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Efficacy of National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS): Ayush Integration Projects Dietary and Lifestyle Recommendations for Reversal of Prediabetes – A Validation Case Report.

Manjiri Ranade,¹ Nikhil Mudgalkar.²

¹ Department of Rasa Shastra, Sri Sai Ayurvedic Medical College, Aligarh, India.

² Department of Cardiac Anesthesia, Prathima Institute of Medical Sciences, Nagpur Road, Karimnagar, India.

ABSTRACT

Introduction: Prediabetes is a type of hyperglycaemia in which glycemic indices are higher than normal but lower than the diabetes threshold. The Ministry of AYUSH has shown excellent results with a project for Integration of AYUSH (*Ayurveda*) with the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) for endorsement of healthy lifestyle.

Clinical findings and diagnosis: A 66-year-old female patient was referred to a cardiologist after complaining of dizziness, the patient was diagnosed with prediabetes after evaluation and sought *Ayurvedic* treatment.

Intervention: We followed the food and lifestyle modification suggestions of the NPCDCS-*Ayush* project. The patient's adherence to these suggestions throughout the treatment duration. The patient's symptoms resolved and investigations showed reversal of prediabetes over a year period.

Conclusion: The food and lifestyle recommendations for prediabetes from the NPCDCS-*Ayush* integration project are easy, and have a positive impact. Compliance with the recommendations is crucial for prediabetes reversal.

Keywords: Compliance; Diabetic; Lifestyle Modification; Ayush.

INTRODUCTION

Prediabetes, which is characterised as blood glucose levels that are between normal and diabetic, is on the rise globally. The term “prediabetes” as defined by the American Diabetic Association comprises borderline glycaemia measured by any of three measures—fasting plasma glucose (FPG) 100–125 mg/dL (5.6–6.9 mmol/L), 2-h plasma glucose 140–199 mg/dL (7.8–11.0 mmol/L), or HbA1c 5.7–6.4% (39–46 mmol/mol).¹

There are still questions about its pathophysiology, and our understanding of it is far from comprehensive. One thing is certain: it predisposes a person to diabetes, and the health risks of pre diabetes are significantly higher than those of healthy people. Diabetes patients have a 7-year shorter life expectancy than the general

non-diabetic population, a result directly related to the major diabetic co morbidities.² The economic savings and health benefits associated with preventing prediabetes in a stage where it does not progress to diabetes would be enormous. So, it is prudent to stop prediabetes going to diabetes with a lifestyle modification, dietary therapy and if possible, few low-cost medications.

Correspondence: Dr. Manjiri Ranade. Professor, Department of Rasa Shastra. Sri Sai Ayurvedic Medical College, Aligarh. Email: dr.maanjiri@yahoo.co.in. Phone No. 8712209376.

The Ministry of AYUSH devised a project for Integration of AYUSH (Ayurveda) with National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) to provide health services, taking into account the strength of AYUSH systems for the prevention and management of Non communicable diseases by promoting a healthy lifestyle^[3]. It is mentioned in NPCDCS manual that, Lifestyle management (diet and physical activity) accompanied by drug therapy or insulin are the cornerstone of diabetes management. It suggested modifying Lifestyle i.e. through diet and physical activity. As well as to reduce Insulin Resistance through reduction in weight and specifically reduction of fat mass. Following the guidelines Cereal, barley, sorghum, karela, green leafy vegetables, garlic, turmeric, aloe vera, and fruits such as guava, oranges, and Indian blackberry were all included in the dietary modification programme. Regular walking and yoga were also encouraged. Sugarcane juice, jiggery, sugar, and milk products were avoided. It was avoided to live a sedentary lifestyle, eat fast food, and sleep during the day. We followed the dietary and lifestyle modification suggestions by NPCDCS - Ayush integration project and successfully controlled prediabetic conditions in a patient. The lifestyle modification component, in combination with a few low-cost medicines, can aid in reaching a state of well-being and should be implemented more consistently. A 66-year-old female patient was referred to a cardiologist after complaining of dizziness on occasion. After a comprehensive examination, he recommended a glucose tolerance test, which showed up positive, and the patient was diagnosed with prediabetes, with fasting plasma levels of 120 and 2 hour glucose levels of 192. After two months, the results were comparable, with fasting plasma blood glucose levels of 124 and two-hour glucose levels of 188. The patient sought the advice of an ayurvedic physician and decided to start ayurvedic treatment. The major findings of the patient included easy fatigability and few attacks of dizziness in last 2 months. The patient was advised about slow chewing of food, to consume old harvested grains, barley (*Yava*), sorghum (*Jwar*), whole wheat flour bitter melon, green leafy vegetables, garlic, turmeric (*Haridra*), and Aloe vera (*Kumari*) in vegetables, and fruits such as guava, oranges, and Indian blackberry (*Jambhu Phala*). Sugarcane juice, jaggery, sugar, and tuber vegetables were restricted to the patient. Rice, carbohydrate-rich foods,

and fried or processed foods were also reduced. The patient was advised to avoid sleeping during the day, sleeping excessively, drinking alcohol, and staying on an empty stomach for too long. Ice cream, cold drinks, burgers, pizza, and other fast foods were also advised to be avoided.

The patient was recommended to eat on time and to exercise moderately on a regular basis, notably walking, gesturing to the next level of mobility, and better time management. The patient was also encouraged to maintain a stress-free lifestyle and to practise *yogasana* if at all feasible. She was also instructed to keep a daily food and exercise diary. Every month, the principal investigator reviewed the diary through Whatsapp, and if the patient diverged from the suggested lifestyle, she was counselled. She was educated about the consequence of her negligence, including pathological alterations happening in her body.

The patient's fasting blood sugar, glycosylated haemoglobin, and 2 hour plasma glucose after a meal were all analyzed every three months. The timeline of patient investigation is mentioned in. [Table 1]

After 2 months of therapy, the patient felt symptomatically improved, with no dizzy attacks and a sense of rejuvenation. . Every third month, the patient's blood tests revealed a progressive decline in fasting plasma glucose, glycosylated haemoglobin, and 2 hour plasma glucose after a glucose tolerance test.

DISCUSSION

According to *Ayurvedic* concepts, prediabetes can be correlated with *pramehapurvarupa*, i.e. the prodromal stage of disease that occurs before the fourth *kriyakala*, where the *sthanasanshraya* of *dosha dushyasammurechana* will take further, and in this stage *kapha* is still in the lead.

Every disease, according to *Ayurveda*, is caused by an imbalance of *agni*, or digestive fire. *Agni* imbalance results from consuming the wrong foods and leading an imbalanced lifestyle. The *Kapha dosha*, which includes the Earth and Water elements, (*prithvi and jala mahabhuta pradhana*) is predominantly responsible for type 2 diabetes. *Kapha* governs the body's physical structure and

many metabolic processes, but when it assembles in excess, it can cause weight gain, tiredness, allergies, and resistance to change. Because *Ayurveda* believes that prediabetes is driven by too much *Kapha dosha*. It advocates a *Kapha*-balancing diet to keep diseases at bay.^{4,5} The guidelines include eating more foods that are bitter, astringent, or pungent in flavour and reducing consumption of foods which are categorized as sweet, sour, or salty.

The NPCDCS–AYUSH integration initiative illustrates that Ayurvedic intervention, such as *MamajjakaChurna*, *AmalakiChurna*, and *GuduchiChurna* taken twice a day,

effectively controls blood sugar levels in pre-diabetic and type 2 diabetic patients and improves disease management when combined with lifestyle changes and *Yogasana*, as well as allopathic treatment. In our case, the patient was prediabetic rather than diabetic, and she refused to take the medications. She was, however, willing to follow the project's lifestyle and dietary suggestions, and the results were positive. So, patient adherence to lifestyle and nutritional recommendations is sufficient to return the prediabetes stage to normal.

Table 1: Timeline of patient investigation over the period of 1 year

Baseline investigations 19/2/2019	Plasma glucose level HbA1c 2 hour plasma glucose	124mg/dl 6.1% 188mg/dl
At 3 months follow up 25/06/2019	Plasma glucose level HbA1c 2 hour plasma glucose	110mg/dl 6.2% 190mg/dl
At 6 months follow up 2/10/2019	Plasma glucose level HbA1c 2 hour plasma glucose	106mg/dl 6.1% 160mg/dl
At 9 months follow up 20/1/2020	Plasma glucose level HbA1c 2 hour plasma glucose	100mg/dl 5.6% 156mg/dl
At 1 year follow up 19/4/2020	Plasma glucose level HbA1c 2 hour plasma glucose	96mg/dl 5.4% 136mg/dl

Table legends:

mg/dl -milligrams/decilitre
Cut off values of plasma glucose fasting is 100mg/dl
Cut off value of plasma glucose at 2nd hour is 155 mg/dl
Cutoff value of Glycosylated haemoglobin is below 5.4%
The values are obtained from the laboratory of Prathima Institute of Medical Sciences to avoid analytical bias.

CONCLUSIONS

The food and lifestyle advice for prediabetes developed by the NPCDCS-Ayush integration project include small lifestyle and dietary modifications that may lower the

chance of prediabetes progressing to diabetes, as shown in our case report. The influence of a lifestyle intervention, such as short- and long-term changes in eating and exercise habits, on glucose metabolism was favourable. Compliance with the guidelines is critical to successfully reversing pre-diabetes.

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Consent: The consent was signed by the patient and the original article is attached with the patient's chart.