged use, including constipation, difficulty urinating, and in certain instances, low blood pressure, sedation, reduced alertness and concentration, dizziness, motor incoordination, and fatigue. Steroids in the form of nasal sprays are also used such as beclomethasone dipropionate, budesonide, and flunisolide include dryness, crustiness, itching, redness, swelling, and

nosebleeds. These adverse effects can hinder patients from completing their treatment regimen. Due to their unpleasant taste and smell, burning sensations in the nose, coughing, and sneezing. Immunotherapy represents a modern and sophisticated treatment option; however, it has disadvantages such as significant expense and the need for numerous follow-up appointments.

This study addresses local use of 15% silver nitrate as an easy to administer, cost effective treatment on which very few studies have been done for allergic rhinitis. No premedication is necessary, and side effects are minimal. There is no need for advanced equipment or surgical procedures. Due to the high prevalence of the disease, it can be applied in many cases.

This method is simple, effective, and favoured by patients. This method is beneficial for patients suffering from allergic rhinitis, as it can be performed on an outpatient basis. It offers quicker relief with fewer follow-up appointments, improved adherence, cost efficiency, and avoids systemic side effects such as unpleasant taste and smell, irritation, coughing, sneezing, dizziness, impaired motor coordination, fatigue, headaches, constipation, blurred vision, and dry mouth.

In our study patients were selected between the age group of 18 to 65 years diagnosed with Allergic Rhinitis. The results showed no specific age group with higher incidence of symptoms of Allergic Rhinitis. There is no relation between age group and occurrence of Allergic Rhinitis.^{7,29}

In our study patients of both sexes were taken. Out of total 63 patients 34 males and 29 females were included in the study. There was no relation found between sex of the patient and incidence of Allergic Rhinitis.

In our study patients with follow up after 1 week of 15% Silver nitrate application 87.3% patients had no symptoms, only 11.11% of patients complained of Nasal discharge, 7.94% had Recurrent episodes of sneezing and 4.76% had watering from eyes after 1 week procedure. A significant number of patients showed considerable improvement regarding all symptoms of Allergic Rhinitis. The symptoms of Allergic Rhinitis were significantly improved in majority of the patients even on 1 week follow up.

In our study patients with follow up after 3 months of 15% silver nitrate application, 87.30% had no symptoms in terms of nasal discharge, recurrent episodes of sneezing, watering of eyes. 12.70% patients had Nasal discharge as a symptom, 11.11% patients had Recurrent episodes of sneezing and 11.11% had Recurrent episodes of sneezing symptom after 3 months procedure. Patients showed significant improvement in symptoms even after a follow up period of 3 months.

In our study patients were followed up after 6 months for assessment of nasal discharge, multiple episodes of sneezing and watering of eyes, 87.30% patients did not have any symptoms, 12.7% patients had Nasal discharge as a symptom, 7.94% patients had Recurrent episodes of sneezing and 7.94%. Local application of 15% silver nitrate could significant relief in majority of the patients for 6 months.

15% Silver nitrate local application is an easy and effective method for alleviating symptoms for atleast 6 months. The procedure can also be repeated if the symptoms recur. This study has shown negligible local and systemic side effects, good patient acceptability and doesnot require any sophisticated equipment or surgical skills.^{3,26}

CONCLUSION

The study shows that a single local application of 15% silver nitrate achieves excellent control of symptoms of allergic rhinitis like multiple episode of sneezing, nasal discharge and watering of eyes, these symptoms were controlled for a period of 6 months. The study also showed that patient compliance for this modality of treatment was excellent, with no side effects and low cost of treatment. Considering all these factors this modality of treatment can be considered as one of the mainstay treatment for Allergic Rhinitis.

SUMMARY

This research examines the local use of 15% silver nitrate for allergic rhinitis, representing a rare modality into a novel and uncommon treatment method that utilizes local application of 15% silver nitrate. This technique is easy, efficient, and well-liked by patients. This technique is useful for patients with allergic rhinitis as this procedure can be done on an outpatient basis, providing faster relief with fewer follow-ups, greater compliance, cost-effectiveness and no systemic adverse effects like unpleasant taste and smell, irritation, cough, sneezing, dizziness, poor motor coordination, exhaustion, headache, constipation, blurry vision, dry mouth and reduced coordination. This research examines the local use of 15% silver nitrate for allergic rhinitis, representing a rare investigation into a novel and uncommon treatment method that utilizes local application of 15% silver nitrate.

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ANNEXURES

ANNEXURE – I - INFORMED CONSENT FORM

**“ASSESSING EFFICACY OF LOCAL APPLICATION OF 15% SILVER
NITRATE IN TREATMENT OF ALLERGIC RHINITIS”**

Name of Student/Principal Investigator: _____

Name of Guide/Co Investigators: _____

Objective:

To assess the efficacy of local application of 15% silver nitrate in treatment of allergic rhinitis.

Introduction:

Clinically, Allergic Rhinitis is defined as the presence of two or more symptoms—such as anterior or posterior rhinorrhoea, sneezing, nasal blockage, and/or nasal itching—for over 6 months, with inflammatory changes in the nasal mucosa resulting from exposure to inhaled allergens.¹

Allergic rhinitis represents substantial portion of the global burden, accounting for approximately 55% of all allergies³. The reported incidence of allergic rhinitis in India also falls between 20% and 30%. Research has demonstrated that the occurrence of allergic rhinitis in India has been on the rise over the recent years. The International Study of Allergies in Childhood (ISSAC) reported that nasal symptoms were seen in 12.5% of children aged 6 to 7 years and in 18.6% of those aged 13 to 14 years in India.²

A study demonstrated that while the overall prevalence of allergic rhinitis rose from 12.4% in 1992 to 15% in 2000, aligning with global trends, 23.1% of individuals who had allergic rhinitis in 1992 were symptom-free by 2000. In general, symptoms of rhinitis lessen with age and skin prick tests reveal reduced reactivity in older adults.²

Symptoms of Allergic Rhinitis include nasal pruritus, itching in the throat, mouth, or eyes, multiple episodes of sneezing and nasal discharge. There exists a complex and reciprocal relationship between allergic rhinitis and problems regarding mental health, including depression, anxiety, stress, and sleep problems. Often caused by allergic rhinitis, nasal congestion can disrupt sleep patterns, cause fragmented sleep, and make it harder to breathe at night.³

For treating Allergic Rhinitis, various methods are commonly employed, such as Antihistaminics like Promethazine and Chlorpheniramine. However, Fexofenadine can lead to systemic side effects with prolonged use such as constipation, problems with urination, and in certain instances, low blood pressure, sedation, reduced alertness and concentration, dizziness, lack of coordination in movement, and exhaustion. Intranasal Glucocorticoids like beclomethasone dipropionate, budesonide, flunisolide have side effects like dryness, crustiness, itchiness, redness, swelling and nosebleeds which makes it difficult for the patients to complete the course of the treatment. Budesonide nasal sprays are difficult to use for pediatric children because of their unpleasant taste and smell, burning sensation in nose, coughing, and sneezing. Immunotherapy is also one of the most recent and advanced forms of treatment but has drawbacks like high cost and multiple followups.⁴

This research examines the local use of 15% silver nitrate for allergic rhinitis, representing a rare investigation into a novel and uncommon treatment method that

utilizes local application of 15% silver nitrate.^{4,5} This technique is easy, efficient, and well-liked by patients. This technique is useful for patients with allergic rhinitis as this procedure can be done on an outpatient basis, providing faster relief with fewer follow-ups, greater compliance, cost-effectiveness and no systemic adverse effects like unpleasant taste and smell, irritation, cough, sneezing, dizziness, poor motor coordination, exhaustion, headache, constipation, blurry vision, dry mouth and reduced coordination. This research examines the local use of 15% silver nitrate for allergic rhinitis, representing a rare investigation into a novel and uncommon treatment method that utilizes local application of 15% silver nitrate.

Explanation of procedure:

If you agree to participate in this study, the relevant data will be collected as per the proforma and the final diagnosis will be confirmed using serum IgE levels. Following this 4% lignocaine soaked cotton pledgets will be kept in the nasal cavity at the level of bilateral inferior turbinates and removed after 5 minutes. 15% silver nitrate will be applied at the anterior part of bilateral inferior turbinates.

Withdrawal from participation in the study:

Participation in this study is voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You will/will not have nor get any benefits by participating in this study. The data gathered will help the population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person from identifying you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purposes and or presented to scientific groups. However, your identity will never be revealed.

Questions:

If you have any question or complaints with regard to your right as study participant you may contact Dr Harsha Hegde, Chairperson, Ethical committee of JNMC, 0831-2473777 Extension 4052.

Legal rights: By signing this consent form, we are not waving any of your legal rights.

CONSENT STATEMENT

I am making a voluntary decision to participate in the study “**ASSESSING EFFICACY OF LOCAL APPLICATION OF 15% SILVER NITRATE IN TREATMENT OF ALLERGIC RHINITIS**”. My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was given the opportunity to ask questions and that they have been answered to my satisfaction.

Name of the participant:

Signature or left thumb impression of the participant:

Name of the witness:

Signature or left thumb impression of the witness:

Name of the investigator:

Signature of the investigator:

ANNEXURE – II PROFORMA

ASSESSING EFFICACY OF LOCAL APPLICATION OF 15% SILVER

NITRATE IN TREATMENT OF ALLERGIC RHINITIS

Date :

Name of participant :

Age :

Sex :

Address :

Name of Parent / Guardian :

Relation :

Op / IP no. :

Date of admission :

Date of discharge :

Chief Complaints :

History of Presenting illness :

Past History :

Personal History :

Family History :

General Physical Examination –

Built :

Nourishment :

Vitals –

Pulse rate :

Blood Pressure :

Respiratory Rate :

Pallor :

Icterus :

Clubbing :

Cyanosis :

Lymphadenopathy :

Oedema :

Nose Examination-

External Appearance-

Root :

Bridge :

Dorsum :

Tip :

Ala :

Coloumella :

Vestibule :

Cold Spatula test :

Anterior Rhinoscopy:

Posterior Rhinoscopy :

ANNEXURE – IV KEY TO MASTER CHART:

S. No	Age	Sex	IP/OP no.	Diagnosis	Symptoms before procedure	Symptom on 1st follow up (1 week)	Symptom on 2nd follow up (3 months)	Symptom on 3rd follow up (6 months)	Result - Improved / Not improved
1	41	F	7106211	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
2	54	M	6234784	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
3	29	M	6696574	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
4	19	M	2274932	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
5	32	M	6438383	Allergic Rhinitis	nasal discharge, watering of eyes	nil	nil	nil	Improved
6	31	M	7166309	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
7	18	F	7162295	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
8	18	M	6220213	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
9	59	F	7178808	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
10	44	F	7181575	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
11	18	M	6693510	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
12	19	F	7186397	Allergic Rhinitis	recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
13	27	M	7130958	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
14	26	M	7183183	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
15	27	F	5767823	Allergic Rhinitis	nasal discharge, watering of eyes	nasal discharge, watering of eyes	nasal discharge, watering of eyes	nasal discharge, watering of eyes	Not improved
16	26	M	72371211	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
17	18	F	7247053	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
18	44	F	6248657	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nasal discharge	nasal discharge, recurrent episodes of sneezing	nasal discharge, recurrent episodes of sneezing	Not improved

19	34	F	7250366	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
20	38	M	7250232	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
21	42	F	7250397	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
22	35	F	7250236	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	Not improved
23	32	F	7224390	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
24	32	F	7274737	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
25	29	F	7221730	Allergic Rhinitis	nasal discharge, watering of eyes	nil	nil	nil	Improved
26	23	F	7257168	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
27	50	F	7361780	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	Not improved
28	65	M	11006950	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
29	32	F	118656	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
30	19	M	1189430	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
31	28	M	1189810	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
32	38	F	1193637	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
33	36	M	1200192	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
34	42	M	1199101	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
35	42	M	1199466	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	Not improved
36	32	M	1199551	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
37	28	M	1201585	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing,	nil	nil	nil	Improved

38	43	F	7282508	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
39	39	M	1207791	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
40	18	M	1198761	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
41	18	M	6802921	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
42	39	F	1223444	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
43	30	M	3569326	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
44	48	M	1172528	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
45	34	M	1166605	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	Not improved
46	29	M	1166599	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
47	22	M	1157179	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing,	nil	nil	nil	Improved
48	37	M	1152489	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
49	26	M	1151767	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
50	18	M	1165535	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
51	42	F	1161143	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
52	33	F	1162195	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
53	24	M	1162077	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
54	32	F	1159857	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	Not improved
55	34	M	1164212	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
56	33	F	10026408	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
57	60	F	7169756	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved

58	44	F	7821636	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
59	45	M	12062051	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	nasal discharge, recurrent episodes of sneezing, watering of eyes	Not improved
60	45	M	4868010	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
61	28	F	7302671	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing	nil	nil	nil	Improved
62	22	F	7243687	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved
63	18	F	7391680	Allergic Rhinitis	nasal discharge, recurrent episodes of sneezing, watering of eyes	nil	nil	nil	Improved