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To Study the Efficacy of Kalingadi Arka Nasal Spray in Kaphaja Prathishyaya (Chronic Rhinosinusitis) An Open Labeled Randomized Controlled Clinical Study

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Abstract

Background: Chronic rhinosinusitis is a common inflammatory disorder of the nasal and paranasal sinus mucosa that significantly affects quality of life. Symptoms such as nasal obstruction, nasal discharge, facial heaviness, headache and reduced sense of smell are commonly observed. Contemporary management mainly includes antibiotics, antihistamines and corticosteroid nasal sprays, which provide symptomatic relief but may be associated with recurrence and adverse effects on prolonged use. In Ayurveda, a similar clinical condition is described as Kaphaja Prathishyaya. Nasya therapy is considered an important treatment modality for diseases of the nose. Kalingadi Arka possesses Kapha-Vatahara and Shothahara properties which may help relieve nasal obstruction and mucous accumulation. This study was undertaken to evaluate its efficacy in the management of Kaphaja Prathishyaya.

Methodology: The present study was designed as an open-label randomized controlled clinical trial conducted on 40 patients diagnosed with Kaphaja Prathishyaya who satisfied the diagnostic and inclusion criteria. The participants were randomly allocated into two groups comprising 20 patients in each group. Group A (control group) was administered Kalingadi Taila Nasya, while Group B (trial group) received Kalingadi Arka in nasal spray form. The intervention was given for a duration of seven days. Patients were assessed before treatment, immediately after completion of therapy and during follow-up (0, 8^{th}, 15^{th} day). The assessment was carried out based on subjective parameters such as nasal obstruction, nasal discharge, headache, heaviness of head, itching of throat and palate and loss of taste, along with objective evaluation using the SNOT-22 score. The collected data were analyzed using appropriate statistical methods to evaluate the therapeutic efficacy of the intervention.

Results: The present study demonstrated that Kalingadi Arka nasal spray produced a statistically significant reduction in the clinical symptoms of Kaphaja Prathishyaya ($p < 0.05$). Within-group analysis showed significant improvement in nasal obstruction, nasal discharge and associated symptoms after treatment. However, inter-group comparison did not reveal a statistically significant difference between the trial and control groups ($p > 0.05$). These findings indicate that the intervention is effective and comparable to the

standard therapy.
Conclusion: Kalingadi Arka nasal spray is a promising intervention that may prove beneficial in reducing the symptoms of Kaphaja Prathishyaya and improving the quality of life of affected patients. It may be considered as an effective and safe therapeutic option in the management of this condition.

Keywords: Chronic Rhinosinusitis, Kaphaja Prathishyaya, Kalingadi Arka, Nasya, Nasal Spray Therapy, Ayurveda.

1. INTRODUCTION

Chronic rhinosinusitis (CRS) is a common inflammatory disorder of the nasal and paranasal sinus mucosa, affecting nearly 5–12% of the global population and a significant proportion of individuals in developing countries. The condition is characterized by persistent nasal obstruction, nasal discharge, facial heaviness, headache and impaired sense of smell, leading to considerable reduction in quality of life. Environmental pollution, allergens, recurrent infections and lifestyle factors are recognized contributors to the rising prevalence of this disorder. Despite advances in contemporary medicine, recurrence of symptoms and the need for long-term pharmacotherapy remain important clinical challenges in the management of CRS.

In Ayurveda, a condition with similar clinical manifestations is described as Kaphaja Prathishyaya, which arises due to the vitiation of Kapha along with Vata leading to obstruction of nasal passages and excessive accumulation of mucous secretions. Classical symptoms include Nasasrava (nasal discharge), Nasa pratistabdha (nasal obstruction), Shirashoola (headache), Mukhashiro gurutva (heaviness of head and face) and itching of throat and palate. Ayurveda considers the nose as the gateway to the head and recommends Nasya as an important therapeutic procedure for diseases occurring above the clavicle, as it helps eliminate vitiated doshas and restore normal nasal function.

Contemporary management of CRS primarily involves antibiotics, antihistamines and corticosteroid nasal sprays which provide symptomatic relief but may be associated with recurrence and adverse effects on prolonged use. Hence, there is a growing need for safe and effective alternative therapeutic approaches. Classical Ayurvedic texts recommend Kalingadi Avapeedana Nasya in the management of Kaphaja Prathishyaya. Based on this reference, Kalingadi Arka was adapted into a nasal spray formulation to improve patient compliance and therapeutic applicability. The formulation possesses Kapha-Vatahara, Shothahara and Lekhana properties which may help reduce mucosal congestion, liquefy accumulated Kapha and facilitate drainage of nasal secretions. Therefore, the present study was undertaken to evaluate the efficacy of Kalingadi Arka nasal spray in the management of Kaphaja Prathishyaya (Chronic Rhinosinusitis).

2. MATERIAL AND METHODS

METHOD OF COLLECTION OF DATA

STUDY DESIGN: Open label controlled interventional clinical study.

Screening the patients: Screening form which contains the Questionnaire to fulfil the inclusion and exclusion criteria and symptoms of kaphaja Prathishyaya (chronic rhinosinusitis) was filled by principal investigator.

Sampling technique: Convenience Sampling.

Sample size: It was a comparative clinical study where in 40 subjects diagnosed as Kaphaja Prathishyaya (chronic rhinosinusitis) was randomly assigned into two groups i.e., Group A (Control Group) and Group

B (Trial Group), each comprised of 20 patients.

SCREENING THE PATIENTS: Screening form which contained the Questionnaire to fulfill the inclusion and exclusion criteria and symptoms of Kaphaja Prathishyaya (chronic rhinosinusitis) was filled by principal investigator.

DIAGNOSTIC CRITERIA:

1. Patient presenting with the clinical features of Kaphaja Prathishyaya
2. Patient presenting clinical symptoms of Chronic rhinosinusitis
3. Sino nasal outcome test 22(SNOT-22)
4. X-ray PNS-water's view (confirming Chronic rhinosinusitis)

ELIGIBILIGY CRITERIA: ICD-11-MMS CODE CA00–CB7Z

INCLUSION CRITERIA:

1. Patients with clinical features of Kaphaja Prathishyaya (chronic rhinosinusitis)
2. Subjects fit for Nasya karma
3. Patient of either sex, with age group between 20-40 years
4. Patients with chronicity less than 5year

EXCLUSION CRITERIA:

1. Patients with any other systemic disorders (like TB, HIV, Retro positive diabetes, Hypertension and Thyroid.) that may interfere the course of treatment
2. Any associated conditions like migraine headache, referred pain from dental pathology was excluded
3. Patients with nasal polyps along with rhinosinusitis was not considered for the study
4. Patients suffering from Chronic Simple Rhinitis associated with tonsillitis, adenoids
5. Patients of gross DNS being the reason for nasal blockage

INTERVENTION:

Group A- Control group - Sample Size: 20	
Kalingadi taila Nasya	Nasya done for 7 days (8 drops of taila to each nostril)
Duration of study	15days
Assessment	• 0^{th} day diagnosis (before treatment) • 8^{th} day assessment (after treatment) • 15^{th} day 1st Follow up
Drugs	Kalinga, Hingu, Maricha, Laksha, Tulasi, Katphala, Kushta, Vacha, Shigru, Vidanga, Sarshapa taila, Gomutra, Water

Group B- Trial group- Sample Size: 20	
Kalingadi Arka nasal spray	3 puffs of Kalingadi Arka nasal spray to each nostril thrice daily (every 6^{th} hour)
Duration of study	15 days
Assessment	• 0^{th} day diagnosis (before treatment) • 8^{th} day assessment (after treatment) • 15^{th} day 1st Follow up
Drugs	Kalinga, Hingu, Maricha, Laksha, Tulasi, Katphala Kushta, Vacha, Shigru, Vidanga, Water

ASSESSMENT SCHEDULE

1st assessment	Before treatment	DAY 0	Diagnosis, Screening
2nd assessment	After Treatment	DAY 8	All the subjective & Objective parameters considered Assessment
3rd assessment	After Follow-Up	DAY 15	All the subjective & Objective parameters considered Assessment

STATISTICAL METHODS:

ASSESSMENT CRITERIA- GRADATION INDEX

Sl	Lakshanas	Grade 0	Grade 1	Grade 2	Grade 3
1	**Nasa srava**	No discharge	Mild-Occasional discharge on blowing the nose	Moderate- Occasional discharge but needs clearing of the nose	Severe- frequent discharge which needs clearing of the nose continuously
2	**Nasa prathistabda**	No obstruction	Mild- Obstruction felt once a while	Moderate- Obstruction felt frequently, relieves on clearing the nasal passage	Severe- Continuous obstruction, no relief even on clearing the nasal passage
3	**Mukhashiro guruthva**	No heaviness	Mild- Heaviness felt only on forward bending	Moderate- Heaviness felt on forward and on lateral bending	Severe- Heaviness felt on any movements
4	**Shirashoola**	Absent	Mild- mild intensity, does not disturb the routine work	Moderate- moderate intensity, which disturbs routine work	Severe- severe intensity, not able to perform routine work
5	**Nasanaha**	Absent	Mild- ≤ ¼ th of Nasal cavity	Moderate - > ¼ th or ≤ ½ of Nasal cavity	Severe - > ½ of the Nasal cavity
6	**Gala, Oshta, Talu kanduyana**	No itching	Mild- Occasional itching, which is negligible	Moderate- Frequent itching, which relieves on scratching	Severe- Continuous itching, no relief on scratching
7	**Aruchi**	Absent	Present		

Withdrawal Criteria:

The participants were withdrawn from the study if there was any major ailment necessitating the institution of new modalities of treatment. The decision to withdraw a participant from the trial was taken by the PG Scholar with proper justification and formal information to the guide and the Ethics Committee within two working days.

Dropouts: No dropouts were recorded during the clinical study.

Drug Compliance:

If there was more than or equal to 80% compliance, the participant was continued in the study. The

compliance was assessed after treatment by structured interaction and Therapeutic drug monitoring where patient was instructed to carry the containers to assess the approximate quantity of Arka nasal spray utilized during the study period.

Recording and Reporting of ADR:

No ADR was reported during the clinical study

Consent form:

Consent form was signed by each patient with their witness. An informed consent form was maintained for the study.

Confidentiality of data:

The personal data of the patient and the data related to the outcome will be kept confidential and the primary data will be stored in a separate file, protected with password for a period of 5 years.

OBSERVATIONS

Sl no	Demographic data	Percentage
1	Age	20-30: 25%, 31-40: 85%
2	Gender	Female: 55%, Male: 45%
3	Religion	92.5% subjects were Hindu
4	Occupation	Prevalence of IT professionals and House wives were more i.e. 47.5% and 20% respectively
5	Education	Prevalence of graduates and undergraduates were more i.e. 62.5% and 22.5% respectively
6	Marital status	Married: 55%, Unmarried: 45%
7	Economic status	Middle class: 72.5%
8	Family history	60% of subjects had Negative family history
9	Diet	80% of subjects had mixed diet
10	Prakruti	60% of subjects had vata-kapha Prakruti
11	Pramana	87.5% of subjects had Madhyama Pramana
12	Sara	95 % subjects had Madhyama sara
13	Samhanana	All the subjects had Madhyama Samhanana
14	Satva	80% had Madhyama Sharirika Satva, 55% had Madhyama Manasika Satva
15	Sathmya	80% of subjects had Madhyama Sathmya
16	Abhyavarana shakthi	90% of subjects had Madhyama shakti

17	Jarana shakthi	90% of subjects had Madhyama shakti
18	Vyayama shakthi	85% of subjects had Madhyama shakti

RESULTS:

1. NASASRAVA

Effect of Treatment on Nasasrava within Group A

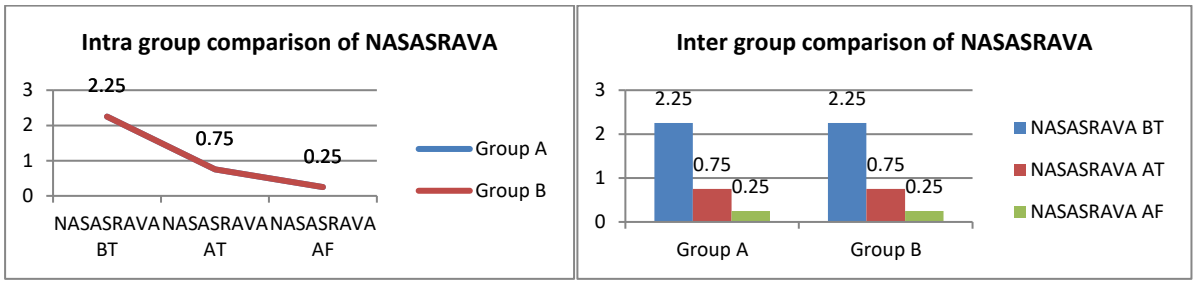
Ass	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	2.25	0.550	1	3	2.00	3.00	37.143	0.000**
AT	20	0.75	0.444	0	1	1.00	1.75		
AF	20	0.25	0.444	0	1	0.00	1.25		

Effect of Treatment on Nasasrava within Group B

Ass	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	2.25	0.444	2	3	2.00	3.00	37.143	0.000**
AT	20	0.75	0.444	0	1	1.00	1.75		
AF	20	0.25	0.444	0	1	0.00	1.25		

	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	2.25	0.550	20.63	412.5	2	197.500	-0.085	0.932#
	2	20	2.25	0.444	20.38	407.5	2			
AT	1	20	0.75	0.444	20.5	410	1	200.000	0.000	1.000#
	2	20	0.75	0.444	20.5	410	1			
AF	1	20	0.25	0.444	20.5	410	0	200.000	0.000	1.000#
	2	20	0.25	0.444	20.5	410	0			

Inter group comparison of Nasasrava



2. NASA PRATISTABDA

Effect of Treatment on Nasa Pratistabda within Group A

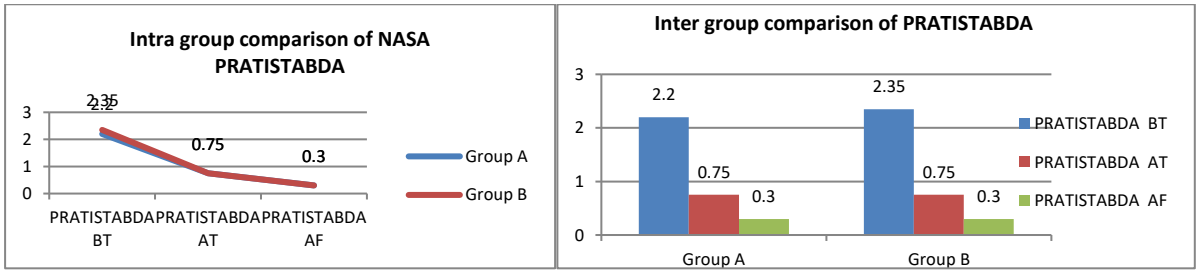
	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	2.20	0.410	2	3	2.00	3.00	37.130	0.000**
AT	20	0.75	0.444	0	1	1.00	1.73		
AF	20	0.30	0.470	0	1	0.00	1.28		

Effect of Treatment on Nasa Pratistabda within Group B

	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	2.35	0.489	2	3	2.00	3.00	37.130	0.000**
AT	20	0.75	0.444	0	1	1.00	1.73		
AF	20	0.30	0.470	0	1	0.00	1.28		

Effect of Treatment on Nasa Pratistabda between Group A & Group B

	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	2.20	0.410	19	380	2	170.000	-1.049	0.294#
	2	20	2.35	0.489	22	440	2			
AT	1	20	0.75	0.444	20.5	410	1	200.000	0.000	1.000#
	2	20	0.75	0.444	20.5	410	1			
AF	1	20	0.30	0.470	20.5	410	0	200.000	0.000	1.000#
	2	20	0.30	0.470	20.5	410	0			



3. MUKHA SHIRO GURUTVAM

Table no.60: Effect of Treatment on Mukha Shiro Gurutvam within Group A

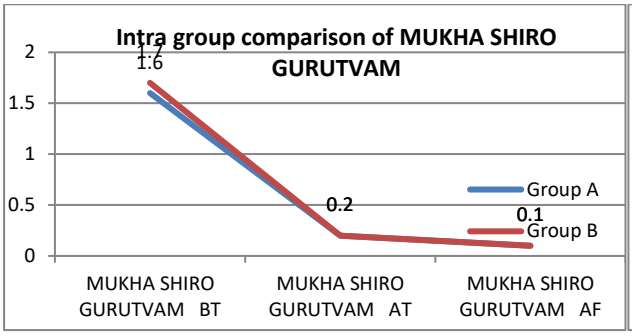
	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	1.60	0.598	1	3	2.00	3.00	38.839	0.000**
AT	20	0.20	0.410	0	1	0.00	1.55		
AF	20	0.10	0.308	0	1	0.00	1.45		

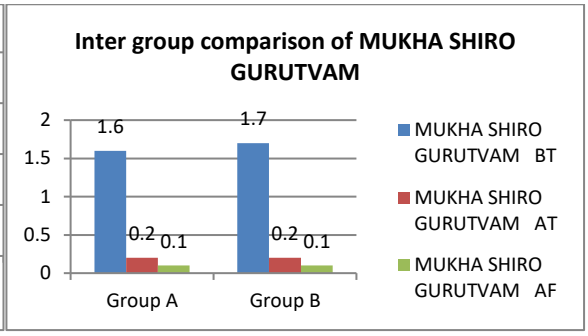
Table no.61: Effect of Treatment on Mukha Shiro Gurutvam within Group B

	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	2.25	0.444	2	3	2.00	3.00	37.143	0.000**
AT	20	0.75	0.444	0	1	1.00	1.75		
AF	20	0.25	0.444	0	1	0.00	1.25		

Effect of Treatment on Mukha Shiro Gurutvam between Group A & Group B

	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	1.50	0.513	20.25	405	1.5	195.000	-0.154	0.877#
	2	20	1.55	0.605	20.75	415	1.5			
AT	1	20	0.15	0.366	20.5	410	0	200.000	0.000	1.000#
	2	20	0.15	0.366	20.5	410	0			
AF	1	20	0.10	0.308	20.5	410	0	200.000	0.000	1.000#
	2	1	20	0.10	0.308	20.5	410			





4. SHIRASHOOLA

Effect of Treatment on Shirashoola within Group A

	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	1.50	0.513	1	2	1.50	3.00	39.377	0.000**
AT	20	0.15	0.366	0	1	0.00	1.53		
AF	20	0.10	0.308	0	1	0.00	1.48		

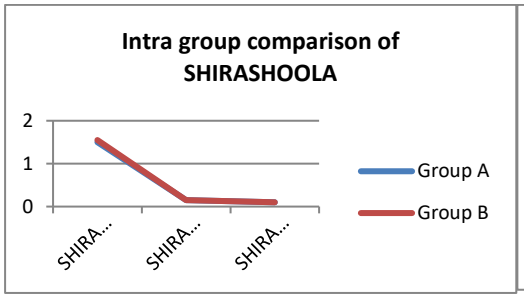
Effect of Treatment on Shirashoola within Group B

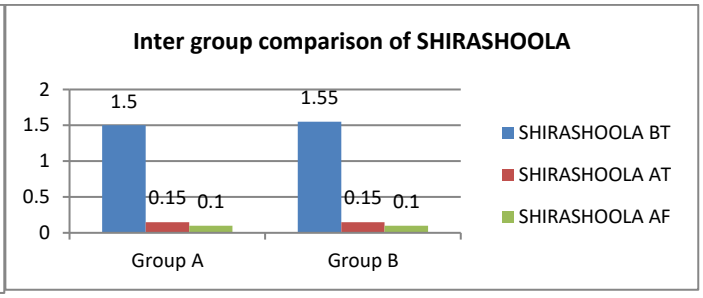
	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	2.25	0.444	2	3	2.00	3.00	37.143	0.000**
AT	20	0.75	0.444	0	1	1.00	1.75		
AF	20	0.25	0.444	0	1	0.00	1.25		

Effect of Treatment on Shirashoola between Group A & Group B

	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	1.60	0.598	19.75	395	2	185.000	-0.454	0.650#
	2	20	1.70	0.657	21.25	425	2			

AT	1	20	0.20	0.410	20.5	410	0	200.000	0.000	1.000#
	2	20	0.20	0.410	20.5	410	0			
AF	1	20	0.10	0.308	20.5	410	0	200.000	0.000	1.000#
	2	20	0.10	0.308	20.5	410	0			





5. NASANAHA

Effect of Treatment on Nasanaha within Group A

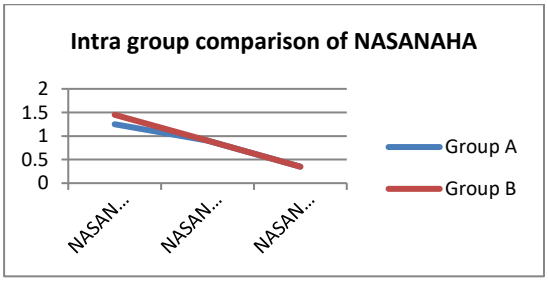
	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	1.25	.639	0	2	1.00	2.60	26.462	0.000**
AT	20	0.90	.447	0	2	1.00	2.10		
AF	20	0.35	.489	0	1	0.00	1.30		

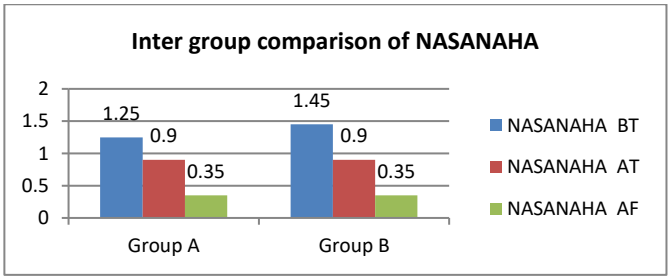
Effect of Treatment on Nasanaha within Group B

	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	1.45	0.826	0	3	1.00	2.65	27.111	0.000**
AT	20	0.90	0.447	0	2	1.00	2.05		
AF	20	0.35	0.489	0	1	0.00	1.30		

Effect of Treatment on Nasanaha between Group A & Group B

	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	1.25	0.639	19.25	385	1	175.000	-0.742	0.458#
	2	20	1.45	0.826	21.75	435	1			
AT	1	20	0.90	0.447	20.5	410	1	200.000	0.000	1.000#
	2	20	0.90	0.447	20.5	410	1			
AF	1	20	0.35	0.489	20.5	410	0	200.000	0.000	1.000#
	2	20	0.35	0.489	20.5	410	0			





6. GALA, OSHTA, TALU KANDUYANA

Effect of Treatment on Gala, Oshta, Talu kanduyana within Group A

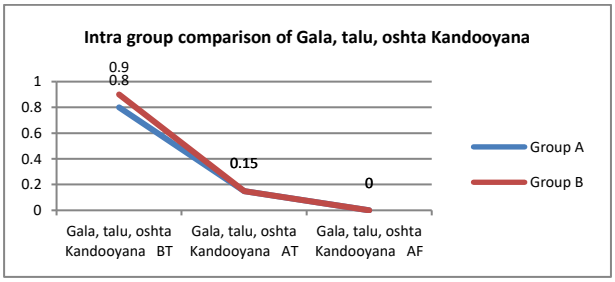
	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	0.80	0.768	0	2	1.00	2.58	21.526	0.000**
AT	20	0.15	0.366	0	1	0.00	1.80		
AF	20	0.00	0.000	0	0	0.00	1.63		

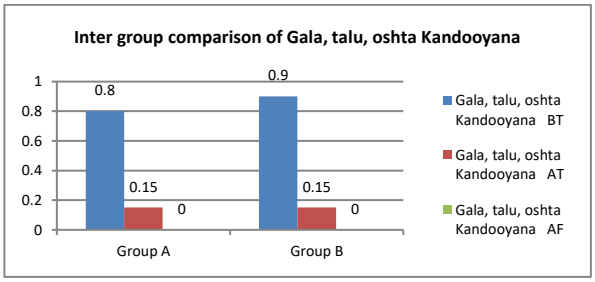
Effect of Treatment on Gala, Oshta, Talu kanduyana within Group B

	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	0.90	0.788	0	2	1.00	2.63	23.463	0.000**
AT	20	0.15	0.366	0	1	0.00	1.78		
AF	20	0.00	0.000	0	0	0.00	1.60		

Effect of Treatment on Gala, Oshta, Talu kanduyana between Group A & Group B

	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	0.80	0.768	19.8	396	1	186.000	-0.405	0.685#
	2	20	0.90	0.788	21.2	424	1			
AT	1	20	0.15	0.366	20.5	410	0	200.000	0.000	1.000#
	2	20	0.15	0.366	20.5	410	0			
AF	1	20	0.00	0.000[a]	20.5	410	0	200.000	0.000	1.000#
	2	20	0.00	0.000[a]	20.5	410	0			





7. ARUCHI

Effect of Treatment on Aruchi within Group A

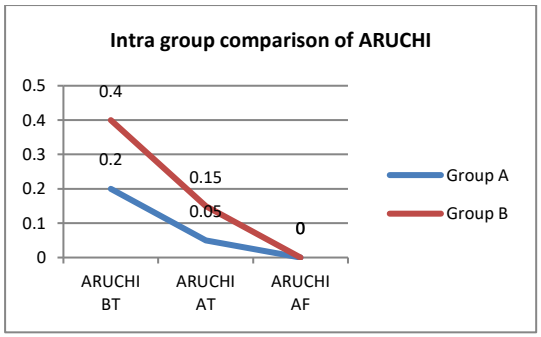
	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	0.20	0.410	0	1	0.00	2.18	6.500	0.039*
AT	20	0.05	0.224	0	1	0.00	1.95		
AF	20	0.00	0.000	0	0	0.00	1.88		

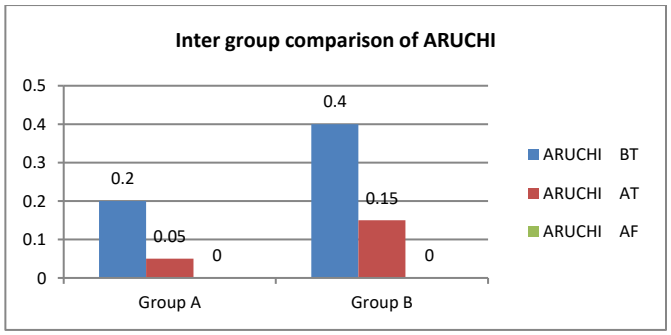
Effect of Treatment on Aruchi within Group B

	N	Mean	Std. Deviation	Minimum	Maximum	Median	Mean rank	Chi-Square value	p value of Friedman Test
BT	20	0.40	0.503	0	1	0.00	2.33	12.250	0.002**
AT	20	0.15	0.366	0	1	0.00	1.95		
AF	20	0.00	0.000	0	0	0.00	1.73		

Effect of Treatment on Aruchi between Group A & Group B

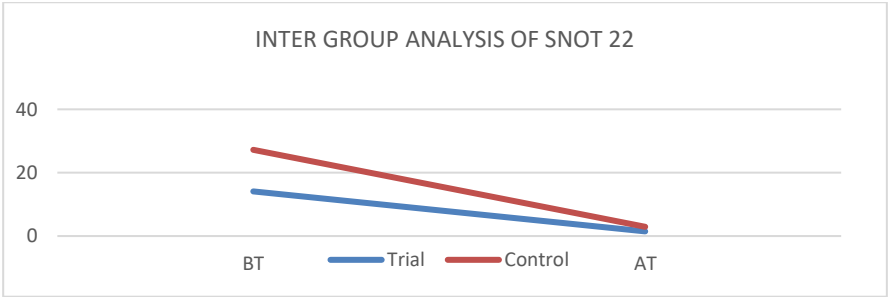
	Group	N	Mean	Std. Deviation	Mean Rank	Sum of Ranks	Median	Mann-Whitney U value	Z value	p value of Mann-Whitney U test
BT	1	20	0.20	0.410	18.5	370	0	160.000	-1.363	0.173#
	2	20	0.40	0.503	22.5	450	0			
AT	1	20	0.05	0.224	19.5	390	0	180.000	-1.041	0.298#
	2	20	0.15	0.366	21.5	430	0			
AF	1	20	0.00	0.000	20.5	410	0	200.000	0.000	1.000#
	2	20	0.00	0.000	20.5	410	0			





SNOT 22: Mean score of SNOT

Groups	AT	BT	Within the group comparison (BT-AT) Wilcoxon signed rank test
Group 1	14.09±4.482(14.00)	1.47 ± 3.090(0.00)	Z = 4.942, p = 0.000
Group 2	13.15±3.318(13.00)	1.45 ± 2.59(0.00)	Z = 5.024, p = 0.000
Between the group comparison	Z = 0.851, p = 0.395	Z = 0.691, p = 0.49	



Analysis of effect of treatment

It was observed that there was no statistically significant difference at baseline and after treatment (p >

0.05). The statistical significance of change in the mean score of SNOT within each group was assessed by Wilcoxson Signed Rank test. In both groups, a highly significant difference was observed between BT (day 0) and AT (at 8th day) as $p < 0.05$.

DISCUSSION:

Selection of the Problem:

Kaphaja Pratishyaya corresponds to Chronic Rhinosinusitis, a chronic inflammatory disorder affecting nearly **10–15%** of the global population. Increasing urbanization, air pollution, allergens and lifestyle changes contribute significantly to its rising incidence. Despite modern management with antibiotics, corticosteroids and surgery, recurrence and long-term dissatisfaction remain common. Ayurveda advocates Nasya therapy for Urdhwajatrugata disorders, which helps clear Srotorodha and pacify Kapha. However, classical Nasya procedures require preparatory steps and clinical supervision. Hence, developing a nasal spray based on Ayurvedic principles provides a convenient, patient-friendly and self-administrable alternative while maintaining therapeutic efficacy.

Disease Perspective:

Pratishyaya initially presents as a manageable condition but may progress to chronic disease if improperly treated. Classical texts describe etiological factors such as exposure to cold, dust, allergens, Viruddhahara, suppression of natural urges and head injury. From a modern perspective, Chronic Rhinosinusitis is a multifactorial inflammatory disorder involving impaired mucociliary clearance, microbial persistence, environmental exposure and immune dysregulation. The chronic nature of the disease significantly affects daily activity, productivity and quality of life. Therefore, management should aim at Kapha-shamana, reduction of inflammation, enhancement of immunity and restoration of normal nasal physiology.

Selection of Drug:

The trial drug Kalingadi Arka was selected considering the Kapha-dominant pathology of Kaphaja Pratishyaya. The formulation contains drugs such as Kalinga, Maricha, Hingu, Tulasi, Vidanga, Kushta, Shigru, Vacha and Katphala, which possess Kaphahara, Shothahara, Krimighna and Vedanasthapana properties. These actions help liquefy thick nasal secretions, reduce mucosal edema, control microbial colonization and relieve headache. The Arka preparation method extracts volatile active principles, ensuring rapid absorption and quick therapeutic action. In addition, the nasal spray format improves drug distribution, patient compliance, ease of administration and therapeutic acceptability, making it suitable for modern clinical practice.

Mode of Action:

According to Ayurvedic principles, the nose is considered the gateway to the head. Drugs administered through the nasal route reach the Shringataka marma and spread to the supraclavicular region through various channels, thereby removing vitiated doshas from the head region. Intranasal drug delivery also has physiological significance in modern medicine because the olfactory region provides a direct interface between the external environment and the central nervous system. The ingredients of Kalingadi Arka predominantly possess Katu rasa, Ushna virya and Tikshna guna, facilitating Srotoshodhana and Kapha-shamana. These actions promote liquefaction and drainage of accumulated secretions, reduce inflammation and enhance mucosal immunity, thereby improving nasal patency and relieving symptoms.

Analytical Study:

Organoleptic evaluation of the formulation revealed a clear, colorless and pleasant preparation with acrid taste, indicating proper distillation and acceptable sensory characteristics. Physicochemical parameters

such as specific gravity (0.9630), refractive index (1.33157), pH (6.54) and viscosity (1.12) confirmed pharmaceutical stability and suitability for intranasal administration. High Performance Thin Layer Chromatography (HPTLC) analysis demonstrated distinct bands at Rf values 0.67, 0.68 and 0.87, indicating the presence of multiple phytoconstituents such as flavonoids, volatile oils and phenolic compounds. These findings support the quality, authenticity and standardization of the formulation.

Clinical Observations:

Most patients belonged to the 31–40 years age group, indicating higher exposure to environmental allergens and occupational stress. A slightly higher prevalence was observed among females. Many participants were IT professionals and housewives, suggesting the role of indoor pollution, dust and air-conditioned environments. The majority of patients exhibited Vata-Kapha prakriti and Madhyama bala parameters such as Sara, Samhanana and Satva. Dietary habits revealed a predominance of non-vegetarian diet, which may influence inflammatory responses. These observations highlight the multifactorial nature of the disease involving environmental, dietary and constitutional factors.

Discussion on Results:

Both the trial and control groups demonstrated improvement in major symptoms such as Nasasrava, nasa pratistabda, Nasanaha, shirashoola and mukha-shiro-gurutva, although the intergroup comparison showed statistically non-significant differences ($p > 0.05$). The observed improvement can be attributed to the Kapha-shamaka and Shothahara actions of the formulations, which help liquefy secretions, reduce mucosal inflammation and restore nasal patency. Nasal spray administration ensures uniform distribution of the drug over the mucosal surface, enhancing bioavailability and therapeutic efficacy. The lipid medium in Nasya therapy facilitates deeper penetration and sustained action. Improvement in SNOT-22 scores within both groups indicates significant symptomatic relief and improved quality of life.

Limitations of the Study

1. For generalization and standardization of the Arka nasal spray, a study on large sample group should be done, to evaluate the efficacy.
2. In the present study only one follow-up was done since chronic rhinosinusitis can reoccur on exposure to triggering factors and needs a long duration to understand long-term effectiveness.
3. Objective measurements like Rhinomanometry would have been more efficient as this study is based on all subjective measures, which is influenced by individual perceptions.
4. in the present study blinding technique was not adopted

Recommendations for Further Study

1. The present study design can be further strengthened by conducting prospective clinical trials with a larger sample size to enhance the reliability and generalizability of the findings.
2. Incorporation of Rasayana drugs following Nasya therapy and spray therapy may be explored as an adjunct approach, with the objective of improving systemic immunity and thereby reducing disease recurrence.
3. Repeated courses of Kalingadi Arka nasal spray may be recommended in patients with recurrent manifestations, to assess its long-term efficacy and preventive potential.
4. The role of Kalingadi Arka nasal spray with other suitable Kaphahara drugs may be studied as a preventive strategy, with emphasis on its utility in minimizing recurrence and maintaining nasal health.

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