

Case study

Effect of Barley based diet in Diabetes- A case report

ABSTRACT:

Aim: Diabetes is becoming more prevalent in India. The increase in prevalence in most populations have probably been driven by a modifiable risk factors including lack of exercise, increasing prevalence of overweight/obesity, unhealthy diets and habits. Yava(Barley)is one among the food articles and its preparation is extensively suggested in Prameha(Diabetes) and other lifestyle disorders. Diet intervention is the primary and effective way to control sugar levels. Barley based diet is formulated and evaluated for blood and urine sugar levels and lipid profile. Diet therapy without much alteration of one's habit will be acceptable by the individuals.

Study design: Randomized controlled trial.

Place and duration of the study: Department of Swasthavritta, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, between December 2022 and February 2023.

Methodology: Barley based diet was formulated in the form of flat bread, suggested for a month as dietetic intervention. Diabetic subject was screened from the out-patient department. Laboratory investigations were carried out with one month intervals for three times. Subject studied for observation period and intervention period with the follow ups.

Results: There was a decrease in blood sugar and urine sugar levels and in lipid profile. Symptoms like polyphagia, heaviness in the body also reduced.

Conclusion: Ayurveda literatures opines that Prameha is a disease of vitiated Kapha and Fat tissue. Yava has the properties of pacifying Kapha and fat. Diet formulated out of it act as potential antidiabetic food. Yava can be an alternative to other grains and more beneficial in Diabetes.

Keywords: Yava,barley,prameha,diabetes,lifestyle disorders,Ayurveda,diet,case report

1. INTRODUCTION

Dietary habits and sedentary lifestyle are the major factors for rapidly rising incidence of DM among developing countries. The role of diet in the etiology of T2DM was proposed by Indians as mentioned earlier, who observed that the disease was almost confined to rich people who consumed oil, flour, and sugar in excessive amounts. The poorly controlled DM can lead to damage various organs, especially the eyes, kidney, nerves, and cardiovascular system [1]. Diabetics tend to practice various dietary trials to control sugar levels and prevent complications. Yava(barley) is one among food article suggested in Prameha(Diabetes) in Ayurvedic literatures. Preparations of Yava is a food of choice and elaborately discussed in the context of Prameha [2]. It also helps in reducing fat [3]. Prameha is one among diseases arised out of over nutrition [4]. Wrong dietary habits vitiates Kapha (one of three humors of the body) and

Medas (fat tissue) and increases Kledata (moistness) in the body [5]. Yava based diet increases dryness, reduces Kapha [6]. Yava is also considered as daily consumable food article [7]. A clinical trial was done on a diabetic subject prescribing Yava based diet for a month and analyzed.

2. PRESENTATION OF CASE:

2.1. TIMELINE:

The female subject of age 59 years screened for Diabetes. The case was enrolled on OPD base at Sri Dharmasthala Manjunatheshwara Ayurveda Medical College and Hospital, Hassan, Karnataka, India. She was a known diabetic since 4 years and was on antidiabetic medicine. She was prescribed Yava based diet replacing her two major meals per day for a month. Her antidiabetic medicine was continued. The follow up of the patient done on every 10th day. Blood and urine samples tested for FBS, PPBS, FUS, PPUS, Lipid profile monthly once for three times. i.e. on 03.12.2023, 05.01.2023, 08.02.2023. First month was observation period without any diet intervention but her antidiabetic medicines were continued as before. The blood and urine tests performed and common do and don'ts in Diabetes were suggested. The diet intervention started on the 2nd month after laboratory investigation, where her antidiabetic drug was told to continue. The add on effect of Yava based diet was analysed after the third laboratory investigation.

2.2 DIET INTERVENTION:

The Yava based diet in the form of Rotika/Roti/Chapati/flat bread was told to consume in the dose of two Rotis twice a day for a month. The flour of the same was packed and distributed every 10 days on follow ups. The subject was monitored well. None of the other food practices of the subject was altered.



Figure 1: Yava based diet

2.3. ADVERSE DRUG EVENT:

Subject complained of constipation for two days initially which was relieved later without any treatment.

3. DISCUSSION:

Yava based diet was introduced to the subject and studied on blood and urine sugar levels. Lipid profile also observed as several prospective studies present both impaired insulin release and insulin resistance as the major factors for the development of type 2 diabetes [8].

3.1.DIAGNOSTIC ENTRY:

Table 1: Interval of laboratory investigation with findings

Laboratory investigations	03.12.2023	05.01.2023	08.02.2023
FBS	130.0	120.6	96.7
PPBS	201.0	167.9	113.5
FUS	ABSENT	TRACE	ABSENT
PPUS	1.0%	0.5%	ABSENT
Total Cholesterol	209.0	188.0	141.0
H.D.L. Cholesterol	40.3	45.0	38.2
L.D.L. Cholesterol	125.1	107.0	68.2
Triglycerides	213.0	180.0	173.3
V.L.D.L. Cholesterol	42.6	36.0	34.5

FBS

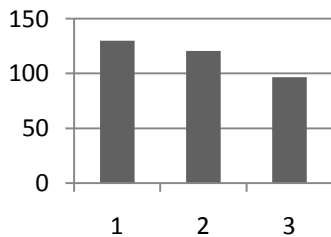


Figure 2

PPBS

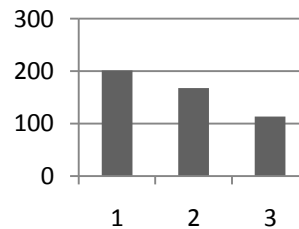


Figure 3

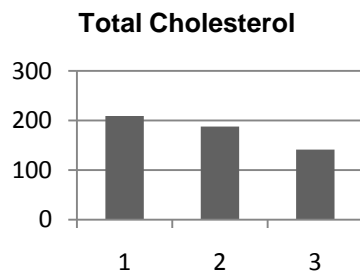


Figure 4

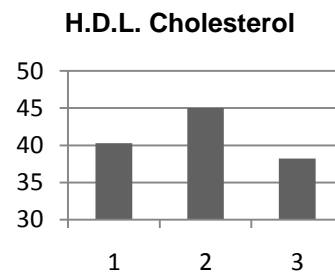


Figure 5

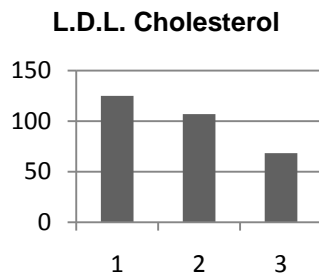


Figure 6

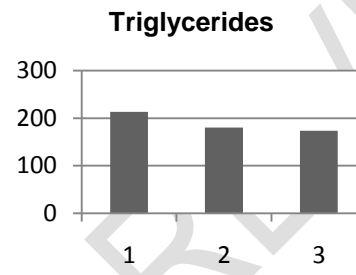


Figure 7

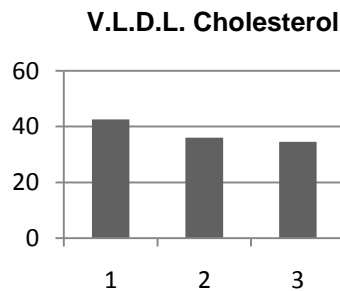


Figure 8

Figures 2,3,4,5,6,7,8: Graphs shows the effect of Yava based diet on biochemical parameters at one month intervals i.e., at 0th day(1st laboratory investigations), after one month observation(2nd laboratory investigations) and after diet intervention(3rd laboratory investigations)

Yava based diet showed marked reduction in fasting blood sugars, postprandial blood sugar, fasting and post prandial urine sugar. There was decrease in total cholesterol, triglycerides, LDL and VLDL cholesterol. Food recipes of Yava has been prescribed in the texts of Ayurveda. Rotika formulation prepared out of Yava reduces Kapha in the body [9]. In Prameha, increased Kapha, Meda, Kledata in the body is due to habituated intake of unhealthy diet such as excess of Madhura (sweet), Amla(sour), Lavana(salt), Snigdha(oily), Picchila(sticky), Abhishyandi(obstructive) Ahara(food). Fatigue, tendency to sit, sleep, to be comfortable, increase intake of food, increase frequency of micturition are few of its symptoms. Yava is the food article primarily said in the context of Prameha and Santarpanjanya vyadhi(lifestyle disorders). Yava has the qualities of heavy, reduces kapha, fat, imparts dryness in the body. It has madhura kashaya rasa(sweet and astringent taste) [10]. Yava based diet can be easily

consumed everyday. It brings early satiety as it is heavy in nature. It takes away kledata from the body due to its dry quality. When the kapha and medas start reducing, individual feels lightness in the body and enthusiastic As it is heavy in nature, individual's frequency of hunger reduces. Dietary factors are of paramount importance in the management and prevention of type 2 diabetes.[11]

3.2.PATIENT PERSPECTIVE:

Subject was satisfactory on taking Yava based diet. Prescribed dose was said to be sufficient and felt full, polyphagia was reduced. There was presence of lightness in the body from 3 rd day. Initially complained of constipation for two days which was relieved later. Few symptoms like fatigue, sleepiness reduced and comfortable on following the diet.

4.CONCLUSION:

This study shows the significance of traditional food articles, that are advised in Ayurveda literatures like Yava, which was used widely before in day to days food habit. Diet and lifestyle are modifiable risk factors, when corrected the disease can be reversed or brought under control. Diabetes is one among metabolic or lifestyle disorder. The knowledge of causative factor and pathology is essential to share with the health seekers so that they can follow the prescribed intervention, such as diet therapy in this case. The diet intervention which is near to food practice of the individual becomes more acceptable and followed longer. There is a need for such dietary solutions that has effective role in preventing Diabetic morbidity. When one suffers from lifelong diseases like diabetes, more challenging and confusing for the patients is restriction and regulating the food pattern. Correction of diet is the utmost importance to control sugar levels. Lot of diabetic foods though available, they seems to be expensive and taking in long run is difficult. And it needs to replace the normal diet pattern. Whereas, the Yava based diet is very much safer, near to ones food practice. The diabetic doesn't feel that he is on some special foods for his disease. The diet therapy should also have psychological acceptance. Yava is food grain considered under daily consumables, it is good for Kaphaja vyadhi(Diseases due to increased kapha) and Medoja vyadhi (diseases due to increased fat). Yava can be consumed in the form of regular wheat chapatti/roti/flat bread. The practice of such diet not only reduces blood and urine sugar levels, but also has relieving effect from subjective symptoms.

CONSENT (WHERE EVER APPLICABLE)

All authors declare that written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

NOTE:

The study highlights the efficacy of "Ayurved" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

REFERENCES

1. Sami W, Ansari T, Butt NS, Hamid MRA. Effect of diet on type 2 diabetes mellitus: A review. *Int J Health Sci (Qassim)*. 2017 Apr-Jun;11(2):65-71.
2. Jadavji Trikamji. *Charaka Samhita of Agnivesha, Chikitsasthana; Pramehachikitsa Adhyaya*. Chapter 6, Verse 21. 1st ed. Varanasi, India; Chowkambha Prakashan; 2011. p. 446.
3. Jadavji Trikamji. *Charaka Samhita of Agnivesha, Chikitsasthana; Santarpaneeyam Adhyaya*. Chapter 23, Verse 23. 1st ed. Varanasi, India; Chowkambha Prakashan; 2011. p. 123.
4. Jadavji Trikamji. *Charaka Samhita of Agnivesha, Sutrasthana; Santarpaneeyam Adhyaya*. Chapter 23, Verse 25. 1st ed. Varanasi, India; Chowkambha Prakashan; 2011. p. 122.
5. Jadavji Trikamji. *Charaka Samhita of Agnivesha, Nidanasthana; Pramehanidana Adhyaya*. Chapter 4, Verse 6-7. 1st ed. Varanasi, India; Chowkambha Prakashan; 2011. p. 212.
6. Jadavji Trikamji. *Charaka Samhita of Agnivesha, Sutrasthana; Santarpaneeyam Adhyaya*. Chapter 23, Verse 22. 1st ed. Varanasi, India; Chowkambha Prakashan; 2011. p. 123
7. Jadavji Trikamji. *Charaka Samhita of Agnivesha, Sutrasthana; Matrashiteeya Adhyaya*. Chapter 5, Verse 12. 1st ed. Varanasi, India; Chowkambha Prakashan; 2011. p. 38.
8. Felber, JP., Golay, A. Pathways from obesity to diabetes. *Int J Obes* 26 (Suppl 2), S39–S45 (2002)
9. Bhavamishra. *KrutannaVarga*. In: ChuneekarK..C, Pandey G.S., ed. by. Bhavaprakashanighantu. 1st ed. Varanasi: Chaukhambhabharati academy; 2013. p. 712.
10. Bhavamishra. *Dhanya Varga*. In: ChuneekarK..C, Pandey G.S., ed. by. Bhavaprakashanighantu. 1st ed. Varanasi: Chaukhambhabharati academy; 2013. p. 628.
11. Forouhi NG, Misra A, Mohan V, Taylor R, Yancy W. Dietary and nutritional approaches for prevention and management of type 2 diabetes. *BMJ* 2018;361:k2234

UNDER PEER REVIEW