



# Management of Prediabetes (An Increased Risk of Type 2 Diabetes) with Life Style Modifications

Shrisha S Raj<sup>1</sup>, Bhuvana D<sup>1</sup>, Don Selvin<sup>2</sup> and Hsiu-Ling H<sup>3\*</sup>

<sup>1</sup>Department of Chemistry, School of Science Sandip University, India

<sup>2</sup>Department of Medicine, Seth G.S. Medical College & Hospital, India

<sup>3</sup>Department of Chemical and Materials Engineering, Lunghwa University of Science and Technology, Taiwan

\*Corresponding authors: Hsiu-Ling Hsu, Department of Chemical and Materials Engineering, Lunghwa University of Science and Technology, Taiwan, Tel: +919606777481; Email: rosslyn@mail.lhu.edu.tw

## Mini Review

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## Abstract

Prediabetes, characterized by elevated blood glucose levels that are below the diagnostic threshold for diabetes, poses a significant health challenge worldwide due to its association with an increased risk of developing type 2 diabetes mellitus. This abstract explores the crucial role of lifestyle modifications in the effective management of prediabetes, emphasizing a holistic approach to prevent or delay the progression to overt diabetes.

The primary focus of this review is on lifestyle interventions, including dietary changes, regular physical activity, and weight management, as key strategies to address the underlying factors contributing to insulin resistance and impaired glucose metabolism. Evidence from clinical studies underscores the efficacy of these interventions in improving insulin sensitivity, promoting weight loss, and stabilizing blood glucose levels among individuals with prediabetes.

Furthermore, the abstract highlights the importance of personalized and sustainable lifestyle modifications, considering individual preferences, cultural influences, and socioeconomic factors. Behavioral interventions, such as motivational coaching and support groups, are discussed as essential components to facilitate long-term adherence to healthy lifestyle practices.

In conclusion, this article advocates for a comprehensive and patient-centered approach to managing prediabetes, with a strong emphasis on lifestyle modifications. By empowering individuals with prediabetes to make sustainable changes in their daily habits, there is a promising avenue to curb the progression to type 2 diabetes and improve overall health outcomes.

**Keywords:** T2DM; Primary Aldosteronism; Chronic Kidney Disease

**Abbreviations:** MUFA: Monounsaturated Fats; GI: Glycemic Index.

## Introduction

Prediabetes is the condition where blood glucose levels are high but not enough to classify as diabetes. The elevation

of blood sugar is a continuum and hence prediabetes cannot be considered an entirely benign condition. Although most people with prediabetes have no symptoms, one might notice extra thirst, frequent urination, having blurred vision or extreme fatigue in the prediabetes conditions [1]. Prediabetes is the stage which has the higher risk of developing the diabetes mellitus. As it is a reversible with

many of the lifestyle modifications.

### Life Styles Modifications

Managing prediabetes through a healthy diet is crucial for preventing the progression to type 2 diabetes and promoting overall well-being. Adopting a balanced and nutritious eating plan can help stabilize blood sugar levels, maintain a healthy weight, and improve insulin sensitivity [2].

- Eating healthy foods
- Being more active
- Losing excess weight
- Stopping smoking
- Getting enough sleep
- Getting regular checkups
- Limiting portion sizes of refined carbohydrate foods
- Incorporating fiber
- Limiting saturated and trans fats

Mainly incorporate a variety of colorful vegetables and fruits into your meals. These foods are rich in fiber, vitamins, and antioxidants, which can aid in blood sugar regulation. Choose whole grains such as brown rice, quinoa, oats, and whole wheat over refined grains [3]. Whole grains provide sustained energy and are high in fiber, which helps control blood sugar levels. Opt for lean protein sources like poultry, fish, tofu, legumes, and beans. Protein can help stabilize blood sugar and keep you feeling full [4].

### Managing the Carbohydrates

1. **Carb Distribution:** Spread your carbohydrate intake throughout the day to prevent spikes in blood sugar. Focus on complex carbohydrates with a low glycemic index [5].
2. **Portion Control:** Be mindful of portion sizes to avoid overeating. Use smaller plates and listen to your body's hunger and fullness cues [6].

### Limit Sugars and Processed Foods

**Reduce Added Sugars:** Minimize the consumption of sugary foods and beverages. Read labels to identify hidden sugars in processed foods. Carefully read nutrition labels to identify sources of added sugars. Ingredients like sucrose, high-fructose corn syrup, agave nectar, and various other syrups indicate the presence of added sugars [7]. Be aware that some foods marketed as "low-fat" or "diet" may contain higher amounts of added sugars to enhance flavor. Reduce the intake of sugary beverages such as sodas, energy drinks, and sweetened teas. These drinks can contribute significantly to added sugar intake without providing nutritional benefits. Choose water, herbal teas, or infused water with fresh fruits

as healthier alternatives. Processed and packaged foods often contain unhealthy fats, excessive sodium, and refined sugars. Opt for whole, fresh foods whenever possible [8].

### Healthy Fats

Include sources of healthy fats such as avocados, nuts, seeds, and olive oil. These fats can support heart health and may help improve insulin sensitivity. Reduce the intake of saturated and trans fats found in fried foods, processed snacks, and fatty cuts of meat. These fats can contribute to insulin resistance [9].

Managing prediabetes, incorporating healthy fats into your diet is important for overall health and can contribute to better blood sugar control. Here are some examples of healthy fats to include in your prediabetes-friendly eating plan:

1. **Avocados:** Rich in monounsaturated fats, avocados are a nutrient-dense option that can be added to salads, sandwiches, or enjoyed as a side dish.
2. **Nuts and Seeds:** Almonds, walnuts, chia seeds, flaxseeds, and pumpkin seeds provide healthy fats, fiber, and essential nutrients. They make for great snacks or can be added to yogurt, oatmeal, or salads [10].
3. **Olive Oil:** Extra virgin olive oil is a source of monounsaturated fats and contains antioxidants. Use it as a dressing for salads, drizzle it over vegetables, or use it in cooking.
4. **Fatty Fish:** Salmon, mackerel, sardines, and other fatty fish are rich in omega-3 fatty acids. Aim to include fatty fish in your diet at least twice a week for heart health and inflammation reduction [11].
5. **Flaxseed Oil:** Flaxseed oil is a plant-based source of omega-3 fatty acids. It can be added to smoothies, drizzled over salads, or used as a supplement.
6. **Chia Seeds:** Chia seeds are high in omega-3 fatty acids, fiber, and protein. They can be added to yogurt, oatmeal, or used to make chia seed puddings [12].
7. **Coconut Oil:** While coconut oil is high in saturated fat, it consists of medium-chain triglycerides (MCTs), which some studies suggest may have metabolic benefits. Use it in moderation for cooking or baking.
8. **Walnuts:** Walnuts are a good source of polyunsaturated fats, including alpha-linolenic acid (ALA), a type of omega-3 fatty acid. Snack on a handful of walnuts or add them to salads.
9. **Dark Chocolate:** Dark chocolate with a high cocoa content (70% or more) contains antioxidants and can be a satisfying treat in moderation. Choose varieties with minimal added sugars.
10. **Nut Butters:** Natural nut butters, such as almond or peanut butter, provide healthy fats and protein. Use

them as a spread on whole-grain bread or as a dip for fruit slices.

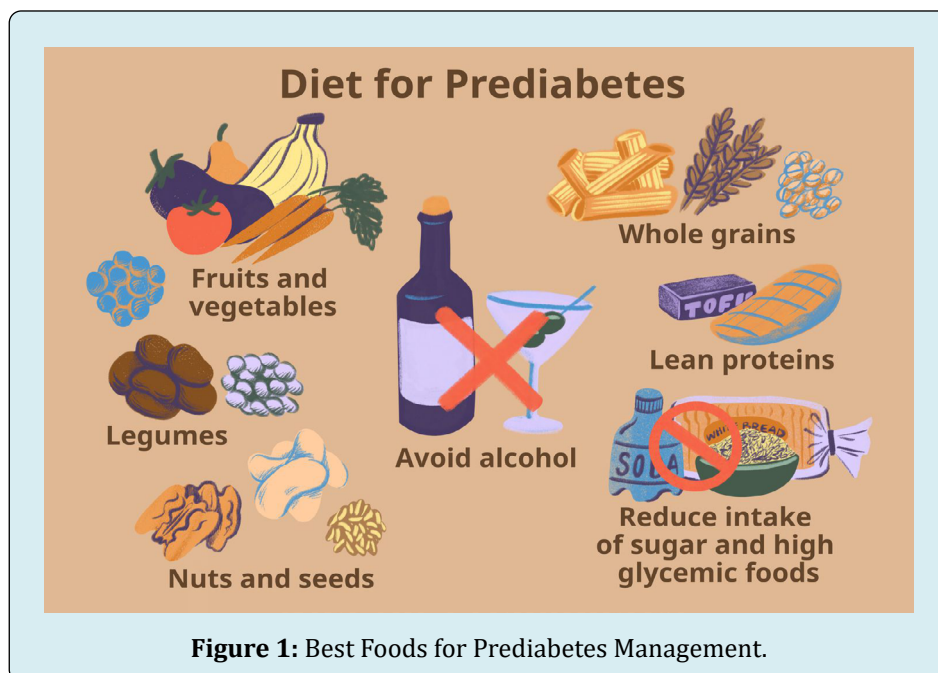
11. **Seaweed and Algae:** Seaweed and algae-based products, such as seaweed snacks or algae oil supplements, can be sources of omega-3 fatty acids [12,13].
12. **Eggs:** Eggs, particularly the yolk, contain healthy fats and various essential nutrients. Include eggs in your diet

as part of a balanced meal.

13. **Edamame:** Edamame, or young soybeans, are a plant-based source of polyunsaturated fats and protein. They can be enjoyed as a snack or added to salads.
14. **Olives:** Olives and olive tapenade provide monounsaturated fats and can be included in salads, sandwiches, or enjoyed as a flavorful topping [14].

Super Foods	Role in managing the prediabetes
Avacados	With a glycemic index of 15, avocados are a fruit that diabetics may safely eat. The majority of the fat in avocados is made up of monounsaturated fats (MUFA), which decrease harmful cholesterol (VLDL). This fruit is quite calorie rich, so you need to be mindful of how much you eat of it [15].
Chia seeds	Due to their low glycemic index, Chia seeds are a good food choice for diabetic patients [16]. Despite its high glucose content, Chia seeds have a GI of only 4, making them one of the “low-GI foods”. Low-GI carbohydrates are slowly digested and absorbed, allowing blood sugar levels to remain stable [17].
Seaweed and Algae	Seaweed, kelp, raw is likely to have a low glycemic index, as estimated by the AI Glycemic Index Estimator. Check out low glycemic index foods page to view the foods with lab verified GI indices [18].
Edamame	Edamame beans can play a very significant role in managing your sugar levels. It has the lowest Glycemic Index (GI) out of all the legumes (GI =14-20). They are rich in protein and fibre but low in carbohydrates. This may lead to low blood sugar [18].
Flaxseed oil	Flaxseed has a glycemic index (GI) of 35, indicating that it is a low-GI food. As it has a low GI, flax seeds are known as a low-glycemic food owing to their high fibre content [19].
Fish	Choose fish that is broiled, baked or grilled to avoid the carbohydrate and extra calories that would be in fish that is breaded and fried. The American Diabetes Association Standards of Medical Care in Diabetes recommends eating fish (mainly fatty fish) twice per week for people with diabetes [20].
Walnuts & Nuts	The estimated glycemic index of walnuts is 15, making them a low-glycemic food and Glycemic load takes portion size into account when predicting a food’s impact on blood sugar. A glycemic load of 1 has very minimal impact on blood sugar [21].

**Table 1:** Role of Healthy Foods in Management of Prediabetes.



**Figure 1:** Best Foods for Prediabetes Management.

### Regulation of Sleep in Managing the Prediabetes

Research indicates that sleep has a critical role in the control of hormones and the metabolism of glucose [22]. An increase in sympathetic nervous system activity brought on by sleep disruption suppresses insulin output and fosters insulin resistance. People who get little sleep are more likely to become obese because it alters the levels of hormones that control hunger and increases calorie intake without increasing energy expenditure [23].

### Avoid Smoking to Prevent the Prediabetes

Smoking is the one of the etiological factor for the development of the diabetes. Evidence suggest that the nicotine changes the cells to responding to the insulin as insulinhelps blood sugar enter cells and that leads to the increase in the blood glucose levels [24].

### Impact of Physical Activity in Managing the Prediabetes

**Aerobic Exercises:** People with prediabetes might benefit greatly by engaging in activities that raise their heart rate and respiration, such as running, cycling, swimming, or dancing. Try to get in at least 150 minutes a week of aerobic activity at a moderate level.

**Strength Training:** Including resistance exercises in your workouts, such bodyweight exercises, resistance band workouts, or weightlifting, can help you gain muscle mass, enhance your insulin sensitivity, and get stronger all over. Aim for two or more workouts a week that focus on your main muscle groups [25].

**Exercises that Promote Balance:** Practices that improve flexibility, balance, and general well-being include yoga, Pilates, and tai chi. Because these exercises increase joint mobility and lower the risk of falls, they can be especially helpful for those with diabetes [26].

### Conclusion

In conclusion, the management of prediabetes through lifestyle modifications stands as a pivotal and evidence-based strategy to mitigate the heightened risk of developing type 2 diabetes mellitus. The collective body of research presented underscores the efficacy of targeted lifestyle interventions, encompassing dietary adjustments, regular physical activity, and weight management, in improving insulin sensitivity and maintaining blood glucose levels within a healthy range.

This comprehensive approach acknowledges the multifaceted nature of prediabetes and recognizes the significance of personalized strategies that consider individual preferences, cultural nuances, and socioeconomic

factors. The importance of early detection and intervention cannot be overstated, and lifestyle modifications provide a practical and accessible means to empower individuals with prediabetes. By fostering a proactive and patient-centered approach, healthcare professionals can guide individuals towards adopting healthier habits, thereby preventing or delaying the onset of type 2 diabetes. As the global burden of diabetes continues to rise, the significance of preventive measures becomes paramount, and lifestyle modifications emerge as a cornerstone in the larger framework of public health strategies.

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