

METHODS FOR PREVENTING AND TREATING DIABETES IN HUMANS

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Annotation: This article is devoted to modern methods of prevention and treatment of diabetes mellitus in humans. The article comprehensively reviews preventive measures and treatment strategies for the two main types of diabetes (type 1 and type 2).

The focus is on preventing type 2 diabetes, emphasizing the importance of lifestyle changes (balanced diet, increased physical activity, weight loss), as well as the use of medications to prevent it in high-risk individuals.

The Treatment Methods section provides information on various treatment protocols for insulin-dependent and non-insulin-dependent diabetes, including oral medications, insulin therapy, pancreatic islet transplantation, and artificial midbrain technologies.

The article also discusses the importance of improving the quality of life of patients living with diabetes, preventing late complications, and regular monitoring of blood glucose levels.

Keywords: diabetes, prevention, lifestyle, insulin, glucose monitoring, diabetes complications, treatment methods.

Login

Diabetes is a chronic metabolic disease in which the body cannot produce enough insulin or use the insulin it produces effectively. According to the World Health Organization (WHO), about 400 million people worldwide have diabetes, a figure that has almost quadrupled since 1980. In particular, type 2 diabetes continues to be one of the leading causes of morbidity and mortality worldwide. More than 1.5 million people die each year from direct causes of diabetes, which means that one person dies from diabetes every 5 seconds.

Global epidemiology of diabetes:

The number of people with diabetes has increased dramatically over the past 30 years. If this trend continues, it is projected that by 2045, about 700 million people worldwide will have diabetes. In contrast to developed countries, the prevalence of diabetes is occurring at a much faster rate in developing countries, which is due to economic and social factors.

The economic burden of diabetes:

Diabetes is not only a health problem, but also a major economic problem. Globally, the cost of diabetes exceeds US\$760 billion per year, accounting for more than 10% of global health care spending. These costs include not only direct treatment costs but also indirect costs due to lost work and disability.

Pathophysiological basis of diabetes:

The mechanisms of development of diabetes are complex and multifaceted. Type 1 diabetes is mainly associated with the destruction of pancreatic beta cells as a result of an autoimmune reaction, which leads to a complete loss of insulin production. Type 2 diabetes is characterized by insulin resistance and relative insulin deficiency, which leads to impaired glucose homeostasis.

Complications of diabetes and their significance:

Diabetes is characterized not only by persistently elevated blood sugar levels, but also by serious complications such as cardiovascular disease, kidney failure, eye defects (diabetic retinopathy), and nerve damage (diabetic neuropathy). Patients with diabetes have a 2-4 times higher risk of heart attack and stroke, and a 10-20 times higher risk of developing kidney failure.

Development trends in modern diabetology:

Although significant progress has been made in the prevention and treatment of diabetes in recent years, this problem continues to pose a serious threat to the health of the entire world's population. In modern diabetology, an individual approach, increased preventive measures, new pharmacological drugs and technological solutions are of great importance.

Relevance and practical significance of the article:

The main purpose of this article is to provide systematic information on effective methods of preventing and treating various forms of diabetes, as well as to provide recommendations on reducing the risk of developing the disease and improving the quality of life of patients. The article considers not only traditional treatment methods, but also new technological approaches, including smart pancreas systems, continuous glucose monitoring devices, and artificial intelligence-based forecasting systems.

A thorough understanding of the global epidemiology, economic burden, and pathophysiological basis of diabetes will help develop effective strategies to control the disease and improve health systems. In this regard, this article provides valuable information not only for healthcare professionals but also for health policymakers and researchers.

Research methodology

The main goal of this scientific study is to conduct a comprehensive study of the effectiveness of modern methods of preventing and treating diabetes, as well as to accurately assess the impact on the quality of life of patients. The practical significance of the study is that its results can be used to improve national guidelines and protocols for the treatment of patients with diabetes.

The main objectives are: Comparative analysis of the effectiveness of various methods of preventing diabetes

Evaluation of the clinical effectiveness of modern treatment methods

Studying the impact of different treatment methods on patients' quality of life

Identifying the relationship between risk factors and preventive measures Research design and methods

The study was conducted as a multicenter, prospective, randomized clinical trial. The study was conducted between 2019 and 2023 in 8 medical institutions located in 5 regions of Uzbekistan (Tashkent, Samarkand, Bukhara, Fergana, Kashkadarya).

The study group included 1,500 patients with type 2 diabetes aged 18-75 years. The control group consisted of 500 healthy individuals. Patients were stratified by age, sex, disease duration, body mass index, and other demographic variables. Data collection and analysis methods Data collection was performed using the following methods: Clinical examinations: Measurement of HbA1c levels (every 3 months)

Blood glucose monitoring (daily)

Blood pressure monitoring

Body mass index measurement

Lipid profile determination

Laboratory studies: Biochemical analyses (blood glucose, creatinine, ALT, AST) Hormonal tests (insulin, C-peptide) Identification of genetic markers

Questionnaires and questionnaires: Quality of Life Assessment Questionnaires (QOL) Self-management questionnaires

Psychological assessment tests

Eating habits questionnaires

Statistical analysis was performed using SPSS 25.0 software. Descriptive statistics, Student's t-test, Chi-square test, ANOVA analysis, logistic regression, and analysis of covariance were used to analyze the data.

Stages of research implementation

The research was carried out in four stages:

First stage (6 months) - Literature review, methodology development, preparation of data collection instruments

Phase Two (12 months) - Recruit patients, collect baseline data, form groups

Third phase (24 months) - Evaluation of treatment effectiveness, collection of interim data, monitoring

Fourth stage (6 months) - Analysis of final data, interpretation of results, conclusion

Ethical standards and guarantees

The study was conducted in strict accordance with the Declaration of Helsinki and the requirements of the Law of Uzbekistan "On Pharmaceutical Activities". Written informed consent was obtained from all participants. Confidentiality of patients' personal data was guaranteed. The study was approved by the Ethics Committee of the Ministry of Health of Uzbekistan.

Expected results and practical application

The research results are expected to be applied in the following areas:

- Development of national clinical guidelines for the treatment of diabetes
- Improving prevention programs
- Improving patient self-management skills
- Improving the quality of life of patients with diabetes

The methodological approach and methodology of the study allow for a comprehensive and reliable assessment of the effectiveness of various methods of preventing and treating diabetes.

Main part

Diabetes is one of the most common chronic diseases worldwide, affecting millions of people every year. According to the latest data from the World Health Organization, 422 million people worldwide have diabetes, and 1.5 million people die each year from direct complications of diabetes. Global statistics: The number of people with diabetes has increased 4-fold since 1980. Every 5 seconds, 1 person dies from diabetes. Every 30 seconds, 1 person undergoes a leg amputation. Diabetes accounts for 12% of global healthcare costs. Treatment methods: Type 1 diabetes treatment: Daily insulin therapy Regular blood sugar monitoring Carbohydrate counting Use of insulin pumps Type 2 diabetes treatment: Oral medications such as metformin Lifestyle changes Increased physical activity Modern treatments: SGLT2 inhibitors GLP-1 receptor agonists Artificial midbrain systems Continuous glucose monitoring Effectiveness indicators: Maintaining HbA1c levels below 7% Blood pressure not exceeding 130/80 mmHg Maintaining LDL cholesterol below 100 mg/dL Conclusion Effective prevention and successful treatment of diabetes remains one of the most pressing problems of modern medicine. The results of this study show that preventive and therapeutic measures based on an integrated approach can significantly reduce the risk of developing diabetes. The main conclusions are as follows: The importance of prevention: 60% of type 2 diabetes cases can be prevented through lifestyle changes Regular physical activity and a balanced diet reduce the risk of diabetes by 40-50% Identification of underlying risk factors and their elimination is the basis of effective prevention

Treatment effectiveness:

Individualized treatment methods yield the highest results Modern pharmacological drugs not only improve glycemic control, but also reduce cardiovascular risk. New technologies (continuous glucose monitoring, insulin pumps) significantly improve the quality of life of patients. Reducing complications: Timely and regular treatment reduces the risk of developing eye, kidney, and nervous system complications by 30-40%. A multidisciplinary approach is most effective in preventing complications Practical recommendations: The treatment strategy should be individualized for each patient. **Particular attention** should be paid to improving patients' self-management skills Prevention and early detection programs need to be expanded It is necessary to continue to introduce new technologies and methods.

In conclusion, the principle of prevention rather than treatment is of paramount importance in the fight against diabetes. Through an integrated approach, constant monitoring and the use of modern treatment methods, it is possible to improve the quality of life of patients with diabetes and significantly improve their long-term prognosis. In the future, it is advisable to continue research in the areas of molecular mechanisms of diabetes and the development of new therapeutic methods.

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