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A comparative Clinical study of nasal (Nasya Karma) and oral administration of Brahmi Ghrita in healthy volunteers.

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Abstract:

Background: In the present era, a boom in the Alternative and Complementary systems of medicine has led to deep introspection of their utility based on scientific validation. Hence it is the need of the hour to establish a firm scientific basis for classical Panchakarma treatments. Nasya Karma is an important Panchakarma therapy. The nose is the doorway to the brain and it is also the doorway to consciousness. In Nasya Karma an excess of bodily humors accumulated in the sinus, throat, nose or head areas is eliminated by means of the nearest possible opening, the nose. Also Medhya (cognitive) drugs are most commonly used by this route in practice.

Aim: This study was planned to prove the effect of Nasya of Brahmi Ghrita on memory enhancing in healthy volunteers. **Materials and Methods:** Total 101 healthy volunteers were registered and randomly divided into 3 groups. In Group A (Brahmi Ghrita Nasya) 33 healthy volunteers were completed the treatment. In Group B (Brahmi Ghrita Snehapana) 34 healthy volunteers were completed the treatment and In Group C (cow ghee Nasya) 33 healthy volunteers were completed the treatment. Observation regarding the demographic data of the healthy volunteers and assessment was done by PGI memory Scale after Nasya & Snehapana. **Conclusion:** Brahmi Ghrita Nasya, Brahmi Ghrita Snehapana and Cow ghee Nasya are all effective in memory enhancement and cognitive enhancement in the healthy volunteers. Comparatively, Brahmi Ghrita Nasya is more effective in memory enhancement and cognitive enhancement as compared to other therapies under trial.

Key words: Brahmi Ghrita, Nasya, Memory enhancement, cognitive enhancement

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INTRODUCTION:

Nowadays many modern drugs have better systemic bioavailability through nasal route as compared to oral or systemic administration. Many researches show that there is better absorption of drug in CSF through nasal route than any other route.¹ Orally administered drugs significantly degraded in the gastrointestinal tract or considerably metabolized by first pass effect in the liver.² Intranasal drug delivery offers a promising alternative route for administration of such drugs. Nasal drug delivery system is also suitable for restricting and obstacles blood brain barrier so that drug can be delivered in the biophase of CNS. Intranasal route for therapeutic purposes arises from the anatomical, physiological and histological characteristics of the nasal cavity, which provides rapid systemic drug absorption and quick onset of action.

Intranasal therapy has been an accepted form of treatment in the Ayurvedic system of Indian medicine, in Ayurveda special procedure called Nasya has been mentioned. The *Acharyas* have also said “*Nasa Hi Shiraso Dvaram*”.³ Because nose is indirectly connected with the brain centers in the head. This indicates there is a very close relationship between the nose and Brain.

Acharya Charaka has mentioned one specific anatomical structure named *Munja*, which is like type of grass which acts like *Ishika* (i.e., like a painter’s brush). The *Munja* structure can be thought for an olfactory bulb and the *Ishika* for the numerous neurons join together to form the olfactory tract.⁴ During this explanation, classics have mentioned one more structure; the *Shringataka Marma* (anatomical area) where there is an association of *Ghrana* (nasal), *Akshi* (visual), *Shrotra* (auditory), and *Jiwha* (lingual) *Siras* (nerves and vessels) are present.⁵ *Acharya Charaka* says the *Sneha Pradhana Navana* drug (lipid processed herbal drug), gets absorbed in the *Shringataka* region. That means lipid soluble drugs are much more efficiently absorbed by nasal mucosa. *Nasya Karma* is used both to manage the local and general disorders. The aim of this study was to explore the mode of action of *Brahmi Ghrita Nasya* and to prove the effect of *Nasya* of *Brahmi Ghrita* on memory enhancing in healthy volunteers

Aims & Objectives

1. To evaluate the efficacy of nasal (*Nasya*) and oral administration of *Brahmi Ghrita* as memory enhancer and cognitive enhancer in healthy volunteers.

2.To compare the effects of Brahmi Ghrita when administrated nasally (Nasya) and orally.

Materials and methods: Total 101 healthy volunteers were registered and randomly divided into 3 groups. In Group A (Brahmi Ghrita Nasya) 33 healthy volunteers were completed the treatment. In Group B (Brahmi Ghrita Snehapana) 34 healthy volunteers were completed the treatment and In Group C (cow ghee Nasya) 33 healthy volunteers were completed the treatment and 1 healthy volunteers left before completion of treatment. The dose of Nasya was 16 Bindu (8 ml) in each nostril once in the morning for a period of 7 days. Three sittings of nasya were carried out in each patient with an interval of 7 days (total duration 35 days) same dose and duration was use for Snehapana. Observation regarding the demographic data of the healthy volunteers and assessment was done by PGI memory Scale⁶ after Nasya & Snehapana.

Criteria for Selection of the Volunteers

- Healthy Volunteers between age group of 20 years to 60 years were selected.

Exclusion Criteria:

- Healthy Volunteer having age less than 20 years & above 60 years.

- Classical *Nasya Karma Ayogya* and *Abhyantar Snehapana Ayogya* volunteers. Diabetes, any cardiovascular diseases, renal diseases or any other disease effecting multiple body systems and pregnant women.

CLINICAL OBSERVATIONS AND RESULTS

Among observations it was found that, maximum healthy volunteers i.e. 54.45 % were from the age group 20-30, 70.29 % healthy volunteers belonged to middle class, 63.73 % healthy volunteers were observed as vegetarian and 36.63% healthy volunteers were taking both veg. and non-veg. food. The dominance of Rasa in the diet of the healthy volunteers was sweet i.e. 95.04 %. 67.32% healthy volunteer's diet timing was regular. 90.09% healthy volunteers were having Sitting nature of work. 18.81% healthy volunteers were having most of the standing work. 89.11 % were taking sound sleep. Maximum numbers of healthy volunteers of this study i.e. 66.33 % were of Madhyam Koshtha. 46.53 % healthy volunteers were of Kapha-Vata Prakriti, 70.29 % healthy volunteers were of Rajas tama Prakriti, 69.3% of healthy volunteers were having Samagni and 86.14 % healthy volunteers were having Madhyama Vyayam Shakti (table 1-34).

Observation of Samyak Lakshans of Nasya karma

In Group A maximum 87.88% healthy volunteers in 1st sitting treated with Brahmi Ghrita Nasya experienced Urolaghuta (Feeling of lightness in chest) on second and third day however in Group C maximum 100 % healthy volunteers in 1st sitting treated with Cow ghee Nasya experienced Urolaghuta on first and second day. In Group A maximum 81.81 % healthy volunteers in 1st sitting treated with Brahmi Ghrita Nasya experienced Shirolaghuta (Feeling of lightness in head) on second and third day however In Group C maximum 96.96 % healthy volunteers in 1st sitting treated with Cow ghee Nasya experienced Shirolaghuta on second and third day. In Group A maximum 69.39 % healthy volunteers in 1st sitting treated with Brahmi Ghrita Nasya experienced Netralaghuta (Feeling of lightness in eyes) on second and third day however in Group C maximum 84.84 % healthy volunteers in 1st sitting treated with Cow ghee Nasya experienced Netralaghuta on second day. Srotovishuddhi (cleansing of channels) symptoms appear more frequently in all sittings of Brahmi Ghrita Nasya than Cow ghee Nasya group. Svaravishuddhi

(sweetness of vice) was found more on 4th, 5th and 6th day of Nasya in third sitting (Table 39). Sweetness in vice was experience more by Cow ghee Nasya group but symptoms lasted longer in Brahmi Ghrita Nasya group. Vaktravishuddhi (cleansing of mouth) symptom was also found more frequently in Brahmi Ghrita Nasya than Cow ghee Nasya group (Netratejavridhhi (improvement in eyesight) was observed mostly on 6th and 7th day of Nasya in both group. Indriyaprasad (sensorial happiness) and Chittaprasada (mind happiness) symptom was more oftenly seen. In both groups maximum volunteers experience Chittaprasada 5th, 6th and 7th day of Nasya Vikaropshama (Improvement in disease condition/better feeling) was mostly found on 6th and 7th days Nasya Svapnaprabodhana (good sleep and awakening) was experience by 100 % healthy volunteers in 1st sitting treated with Brahmi Ghrita on sixth and seventh day in 2nd sitting on fifth, sixth and seventh day and in 3rd sitting on fourth, fifth, sixth and seventh day. In Group C 100 % healthy volunteers in 1st sitting treated with Cow ghee Nasya experienced Svapnaprabodhana on sixth and seventh day, In 2nd sitting on fifth, sixth and

seventh day and in 3rd sitting on sixth day. In Group A maximum 9.09 % healthy volunteers in 1st sitting treated with Brahmi Ghrita Nasya observed Atiyoga lakashana on fourth day and 6.06 % on sixth day. 3.03% healthy volunteers in 2nd sitting observed Atiyoga lakashana on first, third and fourth day and 9.09% on seventh day. 3.03 % healthy

volunteers in 3rd sitting observed Atiyoga lakashana on sixth day. In Group C 3.03% healthy volunteers in 1st sitting and in 3rd sitting treated with Cow ghee Nasya observed Atiyoga lakashana on sixth day and in 2nd sitting 6.06% on 7th day.

Effect of therapy on PGI (Post Graduate Institute) Memory Scale

Table no. 1 Effect of therapy on remote memory

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	6.03	6.82	0.84	14.14	231	21	<0.001
B (n=34)	5.88	6.38	0.5	8.5	142	20	<0.01
C (n=33)	6.03	6.87	0.84	14.07	237	22	<0.001

Table no. 2 Effect of therapy on recent memory

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	5	5	-	-	-	-	-
B (n=34)	4.97	5	0.29	-	-	-	-
C (n=33)	5	5	-	-	-	-	-

Table no. 3 Effect of therapy on mental balance

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	5.72	6.69	0.96	16.93	396	30	<0.001
B (n=34)	6.38	7.66	0.62	9.67	237	27	<0.001
C (n=33)	6.38	7.66	1.03	17.25	410	29	<0.001

Table no. 4 Effect of therapy on attention and concentration

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	7.6	9.76	2.12	28.28	465	30	<0.001
B (n=34)	7.88	9.56	1.68	21.26	496	31	<0.001
C (n=33)	7.24	8.51	1.27	17.57	473	31	<0.001

Table no. 5 Effect of therapy on delayed recall

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	6.81	8.79	1.97	28.88	528	32	<0.001
B (n=34)	8.03	9.67	1.29	15.43	406	28	<0.001
C (n=33)	8.03	9.06	1.03	12.83	406	28	<0.001

Table no. 6 Effect of therapy on immediate recall

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	6.52	9.09	2.57	39.53	528	32	<0.001
B (n=34)	7.32	9.23	1.91	26.10	528	32	<0.001
C (n=33)	7.45	8.78	1.33	17.88	442	30	<0.001

Table no. 7 Effect of therapy on retention for similar pairs

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	4.81	5.21	0.39	8.17	36	8	<0.01
B (n=34)	4.82	4.97	0.14	3.04	10	4	<0.05
C (n=33)	4.85	5	0.15	3.13	-	-	-

Table no. 8 Effect of therapy on retention for dissimilar pairs

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	5.6	8.12	2.51	44.86	520	33	<0.001
B (n=34)	6.47	8.64	2.18	33.63	528	32	<0.001
C (n=33)	6.27	8.36	2.09	33.33	528	32	<0.001

Table no. 9 Effect of therapy on visual retention

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	7.69	9.57	1.879	24.4	528	32	<0.001
B (n=34)	8.32	9.44	1.18	13.42	441	30	<0.001
C (n=33)	8.21	9.39	1.18	14.39	496	31	<0.001

Table no. 10 Effect of therapy on recognition.

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	8.57	9.93	1.36	15.9	325	25	<0.001
B (n=34)	9.18	9.94	0.76	6.33	153	17	<0.001

C (n=33)	8.82	9.64	0.82	9.27	325	25	<0.001
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Table no. 11 Effect of therapy on total score of PGI memory scale.

Groups	Mean B.T.	Mean A.T	Mean Diff.	% Change	'W'	'N'	'P'
A (n=33)	64.36	79.03	14.67	22.78	561	33	<0.001
B (n=34)	69.61	79.85	10.23	14.70	595	34	<0.001
C (n=33)	67.87	77.63	9.75	14.37	561	33	<0.001

Table no. 12 Comparison of effect of therapies on pgi memory scale in 100 healthy volunteers.

PGI Memory Scale	ANOVA	P	Comparison between groups (DUNN'S TEST)	Mean Diff of ranks	p
Recent Memory ⁷	2.941	>0.05	A-B	-	-
			A-C	-	-
			B-C	-	-
Mental Balance ⁸	4.113	>0.05	A-B	-	-
			A-C	-	-
			B-C	-	-
Remote Memory ⁹	2.868	>0.05	A-B	-	-
			A-C	-	-
			B-C	-	-
Attention and Concentration ¹⁰	8.201	<0.05	A-B	10.988	>0.05
			A-C	19.212	<0.05
			B-C	8.225	>0.05
Delayed Recall ¹¹	13.864	<0.001	A-B	17.059	<0.05
			A-C	23.333	<0.001
			B-C	6.275	>0.05
Immediate Recall ¹²	11.449	<0.01	A-B	6.338	>0.05
			A-C	22.258	<0.01
			B-C	15.919	>0.05
Retention of Similar pairs ¹³	2.084	>0.05	A-B	-	-
			A-C	-	-
			B-C	-	-
Retention of Dissimilar pairs ¹⁴	1.290	<0.05	A-B		>0.05
			A-C		<0.05
			B-C		>0.05
Visual Retention ¹⁵	12.929	<0.01	A-B	20.603	<0.01

			A-C	18.212	<0.05
			B-C	-2.391	>0.05
Recognition ¹⁶	7.078	<0.05	A-B	17.185	<0.05
			A-C	12.00	>0.05
			B-C	-5.185	>0.05
Total Score of PGI Memory scale	18.54	<0.001	A-B	23.195	<0.01
			A-C	29.151	<0.001
			B-C	5.96	>0.05

Effect of the therapy on Remote memory was found almost negligible however 14.14 % improvement was found in remote memory in group A, in Recent memory no change was found in treatment groups because all the volunteers got the full score before and after treatment. So, there was no chance at all for improvement. While assessing 16.93 % improvement was found in mental balance in group A, 9.67 % in group B and 17.25 % in group C. Maximum 28.28 % improvement was found in attention and concentration in group A, 21.26 % in group B and 17.57 % in group C. Statistically highly significant results $P<0.001$ were found in attention and concentration in all treatment groups. Statistically highly significant results $P<0.001$ were found in delayed recall in all treatment groups and 28.88 % improvement was found in delayed recall in group A, 15.43 % in group B and 12.83 % in group C. Maximum 35.53 % improvement was found in immediate recall

in group A, 26.10 % in group B and 17.88 % in group C. Statistically highly significant results ($P<0.001$) were found in immediate recall in all treatment groups. 44.86 % improvement was found in retention for dissimilar pairs group A, 23.63 % in group B and 33.33 % in group C. Statistically highly significant results ($P<0.001$) were found in retention for dissimilar pairs in all treatment groups. . 24.4 % improvement was found in visual retention pairs group A, 13.42% in group B and 14.39 % in group C. Statistically highly significant results ($P<0.001$) were found in retention for visual retention in all treatment groups. 15.9 % improvement was found in visual retention pairs group A, 6.33 % in group B and 9.27 % in group C. Statistically highly significant results ($P<0.001$) were found in visual retention in all treatment groups. Maximum 22.78 % improvement was found in total score of PGI memory scale group A, 14.70% in group B and 14.37 % in group C. Statistically highly

significant results ($P < 0.001$) were found in total score of PGI memory scale in all treatment groups.

In the PGI memory scale, on comparing all treatment groups statistically significant improvement was found in parameters like Attention and Concentration ($p < 0.05$), Delayed recall ($p < 0.001$), Immediate recall ($p < 0.01$), Retention for Dissimilar pairs ($p < 0.05$) and Visual retention ($p < 0.05$). In *Brahmi Ghrita Nasya* when compared to Cow ghee *Nasya*, confirmed added and superior effect of Brahmi on these parameters.

In some parameters like Delayed recall ($p < 0.05$), Visual retention ($p < 0.01$) and recognition ($p < 0.05$), significantly higher results were obtained, in *Brahmi Ghrita Nasya* as compared to *Brahmi Ghrita Snehapana*, proves the superiority of *Nasyakarma* over *Snehapana* in memory enhancing.

Overall effect of therapy on the basis of PGI Memory Scale

In group A (*Brahmi Ghrita Nasya* group) maximum i.e. 60.61% volunteers reported the mild improvement followed by 33.33% which found to be improved & 0.06% volunteers remained unchanged. In group B (*Brahmi Ghrita Snehapana* group) Maximum i.e. 70.59 % volunteers reported the mild

improvement and 5.88 % which found to be improved. However, 23.52% volunteers remained unchanged. In group C (Cow ghee *Nasya* group) Maximum i.e. 75.76 % volunteers reported the mild improvement and 6.06 % which found to be improved. However, 18.18 % volunteers remained unchanged.

DISCUSSION:

Discussion part of the research a fruitful discussion has been done to give the possible reasoning based on the specific logic to explain and interpret the findings of the study to correlate the same with their causes. This section also has described in details the mode of action of *Nasya karma* and *Brahmi Ghrita*.

The results shown by *Brahmi Ghrita* was also discussed. *Brahmi* has *Tikta*, *Kashaya Rasa*, with *Laghu*, *Snigdha*, *Sara Guna*, *Sheeta Veerya*, *Madhura Vipaka* and brain tonic effect by counteracting vitiated *Vata* and *Kapha*. Cow ghee has *Madhura Rasa* with *Guru*, *Snigdha Guna*, *Sheeta Veerya*, *Madhura Vipaka* and brain tonic and rejuvenative effect by pacifying all three vitiated *Dosha*. *Tikta rasa* has dominance of *Aakash* and *Vayu mahabhoota*. This combination of *Mahabhoota* helps in highly penetrating capacity of drug molecules to

reach the minute channels supplying nutrition to the *Manovaha Srotas*.¹⁷ Ghee has *Samskaranuvartanum* property the formulation of *Brahmi Ghrita sheeta veerya* drugs. Drugs having *Sheeta Veerya* nourish the neuronal matter of brain via *Tarpaka & Avalambaka Kapha* and improve *Dharana*. Brahmi works on chelation of metal ions, scavenging of free radicals, and enhanced antioxidative defense enzymes. *Bacopa monnieri* extract may be able to increase memory formation by the enzyme Tryptophan Hydroxylase (TPH2) and increasing the expression of the serotonin transporter (SERT). Brahmi possesses anti cholinesterase, antioxidant, antidepressant, neuro protective properties and it has memory enhancing activity and improves cognitive function.¹⁸

Acharya Charaka described that *Nasa* is the only gate way to *Shirah*. The medicine administrated through *Nasya* can easily spread to *Shirah* and get absorbed. The drug administrated through nostrils reaches *Sringataka*, a *Sirahmarma* by *Nasa Srota* and spreads in the *Murdha* (Brain), taking routes of *Netra* (eyes), *Shrotra* (ears), *Kantha* (throat) *Sira Mukhas* and scratches the morbid *Doshas* in *Urdwajatru* and extract them from

Uttamanga(upper part of body). Modern science also accepts advantages of nasal drug delivery system in which through nasal route drug degradation is absent. Hepatic first – pass metabolism is absent. It has rapid drug absorption, quick onset of action. Better nasal bioavailability for smaller drug molecules. Drugs which cannot be absorbed orally may be delivered to the systemic circulation through nasal drug delivery system and nasal drug route is the convenient route when compared with parenteral route for long term therapy.

CONCLUSION:

The Ayurvedic philosophy of *Medha*, *Smriti*, *Mana* and *Buddhi* played a important role in the processes of cognition and memory. The process of recollection takes place properly after the *Buddhi*, *Medha* and *Smriti* unites. In Cow ghee *Nasya*, the *Samyaka Lakshanas* were seen earlier than *Brahmi Ghrita Nasya*, but in *Brahmi Ghrita Nasya* the symptoms lasted longer than the Cow ghee *Nasya* and with the increase of sittings, the *Samyaka Lakshanas* improved durability. In the PGI memory scale, statistically significant improvement was found in parameters like Attention and Concentration, Delayed recall, immediate Recall, Retention for Dissimilar

pairs and Visual retention. In Brahmi Ghrita Nasya when compared to Cow ghee Nasya, confirmed added and superior effect of Brahmi on these parameters. In some parameters like Delayed recall, Visual retention and Recognition, significantly higher results in Brahmi Ghrita Nasya as compared to Brahmi Ghrita Snehapana, proves the superiority of Nasyakarma over Snehapana in memory enhancing. Brahmi Ghrita Nasya, Brahmi Ghrita Snehapana and Cow ghee Nasya are all effective in memory enhancement and cognitive enhancement in the healthy volunteers. Comparatively, Brahmi Ghrita Nasya is more effective in memory enhancement and cognitive enhancement as compared to other therapies under trial.

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