



ORIGINAL RESEARCH PAPER

Medical Science

HYPOGLYCEMIC EFFECT OF DWINISADI KWATHA IN TYPE II DIABETES MELLITUS

**KEY WORDS:** Type 2 Diabetes Mellitus, Dwinisadi Kwatha, FBS, PPBS, HbA1c.

**Dr. Sanitha V. Shankar\***

Research fellow, Project on Bronchial Asthma, Govt. Women and Children Hospital, Poojappura, Thiruvananthapuram, Kerala. \*Corresponding Author

**Dr I. Ashrafudeen**

Professor, Dept. of Kayachikitsa, Govt. Ayurveda College, Thiruvananthapuram, Kerala.

ABSTRACT

Diabetic Mellitus (DM) refers to a group of common metabolic disorders that has a main characteristic feature of hyperglycemia.<sup>1</sup> According to the latest data from the World Health Organisation, globally about 422 million adults are living with Diabetes Mellitus.<sup>ii</sup> This study was undertaken to clinically evaluate the hypoglycemic effect of Dwinisadi Kwatha in Type 2 Diabetes Mellitus. The study was conducted pre & post without control group at Govt Ayurveda College, Trivandrum, as per criteria. The study drug was given to the thirty patients and was advised to take 48 ml luke warm kwatha twice daily before food for 90 days. FBS, PPBS and HbA1c were done before and after treatment. Statistical analysis revealed that there was significant reduction in FBS, PPBS and HbA1c level and symptoms of type 2 DM.

INTRODUCTION

Diabetic Mellitus (DM) refers to a group of common metabolic disorders that has a main characteristic feature of hyperglycemia.<sup>iii</sup> Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Amongst the many dreadful conditions arising because of modern-day living, Diabetes is a giant disease considered as one of the archenemies of the humankind caused by improper diet and lifestyle. Diabetes affects more than 62 million Indians, which is more than 7.1% of India's Adult Population.<sup>v</sup> DM is caused by pancreatic islets β-cells defect that result in reduction of insulin secretion, insulin action, or both.<sup>viii</sup> Distinct genetic and metabolic effects in insulin action and/or secretion are responsible for the hyperglycemia in Type 2 Diabetes mellitus. The management of diabetes include proper diet, exercise regimen, hypoglycemic drugs and the prevention of complications.

MATERIALS AND METHODS

**Study design:** Interventional study – Pre & Post Test without control group.

**Study setting:** Outpatient and Inpatient Department of Kayachikitsa Govt. Ayurveda College Hospital, Thiruvananthapuram.

**Inclusion criteria:** Patients in the age group of 30-60 years both male and female with newly identified Type II diabetes mellitus having FBS level from 126 mg/dl to 200 mg/dl or PPBS level from 200 mg/dl to 250 mg/dl having HbA1c level between 6 - 9 %.

**Exclusion Criteria:** Patients with diagnosed cases of Diabetic complications, diagnosed cases of Cardiac, Renal, Hepatic and Pulmonary Disorders, Pregnant or lactating women and patients undergoing medications with steroids, oral contraceptives were excluded from the study.

Sequential sampling was done satisfying the inclusion and exclusion criteria till attaining the sample size of 30 patients. Data was collected through detailed clinical research proforma and laboratory investigations including FBS, PPBS, HbA1c, liver function tests and renal function tests.

Procedure:

Patients both male and female in the age group of 30-60 from the study setting are selected for the study. They were subjected to detailed clinical examination and investigations including Fasting blood glucose, 2h Post prandial glucose level, HbA1c, LFT and RFT. The study was conducted in a single group and the study drug was given to the patient for 90 days in airtight packets containing 48 g coarse powder per day, with date of administration labeled on packets. The patient was advised to prepare kwatha by adding 768ml of water to 48 g coarse powder, boiled and reduced to

96ml. Patient was advised to take 48 ml luke warm kwatha twice daily 45 minutes before food. 15 such packets were given to them in each visit with an interval of 15 days. The patient was evaluated on the 0th, 31st, 61st and 91st day on the basis of laboratory findings and signs and symptoms. Diabetic diet was advised during this course. The collected data was subjected to statistical analysis using appropriate statistical techniques. For continuous variables, paired t test was applied to find statistically significant or not, before and after treatment effects on respective outcome variables. Also when there is violation of assumption of normality, then the corresponding non parametric Wilcoxon's signed rank test was applied. All analysis was carried out with the help of the software SPSS version 16.5.

DRUG REVIEW

The study drug "*Dwinisadi Kwatha*<sup>viii</sup>" is mentioned in Chikitsamanjari, Prameha Chikitsa Adhyaya. It consists of 10 drugs- *Nisa, Darvi, Hareetaki, Vibheetaki, Amalaki, Abda, Dhananjaya, Kataka, Aakuli and Ekanayaka*. Preparation and dose fixation of drugs are according to the standards of Ayurveda Pharmacopodia of India.

RESULTS

The clinical study was conducted in thirty subjects and the data was collected by interrogation, clinical examination and investigations. The data collected from samples were arranged under following headings:

1. INTERPRETATION OF DATA RELATED TO DEMOGRAPHY

**Age:** Majority of the patients (46.6%) belonged to the age group 51-60.

**Sex:** Most of the patients 46.6 % were males and 53.3 % were female patients.

**Religion:** Majority of patients 83.33 % were Hindus, 6.66 % were Christians and 10 % were Muslims.

**Educational status:** Majority of patients 33.3% had primary education followed by high school education (30%). 10% of them were illiterate and only 26.6 % of them were graduate.

**Marital status:** Among the 30 patients 93.3 % were married and only 6.6 % were widow.

**Domicile:** Majority of patients 66.6 % were from rural areas of Thiruvananthapuram. This may be because the persons from rural area will be less aware of their health and balanced diet.

**Socio economic status:** Majority of patients 53.3 % were in middle class family followed by poor class family 40%. Lack of awareness about the health can be attributed to this data.

**Occupation:** 16.6 % were manual labourers, 30 % were office staffs, 26.66 % were house wives, 10 % were business men, and 16.6 % belong to other category. Majority shows the job with decreased physical activity.

**2. INTERPRETATION OF DATA RELATED TO GENERAL CONDITION OF THE PATIENT**

**Diet:** Majority of the patients 96.6 % were taking mixed diet.

**Sleep:** Majority of patients 50% had sound sleep and 26.6% had disturbed sleep.

**Exercise:** 40 % of patients didn't do any exercise. This shows the relationship between sedentary life style and increased incidence of Type 2 DM.

**Body weight:** Only 20 % of the patients were overweight and 80% of them were having normal body weight.

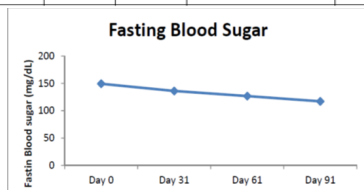
**Prakriti:** Majority of the patients had Kaphanubandha prakriti.

**3. INTERPRETATION OF DATA RELATED TO DIABETES MELLITUS**

73.3% had a strong family history of DM shows the positive relation of family history and Diabetes; which adheres to the occurrence of this disease as a Kulaja vyadhi.

**4. INTERPRETATION OF DATA RELATED TO RESPONSE TO TREATMENT EFFECTIVENESS OF TREATMENT ON FBS**

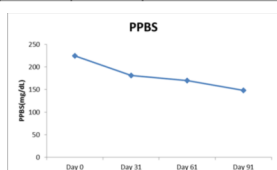
	N	FBS		Paired comparison	Paired t test	
		Mean	sd		t	p
Day 0	30	149.3	25.4			
Day 31	30	136.1	26.7	BT- 31st day	2.392	.023
Day 61	30	126.7	21.4	BT and 61st day	4.532	<0.001
Day 91	30	117.1	20.8	BT and 91st day	6.626	<0.001



The mean value of FBS before treatment was 149.3 ± 25.4 and after 30 days of treatment it reduced to 136.1 ± 26.7. After 60 days of treatment the mean value of FBS reduced to 126.7 ± 21.4. After 90 days of treatment, the mean value of Fasting Blood Glucose reduced to 117.1 ± 20.8 and there is statistically highly significant reduction in Fasting blood sugar level from 'before treatment' to 'after 90 days of treatment'(p<0.001). This shows the highly significant effect of Dwinisadi Kwatha on reducing the FBS level (p<0.001).

**EFFECTIVENESS OF TREATMENT ON PPBS**

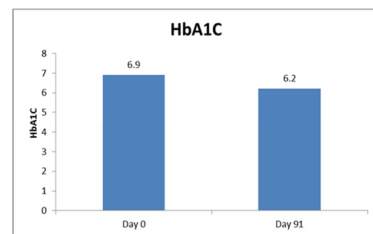
	N	PPBS		Paired comparison	Paired t test	
		Mean	sd		t	p
Day 0	30	224.9	43.3			
Day 31	30	181.1	37.4	BT- 31st day	4.869	<0.001
Day 61	30	170.0	43.4	BT and 61st day	4.859	<0.001
Day 91	30	147.8	32.7	BT and 91st day	6.818	<0.001



The mean value of Post Prandial Blood Sugar before treatment was 224.9 ± 43.3 and after 30 days of treatment it reduced to 181.1 ± 37.4. After 60 days of treatment the mean value of PPBS reduced to 170.0 ± 43.4. After 90 days of treatment, the mean value of Post Prandial Blood Glucose was reduced to 147.8 ± 32.7 and there is statistically highly significant reduction in PPBS level from 'before treatment' to 'after 90 days of treatment (p<0.001).

**EFFECTIVENESS OF TREATMENT ON HbA1c**

	N	HbA1c		Paired t test	
		mean	sd	t	p
Day 0	30	6.9	0.9	5.479	<0.001
Day 91	30	6.2	0.5		



The mean value of Glycosylated Haemoglobin (HbA1c) before treatment was 6.9 ± 0.9 and after treatment it reduced to 6.2 ± 0.5. There is statistically highly significant reduction in HbA1c from 'before treatment' to 'after treatment' (p<0.001).

**5. INTERPRETATION OF DATA RELATED TO CLINICAL PARAMETERS**

Considering the clinical symptoms after treatment, Dwinisadi Kwatha was found to be effective in reducing the symptoms like Polyuria, Polydipsia, Polyphagia, Lassitude, Excessive sweating and Dryness of mouth. There is statistically significant change in above said symptoms while comparing before and after treatment (p<0.001).

**DISCUSSION**

Prameha is a Santarpana janya vyadhi and Kapha medo dravstva is the basic pathology occurring in prameha. Due to this, the saumya bhavas are expelled out through mutra and sweda leading to saumya bhava soshana in the body. In prameha, Kaphapradhana tridosh dushhti<sup>iii</sup> occurs. Due to samana gunas the vitiated Kapha first affects the Medas. Kapha and Medas then combines with the Sareera kleda. Thereafter Dhatvagni mandhya occurs and leads to impairment of Dhatu parinama and Poshana. The Dushyas involved are Medas, Mamsa, Rasa, Raktha, Majja, Sukra, Vasa, Lasika and Ojus<sup>iv</sup>.

As a whole the drug Dwinisadi Kwatha possess *Tikta, Kashaya rasa; Laghu, Ruksha* guna; equal number of *Ushna and Seeta* veerya drugs ; *Katu vipaka* and *Tridosha samana karma* especially *Kapha-pitha samana, Pramehaghna, Chakshushya, Hridya, Vishagna* and *Rasayana* properties. These properties of the drug can counter the properties of the vitiated dosha and leads to Samprapthi vighatana of the vyadhi.

Nisa and Amalaki are mentioned as the agrya oushadas for all mehas<sup>v</sup> and are included in this yoga. Darvi is especially beneficial in netra rogas and it can prevent the diabetic retinopathy. Hareetaki is best anulomana drug and also having Rasayana, Chakshushya and Lekhana properties. Prameha rogi is said to be durvirechya and Triphala is having anulomana and Virechana quality by which it can eliminate Kleda bhava from the body and the Medodhatu tends to be normal. Musta included in Trishna nigrhana,<sup>vi</sup> Triptighna<sup>vii</sup> and Kandughna gana<sup>viii</sup> and can be effectively uses to alleviate associated complaints like polydipsia, itching etc. Arjuna possesses Kashaya rasa, Laghu Ruksha guna and Katu vipaka and has Kapha-pitha hara and Hrdya property.

Ekanayaka is having Pachana and Soshana properties and help in reducing the Kleda. Also, Triphala, Darvi and Kataka having Chakshushya action which can be used effectively to prevent the onset of diabetic retinopathy.

### CONCLUSION

The study drug Dwinisadi Kwatha is effective in lowering the FBS, PPBS and HbA1c level during the study period which is statistically significant. The study drug Dwinisadi Kwatha reduced the symptoms of diabetes such as Polyuria, Polydipsia, Polyphagia, Lassitude, Excessive Sweating and Dryness of mouth during the study period which is statistically significant.

### REFERENCES

1. Foster DW (2012) Harrison's principle of internal medicine (18th edtn), Diabetic Mellitus 2060-2087. (n.d.), doi:<https://www.who.int/diabetes/global-report/>
2. Foster DW (2012) Harrison's principle of internal medicine (18th edtn), Diabetic Mellitus 2060-2087. (n.d.), doi:<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3632174/>
3. Joshi S R, Parikh RM. India-diabetes capital of the world; now heading towards hypertension. J Assoc Physicians India. 2007;55:323-4. [PubMed]
4. World Health Organization (2015) Diabetes Fact sheet No 312. World Health Organization, Geneva.
5. American Diabetes Association (2014) Diagnosis and classification of diabetes mellitus. Diabetes Care 37: S81-S90.
6. Nambudri DS. Prameha chikita adhyaya Chikitsamanjari. Edition, 2015, Sloka 14, Vidyarambam publishers, Alappuzha. 2015
7. Agnivesa. (Reprint 2008). Prameha nidana adhyayam. In Vaidya jadavjitrikamjiacharya (Ed), Charaka Samhitha. Varanasi: Chaukamba Sanskrit Prathishtan.sutra sthana 4/6.
8. Agnivesa. (Reprint 2008). Prameha nidana adhyayam. In Vaidya jadavjitrikamjiacharya (Ed), Charaka Samhitha. Varanasi: Chaukamba Sanskrit Prathishtan.nidana sthana 4/7.
9. Vagbhata, Vajeekarana adhyaya. In: cheppatt Achutha variyar (ed.) Ashtanga Hridaya. Sivakasi, Visuvasam Offset Printers; (Reprint) 2009. Uthara sthana 40/48 p 417.
10. Agnivesa. (Reprint 2008). Shad virechana satsasriteeyam adhyayam. In Vaidya jadavjitrikamjiacharya (Ed), Charaka Samhitha. Varanasi: Chaukamba Sanskrit Prathishtan.sutra sthana 4/29 p 95.
11. Agnivesa. (Reprint 2008). Shad virechana satsasriteeyam adhyayam. In Vaidya jadavjitrikamjiacharya (Ed), Charaka Samhitha. Varanasi: Chaukamba Sanskrit Prathishtan.sutra sthana 4/11 p 90.
12. Agnivesa. (Reprint 2008). Shad virechana satsasriteeyam adhyayam. In Vaidya jadavjitrikamji acharya (Ed) Charaka Samhitha. Varanasi: Chaukamba Sanskrit Prathishtan.sutra sthana 4/14 p 91.