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A CLINICAL STUDY ON ROLE OF MAHAGONI (*SWIETENIA MAHAGONI*) IN THE MANAGEMENT OF MADHUMEHA (DIABETES MELLITUS)

Sanatan Rai[1*], Archana Rai[2], Sukumar Ghosh[3], Rohit Kumar Ravte[4], Jayram Hazra[5]

[1]SRF, [4]Research Officer (Ayu), [5]Director, National Research Institute of Ayurvedic Drug Development,
CCRAS, Ministry of AYUSH, Government of India, 4CN Block, Bidhannagar, Kolkata- 700091, West Bengal, India.
[2]PG Scholar, [3]Reader and HOD, Department of Kaya Chikitsa, Institute of Post Graduate Ayurvedic Education and Research,
Shyamadas Vaidya Sastra Pith, Kolkata – 700009, West Bengal, India.

ABSTRACT

Madhumeha is by far the most common of the metabolic disorders. It is not a specific disease in Ayurveda but considered as a variety of the disease 'Prameha'. The present day scholars have correlated it with Diabetes mellitus. Diabetes mellitus is a heterogeneous chronic metabolic disorder principally characterized by persistent hyperglycemia resulting from defects in insulin action and/or insulin secretion. When fully expressed, diabetes is characterized by fasting hyperglycemia, but the disease can also be recognized during less overt stage and before fasting hyperglycemia appears, most usually by the presence of glucose intolerance. Diabetes mellitus may be suspected or recognized clinically by the presence of characteristic symptoms such as excessive thirst, polyuria, pruritus, otherwise unexplained weight loss, or one or more of the many complication associated with or attributable to the disease.

INTRODUCTION

The history of Diabetes mellitus dates back to the sixth century AD when Hindu physicians recognized that it was caused by an excess intake of oil and sugar. It was called *madhumeha* (sweet urine) or *bahumoothra* (excess urination). It was then called as the sugar disease [1-4].

This global pandemic principally involves type 2 diabetes and is associated with greater longevity, obesity, unsatisfactory diet, sedentary life-style and increasing urbanization [5].

The world wide prevalence of Diabetes Mellitus has risen dramatically in past two decades. From an estimated 30 million cases in 1985 to 285 million in 2010. Based on current trends, the International Diabetes Federation projects that 438 million individuals will have diabetes by the year 2030 [6].

In India there were an estimated 19.4 million diabetes individuals in 1995 which is projected to increase to nearly 80 million in 2030 [7,8].

Because of increasing trend of the disease scholars of different systems are working hard to overcome the problem. Ayurveda include a vast source of drugs of different origin which are used by the Ayurvedic physicians for thousands of years to control madhumeha. Many of such drugs have also been studied in the present era with scientific parameters to assess their anti-diabetic effect. This has encouraged the present scholar to assess the anti-diabetic effect of a drug of plant origin, i.e. Mahagoni (*Swietenia mahagoni* (L.) Jacq. Study on streptozotocin and nicotinamide-induced type 2 diabetes in rats concludes that the Methanolic Extract of seeds of *Swietenia mahagoni* has hypoglycemic as well as

Corresponding Author

Sanatan Rai
Email: - sanatan17485@gmail.com

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hypolipidemic effect [9]. Few Ayurvedic scholars have also tried to study the anti-diabetic effect of *S. mahagoni* [10].

AIMS AND OBJECTIVES

To evaluate the role of mahagoni in management of madhumeha (Diabetes Mellitus).

To observe any clinical adverse effect of the said drug during the study period

MATERIALS AND METHODS
Source and Preparation of Drug

The seed of *Swietenia mahagoni* were purchased from the shops of local markets of Kolkata and were identified by experienced ayurvedic physicians. Seeds of *Swietenia mahagoni* were dried in the sunlight and outer coverings were removed. After that the dried seeds were powdered in apothecary (pharmacy) department of Institute of Post Graduate Ayurvedic Education and Research at SVSP, 294/3/1, A. P. C. Road, Kolkata – 700009. In the air tight glass container the powder was preserved and supplied to the patient time to time.

Selection of Patients

After detail history taking clinical examination and pathological investigation, 60 patients were selected from the OPD of Institute of Post Graduate Ayurvedic Education and Research at SVSP, Kolkata for this study. The study was approved by Institutional Ethics Committee of the IPGAER, Kolkata (PG/662/2012 dated 19.06.2012). Written informed consent of all the participating subjects was obtained by signature.

Exclusion Criteria

i) Insulin dependent diabetes mellitus, ii) Hypertension, iii) Liver disease
iv) Renal Disease, v) Pregnancy, vi) History of drug intake like steroid, diuretics, OCP etc, vii) Pancreatitis, viii) Acute infection, ix) Complication of Type II DM.

Inclusion Criteria

i) Age of patient > 40 years < 60 years, ii) Patient of both sexes, iii) Presence of diabetes symptoms, iv) Raised Blood sugar as per diagnostic criteria: PPBS level not exceeding 250 mg/dl, FBS level not exceeding 200 mg/dl. v) Patient not taking any other medicine for Diabetes. vi) Free from any complication.

Diagnostic Criteria

For selection of the cases, the following diagnostic criteria will be followed.

Subjective Criteria

Presence of following diabetic symptoms which were based on textual reference.
1. Polyphagia 2.Polydipsia 3.Polyurea 4.Excessive sleep

5.Excessive weight loss 6.Weakness and 7. Malaise

Objective Criteria

1) Blood Sugar Estimation
   a) Fasting plasma glucose value (after 8 hrs. fasting) from 126 mg/dl to 200 mg/dl.
   b) Post prandial glucose value (2 hrs. after meal) from 200 mg/dl to 250 mg/dl.
2) Glycosated haemoglobin
3) Urine for routine examination with special attention to sugar, protein and acetone content.
4) Routine haematology
5) Lipid profile

Study Design:

50 patients of madhumeha were taken for this research program after proper examination and investigations. All the patients were treated with the trial drug at dose of 2 gm twice daily and regular monthly check up was done for 3 months. Demographic profile of 50 participants was recorded. Out of 50, 10 participants dropped out. Laboratory profile of 40 participants was carried out. Out of 40 participants, Glycosylated hemoglobin (HbA$_1$c) estimation was done for 10 participants only due to financial constraints.

Step – I : Selection of madhumeha patient as per selection criteria from the OPD of
IPGAE & R at SVSP.
Step – II : Confirmation of diagnosis.
Step – III : All the patients were treated with swietenia mahagoni seed powder in a
dose of 2 gram twice daily.
Step – IV : Monthly follow up and observation of adverse effect for 3 months .
Step – V : Observation of results and statistical analysis using paired 't' test.

Observation and Result:
Pattern of Prefer Rasa

Preference of Rasas were observed in all the patients of the study.
It was observed that maximum number of patients i.e. 28 patients (56%) prefers Madhur rasa followed by 7 patient (14%) Lavan rasa and 6 patients (12%) preferring Amla rasa.

Deha Prakriti

According to the doshik involvements, various type of deha prakriti was identified among the 50 patients of madhumeha.

It was revealed that maximum number of patients were vata kaphaj prakriti, i.e. 28 patients (56%) followed by 10 patients (20%) of pitta kaphaj prakriti.

Manas Prakriti

Among all the 50 patients of madhumeha the manas

prakriti was determined.

Maximum patients from our research work were found to have tamasik prakriti.

Therapeutic Trial

Therapeutic trial was conducted in 50 patients of Madhumeha. They were treated with seed powder of Swietenia mahagoni in a dose of 2 gm twice daily before meal the effect of treatment on symptoms profile as well as objective parameters were evaluated on 40 patient. These are shown in following table.

All the symptoms of Madhumeha (Diabetes Mellitus) were markedly reduced at the end of therapeutic trial the percentage of relief of symptoms were satisfactory.

RESULTS FROM DIFFERENT OBJECTIVE PARAMETERS BY LABORATORY ANALYSIS

The Results have been assessed on the basis of different parameter before and after treatment of madhumeha patient. These are shown in following table.

Table 1. Effect of Swcitenia Mahagoni seed in different symptoms of Madhumeha.

Sl. No.	Symptoms	Before Treatment	After treatment
01.	Polyuria	84%	14%
02.	Polydipsia	80%	16%
03.	Polyphagia	76%	12%
04.	Weight Loss	40%	20%
05.	Weakness	44%	10%
06.	Increased sleep	36%	12%
07.	Malaise	32%	8%

Table 2. Effect of treatment on fasting blood sugar of 40 patients.

Biochemical value	Mean score		% of Relief	SD (±)	SE (±)	't'	p
	BT	AT					
FBS	168	131	22.024%	7.8	5.6	6.19	<0.001

BT = Before treatment	AT = After treatment
SD = Standard Deviation	SE = Standard Error
't' = paired test	p = represents the significant level of percentage.

Table 3. Effect of treatment on Post prandial blood sugar of 40 patients.

Biochemical value	Mean score		% of Relief	SD (±)	SE (±)	't'	p
	BT	AT					
PPBS	230.95	176.95	23.38	56.42	8.9	6.07	<0.001
BT = Before treatment	AT = After treatment						
SD = Standard Deviation	SE = Standard Error						
't' = paired test	p = represents the significant level of percentage.						

Table 4. Effect of treatment on HbA$_1$C of 10 patients

Biochemical value	Mean score		% of Relief	SD (±)	SE (±)	't'	p
	BT	AT					
HbA$_1$C	7.43	7.0	49.8	.334	.1003	3.64	<0.001

BT = Before treatment	AT = After treatment
SD = Standard Deviation	SE = Standard Error
't' = paired test	p = represents the significant level of percentage.

CONCLUSION

Oral administration of Sweitenia mahagoni is very effective for releiving the symptoms, but its biggest drawback is its bitter taste. Sweitenia mahagani showed significant result in lowering fasting and post prandial blood sugar level as well as HbA$_1$C level.

Thus on the basis of above finding, it can be concluded that Sweitenia mahagoni may be safely used for prolonged period for the patients of Madhumeha (Diabetes mellitus). Further a large number of clinical studies are suggested.

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