

- Follow individualized lifestyle advice regarding diet and exercise
- Inform women with GDM about their risk of developing type 2 diabetes.

10.3 Diabetes in young people

10.3.1 An overview

Approximately three-quarter of all newly diagnosed cases of type 1 diabetes occur in individuals younger than 18 years. Care of this group requires integration of diabetes management with the complicated physical and emotional growth needs of children, adolescents, and their families.

Information should be supplied to the school or day care setting so that school personnel are aware of the diagnosis of diabetes in the student and of the signs and symptoms and treatment of hypoglycaemia.

Management of diabetes during childhood remains the responsibility of the paediatric departments in hospitals. In smaller hospitals, a paediatrician with interest in diabetes should be designated to look after the cohort in the district. In larger teaching hospitals, care should be organized in specialist clinics, to education, training and research. These will be acting as tertiary referral centres for the smaller hospitals. Doctors in primary care sectors should be competent in recognizing diabetic emergencies in children and be familiar with the appropriate clinics in their locality.

A detailed descriptive account of practical management of diabetes in young people is beyond the scope of these guidelines. However, local protocols for care with adequate details should be made available in every paediatric department. These should be prepared and maintained up to date by the local paediatric endocrinologists and made available in hard and soft copies.

10.3.2 Specific challenges to diabetic care in younger people at different stages

10.3.2.1 Challenges for infants and toddlers, and their caregivers

- Dependence on parents and care providers for managing diabetes
- Irregular eating and activity levels
- Difficulties for caregivers to distinguish normal behaviour from diabetes-related mood swings
- Pain caused by injections and glucose monitoring
- Hypoglycaemia (low blood sugar) is more common.

10.3.2.2 Challenges for school-age children

- Adjusting to change from home to school environment
- Establishing relationships with other children
- Learning to self-manage their diabetes
- Adapting their diabetes to the school environment.

10.3.2.3 Challenges for adolescents

- Higher insulin insensitivity linked to puberty
- Rapid behavioural changes
- Increased risk of depression, anxiety, and low self esteem
- Transition to adult services.

10.3.3 Practical issues in clinical management of diabetes issues in younger people

10.3.3.1 Insulin dose

Insulin dose depends on many factors such as, age, weight, stage of puberty, duration and phase of diabetes, state of injection sites, nutritional intake and distribution, exercise patterns, daily routine, results of blood glucose monitoring (and HbA_{1c}), intercurrent illness. The “correct” dose of insulin is that which achieves the best attainable glycemic control for an individual child or adolescent without causing obvious hypoglycaemia problems, and the harmonious growth according to weight and height children’s charts.

Professionals should be aware of the continuing need for increasing insulin dose with growth, and in particular increased dose requirements on entering puberty.

10.2.3.2 Insulin regimen

The choice of insulin regimen will depend on many factors including age, duration of diabetes, lifestyle (dietary patterns, exercise schedules, school), targets of metabolic control and particularly individual patient/family preferences. These are advised to the child and parents by the specialist paediatrician.

Available options include:

- The basal-bolus regimen: (intermediate-acting or long-acting insulin (analogues) once or twice daily to cover basal needs and rapid-acting or regular insulin boluses with meals and snacks) has the best possibility of imitating the physiological insulin profile
- Premixed Insulin: at least two injections of insulin per day (pre-mixed short/rapid-acting and NPH-style basal insulin).

10.3.3.3 Adjustment of insulin doses

Patients, families, junior doctors and educators need to be instructed on how to adjust insulin doses for consistent high blood glucose levels depending on the most likely physiological/pharmacological explanations.

When using carbohydrate counting, persistent elevations of plasma glucose may require adjustment in ratios for carbohydrate. Unexplained hypoglycaemia requires re-evaluation of insulin therapy. Day to day insulin adjustments may be necessary for variations in lifestyle routine especially exercise or dietary changes. Various levels of exercise require adjustment of diabetes management.

Special advice may be helpful when there are changes of routine, travel, school outings, educational holidays/diabetes camps or other activities, which may

require adjustment of insulin doses. During periods of regular change in consumption of food (e.g. Ramadan) the total amount of insulin should not be reduced but redistributed according to the amount and timing of carbohydrate intake. However, if total calorie intake is reduced during Ramadan, the daily amount of bolus insulin for meals usually needs to be reduced for example to two-thirds or three-quarters of the usual dose.

10.3.3.4 Metabolic control

SMBG is an essential tool in the optimal management of childhood and adolescent diabetes. It should be made available for all children with diabetes. The frequency should be individualized to optimize each child's diabetes control.

Glycaemic control: Reasonable blood glucose goals are similar to those in adults (see above) except in infants & toddlers, when 100-220 mg/dl and even up to 240 mg/dl may have to be acceptable.

Testing for ketones: This should be available and performed during illness with fever and/or vomiting, when blood glucose is >250 mg/dl in an unwell child, or when persistent BG levels above 250 mg/dl are present, when there is persistent polyuria with elevated BG, especially if abdominal pain or rapid breathing are present.

HbA_{1c}: Facilities for the measurement of HbA_{1c} should be available to all centres caring for young people with diabetes. The target HbA_{1c} for all age groups is <7.5 % with minimal levels of hypoglycaemia.

10.3.3.5 Sick-day management

Sick day management in children and adolescents with diabetes is an essential component of education of children and parents.

General principles: Never stop insulin, maintain hydration, treat the illness. Monitor frequently for blood glucose and urine ketones.

Need for hospital care: Timely referral to hospital should be encouraged, and in particular if:

- the underlying condition is unclear
- there is worsening dehydration
- vomiting persists beyond 2 hours
- blood glucose continues to rise
- blood glucose falls to <70 mg/dl and cannot be raised
- there is a change in conscious level
- in children >2-3 years old
- a risk of DKA is identified and this cannot be managed at home.

10.3.4 Special types of diabetes in younger people

All forms of diabetes should be recognized and treated promptly, with timely referral to the designated diabetes paediatrician.

These include:

- Type 2 DM in young people: clinical presentation is similar to type 1 DM. However, it is a slowly progressive disease. Most patients remain asymptomatic for long time. It may be accompanied by the presence of microvascular and macrovascular complication at time of diagnosis
- Monogenic DM: Maturity onset diabetes of the youth characteristics suggests the possibility of this diagnosis of various single gene defects
- Neonatal diabetes: Insulin-requiring hyperglycaemia in the first three months of life. It can be a transient or the start of permanent neonatal diabetes. It should suggest a form of monogenic diabetes.

10.3.5 Acute complications of diabetes in young people

Diabetic ketoacidosis: see Section 8.2 and Appendix 4

Hypoglycaemia: see Section 8.3 and Appendix 5

10.3.6 Transition from paediatric to adult services

The transition from a paediatric to an adult orientated service should not involve a sudden unanticipated transfer but an organized process of preparation and adaptation. The process should be a component of a high quality diabetes service (including the use of linked databases) and must involve both teams of carers but an understanding of the two different systems of care and the differing expectations of those providing and those receiving care. There is a potential danger that young people become lost in the transition process and cease regular attendance at the specialized service. This is likely to be associated with poor adherence to treatment with increased risk of acute and long-term complications of diabetes including increased mortality.

For successful transition to an adult service, the following steps should be considered:

- Identifying an adult service able to provide for the needs of young adults with diabetes
- Providing a joint adolescent or young adult clinic with members of both professional teams working together to facilitate the transition process for both adolescents and their parents.
- Liaison between the paediatric and adult services. Ideally, this should involve identifying a specific person in the service who is able to move between both services to help the transition of the young person into the adult service
- Discussion with the adolescent and parents well in advance as to the best time for transfer (around the age of 10 yr), based on their own preference and readiness, and on the availability of services
- It is preferable to have flexibility about age of transition as family circumstances and an adolescent's psychosocial maturity differ widely.

Development of clear, documented plans for transition services, and provision of a clinical summary of young person's medical history including indices of control, the

results of complication screening and information on any co-morbidities that may influence how the person is managed medically.

10.4 Care of older adults with diabetes

Older adults can be treated with the same drug regimens as younger patients, but special care is required in prescribing and monitoring drug therapy.

Drugs should be started at the lowest dose, especially sulfonylureas, and titrated up gradually until targets are reached or side effects develop.

It may be appropriate to relax glycaemic targets in some individuals.