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Type 5 Diabetes: Re-Emergence of Malnutrition-Related Diabetes Mellitus as a Distinct Global Health Entity

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Introduction

Type 5 Diabetes is a newly recognized form of diabetes formally classified by the International Diabetes Federation in 2025. Previously referred to as *malnutrition-related diabetes mellitus (MRDM)* or *J-type diabetes*, this condition primarily affects undernourished adolescents and young adults in low- and middle-income countries (LMICs), particularly in regions of South Asia and sub-Saharan Africa [1–4].

Unlike other Types of diabetes, Type 5 diabetes develops as a consequence of chronic undernutrition during fetal life, childhood, or adolescence, which impairs pancreatic growth and β-cell development. The disease is characterized by severe insulin deficiency without evidence of autoimmune destruction or significant insulin resistance [1–6].

The formal recognition of Type 5 diabetes addresses a long-standing diagnostic gap affecting millions of individuals who historically did not fit conventional diabetes classifications.

Historical Background

The condition was first described in 1955 by physician Philip Hugh-Jones in Jamaica among young, lean patients with atypical diabetes features. Because these individuals required insulin yet rarely developed ketoacidosis, the disorder was initially termed “J-type diabetes” [7].

In 1985, the World Health Organization officially recognized the condition as MRDM and due to insufficient mechanistic evidence and ongoing controversy, the WHO removed MRDM from its classification system in 1999 [7,8].

Renewed clinical and epidemiological evidence demonstrated that many affected individuals possess a unique metabolic profile distinct from both Type 1 and Type 2 diabetes. Consequently, the IDF formally reinstated the disorder in 2025 under the designation “Type 5 diabetes” [1,2].

Pathophysiology

The central pathogenic mechanism in Type 5 diabetes is impaired pancreatic development caused by prolonged nutritional deprivation during critical developmental periods [3,4].

Chronic undernutrition may result in:

- Reduced pancreatic size
- Lower β-cell mass
- Impaired insulin synthesis and secretion
- Altered endocrine and exocrine pancreatic function

This phenomenon is closely linked to the "fetal origins" or "developmental programming" which suggests that adverse intrauterine environments permanently alter metabolic function later in life hypothesis which was proposed by Barker and colleagues, [9].

Unlike Type 1 diabetes, Type 5 diabetes is not mediated by autoimmune β-cell destruction. Unlike Type 2 diabetes, insulin resistance is not the dominant metabolic defect. Instead, patients exhibit profound insulin deficiency associated with a structurally and functionally underdeveloped pancreas [1–5].

Clinical Characteristics

Patients with Type 5 diabetes typically present with the following features:

- Age younger than 30 years
- Low body mass index (BMI <18.5 kg/m²)
- History of chronic undernutrition or food insecurity
- Severe hyperglycemia
- Absence of autoimmune markers
- Relative resistance to ketosis or diabetic ketoacidosis

Common symptoms include:

- Excessive thirst (polydipsia)
- Frequent urination (polyuria)
- Unexplained weight loss
- Fatigue
- Recurrent infections
- Slow wound healing

Additional manifestations of chronic undernutrition may include:

- Impaired skeletal growth
- Hair and skin abnormalities
- Enlarged parotid glands
- Muscle wasting [1–6].

One clinically important distinguishing feature is that many patients do not develop urinary ketones or ketoacidosis at diagnosis despite marked hyperglycemia, differentiating the disorder from classic Type 1 diabetes [2,4].

Diagnosis

Currently, no universally standardized diagnostic criteria exist for Type 5 diabetes. Diagnosis is therefore based on clinical evaluation and exclusion of other diabetes subtypes [2,5].

Important diagnostic indicators include:

- Young age at onset
- Very low BMI
- Evidence of chronic malnutrition
- Absence of islet autoantibodies
- Detectable but reduced insulin secretion
- Lack of significant insulin resistance
- Resistance to ketosis

Misdiagnosis remains common, particularly in resource-limited settings where advanced antibody and genetic testing may be unavailable [3].

Researchers estimate that millions of cases historically labeled as atypical Type 1 or Type 2 diabetes may actually represent Type 5 diabetes [1,2].

Differentiation from Other Diabetes Types

Diabetes Type	Primary Mechanism	Key Features
Type 1 Diabetes	Autoimmune β-cell destruction	Autoantibodies positive, ketosis common
Type 2 Diabetes	Insulin resistance	Often obesity-associated
Type 5 Diabetes	Malnutrition-induced pancreatic underdevelopment	Severe insulin deficiency without autoimmunity or obesity

Management and Treatment

Management of Type 5 diabetes requires a dual therapeutic approach focused on both glycemic control and nutritional rehabilitation [2–5].

1. Nutritional Rehabilitation

Nutritional support is the cornerstone of therapy and includes:

- Protein supplementation
- Micronutrient replacement
- Calorie restoration
- Management of concurrent infections

2. Insulin Therapy

Patients often require insulin therapy but generally demonstrate greater insulin sensitivity than patients with classic Type 1 diabetes. Consequently, lower insulin doses may be sufficient [2,4].

3. Oral Antidiabetic Agents

Some patients may respond to oral medications that stimulate endogenous insulin secretion, although evidence remains limited and treatment protocols are still evolving.

Complications

If untreated or mismanaged, Type 5 diabetes may lead to:

- Cardiovascular disease
- Diabetic nephropathy
- Retinopathy
- Peripheral neuropathy
- Recurrent infections
- Reduced life expectancy

Because many affected individuals also experience chronic poverty and healthcare inequality, outcomes are often worsened by delayed diagnosis and limited treatment access [3–5].

Global Health Significance

The recognition of Type 5 diabetes highlights the growing understanding that diabetes is not solely a disease of obesity or affluence. Instead, it reflects the profound influence of early-life nutrition, poverty, and developmental health on metabolic disease risk [1–4].

Experts estimate that approximately 20–25 million people worldwide may be affected, although the true prevalence remains uncertain due to historical underdiagnoses and inconsistent classification systems [1,2].

The IDF recognition of Type 5 diabetes therefore represents not only a scientific development but also an important step toward improving global health equity.

Conclusion

Type 5 diabetes is an emerging and clinically significant form of diabetes associated with chronic undernutrition and impaired pancreatic development. Officially recognized by the IDF in 2025, it differs fundamentally from Type 1 and Type 2 diabetes in both pathophysiology and clinical management.

Recognition of this condition has important implications for diagnosis, treatment, nutrition policy, and global health equity. Improved awareness among clinicians and policymakers may help reduce misdiagnosis and improve outcomes for millions of affected individuals worldwide.

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