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QANDLI DIABETNING OLDINI OLISHDA SOG‘LOM OVQATLANISH VA JISMONIY FAOLLIKNING AHAMIYATI

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Buxoro Abu Ali ibn Sino nomidagi jamoat salomatligi texnikumi, o‘qituvchi

Annotatsiya. Ushbu maqolada, avvalo, 2-tur qandli diabetning oldini olishda sog‘lom ovqatlanish va muntazam jismoniy faollikning o‘rni zamonaviy xalqaro tavsiyalar hamda epidemiologik ma’lumotlar asosida tahlil qilinadi. Sog‘lom tana vaznini saqlash, energiya muvozanatini nazorat qilish, sabzavot, meva, dukkakli mahsulotlar, butun donli mahsulotlar va tolaga boy oziq-ovqatlar ulushini oshirish, shakarli ichimliklar va yuqori darajada qayta ishlangan mahsulotlarni cheklashning profilaktik ahamiyati yoritiladi. Shuningdek, haftasiga kamida 150 daqiqa o‘rtacha intensivlikdagi jismoniy faollik, kuch mashqlari va uzoq vaqt o‘tirishni kamaytirishning insulin sezgirligi va tana vazniga ta’siri ko‘rib chiqiladi. Maqolada jahon va O‘zbekiston bo‘yicha mavjud statistik ko‘rsatkichlar, profilaktik dasturlarning samaradorligi va birlamchi tibbiy yordam hamda tibbiy ta’lim uchun amaliy tavsiyalar keltirilgan.

Kalit so‘zlar: qandli diabet, 2-tur diabet, sog‘lom ovqatlanish, jismoniy faollik, profilaktika, semizlik, insulin rezistentligi, turmush tarzi.

ЗНАЧЕНИЕ ЗДОРОВОГО ПИТАНИЯ И ФИЗИЧЕСКОЙ АКТИВНОСТИ В ПРОФИЛАКТИКЕ САХАРНОГО ДИАБЕТА

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Аннотация. В статье рассматривается роль здорового питания и регулярной физической активности в профилактике сахарного диабета 2 типа на основе современных международных рекомендаций и эпидемиологических данных. Особое внимание уделено поддержанию здоровой массы тела, энергетическому балансу, увеличению доли овощей, фруктов, бобовых, цельнозерновых продуктов и пищевых волокон, а также ограничению сладких напитков и ультрапереработанных продуктов. Анализируется значение не менее 150 минут умеренной физической активности в неделю, силовых упражнений и сокращения длительного сидения. Представлены глобальные данные и доступные показатели по Узбекистану, а также практические рекомендации для первичной медико-санитарной помощи и медицинского образования.

Ключевые слова: сахарный диабет, диабет 2 типа, здоровое питание, физическая активность, профилактика, ожирение, инсулинорезистентность, образ жизни.

THE IMPORTANCE OF HEALTHY NUTRITION AND PHYSICAL ACTIVITY IN THE PREVENTION OF DIABETES MELLITUS

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Abstract. This article examines the role of healthy nutrition and regular physical activity in preventing type 2 diabetes mellitus using current international recommendations and epidemiological evidence. Particular attention is given to maintaining a healthy body weight, balancing energy intake with expenditure, increasing consumption of vegetables, whole fruits, legumes, whole grains and other fibre-rich foods, and limiting sugar-sweetened beverages and highly processed foods. The article also analyses the importance of at least 150 minutes of moderate-intensity physical activity per week, resistance exercise and interruption of prolonged sedentary time. Global statistics, available Uzbekistan-specific indicators, evidence from diabetes prevention programmes and practical recommendations for primary health care and medical education are presented.

Keywords: diabetes mellitus, type 2 diabetes, healthy nutrition, physical activity, prevention, obesity, insulin resistance, lifestyle.

INTRODUCTION

Diabetes mellitus is one of the fastest-growing noncommunicable diseases worldwide. According to the World Health Organization (WHO), the number of people living with diabetes increased from about 200 million in 1990 to approximately 830 million in 2022, while the estimated prevalence among adults aged 18 years and older doubled from 7% to 14% over the same period [1]. The International Diabetes Federation (IDF) estimated that 589 million adults aged 20–79 were living with diabetes in 2024 and projects this number to reach about 852.5 million by 2050 [2]. These figures underline the importance of shifting health systems from a treatment-only model toward prevention, early risk identification and long-term support for healthy behaviour.

Type 2 diabetes accounts for around 90% of diabetes cases and is strongly associated with modifiable factors, including excess body weight, unhealthy dietary patterns, physical inactivity and prolonged sedentary behaviour [3]. Unlike type 1 diabetes, type 2 diabetes can often be prevented or delayed. WHO identifies healthy diet, regular physical activity, maintenance of a healthy body weight and avoidance of tobacco as core preventive measures [1,3]. Therefore, nutrition and movement are not merely general wellness recommendations; they are central components of evidence-based diabetes prevention.

The relevance of this topic is particularly high for public-health education. Teachers in medical and public-health technical schools can influence future health workers' understanding of disease prevention and, through them, community health behaviour. The aim of this article is to analyse current evidence on healthy nutrition and physical activity in the prevention of type 2 diabetes, present selected global and Uzbekistan-specific statistics, and formulate practical recommendations applicable to health education and primary care.

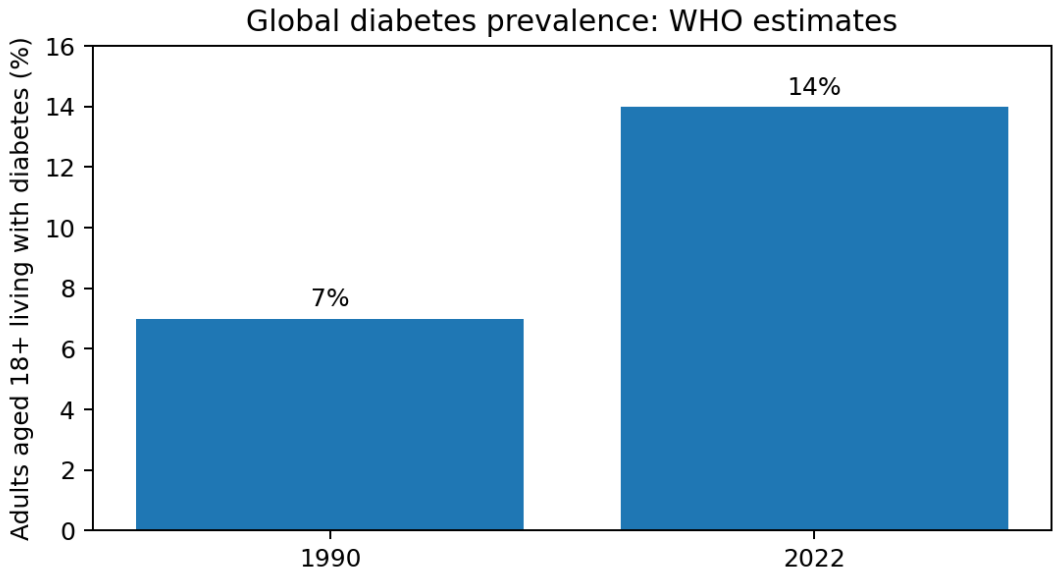


Figure 1. Global adult diabetes prevalence, 1990 and 2022. Source: WHO [1].

METHODOLOGY (METHODS)

A narrative review approach was used. Priority was given to high-authority and recent sources published mainly between 2020 and 2025, including WHO fact sheets and guidance, the IDF Diabetes Atlas, and the American Diabetes Association (ADA) Standards of Care in Diabetes. Older sources were included only when they provided foundational evidence, such as long-term diabetes prevention trial findings or country-profile data that remain useful for historical comparison. The review focused on four domains: (1) current diabetes burden; (2) dietary factors related to risk reduction; (3) the preventive effects of physical activity and weight management; and (4) practical strategies for primary care and health education.

Descriptive statistics from international organizations were summarized in tables and figures. Because available data are not always from the same year or age group, direct comparisons were avoided where inappropriate. In particular, the Uzbekistan-specific WHO diabetes profile was published in 2016 and reflects data available at that time; it is therefore presented as historical country-profile

information rather than a current 2026 estimate [4]. This distinction is important for scientific accuracy.

RESULTS

1. The growing burden of diabetes

WHO reports that 14% of adults aged 18 years and older were living with diabetes in 2022, compared with 7% in 1990 [1]. In addition, 59% of adults aged 30 years and older who had diabetes were not taking diabetes medication in 2022, with treatment coverage lowest in low- and middle-income countries [1]. Diabetes is associated with serious complications, including cardiovascular disease, kidney failure, loss of vision, nerve damage and lower-limb amputation. In 2021, diabetes was directly responsible for an estimated 1.6 million deaths worldwide, while kidney disease caused by diabetes accounted for an additional 530,000 deaths [1].

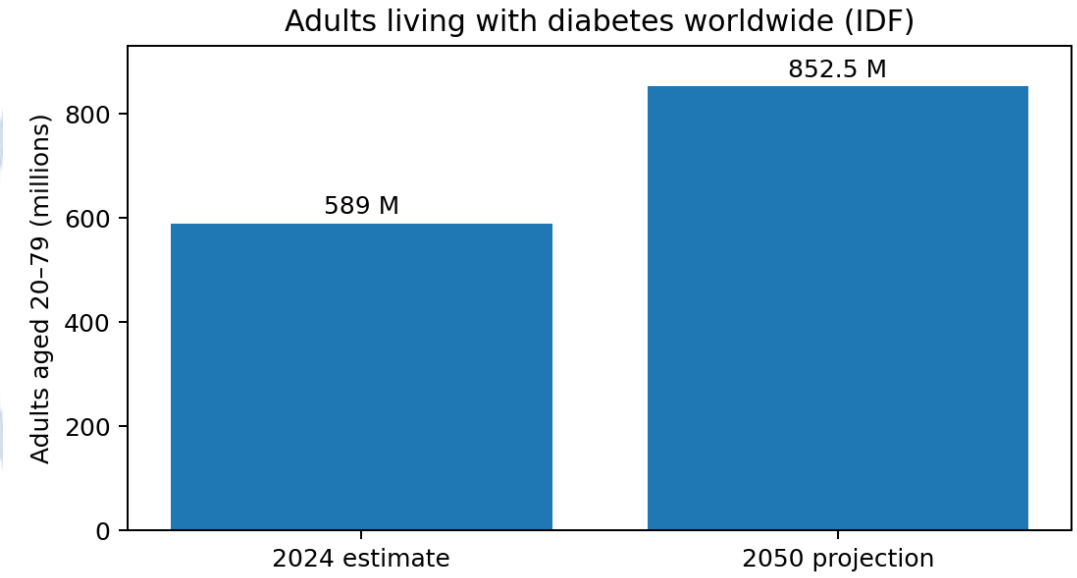


Figure 2. Estimated global number of adults aged 20–79 living with diabetes in 2024 and projection for 2050. Source: IDF Diabetes Atlas, 11th edition [2].

The 2025 IDF Diabetes Atlas estimates that 11.1% of adults aged 20–79 were living with diabetes in 2024. The projected rise from 589 million to approximately 852.5 million by 2050 represents an increase substantially greater than expected population growth, indicating that demographic change alone cannot explain the future burden [2]. Prevention strategies that address diet, physical inactivity, obesity and social environments are therefore essential.

2. Healthy nutrition as a preventive factor

Healthy nutrition reduces diabetes risk through several interconnected mechanisms: limiting excessive energy intake, supporting a healthy body weight, improving postprandial glucose responses, increasing dietary fibre intake and

reducing exposure to foods that promote excessive calorie consumption. WHO emphasizes that a healthy diet should be adequate, balanced, moderate and diverse. Modern diets in many settings contain increasing amounts of highly processed foods rich in unhealthy fats, free sugars and sodium, while intake of fruits, vegetables and fibre is often insufficient [5].

The ADA recommends individualized eating plans for people with prediabetes or at high risk of diabetes rather than a single universal macronutrient formula. Healthy patterns should emphasize non-starchy vegetables, whole fruits, legumes, lean protein sources, whole grains, nuts and seeds while minimizing sugar-sweetened beverages, sweets, refined grains, red and processed meats and highly processed foods [6]. High-fibre, minimally processed carbohydrates are particularly valuable because they generally produce a slower glucose rise and improve satiety. Replacing sugar-sweetened beverages with water is a simple, practical intervention for reducing excess sugar and energy intake [6].

For communities in Uzbekistan, prevention advice should be culturally realistic. Traditional meals do not need to be completely abandoned; instead, portion size, cooking method and meal composition can be modified. Practical examples include increasing vegetable portions, using legumes more frequently, choosing whole-grain or less-refined cereals when available, reducing repeated servings of bread or rice, limiting sugary tea and sweetened drinks, using less animal fat, and avoiding routine consumption of confectionery and fast foods. The goal is not a short-term restrictive diet but a sustainable eating pattern.

Table 1. Practical dietary priorities for type 2 diabetes prevention

Priority	Recommended approach	Public-health rationale
Vegetables and whole fruits	Include daily and vary by colour and type.	Increase fibre and micronutrient density while supporting satiety.
Whole grains and legumes	Replace part of refined grains with whole grains, beans, lentils or chickpeas.	Slower carbohydrate absorption and higher fibre intake.
Sugary drinks	Prefer water or unsweetened drinks.	Reduces rapidly absorbed sugar and unnecessary calories.
Processed foods	Limit sweets, refined snacks, fast foods and ultraprocessed products.	Helps reduce excess energy, added sugar, unhealthy fats and sodium.
Portion control	Match energy intake to activity level and weight goals.	Supports healthy weight and decreases insulin-resistance risk.

3. Physical activity and reduction of diabetes risk

Regular physical activity improves insulin sensitivity, increases glucose uptake by skeletal muscle, contributes to weight management, reduces visceral fat and improves cardiovascular fitness. WHO recommends at least 150 minutes of moderate-intensity physical activity each week as part of type 2 diabetes prevention

[1]. Globally, however, about 31% of adults do not meet recommended levels of physical activity, indicating a major preventable public-health gap [7].

The ADA similarly recommends a minimum of 150 minutes per week of moderate-intensity physical activity for adults at high risk of type 2 diabetes, with activity distributed across the week [8]. Brisk walking is one of the most accessible examples. Resistance exercise can be added because it helps maintain or increase muscle mass, which is metabolically important for glucose disposal. Long periods of sitting should also be interrupted regularly. For people who are initially inactive, small increases in walking, household activity, gardening, cycling or stair use can be a realistic starting point.

Evidence from the Diabetes Prevention Program (DPP) and subsequent analyses demonstrates the effectiveness of combined lifestyle change. Intensive lifestyle intervention targeting approximately 7% weight loss and at least 150 minutes of moderate physical activity per week reduced progression to type 2 diabetes by about 58% in high-risk adults. Importantly, achieving the physical-activity goal alone, even without reaching the full weight-loss target, was associated with an approximately 44% reduction in diabetes incidence [8,9]. These findings show that meaningful benefit is possible even when perfect weight-loss goals are not achieved.

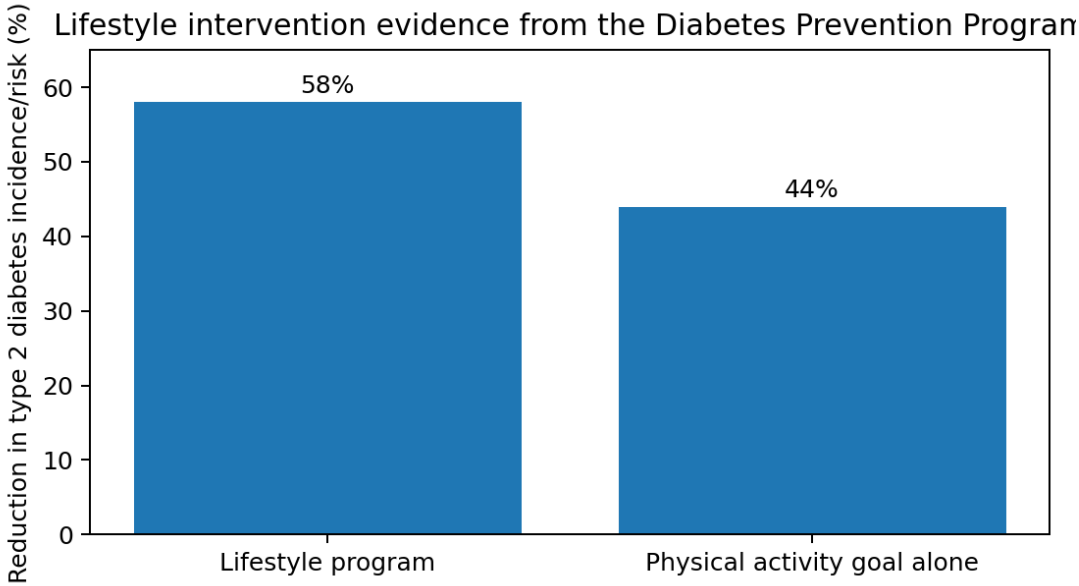


Figure 3. Effect of intensive lifestyle intervention and achievement of the physical-activity goal in high-risk adults. Sources: ADA Standards of Care and DPP evidence [8,9].

4. The role of body weight and sedentary behaviour

Excess weight is one of the strongest modifiable risk factors for type 2 diabetes because adipose tissue, particularly visceral fat, contributes to insulin resistance and chronic metabolic inflammation. ADA guidance for adults with overweight or

obesity and high diabetes risk supports intensive lifestyle programmes aiming for at least 7% initial body-weight reduction, while broader weight-management guidance recognizes clinically meaningful benefits from weight loss in the range of approximately 3–7% or more depending on the individual context [6,8,10]. Weight loss should be achieved through sustainable nutrition, activity and behavioural support rather than unverified supplements or extreme diets.

Sedentary time is an additional target. A person may complete a daily exercise session but still spend most waking hours seated. Current diabetes guidance therefore encourages interruption of prolonged sitting, alongside planned aerobic and resistance activity [6]. In educational settings, this can be translated into simple habits: standing or walking during breaks, short movement sessions between classes, walking meetings, use of stairs and limiting unnecessary screen time.

5. Available Uzbekistan-specific indicators

The WHO diabetes country profile for Uzbekistan, published in 2016, reported an estimated diabetes prevalence of 8.7%, overweight prevalence of 46.3%, obesity prevalence of 14.3% and physical inactivity prevalence of 18.1% in the data available at that time [4]. These figures should not be interpreted as current 2026 prevalence estimates, but they illustrate that diabetes risk factors were already significant and justify continued surveillance and prevention. Updated nationally representative measurements would be valuable for monitoring current trends and targeting interventions.

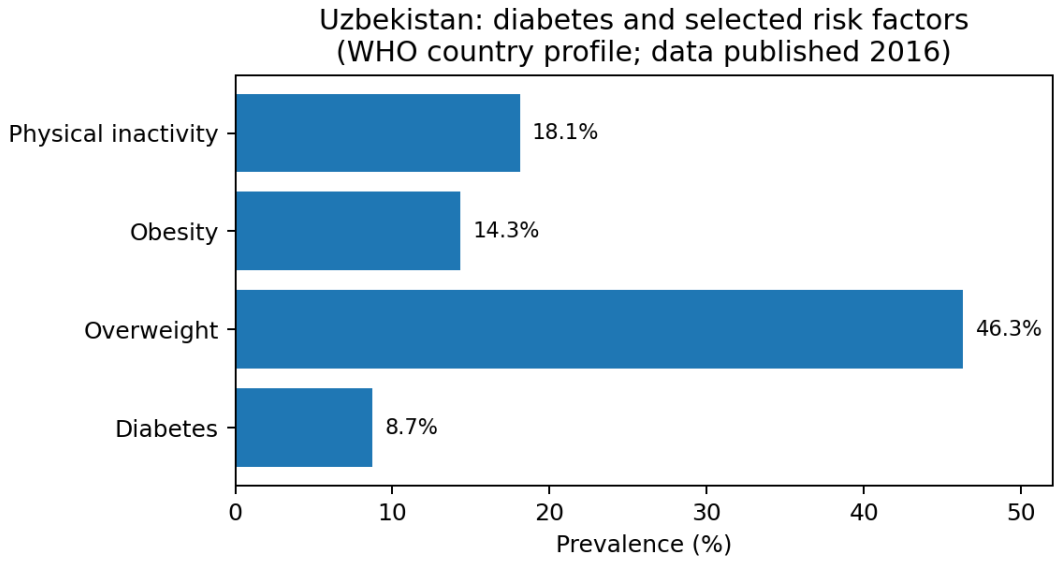


Figure 4. Diabetes and selected risk-factor prevalence in Uzbekistan from the WHO country profile published in 2016. These are historical profile data, not 2026 estimates [4].

DISCUSSION

The reviewed evidence consistently supports a combined approach rather than relying on one isolated behaviour. Healthy eating and physical activity act through overlapping biological and behavioural pathways. Improved diet helps control energy intake and diet quality; exercise improves insulin action and energy expenditure; together they support weight management. This explains why structured lifestyle programmes can achieve larger reductions in diabetes risk than single, low-intensity messages.

Current recommendations have also moved away from the idea that one "diabetes-prevention diet" fits everyone. Mediterranean-style, lower-carbohydrate and other evidence-based eating patterns may all be suitable when they emphasize nutrient quality, appropriate energy intake and sustainability [8]. This flexibility is especially important in culturally diverse populations because adherence is more likely when recommendations can be adapted to familiar foods, family routines and financial realities.

A second important finding is that prevention should not be limited to personal responsibility. Food availability, price, work schedules, safe places for exercise, health literacy, transportation and access to preventive health services influence people's ability to follow healthy recommendations [3,10]. Effective diabetes prevention therefore requires action at several levels: individual counselling, family support, educational programmes, primary health-care screening and environments that make healthy choices easier.

For medical technical schools, the topic has dual value. Students should understand both the biological basis of diabetes prevention and the communication skills required to explain prevention without stigma. People with overweight, obesity or prediabetes should not be blamed. Health workers should focus on achievable goals, shared decision-making and gradual behavioural change. Simple counselling such as "replace one sugary drink with water," "walk briskly for 30 minutes on five days each week," or "add vegetables to half of the plate" may be more actionable than broad instructions to "live healthily."

Practical recommendations for prevention programmes

Setting	Recommended action	Measurable indicator
Primary health care	Identify adults with overweight/obesity or other diabetes risk factors and provide structured lifestyle counselling.	Weight/BMI trend, activity minutes, glucose testing when indicated.
Medical education	Teach students to deliver brief, non-stigmatizing nutrition and activity counselling.	Observed counselling skills and case-based assessment.
Community	Promote walking groups, healthy canteen options and reduced sugary-drink availability.	Participation rate and healthier food/beverage uptake.

Individual/family	Set one or two realistic goals and review them regularly.	Weekly activity, beverage choices, portions, body-weight trend.

CONCLUSION

Type 2 diabetes is a major and increasing public-health problem, but a substantial proportion of risk is modifiable. The strongest practical message from current evidence is that healthy nutrition, regular physical activity and healthy weight management should be implemented together. A diet centred on vegetables, whole fruits, legumes, whole grains, nuts, seeds and other minimally processed foods, combined with reduced intake of sugar-sweetened drinks and highly processed foods, supports diabetes prevention. At the same time, adults should work toward at least 150 minutes of moderate-intensity physical activity per week and reduce prolonged sedentary time [1,6,8].

For Uzbekistan, diabetes prevention can be strengthened by integrating culturally appropriate nutrition education, accessible physical-activity promotion, risk-factor screening and behaviour-change support into primary care and medical education. Updated national surveillance data are also needed to accurately measure present-day prevalence and evaluate progress. The most effective prevention strategy is not a temporary diet or short exercise programme, but a sustainable lifestyle supported by families, health workers, educational institutions and healthy community environments.

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