WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 10, 744-753. Review Article ISSN 2277– 7105

EFFECT OF *ASANADI GHANA VATI* IN THE MANAGEMENT OF *MADHUMEHA* (TYPE-2 DIABETES MELLITUS) – A CLINICAL STUDY

Vandana Gupta[1], Bipin Bihari Keshari*[2], S. K. Tiwari[3], K.H.H.V.S.S. Narasimha Murthy[4]

[1]Assistant Professor, Department of Kayachikitsa, V. Y. D. S. Ayurvedic College, Khurja

[2]Assistant Professor, Department of Maulika Sidhanta, V. Y. D. S. Ayurvedic College, Khurja.

[3]Former Professor & Head, Department of Kayachikitsa, Faculty of Ayurveda, I.M.S., Banaras Hindu University, Varanasi

[4]Mentor & Associate Professor, Department of Kayachikitsa, Faculty of Ayurveda, I.M.S., Banaras Hindu University, Varanasi

Article Received on
05 Aug 2015,

Revised on 01 Sep 2015,
Accepted on 22 Sep 2015

***Correspondence for Author**
Bipin Bihari Keshari
Assistant Professor, Department of Maulika Sidhanta, V. Y. D. S. Ayurvedic College, Khurja.

ABSTRACT

The Ayurvedic scholars have knowledge of *Madhumeha* since antiquity. *Madhumeha* is a multifactorial disease caused due to abnormal interaction of three *doshas*, predominantly *vata dosha* and ten *dushyas* (mainly *ojas*). According to Acharya Caraka, if *vayu* due to its roughness converts the *oja* which is naturally of sweet taste into one of the astringent taste and carries it to the urinary bladder, then it causes the disease *Madhumeha*. In *Madhumeha* the patient passes urine which is astringent and sweet in taste, pale in colour and ununctuous and is incurable. In this study, 44 clinically diagnosed patients of type 2 diabetes mellitus were selected as per inclusion and exclusion criteria. Out of 44 registered patients of type 2 diabetes mellitus only 40 patients turned up to complete follow up and they were advised to take *Asanadi Ghana vati* 2 BD for 3 months. Results showed statistically highly significant in all the subjective and objective parameters after complete treatment.

KEYWORDS: *Madhumeha*, Type-2 Diabetes mellitus, *Asanadi Ghana vati* etc.

INTRODUCTION

Diabetes mellitus is a syndrome with disordered metabolism and inappropriate hyperglycemia due to either a deficiency of insulin secretion or to a combination of insulin resistance and inadequate insulin secretion to compensate.[1] Type 1 diabetes mellitus is the result of complete or near total insulin deficiency. While type 2 diabetes mellitus is heterogeneous group of disorder characterized by variable degree of insulin resistance, impaired insulin secretion and increased glucose production,[2] Type 2 diabetes is much more common than type 1 diabetes. Type 2 accounts for around 90% of all diabetes worldwide and is largely the result of excess body weight and physical inactivity,[3] Recent studies have shown an alarming increase in the prevalence of type-2 diabetes in India. The rapid occurrence of urbanization in developing countries causes modification in lifestyle and dietary habit which adversely affects the metabolism further leads to type-2 diabetes mellitus.

Aims and Objectives

The present study was conducted to assess the efficacy of *Asanadi gana dravya* in the management of *madhumeha* (Type-2 Diabetes mellitus).

MATERIAL AND MATHOD

Selection of Patient

44 patient of type-2 diabetes mellitus were randomly selected from the O.P.D. and I.P.D. of Department of Kayachikitsa, Sir Sunderlal Hospital, I.M.S., Banaras Hindu University. Case selection was random regardless of age, sex, occupation, socioeconomic status etc. Out of 44 registered patients only 40 patients turned up to complete follow up. In present work, *Asanadi gana dravya* has been selected for the management of *Madhumeha* (Type-2 Diabetes Mellitus).

Selection of trial drug

Ashtanga Samgraha and *Ashtanga Hridaya*, both these *Samhita* has described the *Asanadi gana* under *Vividhaganasamgraham-adhyaya*[4] (A. S. Su. 16/13, 14) and *Shodhanadiganasamgrahaadhyaya*[5] (A. H. Su. 15/19, 20) respectively. *Asanadi gana dravya* are used for treatment of *Switra* (leucoderma), *Kustha* (leprosy and other skin disorders), *Kaphaja-vikara, Krimi* (worms infestation), *Panduroga* (anaemia), *Prameha* (diabetes and other urinary disorders) *and Medodosha* (diseases of fat accumulation),[4&5] They also described this group of drug in different *Pramehahara yogas* in *Pramehachikitsa* adhyaya[6&7] (A.S.Ch. 14/17,21,22) & (A.H.Ch.12/29, 34,35,41) which are as follow: (a). The

decoction of *asanadi gana* is used in preparation of an *Ayaskriti*, which is very effective formulation in *prameha*. (b) *Shilajatu* soaked and macerated in the decoction of drugs of *asanadi gana* is usefull in all type of *prameha, Gandamala, Arbuda, Granthi, Sthaulya, Kushtha, Bhagander, Krimi, Shlipada, and Shopha.* (c) The decoction of *asanadi gana dravya* is used for bathing and poured over the body in treatment of *Prameha pidika* (diabetic ulcer).

Asanadi gana is group of 23 drugs which are well described in ancient Ayurvedic classics. The ingredients of the *Asanadi gana* are *Asana* (Pterocarpus marsupium Roxb.), *Tinisha* (Ougenia oojeinensis), *Bhurja* (Betula utilis D. Don.), *Arjuna* (Terminalia arjuna), *Prakirya (*Holoptelea integrifolia Planch.), *Khadira* (Acacia catechu), *Kadara* (Acacia suma), *Shirisha* (Albizzia lebbeck Benth.), *Shimshapa* (Dalbergia sissoo Roxb.), *Meshasringi* (Gymnema sylvestre), *Shwetachandana* (Santalum album Linn.), *Raktachandana* (Pterocarpus santalinus), *Daruharidra* (Barberis aristata), *Tala* (Borassus flabellifer), *Palasha* (Butea monosperma), *Agaru* (Aquillaria agallocha Roxb.), *Shaka* (Tectona grandis Linn.), *Shala* (Shorea robusta Gaertn.), *Dhava* (Anogeissus latifolia wall.), *Kramuka* (Areca catechu Linn.), *Indrayava* (Holorrhena antidysentrica), *Chagakarna* (Vateria indica Linn), *Ashwakarna* (Dipterocarpus alatus). In various pharmacological studies, done in last few decades on the drugs of *asanadi gana dravyas*, it has been proved that almost all the constituents of *asanadi gana*, posses antihyperglycemic, hypolipidemic, antioxidant and other therapeutic properties.[8]

Preparation of Trial Drugs (*Asanadi Ghana Vati*)

The ingredients of *Asanadi gana dravya* (*yathalabhyam*) were purchased from Goladinanath market, Varanasi. These drugs were properly identified by the help of Dravyaguna experts. The test drug (*Asanadi Ghana vati*, 500mg each) was prepared in the Ayurvedic pharmacy, Department of Rasashastra, IMS, BHU, Varanasi.

Dose and Drug Schedule

In this study, the patients were treated with *Asanadi Ghana vati* 2 B.D. with normal potable water for 3 months (divided in three follow ups, each of 1 month interval). Final assessment was done after completion of three months. Most of the selected patient are known diabetic so that most of them are aware about the diets and further dietetic restriction was not advised. The patients were allowed to continue on the diet and exercise which they were already taking.

INCLUSION CRITERIA

1. Patients of type 2 diabetes mellitus with blood sugar level; Fasting blood sugar ≥126 to 250 mg/dl, postprandial blood sugar ≥200 to 350mg/dl during an oral glucose tolerance test and symptoms of diabetes plus random blood sugar ≥ 200 to 350mg/dl
2. Age in between 20-70 years.

EXCLUSION CRITERIA

1. Type-1 Diabetes Mellitus cases
2. Patients of type-2 Diabetes Mellitus taking insulin
3. Age below 20 years and above 70 years.
4. Cases with severe diabetic complications such as nephropathy, retinopathy, CAD, diabetic foot etc.
5. Patients having chronic diseases like tuberculosis, bronchial asthma, chronic renal failure, hepatitis etc or other endocrinopathy.

Investigation

Following investigations were carried out in order to assess the efficacy of trial drug and to find out any systemic disease:

- Fasting and Postprandial blood sugar
- Glycosylated Haemoglobin(HbA_{1c})
- Lipid Profile, Blood urea, Serum creatinine
- Routine hematological tests: Hb%, TLC, DLC, ESR
- Urine test : Routine and microscopic

Criteria for assessment

Assessement was done on the basis of improvement in the clinical symptoms with the help of suitable scoring method (0-3). Under the objective parameters biochemical investigations (FBS, PPBS, Glycosylated heamoglobin etc.) have been done. The collected data of all the patients were assessed statistically by using Friedman test, paired t-test etc.

Criteria for assessment of overall improvement in symptoms

To determine overall improvement based on all the symptoms, a criteria was defined. Number of symptoms absent at 3rd follow up as compared to before treatment was used to define as overall criteria for improvement as below

1. Complete Improvement 100%

2. Marked Improvement 75% to <100%
3. Moderate Improvement 50% to <75%
4. Mild Improvement 1 to < 50%
5. No Improvement 0%

Observations

Table no. 1: Showing shift of grades of symptoms in 40 cases of type 2 Diabetes mellitus

Symptoms	Symptoms grades	No. & Percentage of Cases				Within the group comparison Friedman test
		BT	F_1	F_2	F_3	
Polyuria	0 1 2 3	7 (17.5%) 11(27.5%) 15 (37.5%) 7 (17.5%)	8 (20.0%) 14 (35.0%) 16 (40.0%) 2 (5.0%)	12 (30.0%) 20 (50.0%) 8 (20.0%) 0	23 (57.5%) 15 (37.5) 2 (5.0%) 0	χ^2 = 63.83 P<0.001 HS
Polyphagia	0 1 2 3	11 (27.5%) 15 (37.5%) 10 (25.0%) 4 (10.0%)	13 (32.5%) 19 (47.5%) 8 (20%) 0	17 (42.5%) 21 (52.5%) 2 (5.0%) 0	27 (67.5%) 12 (30.0%) 1 (2.5%) 0	χ^2 =52.224 p<0.001 HS
Polydipsia	0 1 2 3	9 (22.5%) 15 (37.5%) 10 (25.0%) 6 (15.0%)	12 (30.0%) 18 (45.0%) 8 (20.0%) 2 (5.0%)	17 (42.5%) 20 (50.0%) 3 (7.5%) 0	28 (70.0%) 12 (30.0%) 0 0	χ^2 =60.931 p<0.001 HS
Weakness	0 1 2 3	7 (17.5%) 13 (32.5%) 11 (27.5%) 9 (22.5%)	10 (25.0%) 15 (37.5%) 14 (35.0%) 1 (2.5%)	16 (40.0%) 19 (47.5%) 5 (12.5%) 0	25 (62.5%) 15 (37.5%) 0 0	χ^2 =69.623 p<0.001 HS
Burning/tingling sensation	0 1 2 3	7 (17.5%) 9 (22.5%) 13 (32.5%) 11 (27.5%)	9 (22.5%) 15 (37.5%) 13 (32.5%) 3 (7.5%)	11 (27.5%) 23 (57.5%) 6 (15.0%) 0	25 (62.5%) 14 (35.0%) 1 (2.5%) 0	χ^2 =73.866 p<0.001 HS
Cramps on walking	0 1 2 3	25 (62.5%) 10 (25.0%) 4 (10.0%) 1 (2.5%)	29 (72.5%) 10 (25.0%) 1 (2.5%) 0	34 (85.0%) 6 (15.0%) 0 0	39 (97.5%) 1 (2.5%) 0 0	χ^2 =33.220 p<0.001 HS
Joint pain	0 1 2 3	18 (45.0%) 14 (35.0%) 6 (15.0%) 2 (5.0%)	21 (52.5%) 14 (35.0%) 5 (12.5%) 0	28 (70.0%) 12 (30.0%) 0 0	36 (90.0%) 4 (10.0%) 0 0	χ^2 =43.141 p<0.001 HS
Loss of libido	0 1 2 3	24 (60.0%) 10 (25.0%) 5 (12.5%) 1 (2.5%)	24 (60.0%) 13 (32.5%) 3 (7.5%) 0	29 (72.5%) 10 (25.0%) 1 (2.5%) 0	35 (87.5%) 5 (12.5%) 0 0	χ^2 =24.463 p<0.001 HS
Weight loss	0 1 2 3	28 (70.0%) 9 (22.5%) 3 (7.5%) 0	32 (80.0%) 8 (20.0%) 0 0	36 (90.0%) 4 (10.0%) 0 0	39(97.5%) 1 (2.5%) 0 0	χ^2 =26.107 p<0.001 HS

BT- Before Treatment, F_1 – 1st follow-up, F_2 – 2nd follow-up, F_3 – 3rd follow-up

Table no. 2: Showing the Overall improvement based on all symptoms

Overall improvement based on all symptoms	N0. & Percentage
Complete improvement	4 (10%)
Marked improvement	12 (30%)
Moderate improvement	14 (35%)
Mild improvement	10 (25%)
No improvement	0

Table no. 3: Showing effect of *Asanadi Ghana Vati* on objective parameters

Objective Parameters	Mean ± SD				Within the group comparison Paired t-test BT-F_3
	BT	F_1	F_2	F_3	
Fasting Blood Glucose	170.45 ± 30.97	154.76 ± 29.73	140.58 ± 28.44	126.08 ± 23.96	44.37 ±11.06 t=25.370 p<0.001
Postprandial Blood Glucose	272.30 ± 33.98	255.75 ± 33.19	237.64 ± 31.87	219.77 ± 32.80	52.53 ±6.31 t=52.579 p<0.001
Glycosylated Heamoglobin %	7.61 ± 1.02	-	-	6.89 ± 1.01	0.72 ± 0.158 t = 28.66 p<0.001
Total Cholesterol	212.13 ± 52.501	-	-	197.39 ± 48.73	14.74 ± 10.15 t= 9.179 p<0.001
Serum Triglyceride	183.81 ± 43.74	-	-	170.79 ± 43.67	13.01 ± 8.73 t= 9.42 p<0.001
Serum HDL*	38.62 ± 7.69	-	-	42.64 ± 8.74	- 4.02 ± 3.79 t= - 6.72 p<0.001
Serum LDL**	129.28 ± 32.63	-	-	120.13 ± 27.88	9.14 ± 11.59 t= 4.988 p<0.001
Serum VLDL***	50.22 ± 22.89	-	-	47.91 ± 22.18	2.30 ± 2.95 t= 4.925 p<0.001
BMI****	27.12 ± 4.00	-	-	26.95 ± 3.27	0.17 ± 0.958 t= 1.146 p>0.05
Blood Urea	29.96 ± 5.74	-	-	29.80 ± 5.49	0.16 ± 1.28 t= 0.73 p>0.05
Serum Creatinine	0.99 ± 0.48	-	-	0.98 ± 0.43	0.01 ± 0.058 t= 0.168, p>0.05

*High Density Lipoprotein, **Low Density Lipoprotein, ***Very Low Density Lipoprotein, ****Body Mass Index

In this study, maximum cases (43.2%) were in the age group of 51-60 years, 65.9% were male, 77.3% were hindu, 47.7% were graduate, 45.5% were servicemen, 95.5% were

married. Maximum cases (72.7%) were from middle socioeconomic group, 77.3% were from urban community, 54.5% were belonging to mixed dietary habit. 59.1% patients had negative family history, 43.2% had no any addiction. 59.1% were having *kaphapittaja prakriti* and 59.1% were having *Rajasika manas prakriti*. In the study, maximium chronicity was >5-8 years (27.3%).

Among the chief complaints of *prameha*, 82.5% cases had polyuria, 82.5% had generalized weakness, 82.5% had burning sensation and numbness, 77.5% had polydipsia, 72.5% had polyphagia, 55.0 % had joint pain, 40.0 % had loss of libido, 37.5% had cramps on walking and 30.0% had weight loss.

Asanadi Ghana vati was found statistically significant in reducing the all the symptoms- polyuria (χ^2 = 63.83, p<0.001), polyphagia (χ^2 = 52.22, p<0.001), polydipsia (χ^2 = 60.93, p<0.001), weakness (χ^2 =69.62, p<0.001), burning sensation & numbness (χ^2 = 73.86, p<0.001), cramps on walking (χ^2 = 33.22, p<0.001), joint pain (χ^2 = 43.14, p<0.001), loss of libido (χ^2 = 24.46, p<0.001), weight loss (χ^2 = 26.12, p<0.001) (Table 1).

There are 10% cases have complete improvement in the symptoms and 30% cases have marked improvement. Patients with moderate improvement and mild improvement were 35% and 25% respectively. (Table 2)

On objective parameters, *Asanadi Ghana vati* was found statistically highly significant in FBS (t=25.37, p<0.001), PPBS (t= 52.57, p<0.001), glycosylated heamoglobin (t= 28.66, p<0.001), total cholesterol (t= 9.17, p<0.001), serum triglycerides (t= 9.42, p<0.001), HDL (t= -6.72, p<0.001), LDL (t= 4.98, p<0.001), VLDL (t= 4.92, p<0.001), BMI (t= 1.14, p>0.05), Blood urea (t= 0.73, p>0.05), serum creatinine (t= 0.16, p>0.05) (Table 3).

DISCUSSION

In *Asanadi Ghana vati,* most of the drugs posses *kashaya* and *tikta rasa*. The prominent *guna* present in this polyherbal compound are *laghu* and *ruksha*. All the component of *Asanadi Ghana vati* have *katu vipaka*. *Sheeta virya* drugs are more as compare to *ushnaa virya* drugs. Most of the drugs having *kapha-pitta shamaka* propertiy, followed by *tridosha-shamaka* properties. *Khadira* and *Sirisha* have *Kushthaghna* and *Vishaghna prabhava* respectively.

According to Acharya Caraka, if *vayu* due to its roughness converts the *oja* which is naturally of sweet taste into one of the astringent taste and carries it to the urinary bladder, then it causes the disease *Madhumeha*. In *Madhumeha* the patient passes urine which is astringent and sweet in taste, pale in colour and ununctuous and is incurable.[9] It is also said that if not cured or treated properly in due course of time, *Prameha* changes in Madhumeha.[10]

In the pathogenesis of the *Madhumeha*, all the three *doshas* and ten *dushyas* get vitiated but *vata dosha* and *oja* (essence of all the *dhatus*) are predominantly provoked. Vitiation of *vata* occurs in two ways, (i) due to increase in *vata* due to *dhatukshaya* and (ii) due to *avarana* of *vata* by the *doshas* (*kaph, pitta, meda* and *mamsa* etc.).[11] So, in its management such drugs are to be selected which are against *kapha, pitta, meda* and *kleda*. In general drugs having *Katu* (pungent), *Tikta* (bitter) and *Kashaya* (astringent) *Rasa* are indicated in all types of *Prameha.*[12]

In *Asanadi Ghana vati, tikta* and *kashaya rasa* having *lekhana* property, scraps out excessive *kapha* and *meda* from *srotas*. Moreover *kashaya rasa* also have *shoshana* property which absorbs the excessive *kapha, meda* and *kleda. Laghu guna* reduces *kapha*, makes body light and clears the body channels (*Srotoshodhana*). *Ruksha guna* reduces *kapha, meda* and *kleda* thus removing the *avarana* (obstruction) of *vata*. With regards to *Vipaka*, all are having *Katu vipaka* which enhances the *jatharagni* and *dhatvagni* and normalizes the metabolic process. It also reduces the *Kapha* and *medas*. *Kashaya* and *tikta rasa* along with *sheeta virya* might have corrected the vitiation of *pitta dosha*. Related to *doshakarma* most of the drugs are *kapha-pitta shamaka* followed by *tridosha shamaka*. So the alleviation of *kapha, pitta, meda* and *kleda* helps to remove the *avarana* to the path of *vata* thereby alleviating its *dushti*. So, this drug was supposed to be effective on *Kapha* and *Pitta* mainly and also on *Vata*.

Overall therapeutic effect of the test drug was found statistically significant in all the sign and symptoms when compared with initial and F_3. In objective parameters, it was significant in FBS, PPBS, glycosylated heamoglobin, total cholesterol, serum triglycerides, HDL and LDL. During the trial the blood urea and serum creatinine level fluctuated within the normal range and no any obvious change is observed which reveals that selected Ayurvedic drug are safe as per regards of renal function test.

CONCLUSION

The present study shows that all the ingredients of *Asanadi Ghana vati* are well documented in the classical text of Ayurveda and various pharmacological researches done these drugs have also proved it time to time. After evaluating the observation of the present series of investigation it can be concluded that compound Ayurvedic formulation (*Asanadi Ghana vati*) have potent antidiabetic activity. Moreover, no any adverse effects were reported during the clinical trial of three months. So, the present trial drug seems to be effective and completely safe for the management of *Madhumeha* (Type 2 diabetes mellitus).

REFERENCES

1. McPhee Stephen J., Papadakis Maxine A., Rabow Michael W. editors, 2012 Current Medical Diagnosis and Treatment, 51 edition, Mc Graw Hill Medical; 2012.
2. Braunwald et al: In Harrison's Principles of Internal Medicine, Vol. II. 17th edition. McGraw Hill Book Company, New York.
3. http://www.who.int/features/factfiles/diabetes/facts/en/
4. Ashtanga Samgraha of Vriddha Vagbhatta with the Shashilekha Sanskrita commentary by Indu, Prologue in sanskrita and English by Professor Jyotir Mitra, Sutrasthana Vividhaganasamgrahaadhyaya chapter 16, Chowkhambha Sanskrita Series office Varanasi, Edition: IInd 2008.
5. Ashtanga Hridaya of Vagbhatta, Edited with the Vidyotini Hindi commentary by Kaviraj Atridev Gupta, edited by Vaidya Yadunandana Upadhyay, Sutrasthana Shodhanadiganasamgrahaadhyaya chapter- 15, Chowkhambha Prakashana, Varanasi, Edition: Reprint 2009.
6. Ashtanga Samgraha of Vagbhata, English translation by Prof. K. R. Srikantha Murthy, Vol. II, Fifth edition, 2005, Chaukhambha Orientalia, Varanasi.
7. Astangahridayam of Vagbhatta, edited with the 'Vidyotini' Hindi commentary by Kaviraja Atrideva Gupta, Chikitsasthana, Pramehachikitsitam adhyay 12, Chaukhambha Sanskrita Sansthana, Varanasi, Reprint edition: 2005.
8. Gupta Vandana et al. *"A Review on Antidiabetic Action of Asanadi Gana"*, 'International journal of research in ayurveda and pharmacy'. 4(5), Sep-Oct.2013.
9. Agnivesha'S Caraka, Caraka Samhita, with Vidyotini Hindi Commentary by Sastri K.N. and Caturvedi G.N. (Ed. Sashtri RD. et al.), Part- I, Caukhambha Bharati Academy, Varanasi, Ed. Reprint 2001.

10. Murthy K. R. Srikantha, Illustrated Susshruta Samhita, Third edition, 2008, Chaukhambha Orientalia, Varanasi.
11. Astangahridayam of Vagbhatta, edited with the 'Vidyotini' Hindi commentary by Kaviraja Atrideva Gupta, Chaukhambha Sanskrita Sansthana, Varanasi, Reprint edition: 2005.
12. Kayachikitsa, by Prof. R.H. Singh, vol II, Chaukhamba Sanskrita Pratishthana, Delhi, edition: Reprint 2007.