

Empowering Lifestyle Changes in Preventing and Managing Type 2 Diabetes

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ABSTRACT

Type 2 Diabetes (T2D) is a significant public health concern globally, with lifestyle factors such as poor diet, physical inactivity, and obesity playing pivotal roles in its onset and progression. This article explores the importance of empowering lifestyle changes to prevent and manage T2D. It examines the impact of dietary modifications, regular physical activity, weight management, and smoking cessation on reducing diabetes risk and improving metabolic health. Behavioral and psychological interventions, including motivational strategies and support systems, are discussed in promoting long-term adherence to healthy habits. Case studies from community-based programs and clinical interventions highlight successful outcomes of lifestyle modification efforts in preventing and managing T2D. The article concludes by addressing future directions in diabetes prevention, emphasizing the potential of further integrating technology and personalized approaches to enhance intervention effectiveness. With a growing focus on prevention and early intervention, lifestyle modifications are critical in reducing the global burden of T2D and improving health outcomes for at-risk populations.

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Introduction

Type 2 diabetes (T2D) is one of the most significant public health concerns in the modern world since it affects a vast number of people. T2DM, on the other hand, can be diagnosed in young people, but it mainly affects adults, and its risk factors include diet, lack of physical activity, and obesity. The condition happens when the body stops responding to insulin, and blood glucose levels tend to rise if not controlled, leading to severe complications like heart diseases, kidney diseases, and neuropathy. T2D, nonetheless, has been increasing rapidly, mainly due to the expansion of urbanization rates, low physical activities, and high prevalence of overweight and obesity. This condition is not only a source of pain and poor quality of life for affected individuals but also consumes an inappropriately large amount of global healthcare resources. The key issues are preventing the development of T2D and efficient management measures to control the increased rates.

It has become clear that lifestyle modifications are one of the best options to prevent and manage T2D. In contrast to pharmacologic strategies, lifestyle modifications are directed towards fundamental corporeal aspects that lead to diabetes development, including diet and lack of exercise. Much research has shown that losing excess weight through improved diet and exercise and the adoption of healthier lifestyles could reduce the risk of developing T2D tremendously. As for T2D, lifestyle modifications are paramount in patients with a diagnosis of such; often, they prevent progression

to medicalization or can do so for quite a while. Daily exercise helps reduce the problem with insulin and dietary alterations to regulate blood glucose levels. As a result of these interventions, the individual's metabolic status improves, and the development of associated complications is minimized, improving the prognosis of the disease. Lifestyle changes primarily prevent and treat diabetes by giving people the tools to make better decisions about their health [1].

The Role of Diet in Preventing Type 2 Diabetes • Impact of Nutrition on Blood Glucose Levels

Proper dieting involves controlling glucose levels in the blood, which is vital in preventing or treating T2D. Both carbohydrates, fats, and proteins influence blood sugar levels. However, this is different depending on the type of nutrient, with carbohydrates exerting the most significant effect because they are metabolized very quickly to glucose. Foods containing high amounts of refined sugars and simple carbohydrates cause rapid changes in blood glucose levels. This, over time, leads to insulin resistance, one of the prime causal factors of T2D.

Thus, when consumers take complex carbs with low GI, they digest them slowly, increasing blood sugar. Wholemeal grains, beans, and vegetables are low-GI foods that ensure blood sugar levels do not fluctuate within the body. Furthermore, fats and proteins also act on carbohydrates by influencing the rate of digestion so that glucose is released slowly into the bloodstream whenever the carbohydrate is combined with fats or proteins. However, as saturated and trans fats are taken in large amounts, one increases the chances of developing diabetes. The balance of such macronutrients is essential to managing blood glucose levels

well. Foods high in fiber, healthy fats, and lean protein benefit the body, including stabilizing blood sugar and improving insulin levels. Changing their dietary habits from the Mediterranean diet to a typical Western diet loaded with processed and red meat and high glycemic index foods increases the risk of developing T2D [2].

• Dietary Recommendations for Diabetes Prevention

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Furthermore, fats and proteins also act on carbohydrates by influencing the rate of digestion so that glucose is released slowly into the bloodstream whenever the carbohydrate is combined with fats or proteins. However, as saturated and trans fats are taken in large amounts, one increases the chances of developing diabetes. The balance of such macronutrients is essential if one manages blood glucose levels well. Foods high in fiber, healthy fats, and lean protein benefit the body, including stabilizing blood sugar and improving insulin levels. Changing their dietary habits from the Mediterranean diet to a typical Western diet loaded with processed and red meat and high glycemic index foods increases the risk of developing T2D [3].

Physical Activity and its Role in Diabetes Prevention and Management

• Benefits of Regular Exercise on Insulin Sensitivity

Physical activity is also significant for maintaining adequate blood glucose control, as examined in Type 2 diabetes (T2D). Insulin sensitivity quantifies how well the body cells are receptive to insulin and acknowledges glucose to get into cells and be used. Insulin resistance is apparent in ordinary people or people with T2D, raising blood glucose levels. On the other hand, exercise has a meta-physiological function since it promotes the better uptake of insulin by the cells. Muscles take glucose into the cell during muscle contraction and exercise without insulin, which causes blood glucoconcentration. This effect persists with prolonged and post-exercise time; since muscles even become more insulin responsive, a unit of insulin could reduce glucose levels effectively. This enhancement of insulin sensitivity occurs whether you are doing aerobics like walking, cycling, or swimming or doing anaerobic exercises like weight pulling. Some research has found that regular exercise reduces the amount of glucose in the blood; it offers this capability even when no weight loss is experienced. For individuals at increased risk for T2D, exercise helps to postpone or forestall the disease based on the positive effects on insulin sensitivity and glucose homeostasis. Secondly, exercise can decrease and improve the lipid profile, particularly abdominal fat, which is a strong marker for insulin resistance, thus improving the protective effect towards T2D [4].

• Recommended Physical Activity Guidelines

Health management organizations like the American Diabetes Association (ADA) and World Health Organization (WHO) advise

the following exercise regimes for maintaining or preventing T2D: aerobic and resistance exercises. According to the ADA, adults should engage in at least 150 minutes of moderate-intensity aerobic exercise at least three days per week, with some exercise at moderate intensity separated by one or two non-consecutive days. Aerobic exercises ranging from moderate intensity include brisk walking, swimming, and cycling and could improve cardiovascular fitness and diabetes by controlling blood glucose concentration. But, in the same respect, resistance training should be included at least two to three times a week in the fitness regimen. Aerobic exercises aerobics such as weight lifting and using resistance bands assist in constructing and maintaining muscle tissue, which enhances glucose uptake and insulin sensitivity. This also stops the loss of muscles experienced with age, vital in managing diabetes for many years.

Adding flexibility and balance training like yoga or tai chi will enhance the results of people with T2D or those at high risk of developing T2D, especially those who are old. These exercises help prevent mobile immobility, reducing the chances of falls, which can be complicated by Diabetes neuropathy, among others [5].

Weight Management and Obesity Prevention

• The Relationship between Obesity and Type 2 Diabetes

The main predisposing factor to T2D is the condition referred to as obesity. Data review has revealed a direct link between obesity, specifically abdominal obesity, and the development of insulin resistance in T2D. In obese persons, the pancreas releases more insulin to keep blood glucose levels regular; hence, high insulin levels are called insulin resistance. The lesson is that eventually, the pancreas cannot produce enough insulin to meet the body's needs, blood glucose levels rise, and the development of diabetes occurs. Omental or visceral fat is considered unhealthy because it penetrates the organs, interferes with proper functioning, and causes chronic inflammation. This inflammation compounds the offer of insulin resistance, thereby contributing to the vicious cycle that leads to T2D. Obesity is a primary risk factor for T2D, and this group of patients has been found to exhibit a less favorable glycaemic control compared to normal and overweight patients. Also, research has found that as little as 5-10 additional pounds over the years doubles the chances of contracting T2D, especially if someone has a family history or does not exercise much. On the other hand, weight loss as small as 5–10% of total body weight is likely to dramatically decrease the incidence of T2D or enhance glycemic control in people with the disease. Maintaining a good weight in controlling and preventing T2D is important, as indicated above [6].

• Strategies for Achieving Sustainable Weight Loss

Managing T2D involves weight control, including weight reduction and weight maintenance to a healthy level. Of course, weight reduction cannot be oriented; it must be lifetime-oriented, and there should be constant changes in the daily routine rather than occasional diets. It has been discovered that dietary interventions alongside exercise are among the best approaches to effect a sustainable weight loss program (see Figure 1). Wholesome, unprocessed foods replenishing reduced calorie intake are critical to implementing the weight loss program. Many foods contain empty calories and contribute towards excessive calorie intake with no nutritional value; keeping off such foods is essential, and replacing them with nutrient-dense meals such as vegetables, whole grains, lean proteins, and healthy fats to help develop a calorie deficit. Dietary restraint or moderation is also part and

parcel of a weight loss diet, controlling portions of food and drinks and preventing overindulgence in foods while still eating balanced meals.

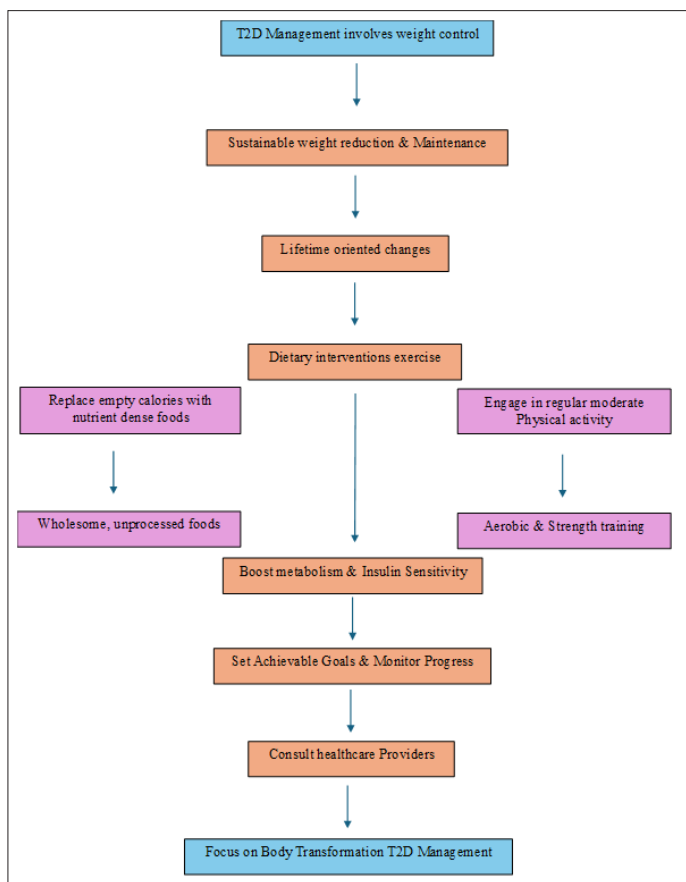


Figure 1: Management of Type 2 Diabetes (T2D) through Weight Control

Another determinant of weight status is physical activity, which should be defined as at least moderate physical activity on most days of the week. The proposed system of aerobic exercises such as walking, cycling, swimming, and strength exercises helps burn calories and develop muscles to boost the body's metabolic rate. One of the benefits of engaging in physical activity is that metabolism is increased, meaning that a person who has made an effort to lose some weight will easily be able to sustain the result. Besides, regular physical activity enhances the

body's sensitivity to insulin, which proves helpful in managing a diabetes patient's blood glucose level.

Other actions that can help promote weight loss include Setting achievable goals, monitoring one's progress, and consulting healthcare providers or weight loss programs. These strategies help people remain focused on the program and support them in overcoming the barriers that come with the plan. The focus is on transforming the body without simply attaining the weight loss goal and increasing the body's ability to fight off T2D by leaps and bounds [7].

Behavioral and Psychological Interventions

• Motivating Long-Term Lifestyle Changes

Promoting change that fosters long-term behavior modification is the cornerstone of primary and secondary prevention of T2D. Lifestyle change is challenging because people must devote time and energy to changing their behaviors, including food choices, exercise, and weight. Self-driven reasons that would help individuals embrace change include personal health, minimization of complications, and better quality of life, among others, which are the most effective since the individuals have bought the change. One of the most potent change management techniques concerns goals: they should be specified accurately with a delineation of acceptable targets. Instead, he said people should be counseled to make small, gradual changes, like downsizing their plates, increasing activity levels over time, or swapping unhealthy, processed foods for healthier foods. These small victories can fuel more actions: people start seeing progress, which motivates them to keep on with the process.

Also, watching one's behavior by using daily logs about foods taken, physical activities, or smartphones can assist in keeping the goal set in view. Apart from getting feedback immediately, tracking progress enables one to see trends, which allows them to see areas that require improvement. Hence, cognitive-behavioral approaches, including thought-challenging and identifying emotional eating inducements, are also significant components in sustaining behavioral modification. These methods enable a person to accept obstacles and keep a positive attitude towards diabetes prevention or management. Table 1 presents the core of these changes, highlighting that diet, activity, weight loss, and smoking reduction all exert potent preventive effects on Type 2 diabetes and enhance other aspects of metabolic health and clinical outcomes, as demonstrated in the Finnish Diabetes Prevention Study and the Look AHEAD Study [8].

Table 1: Key Lifestyle Interventions for Preventing and Managing Type 2 Diabetes

S.No	Lifestyle Intervention	Key Benefits	Sources/Studies
1.	Dietary Changes	Improved blood glucose control, reduced insulin resistance, weight management	Finnish Diabetes Prevention Study (DPS)
2.	Physical Activity	Increased insulin sensitivity, improved cardiovascular health, reduced abdominal fat.	American Diabetes Association (ADA)
3.	Weight Management	Reduced risk of Type 2 diabetes, improved glycemic control	Look AHEAD Study
4.	Smoking Cessation	Enhanced insulin sensitivity, reduced inflammation, better cardiovascular health	Multiple Studies

• Role of Support Systems and Counseling

Stakeholder support and counseling can enhance long-term behavior change for at-risk or those with T2D. It was found that compliance with lifestyle interventions is higher when the patient has social or professional support than in those who try it individually. Supplements can be provided by family, friends, and healthcare specialists or structured diabetes self-management programs. People around the patient can also be of great value in that they can help maintain positive changes, engage in those changes, or provide support during

the worst of times. It is always easier to go through a process when you are not alone and also because there is some check to ensure that you stay motivated all through. Another benefit of using group-based programs, whether a community aerobics or Zumba community or a diabetes prevention seminar, is promoting social support and a shared group identity for participants with similar difficulties or struggles. The support of a dietitian, a behavioral therapist, or a diabetes educator would also improve these measures' effectiveness. These professionals show a lot of concern and assist a person through barriers like emotional eating, stress, or relapse to inadequate standards. Motivational interviewing, a counseling style focused on asking questions to encourage consideration of change, has been especially useful for maintaining long-term diet and physical activity changes.

Finally, favorable social support, reinforcement, and professional stipends guide people in achieving their goals, shielding them from emotional exhaustion and establishing a perpetual technique of diabetes prevention and management [9].

The Role of Smoking Cessation in Reducing Diabetes Risk

• Smoking as a Risk Factor for Type 2 Diabetes

Current smoking is one of many self-reported modifiable risk factors associated with T2D in the literature. Cross-sectional studies show that smokers are at 30-40% increased risk of T2D, attributable to the harmful effects of nicotine and other toxic constituents in cigarettes. Cigarette smoking negatively affects insulin sensitization and glucose homeostasis and causes inflammation in the body since inflammation is among the critical steps in the development of T2D. Moreover, smoking causes weight addition and abdominal obesity, which are byproducts of insulin resistance. Poor diet and lack of exercise also go hand in hand with smoking, and this makes the smoker prone to T2D. Second-hand smoking also increases the likelihood of contracting the disease, and therefore, smoking must not be overlooked in instances tackling diabetes [10].

• Benefits of Smoking Cessation on Metabolic Health

Smoking cessation majorly reduces the risk of T2D and improves metabolism. It only takes a few weeks to undergo a rise in insulin sensitivity, where the body is better placed to control blood glucose levels. After some years, there are improved inflammation markers, oxidative stress, insulin resistance, and diabetes. Other than the delayed onset of T2D, smoking cessation leads to reducing abdominal fat and effective weight loss, which are significant aspects of delaying and managing diabetes. The research further reveals that smokers who decide to quit smoking get better cardiovascular health, and this is relevant for those who have type 2 diabetes or prediabetes because they are prone to develop diabetes. All in all, smoking cessation minimizes the risk of T2D and improves later metabolic and cardiovascular prognosis [11].

Case Studies on Successful Lifestyle Interventions

• Examples of Community-Based Programs

Several variations involving community decision-making processes are helpful in the facilitation of lifestyle changes that would assist people with T2D. A prime example is the DPP, a major clinical trial aimed at overweight middle-aged adults with impaired glucose tolerance in their local community. Clients in the program were helped to change their diet, physical activity level, and weight. Thus, the DPP proved that diet and exercise, even in a workplace environment, may significantly help to prevent the development of T2D. Likewise, such programs like the Finnish Diabetes Prevention Study (DPS, from now on) offer community-based support along with information on what to eat

well and how to exercise and manage their weight. According to the study, the levels of diabetes were found to have decreased by 58% among the participants, with many of them still keeping off the excess weight and having better insulin sensitivity. It shows that by improving group support, education, and other performed lifestyle interventions, it is possible to prevent T2D in large populations [12].

• Outcomes from Clinical Interventions

Clinical interventions also support the idea of positive experiences of lifestyle modifications in T2D treatment. For instance, research conducted at the Joslin Diabetes Center tested the efficiency of a lifestyle change program for people with newly diagnosed T2D. Self-management programs included individualized dietary education, physical activity, and behavior change strategies. At one year, most patients reported significant changes in their HbA1c, blood pressure, and body weight. Look AHEAD or Action for Health in Diabetes is another successful story of weight loss by lifestyle intervention for people having T2D. The intervention aims to target participants who engaged in the program, had better glycemic control, reduced cardiovascular risk, and lower healthcare costs in the long run. It is evident from these clinical cases that professional, personalized LCM programs can facilitate the development of T2D and also reverse T2D symptoms dramatically to enhance patients' quantity and quality of life [13].

Conclusion

Lifestyles have a prominent position in preventing and managing Type 2 diabetes (T2D). Lifestyle modification and its type, including diet and nutritional changes, increase in exercise, weight loss or gain, smoking cessation, and behavior therapy, are remarkable abilities to enhance industrial sensitivity and elevate and rectify hyperglycemia and its complications. Several community-based and clinical interventions have shown that actual behavioral changes can go a long way in delaying or preventing T2D. It is essential to understand that these interventions benefit metabolic status and increase the quality of life in populations at risk for or living with T2D.

Ahead, there will be calls for the use of technology like telehealth and health apps in lifestyle intervention programs for people. The global burden of T2D can be minimized by scaling up a community-based approach and access to center-based diabetes prevention programs. Similarly, evidence indicating that interventions have to be anchored to the patient demographics and social determinants of health will also be necessary.

These strategies can make a substantial positive impact in the future through proactive primary prevention of, or early intervention in, the progression of T2D and the long-term maintenance of the resultant lifestyle behaviors [14].

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