

PSORIASIS: - AYURVEDIC REVIEW

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ABSTRACT

Ayurveda is an ancient medical practice that vaidyas sometimes use to cure psoriasis. The practice originated in India more than 3,000 years ago. It involves incorporating a special diet, herbal compounds, and additional supportive medical practices. *Ayurveda*, also known as *Ayurvedic* medicine, aims to help a person heal their body, mind, and spirit. *Ayurvedic* medicine features treatments that have been used to treat psoriasis. Psoriasis is a condition that causes excess and rapid growth of skin cells, leading to plaque-like deposits that build up on the skin. While *Ayurveda* may be able to treat psoriasis in some people, its results haven't been studied in large-scale clinical trials or systematic research reviews. According to an article in the International Journal of Green Pharmacy, *Ayurvedic* practitioners classify psoriasis as a "*kushtha*" health condition. This means the condition is a chronic one, which is also "*krucchasadhya*" (intractable) and "*asadhya*" (incurable). *Ayurvedic* texts say that psoriasis arises due to an imbalance of two "*doshas*" (areas of energy) known as the "*Vata*" and "*Kapha*." By these types of research studies it is proved that *Ayurvedic* treatments are effective in psoriasis. However, until there is more scientific evidence needed, it is always a good idea for a person with psoriasis to check by *vaidya* before using any *Ayurvedic* treatments. One of the most common topical preparations used to treat psoriasis in *Ayurvedic* medicine contains turmeric. This is a compound that is derived from a root that is similar to ginger.

KEYWORDS: *Kushtha, doshas, Vata, Kapha, krucchasadhya, asadhya.*

INTRODUCTION

Psoriasis is a chronic disease that can have substantial psychological and social impact on patient's life. Psoriasis has been shown to affect health-related Quality of Life to an extent similar to the effects of other chronic diseases such as depression, myocardial infarction, hypertension, etc. The modern treatment options not only provide temporary relief but also have serious side effects. Thus, the chronic and recurring nature of the disease hampers the Quality of Life to a great extent. Psoriasis can have a significant impact on a patient's Quality of Life, sometimes profoundly altering their everyday life. Quality of Life patient survey published in the Archives of Dermatology in 2001 showed that physicians underestimate disease severity. 78% of severe psoriatics are frustrated by lack of efficacy of treatment and 26 minutes is the average time to apply topical medications per day.

In the *Ayurvedic* treatment for skin disease, the primary aim is to detoxify the body by eliminating the toxins from the body fluids (*Rasa*). On the basis of several case studies, we understand that the vitiated *Vata* and *Kapha* enhances the accumulation of low potency poisons

(*Dooshi Vishas*) responsible for basic pathological changes in the human body and *Dooshi Vishas* also obstruct the circulatory channels.

Aim of study

1. To prove the effect of *Ayurvedic* remedies described in *Samhitas*.
2. To share the knowledge of *ayurved* about skin disease.
3. To remove doubts about *Ayurvedic* medicine in society.
4. Find out actual facts described in *ayurved* text.
5. collect knowledge of skin disease from various *samhitas*.
6. Collect information of various drugs used for psoriasis.
7. To check the pharmacological importance of *Ayurvedic* remedies.

Review of *Kushtha* (psoriasis)

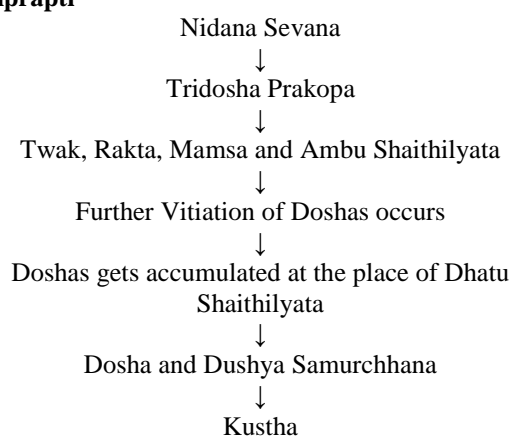
Kushtha (*Ayurvedic* concept)

"*Kushnati iti Kushtha*" means that which makes ones skin look disgraceful or ugly or which destroys *twak* and other *dhatu*s is called *Kushtha*.

Etiology

Aharaja Nidana- Taking excessive amount or constant usage of certain foods like new formed rice, heavily digestible foods, citrus fruits, She buffalo milk, curd, fish, jaggery, unrefined sesame oil, Horse gram, black gram, field beans, food articles (sweets) prepared by sugars, and carbohydrate rich foods. Improper food habits play an important role in the etiology of Kustha. Viharajanidana- Day sleep, sexual intercourse, suppressing the natural urge of the body, excessive exposure to sunrays, excessive worry/grief, excessive physical exercise Sansargaja Nidana- Kushtha is considered as Sansargaja Vyadhi (communicable or infective disease) 9 Manasika Nidana/Behavioral factors –behavioral misconduct, excessive worry, grief, antisocial activities, sinful activities and other punishable activities Kulaja Nidana- Kushtha is considered as Adibala Pravratata Vyadhi i.e., a hereditary disorder Poorva Janmakrata: According to Sushruta if the person suffered from Kushtha in his previous life and if he takes rebirth then he develops Kushtha in his present life also.

Samprapti



Nidan

1. Sparsajnatva- lack of touch sensation in the skin lesion area.
2. Atisweda or Na Va – Excessive sweating or absence of sensation.
3. Loma harsha – Horripulation.
4. Kandu, Toda, Shrama and Klama – itching, pricking pain, physical exhaustion and mental fatigue.
5. Discoloration and elevation of the patches (kotha) in the skin.
6. Shoolam – Excessive pain in the ulcerated parts.
7. Vranaadhikam – Instantaneous appearance and continued persistence of these ulcers and.
8. Daha, Suptangata – Burning sensation and numbness.

Types

Sidhma Kustha: Svetam, Tamram – White and coppery in color. Tanu, Ghrustamvimunchati – Thin, and when rubbed, it emits small particles of the skin in the form of dust.

Alabupushpavarnam – It resembles the flower of alabu (Lagenariasiceraia) and Prayena Cha Urasi – It is generally located in the chest. It is caused due to Vata and Kapha Dosha increase.

Kitibha:- Shyavam- It is blackish brown in color Kina kharasparsham – It is rough in touch like a scar tissue and Parusham – It is hard to touch It occurs due to increase of Vata and Kapha Dosha.

Eka Kushta:- Asvedana – Absence of sweating Extensive localization and Yatmatsyakalopamam – Resembles the scales of fish. It occurs due to increase of Vata and Kapha Dosha.

Some drugs for psoriasis

Guggulu (Commiphora wightii): Having anti-inflammatory and lipid-lowering properties, it is helpful in removing fats and excessive fluids in the skin during natural treatment for psoriasis in scalp.

Neem (Azadirachta indica): According to the Ayurvedic texts, it is an effective blood purifier and is used to treat several chronic skin conditions including psoriasis.

Bakuchi (Psoralea corylifolia): The seeds contain an essential oil (dark brown resin). The seeds of this herb have anthelmintic, antibacterial, astringent, cytotoxic, deobstruent, and stimulant properties. It is widely used in skin disorders like psoriasis treatment of face, psoriasis treatment of nails, psoriasis treatment of hair & psoriasis treatments of scalp etc. It assists the skin to rejuvenate by eliminating toxins from the body and thus it is one of the best herbs for the treatment of psoriasis in Ayurveda.

Kumari (Aloe Vera): It is known for its natural soothing and cooling properties. Aloe Vera may also help regenerate skin cells and heal irritated skin. It reduces excessive inflammation when applied to the skin. Various minerals present in Aloe Vera are calcium, copper, magnesium, manganese, potassium, sodium and zinc etc. It is also responsible for enhancing the penetrative effect of the other ingredients into the skin. Therefore, the aloe-Vera extract is highly useful in psoriasis disease. We can use it as a topical cream for natural psoriasis treatment.

Oregon grape/ barberry (Mahonia aquifolium): The extract of the bark and root of Mahonia aquifolium contains alkaloids which have been shown to be strong anti-microbial and anti-fungal agents. Studies have demonstrated that these alkaloids induce powerful antioxidant activity which inhibits the over-proliferation of skin cells called keratinocyte (abnormal skin cell; the hallmark of psoriasis) growth. It also alleviates inflammation and hence is beneficial for the psoriasis natural treatment. The stem and leaves of this plant can be ground into powder, distilled into an extract, & used as a skin cream. It helps in reducing redness in psoriatic

flares. It is more effective in both mild & moderate type of psoriasis.

Turmeric (*Curcuma longa*): It has unique anti-inflammatory and antibacterial properties, thus, helps in the psoriasis treatment. Make a paste from one part turmeric powder to two parts water. Add the ingredients and simmer to make a thick paste. It is also very useful in Ayurvedic treatment for scalp psoriasis.

Ayurvedic remedies for psoriasis

1. Early sun can effectively reduce skin inflammation and scales.
2. The extract of sesame seeds on an empty stomach can also help.
3. Garlic and onions may also be used to purify the blood.
4. Bitter Gourd is also a valuable home remedy for psoriasis.
5. Avoid fragrances (soaps and perfumes).
6. Do not hinder natural urges like vomiting, urination, bowels, etc.
7. Don't sleep during the day.

Diet for psoriasis: Psoriasis Ayurvedic treatment diet

Eat Anti-oxidant-rich herbs and spices, like thyme, sage, cumin, and ginger. Fruits and veggies, especially berries, cherries, and leafy greens. Drink plenty of water. Some foods can make inflammation worse. Eat less or avoid like wheat, rye barley, & milk. Avoid processed foods and refined sugars. Avoid caffeinated beverages and carbonated beverages. Avoid acidic foods.

Yoga for psoriasis

Balasana (Child Pose) The aim of Yoga asana in the treatment of psoriasis is to relax breathe, reduce stress, stretch your body and calm down your mind.

Anjali Mudra (Salutation Pose) Stimulates heart muscles, relieves pain, and promotes inner calm, detoxification of the body.

Pranayama for psoriasis

Bhastrika- According to Pascal's law, if the volume remains constant, the pressure is equally distributed in all direction. This pressure causes the reaction forces in organs and glands in the vicinity in order to remain in equilibrium. So, secretions from glands are initiated and increase the blood flow to the body, thereby clearing the toxins from the body.

Bahya- We exhale all the air out of lungs and it is considered to be very pure breathing technique that helps in detoxification of the body.

Exercise for psoriasis

Fingers ROM exercises- Very important to be performed because the sequel of psoriasis, that is psoriatic arthritis in which PIP and DIP joints of fingers and toes are

involved, if not taken care of can lead to deformities termed arthritis mutilans.

Back extensors- Strengthening exercises such as back extensors along with stretching of chest muscles are helpful, as most cases of psoriatic arthritis show spondyloarthritis i.e. inflammation of both joints and entheses leading to tightness and weakness.

Chikitsa

Patient suffering from Kustha dominated by Vata is administered with herbal ghee internally.

Patient suffering from Kustha dominated by Kapha, is administered Vamana – emetic therapy. Patient suffering from Kustha dominated by pitta is given Virechana – purgation therapy. For Vamana and Virechana for a Kushta patient, patient suffering from Kustha, the recipes described in the Kalpasthana section is employed. **Rakotamokshana – bloodletting:** **Pracchanna Raktamokshana** Blood-letting is done with a coarse device in case of Kusht with mild symptoms. **SiraVyadha Raktamokshana – vein puncture –** is administered in more acute stage. **Multiple Shodhana therapies:** Kushta patient with more vitiated Doshas (Bahudosh) is given Shodhana therapies for several times, with a lot of care. Excessive elimination of Doshas (morbid factors) might weaken the patient and the aggravated Vata might endanger patient's life instantaneously. Because Vayu gets aggravated and the patient becomes weak soon after the elimination therapies which condition will be remedied by the administration of the **Snehapana – oleation therapy** **Shamana** treatment for Kushta – **Palliative measures:** The remedies for cure of different types of Kustha, are categorized on the basis of aggravation of Doshas. Therapies for the cure of Kustha in general are Intake of **Rasanjana** (solid extract prepared of the decoction of **Daruharidra**) along cow urine cures Kushta (skin diseases). Intake of **Abhaya** along with **Trikatu** (Ginger, pepper and long pepper), **Guda** (Jaggery) and sesame oil for 1 month cures Kushta. **Patolamuladi Kashaya, Mustadi Churna, Triphaladi Churna, Madhvasava, Kanakabindvarista, Triphalasava** are useful in Treatment of kushta.

Use of Sulphur: Administration of **Lelitaka** (Sulphur) with the juice of (**Amalaki**) together with honey is the remedy par excellence for the cure of 17 types of Kustha (skin diseases). Similarly, is the therapeutic efficacy of **Makshika Dhatu** (copper pyrite) taken together with Cow's urine.

Use of Mercury: If **Rasa** (mercury) is processed by adding sulphur or **Svarnamakshika** (copper Pyrite), the **Bhasma** so prepared would be a remedy par excellence for curing all ailments. Similarly, Mercury processed with **Diamond** and **Shilajatu**, or **Yogaraja** cures all ailments.

Psoriasis (Modern concept)

Definition The word 'psoriasis', is derived from the Greek word "psora", which means "itch" or "scurf" or "rash". Psoriasis is a chronic (long-lasting) skin disease of scaling and inflammation.

Diet in Psoriasis- Diet has been suggested to play a role in the etiology and pathogenesis of psoriasis. It has been observed that psoriasis has been improved in 60% of the patients who changed their dietary habits. Fasting periods, low-energy diets and vegetarian diets improved psoriasis symptoms in some studies.

Environmental Factors- These environmental trigger factors can be mechanical injury, ultraviolet, and chemical injury; various infections; prescription drug use; psychological stress, smoking; and other factors. The most compelling of these is infection with group A streptococci. Streptococcal throat infections frequently precede outbreaks of guttate psoriasis which can then lead to chronic plaque psoriasis. Psychological stress plays an important role. Till date several studies suggested that most of the dermatological disorders are chronic inflammatory, immunogenic and psychosomatic in nature

Genetic factors- Research studies are found that really established the genetic component in Psoriasis. There is a clear genetic basis in psoriasis, as the incidence was found much greater amongst first- and second degree relatives of patients with psoriasis.

Immunologic factors: Evidence suggests that psoriasis is an autoimmune disease. Studies show high levels of dermal and circulating TNF- α . Psoriatic lesions are associated with increased activity of T cells in the underlying skin.

Pathogenesis

Specifically, the epidermis is infiltrated by a large number of activated T cells, which appear to be capable of inducing keratinocyte proliferation. This is supported by histologic examination and immunohistochemically staining of psoriatic plaques revealing large populations of T cells within the psoriatic lesions. Ultimately, a ramped-up, deregulated inflammatory process ensues with a large production of various cytokines (e.g., tumour necrosis factor- α [TNF- α], interferon-gamma, interleukin). Many of the clinical features of psoriasis are explained by the large production of such mediators. Interestingly, elevated levels of TNF- α specifically are found to correlate with flares of psoriasis. Key findings in the affected skin of patients with psoriasis include vascular engorgement due to superficial blood vessel dilation and altered epidermal cell cycle. Epidermal hyperplasia leads to an accelerated cell turnover rate (from 23 d to 3-5 d), leading to improper cell maturation. Cells that normally lose their nuclei in the stratum granulosum retain their nuclei, a condition known as parakeratosis. In addition to parakeratosis, affected

epidermal cells fail to release adequate levels of lipids, which normally cement adhesions of corneocytes. Subsequently, poorly adherent stratum corneum is formed leading to the flaking, scaly presentation of psoriasis lesions, the surface of which often resembles silver scales.

Sign and symptoms

Psoriasis can go undetected its first occurrence or during its earlier stages; symptoms appear mild as small, faint, dry patches.

Common symptoms include

Plaques of red skin often covered with loose, silver scales. This is the symptom most commonly associated with psoriasis such lesions can be extensive, itchy and painful. Cracking and bleeding may occur. In the most severe cases, these patches merge with one another to cover entire surface areas of the body. -Irritated patches of skin and dots, which are raised and thick, ranging from pink-red salmon to red in colour. Often these skin patches or skin dots are, like noted in the aforementioned, covered in silvery scales. -Redness on elbows, knees, trunk and scalp. Though these are the main places in which psoriasis symptoms are seen, symptoms can occur anywhere on the body. -Change and disfiguration of nails. Thickening, yellow-brown spots, dents and pits in the nail surface, separation of nail from base and crumbling of the actual nail may occur. -Severe dandruff. Plaques of silver scales or crust may develop as loose flakes constantly shed.

Diagnosis

In most cases, psoriasis can be diagnosed by examining skin. If the dermatologist isn't sure whether the patient has psoriasis, he or she may order a biopsy. If there are symptoms of psoriatic arthritis, such as swollen and painful joints, your doctor might run blood tests and take X-rays to rule out other forms of arthritis.

Prognosis

Scientific research has suggested that the physical and mental disability associated with moderate to severe cases of psoriasis is similar to that experienced with other chronic health conditions, such as heart disease and cancer. Associated Factors:-Psoriasis is related to several other factors, including: Smoking, Alcohol consumption, Metabolic syndrome, Lymphoma, Depression, Suicide, Melanoma, Cardiovascular disease, Respiratory diseases, Diabetes, Kidney disease, Arthritis. These factors may also account for the mortality changes noted in patients with severe psoriasis.

Laboratory investigations

Blood – Hemoglobin (Hb), total count (TC), differential count (DC), erythrocyte sedimentation rate (ESR), total red blood cells (RBC), peripheral blood picture.

Urine– Routine and microscopic examination.

Biochemical – Fasting blood sugar (FBS), serum creatinine, serum glutamate oxaloacetate transaminase (SGOT), serum calcium, total protein, albumin/globulin (A/G) ratio.

Treatment

Treatment is based on: The severity of the disease, The extent and location of the areas involved, Responsiveness to the treatment Topical Treatment, Corticosteroid creams and ointments (most common treatment), Synthetic forms of vitamin D and retinoids, Retinoids, Coal tar preparations, Bath solutions and moisturizers, Tacrolimus and pimecrolimus (especially for inverse psoriasis), Photo (Light) Therapy, Daily, short, nonburning exposure to sunlight, clears or improves psoriasis in many people. Sunlight is often included among initial treatments. A more controlled form of artificial light treatment (UVB phototherapy) is often used in cases that are more widespread. Alternatively, psoriasis can be treated with ultraviolet A (UVA) and psoralen. Psoralen is an oral or topical medication that makes the body more sensitive to light. This treatment is known as PUVA. Phototherapy may cause side effects such as nausea, headache, and fatigue, burning, and itching. Both UVB and PUVA may increase the person's risk for squamous cell and, possibly, melanoma skin cancers.

Systemic Treatment For more severe types of psoriasis, systemic therapy includes

- Methotrexate—a type of systemic medication that affects the whole immune system.
- Cyclosporine—another type of systemic medication that suppresses the immune system.
- Hydroxyurea— less toxic than methotrexate or cyclosporine, but may be less effective.
- Systemic retinoid Compounds with vitamin A-like properties taken internally may be prescribed in severe cases.
- Newer medications include biologic agents, which affect a part of the body's immune response by targeting certain cells in the immune system that cause inflammation.

Prevention: Avoiding physical trauma to the skin, infections, and cold, dry temperatures may help reduce flare-ups in people with the condition. It is advised to avoid certain foods which are thought to make the psoriasis worse.

CONCLUSION

By this study we can conclude that Ayurveda has effective treatment for psoriasis. The cost therapy is minimal. The side effects are minimal. Natural sources are easily available and easy to perform the medicine.

REFERENCES

1. Dwivedy Ramanath., Prof., editor. p. 4th ed. Varanasi: Chaukhamba Sanskrit Series;

- Chakradatta- of shri Chakrapanidatta, with Vaidatprabha 'Hindi Commentary and notes by Dr. Indradeva Tripathi; p. 279. Chapter 50-Kushtha Chikitsa, Shloka, 2002; 17.
2. Bhishagratna Vaidya Gopinath., Shri. 2nd ed. Pahadganj, Delhi: B. J Publishers Pvt. limited; Bharat Bhaishajya Ratnakara - "Dhakaradi Lepa Prakrana", no. 3320, collected by Rasavaidya Nagindas Chagganlal shah, 1999; 142.
3. [last Cited on Feb 6]. Available from: <http://www.dermatology.org>, 2011.
4. Finlay AY, Khan GK, Luscombe DK, Salek MS. A validation of Sickness Impact Profile and Psoriasis Disability Index in Psoriasis. *Brit J Dermatol*, 1990; 123: 751–6. [PubMed]
5. [Last cited on 2011 Feb 6]. Available from: <http://www.psoriasisguide.com>.
6. [Last cited on 2011 Feb 6]. Available from: <http://www.psoriasis.org>.
7. [Last cited on 2011 Feb 6]. Available from: <http://www.wikipedia.org>.
8. Articles from Ayu are provided here courtesy of Wolters Kluwer -- Medknow Publications.
9. Charak Samhita nidan sthana Part II by Dr. L.K. Dwivedi, Choukhambha publications, chapter ¼.
10. Charak Samhita sutra sthana Part I by Dr. L.K. Dwivedi, Choukhambha publications, chapter 26/86-87.
11. Sushrut Samhita, Sutra Sthan, Part I, By Keval Krishna Thakral, Choukhamba Orientalia, Chapter 20/ 15-16.
12. Charak Samhita sutra sthana Part I by Dr. L.K. Dwivedi, Choukhambha publications, chapter 26/92.
13. Charak Samhita sutra sthana Part I by Dr. L.K. Dwivedi, Choukhambha publications, chapter, 26/84.
14. Sushrut Samhita, Sutra Sthan, Part I, By Keval Krishna Thakral, Choukhamba Orientalia, Chapter 20/ 16.
15. Madhav Nidan, Of Mashavkara by Srivijayarakshita and Srikanthadatta By Sri Sudarshan Sastri, Chaukhambha Prakashan, Part II, Chapter, 50: 200-202.
16. Charak Samhita Chitiksa sthana Part III by Dr. L.K. Dwivedi, Choukhambha publications, chapter, 5-6.
17. Charak Samhita sutra sthana Part I by Dr. L.K. Dwivedi, Choukhambha publications, chapter, 23/6.
18. Charak Samhita sutra sthana Part I by Dr. L.K. Dwivedi, Choukhambha publications, chapter 11/35
19. Vaman Shivram Aapte. *Sanskrit-Hindikosa*, Varanasi; Chowkhamba vidyabhavan, 2010; 319.
20. P.V Sharma. *Sushrut Samhita vol 2*, (with English translation of text and Dalhana's commentary along with critical notes). Varanasi; Chowkhamba Visvabharati, 2013; 463-464.
21. Prof. Siddhi Nandan Mishra. *Bhaisajya Ratnavali of Kaviraj Govind Das Sen* (edited with 'Siddhiprada' Hindi commentary). Varanasi; Chowkhamba Surbharati Prakashan, 2015; 938.

22. Bhav Prakash (of Sri Bhavamisra edited with the vidyotini Hindi commentary) by Pandit Sri Brahma Sankara Misra, 2: 586.
23. R.K. Sharma Bhagwan Dash. Charak Samhita (text with English translation & critical exposition based on Cakrapani datta's Ayurveda Dipika). Varanasi; Chowkhamba Sanskrit Series office, 2014; 540.
24. R.K. Sharma Bhagwan Dash. Charak Samhita (text with English translation & critical exposition based on Cakrapani datta's Ayurveda Dipika). Varanasi; Chowkhamba Sanskrit Series office, 2014; 541-543.
25. Prof. Siddhi Nandan Mishra. Bhaisajya Ratnavali of Kaviraj Govind Das Sen (edited with 'Siddhiprada' Hindi commentary). Varanasi; Chowkhamba Surbharati Prakashan, 2015; 939-940.
26. Sri Brahmasankara Misra. Bhav Prakash (of Sri Bhamisra edited with the Vidyotini Hindi commentary, notes and appendix) vol 2, Varanasi; Chowkhamba Sanskrit Bhawan, 2015; 587.
27. P.V Sharma. Sushrut Samhita vol 2, (with English translation of text and Dalhana's commentary along with critical notes). Varanasi; Chowkhamba Visvabharati, 2013; 465.
28. Sri Brahmasankara Misra. Bhav Prakash (of Sri Bhamisra edited with the Vidyotini Hindi commentary, notes and appendix) vol 2, Varanasi; Chowkhamba Sanskrit Bhawan, 2015; 588.
29. Dr. P. Srinivas rao. Astanga Samgraha (text with English translation, notes, index & Sloka index) vol 3. Varanasi; Chowkhamba Krishnadas academy, 2009; 328.
30. Prof. Siddhi Nandan Mishra. Bhaisajya Ratnavali of Kaviraj Govind Das Sen (edited with 'Siddhiprada' Hindi commentary). Varanasi; Chowkhamba Surbharati Prakashan, 2015; 944.
31. Prof. Siddhi Nandan Mishra. Bhaisajya Ratnavali of Kaviraj Govind Das Sen (edited with siddhiprada Hindi commentary). Varanasi; Chowkhamba surbharati Prakashan, 2015; 937.
32. P.V Sharma. Sushrut Samhita vol 2, (with English translation of text and Dalhana's commentary along with critical notes). Varanasi; Chowkhamba Visvabharati, 2013; 464.