

Etiopathological Study and Effect of Flaxseed Powder on Dyslipidemia (Medodushti)

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Abstract: Dyslipidemia is a condition where in lipids are raised in plasma. It results from abnormalities in lipid metabolism or plasma lipid transport or a disorder in the synthesis and degradation of plasma lipoproteins. The condition is on upward trend day by day due to faulty life style and dietary habits (fast food, junk food etc.), excessive consumption of alcohol, smoking and stress etc. It is one of the major health issues in the present scenario. It causes narrowing and blockage of the arteries and produces mainly heart disease while other diseases include Cerebrovascular Disease, renal diseases, liver diseases, peripheral vascular diseases, etc. Overall, raised cholesterol is estimated to cause 2.6 million deaths (4.5% of total) and 29.7 million disability adjusted life years.¹ Hence the present study was carried out to assess effect of Atasi (Flaxseed powder) on Medodushti (dyslipidemia). To fulfill the objectives total 20 patients were registered on the basis of lipid profile and BMI, again these patients were administered Atasi 20gm BD for 60 days, Atasi showed Highly Significant result ($p < 0.001$) on improving symptoms of medodushti and on Total Cholesterol, Triglycerides, HDL, LDL.

Keywords: Dyslipidemia, Medhorog, Atasi

1. Introduction

Today, although man has developed sophisticated machines, medical equipment and powerful medicines, he is deprived of health and therefore he is very far away from happiness. In a quest to achieve more of worldly pleasures and luxury we adopt a faulty lifestyle and increase the disease causing risk factors and stress in our life. This is the reason behind surge of lifestyle disorders these days. Life style disorders are burning problem of present Era, dyslipidemia is one among this category. Faulty life style and dietary habits are mainly responsible for predisposing such type of problem. The outcome of dyslipidemia are many serious diseases like coronary artery disease, cerebro-vascular accident etc.

Medodushti can be correlated with dyslipidemia on the basis of disease process and clinical features. It occurs due to the Mandagani especially Medodhatwagani.

The excessive use of specific Ahara like Atimadhura, Atisnigdha etc., and Vihara like Avyayama, Divasvapnalead to Jatharagni Dushti which results in Agnimandya. This further leads to formation of Ama Anna Rasa and subsequent Ama Rasa Dhatu. The Ama Rasa Dhatu thus leads to Medo dhatvagni mandya. The above consumed factors due to their affinity for MedoDhatu cause a direct increase in the Asthaya MedoDhatu. The increase in Sthayi MedoDhatu results in Atisthauyaor Obesity whereas an increase in the Asthaya Medo Dhatu would lead to conditions like Ama Asthaya Dhatu Vriddhi (dyslipidemia).

The trial drug Atasi has been used for the present study which has Deepana, Pachana property, KaphaNashaka and Lekhaniya property as well as Srotoshodhaka Guna which help in normalizing the disturbed Lipid levels and correcting function of Rasadhatvagni and Medodhatvagni. Flaxseed contains high levels of α -linolenic acid (LNA) and insoluble

and soluble fibers. LNA makes up approximately 57% of all fatty acids in flaxseed oil. Alpha-linolenic acid (ALA) rich flaxseed powder results in a higher cholesterol secretion into bile leading to, a depletion of the intrahepatic pool of cholesterol, and thus to an increase in cholesterol synthesis and turnover.²

2. Material and Methods

2.1 Aims and Objectives

- To study the Aetiopathology of Medodushti.
- To evaluate the effect of flaxseed powder on Dyslipidemia.

2.2 Plan of Study

1) Clinical Study

(A) Selection of Patient:

Patient attending the OPD of the P.G department of Rog nidan and Vikriti Vigyan of uttrakhand Ayurved university Rishikul campus haridwar having complaint of Medodushti selected for present study. The study was conducted on 20 patients on the basis of inclusion & exclusion criteria. Written informed consent was taken from patients before including in the study.

(B) Type of Study: Single blind study.

(C) Total Duration of Study: 60 days

(D) Selection of the Sample: Randomized sampling

(E) Assesment of Follow and Up: The assessment were done on the basis of subjective and objective parameter at the interval of the 15 days during the study period follow up will be done on 15th and 30th days after completion of study.

(F) Trial Schedule:

Patients were kept on strict dietary regimen and routine exercise with Flaxseed powder as dietary supplement.

Dose of drug - 20gm twice of the day.

(G) Sample Size: For present clinical study minimum 20 patients were selected on basis of inclusion and exclusion criteria.

(H) Inclusion Criteria

- Patient having the symptoms of *Medodushti* with *Dyslipidemia*.
- Serum Cholesterol - > 200mg/dl
- Serum Triglyceride - > 150 mg/dl
- Serum LDL - > 110mg/dl
- Serum VLDL - > 40mg/dl
- Patient between age group of 20 – 60 years in either sexes fulfill the criteria of subjective and objective parameters.

(K) Exclusion Criteria

- 1) Patient suffering with any systemic disease like cardiac and renal disease, hypertension.
- 2) Patient suffering for Endocrine disorders like diabetes, thyroid dysfunction etc.

(L) Criteria for Withdrawal

- a) Personal matters
- b) Aggravation of complaints
- c) Any other difficulties

(M) Criteria for Examination and Assessment

- Both subjective and objective parameters were employed for assessment of the *Medodushti*.
- Lipid profile and B.M.I were major criteria for assessment.

(N) Diagnostic Criteria: All the patients included in study were examined thoroughly and the following points were considered for the diagnosis:-

A. Subjective:-**Classical sign and symptoms:-****a) अत्यधिक निद्रा (Excessive sleeping)**

Sleeping 5 to 6 hours in the 24 hours	0
Sleeping 7 to 9 hours in the 24 hours	1
Sleeping 10 to 12 hours in the 24 hours	2
More than 12 hours with drowsiness	3

b) दौर्बल्य (Debility)

Not Present	0
After heavy work, relieved soon & tolerate	1
After Moderate work relieved later & tolerate	2
After little work relieved later	3

c) क्षुदतिमात्रं (Excessive hunger)

Usual hunger and have food 2 times a day	0
Slight excessive hunger but can't bear easily for long time	1
Excessive hunger but able to bear hunger for few hours	2
Within few hours of eating feels again hungry	3

d) कृच्छ्रव्यवायता (difficulty in sexual intercourse)

Absent	0
Mild	1
Moderate	2
Severe	3

e) पिपासातियोगः (Excessive thirst)

Drinking less than 6 times in 24 hour	0
Drinking 7 – 9 times in 24 hour	1
Drinking 10 – 15 times in 24 hour	2
Drinking more than 15 times in 24 hour	3

f) स्वेदाबधः (Excessive sweating)

Normal sweating in hot	0
Slight excessive sweating in little hot	1
Excessive sweating even in little hot	2
Excessive sweating in very cold leads to wetting of cloths	3

g) जवोपरोधः (hampered movements)

Absent	0
Mild	1
Moderate	2
Severe	3

B. Objective:-

- Serum Cholesterol - >200mg/dl
- Serum Triglyceride - >150 mg/dl
- S.LDL - >110mg/dl
- S.VLDL - > 40mg/dl

C. Investigation:

- Lipid profile
- Body weight
- BMI
- Complete blood count
- Blood sugar (fasting &PP) etc.

3. Drug Review

In the pathology of dyslipidemia, *Kapha* is main *Dosha*, *Rasa* and *Meda* is main *Dushya*, and pathology takes place at *Rasadhatvagni* and *Medodhatvagni* level. So, that type of drug therapy should be selected which has *Kapha* and *Medanashaka* property and have efficacy to correct the function of *Rasadhatvagni* and *Medodhatvagni*. *Atasi* (*Linum usitatissimum*) has been used in the indigenous system of medicine since a long time. The plant is native of Bengal, Bihar, and Uttar pradesh. Its rhizome is used in many Ayurvedic medicines. *Atasi* is considered to be a anti inflammatory and anti dyslipidemic properties.

अतसी मदगन्धा स्यान्धुरा बलकारिका \ कफवातकारि चेषत्
पित्तहत कुष्ठवातनुत् \ \ रा. नि. \ \³
अतसी मधुरा तिक्ता स्निग्धा पाके कटुगुरुः । उष्णा
द्वक्छुक्रवातघनी कफपिताविनाशिनी भा. प्र. \ \ ६७।⁴

Flaxseed contains high levels of α -linolenic acid (LNA) and insoluble and soluble fibers. LNA makes up approximately 57% of all fatty acids in flaxseed powder. Diets rich in LNA reduced the incidence of nonfatal infarction and overall mortality in men. Flaxseed is also an important source of dietary fiber. Two thirds of flaxseed fiber is insoluble, preventing constipation by increasing fecal bulk and

promoting gut motility, whereas the soluble fraction may reduce glycemia and lipidemia. It has been shown that water soluble form has decreasing effects on cholesterol and reduces triglyceride.⁵

4. Observations

Total 20 patients were registered for study. The following observations were drawn based on study-

Maximum number patients (52.5%) were found in the age group of 51-60 years followed by (30%) patients in the age group of 41-50 years. Maximum number patients were Male (57.5%) followed by (42.5%) patients were female. Maximum number of patients belongs to Hindu religion (8.5%). Maximum patients were Married (82.5%). Maximum number of patients were Graduate pass (30%) followed by (20%) patients were primary. Maximum number of patients were House wife (40%) followed by (35%) patients were service class from. Majority of the patients belong to lower middle class family (35%) followed by (30%) patients from the Middle class. Incidence was High (85%) in patients from Urban areas. In the present study 65% were Mixed and 35% patients were having Vegetarian dietary habit.

5. Observation of Objective Criteria

1) Distribution according to Body Mass Index (BMI)

All the registered cases were categorized into three groups depending upon their body mass index.

- a) Obese (BMI- >30Kg/m²)
- b) Over weight(BMI- 25-29.9 Kg/m²)
- c) Normal BMI (BMI- 18-24.9 Kg/m²)
- d) Under weight (BMI- < 18Kg/m²)

Table 1

BMI	No. of Patients
<25	07
25-30	09
>30	04

BMI distribution of 20 patients is described in Table 1

1. Distribution according to Cholesterol

Table 2

CHOLESTEROL (mg/dl)	No. of Patients
180-199	06
200-240	08
>240	06

Maximum patients had cholesterol ranging 200-240 mg/dl, followed by lying in the range 180-199 mg/dl and 20% had cholesterol level above the 240.

2. Distribution according to Triglyceride

Table 3

TRIGLYCERIDE (mg/dl)	No. of Patients
50-150	04
150-180	12
199-250	04

60% patients had triglyceride in the range 150-180 mg/dl, 20% patients had in range 50-150 mg/dl and 199-250 mg/dl.

3. Distribution according to H.D.L

Table 4

H.D.L (mg/dl)	No. of Patients
< 40	09
40-60	09
>60	02

45 % patients had HDL 40-60 mg/dl and 45 % patients below the range of 40mg/dl, 10% patients had above the 60 mg/dl range.

5. Distribution according to L.D.L

Table 5

L.D.L (mg/dl)	No. of Patients
80-150	10
150-180	07
>180	03

Maximum 50 % patients had LDL in range 80-150 mg/dl, 35.5% had LDL in range 150-180 mg/dl and 15% patients lied in the range >180 mg/dl.

6. Distribution according to V.L.D.L

Table 6

V.L.D.L (mg/dl)	No. of Patients
<20	00
20-40	13
41-60	05
>60	02

Maximum 65 % patients had LDL in range 20-40 mg/dl, 25% had LDL in range 41-60 mg/dl and 10% patients had in the range >180 mg/dl.

6. Result

Table 7: Effect of flaxseed powder as a dietary supplements on subjective symptoms of dyslipidemic patients

Symptoms		Mean score	D	Relief %	W	P	S
AtyadhikNindra	BT	2.00	0.80	40.00	-136	0.001	HS
	FU 1	1.20					
	AT	0.70					
Karchhvyavayata	BT	1.95	0.45	23.00	-45	0.008	NS
	FU 1	1.50					
	AT	1.05					

<i>Javoparodh</i>	BT	2.25	0.85	37.77	-153	0.001	HS
	FU 1	1.40					
	AT	0.85					
<i>Daurbalyta</i>	BT	2.45	0.85	34.69	-153	0.001	HS
	FU 1	1.60					
	AT	0.70					
<i>Svedabadhya</i>	BT	0.60	0.25	41.66	-15	0.063	NS
	FU 1	0.35					
	AT	0.10					
<i>Kshudatimatram</i>	BT	2.75	0.95	34.54	-190	0.001	HS
	FU 1	1.80					
	AT	1.10					
<i>Pipasatiyoga</i>	BT	1.10	0.40	36.36	-36	0.008	S
	FU 1	0.70					
	AT	0.30					

Table 8: Effect of flaxseed powder on BMI of dyslipidemic patients

BT	AT	D	Relief %	S.D	S.E	T	P	S
25.81	24.33	1.48	5.92	0.71	0.16	9.28	0.001	HS

Table 9: Effect of Flaxseed Powder On Lipid Profile – Table no.9

Symptoms		Mean score	D	Relief %	SD	SE	T	P	S
CHOL	BT	228.09	39.12	17.15	32.12	7.17	5.45	0.001	HS
	FU 1	188.96							
	AT	170.24							
TRI	BT	179.12	23.99	13.40	14.96	3.34	7.16	0.001	HS
	FU 1	155.13							
	AT	132.90							
HDL	BT	39.30	-7.81	20.02	6.34	1.41	-5.50	0.001	HS
	FU 1	47.11							
	AT	50.97							
LDL	BT	144.33	27.28	18.94	32.13	7.18	3.79	0.001	HS
	FU 1	117.05							
	AT	93.93							
VLDL	BT	38.24	6.35	16.71	9.90	2.27	2.79	0.012	NS
	F	31.50							
	AT	26.06							

On assessment of biochemical parameters, statistically Highly Significant result ($p < 0.001$) was found in Total Cholesterol, Triglycerides, HDL, LDL except one parameter VLDL where result was Statistically Significant.

7. Discussion

Study of *Ayurvedic* classics reveals that there is no clear-cut indication or parallel term for lipid. So dyslipidemia can't be directly correlated with any disease conditions describe in *Ayurvedic* classics but the concept of *Abaddha Meda* expounded in modern science. Lipid are circulating entity, which is not bound (*Abaddha*). Thus, from this infer that it is *Poshkamsha* of *Mamsa Dhatu* and *Abaddha Meda Dhatu*, which is circulating in blood to support the *Dhatu*⁶.

Discussion part of the study deals with the possible reasoning based on the specific logic to explain the interpretation of the findings and correlates them with their causes. Hence, discussion forms one of the most crucial parts of any scientific research work.

Maximum number of patients 42.5% had BMI in range 25-30 and only 37.50% patients had normal BMI. The disease has a strong associate on with obesity and other metabolic disorders. Sedentary life style is stated as very important cause of dyslipidemia.

PROBABLE MODE OF ACTION OF THE ATASI:-

“किन्चित् रसेन कुरुते कर्म वीर्येण चापरम् ।
द्रव्यं गुणेन पाकेन प्रभावेण च किन्चन् ॥”⁷

Somedrugsact by means of Rsa, other Veerya and other by Guna ,Vipaka or Prabhava.

“रसं विपकास्तौ वीर्यं प्रभावःतान् अपोहति ।

बलसाम्ये रसादीनां इति नैसर्गिकंबलम् ।।”⁸

In case of equality of strength, Vipaka subdues Rasa, Veerya subdues both and prabhava all these three. These are the nature relative degrees of strength.

“न तु केवलं गुण प्रभावादेव द्रव्याणि कार्मुकाणि भवन्ति, द्रव्याणि हि द्रव्यप्रभवात् गुणप्रभावात् द्रव्यगुणप्रभावाच्च कार्मुकाणि भवन्ति ।।”⁹

The drugs are active not only due to properties but also due to their own intrinsic composition, properties and both combined together in particular time, on reaching a particular locus, with a particular mechanism and objective. *Aatsi* has a *Tikthrasa*. *Tikth* Rasa helps in *Agni Pradeepna*. Which increase the *jathraagni* hence helps in *Deepna* and *Pachana*. The composition of *Tikth* rasa is *Vayu* and *Aakash Mahabhuta*. Though It doesn't have *Agni Mahabhuta* but still increases the *Jathraagni* because *Vayu* and *Aakash Mahabhuta* works in the micro channels of body. Hence increases the bioavailability of the drug in the body. Due to its *Usna Virya* property *Aatsi* is *Kaphanasaka* and *Shorotoavrodhnasaka*, hence increases the *jathraagni* and improves the metabolism. *Aatsi* has *Katu vipaka*. *Katu vipaka* has a *Agni Mahabhuta* which also increases the *jathraagni*.

Alpha-linolenic acid (ALA) rich flaxseed powder results in a higher cholesterol secretion into bile leading to, a depletion of the intra - hepatic pool of cholesterol, and thus to an increase in cholesterol synthesis and turnover. ALA rich diet reduces hepatic lipid accumulation both by stimulating β -oxidation and by suppressing fatty acid synthesis. Flaxseed powder could have exerted its protective effect probably as a better substrate for mitochondrial and peroxysomal β oxidation. All these mechanism may account for the better regulation of hepatic lipid metabolism by Flaxseed powder. The present results indicate that hepatic cholesterol lowering effect resulted from the reduction of cholesterol synthesis in liver tissues. Thus, the reduction of esterified cholesterol (cholic, chenodeoxycholic acid) level by flaxseed powder, may indicate that the cholesterol was used for the synthesis of vital molecules in tissues, including the liver. Dietary ALA results in higher cholesterol secretion.¹⁰

8. Conclusion

Conclusion is the surmise wedge of the evaluation. So at the wind up successive supposition can be drawn on the basis of observations and results.

- Life style disorders are burning problem of present era, Dyslipidemia is one amongst them.
- Faulty life style and dietary habits are mainly responsible for predisposing such type of problem.
- *Medodushti* occurs due to the *Mandagani* specially due to *Medodhatuagani*.
- *Mandagani* is caused due to *KaphVardhak Aahar – Vihar*, Which ultimately leads to *Medodushti*.
- *Medodushti* can be correlated with dyslipidemia on the basis of disease process and clinical features.

- *Medodushti* is a functional condition and just a precursor stage of *Medoroga* and can be easily reversed by effective treatment.
- *Atasi* proved quite effective in treating *medoroga* by its *tikta ushna deepana kaphnashaka* properties
- Use of Flaxseed powder among with life style modification and dietary restriction is quite effective in managing dyslipidemia which was observed in study done.

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