

ABSTRACT : Syndrome-X has emerged as an area of special interest to medical faculty as it houses worst lifestyle pathologies in one patient. There being unknown common ground to Diabetes Mellitus, Hypertension, Obesity & dyslipidemia, the nomenclature adopted is Syndrome-X. As these diseases are observed to be led by Diabetes Mellitus, the other names of the syndrome are Metabolic Syndrome & Insulin resistant syndrome. This is why the Ayurvedic name attributed is 'Santarpanottha Madhumeha Vishesha'. The present study was aimed at observing & evaluating the common Nidana along with a comparative clinical study of two herbo-mineral compounds. 100 diagnosed patients of Syndrome-X were selected and randomly divided in two groups of fifty patients each; Group-A receiving Compound - A, Whereas Group-B receiving Compound - A with Medohara (Navak) Guggulu respectively. The vehicle for both the groups was Dashamoola decoction in a dose of 40 ml twice a day for 45 days. It was observed that most patients in group -B had significant improvement in Shrama, Prabhoot mootrata, Daurbalya, Vibandha, Kanthatalu shosha, Pipasadhikya & Sada.

Key words : Syndrome-X, Madhumeha, Sthaulya, Hypertension, Dyslipidemia, Body Mass Index, Guggulu.

INTRODUCTION

The diseases have always been a greater concern than the body for the mankind. The ever-ongoing tussle is getting tougher for mankind because of over modernization of every possible entity. This is accumulating, because of fall in calorie burning, as pathological over-storage of fats & energy; Ayurveda labels it as a Kapha vitiation that can eventually lead to life threatening diseases. Syndrome-X has emerged as an area of special interest to medical faculty as it houses worst lifestyle pathologies in one patient. There being unknown common ground to Diabetes Mellitus, Hypertension, Obesity & dyslipidemia, the nomenclature adopted is Syndrome-X.¹ As these diseases are observed to be led by Diabetes Mellitus, the other names of the syndrome are Metabolic Syndrome & Insulin resistant syndrome.²

At present, it is not clear whether the metabolic syndrome has a single cause, and it appears that it can be precipitated by multiple underlying risk factors. The most important of these underlying risk factors are abdominal obesity (Sthaulya) and insulin resistance (Madhumeha). Other associated conditions include physical inactivity, ageing, hormonal imbalance, and genetic or ethnic predisposition.³

The modern medical system not being able to discover a common ground for these diseases' accumulation in a patient named it as Syndrome-X.⁴

* Professor & Head , PG Dept of Roga & Vikriti Vigyan, National Institute of Ayurveda, Jaipur.

** Lecturer, SSMD Ayurvedic College & Hospital, Moga, Punjab.

Aims and Objectives :

The major aims and objectives of the present study were:

1. To discuss the Nidana of syndrome X in present context.
2. The evaluation of Herbo-mineral compound in management of all the parameters of Syndrome -X.

MATERIAL AND METHODS

For the present study, 100 diagnosed patients of Syndrome-X were selected from the hospitals' O.P.Ds., SKSS Ayurveda College, Ludhiana & SSMD Ayurveda College, Moga. These patients were taken in two groups of fifty patients each-

Group-A - receiving Compound - A only.

Group-B - receiving Compound - A with Medohar (Navak) Guggulu⁵.

The vehicle for both the groups was Dashamoola decoction in a dose of 40 ml BD for 45 days.

Criteria for the selection of the patient :

Clinical Criteria : - The following criteria were developed to select the cases on clinical ground, which is based on the signs and symptoms, described in Ayurvedic and modern texts.

- (1) Prabhutavila mutrata⁶
- (2) Sthaulya⁷
- (3) Madhurasyata⁸
- (4) Shrama / Ayasaja Shwasa⁹
- (5) Tandra¹⁰
- (6) Klama¹¹
- (7) Trishnadhikya¹²

- (8) Kshudhadhikya¹³
 (9) Nidra- Viparyaya¹⁴
 (10) Swedadhikya¹⁵

Exclusion criteria :

1. Type 1 (Insulin dependent) Diabetes Mellitus.
2. Type 2 patients on insulin therapy.
3. Patients with Malignant Hypertension with complications.
4. Patients with BMI > 40.
5. Patients with secondary Diabetes Mellitus, Heart diseases or Hypertension caused due to medications.
6. Patients associated with genetic syndromes like DIDMOAD (Diabetes Insipidus, Diabetes Mellitus, Optic atrophy, nerve deafness), lipoatrophy, muscular dystrophies, and Friedreich's ataxia, Down's syndrome, Klinefelters syndrome and Turner's syndrome.
7. Defaulter patients who did not follow up properly.

Clinical study :

- ◆ Group A was administered the standard Powder Dose of Compound-A, 5 gm twice a day.
- ◆ Group B also received the standard Powder Dose of Compound-A, 5 gm twice a day, along with Medohara Guggulu 500 mg BD.

Anupana (Vehicle) for both the groups was Dashamoola Kwatha 40 ml BD.

The duration of drug administration was 45 days along with advised corrections in diet, physical exercise etc. A daily easy walk for 45 min was advised.

Preparation of Drug :

Pharmacy of SKSS Ayurveda College, Ludhiana prepared the following herbs / herbals.

1. The following preparation was randomly labeled as *Compound - A*
 - a. Haritaki - 1 Part
 - b. Vibhitaki - 1 Part
 - c. Amalaki - 1 Part
 - d. Devadaru - 1 Part
 - e. Daruharidra - 1 Part
 - f. Shankhpushpi - 1 Part
 - g. Shilajit - 1 Part
 - h. Sarpagandha - 1/3 rd Part
2. Medohara Guggulu / Navak Guggulu¹⁶ comprising Triphala, Trikatu, Trimada & Guggulu.

3. Dashamoola Powder.Syndrome-X has emerged as an area of special interest to medical faculty as it houses worst lifestyle pathologies in one patient.

Posology :

- ◆ Compound A was given as a tablet form in a dose of two tablets of 250 mg twice a day to both the groups.
- ◆ Navak Guggulu was given in a dose of 500 mg BD only to Group B patients.

Criteria for the assessment of progress :

The assessment of progress was made by the observations & examination of patients.

Objective & subjective parameters were decided for the clinical assessments e.g. BP, weight, S.Cholesterol, FBS, PPBS, temperature, pulse etc.

- a) Objective assessment: Following Parameters were assessed objectively :

- 1) All investigations were done on patients in pathology labs, SKSS & SSMD Ayurveda colleges.

- 2) General physical examination.

- b) Subjective assessment: For the subjective assessment, different symptoms were graded as follows:

Severity	Grade
Negligible	-
Mild	+
Moderate	++
Severe	+++
Very Severe	++++

These parameters were those, which a physician cannot measure quantitatively e.g. pain, hunger, sleep, lethargy, etc.

- a) Routine hematological investigations :

- i. Hemoglobin - Sahli's Method
- ii. Erythrocyte sedimentation rate- Westergren's method.
- iii. Total leukocyte count (TLC) - TLC was measured with the help of Improved Neubauer's chamber and a count of leukocyte per cubic millimeter was noted.
- iv. Differential leukocyte count (DLC) - For this, a thin film of peripheral blood was prepared on a glass slide and stained with Leishman's stain and DLC was done under oil immersion.

- b) Routine Urine Investigations :

- i. Physical examination - Colour, volume, transparency, reaction, specific gravity etc. were noted.

- ii. Chemical examination Urine glucose - Benedict's qualitative (Semi-quantitative) test was done for urine glucose & urine proteins.

Albumin and phosphate - This was done by heat and Acetic acid test.

- (iii) Microscopic examination - Sediments of urine obtained by centrifugation were observed under microscope.

- (iv) Patients were asked to measure 24 hour urine output before & after drug trial. Most of them used cold drink pet bottles of 1.5 L or 2 L.

- c) Special blood investigations like Fasting blood sugar, Post prandial blood sugar, Lipid profile, S.creatinine & B.urea. These investigations were done using respective commercial kits available in the market.

OBSERVATIONS & RESULTS

These are being presented in the form of tables & graphs along with explanatory observations.

TABLE NO. 1 : AGNI WISE ASSESSMENT :

	Group A	Group B	% age
Manda	05	19	24
Sama	07	02	09
Vishama	11	08	19
Teekshna	27	21	48
Total	50	50	100

TABLE NO. 5 : ROOPA (SYMPTOMATOLOGY) CHART :

Sr. Symptom No.	Group A				Group B			
	Average severity BT	Average Severity A.T.	Diff.	%	Average severity BT	Average Severity A.T.	Diff.	%
1. Prabhootavila Mootrata	1.83	1.63	0.20	12.00	2.23	1.8	0.43	+21.7
2. Sthaulya	1.03	1.01	0.02	05	1.0	0.9	0.1	10.00
3. Mootra Madhurya	0.04	0.03	0.01	25	1.0	0.93	0.067	+06.67
4. Shrama	0.93	0.93	00	00	1.76	1.36	0.4	+22.7
5. Daurbalya	2.2	1.9	0.3	16	2.43	1.2	1.23	+50.6
6. Kshudhadhikya	1.2	0.9	0.3	25	1.96	1.8	0.16	+8.16
7. Aalasya	2.73	2.13	0.6	28.16	2.66	1.46	1.2	+4.51
8. Nidra Viparyaya	0.76	0.36	0.40	111.1	1.36	0.93	0.43	+31.6
9. Kandu	0.56	0.56	00	00	1.0	0.93	0.07	+7.00
10. Mukha Madhurya	1.06	1.23	-0.17	-16	1.36	1.2	0.16	+12.7
11. Vibandha	1.7	1.13	+0.57	+33.3	1.1	0.56	0.54	+49.00
12. Hast pada Tal daha	0.73	0.6	+0.13	+17.8	1.16	0.8	0.36	+31.00
13. Kantha Talu Shosha	1.93	2.66	-0.73	-38.16	2.13	1.16	0.97	+46.6
14. Malavritta Jihva	1.0	1.2	-0.2	-20	1.1	1.03	0.07	+6.7
15. Sada	2.13	2.7	-0.57	-26.7	2.5	1.43	1.07	+42.8
16. Delayed wound healing	0.26	0.26	0.00	0.00	0.4	0.36	0.04	10.00
17. Napunsakata	0.63	0.63	0.0	0.00	0.13	0.13	0	0
18. Pipasadhikya	1.93	2.7	-0.77	-39.89	2.26	1.23	1.03	45.5

TABLE NO. 2 : SROTODUSHTI ASSESSMENT :

	Group A	Group B	% age
Udakavaha	50	50	100
Mootravaha	50	50	100
Pranavaha	50	50	100
Pureeshavaha	10	04	14
Swedavaha	14	11	25
Annavaaha	09	10	19

TABLE NO. 3 : NIDAN ASSESSMENT :

	Group A	Group B	% age
Mamsa Sewana	10	10	20
Dadhi Sewana	49	48	97
Dugdha Vikar Sewana	48	50	98
Madhur Padartha	46	43	89
Ghrita Sewana	50	50	100
Dravati Sewana	49	50	99
Rookshati Sewana	44	50	94
Avyayama	49	43	92
Ati Nidra	47	24	71
Asya Sukha	50	50	100

TABLE NO. 4 : POORVA ROOPA ASSESSMENT :

	Group A	Group B	% age
Mukha Madhurya	48	47	95
Hast Pad Tal Daha	36	45	81
Mukh Talu Shosha	49	50	99
Shrama	49	47	96
Alasya	50	50	100
Tandra	50	50	100

TABLE NO. 6 : IMPROVEMENT IN UPADRAVA (COMPLICATIONS) :

Sr. Upadrava No.	Group A				Group B			
	Average severity BT	Average Severity A.T.	Diff.	%	Average severity BT	Average Severity A.T.	Diff.	%
1. Pipasadhikya	1.93	1.83	0.10	3.89	2.26	1.23	1.03	45.50
2. Daurbalya	2.20	2.00	0.20	9.00	2.43	1.20	1.23	50.60
3. Sthaulya	0.166	0.160	0.006	0.02	0.33	0.20	0.13	39.30
4. Apachana	1.30	1.16	0.14	10.00	0.83	0.46	0.37	44.50
5. Shwasa	0.60	0.50	0.10	17.00	0.10	0.10	0.00	0.00
6. Nephropathy	0.17	0.16	0.06	6.00	0.20	0.13	0.07	35.00
7. Infection	0.46	0.31	0.15	33.00	0.10	0.06	0.04	40.00

TABLE NO. 7 : EFFECT OF THERAPY ON LABORATORY INVESTIGATIONS :

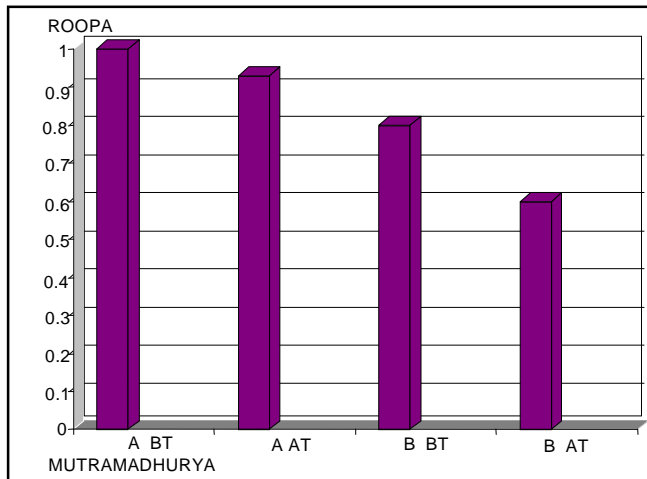
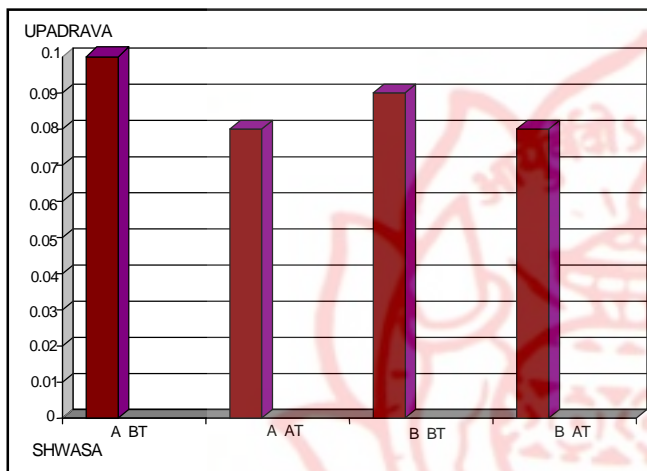
Sr. INVESTIGATION No.	Group A				Group B			
	Σd^2	SD	t	p	Σd^2	SD	t	p
1. Haemoglobin	62.2	1.46	2.23	<0.05	7.05	0.493	4.43	<0.001
2. Fasting blood sugar	34733.6	34.6	2.2444	<0.05	15630.2	23.21	5.043	<0.001
3. Post Meal blood sugar	11481.0	19.89	-7.59	-	25150.11	29.45	6.3	<0.001
4. ESR	2020.70	8.347	-4.52	-	36912.89	35.67	1.518	-
5. S. Creatinine	0.5515	0.019	-21.02	-	5.522	0.4363	0.050	-
6. Blood Urea	3809.12	11.46	2.48	<0.05	478.23	4.06	3.637	<0.01
7. S. Cholesterol	84476.11	2912.9	-0.49	-	4641.6	12.65	5.75	<0.001
8. S. Triglycerides	23321.55	804.19	-0.081	-	18621.75	25.34	2.06	<0.05
9. Body Mass Index	3.699	0.2845	-8.54	-	7.7642	0.5972	6.95	<0.001
10. Urine Output/Day (ml)	2210416.6	276.08	-7.09	-	6314941.0	466.64	4.96	<0.001

TABLE NO. 8 : EFFECT OF THERAPY ON SYMPTOMS :

Sr. Roopa No.	Group A				Group B			
	Σd^2	SD	t	p	Σd^2	SD	t	p
1. Prabhootavila Mutrata	5.3667	0.43	9.752	<0.001	4.0	0.37	14.47	<0.001
2. Sthaulya	2.7	0.305	1.79	<0.05	1.9	0.256	2.136	<0.05
3. Mootra Madhurya	1.742	0.245	1.480	-	0.35	0.11	3.28	<0.01
4. Shrama / Klama	11.5	0.6297	4.343	<0.001	7.36	0.50	4.7	<0.001
5. Daurbalya	5.6	0.439	7.47	<0.001	3.90	0.36	15.6	<0.001
6. Aalasya	6.41	0.47	5.435	<0.001	6.8	0.48	13.6	<0.001
7. Kandu	4.284	0.384	0.948	-	1.891	0.255	1.287	-
8. Kshudhadhikya	5.3630	0.430	2.96	<0.01	4.21	0.38	2.39	<0.02
9. Nidra Viparyaya	8.966	0.556	3.60	<0.01	7.20	0.498	4.39	<0.001
10. Mukha Madhurya	5.92	0.452	2.42	<0.02	3.468	0.346	2.10	<0.02
11. Hast Pada Tal Daha	7.172	0.497	1.464	-	8.93	0.55	3.61	<0.01
12. Kantha Talu Shosha	1.6038	0.235	16.99	<0.001	4.78	0.40	14.08	<0.001
13. Vibandha	27.33	0.970	3.189	<0.01	14.45	0.705	4.14	<0.001
14. Malavrit Jihva	4.8	0.4068	2.68	<0.02	2.89	0.315	1.04	-

TABLE NO. 9 : EFFECT OF THERAPY ON UPADRAVA (COMPLICATIONS) :

Sr. UPADRAVA No.	Group A				Group B			
	Σd^2	SD	t	p	Σd^2	SD	t	p
1. Sada	11.355	0.6257	4.94	<0.001	9.1	0.56	10.3	<0.001
2. Pipasadhikya	5.36	0.430	9.73	<0.001	2.96	0.31	18.1	<0.001
3. Sthaulya	4.41	0.389	4.218	<0.001	4.16	0.37	2.36	<0.05
4. Apachana	27.40	0.97	0.75	Insigni	6.96	0.48	4.10	<0.001
5. Kantha Talu Shosha	1.6038	0.235	16.99	<0.001	4.78	0.40	14.08	<0.001
6. Daurbalya	8.625	0.545	5.349	<0.001	3.90	0.36	15.6	<0.001
7. Shwasa	0.941	0.180	0.912	Insigni	0.876	1.003	0.813	Insigni
8. Nephropathy	1.745	0.245	1.473	Insigni	1.320	0.118	1.693	Insigni

Figure No. 1 : EFFECT OF THERAPY ON MUTRAMADHURYA :**Figure No. 2 : EFFECT OF THERAPY ON SHWASA :**

The 24% & 19% of patients had Manda & Vishama Agni leading to production of Ama and Srotodushti (Table 1). The 100% patients suffered from Udakvaha, Pranavaha and Mootravaha Srotodushti due to Prabhoot Mootrata & Hridroga (Table 2). Minimum patients were non-vegetarians owing to population center being Hindu dominant area. All patients gave history of regular Ghrita sevan, Drava ati sevan and Asya sukha. (Table 3). Almost all patients gave history of prodromal signs of Mukhamadhurya, Mukha-Talu Shosha, Alasya, Tandra and Shrama due to disturbed metabolism of Carbohydrates, Fats, Water and Electrolytes (Table 4).

Srotodushti: Main srotasa involved were Pranavaha, Udakavaha & Mootravaha (100% of the patients). The srotas most involved next to both of them was Swedavaha. Lesser patients suffered from Annavaha & Pureeshvaha srotodushti.

Nidana : As far as nidana sevan is concerned, most followed Nidana were Dugdha vikar sevan, Lavana-Ksharaatisevan, Dadhi sevan, Ghrita sevan,

Asyasukha & Avyayama. The study being from a Hindu dominant area, non-vegetarians were very few hence least patients had the nidana 'Mamsa Sevana'.

Family History : More patients gave a history of at least one of the first-degree relative suffering from NIDDM or high cholesterol. The 58 % patients gave family history for Obesity. Among remaining, some being uneducated were ignorant of their family history.

DISCUSSION

Syndrome-X can be considered to have found generous place in Ayurveda texts; may be scattered. This can be addressed with a new term as *Santarpanotha Madhumeha Vishesha* because of the most significance attributed to Diabetes Mellitus. Syndrome-X arises from lack of proper lifestyle, physical exercise & daily / seasonal regimen. Acharyas have given wide descriptions about the individual diseases' signs & symptoms, types of diseases, complications and treatments, but in all aspects, we cannot compare it with modern literature.

Diabetes Mellitus was described more than 2000 years ago. Ancient Hindu sage Sushruta had described the syndrome as characterized by 'honeyed urine' in about 1000 BC. Hridroga is one of the most important disorders of the body & is included here to represent dyslipidaemias & hypertension. Cyanosis, syncope, dyspnoea, pyrexia, Kasa, Hikka, vomiting, chest pain, anorexia etc. are the commonest signs & symptoms of Hridroga. Thus ancient & modern descriptions match, but Hypertension as such is difficult to correlate with any Ayurvedic pathology directly.

On analyzing physical prakirti of the patients, 57% were of Vata Kaphaja prakirti. The explanation for this can firstly be the "Nidana-samuha" of Syndrome-X being Kapha vardhaka. Then in Aavarana, Pitta and Kapha trap Vayu & vitiate it; as one which traps (Avaraka) expresses exaggerated functions & the Aavritta (Trapped one) shows diminished functions. Eventually, all three Doshas are vitiated & enter chronicity giving lead to Vata for the demolition.

In reference to Agni & Koshta, those having constipation were usually having loss of appetite or irregular timing of appetite. The 56 % patients had constipation & 70% patients had Manda or Vishama Agni. This Manda & Vishama Agni indicates Ama production. Although a Sthaulya patient in the beginning of the disease gains weight due to Kapha Vardhaka Nidana & appears healthy but this is an illusion produced by accumulation of Malbhoot meda. For this Chakrapani comments "abaddham iti asamhatam" We can co-relate Medo Dhatvagni to insulin. Here

Medodhatavagni (Insulin) is decreased & produces Malbhoot Abaddha Meda, which cannot nourish Majja & Shukra properly. For this, Chakrapani has used the phrases, "Asamhatam" for abaddha meda. By the term "Mahatyayik" he means destruction of Majja and dhatus deeper to it, so person looks strong but really is not. Here it can be said that "Ama" for every disease is a different entity. When any of 13 Agni is dull, Ama is produced but this Ama can be of innumerable structures & qualities. In case of Madhumeha (Diabetes Mellitus) increased blood sugar can directly be termed as 'Ama'. This blood sugar has got every quality of Ama & paves way for various diseases & infections. This is further certified by the fact that Langhan (fasting) reduces Ama/Blood sugar. We can also label baddha meda as cholesterol within normal levels quantitatively and more of useful HDL and VLDL qualitatively.

On the other hand, Abaddha or Malabhoot Meda can be correlated to hypercholesterolemia and hypertriglyceridemia quantitatively and more of LDL qualitatively. This is supported by modern medicine as most diabetics develop hypercholesterolemia, atherosclerosis and syndrome X. On the same thought process, a numerical value like 120/80 mmHg of blood pressure can be correlated to Nirama Vata in the Pranavaha Srotas & the figures above or below this range can be termed as "SamaVayu". Vata being non-material, such figure only can be a parameter unlike Kapha & Pitta where physical entities can be quantitatively measured.

Among Nidana, the most surprising entity is that of Dugdha (Milk) & its products. It was proven by one study that the infants who were put on cow milk before the age of four months developed IDDM in an abnormal ratio. In this study, many IDDM children were found to have cow-milk antibodies in their blood. Then one milk protein 'Abbos' was held responsible for this antibody formation and subsequent development of IDDM. Although this fact has to be established yet, but this advocates Dugdha as a possible Nidana for Madhumeha, the greatest contributor of Syndrome-X.

No patient with any major complication turned up; could be they preferring higher specialty centers. In the study, 86 patients were sthool (BMI > 25.0) & 14 were samanya (BMI between 20 to 25).

One more thing, which has conceived through this study, is that the two types of Madhumeha; Dhatukshayajanya & Avaranjanya can be called IDDM & NIDDM respectively. As Dhatukshayajanya is said to be fatal/incurable & no treatment is advised for it,

same was the case with IDDM before insulin discovery in 1921. It was invariably fatal. Then both the patients are emaciated, lean & develop disease very early in life. Here Vata is vriddha, but Kapha and Pitta are Ksheena, so they cannot hold life as vata destroys vital entities very rapidly, for which the term "MAHATYAYAT" has been used. Then santarpaka chikitsa is advised for it, as IDDM patients as well cannot withstand strenuous experiences to get rid of increased blood sugar.

The Drug can be assumed effective against Syndrome-X by the following hypothesis-Guggulu act against obesity, DM & Cholesterol by its Kashaya, Tikta, Katu Rasa & has Pramehaghna property; Sarpagandha has anti hypertensive actions. Haritaki acts by its Laghu, Ruksha guna, Vibhitaka by its kaphapitta & Pramehaghna properties. Shilajit & Daruharidra by their Ushna veerya - decrease urine output & reduce weight, increase Agni to get rid of Ama & srotodushti. Overall these drugs decrease Kapha & thus help to overcome the chief signs & symptoms of Madhumeha. Shankhapushpi & Sarpagandha were added for their effectiveness against hypertension.

On the other hand, Amalaki by its Rasayan & Tridoshahara properties, Haritaki by its Vayasthapana, Rasayana, Pancharasa, Tridoshahara, Deepana, Anulomana properties, Vibhitaki by its Rasayana property, Daruharidra by its blood purifying property increase Oja & replenish the lost dhatus in Madhumeha & causes Karshana of Meda Dhatu against obesity & cholesterol. These properties synergistically overcome Vata & increase "bala" i.e. immunity to withstand the possible susceptibility to various infection & complication.

This compound may be showing hypoglycemic & anti cholesterol effect by altering in metabolism & which is the main organ contributing 75% of body metabolisms is deranged in hypercholesterolaemia & diabetes mellitus. Of course, pancreas is source of insulin for regulation of blood glucose levels in the body, but the most important site of insulin resistance in NIDDM is liver and muscle. The liver is thought to be more sensitive than muscle, to the effects of insulin. Liver become sensitive to insulin during the drug therapy to regulate the metabolism by acting on liver directly to increase glycolysis and decrease the gluconeogenesis.

Apart from working on liver, these drugs have properties of Anuloman, Rasayan, Vayasthapan, Amapachan, Raktashodhan, Stambhan etc which act

