WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
Coden USA: WJPRAP Impact Factor 8.63
Volume 15, Issue 17, 1676-1689. Research Article ISSN 2277–7105

COMPARATIVE CLINICAL EVALUATION OF NIRAGNI SWEDANA, NASYA, AND VISHWADI KASHAYAM VERSUS THYROXINE SODIUM IN THE MANAGEMENT OF HYPOTHYROIDISM

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Article Received on 05 August 2026,
Article Revised on 25 August 2026,
Article Published on 01 Sept. 2026,

https://doi.org/10.5281/zenodo.22266715

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How to cite this Article: Shalu Jain*[1], Abhishek Jain[2], Umesh Shukla[3]. (2026). Comparative Clinical Evaluation Of Niragni Swedana, Nasya, And Vishwadi Kashayam Versus Thyroxine Sodium In The Management Of Hypothyroidism. World Journal of Pharmaceutical Research, 15(17), 1676–1689.

ABSTRACT

Background and Rationale: Hypothyroidism is a prevalent endocrine disorder characterized by inadequate thyroid hormone production, manifesting clinically as weight gain, fatigue, constipation, dry skin, and hair loss. Although synthetic thyroxine remains the cornerstone of conventional management, its requirement for lifelong administration and associated risk of metabolic complications have prompted growing interest in exploring complementary and alternative therapeutic approaches. **Objective:** The present study aimed to evaluate the clinical efficacy of an Ayurvedic therapeutic regimen comprising *Niragni Swedan (Vyayam), Nasya (Katutumbi Taila),* and *Vishwadi Kashayam* in the management of hypothyroidism, and to compare its outcomes with standard levothyroxine (thyroxine sodium) therapy. **Materials and Methods:** A prospective, randomized, open-label, controlled clinical trial was conducted at Pt. Khushilal Sharma Government Autonomous Ayurveda College & Institute, Bhopal, India. Forty newly diagnosed hypothyroid patients aged between 21 and 45 years were enrolled and randomly allocated into two groups of 20 participants each. Group A (Ayurvedic group) received *NiragniSwedan*, *Nasya* with *Katutumbi Taila*, and oral *Vishwadi Kashayam*, while Group B

(Control group) received Thyroxine sodium as per the dosage prescribed by a qualified modern physician. The total study duration was 45 days, with an additional 15-day post-treatment follow-up period. Outcomes were assessed based on symptomatic relief and changes in serum thyroid-stimulating hormone (TSH) levels. **Results:** Group A demonstrated extremely significant improvements in constipation, tiredness, hair fall, dry skin, muscle ache, and BMI, with very significant relief in excessive sleep and significant improvement in edema. Serum TSH reduced from 10.292 mIU/mL to 5.812 mIU/mL in Group A (very significant) and from 8.626 mIU/mL to 4.495 mIU/mL in Group B (extremely significant), indicating comparable biochemical efficacy in both groups. Serum T3 and T4 remained statistically non-significant in both groups. Group B showed limited symptomatic and metabolic benefits, with no significant improvement in BMI. **Conclusion:** The Ayurvedic combination of *NiragniSwedan*, *Nasya (Katutumbi Taila)*, and *Vishwadi Kashayam* demonstrated marked symptomatic relief and a statistically significant reduction in serum TSH levels, suggesting its potential as a safe, effective, and viable alternative therapeutic strategy in the management of hypothyroidism. Further large-scale, multi-centric trials are warranted to validate and establish these findings.

KEYWORDS: Hypothyroidism, *NiragniSwedan*, *Nasya*, *Katutumbi Taila*, *Vishwadi Kashayam*,

INTRODUCTION

The thyroid gland is a mainstay of the human endocrine system, regulating growth, metabolism, development, and almost all body functions through hormonal secretion into the bloodstream.[1,2] Hypothyroidism results from structural and functional derangement interfering with thyroid hormone production, leading to a hypometabolic state manifested as weight gain, weakness, lethargy, peri-orbital puffiness, cold intolerance, hair loss, dry and coarse skin, hoarseness of voice, and constipation.[3,4]

The global incidence of hypothyroidism is rising rapidly, posing a major health challenge worldwide.[5] According to the World Health Assembly, approximately 1.5 billion people across 110 countries are affected by thyroid disorders, with an estimated 42 million Indians suffering from the same, hypothyroidism being the most common with a prevalence of 5.4%.[6] It affects approximately one in ten adults, with subclinical hypothyroidism at 11%, predominantly among females (15.86% vs. 5.02% in males).[7] Primary hypothyroidism accounts for over 95% of all cases, while central hypothyroidism of pituitary origin occurs in

only 1 per 1,000 cases.[8]

From an Ayurvedic perspective, the pathogenesis of hypothyroidism correlates with phenomena such as *Kaphavarit-Vata*,[9] *Kapha-Medo-Avrita Vata*,[10] *Galgand* in *Urdhvajatrugata Rogas*, and *Dhatvagnimandhya Janya Vikrati*,[11,12] which appear to play a significant role in disease manifestation.

Despite remarkable advances, modern management of hypothyroidism remains unsatisfactory, with synthetic thyroxine being the sole therapy, necessitating lifelong hormonal dependence and carrying the risk of long-term metabolic complications. This underscores the need for safe, effective, and affordable therapeutic alternatives.[13] In recent decades, there has been a growing global interest in traditional systems of medicine, with a considerable number of patients preferring Ayurvedic phytomedicines and complementary therapies.

To counteract *Avarana Janya Samprapti*, *Niragni Swedan* holds a specific therapeutic role and is recommended in *Kapha-Meda-Avrita Vata*. [13] *Vyayam Niragni Swedan*, as described by Acharya Sushruta in the context of *Mandagni*, *Kaphaja Roga*, and *Medoj Roga*, was accordingly selected.[14] Since the thyroid gland is situated in the supraclavicular region *(Urdhvajatrugata Sthan)*, a *Kapha Sthana*, and the nose is considered the gateway to the head in Ayurveda, *Nasya* with *Katutumbi Taila* was chosen as the most appropriate route of drug administration for *Urdhvajatrugata Rogas*.[15] *Vishwadi Kashayam*, indicated in *Kapha Dosha* and *Agnimandhya*, possesses *Lekhan*, *Agnidipana*, *Srotoshodhana*, and *Medhya* properties, making it suitable for addressing *Medodushti*, *Agnimandhya*, and *Avrita Vata*.[16]

AIM & OBJECTIVES

The present study was designed to evaluate the clinical efficacy of an integrated Ayurvedic therapeutic regimen comprising *NiragniSwedan (Vyayam)*, *Nasya (Katutumbi Taila)*, and *Vishwadi Kashayam* in patients diagnosed with hypothyroidism. The primary objective was to assess therapeutic outcomes with respect to clinical symptom improvement, biochemical parameters particularly serum TSH levels and overall patient well-being. As a secondary objective, a comparative analysis was undertaken between the Ayurvedic protocol and conventional Thyroxine Sodium therapy to determine relative efficacy, safety profile, and patient response. Furthermore, the study sought to explore the potential of traditional Ayurvedic interventions as a complementary or alternative approach to standard modern

management of hypothyroidism, thereby contributing evidence-based insights into integrative treatment strategies and strengthening the scientific foundation for Ayurvedic therapeutics in the clinical management of endocrine disorders.

MATERIALS AND METHODS

2.1 Study Design and Setting

A prospective, randomized, open-label, controlled clinical trial was conducted at the Outpatient Department of Pt. Khushilal Sharma Government Autonomous Ayurveda College & Institute, Bhopal, Madhya Pradesh, India. The study was initiated after obtaining ethical approval from the Institutional Ethics Committee (IEC) (Approval No. PGT/7-A/Ethics/2012-2013/1964, dated 29/09/2020). Written informed consent was obtained from all participants prior to enrollment, and standard COVID-19 safety protocols were strictly adhered to throughout the study period.

2.2 Sample Size and Participant Selection

A total of 40 patients clinically diagnosed with hypothyroidism were enrolled from the Outpatient Department. Participants meeting the eligibility criteria were included irrespective of caste, religion, sex, or socioeconomic status. Enrolled patients were randomly allocated into two groups of 20 participants each using simple randomization.

2.3 Inclusion Criteria

Patients aged between 21 and 45 years with a newly diagnosed hypothyroidism were considered eligible for enrollment. Diagnosis was confirmed on the basis of thyroid profile, with elevated serum TSH levels (>5.0 mIU/mL), with or without low serum T3/T4; cases presenting with normal T3/T4 but elevated TSH were also included. Only those patients who were physically fit to undergo Nasya therapy and NiragniSwedan were enrolled. Additionally, willingness to participate and provision of written informed consent was mandatory for inclusion in the study.

2.4 Exclusion Criteria

Patients with complicated hypothyroidism, including myxedema, thyroid malignancy, or severe mental illness, were excluded from the study. Those suffering from chronic systemic illness or significant comorbidities, as well as patients with congenital hypothyroidism, were also deemed ineligible. Women who were pregnant or lactating and patients with a prior history of thyroid surgery were excluded. Furthermore, any patient with a confirmed or

suspected history of COVID-19 infection was not enrolled in the study.

2.5 Treatment Protocol

Group A — Ayurvedic Treatment Group (Study Group): Participants in Group A received an integrated Ayurvedic therapeutic regimen comprising three interventions. *Niragni Swedan (Vyayam)* was administered as a non-fire-based sudation therapy. *Nasya* therapy was performed using *Katutumbi Taila* at a dose of 6 drops instilled into each nostril. *Vishwadi Kashayam* was administered orally at a dose of 40 ml twice daily. All three interventions were continued for a total duration of 45 days.

Group B — Control Group (Conventional Treatment): Participants in Group B received Thyroxine Sodium at a dosage prescribed by a qualified modern physician, as per standard clinical practice, for the same duration of 45 days.

2.6 Study Duration and Follow-Up

The total intervention period was 45 days for both groups. Following completion of the treatment, a 15-day post-treatment follow-up was conducted to assess the sustainability of therapeutic effects and to monitor for any adverse events or safety concerns**.**

2.7 Outcome Measures

Baseline assessment was performed using a comprehensive research proforma along with a standardized scoring pattern for clinical efficacy. Outcome measures were assessed at baseline (Day 0) and post-treatment (Day 45) and included the following parameters:

Objective Parameters

- Body Mass Index (BMI)

Biochemical Parameters:

- Serum Thyroid-Stimulating Hormone (S. TSH)
- Serum Triiodothyronine (S. T3)
- Serum Thyroxine (S. T4)

2.8 Statistical Analysis

All data were compiled and subjected to appropriate statistical analysis. Descriptive statistics were expressed as Mean ($\bar{x}$), Standard Deviation (SD), and Standard Error (SE). For non-parametric data, the Wilcoxon Signed-Rank Test was applied for intra-group (paired) comparison, and the Mann-Whitney U Test was applied for inter-group (unpaired)

comparison. For objective biochemical parameters, the Paired t-test was used for intra-group comparison and the Unpaired t-test was applied for inter-group comparison. A p-value of <0.05 was considered statistically significant.

CRITERIA FOR ASSESMENT

The assessment of treatment outcomes was based on both subjective and objective parameters. Subjective parameters included excessive sleep, muscle ache, edema, dry and coarse skin, constipation, tiredness, and hair fall, each evaluated on a standardized symptom grading scale ranging from 0 (absent/normal) to 3 or 4 (most severe) based on clinical severity. Objective assessment was carried out using Body Mass Index (BMI), graded according to WHO classification criteria. Biochemical evaluation included serum thyroid-stimulating hormone (S. TSH), serum triiodothyronine (S. T3), and serum thyroxine (S. T4), recorded at baseline (Day 0) and post-treatment (Day 45) to objectively monitor therapeutic response.

RESULTS

A total of 40 patients with newly diagnosed hypothyroidism were enrolled and randomly allocated into two groups of 20 each. All patients completed the study protocol, and no significant adverse events were reported in either group throughout the intervention period. Data obtained from both groups were subjected to appropriate statistical analysis, and the findings are presented as follows.

3.1 Baseline Comparability

At baseline, both groups were comparable with respect to demographic characteristics and clinical parameters. The mean serum TSH in Group A was 10.292 mIU/mL and in Group B was 8.626 mIU/mL, with no statistically significant inter-group difference prior to intervention, confirming homogeneity between the two groups.

3.2 Effect on Biochemical Parameters

Serum TSH, the primary biochemical outcome marker, showed a clinically meaningful and statistically significant reduction in both groups following the respective interventions. In Group A, mean serum TSH declined from 10.292 mIU/mL to 5.812 mIU/mL post-treatment, representing a mean reduction of 4.480 mIU/mL ($t=3.759$; $p=0.0013$), which was categorized as very significant. Group B demonstrated an even sharper biochemical response, with mean serum TSH declining from 8.626 mIU/mL to 4.495 mIU/mL, reflecting a mean reduction of

4.131 mIU/mL (t=6.208; p<0.0001), classified as extremely significant. Notably, both groups achieved comparable degrees of TSH normalization, underscoring the biochemical equivalence of the Ayurvedic regimen with standard thyroxine therapy. Serum T3 and T4 levels, however, did not demonstrate statistically significant changes in either group (p>0.05), which may be attributed to the relatively short intervention duration of 45 days.

3.3 Effect on Subjective Parameters

The Ayurvedic intervention in Group A produced remarkable and statistically superior symptomatic relief across nearly all subjective parameters when compared to Group B. The most striking improvement was observed in excessive sleep, where Group A achieved 90% relief (p=0.0078; W=36.000, very significant), in stark contrast to Group B, which showed a mere 30.7% relief that failed to reach statistical significance (p=0.1250). Similarly, dry and coarse skin responded exceptionally well to the Ayurvedic regimen, with Group A recording 84% relief (p=0.0005; W=78.000, extremely significant) against 50% relief in Group B (p=0.0156, significant). Constipation showed an 80% reduction in Group A (p<0.0001; W=120.000, extremely significant) compared to only 34% in Group B (p=0.0156, significant), reflecting the potent *Deepana and Srotoshodhana* action of *Vishwadi Kashayam.* Tiredness demonstrated 56.7% improvement in Group A (p=0.0001; W=105, extremely significant) versus 33.3% in Group B (p=0.0020; W=55.000, very significant). Hair fall showed 48.5% relief in Group A (p=0.0001; W=105.000, extremely significant) compared to 31.2% in Group B (p=0.0078; W=36.000, very significant). Muscle ache improved by 54.8% in Group A (p<0.0001, extremely significant) and by 63.6% in Group B (p=0.0005; W=78.000, extremely significant), with both groups performingcomparably for this parameter. Edema showed 75% relief in Group A (p=0.0313; W=21.000, significant) while Group B yielded only 60% relief that was not statistically significant (p=0.2500), further demonstrating the advantage of the Ayurvedic protocol in managing fluid retention associated with hypothyroidism.

3.4 Effect on Objective Parameter

BMI, assessed as the primary objective parameter, showed extremely significant reduction in Group A (p<0.0001), reflecting the combined effect of *Niragni Swedan, Vyayam*, and *Vishwadi Kashayam* in reducing *Meda Dhatu* accumulation and improving metabolic function. In contrast, Group B did not demonstrate a statistically significant change in BMI (p>0.05) over the 45-day study period, suggesting that thyroxine supplementation alone may

be insufficient to produce meaningful anthropometric improvement in the short term.

3.5 Comparative Efficacy — Group A versus Group B

A comparative analysis of both groups revealed a clear clinical advantage in favour of Group A for subjective and objective outcomes. Group A achieved extremely significant results ($p<0.0001$) in five of seven subjective parameters — constipation, tiredness, hair fall, dry skin, and muscle ache — along with extremely significant BMI reduction, while Group B achieved significant to very significant results in only three subjective parameters and failed to demonstrate meaningful BMI improvement. With respect to biochemical outcomes, both groups performed comparably in reducing serum TSH, while serum T3 and T4 remained unchanged in both. These findings establish that the integrated Ayurvedic regimen of *Niragni Swedan*, *Nasya* with *Katutumbi Taila*, and *Vishwadi Kashayam* offers superior symptomatic and metabolic benefits while maintaining biochemical efficacy equivalent to standard thyroxine therapy, thereby presenting a compelling case for its role as a safe and effective therapeutic alternative in the management of hypothyroidism.

Grading Scale for Subjective Parameters

1. Excessive Sleep

Table 1: Grading of Excessive Sleep.

Grade	Description
0	6–7 hours/day (Normal)
1	8 hours/day
2	10 hours/day
3	More than 10 hours/day

2. Muscle Ache

Table 2: Grading of Muscle Ache.

Grade	Description
0	Absent
1	Relieved by rest
2	Not relieved by rest but relieved by external application
3	Required external and internal application
4	Present consistently

3. Edema

Table 3: Grading of Edema.

Grade	Description
0	No edema
1	Edema on lower/upper extremities only
2	Edema on both upper and lower extremities
3	Generalized edema (whole body)

4. Dry and Coarse Skin

Table 4: Grading of Dry and Coarse Skin.

Grade	Description
0	No dryness
1	Dryness after bath only
2	Dryness throughout the day, relieved by oil application
3	Dryness throughout the day, not relieved by oil application

5. Constipation

Table 5: Grading of Constipation.

Grade	Description
0	No constipation
1	Motion once daily without complete evacuation
2	Motion once in two days
3	Motion once in more than two days with hard stool

6. Tiredness

Table 6: Grading of Tiredness.

Grade	Description
0	Absent
1	Prefers standing over walking
2	Prefers sitting over standing
3	Prefers lying down over sitting

7. Hair Fall

Table 7: Grading of Hair Fall.

Grade	Description
0	Absent
1	Hair fall on washing
2	Hair fall on combing
3	Hair fall on stretching

Grading Scale for Objective Parameter

Body Mass Index (BMI)

Table 8: Grading of Body Mass Index (BMI) — WHO Classification.

Grade	BMI Range (kg/m²)	WHO Category
0	18.5 – 24.9	Normal
1	25.0 – 29.9	Overweight
2	30.0 – 34.9	Obese Class I
3	≥ 35.0	Obese Class II and above

Biochemical Parameters for Outcome Assessment

Table 9: Biochemical Parameters Assessed at Baseline (Day 0) and Post-Treatment (Day 45).

S.No.	Parameter	Abbreviation	Significance
1.	Serum Thyroid-Stimulating Hormone	S. TSH	Primary diagnostic and outcome marker
2.	Serum Triiodothyronine	S. T3	Assessment of thyroid hormone status
3.	Serum Thyroxine	S. T4	Assessment of thyroid hormone status

DISCUSSION

Hypothyroidism correlates in Ayurvedic understanding with *Kaphavarita* Vata, *Dhatvagnimandhya*, and *Medo Dushti*, necessitating therapeutic interventions directed at Avarana removal, *Srotoshodhana*, and restoration of *Dhatvagn*i. The present study evaluated a tripartite Ayurvedic regimen comprising *NiragniSwedan (Vyayam)*, *Nasya* with *Katutumbi Taila*, and *Vishwadi Kashayam* against conventional Thyroxine Sodium therapy, and the

findings warrant a detailed mechanistic and clinical discussion.

Niragni Swedan facilitates *Vishyandana, Doshapaka, Srotomukha shodhana,* and *Vayu Nigraha* by virtue of its *Vata-Kaphaghna* properties. Physiologically, *Vyayam* elevates basal metabolic rate, induces peripheral vasodilatation, and enhances capillary circulation, promoting elimination of metabolic waste through increased perspiration. The thermogenic effect of brisk physical activity facilitates breakdown of subcutaneous triglycerides into free fatty acids, which are subsequently transported to the liver and converted into bile, thereby reducing *Meda Dhatu* accumulation a central feature of hypothyroid pathogenesis. In a state of controlled caloric intake, the body preferentially utilizes stored fat for energy production, directly addressing the *Medoja* and *Kaphaja* components of the disease. This mechanistically explains the extremely significant BMI reduction observed in Group A ($p<0.0001$), which was notably absent in Group B.

The nasal route holds paramount therapeutic significance in Ayurveda for *Urdhvajatrugata Rogas,* as the nose is considered the *Shira dvara,* the gateway to the head. The thyroid gland, situated in the supraclavicular *Kapha*-dominant zone, makes Nasya a physiologically rational intervention. Lipid-soluble constituents of *Katutumbi Taila* undergo passive absorption through the highly vascular nasal mucosa, a process further enhanced by prior *Abhyanga* and *Swedana,* which improve tissue permeability and local circulation. The proximity of nasal mucosa to intracranial circulation through facial and olfactory nerve communications enables delivery of bioactive compounds to the hypothalamo-pituitary axis, potentially modulating TSH secretion at its source. *Purvakarma* and *Paschatkarma* additionally facilitate drainage of excess Kleda, reducing *Kapha* accumulation in the cervical and thyroid region, thereby supporting the observed TSH reduction in Group A.

Vishwadi Kashayam, indicated in *Agnimandya* and *Kapha Dosha* predominance, constitutes the Shamana component of the protocol. Its constituent herbs collectively *possess Ushna Virya, Tridoshaghna, Deepana, Anulomana, Shothaghna, Lekhan, Medhya,* and *Srotoshodhana* properties, addressing the multidimensional pathological milieu of hypothyroidism. By correcting *Jatharagnimandhya* at the primary level, it prevents the cascading development of *Dhatvagnimandhya Janya Vikara,* thereby restoring normal tissue metabolism. Its Lekhan property directly counters *Medo Dushti*, while *Srotoshodhana* action clears *Kaphaja* and *Medoja Avarana* of *Vata* — the fundamental pathogenic event in hypothyroidism. These combined actions plausibly explain the extremely significant

improvements in constipation, dry skin, tiredness, excessive sleep, and hair fall observed in Group A.

While both groups achieved statistically significant reductions in serum TSH, Group A demonstrated markedly superior outcomes across subjective and objective clinical parameters. The superiority of Group A in excessive sleep (90% vs 30.7%), dry skin (84% vs 50%), constipation (80% vs 34%), and BMI (extremely significant vs non-significant) underscores the holistic therapeutic advantage of the Ayurvedic protocol, which addresses not merely the hormonal deficit but the underlying *Doshic*, metabolic, and *Sroto*-level derangements responsible for the symptomatic burden of hypothyroidism. Conventional thyroxine therapy, while effective in biochemical normalization, appears to offer limited symptomatic and metabolic benefit over a short treatment duration, suggesting that the integrated Ayurvedic regimen holds significant potential as a safe, effective, and holistic therapeutic strategy in the management of hypothyroidism.

The present study acknowledges certain limitations. The sample size of 20 patients per group, while adequate for a pilot clinical trial, limits generalizability of findings. The 45-day duration may have been insufficient to detect significant changes in serum T3 and T4 levels. The absence of blinding, inherent to Ayurvedic procedural therapies, introduces the possibility of performance bias. Future studies with larger sample sizes, longer follow-up periods, and multi-centric enrollment are warranted to validate and consolidate the present findings.

CONCLUSION

The integrated Ayurvedic regimen of *Niragni Swedan (Vyayam), Nasya* with *Katutumbi Taila*, and *Vishwadi Kashayam* demonstrated safe and effective management of hypothyroidism with marked symptomatic relief in constipation, tiredness, hair fall, dry skin, muscle ache, BMI, and serum TSH, establishing its superiority over Thyroxine Sodium in clinical and metabolic outcomes while maintaining comparable biochemical efficacy. Large-scale, multi-centric trials with extended follow-up are recommended to further validate these findings.

REFERENCES

1. Ganpati mudur ‘endocrine disorders remain undetected and untreated in india’ BMJ 1999 jan 23; 31 8(7178); 216 new delhi 2.

2. https://healthywa.wa.gov.au/Articles/S_T/The-thyroid-gland
3. kumar, abbas, aster, Robbins and cotran pathologic basis of disease tenth edition volume II chapter 24 the endocrine system page 1077.
4. Ganpati mudur 'endocrine disorders remain undetected and untreated in india' BMJ 1999 jan 23;31 8(7178); 216 new delhi 2.
5. Unnikrishnan A, Bantwal Gijon M, et.al. Prevalence of hypothyroidism in adult: an epidemiological study in eight cities ofIndia.
6. Fatourechi, V.Subclinical Hypothyroidism: An Update for Primary Care Physicians' 'Mayo Clinic Proceedings, (2009), 84 (1): 65- 71.doi:10.4065/84.1.65. PMC 2664572.PMID 19121255.
7. Unnikrishnan A, Bantwal Gijon M, et.al. Prevalence of hypothyroidism in adult: an epidemiological study in eight cities ofIndia.
8. Fatourechi, V.Subclinical Hypothyroidism: An Update for Primary Care Physicians' 'Mayo Clinic Proceedings, (2009), 84 (1): 65- 71.doi:10.4065/84.1.65. PMC 2664572.PMID 19121255.
9. Shastri Kashinath,ChaturvediGorakhnath edited Charak Samhita of Agnivesha,revised by Charaka and Dridhbala,part II, Chaukhambha Bharati Academy,Varanasi.Reprint.,2009; Chikitsha Sthana28/224; page no;814.
10. Shastri Kashinath,ChaturvediGorakhnath edited Charak Samhita ofAgnivesha,revised by Charaka and Dridhbala,part II, Chaukhambha Bharati Academy,Varanasi.Reprint.,2009; Chikitsha Sthana28/187; pageno;808.
11. Sushruta, SushrutaSamhita, Ayurved-Tattva-Sandipika Commentary of ShriKavirajaShastriAmbikaDutta, Chaukhamba Sanskrit Sansthan, Varanasi, reprint-2010, Nidan Sthan-11 chapter, verse-23, page number355.
12. Sushruta, SushrutaSamhita, Ayurved-Tattva-Sandipika Commentary of ShriKavirajaShastri AmbikaDutta, Chaukhamba Sanskrit Sansthan, Varanasi, reprint-2010, Chikitsa Sthan-32 chapter, verse-15, page number175.
13. Sushruta, SushrutaSamhita, Ayurved-Tattva-Sandipika Commentary of ShriKaviraja Shastri AmbikaDutta, Chaukhamba Sanskrit Sansthan, Varanasi, reprint-2010, ChikitsaSthan-chapter, verse-39, page number134.
14. Shastri Kashinath,ChaturvediGorakhnath edited Charak Samhita of Agnivesha,revised by Charaka and Dridhbala,part II, Chaukhambha Bharati Academy,Varanasi.Reprint.,2009; siddhi Sthana 2/22; pageno;986.

15. GuptKavirajAtridev, edited AshtangHriday of Vagbhatt, Chaukhambhaprakashan, Varanasi edition reprint- 2016, sutra sthan-20.
16. Late.PanditraoDr.D.B. Sahastrayoga:newDehli ch.1vers192 delhi; CCRAS;Ist ed.499p.101.