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Research Article

COMPARATIVE STUDY OF SHIRO ABHYANGA WITH PRAPOUNDARIKADI TAILA AND KARANJA TAILA IN THE MANAGEMENT OF DARUNAKA: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: Dandruff is a common disorder affecting the scalp caused by yeast *Pityrosporum*. Dandruff cannot be completely eliminated but can only be managed and effectively controlled. Dandruff can be compared to Darunaka (Dandruff) based on the features explained in Ayurvedic medicine. Objectives: To evaluate and compare the effects of shiro abhyanga with Prapoundarikadi taila and Karanja taila in the management of Darunaka. Design: This was a randomized comparative clinical study. In Group A, Prapoundarikadi taila shiroabhyanga (Head massage) and in Group B, Karanja taila shiroabhyanga (Head massage) was done for thirty days, daily once in the evening. After the completion of treatment, follow up was done once in fifteen days for a period of 2 months. Results: Statistically significant results were seen in the reduction of severity in kandu, Group A (50.98%) compared to Group B (26.53), ($p < 0.001$), keshachyuti ($p < 0.001$), Group A (41.30%), Group B (20.45%), rookshata Group A (49.05%) compared to Group B (36.53%) ($p < 0.001$) and twak sputana with $p < 0.001$, Group A (48.07%) compared to Group B (20%). Conclusions: Prapoundarikadi taila shiro abhyanga showed statistically significant results in pacifying the symptoms of Darunaka (Dandruff) and marked reduction in clinical symptoms within two months duration compared to karanja taila shiroabhyanga.

Keywords: Dandruff, Darunaka, Shiroabhyanga, Prapoundarikadi taila, Karanja taila

INTRODUCTION

Dandruff, the excessive shedding of dead skin cell from scalp, is apparently caused by a fungus called *Malassezia restricta* and *M. globosa*. *Malassezia* formerly called *Pityrosporum* is a yeast causing infection of skin and scalp.¹ Several studies on the prevalence of dandruff across the world have shown a prevalence of dandruff of up to 50% in the general population. The prevalence may be increasing sharply with rapid urbanization.² No population in any geographical region would have passed through freely without being affected by dandruff at some stage in their life.³ Symptoms of dandruff mainly include presence of fragments, itching of the scalp, and redness around the scalp. Currently available treatment options for the management of dandruff include therapeutic use of zinc pyrithione, salicylic acid, imidazole derivatives, glycolic acid, steroids, sulphur and tar derivatives,⁴ however these agents have certain limitations, either due to poor clinical efficacy or due to the compliance issues. Furthermore, these drugs are unable to prevent recurrence, which is the commonest problem. They include chemical based antidandruff shampoo and herbal based antidandruff shampoo containing antibacterial and antifungal ingredients like ketoconazole, selenium sulfide, zinc pyrithione etc. The antidandruff shampoo's only slow down the scalp flaking and have their own disadvantages like loss of hair, increased scaling, itching, irritation, nausea, headache, vomiting and photosensitivity. Darunaka can be correlated with Dandruff based on the signs, symptoms and pathophysiology. Acharya Vagbhata

⁵ and sharangadara⁶ has opined that Darunaka is a kapalagata roga but Acharya Sushruta⁷ has described this disease as a kshudra roga (minor disease), an irritative disease of the scalp in which shedding of dead tissue is the cardinal feature associated with itching sensation. As per Ayurveda classics, non-application of kasha taila (oiling of head), improper cleaning, sleeping during day time, night vigil, exposure to dust, hot weather, etc are causative factors for Darunaka with symptoms like Kandu (itching), Rukshata (dryness), Twak sputana (cracks in the skin), Kasha Chyuti (hair fall), etc due to the vitiation of Vata and Kapha doshas.^{7, 8} Ayurvedic classics have dealt with various procedures and medications to manage the disease Darunaka. One such treatment is Shiro abhyanga.

Though various works has been carried out on darunaka and shiroabhyanga, prapoundarikadi and karanja taila shiro abhyanga that is being described in chakradutta samhitha of Ayurvedic medicine were not studied. Considering the effectiveness, cost, easy and routine applicability this study was conducted to assess the efficacy of prapoundarikadi and karanja taila shiro abhyanga application in darunaka.

MATERIALS AND METHODS

Subjects

A total number of 40 patients attending OPD and IPD of SJIIM Hospital Bengaluru with complaints of itching sensation over the

scalp, hair fall, dandruff and dryness of scalp were randomly selected for the study.

Inclusion criteria

Patients aged above 10 years and below 48 years with features of dandruff such as itching sensation on the scalp, dryness of scalp, hair fall and small whitish & yellowish colour scales with pityriasis capitis or psoriatic scales affecting males and females were included for the study

Exclusion criteria

Patients with features of seborrhoeic dermatitis, pityriasis steatoides, contact eczemas & other dermatological conditions such as chronic psoriasis etc and also those afflicted with other kapalagata rogas and HIV were excluded from the study.

Ethical clearance and consent

The study was approved by the institutional ethical committee and signed informed consent was obtained from all patients.

Design: In this randomized control study, 40 subjects who satisfied the study criteria were divided into two groups, Group A and Group B using a computer-generated randomizer table (www.randomizer.org). Group A received Prapoundarikadi taila shiro abhyanga continuously for thirty days, once a day in the evening. Group B received Karanja taila shiro abhyanga same as that of Group A. Both the groups were followed once in fifteen days for a period of 2 months.

Assessment Criteria

Outcome variables were recorded before the treatment on 1st day and on 30th day after the treatment.

Parameters

All the below parameters were assessed according to the Gradation index followed in a previous study.⁹

Kandu (Itching)

Kesh bhoomi rukshata (Dryness of scalp)

Twak sputana (Cracking of the skin)

Kesha chyuti (Falling of hair)

Gradation Index

Table 1 - Showing Gradation Index for assessment criteria

Parameters	Grading	
Kandu	0	Absent
	1	Occasionally
	2	Frequently
	3	Constantly
Keshha bhoomi Rookshata	0	Absent
	1	Negligible
	2	Without discomfort on scalp
	3	With discomfort on scalp
Twak sputana	0	Absent
	1	Visible inside the hair
	2	Visible over the hair
	3	Spread over the shoulder
Keshachyuti	0	Absent
	1	Occasionally
	2	Moderate loss
	3	Maximum loss

Follow up

Patients were advised to come for the follow up once in fifteen days for two months

Intervention

Trial Drugs

1. Prapoundarikadi taila¹⁰ in Group A

2. Karanja taila¹¹ in Group B

Prapoundarikadi taila - Collection of Drugs and Preparation

All the raw materials required for the preparation of Prapoundarikadi taila and karanja taila were purchased from the Sanjeevini Pharmacy, Kengeri and DG department of GAMC Bangalore. This trial medicine was prepared in the department of Dravya guna as per the reference of classics. Ingredients such as Prapoundarika, Madhuka, Pippali, Chandana, and Nilotpala were taken each in dose of 10gms with addition of 160 ml of oil and cooked together with double the quantity of Amalaki juice according to the classical method of sneha paka (procedure of taila preparation) to obtain the final taila.

Standardization

Standardization of Prapoundarikadi taila and Karanja taila were done in drug testing laboratory (GCP) Bengaluru, as per the methods mentioned in pharmacopoeial standards for Ayurvedic formulations CCRAS Delhi.¹²

Table 2: Standardization of Prapoundarikadi taila

Loss on drying at 110c	0.2098 % w/w
Weight per ml	0.9180 % w/w
Refractive index at 40c	1.4562
Acid value	5.4386
Saponification value	186.8435
Ester value	181.4049
Description: A medicated oil, light brown in color and pleasant odour	

Karanja taila

This taila was prepared as per the principles of taila preparation. Initially, the taila murchana was done and then a fine powder of Karanja beeja (seeds of karanja) and Drava dravya (liquids) was added and heated over the mild flame to obtain the required taila and then filtered and stored in an air tight, clean and dry container.

Table 3: Standardization of Karanja taila

Loss on drying at 110c	0.1301 % w/w
Weight per ml	0.9183 % w/w
Refractive index at 40c	1.4572
Acid value	3.7231
Saponification value	190.5390
Ester value	186.8159
Description: A medicated oil, light brown in color and odour of slightly pungent	

Procedure of Shiroabhyanga

Before the commencement of procedure, the necessary materials required were kept ready including Prapoundarikadi taila and Karanja taila for Group A and Group B respectively. With the patient being seated comfortably, abhyanga (massage) over the shiras (head) was carried out with the application of luke warm oil (Group A - Prapoundarikadi taila, Group B - Karanja taila) and gently massaged with the finger tips in the direction of hairs for the duration of 400 matrakala (2-3 minutes).¹³

RESULTS

Forty patients with features of darunaka were registered for the study. In the present study, the incidence of darunaka was more in 20 – 29 years (42.5%) age group, (55%) in males, (57.5%) in Hindus and regarding occupation incidence of darunaka was seen more in agriculturists 11 (27.5%). 26 (65%) of darunaka patients

were following mixed dietary habits and (62.5%) of them were rural people. All the 40 patients (100%) had the symptoms of kandu, keshachyuti, rookshatwa and twak sputana.

Table 4: Demographic data

Sl.No	Demographic parameters	Group A	Group B
1.	Age		
	10-19 yrs	3	2
	20-29 yrs	9	8
	30-39 yrs	7	9
	40-49 yrs	1	1
2.	Sex		
	Males	10	12
	Females	10	8
3.	Religion		
	Hindu	11	12
	Muslim	8	8
	Christian	1	0
4.	Occupation		
	Student	4	5
	Teacher	3	2
	Labourer	4	6
	Agriculture	6	5
	Housewife	3	2
5.	Socio-economic status		
	Upper class	2	0
	Middle class	8	8
	Lower class	10	12
6.	Habitat		
	Urban	8	7
	Rural	12	13
7.	Diet		
	Vegetarian	6	8
	Mixed	14	12

Table 5: Severity of Symptoms

Sl. NO	LAKSHANAS	Severe		Moderate		Mild		Nil		Total	
		Gr.A	Gr.B	Gr.A	Gr.B	Gr.A	Gr.B	Gr.A	Gr.B	Gr.A	Gr.B
1	Kandu	13	12	5	5	2	3	0	0	20	20
2	Keshachyuti	10	10	6	4	4	6	0	0	20	20
3	Rookshatwa	14	13	5	6	1	1	0	0	20	20
4	Twak sputana	13	12	6	6	1	2	0	0	20	20

Table 6: Within group results (Group A)

Sl.no	Lakshanas	Mean		Difference in Mean	Percentage	SE	T	P
		BT	AT					
1	Kandu	2.55	1.25	1.3	50.98%	0.319127	4.073612	0.000227
2	Keshachyuti	2.3	1.35	0.95	41.30%	0.310983	3.054828	0.004103
3	Rookshatwa	2.65	1.35	1.3	49.05%	0.320772	4.052722	0.000241
4	Twak sputana	2.6	1.35	1.25	48.07%	0.313512	3.987094	0.000293

In Group A, before the treatment, the initial mean score of kandu was 2.55 and reduced to 1.25 after the treatment with 50.98 percentage of relief and statistical significance $p < 0.05$, keshachyuti was 2.3 and reduced to 1.35 after the treatment with 41.30 percentage of relief and statistical significance $p < 0.05$,

rookshatwa was 2.65 and reduced to 1.35 after the treatment with 49.05 percentage of relief and statistical significance $p < 0.05$ and twak sputana was 2.6 and reduced to 1.35 after the treatment with 48.07 percentage of relief and statistical significance $p < 0.05$.

Table 7: Within group results (Group B)

Sl.no	Lakshanas	Mean		Difference in Mean	Percentage	SE	T	P
		BT	AT					
1	Kandu	2.45	1.8	0.65	26.53%	0.308434	2.10742	0.041736
2	Keshachyuti	2.2	1.75	0.45	20.45%	0.311828	1.443102	0.157185
3	Rookshatwa	2.6	1.65	0.95	36.53%	0.287228	3.307475	0.002065
4	Twak sputana	2.5	2	0.5	20%	0.276253	1.809934	0.07822

In Group B, before the treatment, the initial mean score of kandu was 2.45 and reduced to 1.8 after the treatment with 26.53 percentage of relief and statistical significance $p < 0.05$, keshachyuti was 2.2 and reduced to 1.75 after the treatment with 20.45 percentage of relief and statistical significance $p < 0.05$,

rookshatwa was 2.5 and reduced to 1.65 after the treatment with 36.53 percentage of relief and statistical significance $p < 0.05$ and twak sputana was 2.5 and reduced to 2 after the treatment with 20 percentage of relief and statistical significance $p < 0.05$

Table 8: Results between groups

Sl.no.	Lakshanas	Group A mean		% of relief	p	Group B mean		% of relief	p	Difference in % of relief
		BT	AT			BT	AT			
1	Kandu	2.55	1.25	50.98%	0.000227	2.45	1.8	26.53%	0.041736	24.45%
2	Keshachyuti	2.3	1.35	41.30%	0.004103	2.2	1.75	20.45%	0.157185	20.85%
3	Rookshatwa	2.65	1.35	49.05%	0.000241	2.6	1.65	36.53%	0.002065	12.52%
4	Twak sputana	2.6	1.35	48.07%	0.000293	2.5	2	20%	0.07822	28.07%

Group A showed statistically significant results (50.98%) compared to Group B (26.53) in relieving the severity of kandu with $p < 0.001$, Group A (41.30%) compared to Group B (20.45%) in relieving the severity of keshachyuti with $p < 0.001$, Group A (49.05%) compared to Group B (36.53%) in the severity of relieving rookshata with $p < 0.001$ and Group A (48.07%) compared to Group B (20%) in relieving the severity of twak sputana with $p < 0.001$.

DISCUSSION

Poor diet, poor hygiene, genetic disposition, hormonal imbalances and infections contribute to dandruff. Excessive use of hairsprays and hair gels, improper use of hair-coloring products, excessive use of electric hair curlers, dry indoor heating, tight fitting headgears or scarves, infrequent shampooing of the hair, inadequate rinsing of hair, stress, anxiety and tension worsen dandruff.¹⁴

Based on the features, darunaka can be correlated to dandruff, a dry variety of Pityriasis capitis in contemporary science. Few of the significantly resembling factors are kandu (mild itching), Rookshata (Hairs are dry & fine) and Twak sputana (Scales are dry, fine, white & fall freely on shoulders), but hair fall has not been directly mentioned in the modern classics; even then we can consider Kesha chyuti as the cause of Rookshata.

In Ayurveda, darunaka is said to be one of the kshudra roga as per Sushruta, Madhavakara, Yogaratnakara, Bhaishajya ratnavali and Bhavaprakasha. Darunaka is one among the 9 types of kapalagata roga characterized by Kandu, Rukshata, Twak sputana and Kesha chyuti. Ayurvedic classics have dealt with various procedures and medications to manage the disease Darunaka. One such treatment is Shiro abhyanga.

Though various works has been carried out on darunaka and shiroabhyanga, prapoundarikadi and karanja taila shiro abhyanga that is being described in chakradutta samhitha of Ayurvedic medicine were not studied. Considering their effectiveness, cost, easy and routine applicability this research work was conducted to evaluate the efficacy of prapoundarikadi and karanja taila shiro abhyanga in darunaka.

Present study was a randomized controlled and a comparative study with 40 subjects presenting with the features of darunaka. Prapoundarikadi taila shiro abhyanga (Group A) and Karanja taila shiro abhyanga (Group B) was carried out continuously for thirty days, once a day in the evening. Assessments were done on 1st day and on 30th day and follow up once in 15 days for two months.

It was observed that out of 40, 5 patients (12.5%) had mild kandu, 18 (45.5%) moderate kandu and severe kandu in 17 (42.5%) patients. Rookshata was observed mild in 10 (27.77%), moderate in 14 (38.88%) and severe in 12 (33.33%) patients. Severity of twak sputana was observed mild in 16 (40%), moderate in 12 (30%) and severe in 12 (30%). Severity of keshachyuti was observed 10 (29.41%) mild, 13 (38.23%) moderate and 11 (32.35%) were severe. Consideration of overall effect of therapies, after the treatment, shows that in Group A 40% of patients had good response, 45% of patients had moderate response and 15% of the patients had mild response. In Group B, 25% of patients had good response, 25% of patients had moderate response and 50% of patients had mild response. Group A (Shiroabhyanga with prapoundarikadi taila) showed statistically significant results compared to Group B (Shiroabhyanga with karanja taila) in relieving the severity of kandu, keshachyuti, rookshata and twak sputana with $p < 0.001$.

Similar studies have reported the significant results of shiroabhyanga, in which Hiremath et al showed that the Gunjataila shiroabhyanga showed 30% complete remission, 30%, moderate and 10% mild relief compared to tila taila shiroabhyanga with only 30% moderate relief and 10% mild relief. Gunjataila shiroabhyanga also showed statistically significant results in relieving the symptoms of Darunaka within one-month duration.⁹ According to the study of Kadam et al Dhurdhurpatradi Tailam Shiroabhyanga is more effective than Eladi Tailam Shiroabhyanga in Darunaka is caused by Trichological Exogenous Toxins.¹⁵ Nasya karma is shown to be very effective in the reduction of darunaka as per the study of Shital Ochavan et al.¹⁶ In the study of Sreelakshmi et al application of haritaki choorna lepa mixed with Takra in Darunaka has given significant results.¹⁷ Even the coconut oil application has shown that it has protective effect on hair damage and penetrates into hair cuticle and cortex to produce the effect.¹⁸

Scalp massage, according to a study has shown that the low frequency (LF) sympathetic nerve activity marker significantly decreased whereas the high frequency (HF) parasympathetic nerve activity marker significantly increased after 15 minutes of scalp massage.¹⁹ Another study demonstrated the effects of a 20 minute scalp massage on norepinephrine and cortisol.²⁰ In the study of Cambron et al, blood pressure was found to have decreased significantly after the performance of scalp massage in adults at the normotensive or prehypertensive stage.²¹ In one of the study, nine healthy men received 4 minutes of standardized scalp massage per day for 24 weeks using a scalp massage device. Standardized scalp massage resulted in increased hair thickness

24 weeks after initiation of massage (0.085 ± 0.003 mm vs 0.092 ± 0.001 mm). Stretching forces result in changes in gene expression in human dermal papilla cells. Standardized scalp massage is a way to transmit mechanical stress to human dermal papilla cells in subcutaneous tissue.²²

Similarly, shiro abhyanga practiced in Ayurveda consists of soft and gentle massage of the scalp by finger tips was conducted in two parts of 400 matrakala each. The first part consists of shiro abhyanga of right and left parietal regions. The second part consists of shiro abhyanga of frontal, vertex and occipital regions. The matra kala of the procedure which was adopted in the study was 400 matra kala due to its effect of penetrating deeper and nourishing the twacha of the kapala or the scalp. As a result, the symptoms such as kandu, rookshata, twacha sputana, and kasha chyuti can be successfully treated and managed.

Regarding the mechanism, dalhana, the commentator of sushruta samhitha has opined that, the absorption of sneha or the oil used in shiroabhyanga reaches and penetrates deeper into the different dhatus if it is applied for the sufficient time and by the absorption of drug used for the abhyanga. Dalhana also explains that, when snehana dravya (oily drugs) reaches to the particular dhatu it alleviates the diseases of that particular dhatu.

In the study of Sembulingum et al, the effects of shiroabhyanga and its role on stress has been assessed, which says that during shiroabhyanga different types of mechanical sensation is given to the skin like pressure, rubbing, touches etc. So, these sensory impulses are received by respective receptors present on the surface of skin and carried to the hypothalamus in the brain.²³

Prapoundarikadi taila

Shiroabhyanga with this taila is said to be effective due to its properties such as snigdha guna, which acts through its vatahara, kaphakara and vrishya properties. It performs the actions like snehana, kledana and vishyandana at cellular level of the body. Guru guna of the prapoundarikadi taila increases the bodily strength and kapha, prevents fainting, decreases the perspiration and stabilizes the muscles and organs. Mridu guna of the prapoundarikadi taila reduces the roughness. Drava guna of the prapoundarikadi taila makes the snehana drug propagate swiftly all over the body and liquefies the doshas and mobilizes them by increasing their flowing capacity. Pichhila guna of the prapoundarikadi taila leads to longevity and increases the body strength. It also increases kapha and produces heaviness. Sara guna of the prapoundarikadi taila mobilizes the doshas and mala i.e. waste products by this property. Manda guna of the prapoundarikadi taila makes the sneha dravya diffuse slowly by this and it remains in the contact of doshas, dhatus and malas for long time. Sukshma guna of the prapoundarikadi taila helps the drug to enter in the fine or the minute channels.

Karanja Taila

Karanja taila has the properties of teekshna guna, tikta, kashaya rasa and ushna veerya. By its teekshna guna and ushna veerya it balances vata and kapha doshas, acts as antimicrobial, anthelmintic, germicidal, antipruritis, anti-inflammatory and antidiabetic. Thus, the soft and gentle massage improves blood circulation to the kapala pradesha. The snigdhatva present in the taila pacifies dryness thereby preventing the shedding of scales and hair fall. The ingredients or the chemical composition present in the taila does the actions of microbicidal, antibacterial, skin dermatosis and other aspects as mentioned in the drug review. Thus, shiro abhyanga counteracts different aspects of the disease

process thereby achieving the samprapthi vighatana and thus pacifies the disease.

Abhyanga provides comfortness at the site due to temperature created. The heat causes the blood vessels to dilate, which increases blood circulation and promotes healing, evacuation and cleansing of the secretory passages. The pressure effect and the heat produced by this procedure enhances the absorption of the medicine through the skin. In this way Abhyanga acts through the above properties of sneha (oily substances) as these properties are opposite to the vata dosha. Abhyanga with prapoundarikadi taila provided better relief in all symptoms of darunaka especially in kandu, rookshata, twak sphutana and kasha chyuti whereas, abhyanga with karanja taila provided moderate relief in symptoms like kandu, rookshata, twak sputana, kasha chyuti. In prapoundarikadi taila, the effect of the drug is higher than karanja taila and this may indicate that the abhyanga with prapoundarikadi taila provides the better effect to the patients of darunaka with highly significant statistical values than abhyanga with karanja taila.

Follow Up Study

On the third and fourth follow up, there were no significant changes observed in both the groups which implicates that even after the completion of treatment and follow up of two months, recurrence of darunaka was seen less in prapoundarikadi taila group whereas the karanja taila group patients showed presence of the disease in a greater manifestation.

CONCLUSION

Prapoundarikadi taila shiro abhyanga showed statistically significant results in pacifying the symptoms of darunaka and marked reduction in clinical symptoms within two months duration compared to karanja taila shiroabhyanga.

Strengths of the Study

Prapoundarikadi taila and Karanja taila shiro abhyanga are self-applicable, easy and cost effective. No topical or systemic adverse drug effects were reported throughout the study.

Limitations of the study

As the sample size in the present study was small, high claims cannot be made on the final outcome. Follow up of these cases for longer period is required.

Suggestions and Recommendations

Present study can be carried out in the form of prospective clinical study with large sample size and long duration with frequent and long follow up. Other drugs mentioned in Ayurveda for darunaka (dandruff) can be evaluated.

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