RSSDI Indian Diabetes

EDUCATOR JOURNAL

Theme of the Month

Diabetes in Children and Adolescents

To keep Members of Diabetes Care team abreast about DSME/DSMS - (Diabetes Self management Education/Support) Concepts

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RSSDI Indian Diabetes EDUCATOR JOURNAL

1 st time in India
To keep the members of diabetes care team abreast with DSME and DSMS concepts

FOREWORD

Research Society for the Study of Diabetes in India (RSSDI) founded by Prof. MMS Ahuja in the year 1972 is the biggest scientific association of healthcare professionals involved in promoting diabetes education and research in India. RSSDI is happy to collaborate with USV to support their endeavour to make India the 'Diabetes care capital of the world'. Through this collaboration, RSSDI would like to strengthen the cadre of diabetes educators by empowering them with recent updates in diabetes management helping bridge the gap between the physician and the patient. Today, the rule of 50% is prevailing in terms of awareness, detection, treatment and control in T2DM. Our aspiration is to achieve 90-90-90-90 i.e.90% of people with diabetes should be made aware, 90% should be detected, 90% of those detected should be treated, and 90% of those treated should reach their goals.

Indian Diabetes Educator Journal (IDEJ) is the first of its kind in India, and the longest running monthly diabetes educator journal since April 2015 and continues its endeavour to spread awareness, knowledge and enable healthcare teams to manage individuals with diabetes and empower them for self-care. RSSDI IDEJ will continue to keep the members of diabetes care team abreast with concepts of Diabetes Self-Management Education/Support (DSME/S) with a reach of 44000 doctors and diabetes educators digitally.

This month's IDEJ aims to explore the different types of diabetes observed in children and adolescents. The management of diabetes in this demographic is vital for ensuring their long-term health, quality of life, prevention of complications, support for growth and development, education, and overall family wellbeing. It is imperative for diabetes educators to be aware of various management strategies for diabetes in children and important considerations, ensuring a comprehensive approach. We anticipate that this edition will provide diabetes educators with valuable clinical insights into childhood diabetes and diabetes in young individuals.

We sincerely thank our contributors for making this issue delightful reading for our readers. We dedicate this journal to all the healthcare professionals who are working relentlessly towards making "India–The Diabetes Care Capital of the World."

Sincere Regards,

Dr. Sanjay Agarwal
RSSDI Secretary

*DSME: Diabetes Self-Management Education, DSMS: Diabetes Self-Management Support

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Article: Increasing Prevalence of Type 1 Diabetes in India

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Article: Interview with Dr. Rajesh Joshi

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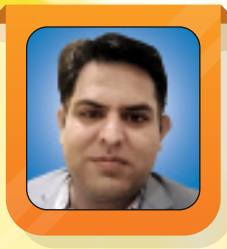

Article: Comorbidities in Children with Type 1 Diabetes Mellitus

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Article: Pharmacotherapy in Children and Adolescents with Type 2 Diabetes

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Article: Healthy Tiffin Ideas for Children with Diabetes

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Article: Frequently Asked Questions on Diabetes in Children and Adolescents

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Cover Story: Different Forms of Diabetes in Children and Adolescents

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Diabetes mellitus is a metabolic disorder characterized by elevated blood glucose levels due to the body's inability to either make enough insulin (hormone) or to efficiently use insulin. Many forms of diabetes exist. The forms commonly found in children and adolescents are mentioned below.

Table 1: Common forms of diabetes found in children and adolescents

Type 1 diabetes mellitus (T1DM)	Neonatal diabetes mellitus
Monogenic diabetes syndromes (maturity onset diabetes of the young - MODY)	Type 2 diabetes mellitus (T2DM)
Cystic fibrosis related diabetes (CFRD)	Steroid induced diabetes
Rare genetic syndromes associated with diabetes (Alström syndrome, Bardet-Biedl syndrome)	Wolfram syndrome
Drug induced diabetes (from medications such as corticosteroids or atypical antipsychotics)	Diabetes secondary to pancreatic disorders or pancreatic surgery

T1DM is the most prevalent type of diabetes in children among all other types. T1DM results from the autoimmune destruction of pancreatic islet cells, leading to a reduced or complete absence of insulin production. The three stages of T1DM are:

- Stage 1: Defined by the absence of clinical symptoms and the presence of β-cell autoimmunity with normoglycemia, this stage can extend for several months to years.
- Stage 2: Asymptomatic until dysglycemia sets up.
- Stage 3: Characterized as the beginning of the disease's symptoms.

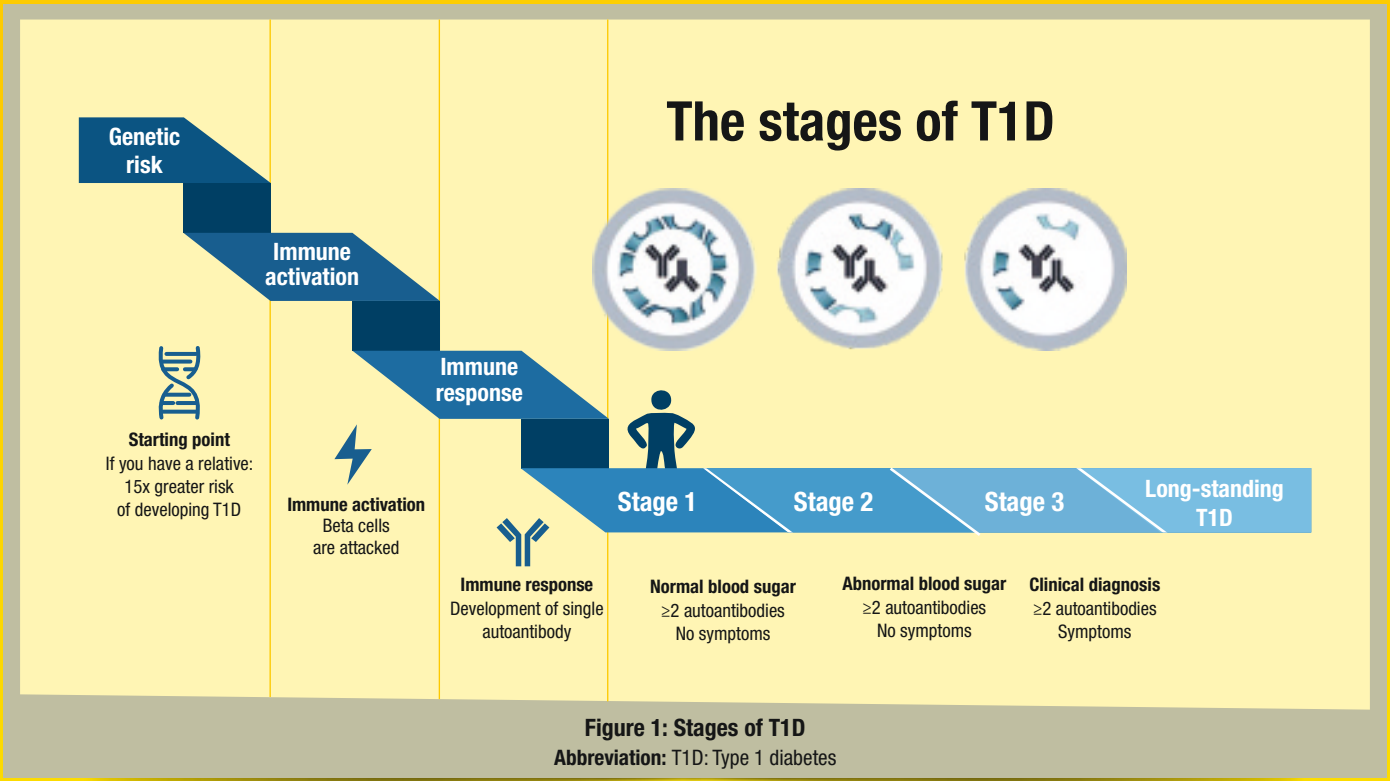

Figure 1: Stages of T1D
Abbreviation: T1D: Type 1 diabetes

Modern lifestyles characterized by reduced physical activity levels and increased sedentary behaviors, such as prolonged screen time, along with increased fast food consumption, have increased the incidence of childhood obesity and associated T2DM. Monogenic diabetes syndromes are a group of rare forms of diabetes caused by mutations in a single gene. MODY, a type of monogenic diabetes, typically presents during adolescence and is often misdiagnosed as either T1DM or T2DM. CFRD is the most common comorbidity associated with cystic fibrosis (CF). The pathophysiology of CFRD primarily stems from inadequate insulin levels, coupled with insufficient glucagon and varying degrees of insulin resistance. Wolfram syndrome is a rare and progressive genetic disorder that affects multiple organ systems. Clinical features include T1DM, optic atrophy, diabetes insipidus, and deafness. Several genetic syndromes are also associated with diabetes. These include Down syndrome, Klinefelter syndrome, Turner syndrome, Friedreich's ataxia, myotonic dystrophy, porphyria, Prader-Willi syndrome, etc. In addition, certain endocrinopathies such as acromegaly, Cushing's syndrome, and pancreatic disorders (pancreatitis, hemochromatosis) are also associated with diabetes. Medication induced diabetes, resulting from drugs like corticosteroids or atypical antipsychotics, is characterized by the development of diabetes because of the effect of these medications on glucose metabolism.

Diabetes in children and adolescents encompasses a spectrum of conditions. Each type has distinct etiological factors, clinical features, and management approaches. Early diagnosis, appropriate treatment, and ongoing management are crucial for optimizing outcomes and improving the quality of life for children and adolescents living with diabetes.

Key points

- Diabetes in children includes T1DM, T2DM, neonatal diabetes, monogenic syndromes (e.g., MODY), CFRD, drug induced diabetes, etc.
- T1DM is the most prevalent, resulting from the autoimmune destruction of the pancreatic β-cells. It progresses through stages from asymptomatic autoimmunity to symptomatic disease.
- Sedentary lifestyles contribute to rising childhood obesity and associated T2DM incidence.
- Other conditions like CFRD, Wolfram syndrome, and genetic syndromes are also associated with diabetes in children.
- Early diagnosis, multidisciplinary management, and support are crucial for optimizing outcomes in children with diabetes.

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Childhood Obesity Precursor to Type 2 Diabetes Mellitus

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Childhood obesity is increasingly recognized as a significant precursor to the development of type 2 diabetes mellitus (T2DM) in children and adolescents. India is witnessing a notable increase in the burden of childhood obesity, particularly among the upper socioeconomic strata and in urban areas. A meta-analysis revealed the pooled prevalence of childhood obesity in India to be 8.4%, while the prevalence of childhood overweight was estimated to be 12.4%. Studies conducted in different states of India have estimated variable prevalence rates, varying from 3% to 20%. The rising prevalence of obesity is influenced by genetic, behavioral (unhealthy eating, sedentary lifestyle), and socioeconomic factors. Higher maternal education is also found to be associated with a lower risk of childhood obesity in a study conducted in Tamil Nadu. Studies have shown that children with high screen time exposure (>2 hours per day) have a higher chance of being obese. This trend in childhood obesity poses a significant public health challenge, with potential long-term repercussions for affected individuals.

The association between childhood obesity and T2DM is well documented. A study published in the Journal of Pediatrics revealed that children with a body mass index (BMI) in the 95th percentile or higher were more prone to developing T2DM later in life. Similarly, research published in the Journal of Clinical Endocrinology and Metabolism found that obesity during childhood and adolescence is correlated with an increased risk of developing T2DM in adulthood. Obese children are found to have a four times higher risk of developing T2DM compared to those with normal weight, emphasizing the critical role of obesity in early onset diabetes.

Although the precise mechanism by which childhood obesity predisposes individuals to T2DM is not fully elucidated, several factors are believed to play a role. One theory suggests that obesity may induce insulin resistance, where the body's cells fail to respond adequately to insulin, resulting in elevated blood glucose levels. Another theory proposes that obesity may trigger chronic inflammation, which can impair pancreatic function and hinder insulin production.

In addition to the elevated risk of T2DM, childhood obesity can also precipitate other health complications such as hypertension, hyperlipidemia, and sleep apnea. These conditions carry long-term implications, including an increased susceptibility to cardiovascular disease and other chronic health ailments.

The issue of childhood obesity in India is a critical public concern. Given the potential long-term consequences of childhood obesity, it is essential to address this issue early. Preventive measures, such as promoting healthy eating habits and regular physical activity in children, can help reduce the risk of T2DM and associated health complications later in life.

Key points

- India is experiencing a surge in childhood obesity, particularly among the affluent and urban areas.
- Childhood obesity is strongly associated with increased type 2 diabetes risk, with children with obesity being four times more likely to develop diabetes.
- The mechanisms underlying this association include insulin resistance and chronic inflammation.
- Childhood obesity also increases the likelihood of other comorbid conditions such as hypertension and sleep apnea, leading to long-term complications such as cardiovascular disease.
- Early intervention, such as promoting healthy eating habits and regular physical activity, can mitigate these risks and improve overall health outcomes.

Resources:

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Uncommon Forms of Childhood Diabetes

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Beyond the commonly observed types of diabetes (Type 1 diabetes mellitus [T1DM], type 2 diabetes mellitus [T2DM]) in children and adolescents, there are less common forms of diabetes that may have distinct features. Below are a few of these uncommon forms of diabetes in children.

Monogenic diabetes: Monogenic diabetes is a form of diabetes caused by a mutation of a single gene. The pancreatic β-cells malfunction as a result of the genetic abnormality. Thus, the body loses its ability to produce enough insulin. Insulin resistance can also occur in some cases. So far, more than 20 genes have been classified as "monogenic diabetes genes" and encompass **maturity onset diabetes of the young (MODY).**

(1) MODY is an uncommon kind of diabetes that is highly hereditary and is caused by a mutation (or alteration) in a single gene. Any child of a parent who carries this gene mutation has a 50% chance of acquiring it from them. The main characteristics of MODY are:

- Having been diagnosed with diabetes under the age of 25 years.
- Having two or more generations with diabetes or a parent with diabetes.
- Not necessarily requiring insulin.

Patients with MODY are often misdiagnosed as having either type 1 or type 2 diabetes since they possess genotypic features of both types of the disease.

(2) MODY mutations have also been observed in several other syndromes, of which one is **Wolfram Syndrome (WS)**, also known as **DIDMOAD** (**D**iabetes **I**nsipidus, **D**iabetes **M**ellitus (type 1), **O**ptic **A**trophy and **D**eafness). The diagnosis of WS is suspected in instances of childhood onset diabetes mellitus in addition to optic atrophy, and this visual impairment is not caused due to diabetes. WS has two main types: Type 1 (WS1) and type 2 (WS2), primarily distinct from one another due to their underlying genetic causes.

- The first sign of WS is **Diabetes Mellitus**, followed by **optic atrophy** that occurs later. Like T1DM, WS is insulin dependent but not autoimmune. Additionally, microvascular problems such as nephropathy and retinopathy are not seen; however, lower levels of glycated hemoglobin (HbA1c) are associated with a reduced need for insulin.
- **Diabetes insipidus** is another feature of WS and affects about half of the people with WS, being more common in WS1, with polydipsia and polyuria being its classical features.
- Other symptoms in WS consist of sensory neuronal hearing loss, bowel dysfunction, ataxia, urinary tract problems, dysphagia, dementia, dysarthria, etc. In some cases, psychological symptoms like anxiety and depression have also been reported. However, the symptoms may vary from person to person and can range from mild to severe.

(3) Another type of diabetes prevalent in people with cystic fibrosis (CF) is **cystic fibrosis related diabetes (CFRD)**. Although it shares features with both type 1 and type 2, its development and course of treatment is different. CFRD is the outcome of abnormal glucose metabolism mainly characterized by a lack of insulin and intermittent insulin resistance. To diagnose CFRD in people with CF, it is critical to identify the early indicators of abnormal glucose metabolism. It is caused by a defective **cystic fibrosis transmembrane conductance regulator (CFTR)** gene that is inherited from both parents and usually identified before the age of 1 year. Patients with CF produce sticky and thick mucus, which can accumulate in the lungs, pancreas, and other organs, leading to a range of symptoms, including lung infections, breathing problems, and problems with food digestion. The majority of CFRD patients are identified before any symptoms appear. Hence, getting screened for diabetes as part of the ongoing treatment for CF is crucial. CFRD is a chronic illness for which there is no known cure; however, it is manageable and improves with insulin treatment.

These types of diabetes, having different clinical courses from type 1 and type 2 diabetes, appear atypically and are linked to underlying genes or factors that are not fully known. Determining subtle differences and correctly diagnosing each patient's type of diabetes becomes crucial to accurately track the course of the illness, direct safe and effective treatment, and identify patients who may experience both acute and long-term problems, thus enhancing their quality of life.

Key points

- Uncommon forms of diabetes include MODY, WS, CFRD, etc.
- Monogenic diabetes and WS showcase unique genetic bases and clinical manifestations, while CFRD emerges as a complication of CF, demanding specialized monitoring.
- Understanding the differences among these types of diabetes is crucial to aid in early diagnosis, tailored management, and improved outcomes for affected individuals.

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Increasing Prevalence of Type 1 Diabetes in India

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Type 1 diabetes mellitus (T1DM) results from the autoimmune destruction of pancreatic islet cells, leading to the absence of insulin production. It predominantly affects children and young adults.

According to the International Diabetes Federation (IDF) diabetes atlas (10th edition, 2021), a total of 1,211,900 children and adolescents younger than 20 years are estimated to have T1DM globally. By country, India now has the highest estimated number of prevalent T1DM cases under 20 years of age (229,400), followed by USA (157,900) and Brazil (92,300).

The etiology of T1DM is divided into immune mediated and idiopathic causes, with around 50% of genetic variations in the major histocompatibility complex (MHC) region predisposing individuals to the disease. Human leukocyte antigen (HLA) classes I and II genes are found to be strongly associated with the susceptibility and onset of T1DM. Approximately 5% of patients have a positive family history, with paternal transmission carrying a higher risk.

However, genetics alone does not equate to causality, and an array of environmental factors are implicated to trigger T1DM and disease progression. Viral infections like rubella virus, mumps virus, coxsackie virus, cytomegalovirus, and enterovirus are implicated in β-cell autoimmunity and pancreas destruction. On the other hand, research also suggests higher T1DM incidence to be associated with vitamin D deficiency, a colder climate, and pollution of the environment.

T1DM usually has an acute and specific presentation, including weight loss and osmotic symptoms. Treatment is through insulin injections, and regular self monitoring of blood glucose is required to achieve good glycemic control. This is important for reducing the incidence of diabetes related complications.

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Interview with Dr. Rajesh Joshi

Dr. (Prof.) Rajesh Joshi

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Dr. (Prof.) Rajesh Joshi is a distinguished pediatric endocrinologist who serves as a professor at B. J. Wadia Hospital for Children besides consulting at Aastha and Ankur hospitals in Mumbai. His expertise encompasses various conditions such as growth disorders, thyroid disorders, diabetes, disorders of sexual development, and other hormonal imbalances that can affect the health and development of children. Dr. Joshi's contributions to pediatric endocrinology extend beyond clinical practice. He is actively involved in research initiatives aimed at advancing the understanding of endocrine disorders in children, as well as teaching and mentoring medical students, residents, and fellows in the field of pediatric endocrinology. He has published over 30 publications in peer reviewed indexed journals besides contributing to book chapters. Through his work, he strives to improve the quality of care and outcomes for young patients while working tirelessly to advance medical knowledge, improve patient care, and enhance the quality of life for young patients and their families.

Diabetes in Children and Adolescents

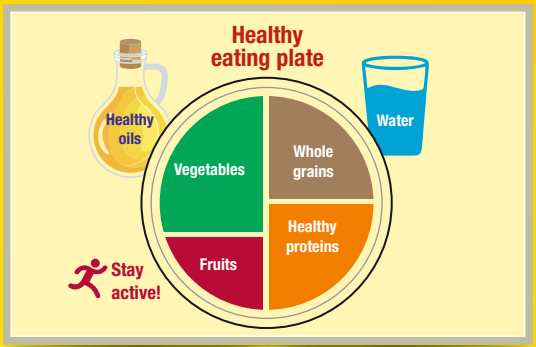
1. Have you noticed an increase in the incidence of type 1 or type 2 diabetes in children in your practice? What reasons do you think are associated?

Since the Coronavirus disease 2019 (*COVID-19*) pandemic, there has been an increase in the incidence of type 1 diabetes. It may be due to increased autoimmunity leading to the destruction of islet cells of the pancreas and a possible small contribution of direct destruction by the virus. The hygiene hypothesis states that common childhood infections may also protect against autoimmune diseases. Therefore, one theory suggests that changes in the overall environmental exposures of young children during the pandemic may be involved in the increase in type 1 diabetes by shifting the balance of environmental factors from protective to inducing islet autoimmunity. As pediatric endocrinologists, we predominantly see children and adolescents with type 1 diabetes, but the incidence of youth onset type 2 diabetes is also on the rise. In one such study, it was 12% and 26.7% at referral centers in Lucknow and Chennai, respectively. The surge is because of increasing obesity in children and adolescents due to increased consumption of processed foods and reduced physical activity. Increased psychosocial stress is also emerging as an important contributor. Indian children have more visceral (abdominal) obesity than Caucasians from birth. Accelerated weight gain in childhood causes insulin resistance and earlier development of type 2 diabetes and metabolic syndrome.

2. What according to you is the right approach to lose or maintain weight in children?

Parents need to teach children healthy habits early to maintain a healthy weight.

Some ways are:



1. Teach about hunger and fullness cues so that children know when to eat (when hungry, not when they are bored or sad) and when to stop eating.
2. Use child sized plates to help gauge how much food a child needs to eat. Learn about age appropriate portion sizes and how to avoid oversized portions. Teach them what a healthy plate should look like (as shown in the image).
3. Prevent snacking throughout the day. Make sure that the child eats regular meals starting from breakfast. Avoid eating in front of the television, computer, or other electronic devices. Also, avoid using food as a reward (especially high calorie ones like dessert).
4. Parents should be good role models by making lifestyle changes together as a family. E.g., go for a walk or cycling, play with children at the park, or swim with them. The family should replace highly processed foods with whole foods like fruits, vegetables, whole grains, nuts, and seeds. Instead of sugary drinks, serve water or low fat milk.
5. Encourage daily physical activity for at least 60 minutes.
6. Cut down screen time to 1½ to 2 hours a day and ensure adequate sleep at night.

3. Should children with diabetes be advised to avoid sugar completely?

Everyone enjoys eating sugary food occasionally, and there is no problem including it as a treat occasionally as part of a healthy, balanced diet. If the child is taking insulin, the dose should be given according to carbohydrates in the sweet. It is also important to note that glucose/sugar or sugary drinks are needed to treat hypoglycemia when blood sugars go low. However, children and adolescents with diabetes should know that eating too much sugar regularly leads to excess weight gain and is harmful to health (increasing the risk for heart disease, stroke, etc.). So, if a child feels like eating sweets occasionally, it's best to eat in moderation and not to displace healthier food choices.

4. What is your opinion on a low carbohydrate diet in children with diabetes?

The typically recommended carbohydrate intake in diet is 45%–65% of total calories. There is limited anecdotal evidence that carbohydrate restriction can improve glycemic and metabolic profiles in children and adolescents with type 1 diabetes mellitus (T1DM) and obese children with type 2 diabetes mellitus (T2DM). However, there are safety concerns with a low carbohydrate (<26% of energy) diet, which include growth deceleration, poor bone health, nutritional deficiencies, nutritional ketosis that cannot be distinguished from ketosis resulting from insulin deficiency, and disordered eating behaviors. Therefore, low carbohydrate diets are not recommended for children and adolescents with type 1 diabetes, except on rare occasions under close supervision by a diabetes care team utilizing safety guidelines.

Children should be advised to reduce their intake of poor quality carbohydrates by minimizing the consumption of processed foods with high amounts of refined grains, added sugars, and sugar sweetened beverages.

5. How can parents and schools collaborate to create a supportive environment for children with diabetes? What measures should be in place to ensure their safety and wellbeing during school hours?

Diabetes management in schools can help provide a supportive learning environment, reduce absences and classroom disruptions, provide support in the event of an emergency, enable the child to participate in activities, and foster self-esteem through independence.

Each child should have a healthcare plan tailored to their needs. The planning team should include parents, the child, designated staff from the school, and the diabetes team. The school staff should be educated about diabetes which includes meal planning, medications, blood glucose monitoring, hypoglycemia and hyperglycemia, emergency guidelines and procedures, equipment, needle and lancet disposal, and community resources. It should include the importance of activity, recess, and meal schedules.

A form detailing all the above school health plans should be provided to the school. An emergency plan should be set to determine who does what if a child with diabetes is unwell or develops hypoglycemia. Teacher or school nurse should preferably measure blood glucose if necessary. Extra blood glucose meters with strips should be provided to them or should be carried in the school bag. Snacking or eating in the classroom should be permitted if hypoglycemia develops.

In T2DM Uncontrolled on DPP4i + Metformin, SGLT2i + Metformin, SGLT2i + DPP4i

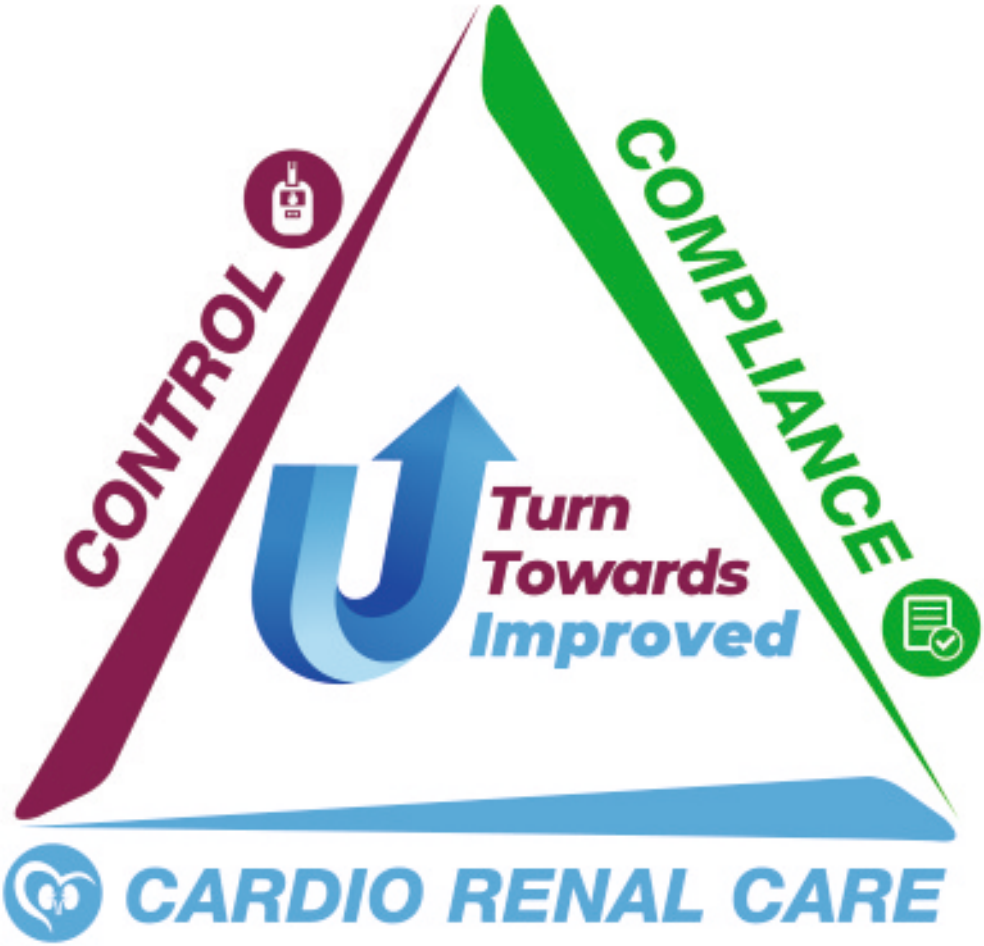
Uptitrate with

UDAPA-Trio

Dapagliflozin 10 MG + Sitagliptin 100 MG + Metformin 500 MG XR

UDAPA-Trio Forte

Dapagliflozin 10 MG + Sitagliptin 100 MG + Metformin 1000 MG XR



In case of any adverse events, kindly contact: pv@usv.in For the use of registered medical practitioner, hospital or laboratory

Abridged Prescribing Information

UDAPA-TRIO Forte, UDAPA-TRIO, Dapagliflozin, Sitagliptin & Metformin Hydrochloride Extended Release Tablets **Composition:** Dapagliflozin 10 mg, Sitagliptin 100 mg & Metformin Hydrochloride Extended Release 1000 mg tablets Dapagliflozin propanediol monohydrate eq. To Dapagliflozin 10 mg Sitagliptin Phosphate Monohydrate IP Eq. Sitagliptin 100 mg Metformin Hydrochloride IP (as Extended Release) 1000 mg Dapagliflozin10 mg, Sitagliptin 100 mg & Metformin Hydrochloride Extended Release 1000 mg tablets Dapagliflozin propanediol monohydrate eq. To Dapagliflozin 10 mg Sitagliptin Phosphate Monohydrate IP Eq. Sitagliptin 100 mg Metformin Hydrochloride IP (as Extended Release) 500 mg **Indication:** It is indicated as an adjunct to diet and exercise to improve Glycemic Control adults with type 2 diabetes mellitus Recommended Dosage: As directed by the physician. **Method of Administration:** Oral **Adverse Reactions:** Most common adverse reactions reported are: Dapagliflozin - Female genital mycotic infections, Nasopharyngitis, Urinary tract infections. Sitagliptin - Upper respiratory tract infection, nasopharyngitis and headache. Metformin - Diarrhea, nausea/vomiting, flatulence, asthenia, indigestion, abdominal discomfort, and headache. **Warnings and Precautions:** Dapagliflozin: Volume depletion; Ketoacidosis in patients with Diabetes Mellitus; Urosepsis and Pyelonephritis; Hypoglycemia; Genital mycotic infections Sitagliptin: **General:** Sitagliptin should not be used in patients with type 1 diabetes or for the treatment of Diabetic Ketoacidosis. Acute pancreatitis: Hypoglycemia is used in combinations when combined with other anti-hyperglycemic medicinal product; Renal impairment: Hypersensitivity reactions including anaphylaxis, angioedema, and exfoliative skin conditions - Steven johnson syndrome; Bullous pemphigoid Metformin Hydrochloride: Lactic acidosis; In case of dehydration (severe diarrhea or vomiting, fever or reduced fluid intake), metformin should be temporarily discontinued and contact with a healthcare professional is recommended. Contraindications: Hypersensitivity to the active substance of Dapagliflozin, Sitagliptin & Metformin or to any of the excipients listed. Any type of acute metabolic acidosis (such as lactic acidosis, diabetic ketoacidosis). Diabetic pre-coma; Severe renal failure (eGFR < 30mL/min); Acute conditions with the potential to alter renal function such as: Dehydration, Severe infection, Shock; Acute or chronic disease which may cause tissue hypoxia such as: Cardiac or respiratory failure. Recent myocardial infarction, Shock, Renal Impairment, Acute intoxication, Alcoholism. **Use in special population:** Pregnant women: Due to lack of human data, drugs should not be used during pregnancy. **Lactating women:** It should not be used during breastfeeding. Pediatric patients: The safety and efficacy of drugs has not yet been established. No data is available. **Geriatric Patients:** In patients >65 years, it should be used with caution as age increases. For Additional Information/full prescribing information, please write to us: USV Private Limited, Arvind Vithal Gandhi Chowk, B.S.D Marg, Govandi, Mumbai - 400088 Last updated on 02/04/2024.

USV Private Limited Corvette Team

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Personalized Counseling for Young Working Professional with Diabetes: A Doctor's Experience on the MyCare Patient Support Program

Dr. Vishwas Dashputra

MBBS, MD (Medicine)
Consultant Physician, Dashputra Nursing, Nagpur

A 27-year-old woman with type 2 diabetes was managed by Dr. Vishwas Dashputra.

Here's what Dr. Vishwas Dashputra has to say:

A young woman with type 2 diabetes, along with hypertension, was referred to me. During consultation, I observed that her blood glucose levels were uncontrolled (glycated hemoglobin [HbA1c]: 12.5%, fasting blood sugar [FBS]: 234 mg/dL, and postprandial glucose [PPG]: 375 mg/dL). During the consultation, I got to know that she was diagnosed with diabetes a year ago, but was not on any medication and was persistently gaining weight due to her erratic lifestyle, which further elevated her blood glucose levels.

I prescribed the required medications and suggested meeting MyCare Diabetes Educator (MDE), Madhura Burade, for diabetes education, diet, and lifestyle intervention. Madhura counseled the patient on the need to control the blood glucose levels. She got to know that the patient works in the police department and so had irregular meal timings, and her sleep cycle was disturbed since a month. The MDE gave her a customized diet plan based on her work schedule and gave practical diet tips, which helped her to make mindful, healthy choices and maintain portion control. She was given some healthy munching options at her workplace and was encouraged to take up yoga and meditation. She was also advised to allocate some time for a hobby to promote mental wellness. In just one month, the patient reduced 3 kg weight and her blood glucose levels improved significantly (FBS: 139 mg/dL and PPG: 176 mg/dL).

Ms. Madhura Burade

NDEP and T1DE Certified Diabetes Educator

Here's what MDE Madhura has to say:

Counseling and motivation for a healthy work-life balance helped her improve glycemic control. A balanced, healthy diet with mindful choices and regular physical activity, along with medications, helped her achieve her glycemic target.

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*PWD: People with Diabetes

Contact for more information
Nikita Thawarkar | 7304930643 | nikita.thawarkar@usv.in

In **uncontrolled** T2DM with or at risk of **CVD, HF and CKD**[1]

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CVD- Cardiovascular Disease HF- Heart Failure CKD- Chronic Kidney Disease
*L Ravikumar et al., Cardiol Cardiovasc Med 2023; 7: 141-144. #= no. of patients | #As per the literature search (PubMed and Google Scholar) on 21st March 2024

Reference: 1. Singh AK. et. al., Endocr Pract. 2023 Jul;29(7):509-516.

UDAPA®-S
Dapagliflozin and Sitagliptin Tablets
Composition: Each Film Coated Tablet Contains: Dapagliflozin Propanediol Monohydrate eq. to Dapagliflozin (10 mg) + Sitagliptin Phosphate Monohydrate IP eq. to Sitagliptin (100 mg)
Indications: For the treatment of type 2 diabetes mellitus inadequately controlled on Metformin monotherapy.
Recommended Dosage: As directed by the physician.
Method of Administration: Oral
Adverse Reactions: Female genital mycotic infections, nasopharyngitis, and urinary tract infections are most common adverse reactions associated with dapagliflozin. While, upper respiratory tract infection, nasopharyngitis, and headache are most common adverse reactions associated with sitagliptin.
Warnings and Precautions: Risk of Volume Depletion in Elderly - Before initiating Dapagliflozin and Sitagliptin, assess volume status and renal function in the elderly, patients with renal impairment or low systolic blood pressure, and in patients on diuretics. Monitor for signs and symptoms during therapy. **Ketoacidosis in Patients with Diabetes Mellitus -** Assess patients who present with signs and symptoms of metabolic acidosis for ketoacidosis regardless of blood glucose level. If suspected, discontinue UDAPA®-S, evaluate and treat promptly. Before initiating UDAPA®-S, consider risk factors for ketoacidosis. Patients on UDAPA®-S may require monitoring and temporary discontinuation of therapy in clinical situations known to predispose to ketoacidosis. **Urosepsis and Pyelonephritis -** Evaluate for signs and symptoms of urinary tract infections and treat promptly, if indicated. Hypoglycemia - Consider a lower dose of insulin or the insulin secretagogue to reduce the risk of hypoglycemia when used in combination with Dapagliflozin and Sitagliptin. **Necrotizing Fasciitis of the Perineum -** Serious, life-threatening cases have occurred in patients with diabetes, both females and males. Assess patients presenting with pain or tenderness, erythema, or swelling in the genital or perineal area, along with fever or malaise. If suspected, institute prompt treatment. **Genital Mycotic Infections -** Monitor and treat if indicated.
Contraindications: Patients with a history of hypersensitivity reaction to the active substance or to any of the excipients. In patients with varying degrees of renal impairment, adjusting the dosage is advised based on the severity of the condition. Prohibited medications include strong CYP2C8 inhibitors/ inducers, drugs increasing/decreasing hypoglycemic action, drugs known to cause QT prolongation, or other oral hypoglycemic agents other than study medications.
Updated on 20th March 2024
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Comorbidities in Children with Type 1 Diabetes Mellitus

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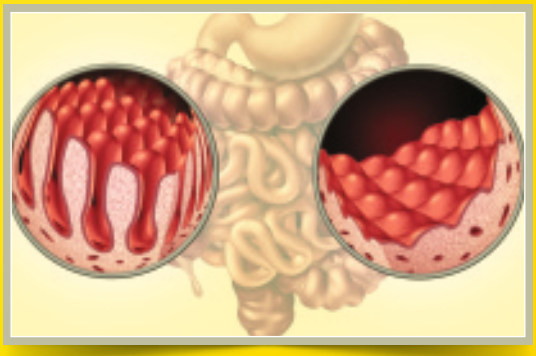
Type 1 diabetes (T1D) raises the risk of other autoimmune conditions due to genetic susceptibility. The common comorbidities associated with T1D are autoimmune thyroid diseases (AITD), celiac disease (CD), autoimmune gastritis/pernicious anemia, Addison's disease, and vitiligo. These conditions occur more frequently in children and adolescents with T1D compared to their healthy counterparts. The presence of additional autoimmune diseases in individuals with T1D can worsen their quality of life and elevate morbidity and mortality rates.

AITD: AITD typically manifests more commonly as hypothyroidism (seen in Hashimoto's thyroiditis) rather than hyperthyroidism (such as Graves' disease or the hyperactive phase of Hashimoto's thyroiditis). While hyperthyroidism in Graves' disease is less common than hypothyroidism in T1D, its occurrence is higher compared to the general population. The physiological impact of thyroid hormones includes increased intestinal glucose absorption, glycogenolysis, and insulin catabolism in the liver. These processes lead to hyperglycemia in hyperthyroidism. Even minor fluctuations in thyroid hormone levels can elevate hypoglycemia risk. In children with T1D, hypothyroidism often leads to hypoglycemia and glucose variability due to heightened insulin sensitivity. Growth disorders observed in these children can be linked to chronic hypoglycemia and deficiency of thyroid hormones.

International Society for Pediatric and Adolescent Diabetes guidelines (2022) suggest screening for thyroid disease by measuring thyroid stimulating hormone (TSH) levels, antithyroid peroxidase antibodies, and antithyroglobulin antibodies soon after the diagnosis of diabetes. Subsequently, TSH levels should be assessed every second year in asymptomatic individuals and every year in those with positive antibodies at diagnosis or a family history of autoimmune thyroid disease. Additionally, prompt TSH measurement is warranted in the presence of clinical manifestations or symptoms of thyroid disease, such as goiter or growth impairment.

CD: CD is another autoimmune disorder triggered by the ingestion of gluten, a protein found in wheat, barley, spelt, and rye. Thus, a gluten free diet is advised in CD.



CD can often be asymptomatic, without gastrointestinal symptoms, exhibiting poor growth, or worsening glycemic control, including hypoglycemia. The presence of CD should be evaluated in any child with gastrointestinal signs/symptoms such as chronic or intermittent diarrhea and/or constipation, chronic abdominal pain/distention, flatulence, anorexia, dyspeptic symptoms, extraintestinal symptoms such as iron deficiency anemia,

unexplained poor growth, weight loss, recurrent aphthous ulceration, decreased bone mineralization, or unexplained hypoglycemia.

CD screening should be conducted at diagnosis and repeated at intervals of 2–5 years. If there are indications of symptomatic CD or if the child has a first degree relative with CD, more frequent assessments are warranted. A gluten free diet is not recommended until diagnosis is confirmed.

Screening for immunoglobulin A (IgA) deficiency should be performed at the time of CD screening. In individuals with confirmed IgA deficiency (low total IgA concentrations), screening for CD should be performed using an immunoglobulin G (IgG) based specific antibody tests (tissue transglutaminase IgG [tTG IgG] or endomysial antibody IgG [EMA IgG]). All IgA deficient individuals with diabetes who are positive for an IgG based serological test should then be referred to a pediatric gastroenterologist for confirmation with endoscopy. Children and adolescents with T1D are advised to follow a lifelong gluten free diet that must be closely monitored by a qualified dietitian to ensure nutrient diversity.

It is essential to monitor concurrent autoimmune conditions in T1D as their coexistence can compromise glycemic control and impact various aspects of children and adolescents' health, including organ function, growth, and development.

Resources:

1. Krzewska A, Ben-Skowronek I. Effect of Associated Autoimmune Diseases on Type 1 Diabetes Mellitus Incidence and Metabolic Control in Children and Adolescents. *Biomed Res Int.* 2016;2016:6219730. doi:10.1155/2016/6219730
2. Ziegler R, Neu A. Diabetes in Childhood and Adolescence. *Dtsch Arztebl Int.* 2018;115(9):146-156. doi:10.3238/arztebl.2018.0146

Management of Diabetes in Children and Adolescents Using Traditional Indian Dietary Practices

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Traditional Indian dietary practices are particularly beneficial in managing diabetes among children and adolescents. These food practices emphasize providing wholesome, balanced, and nourishing meals that are not only nutritious but also visually appealing and palatable.

The thali principle involves serving nutritionally balanced meals with a variety of textures and flavors, using small bowls for each food item to control portions effectively. Including foods from all food groups such as whole grains, vegetables, pulses or nonvegetarian options, and dairy products, as depicted in the image, ensures a balanced intake of carbohydrates, proteins, fats, and fiber. Additionally, this diverse combination incorporates various plant based foods in different colors, providing a rich array of phytochemicals. The traditional Indian 'thali' meal aligns remarkably well with nutrition recommendations for diabetes management by the International Society for Pediatric and Adolescent Diabetes (ISPAD): “Children and adolescents with diabetes should eat a variety of healthy foods, including fruits, vegetables, dairy, whole grains, legumes, and lean meat in amounts appropriate for age, stage of growth, and energy requirements.”

One of the key advantages of the traditional Indian diet is its emphasis on low glycemic index (GI) foods, which are particularly beneficial for managing blood glucose levels in diabetes. Millets, such as sorghum and pearl millet, have been staple grains in many parts of India and offer a lower GI alternative to polished rice and wheat. Parboiled rice, a traditional preparation method involving soaking, heating, and drying the paddy before milling, has a lower GI compared to regular white rice.

The combination of cereals and lentils or pulses in a ratio of 3:1 is another widespread practice that provides a complete protein profile with all essential amino acids, while also reducing the overall GI of the meal. Indian preparations with cereal pulse combination include khichdi, dal dhokli, dal baati, litti, bisi bele bhaat, idli, dosa, Pongal, etc. Lentils and pulses also contain “lente carbohydrates,” which are slowly absorbed due to their high fiber content, aiding in blood glucose management. These protein rich plant based foods are often incorporated into various Indian dishes, such as dal, usal, chilla, paniyaram, etc., providing nutritional value and flavor.

Traditional Indian cooking techniques also play a crucial role in enhancing the nutritional quality of meals. Fermentation, a widely practiced method, improves the bioavailability of nutrients. Sprouting grains and pulses before cooking reduces antinutrients like phytic acid and enhances the content of vitamins and minerals. Additionally, soaking grains and pulses before cooking improves their digestibility and reduces cooking time.

The use of a wide array of spices, herbs, and condiments in Indian cuisine provides more than just flavor; many of these ingredients possess antioxidant and anti-inflammatory properties that may offer additional health benefits in diabetes. These include spices like turmeric, cumin, coriander, ginger, etc.

In addition to the nutritional benefits, traditional Indian dietary practices also emphasize the importance of meal routines and mindful eating. Recommendations from ancient Indian texts encourage eating proper portions at regular mealtimes, sitting on the floor, and eating together as a family, which not only promotes better digestion but also fosters healthy eating habits and supports monitoring of food intake.

Traditional Indian dietary practices provide effective strategies for managing diabetes in children and adolescents. Emphasizing whole, unprocessed, low GI foods, employing healthy cooking techniques, and promoting mindful eating align with modern diabetes management guidelines. Healthcare professionals and families can leverage these practices to enhance glycemic control and overall wellbeing in children and adolescents with diabetes.

Key points

- Traditional Indian dietary practices offer balanced and nourishing meals suitable for managing diabetes in children and adolescents.
- The thali principle ensures a varied and portion controlled intake of whole grains, vegetables, pulses, nonvegetarian options, and dairy products, aligning with diabetes management recommendations.
- Low GI foods like millets and parboiled rice are staples in the Indian diet, aiding in blood glucose control.
- Combining cereals with lentils or pulses provides a complete protein profile and lowers the overall GI of meals.
- Traditional cooking techniques, use of traditional Indian spices with health benefits, and emphasis on meal routines and mindful eating further support diabetes management efforts in children and adolescents.

Resources:

1. Salis S, Virmani A, Priyambada L, Mohan M, Hansda K, Beaufort C. 'Old Is Gold': How Traditional Indian Dietary Practices Can Support Pediatric Diabetes Management. *Nutrients*. 2021;13(12):4427. Published 2021 Dec 10. doi:10.3390/nu13124427
2. Serbis A, Giapros V, Kotanidou EP, Galli-Tsinopoulou A, Siomou E. Diagnosis, treatment and prevention of type 2 diabetes mellitus in children and adolescents. *World J Diabetes*. 2021;12(4):344–365. doi:10.4239/wjd.v12.i4.344
3. ISPAD Clinical Practice Consensus Guidelines 2022. Available at: https://www.ispad.org/page/ISPADGuidelines2022. Accessed March 5, 2024.

Pharmacotherapy in Children and Adolescents with Type 2 Diabetes

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While dietary and lifestyle modification remains the cornerstone in effective type 2 diabetes mellitus (T2DM) management, pharmacotherapy also plays an important role. Management in a timely and efficient manner is essential to prevent or at least delay complications and to improve long-term outcomes.

Adolescents diagnosed with T2DM have a higher degree of insulin resistance and a quicker pace of β-cell function degradation than adults of comparable obesity. They also react less well to insulin sensitizers and have a high likelihood of treatment failure.

While many antihyperglycemic agents are approved for use in adults, not all are approved for use in children and adolescents. Initial treatment of children or adolescents with T2DM includes metformin and/or insulin alone or in combination determined by symptoms, severity of hyperglycemia, and presence or absence of ketosis. For those with glycated hemoglobin (HbA1c) <8.5%, metformin is the treatment of choice together with healthy lifestyle changes; for those with ketosis/ketonuria/diabetic ketoacidosis or HbA1c ≥8.5%, insulin will be required initially, as shown in the figure. The transition to metformin alone usually occurs over 2–6 weeks, reducing insulin dosage by 30%–50% each time the metformin dose is increased, with the objective of discontinuing insulin therapy without compromising glycemic control.

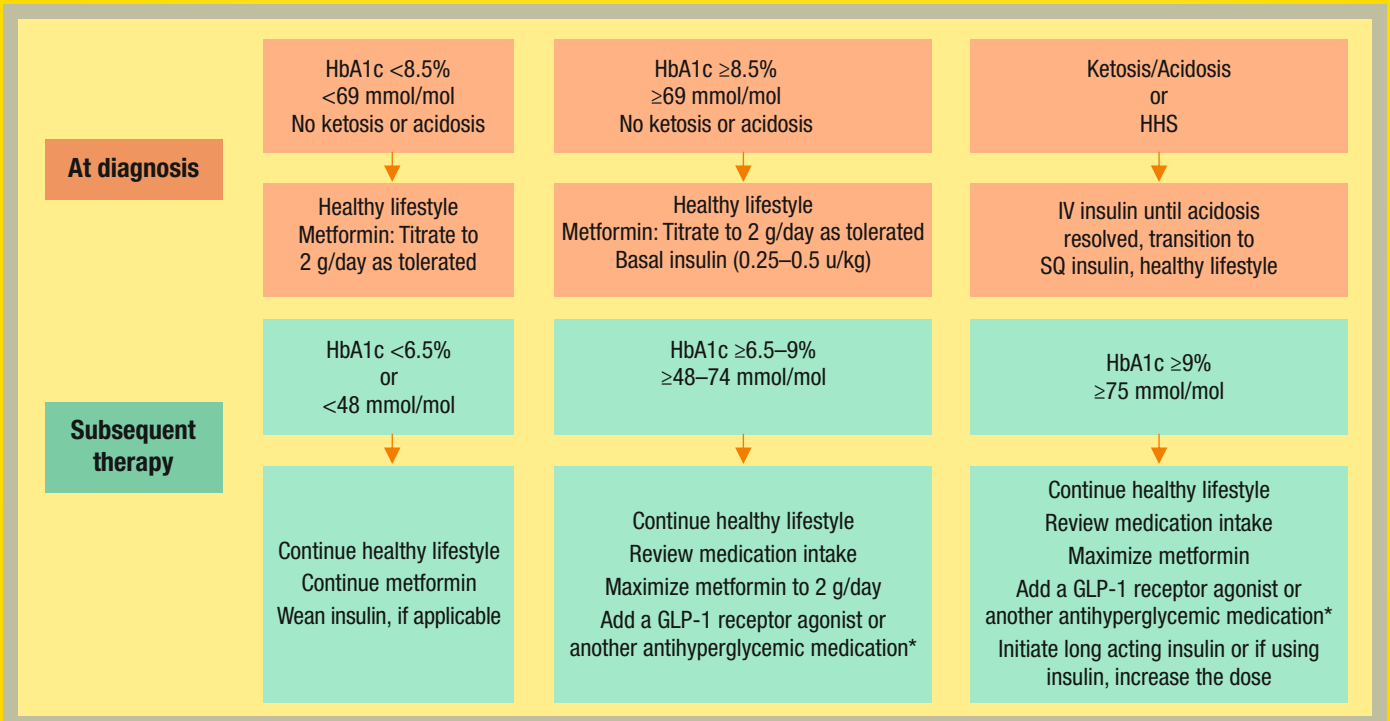

Figure 2: Management of T2DM in children and adolescents

Initial management and subsequent therapy (ISPAD Guidelines 2022), *Antihyperglycemic medication approved for use in children and adolescents.
Abbreviations: HbA1c: Glycated hemoglobin; HHS: Hyperosmolar hyperglycemic state; IV: Intravenous; SQ: Subcutaneous; GLP-1: Glucagon-like peptide-1; T2DM: Type 2 diabetes mellitus

The goal of initial treatment should be to attain an HbA1c of <7.0%. A target of <6.5% is appropriate, provided it can be achieved without hypoglycemia. If the HbA1c target of <7.0% or <6.5% is not accomplished, evidence from the Treatment Options for type 2 Diabetes in Adolescents and Youth (TODAY) study suggests within four months on metformin monotherapy, the addition of a second agent should be considered. The choice of a second agent should consider the degree of glucose lowering required, mechanism of action, cost and payer coverage, regulatory approval, route of administration, dosing regimen, weight loss anticipated, side effects, and impact on comorbidities and complications. With higher HbA1c values, initiation or reinitiation of basal insulin is the preferred option. At every visit, routine use of medication should be assessed, especially before adding additional medications.

Consequently, key elements of managing T2DM in young people include screening for dietary and lifestyle modification, pharmacotherapy, and managing comorbidities and consequences both at the time of diagnosis and throughout the course of the disease.

Resources:

1. Serbis A, Giapros V, Kotanidou EP, *et al.* Diagnosis, treatment and prevention of type 2 diabetes mellitus in children and adolescents. *World J Diabetes.* 2021;12(4):344–365. doi:10.4239/wjd.v12.i4.344.
2. Shah AS, Zeitler PS, Wong J, *et al.* ISPAD Clinical Practice Consensus Guidelines 2022: Type 2 diabetes in children and adolescents. *Pediatr Diabetes.* 2022; 23(7):872-902. doi:10.1111/pedi.13409

Healthy Tiffin Ideas for Children with Diabetes

Dr. Vivek Sidhapura

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Consultant Physician and Diabetologist, Avira Hospital, Anand

A healthy balanced diet is essential for both growth and overall health. Parents are often concerned about food choices for children. Healthy tiffin ideas for children with diabetes (CWD) must focus on balanced meals which help maintain stable blood glucose levels throughout the day.

Here are some healthy tiffin ideas for CWD

- Moong dal dosa or pesarattu/lobia dosa/besan chilla: These foods, made with lentils and beans, offer slow absorbing, low glycemic carbohydrates with high fiber content, thereby aiding in blood glucose control.
- Chicken/fish/egg/paneer chapati wrap: This provides complex carbohydrates and adequate protein for energy at school. Adding vegetables will make it a complete meal with all the essential nutrients important for blood glucose control.
- Vegetable millet pulao/vegetable barley pulao: Foxtail millet, barnyard millet, and barley are shown to have a lower glycemic index compared to rice. Pulao, a hearty dish, incorporates a variety of food groups including vegetables for fiber and dals/beans/chicken/paneer for protein, aiding in blood glucose management.

Other healthy options include oats moong (green gram) paniyaram, bean paniyaram, moong tikki, rajma (kidney bean) tikki, matki (moth bean) tikki, dal/sattu (roasted chickpea flour) paratha, vegetable handvo, moong dal idli, and vegetable stuffed idli.

Remember to consider portion sizes and include a variety of foods from different food groups to ensure a well balanced and nutritious diet for CWD. It is also important to consult a healthcare professional or qualified dietitian for personalized meal planning and dietary recommendations.

Resources:

1. Salis S, Virmani A, Priyambada L, *et al.* Old Is Gold: How Traditional Indian Dietary Practices Can Support Pediatric Diabetes Management. *Nutrients.* 2021;13(12):4427. Published 2021 Dec 10. doi:10.3390/nu13124427.
2. Ren X, Chen J, Molla MM, *et al.* In vitro starch digestibility and in vivo glycemic response of foxtail millet and its products. *Food Funct.* 2016;7(1):372–379. doi:10.1039/c5fo01074h.
3. Glycemic index Barley, University of Sydney, Available at: https://glycemicindex.com/2023/03/barley/

Frequently Asked Questions on Diabetes in Children and Adolescents

Dr. Ravi Varmora

MD (Medicine)

Consultant Physician, Swastik Hospital and ICU, Anand

1. My 6-year-old daughter was recently diagnosed with type 1 diabetes mellitus. We were told and read online that she had to stop consuming egg yolk and rice as it would spike her blood glucose levels. Online information seems conflicting, could you please guide us about the same?

Ans. Eggs, being low in carbohydrates and rich in protein, have a minimal impact on blood sugar levels. Egg yolk specifically provides essential nutrients such as vitamin A, vitamin D, choline, etc. Latest evidence suggests cholesterol from egg yolk does not increase blood cholesterol levels and one whole egg per day for children is completely safe. Rice, especially white rice, has a higher glycemic index. However, it can be consumed by children with type 1 diabetes (T1D). Choosing long grain rice, brown rice, or unpolished rice over white rice will help prevent blood glucose spikes. Cooking and cooling of rice one day prior to consumption has been shown to reduce the glycemic index of rice due to resistant starch formation. Having adequate fiber (salad/vegetable) and protein (curd/rajma/chana/chicken/fish) along with rice will also help manage glucose spikes.

2. My 13-year-old child is part of his school's football team. A few months ago he was diagnosed with type 1 diabetes mellitus. At first, we struggled with managing his blood glucose levels, but now they are stable. We wanted to know if it is safe for him to rejoin the football team post his diagnosis.

Ans. Children with T1D can engage in sports. This enhances their insulin effectiveness and helps maintain blood glucose levels in range. Inform your children's school staff/teacher/friends about hypoglycemia and how to treat hypoglycemia, including glucagon administration. Share emergency contact details and ensure the coach understands when to seek medical help. You must adhere to the care plan outlined by the diabetes care team, which includes target blood glucose ranges for exercise, testing protocols, insulin dosage, and dietary recommendations. A few tips to keep in mind:

- Discuss activity type and duration with your doctor and diabetes educator, to create insulin adjustment plans. Monitor blood glucose levels before, during, and after activity, as well as at bedtime. Adjust insulin dose and carbohydrate intake accordingly to prevent hypoglycemia.
- Before activity, if blood glucose levels are <120 mg/dL, consider a 15 g carbohydrate snack (e.g., fruit or dried fruit with nuts or peanut butter/bread with peanut butter/energy bar/granola). Carry fruit juice/honey/15 g pouches of glucose powder/glucose tablets, for quick hypoglycemic correction during activity.

3. My 2-year-old daughter, has just been diagnosed a month ago with type 1 diabetes mellitus. She has to be injected at least 3–4 times a day with insulin; we are worried that this continuous injecting will cause detrimental effects to her health in the long run. Also, our neighbor suggested an alternative medicine treatment where insulin isn't needed and her condition can be cured.

Ans. Insulin is a hormone, which helps glucose absorption from the blood into cells of the body to be used as an energy source. T1D is a condition in which the body cannot make enough insulin as the immune system damages the cells in the pancreas that make insulin. This makes them completely dependent on insulin. Insulin injections are needed to keep blood glucose levels stable; without which, these individuals can go into diabetic ketoacidosis and eventually even coma if not treated at the right time. This can be life threatening. Insulin injections in the longer run, do not cause any side effects or other health issues if administered properly.

As of now, there is no treatment for T1D except insulin therapy. We suggest you do not fall prey to any unscientific methods or hearsay about curing T1D. T1D cannot be cured; however, it can be efficiently managed by insulin therapy and maintaining a healthy lifestyle.

Recipe: Oats Bhakri Mini Pizza

Makes: 2 mini pizzas

Ingredients	Amount
For pizza sauce	
Medium tomatoes	2 no.
Oil	½ tsp.
Garlic finely chopped	1 tsp.
Onion chopped	½ cup
Oregano dried	¼ tsp.
Red chilli flakes	¼ tsp.
Chilli powder	¼ tsp.
Salt	To taste
For bhakri	
Whole wheat flour	1/3rd cup
Rolled oats	1/3rd cup
Salt	To taste
For vegetable topping	
Red, green, and yellow bell peppers sliced	½ cup
Broccoli florets blanched	¼ cup
Oregano dried	¼ tsp.
Red chilli flakes	¼ tsp.
Cheese	1 cube
1 cup: 250 mL; 1 tablespoon: 15 mL; 1 teaspoon: 5 mL	

Method

Preparation of pizza sauce

- Make a crisscross on the base of the tomatoes and place them in boiling water for 2–3 minutes until the skin begins to peel. Remove the tomatoes and place them in a bowl with cold water.
- Once cooled, peel, deseed, and roughly chop the tomatoes, and blend in a mixer to a smooth pulp.
- Heat oil in a nonstick pan; add the garlic and sauté on a medium flame for a few seconds.
- Add onions and sauté on a medium flame for 1–2 minutes.
- Add the tomato pulp, oregano, chilli flakes, chilli powder, and salt, mix well, and cook on a medium flame for 2–3 minutes while stirring occasionally. Keep aside to cool.

Preparation of bhakri

- Combine all the ingredients in a bowl and knead into stiff dough using enough water.
- Divide the dough into 2 equal portions.
- Roll the dough into 3½ inch circles.
- Heat a nonstick tawa and cook the bhakri on a slow flame while pressing with a folded muslin cloth or a khakhra press, till it cooks on both sides. Keep aside.

How to proceed

- Keep the vegetable toppings ready.
- Place a bhakri on a clean, dry surface, spread the prepared pizza sauce evenly, add the vegetable toppings, and grate cheese on top.
- Bake in a preheated oven at 180°C for 4–5 minutes.
- Garnish with oregano and chilli flakes and serve the mini pizzas hot.

Dia-Games

Word search

Look for the words given in the grid. They could be horizontal, vertical, or diagonal.

C	S	V	E	R	S	S	B	F	W	Z	O	H	A	J	R	Q	F	W	U	H	H	G	I	Z	D	N	W	R	J
F	D	W	E	F	R	U	K	Y	H	Q	K	E	R	H	Q	T	I	T	H	B	P	L	Y	A	I	F	L	W	V
R	B	J	S	E	J	H	L	C	P	G	E	F	S	R	H	Q	T	I	T	H	B	P	L	Y	A	I	F	L	W	V
O	I	P	Z	H	R	F	Y	P	J	V	O	Z	C	X	N	A	P	U	Z	F	R	T	A	G	G	O	P	K	G
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CHILDHOOD OBESITY

SULPHONYLUREAS

PRADER WILLI

ADOLESCENTS

SCREENTIME

DYSGLYCEMIA

GLUTENFREE

COXSACKIE

INSIPIDUS

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POLYURIA

NEONATAL

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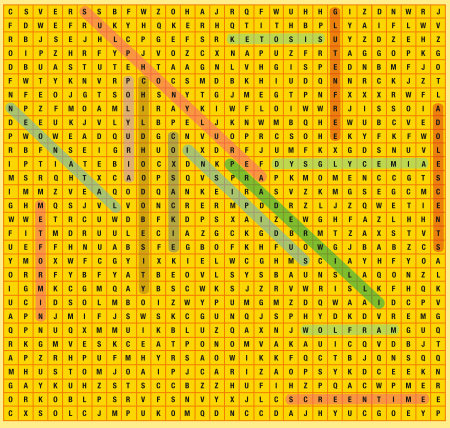

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Glycomet®-GP

Metformin Hydrochloride 500/850/1000 mg SR + Glimepiride 0.5/1/2/3/4 mg

Widely available range for Individualised needs of the patients Across T2DM Continuum

Glycomet®-GP 1
Metformin Hydrochloride 500 mg SR + Glimepiride 1 mg

Glycomet®-GP 3/850
Metformin Hydrochloride 850 mg SR + Glimepiride 3 mg

Glycomet®-GP 0.5
Metformin Hydrochloride 500 mg SR + Glimepiride 0.5 mg

Glycomet®-GP 2
Metformin Hydrochloride 500 mg SR + Glimepiride 2 mg

Glycomet®-GP 2/850
Metformin Hydrochloride 850 mg SR + Glimepiride 2 mg

Glycomet®-GP 0.5 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 0.5 mg

Glycomet®-GP 4 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 4 mg

Glycomet®-GP 1 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 1 mg

Glycomet®-GP 3 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 3 mg

Glycomet®-GP 2 FORTE
Metformin Hydrochloride 1000 mg SR + Glimepiride 2 mg

Abridged Prescribing Information

Active Ingredients: Metformin hydrochloride (as sustained release) and glimepiride tablets **Indication:** For the management of patients with type 2 diabetes mellitus when diet, exercise and single agent (glimepiride or metformin alone) do not result in adequate glycaemic control. **Dosage and Administration:** The recommended dose is one tablet daily during breakfast or the first main meal. Each tablet contains a fixed dose of glimepiride and Metformin Hydrochloride. The highest recommended dose per day should be 8 mg of glimepiride and 2000mg of metformin. Due to prolonged release formulation, the tablet must be swallowed whole and not crushed or chewed. **Adverse Reactions:** For Glimepiride: hypoglycaemia may occur, which may sometimes be prolonged. Occasionally, gastrointestinal (GI) symptoms such as nausea, vomiting, sensations of pressure or fullness in the epigastrium, abdominal pain and diarrhea may occur. Hepatitis, elevation of liver enzymes, cholestasis and jaundice may occur; allergic reactions or pseudo allergic reactions may occur occasionally. For Metformin: GI symptoms such as nausea, vomiting, diarrhea, abdominal pain, and loss of appetite are common during initiation of therapy and may resolve spontaneously in most cases. Metallic taste, mild erythema, decrease in Vit B12 absorption, very rarely lactic acidosis, Hemolytic anemia, Reduction of thyrotropin level in patients with hypothyroidism, Hypomagnesemia in the context of diarrhea, Encephalopathy, Photosensitivity, hepatobiliary disorders. **Warnings and Precautions:** For Glimepiride: Patient should be advised to report promptly exceptional stress situations (e.g., trauma, surgery, febrile infections), blood glucose regulation may deteriorate, and a temporary change to insulin may be necessary to maintain good metabolic control. Metformin Hydrochloride may lead to Lactic acidosis; in such cases metformin should be temporarily discontinued and contact with a healthcare professional is recommended. Sulfonylureas have an increased risk of hypoglycaemia. Long-term treatment with metformin may lead to peripheral neuropathy because of decrease in vitamin B12 serum levels. Monitoring of the vitamin B12 level is recommended. Overweight patients should continue their energy-restricted diet, usual laboratory tests for diabetes monitoring should be performed regularly. **Contraindications:** Hypersensitivity to the active substance of glimepiride & Metformin or to any of the excipients listed. Any type of acute metabolic acidosis (such as lactic acidosis, diabetic ketoacidosis, diabetic pre-coma). Severe renal failure (GFR<30ml/min). In pregnant women. In lactating women.Acute conditions with the potential to alter renal function (dehydration, severe infection, shock, intravascular administration of iodinated contrast agents); acute or chronic disease which may cause tissue hypoxia (cardiac or respiratory failure, recent myocardial infarction, shock); hepatic insufficiency; acute alcohol intoxication; alcoholism. **Use in a special population:** Pregnant Women: Due to a lack of human data, drugs should not be used during pregnancy. Lactating Women: It should not be used during breastfeeding. Pediatric Patients: The safety and efficacy of drugs has not yet been established. Renal impairment: A GFR should be assessed before initiation of treatment with metformin containing products and at least annually thereafter. In patients at increased risk of further progression of renal impairment and in the elderly, renal function should be assessed more frequently, e.g. every 3-6 months.

Additional information is available on request.

Last updated: March 13, 2023

In case of any adverse events, kindly contact: pv@usv.in For the use of registered medical practitioner, hospital or laboratory.

USV Private Limited Corvette Team

Arvind Vithal Gandhi Chowk, B. S. D. Marg, Govandi, Mumbai - 400 088. | Tel.: 91-22-2556 4048 | Fax 91-22-2558 4025 | www.usvindia.com

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Users can share it with their family & friends

Video on Suggestive Lifestyle Interventions to minimise risks - for each category

12 Languages

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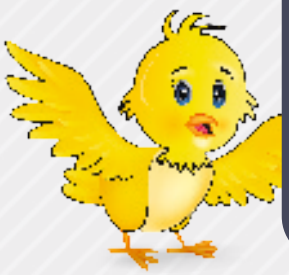

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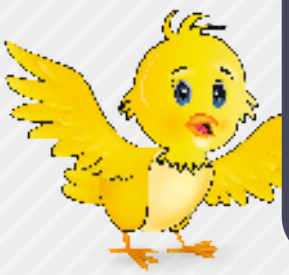

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Choose

Glycomet®-GP

Metformin Hydrochloride 500/850/1000 mg SR + Glimepiride 0.5/1/2/3/4 mg

Green energy

Recycle, Reduce & Reuse

Wat**E**r Neutrality

Eco-friendly manufacturing Facility

No Human Intervention

With New Age GREENTECH#

Technology innovation

Energy efficient

Carbon footprint reduction

High Standard Quality

ICH: International Council of Harmonisation

** AIOCD FEB'24 MAT data # Data on File*

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