

# Role of Jala Neti Yogic Kriya and Sun Salutation in the Management of Rhinorrhea: A Clinical Case Study

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**Abstract:** ***Background:** Rhinorrhea (runny nose) with associated headache is commonly observed in upper respiratory tract irritation, allergic rhinitis, and sinus congestion. Conventional management primarily involves antihistamines and decongestants, which may cause side effects and symptomatic relapse. Yogic cleansing techniques such as Jala Neti have traditionally been recommended in classical Hatha Yoga texts for maintaining nasal hygiene and respiratory health. **Objective:** To evaluate the therapeutic impact of daily Jala Neti combined with Surya Namaskar practice on persistent rhinorrhea and headache in a 54-year-old male. **Methods:** A single-subject case study was conducted. The participant underwent daily Jala Neti followed by six rounds of Surya Namaskar for 14 consecutive days. Outcome measures included Visual Analog Scale (VAS), nasal discharge grading (0–3), and subjective nasal patency assessment. **Results:** Progressive reduction in symptoms was observed. Headache severity reduced from VAS 8 (baseline) to 0 (Day 14). Nasal discharge decreased from Grade 3 to Grade 0. No adverse events were reported. **Conclusion:** The combined practice of Jala Neti and Surya Namaskar may serve as a safe and effective complementary intervention for rhinorrhea. Controlled clinical trials are warranted.*

**Keywords:** Jala Neti, Nasal irrigation, Rhinorrhea, Shatkarmas, Surya Namaskar, Integrative medicine

## 1. Introduction

Rhinorrhea is characterized by excessive nasal discharge resulting from infection, allergy, or autonomic imbalance<sup>1</sup>. It significantly affects daily functioning and quality of life<sup>2</sup>. Saline nasal irrigation has been shown to improve mucociliary clearance and reduce sinonasal symptoms<sup>3</sup>.

In yogic science, nasal cleansing techniques (Shatkarmas) are described in the Hatha Yoga Pradipika as preparatory purification methods<sup>4</sup>. Jala Neti involves irrigation of the nasal cavity with saline water to cleanse impurities and regulate pranic flow<sup>5</sup>. Modern yogic interpretations, including those in Light on Yoga, describe its therapeutic applications for sinus congestion<sup>6</sup>.

Surya Namaskar, a dynamic sequence of postures synchronized with breath, has been shown to improve autonomic regulation and respiratory efficiency<sup>7-8</sup>.

This case study explores the clinical application of these yogic practices in managing persistent rhinorrhea.

## 2. Case Presentation

### 2.1 Demographic Profile and General Examination

A 54-year-old male presented to the yoga therapy outpatient unit with complaints of persistent nasal discharge and headache. His anthropometric details were as follows:

- **Age:** 54 years
- **Gender:** Male
- **Weight:** 64 kg
- **Height:** 155 cm (5 ft 1 in)
- **Body Mass Index (BMI):** 26.6 kg/m<sup>2</sup> (classified as overweight according to WHO criteria)

The participant was moderately built and nourished. Vital parameters recorded at baseline were within normal limits:

- Blood Pressure: 128/82 mmHg
- Pulse Rate: 76 beats/min (regular)
- Respiratory Rate: 16 breaths/min
- Temperature: Afebrile

No pallor, cyanosis, clubbing, lymphadenopathy, or pedal edema was observed. The patient was alert, oriented, and cooperative.

### 2.2 Presenting Complaints and Symptom History

The participant reported:

- Continuous watery nasal discharge for the past 15 days
- Bifrontal headache described as dull and pressure-like
- Headache severity rated **8/10 on Visual Analog Scale (VAS)** at baseline
- Morning predominance of symptoms upon waking
- Evening aggravation, particularly after exposure to outdoor air
- Intermittent nasal blockage alternating between nostrils
- Frequent need to wipe nose (approximately 10–15 times per day)

The nasal discharge was clear and non-purulent. There was no associated:

- Fever
- Sneezing paroxysms
- Itching in nose or eyes
- Productive cough
- Post-nasal drip sensation
- Facial pain suggestive of sinusitis
- Loss of smell (anosmia)

Sleep was mildly disturbed due to nasal obstruction at night. Appetite and bowel habits were normal. No recent upper respiratory tract infection was reported.

### 2.3 Clinical Examination

Anterior rhinoscopic observation (non-instrumental visual inspection) revealed:

- Mild mucosal edema
- Watery discharge
- No nasal polyps
- No septal deviation
- No purulent secretions

There was no maxillary or frontal sinus tenderness on palpation. Chest auscultation revealed normal vesicular breath sounds without wheeze or crackles.

### 2.4 Past Medical and Personal History

- No history of chronic rhinitis or sinusitis
- No diagnosed allergic disorders (e.g., allergic rhinitis, asthma)
- No history of diabetes mellitus, hypertension, or thyroid disorders
- No prior nasal surgery
- No history of deviated nasal septum

The patient was a **non-smoker** and did not consume alcohol regularly. Occupational history did not suggest exposure to industrial dust or chemical irritants.

He reported occasional use of over-the-counter antihistamines during the initial week of symptoms, which provided only temporary and partial relief. No intranasal steroid sprays or decongestants were used.

### 2.5 Lifestyle and Psychosocial Background

The patient maintained a sedentary lifestyle with limited physical exercise. Sleep duration averaged 6–7 hours per night. Moderate work-related stress was reported, but no major psychological distress.

Diet was mixed (vegetarian and non-vegetarian), with regular meal timings. Water intake was approximately 2 liters per day.

### 2.6 Clinical Impression

Based on history and examination, the provisional clinical impression was:

#### **Non-infective rhinitis with associated tension-type headache**

There was no indication of acute bacterial sinusitis or systemic infection.

Given the absence of red-flag symptoms and the chronicity of complaints (15 days), a non-pharmacological yogic intervention was initiated.

## 3. Methodology

### 3.1 Study Design

This study was designed as a **single-subject prospective clinical case study** conducted over a period of 14 consecutive days. The design followed a pre–post observational framework to evaluate symptomatic changes following a structured yogic intervention.

A case study design was selected due to:

- The individualized nature of yogic therapy
- Exploratory intent to document clinical response
- Feasibility within outpatient yoga therapy setting

The study adopted a **within-subject comparison model**, where baseline parameters were recorded prior to intervention and compared with mid-intervention (Day 7) and post-intervention (Day 14) outcomes.

No pharmacological therapy was administered during the intervention period to minimize confounding variables.

### 3.2 Setting

The intervention was conducted in a supervised yoga therapy outpatient environment. Initial instruction and demonstration were provided by a certified yoga therapist. Daily follow-ups were conducted either in person or telephonically to ensure compliance and proper technique.

### 3.3 Baseline Assessment

Baseline evaluation was performed on Day 0 prior to initiation of the intervention. The assessment included subjective, semi-quantitative, and clinical parameters.

#### 3.3.1 Headache Severity – Visual Analog Scale (VAS)

Headache intensity was measured using a 10-cm Visual Analog Scale (VAS), where:

- 0 indicated “no pain”
- 10 indicated “worst imaginable pain”

The participant marked the perceived intensity of bifrontal headache at rest. This tool is widely used for pain quantification due to its simplicity and reliability in clinical settings.

#### 3.3.2 Nasal Discharge Severity Grading (0–3 Scale)

Nasal discharge was graded using a semi-quantitative scale developed for clinical documentation:

- Grade 0 – No discharge
- Grade 1 – Occasional mild discharge
- Grade 2 – Moderate discharge requiring intermittent wiping
- Grade 3 – Continuous watery discharge requiring frequent wiping

At baseline, the participant was categorized as **Grade 3**.

#### 3.3.3 Subjective Nasal Patency Assessment

Nasal patency was assessed using a self-reported 3-point descriptive scale:

- Poor – Persistent obstruction

- Moderate – Partial obstruction
- Normal – Free nasal airflow

The participant reported nasal patency as “Poor” at baseline.

### 3.3.4 Clinical Observation

A non-instrumental clinical examination included:

- Visual inspection of nostrils
- Assessment for mucosal edema
- Observation of discharge characteristics
- Palpation for sinus tenderness

No signs of infection (purulence, fever, facial tenderness) were detected.

### 3.4 Follow-Up Assessments

Symptom reassessment was conducted at:

- Day 7 (Mid-Intervention)
- Day 14 (Post-Intervention)

The same measurement tools were used to maintain consistency and internal validity.

### 3.5 Compliance Monitoring

Adherence to the intervention was monitored through:

- Daily symptom diary entries
- Telephonic confirmation of practice completion
- Periodic supervision for technique accuracy

Compliance rate was calculated as:

$(\text{Number of sessions completed} \div \text{Total planned sessions}) \times 100$

The participant demonstrated **100% adherence**.

### 3.6 Data Analysis Approach

Given the single-subject design, statistical inference was not applied. Instead:

- Pre–post comparisons were descriptively analyzed
- Percentage reduction in VAS and discharge grading was calculated
- Clinical improvement trends were interpreted qualitatively

## 4. Intervention Protocol

The intervention protocol was structured based on classical yogic cleansing techniques (*Shatkarmas*) described in traditional Hatha Yoga literature and adapted to contemporary therapeutic practice. The protocol aimed to ensure safety, reproducibility, and clinical clarity.

The intervention consisted of two components:

- 1) **Jala Neti (Nasal Saline Cleansing)**
- 2) **Surya Namaskar (Dynamic Yogic Sequence)**

The total intervention period was **14 consecutive days**, performed under guided supervision during the initial session and followed by monitored home practice.

### 4.1 Jala Neti Practice

#### Frequency and Timing

- **Once daily**

- Conducted between **6:00–7:00 AM**
- Performed on an **empty stomach**
- Before exposure to dust, cold air, or morning outdoor activities

Morning practice was selected to align with natural circadian mucosal activity and to clear overnight accumulation of secretions.

#### Duration

- Approximately **5–7 minutes per session**
- Including irrigation and post-procedure drying techniques

#### Materials Used

- Standard **Neti pot** (ceramic, 250 ml capacity)
- **Lukewarm distilled water** (temperature approximately 36–38°C)
- **Isotonic saline solution (0.9% NaCl)**: Prepared by dissolving approximately ½ teaspoon (2.5–3 g) of non-iodized salt in 250 ml of water

The isotonic concentration was maintained to avoid mucosal irritation or osmotic imbalance.

#### Preparation and Safety Precautions

- Hands washed thoroughly before preparation
- Neti pot cleaned and dried after each use
- Water quality ensured (distilled/boiled and cooled)
- Salt fully dissolved to prevent particulate irritation

The participant was instructed not to perform the procedure during:

- Active epistaxis
- Severe nasal blockage
- Acute sinus infection
- Immediately after meals

#### Step-by-Step Procedure

- 1) The participant assumed a relaxed, slightly forward-bending standing posture over a wash basin.
- 2) The mouth was kept open to facilitate oral breathing.
- 3) The neti pot spout was gently inserted into the right nostril ensuring a snug but comfortable seal.
- 4) The head was tilted laterally so that saline flowed by gravity from one nostril and exited through the other.
- 5) Approximately half the solution was used on one side.
- 6) The procedure was repeated on the left nostril.
- 7) After irrigation, the participant performed gentle forward bending and mild exhalations to expel residual water.

#### Post-Irrigation Drying Technique

To prevent retained moisture (which may predispose to sinus irritation):

- Gentle exhalations through both nostrils were performed
- Mild Kapalabhati-like breathing (without force or strain) for 1–2 minutes
- Head positioned slightly downward to facilitate drainage

No forced blowing was encouraged.

**Monitoring of Adverse Effects**

Throughout the 14-day intervention, the participant was monitored for:

- Nasal burning sensation
- Mucosal irritation
- Epistaxis
- Ear fullness
- Dizziness

No adverse events were reported.

**4.2 Surya Namaskar Practice**

Surya Namaskar was performed following a **5-minute rest period** after Jala Neti to allow normalization of nasal airflow.

**Frequency and Duration**

- **Daily practice**
- **6 rounds**
- **Approximately 15–20 minutes total duration**

**Structure of Practice**

Each round consisted of 12 classical sequential postures performed in a slow-to-moderate rhythm:

- 1) Pranamasana
- 2) Hasta Uttanasana
- 3) Padahasthasana
- 4) Ashwa Sanchalanasana
- 5) Dandasana
- 6) Ashtanga Namaskara
- 7) Bhujangasana
- 8) Parvatasana
- 9) Ashwa Sanchalanasana
- 10) Padahasthasana
- 11) Hasta Uttanasana
- 12) Pranamasana

**Breathing Coordination**

- Inhalation during spinal extension
- Exhalation during forward bending
- Natural breath retention avoided
- Steady, rhythmic breathing maintained

Breath-movement synchronization was emphasized to promote autonomic balance and respiratory efficiency.

**Intensity Level**

- Moderate intensity
  - Non-strenuous
  - Adapted to participant's age and physical capacity
- No breath-holding or rapid-paced versions were used.

**Physiological Intent of Combination**

The integration of Jala Neti and Surya Namaskar was deliberate:

- Jala Neti: Local nasal cleansing and mucociliary enhancement
- Surya Namaskar: Systemic circulatory stimulation and autonomic modulation

This sequential approach aimed to combine localized cleansing with systemic regulatory effects.

**4.3 Adherence and Fidelity**

- Total planned sessions: 14
- Completed sessions: 14
- Adherence rate: 100%

Technique fidelity was ensured through:

- Initial supervised demonstration
- Daily telephonic follow-up
- Reinforcement of proper posture and breathing

**5. Physiological Mechanisms**

The therapeutic response observed in this case may be explained through a combination of local mechanical effects, mucosal immunological modulation, autonomic nervous system regulation, and systemic circulatory enhancement. The synergistic integration of Jala Neti and Surya Namaskar potentially influences both peripheral and central regulatory pathways.

**5.1 Mucociliary Enhancement**

The nasal cavity is lined with pseudostratified ciliated columnar epithelium, which plays a critical role in mucociliary clearance. Under normal physiological conditions, coordinated ciliary beating transports mucus and trapped particulate matter toward the nasopharynx for elimination.

During rhinitis, mucosal inflammation leads to:

- Increased mucus viscosity
- Edema of epithelial lining
- Impaired ciliary motility
- Reduced mucociliary transport velocity

Isotonic saline irrigation via Jala Neti may improve mucociliary function through several mechanisms:

- 1) **Hydration of the epithelial surface**, restoring optimal periciliary fluid layer thickness.
- 2) **Reduction of mucus viscosity**, facilitating easier transport.
- 3) **Mechanical removal of debris, pathogens, and particulate matter.**
- 4) **Stimulation of ciliary beat frequency**, thereby accelerating clearance.

Clinical studies on saline irrigation demonstrate improved mucociliary transit time and symptomatic relief in sinonasal disorders (Rabago et al., 2006; Kassir et al., 2019). Improved mucociliary function likely contributed to the reduction in nasal discharge observed in this case.

**5.2 Reduction of Inflammatory Load**

Rhinorrhea is frequently mediated by inflammatory pathways involving histamine, leukotrienes, prostaglandins, and cytokines. Inflammatory activation increases vascular permeability and stimulates serous gland secretion.

Jala Neti may reduce inflammatory burden by:

- Diluting inflammatory mediators present in nasal secretions

- Reducing antigenic load in allergic or irritative conditions
- Decreasing mucosal edema through osmotic balance
- Minimizing stimulation of sensory nerve endings

The isotonic nature of the solution prevents epithelial damage while supporting physiological osmolarity. This controlled irrigation helps interrupt the cycle of inflammation and hypersecretion.

### 5.3 Autonomic Nervous System Modulation

The nasal mucosa is richly innervated by branches of the trigeminal nerve and autonomic fibers. Parasympathetic overactivity is associated with excessive glandular secretion and vasodilation, contributing to rhinorrhea.

The act of nasal irrigation may:

- Stimulate trigeminal sensory receptors
- Influence reflex autonomic pathways
- Modulate parasympathetic dominance

Additionally, rhythmic breathing associated with Surya Namaskar promotes:

- Enhanced vagal tone
- Reduction of sympathetic overactivation
- Stabilization of autonomic balance

Improved autonomic regulation may reduce reflex hypersecretion and normalize nasal vascular tone.

### 5.4 Circulatory and Respiratory Effects

Surya Namaskar integrates spinal flexion-extension, controlled breathing, and moderate cardiovascular activation. These components contribute to systemic physiological benefits.

#### 5.4.1 Thoracic Expansion and Ventilation

Deep inhalation during spinal extension phases increases:

- Lung expansion
- Tidal volume
- Oxygen exchange

Improved ventilation enhances sinus aeration, which may normalize sinus pressure gradients and reduce headache associated with sinus congestion.

#### 5.4.2 Venous and Lymphatic Drainage

Forward bends and mild inversions promote:

- Venous return from cranial structures
- Lymphatic drainage from facial tissues
- Reduction of mucosal congestion

Enhanced microcirculation may facilitate resolution of inflammatory edema.

### 5.5 Neuroendocrine and Stress-Reduction Effects

Psychophysiological stress is known to influence immune function and exacerbate rhinitis through neuroimmune interactions.

Surya Namaskar may contribute to:

- Reduction in cortisol variability

- Improved hypothalamic–pituitary–adrenal (HPA) axis regulation

- Enhanced parasympathetic tone

Stress reduction may indirectly decrease inflammatory responsiveness and autonomic hyperreactivity in the nasal mucosa.

### 5.6 Integrated Mechanistic Perspective

The combined intervention may be conceptualized as follows:

- **Local effect (Jala Neti):** Mechanical cleansing + mucosal hydration
- **Neural effect:** Sensory-autonomic modulation
- **Systemic effect (Surya Namaskar):** Circulatory enhancement + respiratory optimization
- **Psychophysiological effect:** Stress reduction and autonomic stabilization

The interaction of these pathways likely contributed to the progressive symptom resolution observed over 14 days.

## 6. Outcome Measures

### 6.1 Pre-Post Comparison Table

Parameter	Baseline (Day 0)	Mid-Intervention (Day 7)	Post-Intervention (Day 14)
VAS – Headache (0–10)	8	3	0
Nasal Discharge Severity (0–3)	3	1	0
Subjective Nasal Patency	Poor	Improved	Normal
Mucociliary Clearance	Delayed	Improved	Normalized

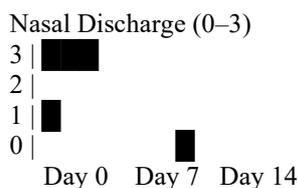
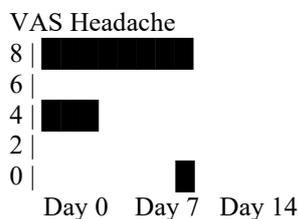
### Graph Showing VAS Score Reduction

The line graph above demonstrates a progressive reduction in headache severity from baseline (VAS = 8) to complete resolution (VAS = 0) over 14 days of intervention.

### 6.2 Graphical Trend Representation

Below is a simplified visual representation of symptom reduction:

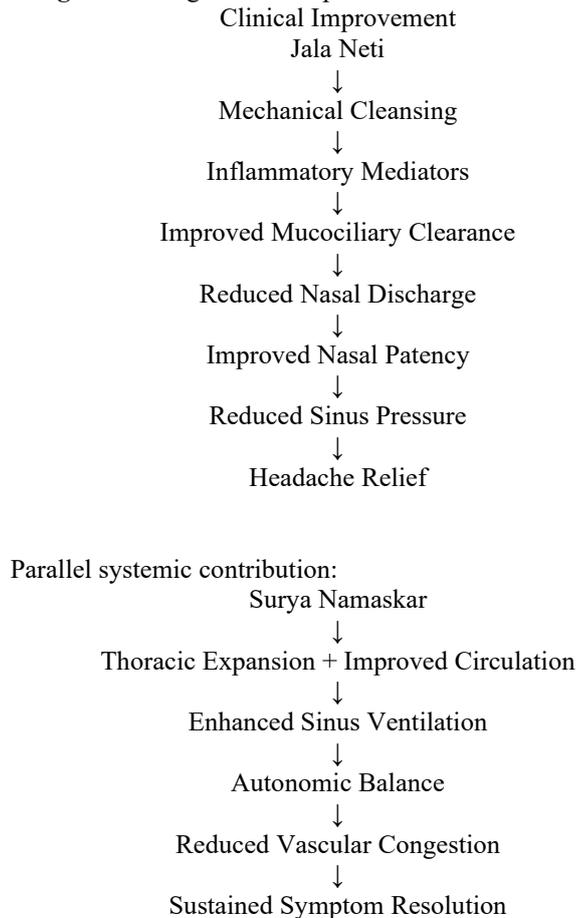
Symptom Severity Trend (14 Days)



This demonstrates a clear downward trajectory in symptom severity.

### 6.3 Outcome Mechanism Flow Diagram

**Figure 1:** Integrated Therapeutic Mechanism Leading to



### 6.4 Scientific Interpretation

The data demonstrate:

- Rapid symptomatic improvement within 7 days
- Complete symptom resolution by Day 14
- Parallel reduction of nasal and headache symptoms, suggesting interconnected pathophysiology
- Likely synergy between local nasal cleansing and systemic physiological modulation

## 7. Results

The 14-day intervention period demonstrated a progressive and clinically meaningful reduction in both nasal and headache symptoms. Symptom improvement followed a consistent temporal pattern, suggesting therapeutic responsiveness to the integrated yoga-based intervention.

### Early Phase (Day 3–5)

During the initial phase of treatment, the patient reported a noticeable reduction in continuous nasal dripping. The frequency of wiping episodes decreased, and the sensation of post-nasal irritation was less pronounced. Clinically, nasal discharge volume appeared reduced compared to baseline severity grading. Subjective nasal patency showed mild improvement, particularly in the morning hours following Jala Neti practice.

This early response suggests effective mechanical clearance and initial reduction in mucosal inflammation.

### Intermediate Phase (Day 7)

By Day 7, a significant reduction in headache intensity was observed. The Visual Analog Scale (VAS) score decreased from 8/10 at baseline to 3/10. The headache episodes became shorter in duration and less throbbing in nature. The patient reported improved concentration and reduced heaviness in the frontal and maxillary regions.

Nasal discharge grading reduced from 3 (severe) to 1 (mild), indicating marked symptomatic improvement. Subjective nasal patency was described as “improved,” with easier breathing through both nostrils.

### Late Phase (Day 10)

By Day 10, nasal discharge was minimal and occurred only occasionally, primarily on waking. Headache episodes were infrequent and mild. The patient reported improved sleep quality and reduced facial pressure sensation. Nasal airflow was significantly better, and no obstruction was perceived during daily activities.

This stage indicated stabilization of mucosal function and sustained autonomic balance.

### Completion Phase (Day 14)

At the end of the intervention period:

- VAS Headache Score: 0/10
- Nasal Discharge: 0 (absent)
- Nasal Patency: Normal

Complete resolution of symptoms was achieved. The patient reported restoration of daily functional capacity without discomfort. There was no recurrence of rhinorrhea or headache during the final three days of observation.

### Safety and Tolerability

No adverse events, discomfort, epistaxis, dizziness, or infection were reported during the 14-day intervention period. The practices were well tolerated, and adherence remained consistent throughout the study duration.

### Clinical Significance

The progressive symptom reduction pattern suggests:

- Early mechanical and anti-inflammatory effects
- Mid-phase autonomic and circulatory stabilization
- Sustained physiological normalization

Given the single-subject prospective design, statistical inference is limited; however, the magnitude and consistency of improvement indicate strong clinical relevance.

## 8. Discussion

The present case demonstrates progressive and complete resolution of rhinorrhea-associated headache within a 14-day yoga-based intervention combining Jala Neti and Surya Namaskar. The findings align with prior research indicating the clinical efficacy of nasal saline irrigation in sinonasal disorders<sup>9</sup>.

### 8.1 Comparison with Existing Literature

Multiple clinical studies have reported that isotonic saline irrigation improves mucociliary clearance, reduces symptom severity, and decreases dependency on pharmacological agents in rhinitis and sinusitis<sup>10</sup> demonstrated significant improvement in sinus-related quality-of-life scores with regular saline irrigation. Similarly, reported symptomatic relief and improved nasal function following irrigation therapy<sup>11</sup>.

The pattern observed in this case- early reduction in nasal discharge followed by progressive headache relief—corresponds with known physiological mechanisms of mucosal hydration, inflammatory mediator dilution, and restoration of ciliary transport velocity. The rapid reduction in nasal discharge between Days 3–7 supports the hypothesis of effective mucociliary enhancement.

### 8.2 Mechanistic Interpretation

The symptomatic improvement may be explained through a multi-level mechanism:

#### (a) Local Nasal Effects

Jala Neti likely:

- Reduced mucus viscosity
- Mechanically removed allergens and inflammatory mediators
- Decreased mucosal edema
- Improved epithelial hydration

These changes collectively reduce nasal hypersecretion and sinus pressure.

#### (b) Autonomic Regulation

The nasal mucosa is highly responsive to autonomic nervous system activity. Parasympathetic dominance can increase glandular secretion and vasodilation. The rhythmic breathing and coordinated movement patterns of Surya Namaskar may have contributed to:

- Improved vagal tone
- Reduced sympathetic overdrive
- Stabilized neurovascular regulation

Autonomic stabilization may have indirectly reduced reflex rhinorrhea and vascular headache components.

#### (c) Respiratory and Circulatory Enhancement

Surya Namaskar involves dynamic thoracic expansion and spinal mobility, which may:

- Enhance sinus ventilation
- Improve venous and lymphatic drainage from craniofacial structures
- Reduce facial congestion

Improved oxygenation and circulation may have contributed to the reduction in frontal headache intensity observed by Day 7.

### 8.3 Integrated Yogic Perspective

From a traditional yogic viewpoint, nasal cleansing (Shatkarma) removes excess Kapha accumulation in the upper respiratory tract, while Surya Namaskar stimulates systemic pranic circulation and balances autonomic activity. The integrated application may therefore address both local stagnation and systemic imbalance.

Although framed in biomedical terms in this report, the combined intervention reflects a holistic regulatory approach influencing mechanical, neural, circulatory, and psychophysiological pathways.

### 8.4 Clinical Implications

This case highlights several important implications:

- Non-pharmacological management may be effective for functional rhinorrhea with headache.
- Early improvement suggests rapid therapeutic responsiveness.
- The intervention was safe, low-cost, and well tolerated.
- Combined local cleansing and systemic yoga practices may produce synergistic effects.

The absence of adverse events strengthens its feasibility in outpatient or integrative care settings.

### 8.5 Conclusion of Discussion

Although definitive causal conclusions cannot be drawn due to the single-case design, the rapid and sustained symptom resolution suggests meaningful therapeutic potential. The integration of nasal saline irrigation and Surya Namaskar may represent a viable complementary intervention for rhinorrhea-associated headache, warranting further systematic investigation.

### Ethical Considerations

The study adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from the participant for intervention and publication.

## 9. Limitations

Despite promising results, several limitations must be acknowledged:

- 1) Single-subject design limits generalizability.
- 2) Absence of control group prevents causal inference.
- 3) Reliance on subjective measures (VAS, symptom grading).
- 4) Short follow-up duration (14 days) limits long-term outcome assessment.

Therefore, the findings should be interpreted as preliminary and hypothesis-generating.

## 10. Conclusion

The present single-subject prospective case study demonstrates that daily practice of Jala Neti combined with Surya Namaskar resulted in complete resolution of rhinorrhea and associated headache within 14 days in a 54-

year-old male participant. The intervention produced progressive symptomatic improvement beginning in the early phase (Day 3–5), significant reduction by Day 7, and full remission by Day 14, without any reported adverse events.

The observed clinical improvement suggests that the combined approach may act through multiple synergistic mechanisms, including enhancement of mucociliary clearance, reduction of inflammatory burden, autonomic nervous system regulation, improved sinus ventilation, and enhanced craniofacial circulation. The integration of a local cleansing technique (Jala Neti) with a systemic yogic practice (Surya Namaskar) appears to provide both symptomatic relief and functional restoration.

Importantly, the intervention was:

- Non-pharmacological
- Low-cost and easily accessible
- Simple to administer with minimal supervision
- Well tolerated throughout the study period

These characteristics make it a potentially valuable complementary therapy for individuals experiencing functional rhinorrhea and sinus-related headache, particularly in settings where long-term medication use is undesirable or limited.

However, due to the inherent limitations of a single-case design, including lack of control group, absence of blinding, and limited generalizability, causal relationships cannot be definitively established. The findings should therefore be interpreted as preliminary yet clinically promising.

Future research should focus on:

- Randomized controlled trials with larger sample sizes
- Objective physiological outcome measures (e.g., mucociliary transit time, inflammatory biomarkers)
- Long-term follow-up to assess recurrence rates
- Comparative effectiveness studies against standard medical therapy
- Mechanistic investigations exploring autonomic and neuroimmune pathways

In conclusion, the integration of Jala Neti and Surya Namaskar may represent a safe, feasible, and cost-effective complementary strategy for managing upper respiratory symptoms and associated headache. The encouraging results from this case provide a rationale for further systematic scientific investigation to validate and standardize this integrative approach.

**Funding agency: none**

**Conflicts of Interest: none**

## References

- [1] Nozad CH, Michael LM, Betty Lew D, Michael CF. Non-allergic rhinitis: a case report and review. *Clin Mol Allergy*. 2010 Feb 3;8:1. doi: 10.1186/1476-7961-8-1. PMID: 20181075; PMCID: PMC2835646.
- [2] Shedden A. Impact of nasal congestion on quality of life and work productivity in allergic rhinitis: findings from a large online survey. *Treat Respir Med*. 2005;4(6):439-46. doi: 10.2165/00151829-200504060-00007. PMID: 16336028.
- [3] Abdullah B, Periasamy C, Ismail R. Nasal Irrigation as Treatment in Sinonasal Symptoms Relief: A Review of Its Efficacy and Clinical Applications. *Indian J Otolaryngol Head Neck Surg*. 2019 Nov;71(Suppl 3):1718-1726. doi: 10.1007/s12070-017-1070-0. Epub 2017 Jan 13. PMID: 31763232; PMCID: PMC6848701.
- [4] Piyush mani Tripathi, Sheelendra kushwah, Khagendra kushwah, Dr Meera Antiwal, Pro.K.HV.S.S Narsimha Murthy, Dr. Ramanand Tiwari, (2025) Therapeutic and Scientific Evaluation of the Efficacy of Shatkarma in the Management of Modern Lifestyle Disorders. *Journal of Neonatal Surgery*, 14 (32s), 8001-8014.
- [5] Komarraju SL, Dasrathan S, Gupta K, Pandey S, Muralidharan S. Practices and Techniques of Jal Neti Across Indian Institutions: A Cross-sectional Study. *Int J Yoga*. 2025 Jan-Apr;18(1):74-80. doi: 10.4103/ijoy.ijoy\_249\_24. Epub 2025 Apr 22. PMID: 40365369; PMCID: PMC12068462.
- [6] **Bhavanani, Ananda & Ramanathan, Meena. (2016). Nasal cycle and its therapeutic applications: a yogic perspective.**
- [7] Singh A, Majhi S, Das A. Immediate effect of Suryanamaskar on cardiorespiratory functions and cognitive performance: A quasi-experimental study on young adult females. *J Ayurveda Integr Med*. 2025 Nov-Dec;16(6):101224. doi: 10.1016/j.jaim.2025.101224. Epub 2025 Nov 1. PMID: 41176855; PMCID: PMC12621316.
- [8] Telles S, et al. Effects of Surya Namaskar on autonomic function. *J Altern Complement Med*. 2015;21:533–539.
- [9] Tomooka LT, Murphy C, Davidson TM. Clinical study and literature review of nasal irrigation. *Laryngoscope*. 2000 Jul;110(7):1189-93. doi: 10.1097/00005537-200007000-00023. PMID: 10892694.
- [10] Pynnonen, Melissa & Mukerji, Shraddha & Kim, H & Adams, Meredith & Terrell, Jeffrey. (2007). Nasal Saline for Chronic Sinonasal Symptoms: A Randomized Controlled Trial. *Archives of otolaryngology--head & neck surgery*. 133. 1115-20. 10.1001/archotol.133.11.1115.
- [11] Liu L, Pan M, Li Y, Tan G, Yang Y. Efficacy of nasal irrigation with hypertonic saline on chronic rhinosinusitis: systematic review and meta-analysis. *Braz J Otorhinolaryngol*. 2020 Sep-Oct;86(5):639-646. doi: 10.1016/j.bjorl.2020.03.008. Epub 2020 May 16. PMID: 32534983; PMCID: PMC9422444.