

**Clinical Evaluation of Medadusti in Pre-Diabetic Stage and Its Management with Trikatu Churna**¹Sukalyan Ray

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Abstract

In human body, digestion, absorption and metabolism depend on the function of *Jatharagni*, *Bhutagni* and *Dhatwagni*. *Meda Dhatu* is produced from *Mamsa Dhatu* with the help of *Mamsagni*. Due to vitiation of *Meda Dhatu* several diseases have been produced, among them *Prameha* i.e. diabetes mellitus is an important disease. The causative factor of *Medavaha Srota Dusti* and *Prameha* are identical. Similarly, the features of *Medadusti* and the features of *Purvarupa of Prameha* are identical. *Meda* is the chief *Dushya* of *Prameha*. *Meda* can be compared with body fat and multiple forms of lipids like cholesterol, triglycerides, low density lipoproteins (LDL), very low density lipoproteins (VLDL) etc. Alteration of fat metabolism in the pathogenesis of diabetes mellitus is an important phenomenon. In the present study, the conceptual understanding of *Medadusti* in *Prameha* (mainly in its prodromal stage) has been clinically verified in 32 subjects having prodromal features of *Prameha* i.e. having pre-diabetic stage. The *Medadusti Lakshans* in terms of *Medavridhhi Lakshans* have been considered as subjective parameters whereas the blood level of total cholesterol, triglyceride and fasting & post prandial blood

glucose has been taken as objective parameters. Most of the subjects have satisfied the subjective criteria of *Medadusti* in prodromal stage of *Prameha*, which validates the conceptual understanding of *Medadusti* being an essential pathological phenomenon in occurrence of *Prameha*. The efficacy of the stipulated drug i.e. *Trikatu Churna* has been verified through subjective and objective parameters and statistically analyzed using paired 't' test before and after treatment. Statistical analysis before and after administration of *Trikatu Churna* for two month in stipulated dose shows the 'p' value <0.001 in most of the parameters (subjective and objective). This indicates the drug taken for the study is highly efficacious against *Medadusti* and subsequently helps to combat the occurrence of *Prameha* i.e. diabetes mellitus.

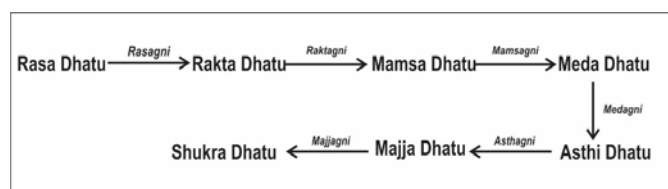
Keywords : *Meda*, *Medadusti*, *Prameha*, Diabetes Mellitus

Introduction

Agni is the main factor for digestion, absorption and metabolism ¹. The root of *Annavaha Srota* is *Amashaya* and *Vamaparsha* ². The food provides nourishment to the tissue elements of body, which are homologues and not contrary in nature ³. The ingested food material at first

goes through digestion and followed by absorption and metabolism with the action of *Jatharagni*, *Bhutagni* and *Dhatwagni* respectively. The pure and waste product of food after digestion and metabolism enter into circulation⁴ through the same channel. This *Dhatu* has its own channel for circulation. Food articles are composed of five *Mahabhutas*. *Agni* is specific out of these five *Mahabhutas* helps on the digestion and absorption of the respective food ingredients⁵. By virtue of seven categories of *Agni*, these tissue elements get metabolized in the way of transformation of nourishing materials and transformation of waste products⁶. With the action of specific *Dhatwagni*, each *Dhatu* converts in to the subsequently *Dhatu*s in the following manner :

Figure 1 : Showing the mechanism of *Dhatu Paka* according to *Kshira Dadhi Nyay* :



Meda is formed from the *Mamsa* with its own *Ushma* in addition to the *Snigdhatva* and *Dravatva Guna* of *Apa Mahabhuta*⁷. *Oja* constitutes the essence of all the seven *dhatu*s taken together⁸. Practically, *Oja* is the essence product of all the *Dhatu*s, produced during specific *Dhatwagni Paka*⁹ and causes the protective mechanism of the body due to its *Sneha Guna*¹⁰. Each *Dhatu* has its own *Oja* which is responsible to maintain its own protective mechanism, breaching of which leads to several diseases related to that particular *Dhatu* (*Dhatu Pradoshaja Vikar*). Lack of exercise, habit of sleeping during day time, excessive intake of fatty substance and excessive intake of fermented drinks like *Varuni Madya* vitiate *Medavaha Srota*¹¹. Several diseases are produced due to *Medadusti* and vitiation of *Medaoja*, among which *Prameha* is the most important one. Moreover, the clinical features of

Medavaha Srotadusti are identical with the prodromal features (*Purvarupa*) of *Prameha*. In human body, *Prameha* occurs in two different pathways – one due to *Dhatu Kshaya* and another is due to *Avaran*. The aggravated *Kapha* afflicts the *Meda*, *Mansa* & *Kleda* and in due course of time *Kaphaja Meha* is converted in to *Pittaja Meha*, followed by *Vataja Meha* following the *Dhatukshaya* pathogenesis if not treated properly¹². On the other hand, when the path of *Vata* is obstructed due to several factors then the *Vata* together with the *Ojas* comes down to reach the *Basti* causing *Prameha* following the *Avaran* pathogenesis¹³. In both types of *Prameha*, the *Avaddha Meda* plays the most important role¹⁴.

Meda can be compared with body fat and multiple forms of lipids like cholesterol, triglycerides, low density lipoproteins (LDL), very low-density lipoproteins (VLDL) etc. *Prameha* can be clinically compared with Diabetes mellitus. Diabetes mellitus is one of the foremost metabolic disorders characterized by elevated level of blood glucose, pathologically known as hyperglycaemia. The number of people suffering from *Prameha* i.e. diabetes mellitus has risen from 108 million in 1980 to 422 million in 2014. The global prevalence of diabetes among adults over 18 years of age has risen from 8.7% in 1980 to 8.5% in 2014¹⁵. Altered metabolism of triglyceride-rich lipoproteins is crucial in the pathophysiology of the atherogenic dyslipidemia of diabetes. Alterations include both increased hepatic secretion of VLDL and impaired clearance of VLDL and intestinally derived chylomicrons. An important consequence of retarded clearance is prolonged plasma retention of both VLDL and postprandial chylomicrons as partially lipolyzed remnant particles. These remnants, which include cholesterol enriched intermediate density lipoproteins (IDLs), are particularly atherogenic in humans and in a number of animal models¹⁶. Thus,

alteration of lipid metabolism is an essential phenomenon in the pathogenesis of diabetes mellitus. Diagnosis of diabetes mellitus is mainly consisting of estimation of blood glucose level. The various levels of blood glucose in fasting and post prandial state have been tabulated in Table No. 1.

Table 1: Blood glucose level in various state:

State	Fasting Blood Sugar	Post Prandial Blood Sugar
Normal	<110 mg/dl	<140 mg/dl
Impaired Glucose Tolerance	110 – 125 mg/dl	140 – 199 mg/dl
Diabetes Mellitus	>_ 126 mg/dl	>_ 200 mg/dl

The glucose intolerance state can be termed as prodromal state of diabetes mellitus i.e. *Prameha*, commonly known as pre-diabetic state. Administration of specific therapeutic measures along with diet and life style in this state helps to arrest the pathogenesis of diabetes mellitus and prevent its clinical manifestation in human being. So, the present study has been carried out to evaluate –

1. The concept of *Meda* and its role in the pathogenesis of *Prameha*.
2. State of *Medadusti* in prodromal stage of *Prameha* i.e. pre –diabetic stage.
3. To assess the efficacy of the selected *Ayurvedic* preparation – *Trikatu Churna* to combat *Medadusti* in prodromal stage of *Prameha* i.e. pre –diabetic stage and subsequently to combat development of *Prameha* i.e. diabetes mellitus.

2. Materials And Methods :

Medadusti is main pathological cause in *Prameha*. The literary information regarding *Medadusti* in *Prameha* was verified through clinical study. Assessment of *Medadusti* in *Purvarupa Avastha* of *Prameha* i.e. pre-diabetic stage was done on the basis of some subjective criteria and biochemical laboratory test.

The study has been also carried out to evaluate the clinical efficacy of *Trikatu Churna* in *Medadusti* as occurs in *Purvarupa Avastha* of *Prameha*.

Trikatu Churna is a known *Ayurvedic* preparation, consisting powder of *Shunti* (*Zingiber officinale*), *Pippali* (*Piper longum* Linn.) and *Maricha* (*Piper nigrum* Linn.) in equal part, which is effective in *Medadusti*. This preparation was administered in the subjects included in the study to observe the improvement of subjective and objective criteria. The subjective and objective criteria were evaluated before and after treatment.

Selection of Subjects :

35 subjects were selected from OPD of Institute of Post Graduate Ayurvedic Education & Research , at Shyamadas Vaidya Sastra Pith Hospital, 294/3/1 A.P.C. Road, Kolkata 700009 irrespective of their sex, occupation and religion. The subjects having the *Purvarupa* of *Prameha* were selected for the study and subsequently the features of *Medadusti* were evaluated on the basis of subjective and objective parameters.

Inclusion Criteria:

- i. Subjects above 30 years of age and below 70 years of age.
- ii. Subjects who are willing to include themselves into the study.
- iii. Subject having fasting blood glucose level more than 110 mg/dl but less than 126 mg/dl.
- iv. Subject having post prandial blood glucose level more than 140 mg/dl but less than 200 mg/dl.
- v. Subjects having the clinical feature of *Purvarupa Avastha* of *Prameha*.
- vi. Subjects not suffering from any other systemic ailments and not taking any other drugs or not under any stipulated therapeutics.

Exclusion Criteria:

- i. Subjects below 30 years and above 70 years of age.

- ii. Subjects those who are not willing to include themselves in the study.
- iii. Subjects having Fasting Blood Sugar less than 110 mg/dl and more than 126 mg/dl.
- iv. Subjects having Post Prandial Blood Sugar less than 140 mg/dl and more than 200 mg/dl.
- v. Patients suffering from any other systemic failure such as Renal failure, Hepatic failure, Heart disease or Thyroid disorders.
- vi. Patients receiving anti diabetic drug and other supplementary therapy.

Subjective Parameters:

In *Medadusti*, though several number of signs and symptoms are manifested (as tabulated in the table no. 4) but considering the presented sign and symptoms of the attended subjects in *Purvarupa* stage of *Prameha* i.e. pre-diabetic stage, the specific following features in respect to *Medavridhi* (type of *Medadusti*) have been considered as subjective parameters for the presented study¹⁷ –

- i. *Snigdha Angata*
- ii. *Kshudra Swasa*
- iii. *Durgandhata of Sharir*

Objective Parameters :

- i. Serum total cholesterol level
- ii. Serum triglyceride level
- iii. Estimation of blood sugar level (fasting & post prandial)

Adoption of Drug :

Trikatu Churna is a well-known *Ayurvedic* preparation consisting powder of dried tuber of *Shunti* (*Zingiber officinale*), root of *Pippali* (*Piper longum* Linn.) and root of *Maricha* (*Piper nigrum* Linn.) in equal part. This preparation is clinically effective on *Medadusti* by virtue of *Katu Rasa* of *Shunti*, *Pippali* & *Maricha* and *Laghu* – *Ushna* - *Ruksha Guna* of *Shunti* & *Laghu* - *Tikshna Guna*

of *Pippali* & *Maricha* as well as *Ushna Virya* of *Shunti*, *Pippali* & *Maricha*. Powder of *Trikatu* has been administered in a dose of 2 gm., twice daily with honey, before lunch and dinner, for a period of one month. After one month effect of the stipulated drug has been evaluated.

3. Study Protocol :

Duration of study :

The duration of the study was two month.

Assessment Criteria:

Assessment has been done on the basis of subjective and objective criteria before and after treatment. For the statistical evaluation, each of the subjective parameters have been arranged as per gradation as mentioned below and evaluated thereafter.

1. *Snigdha Angata* :

Characteristics	Score
No feasible visible glaze	0
Feasible visible glaze in some part of body	1
Feasible visible glaze in buttock, abdomen, thigh & neck	2
Feasible visible glaze all over the body	3

2. *Kshudra Swas* :

Characteristics	Score
No difficulty in respiration after exertion	0
Mild difficulty in respiration after exertion	1
Moderate difficulty in respiration after exertion	2
Severe difficulty in respiration after exertion	3

Durgandhata of Sharir :

Characteristics	Score
No Body odor	0
Body odor after 12 hours of bath	1
Body odor after 6 hours of bath	2
Body odor after 3 hours of bath	3

Follow up of subjects :

All the subjects have been reviewed after two month from the date of administration of first dose. Any special information regarding the general health of the subject has been recorded accordingly.

Study sample :

Total 35 subjects with prodromal features of *Prameha* with features of *Medadusti* were included in the study.

Statistical analysis :

The information gathered on the basis of observation made about various parameters was subjected to statistical analysis in terms of Mean, Standard Deviation (SD) and Standard Error (SE). Paired 't' test was carried out at $P < 0.05$ and $P < 0.001$. The obtained results were interpreted as - $P < 0.05$ is significant & $P < 0.001$ is highly significant.

Dietary restrictions:

All the subjects included in the study have been advised to avoid fatty substance, milk, egg, butter, ghee and excessive oily and fried foods. Similarly, they have also been advised for morning walking and free hand exercise for 30 minutes, brisk walking for minimum 30 minutes after having principal meal and to avoid day-sleep, continuous sitting and other sedentary habits.

4. Observations & Results :

Among the 35 subjects total 3 subjects were dropped out during study course. Hence complete clinical survey has been done in 32 subjects. Distribution of subjective parameters of *Medadusti* among the 32 subjects in prodromal stage of *Prameha* i.e. pre-diabetic stage shows that, *Snigdha Angata* present in 28 subjects (87.5 %), *Kshudra Swas* present in 29 subjects (90.62 %) and *Sharir Durgandhata* present in 31 subjects (96.87%) [table no. 2]. Statistical analysis of subjective and objective parameters of *Medadusti* in 32 subjects in prodromal stage of *Prameha* i.e. pre-diabetic stage before

and after treatment shows that *Trikatu Churna* has significant efficacy on both the subjective and objective parameters with 'p' value < 0.001 . [table no. 3].

Table 2 : Showing the distribution of subjective parameters of *Medadusti* among the 32 subjects having *Purvarupa* of *Prameha* :

Sl. No.	Subjective Parameter	No of subjects	Percentage
01.	<i>Snigdha Angata</i>	28	87.5 %
02.	<i>Kshudra Swas</i>	29	90.62 %
03.	<i>Sharir Durgandhata</i>	31	96.87 %

Table 3: Showing the statistical analysis of subjective and objective parameters in 32 subjects having *Purvarupa* of *Prameha* before and after treatment:

Parameters	Mean BT	Mean AT	SD +/-	SE +/-	't' value	'p' value
<i>Snigdha Angata</i>	2.28	0.812	0.696	0.12	12.2	< 0.001
<i>Kshudra Swas</i>	2.13	0.437	0.77	0.136	12.5	< 0.001
<i>Sharir Durgandhata</i>	2.56	0.91	0.663	0.12	13.75	< 0.001
Serum total cholesterol	210.25	200.5	3.53	0.63	15.6	< 0.001
Serum triglyceride	166.7	158.6	3.18	0.56	14.4	< 0.001
Fasting blood glucose	124.78	120.43	2.27	0.41	10.8	< 0.001
Post prandial Blood glucose	183.12	178.18	2.48	0.43	11.23	< 0.001

5. Discussion :

In today's world, persons suffering from diabetes mellitus i.e. *Prameha* come to the physician in glucose intolerance stage, which is also known as pre-diabetic stage or at the stage of manifestations of *Purvarupa* of *Prameha* due to their increasing health consciousness. And subsequently *Medadusti lakshan* is identical to that of the *Purvarupa* (prodromal stage) of *Prameha*. Considering this in the table no. 4 the identical *Lakshan* of *Medadsuti* and prodromal stage of *Prameha* have been tabulated¹⁸.

Avyayam and *Divaswapna* cause *Medadusti* and *Prameha* directly. But *Medyanam Atibahkshanam* and *Varuni*

Madya Atisevanam cause *Medadusti* directly but indirectly they are related with the *Habyishanna Bhojana* (where the fat substances are maximum) and *Ikshu Vikriti* accordingly, thus acts as causative factor of *Prameha*. In the above context, the identical *Nidan* of *Medavaha Srotadusti* & *Prameha* have been tabulated in the table no. 5¹⁹.

Table 2 shows that, most of the subjects having *Purvarupa* of *Prameha* were satisfying the subjective criteria of *Medadusti*. It signifies that, *Medadusti* is an essential phenomenon in cases of *Prameha*.

Table 3 shows the statistical analysis before and after administration of the drug *Trikatu Churna* (powder of *Shunti*, *Pippali* & *Maricha*). This table shows the 'p' value <0.001 in most of the parameters (subjective and objective), which indicates that, the drug taken for the present study is highly efficacious to combat *Medadusti* and subsequently to prevent occurrence of *Prameha*.

Table 4 : Identical *Lakshan* of *Medadusti* & prodromal stage (*Purvarupa*) of *Prameha* :

Sl. No.	Lakshan	Medadusti	Prameha Purvarupa
01.	Alasyam	++	++
02.	Hrid-Netra-Jihva-Shravana Upadeha	++	++
03.	Jatilahava Kesheshu	++	++
04.	Karapadoyo Daha	++	++
05.	Karapadoyo Suptata	++	++
06.	Kaya Malam	++	++
07.	Kayachhidreshuupadeham	++	++
08.	Kesha Nakhativridhi	++	++
09.	Mukha Talu Kantha Sosha	++	++
10.	Madhuryamasya	++	++
11.	Mutrebhidhavant Pipilikascha	++	++
12.	Madhushukla Mutrata	++	++
13.	Nidra	++	++
14.	Pipasa	++	++
15.	Paridham Angeshu	++	++
16.	Sajyasanaswapna Sukham	++	++

Table 5: Identical *Nidan* of *Medavaha Srotadusti* & *Prameha* :

Sl. No.	Nidan	Medadusti	Prameha
01.	Avyayam	++	++ (direct)
02.	Divaswapna	++	++ (direct)
03.	Medyanam Atibhakshanam	++	++ (indirect)
04.	Varuni Madya Atisevan	++	++ (indirect)

6. Conclusion :

Meda is the chief *Dushya* in pathogenesis of *Prameha*. The *Nidan* of *Meda Dusti* has a definite role to cause *Prameha*. The sign and symptoms of *Medadusti* and the prodromal features of *Prameha* are identical. In all the subjects with prodromal features of *Prameha* i.e. diabetes mellitus, *Meda Dusti Lakshan* are clinically present. If specific drug like *Trikatu Churna*, which can arrest *Medadusti*, is administered in the prodromal stage of *Prameha*, it will subsequently arrest further vitiation of *Meda Dhatu* and thus helps to prevent occurrence of *Prameha* i.e. diabetes mellitus.

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