

# Diet and Lifestyle in Diabetes, A Kerala Perspective

Rajeev Jayadevan

Gastroenterologist and Deputy Medical Director, Sunrise Group of Hospitals\*

## ABSTRACT

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When prescribing diet and lifestyle to diabetic patients, cultural and family preferences should be considered for better compliance. In Kerala, the quantity of rice consumed per meal needs to be curbed. Whole grains should replace refined grains. Repeat servings must be discouraged to ensure portion control. Fruit juices, sweets and sweetened beverages need to be limited or avoided, and healthy snacks promoted. Trans-fats are to be avoided, and the overall use of oil, no matter how healthy it is claimed to be, must be minimised. Saturated fats raise LDL levels and are considered unhealthy at this time. Structured diet and exercise programs work better than plain advice. At least 2.5 hours of exercise is recommended per week, and has multiple benefits. Reducing work-related stress levels, and getting adequate sleep must be given due importance while recommending lifestyle modifications.

**Keywords:** Diabetic diet, Exercise, Sleep, Oils, Fats, Sugar, Fructose, Insulin resistance

\*See End Note for complete author details

## INTRODUCTION

Historically, diabetic diets have evolved over the years, ranging from the Thomas Willis diet in the seventeenth century, which advocated under-nutrition as a theme that was to be followed for about 200 years. Later John Rollo advised high meat and fat diet to upset the digestion as a potential treatment. Frederick Allen, an American physician documented the benefits of starvation diet in early diabetes in 1913, prior to the discovery of Insulin in 1921 which changed the understanding and treatment of diabetes significantly.<sup>1</sup> More recently, studies on very low calorie diets have shown resolution of diabetes.<sup>2</sup>

As diabetic diets continue to evolve based on accumulated scientific evidence, the American Diabetic Association has made the following specific updates in dietary recommendations for diabetics.<sup>3</sup>

1. MUFA (Monounsaturated fat) such as Canola, Sunflower oil, Olive oil, peanut oil are preferred at this time over PUFA. Transfats must be avoided.
2. Sodium restriction to 2300 mg (1 teaspoon) per day, further reductions are required for those with hypertension.
3. There is no need for routine vitamin/mineral/omega-3 supplements.

4. There is no restriction on the amount of protein intake, even if there is microalbuminuria.

In addition, the following recommendations were made to prevent the onset of diabetes in those at risk (2):

1. Dietary strategies including reduced calories and reduced intake of dietary fat, can reduce the risk for developing diabetes.
2. Individuals at risk for type 2 diabetes should be encouraged to achieve the U.S. Department of Agriculture (USDA) recommendation for dietary fiber (14 g fiber/1,000 kcal) and foods containing whole grains (one-half of grain intake)
3. Individuals at risk for type 2 diabetes should be encouraged to limit their intake of sugar-sweetened beverages.

## THE KERALA SCENARIO

Kerala is a tropical sea-side state located in the southern tip of the Indian peninsula, owning a distinct culinary tradition, with some regional variation stemming from its culturally diverse population that has received inputs from three major religions as well as from ancient seafarers from foreign lands who made significant cultural and gene pool contributions over several centuries.

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### Corresponding Author:

Dr Rajeev Jayadevan, MD (Vellore), DNB, MRCP, American Board Certification in Medicine and Gastroenterology  
Senior Consultant Gastroenterologist & Deputy Medical Director, Sunrise Group of Hospitals. E-mail: rajeevjayadevan@hotmail.com

Known to have a high literacy rate, efficient healthcare system with several healthcare parameters comparable with western nations, Kerala also has a substantial number of diabetic patients. In a position statement in 2013, the ADA advised that a patient's personal preferences and metabolic goals should be considered when recommending an eating pattern. Dietary and lifestyle modifications for diabetes in Kerala, therefore, should be customised to local culinary culture and tradition.

Adapting the ADA's diabetic diet to the South Indian context, the Indian Medical Association (Kerala Chapter) in 2016 published a Policy document on the control of Diabetes mellitus in Kerala which made the following nutritional recommendations:

- a. Dietary recommendations must incorporate the patient's cultural background and the culinary preferences of the family. Drastic changes in dietary habits seldom have lasting effect.
- b. Diet must be chosen, keeping in mind the blood pressure pattern and lipid profile of the patient. For those with other associated illnesses like heart or kidney disease, further modifications will be required.
- c. These discussions must be made with the help of a qualified and experienced dietician, also including the patient's family members in the discussion, as the new dietary changes could affect the daily food choices of other family members too. As default rates are high, continued supervision of diet and lifestyle changes are recommended to generate long-term positive health outcomes.

The following region-specific dietary recommenda-

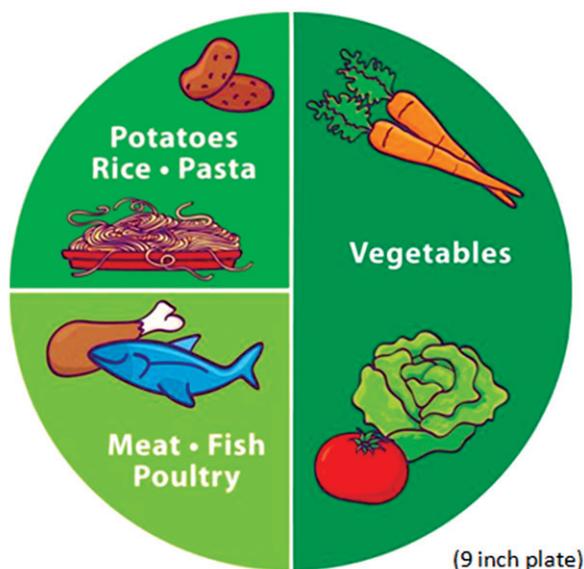


Figure 1. How to create your plate. American Diabetes Association

tions for patients with diabetes have been published in the IMA Policy document on the control of Diabetes mellitus in Kerala<sup>4</sup>

1. A preferred teaching tool for dietary modification in Kerala is the following picture (**Figure 1**)
2. The Kerala lunch is almost universally rice-based. Attempting to change that pattern entirely to chapatti (wheat-based lunch) can be futile. Instead, it would be more practical to advise a wheat-based dinner, while allowing a small portion of rice for lunch.
3. A limited quantity of rice is in fact as good as chapatti, when taken in the right amount after a dietician's consultation. Consuming excess number of chapattis must be warned against, while discussing substitution.
4. Some chapattis have excess maida (a form of refined wheat flour, which has high glycemic index) and oil (more calories per gram) mixed in for greater palatability, this is not advisable.
5. A large quantity of rice is typically consumed over lunch and dinner in the region. The quantity of rice needs to be cut down, ideally to 1-1.5 cups per meal. However, it is prudent to reduce the portions gradually, to improve compliance. Drinking a glass of buttermilk (a locally popular beverage) before a meal can reduce the craving to eat large amounts of rice.
6. The type of rice should be changed to parboiled red rice or Basmati, which have the lowest Glycemic index. White rice is best avoided, as it is associated with diabetes mellitus.<sup>5</sup> High glycemic index foods have been shown to increase the amount of body fat. Although low glycemic index foods improve insulin sensitivity, the effect appears to be the same as an overall low-carbohydrate diet, hence the current emphasis on low carbohydrate diet.<sup>6</sup>
7. Three main meals are the tradition for the region. But for diabetics, this needs to be changed to five or six smaller meals a day, a recommendation that is often hard to put into practice.
8. The updated US dietary guidelines state that foods like egg yolk that contain cholesterol, do not actually raise blood cholesterol. As saturated fats are the main dietary determinant of LDL cholesterol, and since eggs are low in saturated fat, egg yolk does not significantly raise blood cholesterol.<sup>7</sup>
9. There is a local perception that 'fruit juice is healthy', which leads to consumption of excess sucrose and

fructose. When a fruit is processed to make juice, its fibre content gets removed, releasing the sugars to be absorbed rapidly into the bloodstream, raising the glycemic index and triggering an insulin spike. Excess consumption of fruit juices and sugar-sweetened beverages has been linked with obesity and diabetes.<sup>8,9</sup>

10. Sugarcane juice, jaggery and honey are mistakenly consumed freely by some diabetic patients because of their purported 'natural origin', and must be specifically warned against.
11. Healthier alternatives to fruit juices/carbonated beverages are water, buttermilk or unsweetened lime juice.
12. Healthy snacks need to be popularised, these include kozhukkatta or ada (steamed rice cake with non-sweet filling), pulses, egg, aval (pressed rice) products, brown bread sandwiches, momos, wheat dosa rolls with vegetable or chicken filling.
13. Fruits can be consumed in limited quantities, preferably when not too ripe. A ripe fruit contains more calories than when raw, due to higher simple sugar content.
14. Behaviour modification strategies must discourage multiple servings of rice and other foods. Emphasis on fixed portions during each meal.
15. Vegetable consumption must improve to about 2 ½ cups per day.
16. Whole grain products are preferred over refined grain like maida, and have been consistently shown to favourably influence metabolic profile.<sup>10</sup>
17. For those with a preference for sweet treats, an abrupt change to non-sweet foods can be psychologically difficult, and can even force them to become non compliant with diabetic diet. Greater use of safe artificial sweeteners like sucralose will help the creation of an alternative menu of low-calorie sweets for diabetics. Unlike the west, artificial sweeteners are yet to become popular in Kerala.
18. When choosing the type of oil, it is useful to emphasise that more than the type of oil, it is the quantity consumed that is important. For a given weight, oils contain a lot of calories. Least is best, given the abundance of oil in local cooking culture.
19. Fats that are solid at room temperature, such as butter, vanaspathy are called Trans fats, which are artificially created when manufacturers add hydrogen to vegetable oil – a process called hydrogenation.

Trans fats increase the shelf life of foods, but are considered more harmful than saturated fats. Trans-fats, now banned in several developed countries, are extensively used in bakeries and roadside food stalls in Kerala. The use of Trans fats must be discouraged.

20. Sweeteners like high fructose corn syrup, a common ingredient of carbonated beverages, must be avoided. The pattern of increased use of these products has paralleled the rise of obesity and diabetes in the United States. Fructose, unlike glucose, does not suppress the appetite center because it does not stimulate insulin release from the pancreas as much as glucose. Leptin production, which is stimulated by insulin, also drops, and satiety does not occur. Unlike glucose, fructose is lipogenic in the liver and adipose tissue, contributing to insulin resistance from excess fat build-up.<sup>11</sup>

#### Exercise in diabetes:

Exercise habit in Kerala has declined with the advent of urbanization, automation, better economic conditions including rise of the so-called 'Gulf-boom' wherein a significant part of the population is employed in the middle-east, and the rise of the information technology industry that has contributed a number of sedentary jobs to the region. Exercise levels in Kerala have declined over time. Lack of exercise is cited as a major contributor to the rise of diabetes and heart disease in the region.<sup>12-15</sup>

Structured exercise durations of more than 2.5 hours per week were associated with HbA(1c) reductions of 0.89%.<sup>16</sup> Less intense exercise yielded lower decline of HbA1c, but only when combined with dietary modification. In contrast to structured exercise programs, physical activity advice alone did not reduce HbA1c levels. It has been shown that regular physical activity is a protective factor associated with myocardial infarction (OR 0.86, 95% CI 0.76 to 0.97), reducing population attributable risk by 12%. Physical activity during adulthood can increase total life expectancy and life expectancy free of cardiovascular disease.<sup>17</sup>

Exercise has additional benefits of reducing the risk for osteoporosis, falls, hyperlipidemia, hypertension, ischemic heart disease, stroke, depression and dementia.<sup>18</sup> A recent meta-analysis of over 144,000 patients concluded that exercise reduced the risk of 13 types of cancers.<sup>19</sup>

In summary, the ideal quantity of exercise in a patient should be greater than 2.5 hours per week, although

the preferred ratio of endurance training and resistance training is not clear at this time. Safety needs to be given due consideration while choosing the exercise modality.

### Exercise to prevent diabetes

Rigorous exercise and dietary modification has been shown to reduce insulin resistance in pre-diabetics.<sup>20</sup> It is noteworthy that casual advice alone on diet and exercise did not have an effect.<sup>16</sup> In a study of 3233 healthy men, increased muscular strength at baseline was associated with lower risk of developing metabolic syndrome later on in life, in a 7-year follow-up period. This benefit was evident even in overweight and obese subjects, confirming the importance of muscle strength training as part of the daily exercise regimen.<sup>21</sup>

### Other modifiable lifestyle variables

A significant number of people in Kerala work night-shifts, especially in healthcare and IT industry. The importance of adequate sleep needs to be emphasised, especially in diabetic patients. It has been shown that insulin resistance increases after even one night of inadequate sleep.<sup>22</sup> Higher levels of cortisol, TNF- $\alpha$ , IL-6 and lower leptin levels have been documented in sleep-deprived individuals.<sup>23,24</sup> Night shift work has been associated with cardiovascular disease in a number of studies, although there is no increase in mortality.<sup>25,26</sup> Maintenance of sleep hygiene and allocation of adequate time for restful sleep must be emphasised while providing lifestyle advice.

## END NOTE

### Author Information

Dr Rajeev Jayadevan, MD (Vellore), DNB, MRCP, American Board Certification in Medicine and Gastroenterology  
Senior Consultant Gastroenterologist and Deputy Medical Director, Sunrise Group of Hospitals

**Conflict of Interest:** None declared

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