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Study of the efficacy of the *Lekhaniya Ghana Vati* in the management of Hyperlipidemia in DM-II

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ABSTRACT

Hyperlipidemia is emerging big problem in present society, which is now increasing day by day because of sedentary life style of people, consumption of junk food, aerated cold drink and high level of stress are further deteriorating the condition. Hyperlipidemia is a major cause in major illness such as HTN, Obesity, acute MI, IHD, CCF and DM-2. Previous studies of hyperlipidemia shows that reduction of fractions of lipids levels reduce rate of morbidity in individual with DM-2, HTN, CAD. In Ayurveda hyperlipidemia shows close resemblance with *Medoroga* as per Ayurveda. *Lekhaniya Ghana* is specifically indicated in Ayurveda literature for management of *Medoroga*. In current case study 54 yrs female K/C/O DM type 2 came with gross elevation of total cholesterol, triglycerides, LDL, VLDL levels. *Lekhaniya Ghanavati* with proper *Pathya Ahara* was advised to patients for 2 months. Highly significant reduction was observed in total cholesterol level, triglycerides, LDL, VLDL levels.

Key words: Hyperlipidemia, *Lekhaniya Ghanavati*, *Medoroga*, Diabetes Mellitus.

INTRODUCTION

Hyperlipidemia is emerging big problem in present society, which is now increasing day by day because of sedentary life style of people, taking junk food, aerated cold drinks and high level of stress. In current modern medical practices, statin have been largely used, but statin in alone or in combination with fibrate increase possibility of side-effects such as myositis, memory loss, liver damage and even economical burden. Hyperlipidemia require long term treatment. It imposes a tremendous economical burden on individual and ultimately on society.

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Disorders of lipoprotein metabolism are collectively referred to as dyslipidemias. Dyslipidemias are generally characterized clinically by increased plasma levels of HDL cholesterol, triglyceride or both variably accompanied by reduced level of HDL cholesterol. Because plasma lipids are commonly screened, dyslipidemia is frequently seen in clinical practice. The majority of patients with dyslipidemia have some combination of genetic predisposition and environmental contribution.^[1]

The dietary recommendations for individuals with DM include increased monounsaturated fat and carbohydrates and reduced saturated fats and cholesterol.^[2]

Hyperlipidemia in diabetes type II should be assessed aggressively and treated to avoid many cardiovascular risk factors of it and hyperglycemia.

Previous studies and present remedies of hyperlipidemia has constantly found that reduction of fractions of lipids reduce cardiovascular events and morbidity in individual with DM-II.

Diabetes was recognised as a disease entity in ancient Indian System. The disease was described in *Charaka*

Samhita in 600 BC and in *Sushruta Samhita* in 400 BC. Perhaps the disease is as old as mankind.

Hyperlipidemia is emerging big problem in present society, which is now increasing day by day because of sedentary life style of people, taking junk food, aerated cold drinks and high level of stress.^[4]

The prevalence of hyperlipidemia is very high in India which calls for urgent lifestyle intervention strategies to prevent and manage this important cardiovascular risk factor.

So to find out effective herbal formulation which will have less side effects and will cause low economical burden. This topic was selected for the study purpose mentioned in *Charaka Samhita*, as a *Lekhaniya Gana*^[3] in *Sutrasthana Adhyaya 4/3.2*.

OBJECTIVE OF THE STUDY

To study the role of *Lekhaniya Ghanavati* on signs and symptoms of Hyperlipidemia in DM-II.

MATERIALS AND METHODS

Patients: Total 50 patients of hyperlipidemia in DM-II form OPD and IPD Unit of M.N. Agashe, Hospital, Satara, were selected for the study.

Total duration of study: 12 months

Follow up: 3 follow ups ; After 15 days.

Drug: For the present study, *Lekhaniya Ghanavati* was used for the management of hyperlipidemia.

Table 1: Details of *Lekhaniya Ghanavati*^[5]

SN	Drug	Latin Name	Part used	Quantity
1.	<i>Musta</i>	<i>Cyperus rotundus</i>	<i>Mula (Root)</i>	1 Part
2.	<i>Kushta</i>	<i>Saussurea Lappa</i>	<i>Mula (Root)</i>	1 Part
3.	<i>Haridra</i>	<i>Curcuma longa</i>	<i>Kanda (Rhizomes)</i>	1 Part
4.	<i>Daruhari dra</i>	<i>Berberis Aristata</i>	<i>Mula (Root)</i>	1 Part
5.	<i>Vacha</i>	<i>Acorus Calamus</i>	<i>Kanda (Rhizomes)</i>	1 Part

6.	<i>Ativisha</i>	<i>Aconitum heterophyllum</i>	<i>Kanda (Rhizomes)</i>	1 Part
7.	<i>Katurohini</i>	<i>Picrorrhiza Kurroa</i>	<i>Mula (Root)</i>	1 Part
8.	<i>Chitraka</i>	<i>Plumbago Zeylanica</i>	<i>Mulavaril Sal (Root)</i>	1 Part
9.	<i>Chirbilva</i>	<i>Holoptelea intergrifolia</i>	<i>Twacha</i>	1 Part

Method of preparation of *Lekhaniya Ghanavati*

The useful parts of *Musta*, *Kushta*, *Haridra*, *Daruharidra*, *Vacha*, *Ativisha*, *Katurohini*, *Chitraka* and *Chirabilva* were taken in appropriate quantity and 16 parts of water was added to it. It was heated on a medium flame and thoroughly mixed. The heating process was continued until the mixture was free from water and it is in the cake form '*Ghana*'. And then a *Ghanavati* of 500 mg was prepared as per mentioned in Ayurvedic classics.^[6]

Criteria for Diagnosis

Inclusion Criteria

- Hyperlipidemia in DM-II having BSL random less than or equal to 300mg/dl taking standard care of treatment.
- Age group of patient 30 to 60 yrs.

Exclusion Criteria

- The patients suffering from IHD, Acute MI, CCF, Insulin Dependent DM (type 1), Malignancy, AIDS, Pregnancy, Lactating women, Hypothyroidism.
- Hyperlipidemia in DM-II having BSL random more than 300mg/dl.

Table 2: Details of drug administration.

Drug	<i>Lekhaniya Ghanavati</i>
Form of drug	<i>Ghanavati</i> (tablet)
Dose	500 mg - 2 tablets B. D.
<i>Anupana</i>	<i>Koshnajala</i>

Sevanakala	Twice in a day <i>Bhojanapurva</i>
Duration	2 months
Diet	As per <i>Pathyakara Ahara</i> mentioned in Ayurvedic classics

Assessment Criteria

1. Lipid Profile

Total Cholesterol

Criteria	Grade
0-180	0
180-220	1
220-240	2
240-300	3
more than 300	4

HDL

Criteria	Grade
more than 60	0
40-60	1
35-40	2
30-35	3
Less than 30	4

LDL

Criteria	Grade
Less than 130	0
130-150	1
150-200	2
200-240	3
More than 240	4

Triglyceride

Criteria	Grade
Less than 150	0
150-250	1
250-300	2
300-500	3
More than 500	4

2. Urine (Albumin)

Criteria	Grade
Absent	0
+	1
++	2
+++	3
++++	4

3. BMI

BMI	Grade
18-25	0
25-30	1
30-35	2
More than 35	3

4. Waist to hip ratio

- Men = 0.93
- Women = 0.84
- More than 1 indicate abnormal.

5. Weight

Laboratory Investigations

Following laboratory investigations will be carried out before the treatment to rule out any other pathology.

1. Hb%, CBC

2. Urine - routine and microscopic
3. Lipid profile
4. Serum Urea
5. Serum Creatine
6. Tridot
7. ECG

Assessment of total effect of therapy

Percentage	Result
0-25%	No Change
26-50%	Mild Improvement
51-75%	Moderate improvement
76-99%	Marked improvement
100%	Complete cure

RESULTS

It showed that the *Lekhaniya Ghanavati* has role of *Shamana* therapy in Hyperlipidemia. Calculated ‘t’ of *Lakshana* shows that improvement in *Lakshanas* were seen highly significant except BMI. Statistically highly significant difference was observed in weight, waist to hip ratio before and after treatment.

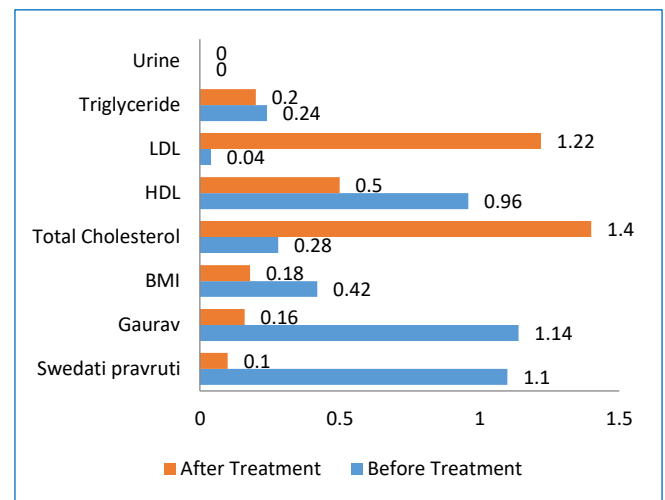
Statistical Analysis

Parameter	n	Mean		Mean Difference	SD	t	p
		BT	AT				
Swedati Pravrutti	50	1.1	0.1	1	0.3642	35	<0.001
Gaurav	50	1.14	0.16	0.98	0.4046	49	<0.001
BMI	50	0.42	0.18	0.24	0.5379	3.99366	0.000132
Weight	50	67.04	64.12	2.92	6.9340	12.05779	<0.001
Total Cholest	50	0.28	1.4	-1.12	0.90	5.036	<0.001

erol					48	0	
HDL	50	0.96	0.5	0.46	0.9253	2.6743	<0.001
LDL	50	0.04	1.22	-1.18	0.7895	3.2721	0.00098
Triglyceride	50	0.24	0.2	0.04	0.9085	6.4261	<0.001
Urine	50	0	0	0	0.3015	3.5	<0.001

Statically the parameters like *Swedati Pravrutti*, *Gaurava*, BMI, Weight, Total cholesterol, HDL, LDL, Triglyceride, Urine showed highly significant results.

Chart 1: Statistical analysis of 50 patients of hyperlipidemia in DM-2.



DISCUSSION

Medoroga is a well described disease from *Samhita* period. *Acharya Charaka* mention it in *Ashtaunindita-Purush Adhyaya (Su.21)*. *Medoroga* is another term, used for the disease *Medoroga*. *Madhavakara* has explained *Medoroga* in separate chapter i.e. 34th chapter of *Madhav Nidana* and he used the synonyms as *Medosvina*, *Atisthula* and *Sthula* etc. according to *Charaka* one of the main cause for *Medoroga* i.e. the *Beejdosh Swabhavata*.

According to the World Health Report 2002 of W.H.O. Hyperlipidemia is under the 10 top selected risks to the health. It is alarming disease with its hazardous complication i.e. hypercholesteremia, ischemic

cardiac disorders, HTN, DM etc. BMI (Body Mass Index) more than 25 indicate increasing risk to health. Much more research work has been done on Hyperlipidemia or still there is lot of scope to work in the area of its etiopathology and the treatment of Hyperlipidemia.

The word *Medoroga* had indicates the deposition of *Prithvi + Jala Mahabhuta* which is dominant factors in the body. *Nidana* of *Medoroga* is divided in 4 categories. 1. *Aharatmaka*, 2. *Viharatmaka*, 3. *Manasa* and 4. *Anya*. Besides these *Nidanas*, it can be seen that due to diet enriched with maximum % of carbohydrate, fats and high tech machineries which makes a person less active and prone to *Medoroga*.

Samprapti of *Medoroga* divided in two categories.

1. According to *Charaka Samhita* in which, increased *Jatharagni* → Maximum ingestion → maximum absorption of *Prithvi, Jala. Mehabhuta* → dominant factors in the body leads to increased i.e. *Medodhatu* in the body.
2. According to *Dalhana* in which, *Medodhatvagni Mandya* → leads to excessive formation of improper *Medodhatu* leads to *Medoroga*.

From various classics the *Rupas* of *Medoroga* are compiled. Some of them are agreed by most of *Acharyas*. Most of the symptoms are related to abundant growth of *Medodhatu* in the body.

Some of the symptoms of *Medoroga*, occurs due to extra accumulation of *Meda* in fat depots leads to *Chalatva* of the various organs of the body, *Kshudrashwasa*, *Anga Gauravata* and other signs and symptoms.

Lekhaniya Ghanavati with *Koshna Jala* for the treatment of *Medoroga* was selected for the present study by considering its significance mentioned in Ayurvedic texts.

Out of all these *Lekhaniya Gana Dravyas*, *Musta*, *Chitraka*, *Vacha*, these drugs are good *Deepana - Pachana*, they improve the digestive function of body and reduce the *Aama*.

Bad cholesterol is resultant factor of improper digestion and increased *Aama* in body.

In Ayurvedic Classics, cholesterol is not mentioned anywhere but *Meda Dhatu* is mentioned. To balance the *Meda Dhatu* is equal to balance cholesterol. We have to improve the quality of *Meda Dhatu*. *Medo - Dhatwagni Vruddhi* is also important in such case.

All *Charakokta Lekhaniya Gana Dravyas* are *Tikta, Kashaya Rasatmaka, Ruksha Gunatmaka* and most of them are *Ushna Viryatmaka*. With these properties all the contains of *Lekhaniya Gana* are supposed to act on *Aama*, increased *Dhatwagni, Jatharagni* and are antioxidants. Hence this *Lekhaniya Gana* is selected.

Dose of *Lekhaniya Ghanvati* was kept 1gm twice a day, before of meal (*Pragbhakta*). This average dose is for the person of age between 21 to 60 years and also considering with *Sadharana Desha, Madhyam Bala* and *Kashtasadhya* of *Medoroga*. *Koshna Jalapana* acts as a *Kaphdosha Nashak* and *Medoghna*. Therefore *Koshna Jala* was given as *Anupana* based on Ayurvedic text.

In the present study maximum 56% patients were from the age group of 51 to 60 years. After that 32% patients were from the age group of 41 to 50 years followed by 6% patients from 21 to 30 years and 31 to 40 years each. So, Hyperlipidemia found more in old age. Modern text books also supports the same observations i.e. In old age between 50-60yrs due to atherosclerotic changes Hyperlipidemia may occur. Maximum patients i.e. 70% patients were female, because they may have a tendency to develop fatty mass. Modern texts support this observation. In young women, body fat stores may be below 30 percent and increase gradually to more than 35 percent in older women whereas in men it increases up to 25 percent only (Harrisons Principles of Internal Medicine). The reason behind this observation might be the feminine factors like pregnancy, post opersting condition, use of oral contraceptives, menopause etc. are predominant factors, which makes female an obese. Maximum patients i.e. 72% were Hindu; this may be the representation of the total community distribution in the city and surrounding from where most of the patients came. Maximum patients i.e. 42% were house wife. The reason behind this might be light nature of work, advancement of new

techniques, tools (mixers, washing machines). Followed by 26% patients were in service. The reason behind this might be light nature of work i.e. Sedentary lifestyle, long time sitting work in front of computer, dietary habits, advancement of new techniques etc. tools (e.g. Mixers, washing machines) which which reduces energy expenditure and besides these the most important cause is *Divaswapa*. Maximum patients i.e. 86% were educated. It clearly shows that education has its relation with health consensus because as the education level increases health awareness increases. In these study maximum patients i.e. 84% were recorded as Married. Moreover, married female found obese in comparison to unmarried, owing to hormonal imbalance occurring after marriage, in pregnancy. Maximum patients i.e. 58% were belonging to Middle class. From this observation it cannot be said that Hyperlipidemia has dominance in Middle class. Person from Upper Class can afford costly medicine and can attend better hospitals for the health care. Persons from middle class are health aware but cannot spend much more money for their health so they always prefer the hospitals where medicine is provided free or at low cost. Besides this in lower class due to improper nutrition prevalence of Hyperlipidemia is less.

Majority of the patients i.e. 86% were having mixed diet. This mixed diet enrich with oil, butter, *Ghrita*, *Payas*, *Vikara* causes production of extra fat which leads to conditions like Hyperlipidemia. Maximum Patients i.e. 66% patients had *Kapha-Vata Pradhan* and 22% patients had *Kapha-Pitta* type of *Prakriti*, 18% *Vata-Pitta Pradhana*. Thus, 90% patients *Prakriti* was *Kapha* dominant either associated with *Vata* or *Pitta*. Maximum patients i.e. 88% had *Madhyama Koshtha*. In normal condition, *Madhyam Koshtha* found due to *Kapha* dominance. Maximum patients 44% were consuming excess *Snigdha* in their daily diet, while *Guru* 50% were dominant *Guna* in the diet of patients and *Katu* 46% , *Tikta* 44% and *Madhura* 4%. *Kapha* and *Meda* are main *Dosha* and *Dushya* respectively in the pathogenesis of Hyperlipidemia.

Among 50 patients, maximum all patients were consuming *Snigdha* 44%, *Guru* 50%, *Madhura* 4% as

Aharatmaka Nidana. This data showed that most of the patients are including those *Aharaja Nidana* aggravates *Kapha Dosha* and *Meda Dushya* it causes excessive accumulation of *Meda* in body. 74% patients did *Awyayam*. Lack of physical activity i.e. *Avyayam* as major cause of Hyperlipidemia.

After giving *Lekhaniya Ghanavati* to the patients of Hyperlipidemia, significant relief in symptoms *Kshudrashwas*, *Swedapravrutti*, *Daurabalya*, *Atinidra* was observed. So, we can conclude that combination of *Tikta, Katu, Kashaya, Laghu, Ruksha Guna, Katu-Vipaka Pradhana* drugs in having the properties of *Strotovibandhanashana* and against *Kapha, Kleda* and *Meda* and *Medodhatvagni*, which gives good results in all signs and symptoms of Hyperlipidemia.

Probable mode of action of *Lekhaniya Ghanavati*

The mode of action of *Lekhaniya Ghanavati* on Hyperlipidemia can be explained as follows;

The Hyperlipidemia originates due to excessive consumption of *Kapha Vrudhikara Aahara, Vihara* and *Manasa Nidana*. These factors derange the *Jatharagni* and that causes production of *Aama Annarasa*, that results in *Medodhatvagnimandya*.

Lekhaniya Ghanavati counters *Kapha Dosha* by its *Tikta, Katu, Kashaya Rasa* dominance, *Katu Vipaka* and *Laghu, Ruksha Guna*. *Meda* and *Kleda* are main culprits in Hyperlipidemia. *Tikta, Kashaya Rasa* had *Medopashoan* and *Medovishoshankarma*. *Laghu, Ruksha Guna* perform *Medo-Kledopa-Shoshana* and *Lekhana Karma*. *Tikta Rasa* encounters *Dhatwagnimandya* and potentiates the weakened *Dhatwagni* which helps in *Aampachana*.

Due to *Deepana* and *Pachana* action of *Tikta Rasa* and *Lekhanakarma* of *Tikshnaguna Strotorodha* is broken. All the involved channels are dilated i.e. *Strotansi Vivrunoti* action is seen. *Katu, Tikta, Kashaya Rasa, Katu Vipaka* and *Laghu, Ruksha Guna* check over *Medovaha* and *Mansavaha Strotodushti*.

Lekhaniya Ghanavati have *Tikta, Katu, Kashaya Rasa, Laghu, Ruksha Guna, Katu Vipaka, Kaphashamaka, Kleda Shoshana, Karshana, Lekhaniya, Medorogahara, Aampachana, Dhatu Shoshana* properties, which

normalize the state of *Dhatwagni*. Thus, regulated *Dhatwagni* and reduces the excessive growth and accumulation of *Medodhatu* and it causes *Lakshanopshamana* of the disease Hyperlipidemia.

During the clinical trials, it was observed that maximum symptoms of patients decrease after one month of starting the medication. During 2 month, avoid *Guru, Snigdha, Madhura* diet was advised to the patients of *Medoroga*.

CONCLUSION

According to statistical analysis, it is concluded that the *Lekhaniya Ghanavati* is more effective in Hyperlipidemia in DM2. It has more effect on symptoms such as *Kshudrashwasa, Gaurava, Swedapravrutti, Daurbalya* and also on objective parameters such as BMI, Waist to Hip Ratio, Weight, Lipid profile, Urine albumin etc. During treatment of two months there was no any side effect found. Statistically it has been proved that *Lekhaniya Ghanavati* is one of the best drug of choice for the treatment of Hyperlipidemia. Hyperlipidemia is emerging big problem in present society, which is now increasing day by day because of sedentary life style of people, taking junk food, aerated cold drink and high level of stress. The positiveness is observed in case of Ayurvedic management is absence of hazardous effect, which is really beneficial to the patient and is of vital importance in view of the global acceptance of Ayurveda. In this way by taking all the parameters of Hyperlipidemia into the consideration it was seen that *Lekhaniya Ghanavati* with *Koshna Jala* was effective in reducing Hyperlipidemia in DM2.

Results of this study are encouraging and trial should be conducted on large sample size and for longer duration.

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