Role and Efficacy of “Katankateriyadi Kwatha” in Patients of Madhumeha (Diabetes Mellitus Type 2): A Clinical Trial

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INTRODUCTION

In the field of research, though experimental studies provide a better understanding regarding the efficacy, mode, and site of action of the drugs, the evaluation of the drugs is incomplete until they tried clinically. As a part of research work, the clinical study is very much essential to establish the effect of the drug.

Madhumeha (Diabetes mellitus) is a by-product of urbanization, proclaimed thousands of years back by Acharya Charaka. India has a high prevalence of diabetes which is increasing in number at an alarming rate. The introduction of oral hypoglycaemic drugs in modern therapeutics materialize to be a breakthrough in the treatment of Diabetes Mellitus initially but subsequently, it was experienced that most of the hypoglycaemic drugs were inadequately effective and were associated with many major side effects. To get rid of this problem, here we aimed to find out an effective and safe remedy to control the disease. This study is an Open-label, standard control, randomized and comparative clinical study with the 3-month assessment of the response of the trial drug “Katankateriyadi Kwatha” on the diabetic patients through subjective and objective parameters.

Keywords: Diabetes mellitus, Clinical study, Madhumeha, Katankateriyadi Kwatha.

INTRODUCTION

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Madhumeha (Diabetes mellitus-2) is worldwide a stubborn disease condition recognized by ancient scholars of ancient India. The Ayurvedic classical texts namely the Samhitas of Charaka, Susruta, Vaghbatha and the subsequent treatises have invariably given a detailed description of the disease Prameha, its causes, types, pathology and the line of management in both preventive and curative aspects. Acharya Charaka has classified it into two groups i.e. Sthula Pramehi and Krishna Pramehi and Sanantarpanjayana and Aparpananjaya Prameha at the other places 1. It can be paralleled with the classification given by Vaghbatha i.e. Dhatushraya Madhumeha and Avaranajanya Madhumeha respectively. The factor which elicits Vata directly causes Aparpananjaya Madhumeha while the factor which elicits Kapha and Pitta causes Sanantarpanjayana Madhumeha. In Avaranajanya Madhumeha, Kapha is the prevailing dosha while the important dushyas are Meda and Kleda. In Avaranajanya Samprapti the vitiated Kapha and Pitta obstruct the patha of Vata causing its aggravation 2. Acharya Susruta mentioned that in Madhumeha the vitiated
Table 1: The individual properties of the trial drug (Katankateriyadi Kwatha) are intervened as:

| Property | Description |
|----------|-------------|
| Rasa - | Katu, Tikta, Kashaya (Madhura rasa in Yastimadhu) |
| Guna - | Laghu, Raksha |
| Virya - | Ushna (shita virya in Yastimadhu & Amalaki) |
| Dosha Karma - | Tridoshaghna |

AIMS AND OBJECTIVES
- To evaluate the role of Katankateriyadi kwatha in Madhumeha (Diabetes Mellitus-2).
- To determine the symbiotic relationship between Katankateriyadi kwatha and anti-hyperglycemic drug (Gliclazide SR).

MATERIAL AND METHODS
Selection of Patients: 75 cases of DM II (out of 85, 10 were drop out) registered from the O.P.D. of Department of Dravyaguna, Sir Sundarlal Hospital, Banaras Hindu University, and Varanasi. Some of these cases were already known diabetics while some cases were diagnosed for the first time when they visited with other complaints.

Pre-Treatment Observation: All the patients were studied at the time of registration considering their age, sex, religion, marital status, occupation, habitat, family history, dietary habits (diet habit-1 and diet habit-2), appetite, bowel habit, addiction, duration of illness and physical activity. After preliminary registration, patients were subjected to document their detail case history taking and physical examination including general and systemic examination.

Diagnostic Criteria: All the patients were examined clinically for signs and symptoms of Madhumeha (type 2 Diabetes mellitus) i.e; Prabhuta mutrata (polyuria), Kshudhadihya (polyphagia), Trishnadhikya (polydipsia), Durbalya (weakness), Karapadatala Suptata (numbness of limbs), Karapadatala Daha (tingling and burning sensation in sole and palm) and Pindikodveshtana (cramps in legs) over few months. The entire patients were subjected to their fasting and postprandial blood sugar, HbA1C, and lipid profile, etc.

Inclusion Criteria
1. Male and female patients within the age limit 25-60 yrs.
2. Newly diagnosed patients with type 2 diabetes mellitus (Madhumeha).
3. Patients already taking oral hypoglycaemic drugs.

Exclusion Criteria
1. Patients having age more than 60 yrs.
2. Patients having type1 DM.
3. Patients with severe complications of Diabetes (Nephropathy, Cardiomyopathy, Retinopathy, Neuropathy, etc.).
4. Patients having a superinfection.
5. Any other chronic diseases like Tuberculosis, Rheumatic Heart disease, Rheumatoid arthritis, etc.
6. Patients of type 2 DM taking insulin were also not included in the study.
7. Pregnant women and patients advised any surgical interventions.

Laboratory Investigations: The entire patients were subjected to their following biochemical investigations.

1. Fasting Blood sugar (FBS)
2. Post-Prandial Blood sugar (PPBS)
3. HbA1C
4. Lipid profile

Study Design: An Open-label, standard control, randomized and comparative clinical trial.
- Sample Size – 75 patients registered divided into 3 groups
- Dropouts – 10 patients
- Duration of Treatment – 3 months
- Follow Up – 30 days interval with 3 follow-ups
- Source of Formulation: The yavakuta churna of katankateriyadi kashaya was prepared in Ayurvedic pharmacy of Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University.

Interventions
- Drug & Dose: The trial drug Katankateriyadi kwatha was advised to the patients. Coarse powder of plant parts approx. 40g taken and four times water is added and boiled till one-fourth remain and this decoction is given two times. The standard drug i.e; Gliclazide SR 60 mg advised twice a day before meal.
- Duration: All the patients were followed up at an interval of every 15 days. The total duration of treatment was 3 months.

Criteria of Assessment of Overall Effect of Treatment: Selected patients were counseled to come for follow-ups at every one-month interval for three months. The assessment was done under the headings subjective and objective parameters.

i. The clinical symptomatology of the selected patients was divided into four grades (0-3) and changes in gradations of each symptom were assessed at each follow-up.
ii. Control on sugar levels for both fasting and after-meal was focused at each follow-up.
iii. Improvement in HbA1C level and lipid profile was analyzed after the last follow-up i.e, 3 months.
Table 2: Composition of Trial Drug Katankateriyadi Kwatha.

| S.No. | Drug name     | Botanical name          | Useful part | Part used |
|-------|---------------|-------------------------|-------------|-----------|
| 1.    | Daruharidra   | Berberis aristata DC.   | Stem        | 1 part    |
| 2.    | Yastimadhu    | Glycyrrhiza glabra Linn.| Stem        | 1 part    |
| 3.    | Chitraka      | Plumbago zeylanica Linn.| Root        | 1 part    |
| 4.    | Haritaki      | Terminalia chebula Retz.| Fruit      | 1 part    |
| 5.    | Bibhitaki     | Terminalia bellirica Roxb.| Fruit    | 1 part    |
| 6.    | Amalaki       | Emblica officinalis Gaertn.| Fruit    | 1 part    |

**Treatment Protocol**

**Group A: Katankateriyadi kwatha group:** Mild to moderate cases of madhumeha (type 2 diabetes) were advised with Katankateriyadi kwatha along with pathya-apathya as per protocol.

**Group B: Control group:** Known patients of madhumeha (type 2 diabetes) were administered with oral hypoglycaemic drug (Gliclazide SR-60 mg) along with recommended pathya-apathya as per protocol.

**Group C: Integrative group:** Known patients of madhumeha (type 2 diabetes) already taking the Gliclazide SR (60 mg BD) but not well under control were advised with Katankateriyadi kwatha additionally along with pathya-apathya as per protocol.

Patients of all the groups were counseled to follow pathya-apathya as given *:

**Pathya**
- Ahara – Yava (barley), green gram, moong dal, all green and leafy vegetables, anyone seasonal fruit daily, 2 chapattis each meal.

**Vihara** – daily 2-3 km brisk walking in the morning

**Apathya**
- Ahara – milk and milk products, dried fruits, chocolates, sugar, rice, bakery products, potatoes and oily and fried food.

**Vihara** – avoid sleeping in the day time.

**Ethical Clearance**

A detailed research proforma was prepared to incorporate all the points from Ayurvedic as well as a modern aspect to study the patients as well as disease. The study had received prior approval from the Institutional ethics committee. (ECR/526/Inst/UP/2014 Dt. 31.1.14).

**Statistical Analysis**

Significant enhancement in the subjective criteria in a single group was assessed by the Friedman test and to compare the effect of the drug between the groups was done by the Chi-square test. Similarly for the improvement of the clinical parameters within the group was judged by paired t-test and comparison between the groups was carried out by one way ANOVA.

**OBSERVATION AND RESULTS**

Statistical analysis of their general profile evidenced the majority of cases belongs to the age group 41-60 yrs. (65.3%) asserting that disease Madhumeha has a predominance of occurrence at middle age group whereas, the onset of the disease was also observed in the younger age group i.e, 20-30 yrs. (9.3%). Also, more male cases (65.3%) were registered as compared to female cases (34.7%). Married cases (60%) were in more incidences and Hindu cases (80%) were registered in a large number. Prevalence of disease was remarked more in-service class individuals (38.7%) contribute to the fact that a sedentary lifestyle (Asyasukham) and work stress is one of the causes of Madhumeha, followed by housewife (28.0%) indicating altered food habits to be one of the dominating cause. Highly marked cases belonged to urban areas (81.3%) illuminating diabetes to be a modern lifestyle disorder. Out of which mostly belongs to middle economic status, it shows its more prevalence in the middle socioeconomic status group. As people of the middle socioeconomic group have to face more stress in their daily lives, diabetes seems to be closely related to stress.

Nearly about 33.3% of cases were having a family history of diabetes contributed to the fact that disease has a genetic predisposition.

The personal profile of the patients elucidates statistical incidence with more cases having a non-vegetarian diet (54.7%) which contributed to the fact that overindulgence in Mansa is one of the causes of madhumeha and the majority with altered bowel habits (50.7%). Maximum cases had no addiction (62.7%) with an average 4-10% cases was observed with alcohol, Tobacco, smoking and other addiction. It also reveals that apathya ahara, vihara contribute to the development of disease in diabetic prone peoples. Marked cases were having a history of diabetes for >6 yrs (40%) with a moderately active lifestyle (62.7%) followed by 16% of patients with a sedentary lifestyle which again supports the review data that showed decreased physical activity (ekasthanarati) as the leading cause of increasing type-2 diabetes mellitus prevalence.

The demography of the clinical profile of the patients was statistically analyzed in each group and also between the groups. About 64% of cases in group A had mild to moderate grade of Prabhuta mutrata (Polyuria) induced due to excess of vitiated kleda initially before treatment as compared to 76% in group B and 48% in group C. Nearly 40% cases in group A were observed with mild to moderate Trishnahdikya (polydipsia) occurs due to Pitta vridhi and udaka kshaya initially before treatment followed by 72% in group B and 56% in group C. Nearly 60%, 68% and 48% cases in group 1st, 2nd and 3rd group respectively had mild to moderate Kshudhadhikya (polyphagia) caused due to Tikshna and ushna guna of Pitta initially before treatment. The majority of cases were observed with 0-4 kg loss of weight/year i.e; 88% in group 1st initially before treatment followed by 74% and 98% in group 2nd, 3rd respectively. In the etiopathogenesis of Prameha, the Dhatu get vitiated, resulting in Dhatuskaya responsible for the manifestation of Daurbalya (weakness),
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Pindikodweshtana (cramps in legs). Approximate 45-55% cases in all the groups suffered from mild to moderate Pindikodweshtana (leg cramps) before treatment. Karapadatala Daha and Karapadatala Suptata (burning sensation and numbness in the palm and foot) are both reported as Purvarupa of Prameha in the Ayurvedic literature. About 50-60% of cases in all groups had mild to moderate Karapadatala Daha (tingling and burning sensation) initially before treatment. Nearly 60% of cases suffered from mild to moderate Karapadatala Suptata (numbness) in group 1st initially before treatment followed by 44% and 48% in group 2nd and 3rd respectively.

All the groups have shown significant relief in all the symptoms in successive follow-ups. Intergroup comparison was found statistically highly significant in symptoms polyuria, polyphagia and tingling & burning sensation. The absence of symptoms was higher in group C as compared to other groups. The overall improvement was determined based on the percentage of presence and absence of symptoms after treatment as compared to before treatment.

1. If no. of symptoms absent is up to 50%, the improvement is considered mild.
2. If no. of symptoms absent is >50 & <75%, the improvement is considered as moderate.
3. If no. of symptoms absent is >75%, then it is considered as a marked improvement.

### Table 3: Overall Improvement based on the presence of eight symptoms before and after treatment:

| Improvement     | No. & (%) of cases | Group 1 | Group 2 | Group 3 | X² |
|-----------------|--------------------|---------|---------|---------|----|
| No change (0%)  | 2 (9.52)           | 0 (0)   | 0 (0)   |         | x²=8.40, df=2, p=0.015 |
| Mild (≤50%)     | 5 (23.80)          | 7 (36.84)| 3 (14.28)| |
| Moderate (51-74.9%) | 4 (19.04)        | 8 (42.10)| 4 (19.04)| |
| Marked (≥75%)  | 10 (47.61)         | 4 (21.05)| 14 (66.66)| |
| Total           | 21 (100)           | 19 (100)| 21 (100)| |

The above table shows marked improvement in overall symptoms in patients of group 3rd nearly 66.66% as compared to group 1st and 2nd after the last follow-up which is statistically highly significant.

### Effect of Trial Drug on FBS

All the groups have shown a highly significant (p ≤ 0.001) decrease in mean FBS by 69.126, 62.963 and 89.519 in group 1st, 2nd, and 3rd respectively at the last follow-up. The intergroup comparison was not statistically significant after treatment indicating that all the groups are equally effective in reducing fasting blood sugar.

### Table 4 Showing effect of treatment on FBS level

| Groups     | FBS (mean±std.deviation) | Comparison within the group Paired t-test (BT-AT) |
|------------|--------------------------|--------------------------------------------------|
|            | BT | F1 | F2 | F3 |               | BT | AT |
| Group 1    | 179.14±47.119 | 149.86±43.160 | 123.90±32.168 | 106.90±16.742 | 69.126±35.828 | t=8.842 | p=0.000 |
| Group 2    | 171.75±21.835 | 141.89±19.591 | 120.73±17.473 | 106.41±13.823 | 62.963±21.028 | t=13.052 | p=0.000 |
| Group 3    | 191.67±50.007 | 146.58±34.795 | 121.92±32.511 | 103.66±16.381 | 89.519±43.976 | t=9.329 | p=0.000 |
| Comparison | F=1.463 | p=0.238 | F=0.348 | p=0.708 | F=0.069 | p=0.934 | F=0.254 | p=0.776 |
| between the group | One-way ANOVA | | | | | | | |
**Effect of Trial Drug on PPBS**: Decrease in mean PPBS at 3rd follow-up as compared to before treatment is 124.756, 106.353 and 127.024 in 1st, 2nd and 3rd group respectively, which were statistically highly significant. All the groups are equally effective in reducing post-prandial blood sugar as the intergroup comparison shows insignificant results.

### Table 5 Showing effect of treatment on PPBS level

| Groups   | PPBS (mean±std.deviation) | Comparison within the group Paired t-test (BT-AT) |
|----------|---------------------------|--------------------------------------------------|
|          | BT | F1  | F2  | F3  |                     |                     |
| Group 1  | 294.27 | 229.64 | 183.91 | 160.29 | 124.756 ± 38.526 | t=14.840,p=0.000 |
|          | ±42.070 | ±48.170 | ±25.002 | ±16.378 |
| Group 2  | 277.29 | 217.62 | 188.18 | 171.26 | 106.353 ± 21.028 | t=21.151,p=0.000 |
|          | ±18.149 | ±32.169 | ±23.556 | ±14.163 |
| Group 3  | 289.05 | 223.51 | 181.22 | 165.80 | 127.024 ± 49.753 | t=11.700,p=0.000 |
|          | ±61.485 | ±46.673 | ±33.579 | ±32.546 |
| Comparison between the group One-way ANOVA | F=0.966, p=0.386 | F=0.490, p=0.615 | F=0.342, p=0.712 | F=1.156, p=0.322 |

**Effect of Trial Drug on HbA1C**: Decrease in mean HbA1C after treatment as compared to before treatment is 1.8095, 1.3158 and 2.1095 in group 1st, 2nd, and 3rd respectively, which were statistically highly significant. Intergroup comparison was not found significant after the treatment.

### Table 6 Showing effect of treatment on HbA1C level

| Groups   | HbA1C (mean±std.deviation) | Comparison within the group Paired t-test (BT-AT) |
|----------|----------------------------|--------------------------------------------------|
|          | BT | F3  |                     |                     |
| Group 1  | 8.576 ± 1.5791 | 6.686 ± 0.4328 | 1.8095 ± 1.3323 | t=6.224,p=0.000 |
| Group 2  | 7.928 ± 0.5842 | 6.711 ± 0.4677 | 1.3158 ± 0.5659 | t=10.134,p=0.000 |
| Group 3  | 8.612 ± 2.1324 | 6.638 ± 0.3866 | 2.1095 ± 2.0557 | t=4.703,p=0.000 |
| Comparison between the group One-way ANOVA | F=1.505, p=0.229 | F=0.149, p=0.862 |

**Effect of Trial Drug on Lipid Profile**: All the groups have shown significant improvement in their lipid profile levels after treatment. Total cholesterol level (Decrease in mean after treatment is 82.938, 63.316 and 64.476 in groups 1st, 2nd and 3rd respectively ) and triglyceride (Decrease in mean after 3rd follow-up is 56.400, 24.579 and 34.524 in groups 1st, 2nd and 3rd respectively ) was statistically highly significant within the group & not significant in intergroup comparison. In both cases group 1st shows significant improvement as compared to other groups.

The value of HDL (Increase in mean after treatment is 9.586, 7.474 and 8.905 in groups 1st, 2nd and 3rd respectively ) was statistically highly significant within the group and also found significant in intergroup comparison showing significant control in HDL with trial drug in synergistic action with standard drug as compared to the standard drug i.e; value of HDL was increased in group C after taking treatment.

In all groups reduction in LDL (Decrease in mean after 3rd follow-up is 23.862, 15.158 and 23.895 in groups 1st, 2nd and 3rd respectively ) and VLDL level (Decrease in mean after 3rd follow-up is 18.9238, 13.0526 and 10.2571 in groups 1st, 2nd and 3rd respectively ) was statistically highly significant within the group & not significant in intergroup comparison. The trial drug was found more effective in controlling LDL and VLDL as compared to the standard drug.
### Table 7: Showing effect of treatment on Cholesterol level

| Groups  | Cholesterol (mean±std.deviation) | Comparison within the group Paired t-test (BT-AT) |
|---------|---------------------------------|-----------------------------------------------|
|         | BT                              | F3                                           |
| Group 1 | 241.35 ± 5.247                  | 166.48 ± 32.816                              |
|         |                                 |                                              |
| Group 2 | 226.00 ± 44.032                 | 169.11 ± 25.166                              |
|         |                                 |                                              |
| Group 3 | 232.48 ± 55.540                 | 167.81 ± 33.397                              |
|         |                                 |                                              |
| Comparison between the group One-way ANOVA | F=0.536 | F=0.036 |
|         | p=0.587                         | p=0.964                                      |

### Table 8: Showing effect of treatment on Triglyceride level

| Groups  | Triglyceride (mean±std.deviation) | Comparison within the group Paired t-test (BT-AT) |
|---------|---------------------------------|-----------------------------------------------|
|         | BT                              | F3                                           |
| Group 1 | 190.86 ± 92.843                 | 139.43±40.185                                 |
|         |                                 |                                              |
| Group 2 | 148.80 ± 17.673                 | 123.68 ± 7.048                                |
|         |                                 |                                              |
| Group 3 | 174.24 ± 52.113                 | 141.14±31.257                                 |
|         |                                 |                                              |
| Comparison between the group One-way ANOVA | F=2.889 | F=2.000 |
|         | p=0.062                         | p=0.145                                      |

### Table 9: Showing effect of treatment on HDL level

| Groups/Tests | Hdl (mean±std.deviation) | Comparison within the group Paired t-test (BT-AT) |
|--------------|---------------------------|-----------------------------------------------|
|              | BT                        | F3                                           |
| Group 1      | 32.95 ± 6.375             | 43.10±6.147                                  |
|              |                           |                                              |
| Group 2      | 31.20 ± 4.796             | 37.95±3.188                                  |
|              |                           |                                              |
| Group 3      | 34.00 ± 11.937            | 44.48±10.759                                 |
|              |                           |                                              |
| Comparison between the group One-way ANOVA | F=0.728 | F=4.153 |
|              | p=0.486                   | p=0.021                                      |
| Post Hoc test |                           |                                              |
| 1 vs 2       |                           |                                              |
| 1 vs 3       |                           |                                              |
| 2 vs 3       |                           |                                              |
As the trial drug (in Group A) is more Medo dhatu and havisha. The study exemplifies that the trial drug is better than the standard drug, wh.

**DISCUSSION**

Prameha is contemplated to be kapha pradhan tridosha vyadhi. Here, the term kapha pradhan reveals that if all the three doshas are involved to produce prameha then it is kapha dosha which make body favourable for the genesis of prameha roga. It also unfolds the fact that in initial stage maximum patients suffer with kaphaja prameha which later on changes into vataja prameha & pitaja prameha. The main dusya in any type of prameha are those components of body which can not only be vitiated by these dosha but could be brought to basti to vitiate amadosha also i.e, 'Medo dhatu' and watery components are main dusya.

Therefore the drugs possessing properties opposite to that of kapha dosha and meda dhatu and are proficient enough to break the samprapti of the disease by intensifyingagni, digesting ama, and cleansing the srotas are competent in opposing the prameha roga.

**Table 10 Showing effect of treatment on LDL level**

| Groups      | Ldl (mean±std.deviation) | Comparison within the group |
|-------------|--------------------------|----------------------------|
|             | BT                       | F3                         |
| Group 1     | 132.44 ± 22.237          | 106.19 ± 18.471            | 23.862 ± 13.350             |
|             |                          |                            | t=8.191, p=0.000            |
| Group 2     | 128.12 ± 17.259          | 117.21 ± 9.295             | 15.158 ± 16.025             |
|             |                          |                            | t=4.123, p=0.001            |
| Group 3     | 137.03 ± 22.016          | 111.14 ± 19.767            | 23.895 ± 16.882             |
|             |                          |                            | t=6.486, p=0.000            |
| Comparison between the group | F=1.166     | F=2.171                    |
| One-way ANOVA | p=0.317             | p=0.123                    |

**Table 11 Showing effect of treatment on VLDL level**

| Groups      | VLDL (mean±std.deviation) | Comparison within the group |
|-------------|----------------------------|-----------------------------|
|             | BT                        | F3                          |
| Group 1     | 52.4448 ± 19.7489         | 32.467 ± 8.7712             | 18.9238 ± 15.7547           |
|             |                           |                             | t=5.504, p=0.000            |
| Group 2     | 45.160 ± 11.0517          | 34.316 ± 5.2605             | 13.0526 ± 11.2915           |
|             |                           |                             | t=5.039, p=0.000            |
| Group 3     | 42.856 ± 12.2087          | 33.619 ± 8.1699             | 10.2571 ± 9.0382            |
|             |                           |                             | t=5.201, p=0.000            |
| Comparison between the group | F=2.844     | F=0.302                    |
| One-way ANOVA | p=0.065            | p=0.740                    |

Therefore, the above-endorsed statistics signal that the test drug epitomizes to control the symptoms better than the standard drug. The study exemplifies that the trial drug is equally effective in controlling FBS, PPBS, and HbA1C as the standard drug, whereas the trial drug (in Group A) is more efficacious in the management of lipid profile as compared to other groups. These results materialize the prameahasahar effect of the drugs Haritaki 16, Amalaki 11, Bibhitaki 12, Daruwaridra 13, Chitraka 14 and Yastimadhu 15. Also proposed actions of the drugs like antioxidant, antistress, immunomodulator, the anti-atherosclerotic activity must also oversee to withstand against the symptomatological effects and complications of the disease.

**DISCUSSION**

Prameha is described to have contrived after the consumption of "havisha of yagya" performed by Daksha Prajapati. Its inclusion in “Ashta Mahagada” by Acharya Charak, Susruta and Vagbhata marked the dominancy of the disease. “Prameho anusanginama” 16, contemplated by Acharya Charak intimates the cohesive nature and poor prognosis of the disease. Based on its etiology and symptoms madhumeha can be co-related with Diabetes Mellitus type-2 (NIDDM-non insulin-dependent diabetes mellitus).
meda, kaphanashak karma and sodhan karma to remove mala rupa dosha. Ushna virya of most of the compound of this kwath pacifies kapha and vata dosha.

Pathya is highly advised along with other drugs in prameha because almost every dhatu (except asthi) and kleda of body might be dushya in prameha roga. Therefore patency and health of srotas inside the body for dhatusamyata in prameha rogi is highly necessary.

CONCLUSION

1. Safe and effective treatment of Madhumeha (DM-II) is much more challenging since very beginning till now because all drugs have their own limitations, in this connection a poly herbal formulation may be a good choice.

2. Katankateriyadi kwatha (a poly herbal formulation) has been used by Acharya Chakrapanidatta (11th cent A.D.) for the treatment of madhumeha.

3. After scientific study (overall objective and subjective assessment) observation were found more effective in group C (treated by both Katankateriyadi kwatha & Gliclazide SR) than group A (treated by Katankateriyadi kwatha) and group B (treated by Gliclazide SR 60 mg) significantly due to synergistic effect.

4. Although the test drug epitomizes to control the symptoms better than the standard drug. No side effects were observed during treatment.

The aforesaid clinical trial gives positive output that Katankateriyadi Kwatha is effective in Madhumeha (DM-II), which needs a larger number of data to communicate Katankateriyadi Kwatha as one of the convalescent and potent compound formulation of vegetable origin drug in madhumeha. Therefore, appropriate ahara-vihara along with the Ayurvedic drugs solitarily or in combination with the modern drugs depending on the necessity provide enduring health benefits in the patients of Madhumeha (Diabetes mellitus).

Conflict of Interest - Nil

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