# How diabetes challenge in India has moved beyond types 1 & 2

*Advances in genetic & clinical research have led to several subtypes being discovered, each with a distinct impact on the body*

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Until the 1970s, diabetes diagnosis was pretty much black and white — juvenile or adult onset, Type 1 or Type 2. But today, doctors are looking at a spectrum of 50 or so subtypes refined by genetic and clinical classifications.

But how much does a subtype really matter when Type 2 accounts for nearly 90% of cases (especially in India) and Type 1 for about 2%, with the rest being exceedingly rare? Neonatal diabetes, for instance, affects only one in four lakh newborns.

For Susanta Das, it mattered. His daughter Ivana was that one in four lakh.

Eleven years ago, Susanta was told that 28-day-old Ivana, diagnosed with Type 1 diabetes, would not survive the month. A street vendor, he went from hospital to hospital, selling his home and land, to keep her alive. Ivana survived the month, and the next. Doctors told him that as long as Ivana received five insulin injections a day (costing Rs 20,000 a month), she would live. "I had no money left, no idea what to do," says Susanta.

"Ivana was brought to our Kolkata centre when she was three months old," says endocrinologist Dr V Mohan, chairman of Madras Diabetes Research Foundation. "We suspected neonatal diabetes, a rare genetic form seen in babies under six months. If identified, insulin can be stopped, and the child switched to an inexpensive sulfonylurea tablet," adds Dr Mohan, who offers free genetic testing for neonatal diabetes children referred from any hospital in India.

Eleven years later, Ivana's sugar levels are stable on one tablet a day. "I have spent just Rs 6,000 on treatment over the past 10 years," says Susanta, who had in the initial months spent Rs 10 lakh.

Going by WHO's classification, there is Type 1, Type 2, gestational diabetes mellitus (GDM), and 'other types', says Dr Nihal Thomas, head of endocrinology, diabetes and metabolism department at Christian Medical College, Vellore. WHO's 'other types' include monogenic diabetes, pancreatic diabetes, drug-induced and endocrine causes, 14 recognised forms of MODY (maturity-onset diabetes of the young), inherited syndromes such as lipodystrophies, hybrid forms like ketosis-prone diabetes, and steroid-induced diabetes.

The list continues to grow, as does research, especially in India, which is ranked in the top two globally in the number of adults with diabetes.

Dr Thomas is part of an international working group researching Type 5 diabetes, a malnutrition-related form that was recognised by International Diabetes Federation (IDF) at the World Diabetes Congress in April 2025, reviving a category first described more than 70 years ago. He says globally, Type 5 may affect millions, particularly in parts of South Asia, sub-Saharan Africa, and other regions where childhood malnutrition is common.

"Type 5 was confused with Type 1 and Type 2. But there are differences. One of two with Type 5 may respond to tablets, while those with early Type 2 may be more insulin resistant," says Dr Thomas. "Adults with Type 5 diabetes have better beta-cell reserve than those with Type 1, but the amount of insulin required for Type 1 is generally more than for those with Type 5. If treated incorrectly with insulin, the consequences can be serious. Which is why getting the type right matters," says Dr Thomas.

Dr Mohan, meanwhile, is leading studies on early GDM with IDF. "GDM is usually screened at 24 to 28 weeks," he says, adding that in India, about one in four women at govt clinics has been diagnosed with the condition. "But we believe that about half of them may have early GDM (before 20 weeks of pregnancy) and are being missed by current screening norms. Identifying it earlier can help prevent complications in mother and baby." A new IDF consensus statement on early GDM, chaired by Dr Mohan, is expected to be published this year.

While early GDM and Type 5 are among the newer classifications, for long, there has been another form plaguing the south Indian population, especially those in Kerala: Type 3C diabetes — a pancreatic form of the disease — usually first picked up by gastroenterologists rather than diabetologists. "In Type 3C, the endocrine glands in the pancreas, which produce insulin, and the exocrine glands that produce digestive enzymes are both affected. So, you must treat the diabetes and the malabsorption simultaneously," says Hyderabad-based Dr Nageshwar Reddy of AIG Hospitals, former president of World Endoscopy Organisation. "Those with this type usually have abdominal pain, diarrhoea and severe weight loss. They assume it's a gastric issue, which is why they come to us. But these symptoms, along with wildly fluctuating sugars —400 one moment, 50 the next — are characteristic as both insulin and glucagon regulation are lost."

Decades ago, Type 3C was so common in Kerala that it was called Kerala pancreatitis and believed to have been caused by eating too much tapioca. "That theory has now been debunked. A mutation known as SPINK1 (genetic change that increases risk of chronic pancreatitis) is thought to be behind it," says Dr Reddy, who has seen more than 10,000 cases. "That is why we speak today of the importance of precision diabetes, of zeroing in on the exact type and even subtype to ensure the right treatment," says Dr Mohan. "To a patient, a precise diagnosis of diabetes can feel like a miracle."

## THE UNUSUAL SUSPECTS

- **Type 1:** Autoimmune, destroys insulin-producing cells
- **Type 2:** Lifestyle-related, marked by insulin resistance. Subtypes are severe insulin deficient (needs drugs to improve insulin secretion) and insulin resistant (needs insulin sensitiser like Metformin)
- **Type 1.5:** Called LADA (Latent Autoimmune Diabetes in Adults), it initially resembles Type 2 but progresses to insulin dependence
- **Type 3C:** Triggered by chronic pancreatitis. Requires insulin plus enzyme replacement; Type 3 is linked to brain insulin resistance that triggers Alzheimer's disease
- **Type 5:** Impaired insulin secretion in lean, malnourished people
- **Monogenic forms:** Rare (about 4%), caused by single-gene mutations. Includes 14 recognised forms of Maturity-Onset Diabetes of the Young (MODY)
- **Gestational diabetes:** Develops during pregnancy
- **Neonatal diabetes:** Seen before 6 months, roughly one in 4 lakh births
- **Lipodystrophies:** Rare inherited disorder with severe insulin resistance, fatty liver. Can lead to liver disease, cirrhosis at young age


### Diabetes on the world map

**India:** Type 2 (nearly 90%), Type 1 (about 2%) and gestational diabetes (reported in 25-30% of pregnancies in some govt clinics) Type 3C, or fibrocalculous pancreatic diabetes, once highly prevalent in Kerala (15% of diabetes cases) & now linked to a gene mutation

**Western countries:** Alcohol-related pancreatitis more common, contributing to Type 3C. Gestational diabetes is 6-8%

**Scandinavian countries:** Higher prevalence of Type 1, around 10% in Finland. Reason unknown

**Black African populations:** Ketosis-prone diabetes. Can be eventually managed like Type 2