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TYPE 2 DIABETES MELLITUS AMONG YOUNG PEOPLE: RISK FACTORS AND PREVENTION

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Abstract: Type 2 diabetes mellitus is an important health concern among adolescents and young adults. Its development involves an interaction between genetic susceptibility, insulin resistance, impaired insulin secretion, and environmental influences. Major risk factors include excess body weight, physical inactivity, family history of diabetes, and exposure to maternal diabetes during pregnancy. Prevention requires attention to nutrition, physical activity, healthy growth, and early identification of individuals at increased risk. This narrative overview discusses the main factors contributing to type 2 diabetes among young people and describes preventive approaches involving families, educational institutions, and healthcare services.

Keywords: type 2 diabetes mellitus, adolescents, young adults, insulin resistance, obesity, prevention.

Introduction

Type 2 diabetes mellitus was previously associated mainly with older adults, but it also occurs in children, adolescents, and young adults. The increasing occurrence of the disease among young people raises concerns about their long-term health. Earlier onset means a longer potential period of exposure to high blood glucose and related complications. Prevention and early detection are therefore important components of adolescent and young adult healthcare.

Diabetes can affect the cardiovascular system, kidneys, eyes, and nerves. Although effective treatment can reduce these risks, preventing or delaying type 2 diabetes remains a major public health objective. Healthy eating, regular physical activity, and appropriate weight management are central to this effort.

Mechanisms of Disease Development

Type 2 diabetes develops when the body cannot use insulin effectively and pancreatic beta cells cannot produce enough insulin to meet its needs. Insulin resistance reduces the response of tissues to insulin, contributing to elevated blood glucose. Initially, the pancreas may compensate by releasing more insulin. When this compensation becomes insufficient, persistent hyperglycemia develops.

Puberty is particularly relevant because hormonal changes temporarily reduce insulin sensitivity. In susceptible adolescents, this physiological change can interact with excess adiposity and inherited risk. However, obesity is not present in every young person with type 2 diabetes, and body weight alone cannot establish or exclude the diagnosis.

Major Risk Factors

Excess body weight and physical inactivity. Overweight and obesity increase the likelihood of insulin resistance. Low physical activity further contributes to risk, while regular movement

helps the body use insulin more effectively. Assessment of weight in children and adolescents requires age- and sex-specific measures rather than adult body mass index thresholds.

Family history and early-life influences. Having close relatives with type 2 diabetes increases susceptibility. This association reflects both inherited characteristics and shared environmental conditions. Maternal diabetes during pregnancy also increases the child's subsequent risk. These factors make family medical history an important part of preventive assessment.

Dietary patterns. Frequent consumption of sugar-sweetened beverages and energy-dense foods can contribute to excessive energy intake and weight gain. A healthy diet should provide adequate nutrients while emphasizing balance, moderation, and variety. Dietary habits established during childhood and adolescence can continue into adulthood, making early nutritional education particularly valuable.

Prevention Strategies

Healthy Nutrition and Family Participation

Practical dietary changes include replacing sugary drinks with water and increasing the availability of vegetables, whole fruits, whole grains, and legumes. Family participation can make these changes easier to maintain. Shared meals, involvement in food preparation, and supportive parental habits can help young people develop healthier routines.

For growing children, weight-related goals should be individualized. Some may benefit from slower weight gain as height increases rather than immediate weight loss. Nutritional advice should support normal development and avoid overly restrictive eating practices.

Regular Physical Activity

Physical activity should be enjoyable, accessible, and appropriate for age and ability. Walking, cycling, swimming, dancing, and team sports offer different opportunities for participation.

WHO recommendations distinguish between age groups: children and adolescents should participate in approximately 60 minutes of moderate-to-vigorous activity daily, while adults should undertake at least 150 minutes of moderate-intensity activity weekly or an equivalent amount of vigorous activity. Muscle-strengthening activities should also be included according to age-specific recommendations.

Risk-Based Screening

Screening can identify abnormal glucose levels before obvious symptoms develop. ISPAD recommends considering screening after puberty begins or from age 10 in children with a body mass index at or above the 85th percentile and additional risk factors. These include a family history of type 2 diabetes, maternal diabetes during pregnancy, or clinical conditions associated with insulin resistance.

Available tests include fasting plasma glucose, glycated hemoglobin, and an oral glucose tolerance test. Interpretation and follow-up should reflect the individual's clinical circumstances.

Supportive Environments

Prevention also depends on conditions beyond individual behavior. Affordable nutritious food, safe spaces for physical activity, school health education, and accessible primary care can support

healthier choices. Public health approaches should recognize these environmental influences and provide practical support for families.

Conclusion

Type 2 diabetes among young people results from interacting biological, behavioral, and environmental factors. Prevention should combine healthy nutrition, regular physical activity, individualized support for healthy growth, and risk-based screening. Coordinated action by families, schools, communities, and healthcare professionals offers an important opportunity to reduce risk and protect long-term health.

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