INTERNATIONAL JOURNAL FOR INNOVATIVE RESEARCH IN MULTIDISCIPLINARY FIELD
ISSN(O): 2455-0620 [Impact Factor: 7.581]
Monthly, Peer-Reviewed, Refereed, Indexed Journal with IC Value : 86.87
Volume - 9, Issue - 8, August - 2023 Publication Date: 31/08/2023

DOIs:10.2015/IJIRMF/202308032 --:-- Research Paper / Article / Review

A critical review of Ayurvedic management of dandruff-like skin disorders using group of ten herbal drugs *(Kandughna Gana)*

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Abstract: *In Ayurvedic science, a wide array of skin diseases has been described in great detail.Individuals throughout the spectrum of puberty to old age are suffering from one such skin disorder that is dandruff. Imbalance in basic three entities [Tridosha] and different metabolites like mansa, lasika, Rakta etc. brings about this disease. Dandruff is one the skin disorders which occurs with several etiological factors, presenting with scaling of dead skin, flakes and itching. Maintaining of healthy status of scalp skin is very important for lustrous and healthy hair. For this purpose, the scalp should be free from fungal and microbial infections. Different herbs are recommended in Ayurved science to serve this intention, wherein ''Kandughna'' category of herbs is included in one of the ayurvedic classics. Plant drugs are known to be beneficial and claimed for specific pharmacological actions like anti-itching, anti-inflammatory, anti-microbial. Ten drugs of Kandhughna class when combined with each other might show cumulative enhanced activity to treat Dandruff-like skin disorders. Therefore, the review of ten herbal drugs stated in Dashenmani Gana of Charak Samhita is summarized in present work and provides combined data useful for further researcher studies.*

Key Words: *Skin diseases, Dandruff, Dashemani drugs, Plant materials, Kandughna.*

1. INTRODUCTION:

Skin diseases are among the most common of all human health afflictions and affect almost 900 million people in the world at any time (1). As skin is the largest organ of the body, these infections are of great concern. Skin represents a complex barrier structure composed of surface keratinocytes, inter-keratinocyte substances, dermis and sub-dermal structures. The skin is a metabolically active organ with vital functions including the protection and homeostasis of the body. Scalp is a unique area of skin in humans. Amongst five layers of scalp, skin is the first layer which is thick and contains hair follicles and sebaceous glands. The hair follicles can extend into the dense connective tissue layer, where the nerves, lymphatics, and the vascular supply of the scalp exist (2). Scalp skin has high follicular density and a high rate of sebum production. Introduction and increase in different infections towards scalp skin is possibly seen by application of various styling implements, combs, hats and use of own fingers. Specific dark and warm environment of the scalp surface is favorable for the external mycotic infections that leads to increase in occurrence of scalp disorders viz. dandruff, seborrheic dermatitis, and tinea capitis, or for parasitic infestations such as pediculosis capitis (3). Infections of the scalp include bacterial infection of hair follicles (folliculitis),infestation of head lice (pediculosis capitis), and fungal infection of scalp ringworm (tinea capitis). Itching and excessive flaking of the scalp is seen with both dandruff (seborrheic dermatitis) and psoriasis(4). In Ayurved, *Darunaka* word resembles with Dandruff, as the symptoms of *Darunak* viz. *Kandu* (itching on scalp), *Keshachyuti* (falling of hair), *Swapa* (abnormalities of touch sensation on scalp), *Rookshata* (roughness or dryness of the scalp) and *Twaksphutana* (breaking or cracking of the scalp skin) are alike with the symptoms of Dandruff (5). It is narrated that the abnormality or aggravated entities especially *Vata*, *Kapha* and *Rakta* towards the scalp skin leads to develop dry, sticky skin and causes itching, flaky patches on the scalp(6).

Different categories of antidandruff medications or cosmetic agents are available in the market for the curative action. It includes antifungal agents, steroidal therapy, keratanization etc. The mechanism counteraction of dandruff might differ from one age to another. However, certain side effects and recurrence of dandruff might be seen in sufferers and some of the cosmetic agents are not cost effective too. Use of herbal drugs and herbal products has distinctive role in the treatment of several disease conditions. The use of herbal medicine in different dosage forms for prevention and treatment of different disorders has a long history in traditional ayurved science. Traditional ayurvedic literature revealed application of various herbal drugs and their different dosage forms in treating and preventing scalp related disease conditions. Emphasis is given in literature to use different parts of the plants viz. flowers, fruits, seeds, leaves, barks and roots projected for medicinal purposes. Considering the similar properties and pharmacological actions *Acharya Charak* has grouped ten herbal drugs and given specific nomenclature for each group, called as *Dashemani* [ten herbal drugs]. Amongst these Dashemani classes, one of the group named as *Kandughna Dashemani* contains herbal drugs viz *Jatamansi, Raktachandan, Neem, Karanja, Daruharidra, Musta, Aargavdha, Kutaja, Yashtimadhu* and *Sarshap*(7). These herbal drugs are having *Kandughna*[to reduce itching], *Kushtaghna* [to reduce skin related problems]and *Krimighna* [antifungal/bacterial] like actions (8).

In the present era, as the demand and popularity of herbal drugs is growing rapidly, it is important to scrutinize these groups of herbal medicines to find the better choice of drugs for the disease like Dandruff, where the conventional medicines prove to be an inadequate. This research article will address the scientific approach towards *Kandughna Gana* by throwing light on explaining Ayurvedic pharmacological action of drug included in it. This manuscript will present critical review of drugs mentioned as *Kandughna Gana* in *Charak Samhita*. Their identification, Ayurvedic actions and all relevant data will be collected, discussed and result concluded in such a manner that this paper will be a foundation for further research work.

2. REVIEW OF LITERATURE:

For the sake of simplicity in treatment *Charaka* and *Sushrut* has categorized different drugs in the form of *gana*. Group of drugs having similar and special characteristics either in *rasa* (taste), *karma* (action), *guna*(properties) is known as *Gana*. In *Charak samhita* these drugs are classified in *Shad Virechana Shatashriteeya adhyay* in the form of *gana*, with10 drugs in each group. *Kandughna gana* is one of the *Charakokta dashemani*, of which all 10 drugs have antifungal, antibacterial, ant-itching properties(8).

Treatment of skin diseases is comparatively difficult than other diseases. *Kandughna gana* has explored the different ways of treatment in the spectrum of skin disorders. Another more beneficial effect of this *gana* is that the whole *gana* can be used and if in some circumstances if only few drugs are available they can be as much as effective as the *gana*. According to *Charaka* and *Sushrut* these drugs can be used in any form like juice (*swaras*), paste (*kalka*), decoction (kwath), Powder (churna) as the condition of the patient or the mode of pathogenesis(9,10).So it is the need of time to explore the utility of *Kandughna gana* in dandruff like skin infections.

3. METHODOLOGY:

The ayurveda classics, relevant textbooks were reviewed. The relevant data was also compiled from various journals, online research articles and other internet sources. Notable previously conducted research work pertaining to *Kandughna Gana* ingredients was also reviewed. The compiled data was then catalogued, tabulated and cohesively presented as current review article.

4. FINDINGS:

Table no 1: Details of *Kandughna gana*(11)

Sr No.	Drug	Latin Name	Family	Part Used
1.	*Raktachandan*	*Pterocarpus santalinus Linn.*	*Leguminosae*	Stem
2.	*Jatamansi*	*Nordostachys jatamansi DC*	*Valerianaceae*	Root
3.	*Aaraghwadh*	*Cassia fistula Linn.*	*Caesalpinioidae*	Leaves
4.	*Karanj*	*Pongamia pinnata Pierre*	*Leguminosae*	Seed
5.	*Neem*	*Azadiracta indicia .Juss*	*Meliaceae*	Leaves
6.	*Kutaj*	*Holarrhena antidisynterica (Linn)Wall)*	*Apocynaceae*	Bark
7.	*Sarshap*	*Brassica campestris Linn. Var. Sarson Prain*	*Cruciferae*	Seed

8.	*Yashtimadhu*	*Glycerrhiza glabra Linn.*	*Leguminosae*	Stem
9.	*Daruharidra*	*Berberis aristataDC*	*Berberidiacae*	Stem
10.	*Musta*	*Cyprus rotundus Linn*	*Cyperaceae*	Rhizome

Table no 2: Pharmacodynamics of *Kandughna gana* (11)

Sr. No	Herbal Drug	Taste *(Rasa)*	Potency *(Virya)*	Biotransformation (Vipaka)	Properties *(Guna)*	Action *(Karma)*
1	***Raktachandana***	Bitter, Sweet (*Tikta, madhur)*	Cold (*Sheeta)*	*Katu*	Heavy, dry (*Guru,Ruksha)*	*Kapha-pitta shmaka, kandughna, raktashodhak*
2	***Jatamansi***	Bitter, Astringent, sweet (*Tikta, kashay, madhur)*	Cold (*Sheeta)*	*Katu*	Light, unctuous, quick (*Laghu, snigdha, tikshna)*	*Tridoshhara, kushtaghna, varnya*
3	***Aaragvadha***	Sweet, Bitter (*Madhur, tikta)*	Cold (*Sheeta)*	*Madhur*	Heavy, unctuous (*Guru, snigdha)*	*Vata-pitta shamak, kandughna, raktashodhak*
4	***Karanja***	Bitter, Astringent (*Tikta,katu, kashay)*	Hot (*Ushna)*	*Katu*	Light,quick (*Laghu, tikshna)*	*Kapha-vataprashamak, kandughna, krumighna*
5	***Neem***	Bitter, Astringent (*Tikta, kashay)*	Cold (*Sheeta)*	*Katu*	Light(*Laghu)*	*Kapha-pitta shamak, raktashodhak , krumighna*
6	***Kutaja***	Bitter, Astringent (*Tikta, kashay)*	Cold(*Sheeta)*	*Katu*	Dry, light (*Ruksha, laghu)*	*Kapha-pitta shamak, krumighna, vranaropana*
7	***Sarshapa***	Pungent, Bitter(*Katu,tikta)*	Hot (*Ushna)*	*Katu*	Quick (*Tikshna)*	*Vatkaphashamak , kadughna, varnya*
8	***Yashtimadhu***	Sweet (*Madhur)*	Cold (*Sheeta)*	*Madhur*	Heavy, unctuous (*Guru, snigdha)*	*Tridoshhara, twachya, kandughna, vranaropana*
9	***Daruharidra***	Bitter, Astringent (*Tikta, kashay)*	Hot (*Ushna)*	*Katu*	Light, dry (*Laghu, Ruksha)*	*Kapha-pitta shamak, kandughna, kushtaghna, vranaropana*
10	***Mustak***	Bitter, Pungent, Astringent (*Tikta,katu, kashay)*	Cold (*Sheeta)*	*Katu*	Light, dry (*Laghu, Ruksha)*	*Kapha-pitta shamak, kandughna, kushtaghna, deepan*

Probable mode of action of herbal drugs of *Kandughna Mahakashyay*:

On the basis of Taste (*rasa)*:
Overall *rasa* comes out to be *tikta-kashaya*. Both these *rasa* have *Kapha-Pitta shamak*effect. Since *kandu* is *Kapha pradhana vyadhi* symptom with some component of *Pitta*, so this *kashaya* may help to alleviate related doshas.

On the basis of Properties *(guna)*:
Common properties present in the *mahakashaya*are *laghu*and *ruksha.* Both these properties are related to *vayu*and *akasha mahabhoota*. Action of these *mahabhoota*are against *prithvi*and *jalamahabhoota*, which ultimately decreases *Kapha*thus help in relieving *kandu*.

On the basis of Potency*(veerya)*:
Out of 10 ingredients of *Kandughna mahakashaya*,7 are of *sheeta veerya* and this would have *Pittashamak* effect as *Pitta* also plays a part in *kandu*.

On the basis of Biotransformation(*vipaka)*:
Regarding *vipaka*, out of ten drugs, eight drugs have *katu vipaka* and two have *madhura vipaka.* This *katu vipaka* has *Kaphashamak* effect which relieves kandu. M*adhur vipaka* has got soothing effect on the body.

On the basis of *Dosha-prabhava*:

All the drugs together have *tridoshaghna (pacifying all three doshas)* action mainly *Kapha-Pittahara* and *Kapha-Vatahara*, along with *Rakta-prasadana* (enhancing quality of blood), *medo-lekhana (*reduction of fat), *kushthaghna* (cures skin diseases), *shoth-hara (*reduces edema*)* action etc.

Table no 3: Review of phytochemicals of *Kandughna gana* (12)

Sr No	Drug names	Active ingredients responsible for anti-dandruff property
1	*Raktachandana*	santalin A and B, savinin, calocedrin, pterolinus K and L, and pterostilbenes
2	*Jatamansi*	jatamansone, jatamansic acid, jatamansonesemicarbazone, jatamansin, N.jatamansiethanol
3	*Aaragvadha*	anthraquinoneglycosides, sennosidesA and B, rheinandits glucoside, barbaloin**.**
4	*Karanja*	flavones, flavans, chalcone, triterpenes and aromatic carboxylic acids.
5	*Nimba*	azadirachtin, nimbolinin, nimbin, nimbidin, nimbidol, salannin, and quercetin.
6	*Kutaja*	conessine, holarrhenine, kurchessine, kurchinidine, kurchinine, pubescine, conimine and antidysentericine
7	*Sarshapa*	sinapine, cheirine, Allylisothyocynate, flavonoids, essential oil
8	*Yashtimadhu*	glycyrrhizin, glycyrrhetinic acid, glycyrrhizic acid,asparagin, liquirtin, glabrin A&B, flavonoids and isoflavonoids.
9	*Daruharidra*	berbamine, Berberine, oxycanthine, epiberberine, palmatine, dehydrocaroline, jatrorhizine and columbamine, karachine, dihyrokarachine
10	*Mustak*	terpenoids, flavonoids, sesquiterpenes, monoterpenes, sitosterol, betacyperone, β- selinene, calcium, cyperene, cyperenon, cyperol

Review of previous work done regarding anti-microbial activity of ten herbal drugs :

Manjutha (2015) provided the scientific base for the antibacterial activity of *Raktachandana* (13). Dey et al done comparative study to find out the antibacterial activities of the methanol and aqueous leaf extracts of P. santalinus(14).

Singh et al(2018)studiedtheantimicrobialactivitiesofvolatileoilanddriedalcoholicextractof dried Rhizomes of N. *jatamansi*, shows highest antimicrobial activity for 1% v/v concentration against various microorganisms(15). Omprakash H. Nautiyal (2013) studied the anti-fungal activity by inhibiting the growth of the dermatophytes(16), in which the researcher found Jatamansone, Nardin, Nardal and Jatamansic acid. These phytochemicals are believed to be exhibiting the antifungal activity.

Datta A et al (2012) done Preliminary phytochemical analysis of dried leaf powder of plant Cassia fistula and evaluated the antibacterial activity of extract from this plant against several bacteria(17). Chaerunisaa et al (2018) successfully studied the activity of cassia fistula bark fraction as antibacterial agents(18).

Ujwal et al(2007)study describes the antimicrobial activity of Pongamia pinnata against bacterial and fungal strains(19).

Patil Usha(2017) established the antifungal activity of Karanja extract on candida fungi(20).

Niharika et al (2010) carried out study to determine the antifungal property of neem leaves extract. The study was performed in laboratory on cultured fungip. ovaleatvariouslevelofneem leaves extract concentration (25%, 50%,75%,100%). The results show that 50% and above level of concentration has optimal level of inhibition on the dandruff growth(21). Naga Padma et al (2015) compared the antidandruff activity of different market product with natural plant extractin which Neem shows greater results(22).

The in vitro antioxidant activity of *Holarrhenaantidysenterica*leaves (methanolic extract) using hydroxyl radical, superoxide anion scavenging, and reducing power assay was studied. It was found to contain high radical scavenging activity and phenolic contents(23).(Ganpathyetal, 2011).

In another study, alcoholic and aqueous extracts of the *Holarrhena antidysenterica* stem bark were reported to have an antibacterial activity against 10 enteric pathogens at the dosage of 200 mg/ml(24). The ten enteric pathogens used for the study were S. aureus, Vibrio cholerae 01, V. cholerae 0139, enteroinvasive E. coli, enteropathogenic E. coli, S. typhimurium, S. enteritidis, Shigella flexneri, Sh. boydii, and Pseudomonas aeruginosa(25).(Ballal M et al, 2001)

Clinical study of *Sarshap* oil and *karanja* oil was evaluated on 20 patients of *Vicharchika* for 30 days, where the assesment criteria include *Kandu (*itching*), Pidaka (*skin eruptions*), Rukshata (*dryness*)* symptoms. Local application of *Sarshap* oil lowers the severity of all these symptoms i.e., *kandu, pidaka* and *Rukshata*, proving the same efficacy of both the oils in Eczema(26).(Poonam et al, 2018).

Another study evaluated the antibacterial activity against *Propionibacterium acne* using ethanol extract of *Glycyrrhiza glabra*. It showed a remarkable antibacterial activity against *Propionibacterium* acne, with only negligible induction of resistance. The study found a marked development of resistance in the bacteria treated with erythromycin(27). (Nam C, et al, 2003)

Active componant of Glycyrrhiza glabra, 18-beta glycyrrhetinic acid (18-beta GA)was studied in this paper.It showed that the in vitro growth of the C. albicans strains was markedly reduced, in a pH- dependent manner, by relatively low doses(6.2 microg/mL) of 18-beta GA(28).(Pellati D, et al, 2009)

Singha Meenakshi stated that the hydroalcoholic extract of Berberis aristata showed antimicrobial and antifungal activity against bacterial and fungal strains causing skin diseases (29).

Cyprus rotandus have a potential to act as a good antimicrobial agent against pseudomonas aeruginosa, Bacillus subtilis and Candida albicans and Escherichia coli because of presence of various phytochemical ingredients Steroid, saponin, Alkaloid, Glycoside and Tannin. *Cyprus rotandus* had shown maximum growth inhibition against Bacillus substilis with an inhibition at 10% concentration unlike the standard antibiotics. These phytochemicals seemed to be active source of useful drugs.(30) (Wangila TP, 2017)

Essential oil and alcoholic extract of *Cyprus rotandus* have anti-fungus activity. Chemical analysis showed the presence of compounds with Best-Known antimicrobial activity, as well as anti-fungal activity like- one, 8-cineole, geranial germacrene-D, limonene, linalool, and application(31).(Duarte et al, 2005)

5. DISCUSSION:

In recent years the importance and value of herbal remedies for all sorts of diseases are being discussed widely. Medicinal plants are naturally gifted with invaluable bioactive compounds which form the back bone of traditional medicines. Many infectious diseases have been known to be treated with herbal remedies throughout the history of mankind. This action is due to the presence of phytochemical components like glycosides, tannins, alcohols, aldehydes etc.

In the current scenario many chemical substances are used for treating dandruff like skin infections. The main active agents used currently for controlling dandruff include imidazole derivative such as ketoconazole, steroids, tar derivatives. Some of the very common side effects associated with these medicaments are itching, mild irritation or oiliness and dryness of hair and scalp. Severe allergic reactions includes rash, itching, difficulty in breathing, tightness

in chest, swelling of mouth, face, increased or abnormal hair loss, blistering, peeling or burning of skin of scalp. The chemicals used for the treatment of dandruff have certain limitations; either due to poor clinical efficacy or due to the compliance issues. Furthermore, these drugs are unable to prevent occurrence, which is a common troublesome clinical problem.

On the contrary, the fundamentals of Ayurvedic drug action are scientific and based on the theory of *Rasa, Guna, Virya, Vipaka* and *Prabhava* which were the simplest parameters in those days to ascertain the action of the drug. The drug of *Kandughna gana* exhibit phytochemicals and antioxidants like N.jatamansi ethanol, Berberine, glycyrrhizin, nimbidin, kurchinine andmany more, which are not only for the discovery of therapeutic agents but are also an asset for the future genera. The presence of this phytochemicals proves the antimicrobial activity of these drugs.

In Ayurveda dandruff is considered as *Vata-Kaphaj* disease. The drugs included in *Kandughna gana* are having *Laghu, Ruksha, Tikshna guna, sheeta Virya* and *Katuvipak,* which is just opposite to *panchabhautic* constituents of *Kapha*. Thus helps to dissipate the *kandu* (itching) symptom of dandruff. All ten drugs possess *kandughna, krimighna* properties and are *kaphavatahar,* which gives relief in skin disorders by relieving *kaṇḍu* & killing *krimi.* Also each drug has been scientifically proved to exhibit antifungal and antibacterial properties. We can use the whole *gana* and if in some circumstances if only few drugs are available they can be as much as effective as the *gana*. Hence by the synergistic combination of herbal drugs of *Kandughna gana* may exhibit positive effect to correct abnormal pathology occurred at head skin, especially dandruff. All this attributes of herbal drugs illuminates their potential to be the better antimicrobial agents in dandruff like skin infections.

6. CONCLUSION :

Herbal drugs have immense potential to treat different abnormal conditions of skin. Specific class of ten herbal drugs stated in ayurved has shown typical pharmacological actions to treat skin disorders. Most of the drugs of *Dashemani* class have researched and proven for their certain activities, showed therapeutic effects as against different skin abnormal conditions. Compared with the conventional allopathic medicines or cosmetics, considering the therapeutic potential of herbal drugs of *Dashemani* class when combined and processed further to prepare advanced formulation might be helpful to cure dandruff like skin condition. The formulation might be relatively low cost and beneficial for the sufferers of Dandruff of Indian population. Thus, the major aim of the current review is to identify and project the medicinal plants which have the potential to become the modern drug substitute for skin disorders.

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