A standard controlled clinical study on *Virechana Karma* and *Lekhana Basti* in the management of dyslipidemia (*Medoroga*)

Pooja B.A, Santosh Kumar Bhatted

Department of Panchakarma, SDM College of Ayurveda, Udupi, Karnataka, 'Department of Panchakarma, All India Institute of Ayurveda, New Delhi, India

**Abstract**

**Background:** Dyslipidemia, a major risk factor of coronary heart disease, is the leading single cause of death in the world. Currently available hypolipidemic agents have been associated with a large number of side effects. The radical Ayurveda *Samshodhana Chikitsa* as a treatment protocol can provide better effect. Therefore, the present study was designed to evaluate the effect of *Virechana Karma* and *Lekhana Basti* in dyslipidemia. **Objectives:** To evaluate the effect of *Virechana Karma* and *Lekhana Basti* in the management of dyslipidemia (*Medoroga*). **Materials and Methods:** Ninety patients of either sex in the age group of 20–60 years, fulfilling the study criteria were included in the study. The patients were randomly divided into three groups (thirty patients each). *Virechana Karma* was administered to patients in group A, *Lekhana Basti* was administered in group B and tablet Atorvastatin in group C. The effect of treatment was assessed by analyzing the complete lipid profile after completion of treatment and after the follow up in comparison to base line score. **Results:** All the three groups showed statistically highly significant result in the lipid profile after the treatment and after the follow up. **Conclusion:** *Virechana Karma* is effective in reducing triglycerides level, whereas *Lekhana Basti* is effective in reducing the cholesterol level in particular.

**Keywords:** Atorvastatin, dyslipidemia, *Lekhana Basti*, lipid profile, *Virechana Karma*

**Introduction**

The twenty-first century is an era of tremendous development and innovation in all aspects of life in general and in the field of technology in particular, which has made living much more comfortable on one side but on the other side, gifted many lifestyle related diseases. One of such gift is dyslipidemia which is a potential signal for unrecognized comorbidities such as obesity, metabolic syndrome, diabetes mellitus, hypertension, cardiovascular disease etc. [1] It may be manifested by elevation of the total cholesterol, low-density lipoprotein cholesterol (LDL) and triglyceride (TGL) concentrations and a decrease in the good high-density lipoprotein (HDL) cholesterol concentration in the blood. The prevalence of dyslipidemia in India is not exactly known as it usually appears as subclinical case without symptoms. For every 1% increase in cholesterol level, there is 1–2% increase in the incidence of coronary heart disease. According to the National Commission on Macroeconomics and Health, there would be around 62 million patients with coronary artery disease by 2015 in India and of these, 23 million would be patients younger than 40 years of age. [2]

Statins are the first choice in the treatment of dyslipidemia. [3] The data from the US National Health and Nutrition Examination Survey conducted from 1999 to 2000 reported that 25% of adults either had total cholesterol >239.4 mg/dl or were taking a lipid-lowering medication. Lifestyle modifications should always be a part of the management of dyslipidemia. However, the need for long-term, lifelong therapy is associated with several adverse effects such as myopathy, increased risk of renal failure, hypothyroidism and memory loss in 15%-20% of the patients on treatment with statins.

There are scattered references available in Ayurveda which can be correlated to dyslipidemia. Lipids can be easily correlated to that of *Medo Dhatu*. Abnormal composition of *Medo Dhatu* is considered as *Medo Dosha* and subsequently as *Medoroga*.

**Address for correspondence:** Dr. B.A. Pooja,
Department of Panchakarma, SDM College of Ayurveda, Kuthpady, Udupi-574 118, Karnataka, India.
E-mail: drpoojab@gmail.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.
Medoroga being Bahu Dosha (excessive vitiated) condition, Samshodhana Chikitsa (bio-purification) is preferred as treatment modality. Among these treatments, Virechana Karma (therapeutic purgation) is best for the elimination of excessively vitiated Pitta Dosha, to correct Agni (factor responsible for digestion and absorption) and Basti Karma (therapeutic enema) is the best treatment for correction of Vata Dosha, which are the basic factors involved in the pathogenesis of Medoroga.14

Considering the incidence, prevalence and impact of dyslipidemia on comorbid pathology and limitations in its treatment, there is a need to provide safe and effective therapeutic measures. Thus, with this thought, a standard controlled comparative clinical study was carried out to evaluate the efficacy of Virechana Karma and Lekhana Basti in comparison with statin group, i.e., Tablet, Atorvastatin.

Materials and methods

The present study was a randomized, standard controlled, comparative clinical trial carried out over a period of 3 months with an objective to compare the effect of Virechana Karma and Lekhana Basti in comparison with tablet atorvastatin in the management of dyslipidemia (Medoroga). The study protocol was approved by the Ethical Committee of the National Institute of Ayurveda, Jaipur (AK/Ph.D.123/16-03-2012). After obtaining written informed consent, ninety patients of either sex in the age group of 20–60 years fulfilling the following study criteria were included in the study.

Inclusion criteria

Abnormal serum lipid levels like serum cholesterol (201 mg/dl or more), serum TGLs (161 mg/dl or more), serum HDL (below 40 mg/dl), serum LDL (131 mg/dl or more), and serum VLDL (41 mg/dl or more) were included in the study.

Exclusion criteria

Patients with a history or evidence of systemic disorders like cardiac, hepatic, renal, and neurological diseases and who were not fit for Virechana Karma and Lekhana Basti were excluded.

A detailed medical history, clinical examination, anthropometric measurements, and baseline laboratory investigations such as Hb %, TLC, DLC, ESR, Urine analysis were also carried out in addition to serum lipid profile.

Grouping

Ninety patients were divided into three groups (thirty patients each) by random sampling method. Virechana Karma was administered to patients in group A, Lekhana Basti in group B and tablet Atorvastatin in group C respectively. The effect of treatment was assessed by analyzing the complete lipid profile after completion of treatment and follow-up in comparison to baseline status.

Group A (Virechana Karma procedure)
Panchakola Churna5 was administered to patient thrice a day in the dose of 2 grams orally after food along with Shukkoshna Jala ( lukewarm water) for a period of 3–7 days until Nirama Lakshana (features of good appetite) was obtained. There after Tripitha Taila6 was administered between 6:30 am and 7 am with lukewarm water as Anupaana (adjuvant) in an increasing dose, starting with 30 ml on the first day, depending upon Agnideepiti (increased power of digestion). Second day onwards the dose was increased accordingly for a period of 3–7 days till Samyak Snigdha Lakshanas (proper features of internal oleation) were observed.

Samshodhana Basti (lukewarm water) for 25 minutes followed by Mridu Vashpa Swedana (mild sudation) for 10 minutes was carried out for 4 days including the day of Virechana Karma. During these three-day, a light diet including rice gruel, green gram soup, grapes, sweet lemon, orange and pomegranate was advised.

Preparation of Virechana Yoga (formulation for purgation)
Forty grams of Triphala Kwatha Churna (powder of Terminalia chebula, Terminalia bellirica and Emblica officinalis) was boiled in 160 ml of water and was reduced to 80 ml to which 15 g of Trivrittha Churna (powder of Operculina turpethum) and 10 g of Katuki Churna (powder of Picchroza curraoa) was mixed. The above mixture was administered followed by 1–2 tablets of Ichchabedi Rasa as Virechana Yoga.

Administration of Virechana Yoga

After Sarvanga Abhyanga and Mridu Svedana, patients were examined for the vitals such as pulse, blood pressure etc., and then, the above mentioned Virechana Yoga was administered in between 9.30 am and 10 am with warm water. Later as per the need, 1–2 Ichchabedi Rasa tablet (125 mg each) were given. Patients were instructed to take warm water repeatedly, not to sleep in the afternoon, not to sit under fan or expose to strong winds or sunlight, have a rest and to attend the urge of defection.

Observations of the patient

The observations like the time of initiation of Virechana Vega (urge of defection), total number of Virechana Vega (bouts of purgation), time of completion, nature of Vega, Kshudha Pravritti (hunger), examination of vitals, Laingiki Lakshana (features of the proper Virechana), Antiki Lakshana (features of proper completion of the procedure), or Vyapada (complications) if any were noted.

After the completion of Virechana, all the patients were advised for special diet which consists of liquid rice gruel, thick rice gruel, green gram soup, green gram soup with spices and meat soup (only in nonvegetarian patients) administered each for 1, 2 or 3 Annakala (meals) where in a day consists of 2 Annakala. In this way, these four diets were advised for 3, 5 and 7 days depending upon Avara (average), Madhyama (medium) and Pravara Shuddhi (best purification) respectively.7 Thereafter,
follow up of the patients was done once in fortnight up to 90 days.

**Group B (Lekhana Basti procedure)**
In this group, Lekhana Basti was administered to the patients of Dyslipidemia as per Kala Basti schedule, but slightly modified as depicted in Table 1.

For the purpose of Basti administration, the patient was first subjected to Sarvanga Abhyanga with Dashamool Taila followed by Vashpa Svedana. Patient was asked to take rice with green gram Dal in small quantity than regular consumption, attend natural urges and walk a few steps before reaching the Basti room. On the day of Niruha Basti (medicated decoction enema), patient was asked to remain empty stomach before the administration of Basti.

After recording the vitals, patient was advised to lie comfortably in left lateral position on Basti table with left leg straight and the right leg flexed at knee and hip joints, head resting on the left hand with the right hand resting on the right leg.

**Preparation of Basti Dravya**
60 ml of Triphala Taila was made lukewarm by keeping it in a hot water bath. Then Shatapushpa Churna and Saindhava Lavana (each 1 gram) was added and mixed till a homogeneous mixture was obtained. Basti Dravya was made lukewarm again and administered with enema syringe fitted with rubber catheter (No. 08) with the patient in appropriate position.

**Preparation of Niruha Basti**
Makshika (honey) 60 ml, Saindhava Lavana 5 g, Triphala Taila 90 ml, Yashtimadhu Kalka 20 g, and Triphala Kwatha 240 ml, were added in a sequential manner and stirred well to get a homogeneous mixture. Gomutra 50 ml, Yavakshara and Ooshakadi Gana Dravya (Hingu, Tutta, Kaseesa and Shilajatu - 2 gram each) were added, and this mixture was administered through Basti Putaka.\[6\]

**Follow-up**
Follow-up of the patients was done once in fortnight up to 90 days.

**Group C (Standard controlled drug)**
Tablet atorvastatin 10 mg once daily was given orally at bed time with warm water for 90 days.

All the patients were advised to avoid oily, bakery, fast food and day sleep during the treatment course. The effect of treatment was assessed on 91\[6\] day. As per the ethical committee advice, the tablet was continued till the completion of study duration in Group C.

All the medicines were procured from National Institute of Ayurveda Pharmacy, Jaipur except Ichchabhedhi Rasa, Yavakshara, Ooshakadi Gana Dravya and Tablet Atorvastatin. Ichchabhedhi Rasa was purchased from Baidyanath Pharmacy Pvt. Ltd. (Batch No. 2-1), Yavakshara from PAB Pharmaceuticals (Batch No. 15) and Ooshakadi Gana Dravya from Dhootapapeshwara Company (Batch No. P130300051) was utilized. Atorvastatin tablets were procured from dispensing section of SMS Medical College and Hospital, Jaipur.

**Assessment criteria**

**Lipid profile**
Complete lipid profile including serum cholesterol, serum triglycerides, serum HDL, serum LDL and serum VLDL were assessed before starting the treatment, after completion of treatment and after follow-up and were analyzed in terms of percentage relief and statistical evaluations.

**Statistical analysis**
The statistical analysis was done using students paired “t” test. ANOVA was applied for the analyzing the parameters of lipid profile.

**Statistical software**
The statistical software namely, SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and Environversion version 2.11.1 manufactured by IBM Corporation released in Chicago were used for the analysis of the data and Microsoft Word and Excel have been used to generate graphs, tables etc.

**Observation and results**
The results were expressed in percentages and mean ± standard deviation. ANOVA was used to find the significance of treatment on the lipid profile [Tables 2-6].

By analyzing the data, it was found that, out of 90 patients, 63.33% patients were male, 83.33% patients were from the age group of 25-50 years, 53.33% patients were Hindus, 76.66% patients were married and 36.66% belongs to higher middle class. It was also observed that 65.55% patients were taking vegetarian diet, 56.66% patients had the habit of Vishamshana, 68.88% of patients were regularly doing consumption of curd in excess, 77.77% were using mustard oil in the diet, 60% of the patients had Vishamagni, 53.33% were of Vata-Kapha Prakriti (body constitution), 53% patients were of Krura Koshtha (bowel habits) and 66.66% were taking Madhura Rasa Pradhatna Ahara. 67.77% patients gave the history of day sleep, 68.88% of patients had a history of worry and 55.55% patients had sedentary lifestyle. In the study, out

| Table 1: Schedule of Kala Basti |
|----------------------------------|
| Day   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  |
| Basti | N   | A   | N   | N   | A   | N   | N   | N   | A   | N   | N   | N   | A   | N   | N   | N   |
| N: Niruha Basti, A: Anuvasana Basti |
Table 2: Comparison of effect of therapies on serum cholesterol among three groups

| Serum cholesterol in mg/dl | BT       | AT       | AF       | Pair wise significance |
|---------------------------|----------|----------|----------|------------------------|
|                           | BT-AT    | BT-AF    | AT-AF    |                        |
| Group A                   | 240.84±32.73 | 199.87±27.21 | 204.33±25.92 | 0.063+                 |
| Group B                   | 267.57±21.15 | 167.17±22.10 | 172.33±21.83 | 0.063+                 |
| Group C                   | 303.33±26.31 | -        | 223.33±34.77 | -                      |

*P*: <0.001**, <0.001**, <0.001**

Group A-Group B 0.001**
Group A-Group C <0.001**
Group B-Group C <0.001**

+Suggestive significance (0.05 < P ≤ 0.10). *Moderately significant (0.01 < P ≤ 0.05). **Strongly significant (P ≤ 0.01), BT: Before treatment, AT: After treatment, AF: After follow-up. n=90

Table 3: Comparison of effect of therapies on Serum Triglycerides among three groups

| Serum TGL in mg/dl | BT       | AT       | AF       | Pair wise significance |
|-------------------|----------|----------|----------|------------------------|
|                   | BT-AT    | BT-AF    | AT-AF    |                        |
| Group A           | 256.89±82.27 | 152.78±15.05 | 156.21±58.33 | 0.747                 |
| Group B           | 218.83±34.25 | 166.77±22.00 | 172.23±21.30 | 0.023*                 |
| Group C           | 232.00±23.98 | -        | 159.67±23.27 | -                      |

*P*: 0.023*, 0.006**, 0.023*  

Group A-Group B 0.019*  
Group A-Group C 0.173  
Group B-Group C 0.606  

TGL: Triglycerides. *Moderately significant (0.01 < P ≤ 0.05). **Strongly significant (P ≤ 0.01), BT: Before treatment, AT: After treatment, AF: After follow-up. n=90

Table 4: Comparison of effect of therapies on Serum HDL among three groups

| Serum HDL in mg/dl | BT       | AT       | AF       | Pair wise significance |
|--------------------|----------|----------|----------|------------------------|
|                    | BT-AT    | BT-AF    | AT-AF    |                        |
| Group A            | 51.71±7.43 | 56.87±6.50 | 57.83±6.34 | 0.137                 |
| Group B            | 56.43±8.26 | 56.50±5.06 | 58.80±5.87 | 0.943                 |
| Group C            | 50.37±6.24 | -        | 49.70±5.86 | -                      |

*P*: 0.005**, 0.094+, 0.809  

Group A-Group B 0.039*  
Group A-Group C 0.069  
Group B-Group C 0.006**  

HDL: High density lipoprotein, BT: Before Treatment, AT: After Treatment, AF: After follow up. *Moderately significant (0.01 < P ≤ 0.05). **Strongly significant (P ≤ 0.01)

Table 5: Comparison of effect of therapies on Serum LDL among three groups

| Serum LDL in mg/dl | BT       | AT       | AF       | Pair wise significance |
|--------------------|----------|----------|----------|------------------------|
|                    | BT-AT    | BT-AF    | AT-AF    |                        |
| Group A            | 131.07±33.27 | 113.28±29.90 | 113.87±31.36 | 0.018*                 |
| Group B            | 167.70±14.65 | 77.27±19.24 | 78.62±20.36 | 0.018*                 |
| Group C            | 206.57±24.71 | -        | 142.03±32.74 | -                      |

*P*: 0.018*, 0.011*, 0.001**  

Group A-Group B <0.001**, <0.001**  
Group A-Group C <0.001**  
Group B-Group C <0.001**  

LDL: Low density lipoprotein, BT: Before Treatment, AT: After Treatment, AF: After follow up. *Moderately significant (0.01 < P ≤ 0.05). **Strongly significant (P ≤ 0.01)
Table 6: Comparison of effect of therapies on Serum VLDL among three groups

| Serum VLDL in mg/dl | BT       | AT       | AF       | Pair wise significance |
|---------------------|----------|----------|----------|------------------------|
| Group A             | 51.39±16.53 | 30.46±3.07 | 31.01±11.75 | <0.001**               |
| Group B             | 43.79±6.87  | 33.35±4.40 | 34.42±4.27  | <0.001**               |
| Group C             | 46.40±4.80  | -        | 31.93±6.65  | <0.001**               |
| P                   | 0.024*     | 0.004**  | 0.213      |                        |
| Group A-Group B     | 0.020*     | -        | 0.205      |                        |
| Group A-Group C     | 0.173      | -        | 0.887      |                        |
| Group B-Group C     | 0.614      | -        | 0.427      |                        |

VLDL: Very low density lipoprotein, BT: Before Treatment, AT: After Treatment, AF: After follow up. *Moderately significant (0.01 < P ≤ 0.05). **Strongly significant (P ≤ 0.01)

of 57 females, 42 (73.69%) had attained menopause, and only 6.66% of patients had family history of Dyslipidemia. 41.11% of patients were having body weight between 51 and 60 kg.

The study revealed that 67.77% patients were having the serum cholesterol level above 240 mg/dl, 87.77% patients had serum triglyceride level ranging between 200 and 499 mg/dl, 87.77% patients were having the serum HDL level in the range of 40 and 60 mg/dl, 32.22% of patients were having the serum LDL level above 190 mg/dl, and 78.88% patients were having the serum VLDL level in the range of 41 and 60 mg/dl.

The Assesment of the result has shown in Tables 2-6.

Discussion

Dyslipidemia can be considered under the broad umbrella of Shauhlya (obesity) mentioned in the Brihatrayi. Atishauhlya is first mentioned by Acharya Charaka as one of the Kaphaja Nanatmaja Vikara in Maharoga Adhyaya which later has been elaborated upon in the subsequent Ashtau Ninditiya Adhyaya. On further contemplation, it is evident that Atishauhlya is a physiology predominant disorder which eventually gets converted into a pathological state. The progression from a physiology to pathology is so prompt that it cannot be pointed out distinctly.

A review of the Laghutrayi bears certain references to dyslipidemia. Adhamalla, commentator of Sharangdhara Samhita has differentiated between the two types of Medo Roga namely Shauhlya and Medo Dosha.

The better result in reducing the cholesterol level obtained by Virechana Karma can be explained in two ways: Virechana Karma being the best treatment for Pitta Doshha through which large amount of bile is excreted which indirectly helps in the excretion of cholesterol. Apart from this, the site of action is on Adho Amashaya (small intestine) from where the cholesterol is reabsorbed. Thus Virechana Karma helps to convert the cholesterol in the non-absorbable form so that it may not be reabsorbed.

On the other side, Yakrit (liver) being the main organ of Pitta Sthana, Virechana Karma may be having a direct effect on the functioning of liver. Once the functioning of liver is corrected, the synthesis of cholesterol may be checked and excretion of cholesterol may be increased by stimulating the bile production and secretion.

In Virechana Karma, injurious substances are brought from the peripheral tissues to the intestine by adopting proper Snehana (oleation) and Svedana (sudation). This means the cholesterol present at the plasma and tissue level might have been brought to the intestine for the excretion by therapeutical purgation.

Comparative better effect on triglycerides (TGL) by Virechana Karma could be attributed by the following reasons. The main action of Virechana Karma is on Pitta Dosha, indirectly on Agni which plays an important role in the digestion and metabolism through which the synthesis of triglycerides might have been regulated. It has also action on Koshtha (small intestine) from where the raw materials for the synthesis of TGL will be absorbed. Hence, regulating the functions of intestine may regulate the uptake and absorption of raw materials for TGL.

The liver plays a major role in the synthesis and storage of TGL. Virechana Karma is the major treatment for Pitta Doshha and Pitta Sthana. Liver being one of the major Pitta Sthana, Virechana Karma significantly improve the function of liver which indirectly regulates the synthesis of TGL.

The improvement in the HDL level had occurred as Virechana Karma mainly works on Agni, Pitta Sthana (liver) and Koshtha, i.e., intestine which helped for the proper formation of Dhatu, i.e., tissues in general and quality of the tissues in particular. Further, in LDL and VLDL level also much better result was observed. As Virechana improves Agni, it regulates the intake of raw material for the production of lipids. It also improves the functioning of liver there by regulates the endogenous production of VLDL.

In the present study, a modified Kala Basti schedule was adopted, in order to have maximum Lekhana effect, more number of Niruha Basti and less number of Anuvasaana Basti were administered as per the Kala Basti schedule.

The effect of Lekhana Basti on serum cholesterol can be studied under two headings:

Action at the level of liver

The chief drugs of Lekhana Basti like honey, Triphala, Gomutra, Yavakshara and Ooshakadi Gana Dravya are having Kaphahara, Medohara activity which might have been absorbed by the superior haemorrhoidal veins and evacuated.
directly to the liver, there by correcting liver metabolism. This might have reduced the synthesis of cholesterol by increasing its excretion. The two-third portion directly enters systemic circulation through inferior and middle haemorrhoidal veins resulting in significant availability of drugs by bypassing the metabolism which may be the cause in reduction in serum level.

**Correcting Vata Dosha**
The corner stone in the treatment of reducing cholesterol is inhibition of acetyl Co-A reductase which may be considered as a part of *Vata Dosha. Basti Karma* regulates the production and function of *Vata Dosha* also.

The effect obtained by *Lekhana Basti* in serum triglyceride may be due to the following reasons. The drugs used in *Basti Karma* are mainly *Medohara* (hypolipidemic) and *Lekhana* in nature; hence they might have reduced the level of TGL. Apart from this, the basic causative factor for dyslipidemia (*Medoroga*) is the abnormal movement of *Vata Dosha* which in turn increases the appetite there by resulting in increased calorie intake. Hence to reduce the calorie intake the main treatment could be regulating the movement of *Vata Dosha* which was achieved by successful administration of *Basti*.

The improvement in the serum HDL level after the *Basti* was observed. *As Lekhana Basti* drugs are having *Medohara* action, it cleanses the channels of transportation there by eliminates the accumulated *Dosha* and *Malaryupi Medo Dhatu* which may be the reason for the reduction of serum LDL and VLDL level.

Atorvastatin calcium is a synthetic lipid-lowering agent and is an inhibitor of HMG-CoA reductase, which catalyzes the conversion of HMG-CoA to mevalonate. Inhibition of HMG-CoA reductase leads to upregulation of LDL receptors in the liver, mediated by correction of Vata Dosha. This results in enhanced clearance of LDL from the circulation, thus playing an important role in lowering the lipid profile.

**Conclusion**
Dyslipidemia is the abnormal amount of lipids in the blood due to impaired lipid metabolism and can be correlated with abnormal Medo Dhatu (*Medo Dosha*). Primarily there is *Agni Vaishamya* and *Vata Dushhti*, hence *Virechana* is best to correct *Agni* and *Basti* to correct *Vata Dosha*.

In addition, it was found that *Virechana Karma* was highly effective in reducing the triglycerides level and *Lekhana Basti* was highly effective in reducing cholesterol level in particular.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

**References**
1. Harrisons, edited by Eugene Braunwald, Anthony S. Fanci, Stephen L. Hauser, Dennis L. Kasper, Dan L. Longo, J. Larry Jameson and McGraw-Hill, Harrison: Principles of Internal Medicine, Vol.- 2. 15th International Edition. Medical Publishing Division 2012. p. 2249.
2. American Heart Association, Chicago: The Association; c1995-2002
3. ibidem, Harrison (1): Principles of Internal Medicine. 2012. p. 2250.
4. Rakshita Vijaya, Datta Shrikanta editor. Madhava Nidana. Madhava Nidana (Madhukosha) of Madhavakara. Ch. 33, Ver. 13-14. Edition Second. Varanasi: Varanaseya Sanskrit Samsthana; 1993. p. 28.
5. Adamalla and Kasirama editor. Sharanghadhara Samhita of Sharanghadhara, Madhyamya Khandha. Ch. 6, Ver. 13-14. Edition Third, Varanasi: Chaukambha Sanskrit Samsthana; 2004. p. 180.
6. Acharya Y T, editor. Charaka Samhita Agnivesh, Sutra Sthana. Ch. 13, Ver. 8. Edition Second. Varanasi: Chaukambha Sanskrit Samsthana; 2004; p. 87.
7. Acharya Y T, editor. Sushruta Samhita of Dalhana, Chikitsa Sthana. Ch. 38, Ver. 82. Edition Second. Varanasi: Chaukambha Sanskrit Samsthana; 2004. p. 545.
8. Acharya Y T, editor. Sushruta Samhita of Dalhana, Chikitsa Sthana. Ch. 21, Ver. 3. Edition Second. Varanasi: Chaukambha Sanskrit Samsthana; 2004. p. 116.
9. Shastri Parushurama editor Sharangadhara Samhita of Adamalla and Kasirama, Purvakhanda. Ch. 7, Ver. 64. Edition Second. Varanasi: Chaukambha Orientalia; 2000. p. 91.