

NATIONAL CLINICAL GUIDELINES

DIABETES MELLITUS IN SPECIAL SITUATIONS

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Valid From: 11th March 2021

Date of Next Revision: 11th March 2023



المبادئ الإرشادية السريرية لدولة قطر
NATIONAL CLINICAL GUIDELINES FOR QATAR



وزارة الصحة العامة
Ministry of Public Health
دولة قطر • State of Qatar

Version History

Version	Status	Date	Editor	Description
1.0	Final	4 th March 2018	Guidelines Team	Final version for publication.
2.0	Final	11 th March 2021	Guidelines Team	Final version for publication.

Citation

Suggested citation style:

Ministry of Public Health Qatar. National Clinical Guideline: Diabetes Mellitus in Special Situations. (2021).

Abbreviations

The abbreviations used in this guideline are as follows:

AIDS	Acquired Immunodeficiency Syndrome
CKD	Chronic Kidney Disease
CSII	Continuous Subcutaneous Insulin Infusion
DAFNE	Dose Adjustment for Normal Eating Programme
DESMOND	Diabetes Education and Self-Management for Ongoing and Newly Diagnosed Programme
DKA	Diabetic Ketoacidosis
DMMP	Diabetes Medical Management Plan
DPP-4	Dipeptidyl Ppeptidase-4
DSME	Diabetes Self-Management Education
DSMS	Diabetes Self-Management Support
EDI-3	Eating Disorders linventory-3
GAD65	Glutamic Acid Decarboxylase Antibodies.
GDM	Gestational Diabetes Mellitus
GLP-1	Glucagon-Like Peptide-1
HbA_{1c}	Glycated Haemoglobin
HIV	Human Immunodeficiency Virus
ID	Intellectual disability
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance

MDD	Major Depressive Disorder
MDI	Multi-Dose Injection
MoCA	Montreal Cognitive Assessment
MODY	Maturity-Onset Diabetes of the Young
MOPH	Ministry of Public Health of Qatar
NPH	Neutral Protamine Hagedorn Insulin
PCOS	Polycystic Ovary Syndrome
PHQ	Patient Health Questionnaire
SGLT-2	Sodium-Glucose Co-Transporter-2
SMBG	Self-Monitoring of Blood Glucose
SUs	Sulfonylureas
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
TDD	Total Daily Dose
TZD	Thiazolidinedione
UTI	Urinary Tract Infection
ZnT8	Zinc Transporter 8

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1 Information about this Guideline

1.1 Objective and Purpose of the Guideline

The purpose of this guideline is to characterise several situations in which the management of both type 1 and type 2 diabetes requires particular consideration. The objective is to improve appropriate investigation, prescribing and referral of patients presenting to provider organisations in Qatar. It is intended that the guideline will be used primarily by physicians, nurses, and health educators in primary care.

1.2 Scope of the Guideline

Aspects of care covered in this guideline include the following:

- Diabetes and driving.
- Diabetes in a work setting.
- Diabetes at school.
- Diabetes management during Ramadan and Hajj.
- Diabetes in dementia.
- Diabetes and mental health.
- Diabetes in people with intellectual and physical disabilities.

Aspects of care not covered in this guideline include the following:

- Initial assessment and diagnosis of type 1 or type 2 diabetes in children, adolescents, adults, or elderly.

1.3 Editorial Approach

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this guideline, has involved the following critical steps:

- Extensive literature search for well-reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising healthcare professionals, subject matter experts and patient representatives, from across Qatar.
- Independent review of the guideline by the National Clinical Guidelines & Pathways Committee, appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Whilst the MOPH has sponsored the development of the guideline, the MOPH has not influenced the specific recommendations made within it.

1.4 Sources of Evidence

The professional literature has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a member of the Editorial Team and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals.
3. Address an aspect of specific importance to the guideline in question.

Further information about the literature search and appraisal process is included in the appendix.

1.5 Evidence Grading and Recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
 - Meta-analyses.
 - Randomised controlled trials with meta-analysis.
 - Randomised controlled trials.
 - Systematic reviews.
- **Level 2 (L2):**
 - Observational studies, examples include:
 - Cohort studies with statistical adjustment for potential confounders.
 - Cohort studies without adjustment.
 - Case series with historical or literature controls.
 - Uncontrolled case series.
 - Statements in published articles or textbooks.
- **Level 3 (L3):**
 - Expert opinion.
 - Unpublished data, examples include:
 - Large database analyses.
 - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A (RGA):** Evidence demonstrates at least moderate certainty of a net benefit from the recommendation.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C (RGC):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.

1.6 Guideline Development Group Members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the National Clinical Guidelines & Pathways Committee. The GDG members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

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1.7 National Clinical Guidelines & Pathways Committee Members

The following table lists members of the National Clinical Guidelines & Pathways Committee (NCGPC), appointed by the MOPH. The NCGPC members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

National Clinical Guidelines & Pathways Committee (NCGPC) Members		
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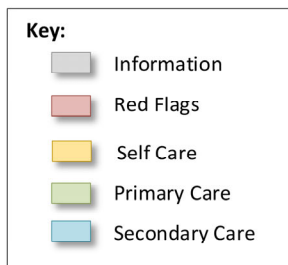
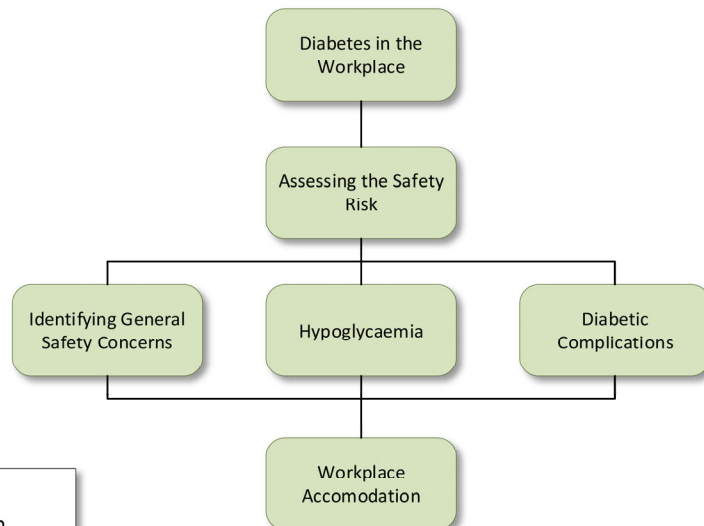
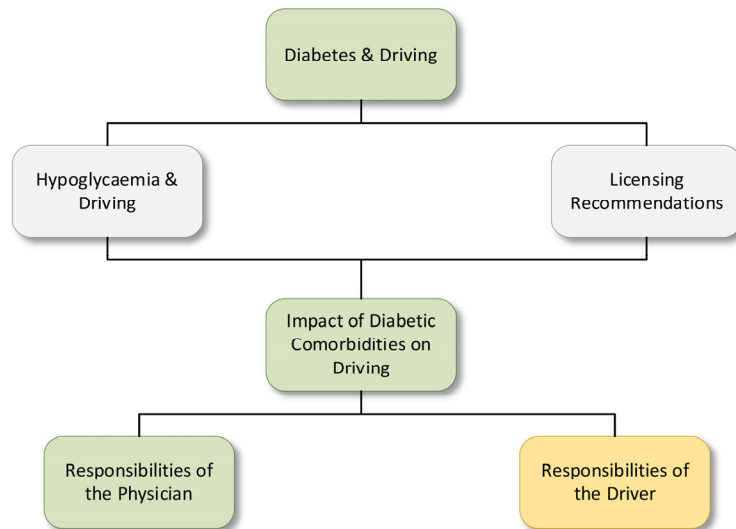
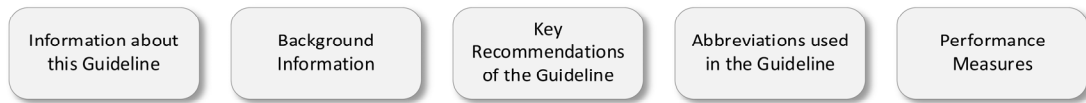
1.8 Responsibilities of Healthcare Professionals

This guideline has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

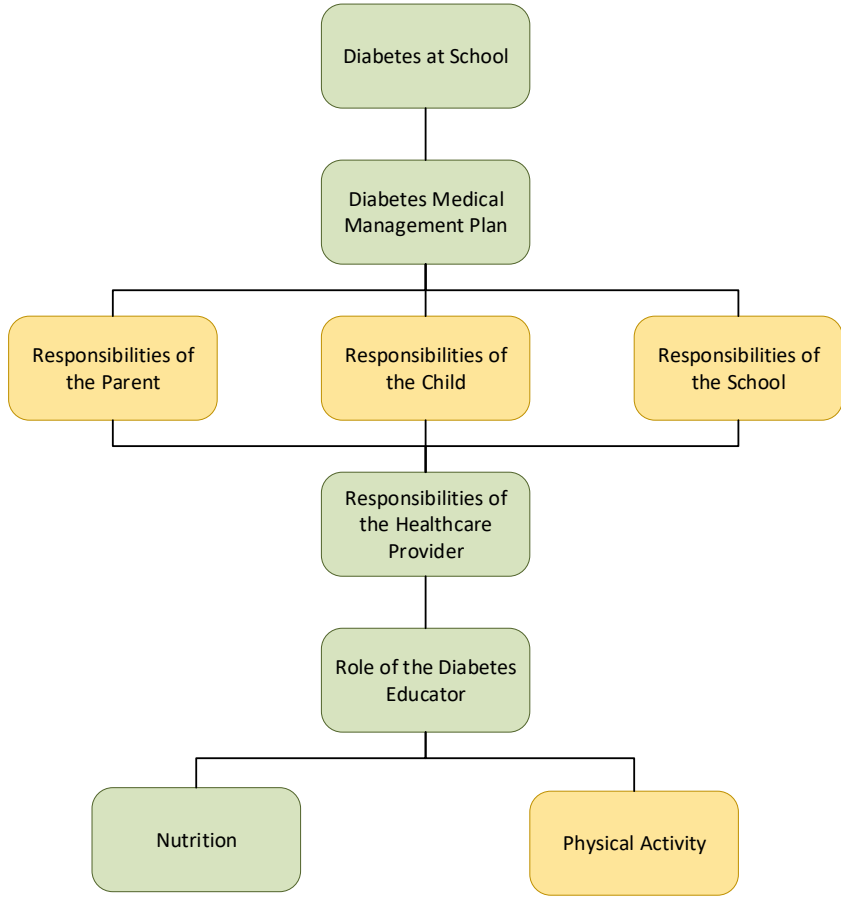
The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or caregivers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

2 Diabetes Mellitus Special Situations Pathway

Click on a box below to see the relevant page of the Pathway.

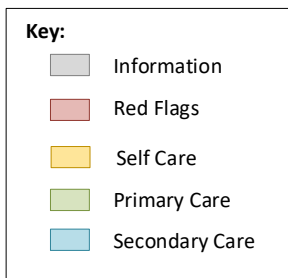
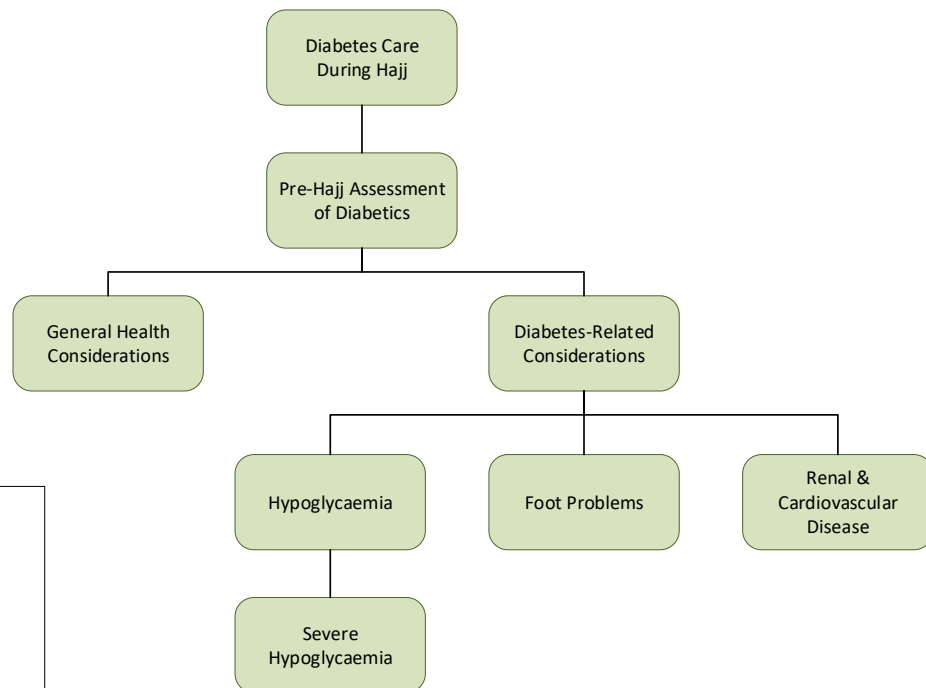
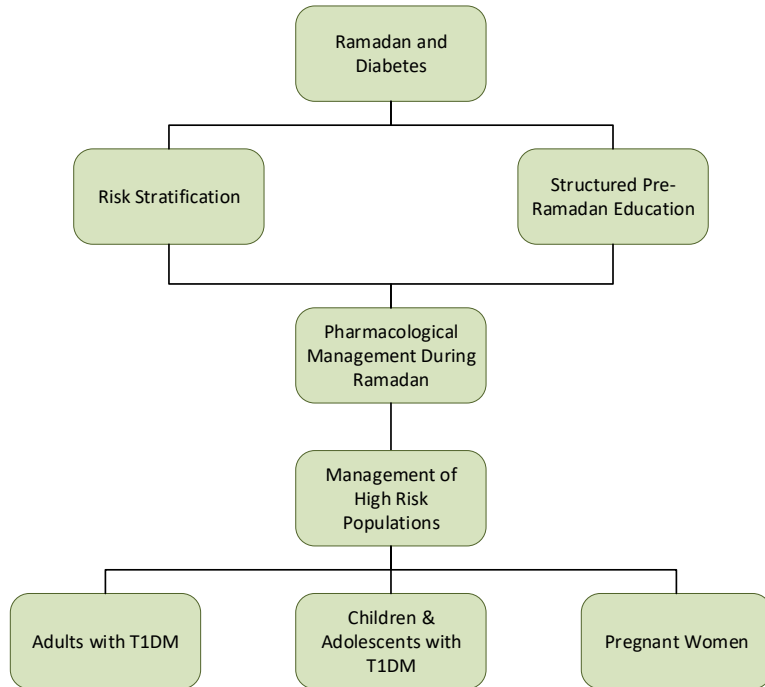
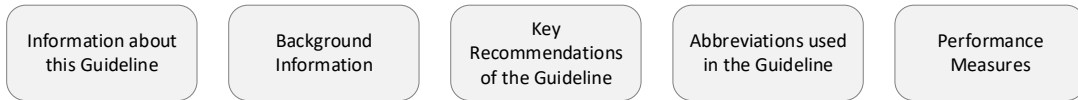


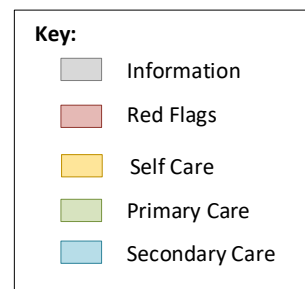
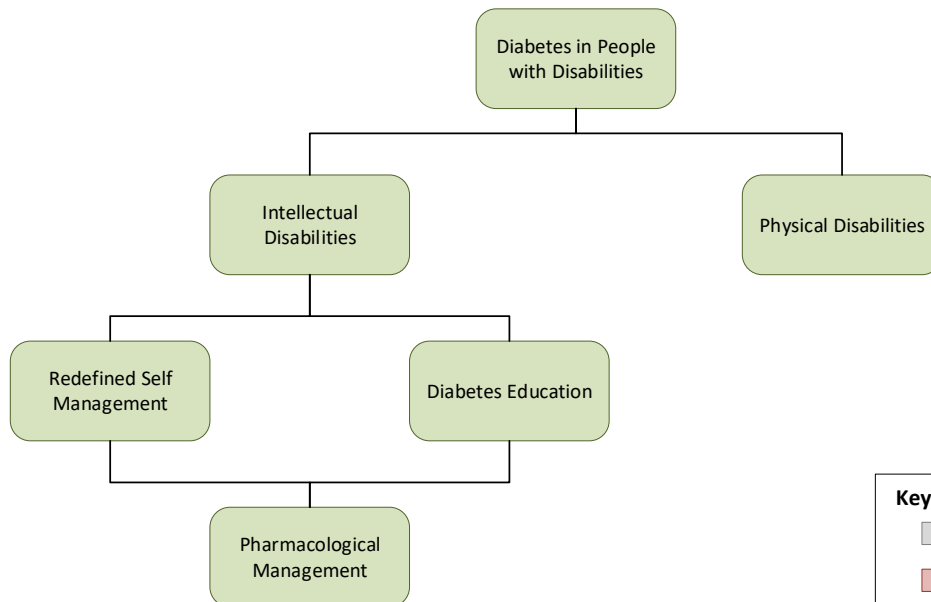
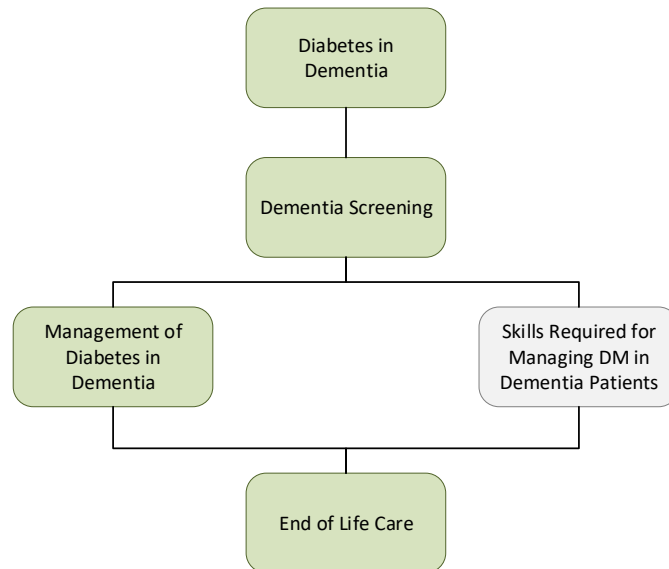
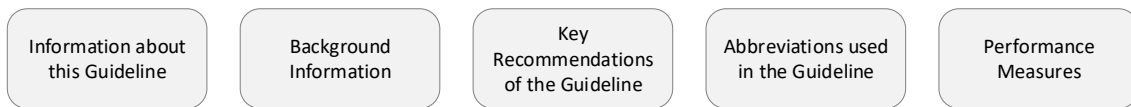
- Information about this Guideline
- Background Information
- Key Recommendations of the Guideline
- Abbreviations used in the Guideline
- Performance Measures

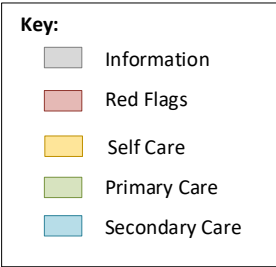
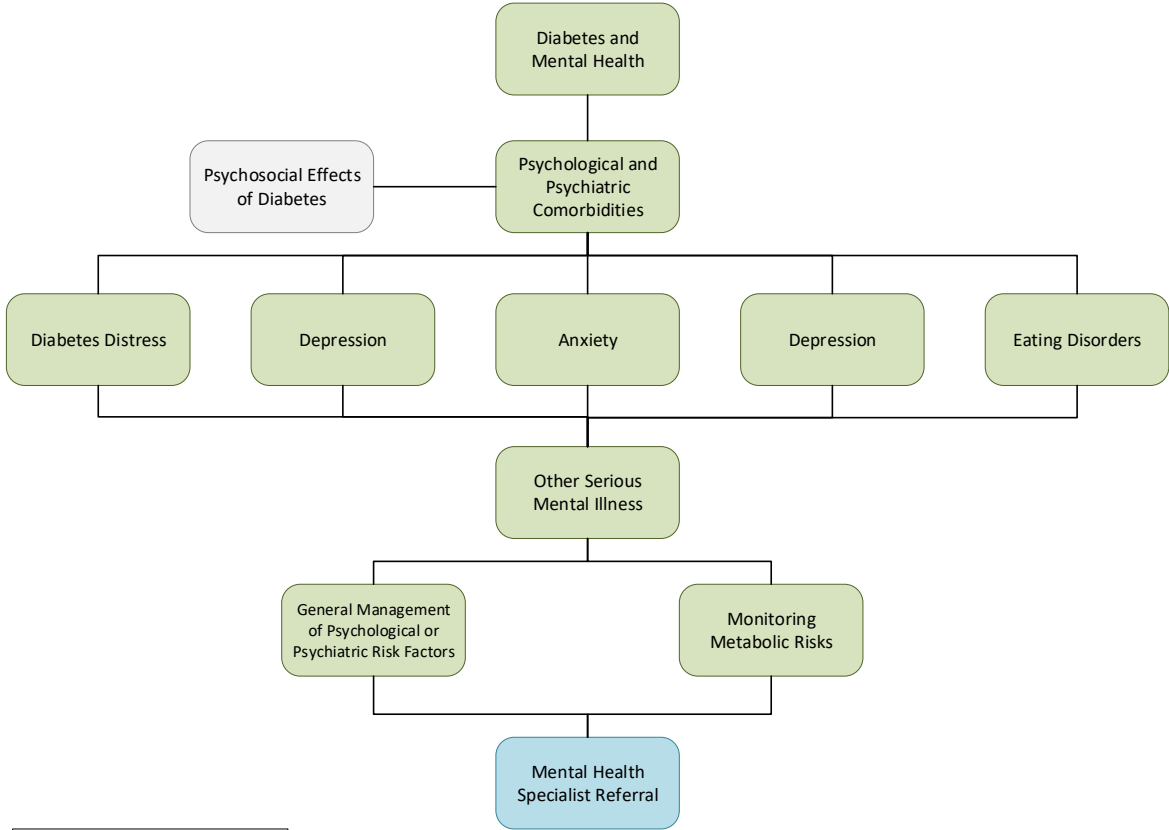
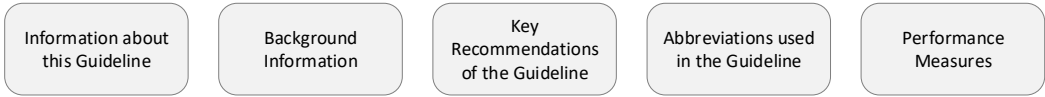


Key:

- Information
- Red Flags
- Self Care
- Primary Care
- Secondary Care







3 Key Recommendations of the Guideline

The key recommendations of this guideline are:

Diabetes and Driving (Section 5):

- Patients with the following characteristics should be advised against driving a motorcycle or car, because of the likely risk to the public and themselves [R-GDG]:
 - Hypoglycaemia unawareness.
 - More than one episode of severe hypoglycaemia in the previous 12 months.
 - Inability to demonstrate appropriate glucose monitoring, if treated with insulin or a sulfonylurea:
 - Appropriate glucose monitoring is defined as:
 - Glucose testing by self-monitoring of blood glucose (glucometer) or continuous glucose monitoring (personal glucose sensor) no more than 2 hours before the start of the first journey and every 2 hours while driving (or more frequently, if required).
 - Compliance with the directions of the treatment regimen outlined by the healthcare professional.
 - Visual impairment.
 - Severe peripheral neuropathy.
- Patients with the following characteristics should be advised against driving an oversized vehicle (bus or lorry) or operating heavy machinery, because of the likely risk to the public and themselves [R-GDG]:
 - Hypoglycaemia unawareness *of any degree*.
 - Any episode of severe hypoglycaemia in the preceding 12 months.
 - Inability to demonstrate appropriate glucose monitoring, if treated with insulin or a sulfonylurea:
 - Appropriate glucose monitoring in this group of patients, is defined as:
 - Regular glucose testing – at least twice daily and more frequently for those on multi-dose injection (MDI) regimens, including on days when not driving.
 - Glucose testing no more than 2 hours before the start of the first journey and every 2 hours while driving.
 - Use of a glucose meter/glucose sensor with memory function to ensure 3 months of readings that will be available for assessment.
 - Attendance of an annual review of diabetes management by a physician.
 - Failure to demonstrate an understanding of the risks of hypoglycaemia.
 - Visual impairment.
 - Severe peripheral neuropathy.

Diabetes in the Work Setting (Section 6):

- An individual with diabetes may require minor accommodation or modification in the workplace in order to be able to safely and effectively do their job, which can be identified and recommended by their treating physician ¹ [L3] (see Section 6.3).
- These workplace accommodations should be based on:
 - The specific requirements of the job; and
 - The individual's, medical history, and their treatment regimen.

Diabetes at School (Section 7):

- Most children spend a significant portion of their day in school and/or various childcare programmes; therefore, proper management of diabetes within the school setting is essential to ² [L2, RGA]:
 - Reduce the risk of short- and long-term diabetic complications.
 - Ensure the safety of the child.
 - Allow for full participation in all school activities.
 - Reduce any interruptions to academic performance.
 - Ensure a normal school attendance ³.
 - Ensure child quality of life.
- The school has a responsibility to ensure the appropriate staff are trained and are able to manage daily diabetes-specific tasks and diabetes emergencies competently ².
- Specific training for school staff can be delivered by a diabetes educator or a member of the diabetes specialist team, and includes training listed in *Section 7.5* ⁴.
- The student's healthcare provider should develop an individualised DMMP in collaboration with the student and parent/guardian ² [L1, RGA]:
 - A signed release of confidentiality limited to diabetes-related care may be required so that the healthcare provider can communicate with the school.
- Frequent contact (clinic, telephone, etc.) with the child, parent/caregiver, and school staff is recommended to optimise management and the fluctuating requirements of diabetes, particularly in its early phases ⁵. Confident, clear, and positive support and advice should be offered ⁵ [L2, RGA].
- Children using insulin pump or glucose sensor, might also use a mobile phone with medical application to share data in real life with their parents/caregivers [R-GDG].
- Children with diabetes should participate fully in physical activity, which should be facilitated by the recommendations made by the diabetes educator ³ [L1, RGA] (see *Section 7.9*).

Ramadan and Hajj (Section 8):

- All patients with T1DM and T2DM are considered exempt from fasting during Ramadan on medical and religious grounds, due to the risk of severe complications ^{6,7}.
- However, fasting may still be permitted if the patient is at low-risk of complications and has an optimal glucose control, and several individuals may participate, even against medical advice.
- Hajj also presents a particular challenge for diabetics, as Hajj duties can be demanding both physically and mentally ⁸ [L2]. Considerable care must therefore be taken for all individuals with diabetes prior to and during Hajj ⁸.
- A pre-Ramadan assessment should occur 6-8 weeks prior to the start of Ramadan to allow for risk stratification of the patient, determine whether the patient intends to fast, and develop an individualised management plan ^{6,7} [L1, RGA].
- Ramadan-focused education should raise the awareness of the risks of diabetes and fasting, allowing the patient to make informed decisions regarding their diabetes management. Such education should aim to reduce the risks of fasting with a simplified delivery from trained professionals ⁶ [L2, RGA].
- See *Section 8.4* for specific recommendations on the pharmacological management of fasting diabetic patients.
- See *Section 8.6* for specific recommendations on managing diabetic patients who plan to perform Hajj.

Diabetes in Dementia (Section 9):

- Screening ⁹:
 - Elderly patients should be screened and monitored for cognitive impairment ⁹ [L2, RGA].
 - May be considered in elderly patients who have difficulties with their activities of daily living ⁹ [L3, RGA].

- Consider screening and treating depression in older adults (≥ 65 years of age) with diabetes as a high priority ⁹ [L2].
- Management considerations for patients with both diabetes and dementia include ^{9,10} [L2, RGA]:
 - Simplify drug regimens and give once daily medication wherever possible.
 - Involve caregivers in all aspects of care.
 - Review the nutritional status often, aiming to maintain weight and good nutrition.
 - Recognise the onset of the terminal phase of severe dementia and modify medications appropriately.
 - For those who are dependent on supportive care, carers should be aware of appropriate timing of medication and access to food.

Diabetes and Mental Health (Section 10):

- Mental health comorbidities commonly associated with diabetes include ¹¹:
 - Depression.
 - Anxiety.
 - Eating disorders.
 - Various psychiatric disorders, including ^{11,12}:
 - Bipolar disorder; and
 - Schizophrenia.
- Routinely screen for psychosocial problems, using the Patient Health Questionnaire (PHQ-2 questions) ⁹ [L1, RGA]:
 - If positive, assess for depression using the PHQ-9 scoring system:
 - The PHQ-9 is a relatively short questionnaire that can be completed by most patients or carers in a clinic setting within 10-15 minutes.
- Offer patients with diabetes and their family members/carers ⁹ [L2]:
 - Timely and ongoing access to mental health professionals.
 - Emotional support after diagnosis, which should be tailored to their emotional, social, cultural, and age-dependent needs.
- Encourage patients to join the *Qatar Diabetes Association* to promote a healthy lifestyle, emotional support and improve motivation [R-GDG].
- See *Section 10* for further specific information on the management of depression, anxiety, eating disorders and other psychiatric illnesses.

Diabetes in People with Disabilities (Section 11):

- Maintaining an optimal glucose range is more complicated in people with intellectual disabilities (ID), due to ^{13,14} [L2]:
 - Inability to consistently recognise the symptoms of hyperglycaemia or hypoglycaemia, resulting in poor glycaemic control.
 - Lack of comprehension and communication difficulties.
 - Interference of prescribed medication e.g. antiepileptics, antipsychotics and neuropathic pain management.
 - Challenging behaviours demonstrated.
 - Difficulty differentiating between diabetes symptoms and symptoms arising from other comorbid health conditions.
 - Lack of support from family or carers, or they lack understanding of how to appropriately manage diabetes.
- Diabetes education and medical care should be readily accessible to patients with ID and their caregivers and delivered at regular intervals by a specialist diabetes educator with appropriate time allocated [R-GDG].
- The complexity of self-management of diabetes will increase with any physical disability, particularly if the individual's eyesight, hearing or fine motor skills are altered ¹⁵ [L2].

- To overcome barriers in achieving good glycaemic control, there are several adaptations a healthcare professional and the individual can make to allow for effective self-management of diabetes ¹⁵ [**L3**] (see *Section 11.3* for further detail).
- The physician and diabetes educator should ¹⁶ [**L2, RGA**]:
 - Plan for education according to the individual's disabilities.
 - Educate the individual and caregiver in an appropriate, accessible, and meaningful way.
 - Assess the individual for both obvious and more subtle disabilities pertaining to diabetes care.

4 Background Information

4.1 Classification

The general categories of diabetes are classified as follows ^{9,17,18}:

- Type 1 diabetes mellitus (T1DM) is caused by damage to the insulin-producing beta-cells within the pancreas. This results in an absolute deficiency of insulin, requiring exogenous replacement.
- Type 2 diabetes mellitus (T2DM) is caused by a progressive reduction in insulin secretion occurring in conjunction with increasing resistance to endogenous insulin.
- Gestational diabetes mellitus (GDM) is carbohydrate intolerance that occurs in pregnant women without known pre-existing diabetes.
- Specific types of diabetes due to other causes, such as ⁹:
 - Monogenic diabetes syndromes, e.g.:
 - Neonatal diabetes.
 - Maturity-onset diabetes of the young (MODY).
- Secondary diabetes includes:
 - Diseases of the exocrine pancreas, e.g. ^{9,17}:
 - Any process that extensively injures the pancreas can cause diabetes e.g.:
 - Cystic fibrosis.
 - Haemochromatosis.
 - Trauma.
 - Infection.
 - Pancreatitis.
 - Pancreatectomy.
 - Pancreatic carcinoma.
 - Drug- or chemical-induced diabetes, e.g. ⁹:
 - With glucocorticoid use.
 - In HIV/AIDS treatment.
 - Following organ transplantation.
 - Chemotherapy.
 - Endocrinopathies ¹⁷:
 - Acromegaly.
 - Cushing's syndrome or disease.
 - Glucagonoma.
 - Pheochromocytoma.
 - Hyperthyroidism sm.

Childhood T1DM is defined by the presence of one or more of the following autoimmune markers ⁹:

- Islet cell autoantibodies.
- Insulin autoantibodies.
- Glutamic acid decarboxylase (GAD65) antibodies.
- Antibodies to tyrosine phosphatases IA-2 and IA-2β.
- Antibodies to zinc transporter-8 (ZnT8).

Childhood T2DM is typically seen in children who ¹⁷:

- Are overweight or obese at presentation.
- Have a strong family history of T2DM.
- At diagnosis, have substantial residual insulin secretory capacity (reflected by normal or elevated insulin and C-peptide concentrations).
- Demonstrate insulin resistance (including clinical evidence of polycystic ovary syndrome (PCOS) or acanthosis nigricans).

- Lack evidence for diabetic autoimmunity (i.e. are negative for autoantibodies typically associated with T1DM).

Pre-diabetes¹⁸:

- Is a term used to refer to individuals with an impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT).
- Indicates a high risk for the future development of T2DM and cardiovascular disease.

4.2 Epidemiology

The *International Diabetes Federation* estimates the diabetes national prevalence in Qatar to be 15.5% ¹⁹.

The 2012 *Qatar STEPwise Survey* conducted with Qatari adults aged 18-64 years showed the following results amongst the 2,496 respondents ²⁰:

- 12.7% had been diagnosed with diabetes in the previous 12 months:
 - The rate was slightly higher in women at 13.3%, when compared to men at 12%.
 - There was an increase in rates with increasing age.
- 5.8% were found to have IFG.
- 66% of all respondents had a positive family history of diabetes (in parents, children, brothers, and sisters).

4.3 Further Information

For detailed information on the diagnosis and management of both T1DM and T2DM in children, adolescents, adults and elderly, or chronic complications of diabetes mellitus, refer the following MOPH National Guidelines²¹⁻²⁴:

- *The Diagnosis and Management of Type 1 Diabetes Mellitus in Adults and The Elderly.*
- *The Diagnosis and Management of Type 2 Diabetes Mellitus in Adults and The Elderly.*
- *The Diagnosis and Management of Diabetes Mellitus in Children and Adolescents.*
- *The Diagnosis and Management of Chronic Complications of Diabetes Mellitus.*

5 Diabetes and Driving

5.1 Background

The cognitive, motor, and sensory skills required for driving may be adversely affected by diabetes and associated diabetic medication ²⁵. The prevalence of diabetes in the Gulf Cooperation Council countries is among the highest globally and as the number of diabetic patients increase, the risk of diabetes-related motor vehicle accidents is also expected to rise ²⁵.

The predominant issue around diabetes and driving is the risk of hypoglycaemia occurring whilst driving, particularly for individuals who are treated with insulin or sulfonylureas ²⁶.

NB: A history of hypoglycaemia does not indicate the patient with diabetes is incapable of safe driving, but rather they require an appropriate evaluation to determine ²⁶ [L2]:

- The cause of hypoglycaemia.
- The circumstances of the episode – whether it was an isolated incident or recurrent.
- If adjustments to their treatment regimen may mitigate the risk.
- The probability of hypoglycaemia recurring:
 - Recurrent episode of severe hypoglycaemia (>2 episodes per year) may indicate that the patient is unable to safely operate a motor vehicle.

5.2 Hypoglycaemia and Driving

The most significant factor associated with driving accidents in drivers with diabetes, is a history of severe hypoglycaemia, regardless of the type of diabetes or the treatment regimen ²⁶ [L2].

The following definitions apply in the context of driving:

Severe hypoglycaemia ²⁶:

- Low glucose levels resulting in:
 - Neuroglycopenia that disrupts cognitive motor function; and
 - Requires another person's assistance in administering glucagon or other resuscitative actions.

Moderate hypoglycaemia ²⁶:

- Moderately low glucose levels and:
 - The driver can still treat themselves but can no longer drive safely.

Hypoglycaemia unawareness ²⁷:

- Onset of neuroglycopenia before the appearance of autonomic warning symptoms.

Hypoglycaemia most commonly occurs as a side effect of diabetes related medication. Insulin and sulfonylureas pose an increased risk of iatrogenic hypoglycaemia ^{9,25,26}.

Fasting during Ramadan ²⁵:

- In patients with diabetes who fast:
 - The incidence of severe hypoglycaemia increases 7.5-fold; and
 - The incidence of severe hyperglycaemia increases 5-fold.
- The increased incidence of both severe hypoglycaemia and hyperglycaemia during Ramadan may impact safe driving and should be considered by patients and healthcare professionals.

NB: Hyperglycaemia ²⁶:

- Significant hyperglycaemia may impair cognitive, motor, and perceptual functioning.
- Dehydration due to the hot desert climate of Qatar, can predispose the patient to hyperglycaemia.
- However, there is little evidence suggesting extreme hyperglycaemia affects driving safety.

5.3 Impact of Diabetic Comorbidities on Driving

Several comorbidities associated with diabetes may also adversely affect an individual's ability to drive safely, such as ²⁵:

- Diabetic retinopathy:
 - Patients may experience increased difficulty with driving, particularly at night.
- Diabetic neuropathy:
 - Patients may be unaware of how much pressure to apply to the pedals or how far to turn the steering wheel.
- Obstructive sleep apnoea:
 - There is an increased prevalence of obstructive sleep apnoea in patients with T2DM.
 - Sleep apnoea puts drivers at an increased risk of a motor vehicle accident.

5.4 Licensing Recommendations

There are a variety of licensing requirements and restrictions, which occur at multiple points and depend on the type of vehicle. These involve different levels and types of review ²⁶.

Patients with the following characteristics should be advised against driving a motorcycle or car, because of the likely risk to the public and themselves [R-GDG]:

- Hypoglycaemia unawareness.
- More than one episode of severe hypoglycaemia in the previous 12 months.
- Inability to demonstrate appropriate glucose monitoring, if treated with insulin or a sulfonylurea.
 - Appropriate glucose monitoring is defined as:
 - Glucose testing no more than 2 hours before the start of the first journey and every 2 hours while driving (or more frequently, if required).
 - Compliance with the directions of the treatment regimen outlined by the healthcare professional.
- Visual impairment.
- Severe peripheral neuropathy.

Patients with the following characteristics should be advised against driving an oversized vehicle (bus or lorry) or operating heavy machinery, because of the likely risk to the public and themselves [R-GDG]:

- Hypoglycaemia unawareness.
- Hypoglycaemia unawareness *of any degree*.
- Any episode of severe hypoglycaemia in the preceding 12 months.
- Inability to demonstrate appropriate glucose monitoring, if treated with insulin or a sulfonylurea.
 - Appropriate glucose monitoring in this group of patients, is defined as:
 - Regular glucose testing – at least twice daily and more frequently for those on multi-dose injection (MDI) regimens, including on days when not driving.

- Glucose testing no more than 2 hours before the start of the first journey and every 2 hours while driving.
 - Use of a glucose meter/glucose sensor with memory function to ensure 3 months of readings that will be available for assessment.
 - Attendance of an annual review of diabetes management by a physician.
- Failure to demonstrate an understanding of the risks of hypoglycaemia.
- Visual impairment.
- Severe peripheral neuropathy.

The National Diabetes Guideline Development Group recommends that the Ministry of Interior and the Traffic Department, implements the above recommendations into driving licensing policies and procedures [R-GDG].

5.5 Responsibilities of the Driver

It is the responsibility of the driving licence holder to:

- Notify the licensing authorities about their diabetes diagnosis when applying or renewing their driver's licence [R-GDG].
- Discuss their condition openly and honestly with their physician to ensure that if there is a problem, the physician can provide appropriate clinical intervention and promote safety ²⁶.
- Monitor glucose, if at any risk of hypoglycaemia ²⁶:
 - Prior to driving a motor vehicle.
 - Every 2 hours whilst driving.
- Be aware of factors that may predict a decline in glucose levels, including ²⁶:
 - Time of insulin administration.
 - Time of last meal.
 - Exercise type, duration, intensity, and timing.
- Be capable of recognising hypoglycaemia and be able to initiate immediate management.
- Not drive until glucose levels have reached an acceptable range, approximately 30-60 minutes following a hypoglycaemic episode, due to delayed recovery of cognitive function ²⁶.

5.6 Responsibilities of the Physician

It is the responsibility of the treating physician to ²⁶:

- Regularly assess the patient with diabetes.
- Provide a recommendation to the patient as to whether or not their condition impairs their ability to safely operate a motor vehicle.
- Provide:
 - Education regarding driving with diabetes and all possible risks associated with the patient's treatment regimen.
 - Instruction on preventing and responding to hypoglycaemia.
 - Awareness regarding the patient's vulnerability for driving accidents and knowing when it is unsafe for the patient to drive.
 - Education on the effect of any present diabetes-related complications on the ability to drive.
- Recommend to patients who are at an increased risk of hypoglycaemia to ²⁶:
 - Always have in their vehicle:
 - A glucometer.
 - A fast-acting source of glucose (e.g. juice, dextrose tablets, etc.)

- Snacks with complex carbohydrate, fat, and protein.
- Never start a long drive without prophylactic carbohydrate consumption to avoid hypoglycaemia during the drive, when low-normal glucose levels are present, such as:
 - 3.9 - 5.0 mmol/L (70 - 90 mg/dL).
 - The optimal self-monitoring glucose level when driving is at least 5 mmol/L (90 mg/dL) [**R-GDG**].
- Immediately stop the vehicle in a safe place if symptoms of low glucose levels present and manage the hypoglycaemia appropriately ²⁶.
- Do not resume driving until their glucose levels normalise (≥ 5.0 mmol/L or 90 mg/dl) and their cognition has recovered ²⁶.

6 Diabetes in the Work Setting

6.1 Background

In general, diabetes should not impact an individual's ability to work and any person with diabetes, regardless of which type, should be eligible for any employment opportunity for which they are qualified²⁸ [L3].

The impact of diabetes and its management varies significantly amongst individuals and therefore decisions regarding employment should not be made based on generalisations of the effects of diabetes²⁸. In instances where an individual's safety and effectiveness at work is in question due to diabetes-related issues, an individualised assessment should be performed prior to making any adverse employment decisions, such as²⁸:

- Failure to hire.
- Failure to promote.
- Termination of employment.

6.2 Assessing the Safety Risk

6.2.1 Identifying General Safety Concerns

Assess the safety risk of individuals with diabetes, including²⁸:

- Determine whether safety concerns are reasonable in regard to the specific responsibilities of the job:
 - In most types of employment, i.e. office jobs, retail, food industry, the safety risk for both the individual and the public is not usually a concern.
 - Certain types of employment, i.e. jobs which involve operating dangerous machinery or carrying a firearm, the risk of the individual becoming disoriented or impaired should be a primary concern.
 - Employment that involves shift work is associated with poorer control of diabetes and people with T1DM should be discouraged from doing shift work where possible²⁸.

6.2.2 Hypoglycaemia

Hypoglycaemia (<3.9 mmol/L, 70 mg/dL) is a potential work place risk, particularly for individuals being treated with insulin and sulfonylureas²⁸ [L2, RGA]:

- Investigate whether the individual is able to effectively self-monitor their condition appropriately. Specifically, are they able to detect and manage low glucose levels.
- Identify the level of risk of incapacitation from hypoglycaemia unawareness:
 - Determine the degree of hypoglycaemia unawareness, if any, by investigating the number and circumstance of hypoglycaemic events experienced by the individual.
 - Risks resulting from hypoglycaemia unawareness may be mitigated by incorporating changes to the individual's management regimen, e.g. increased frequency of glucose monitoring and meals, as well as re-educating the patient on appropriate diabetes management.

Severe hypoglycaemia²⁸:

- A single episode of severe hypoglycaemia should not usually disqualify a person from employment²⁸ [L3]:

- Determine the cause and circumstance of the episode of low glucose levels.
- Determine whether an individual is experiencing recurrent episodes of severe hypoglycaemia:
 - If appropriate, integrate a corrected treatment regimen and a structured education program for the patient on recognising and managing hypoglycaemia.
- Assess a series of self-monitored glucose measurements:
 - If the individual experiences recurrent episodes of hypoglycaemia that remain unexplained, it may indicate that they are unable to safely perform the job.

Patients with the following characteristics should be advised against operating heavy machinery because of the likely risk to the public and themselves [R-GDG]:

- Hypoglycaemia unawareness.
- More than one episode of severe hypoglycaemia in the previous 12 months.
- Inability to demonstrate appropriate glucose monitoring, if treated with insulin or a sulfonylurea.
 - Appropriate glucose monitoring is defined as:
 - Compliance with the directions of the treatment regimen outlined by the healthcare professional.
- Visual impairment.
- Severe peripheral neuropathy.

6.2.3 Diabetic Complications

Diabetic complications (i.e. retinopathy, neuropathy, nephropathy, comorbid heart disease) ¹:

- Should be identified and evaluated:
 - Determine whether and to what degree the established condition interferes with the performance of the job, such as visual impairment, and neurological impairment.

6.3 Recommendations on Workplace Accommodation

An individual with diabetes may require minor accommodation or modification in the workplace in order to be able to safely and effectively do their job, which can be identified and recommended by their treating physician ¹ [L3]:

- Accommodations that employees require generally include:
 - Breaks and if necessary, a safe/private place for glucose monitoring and insulin injection.
 - A place to appropriately store insulin and other medical supplies.
 - Access to healthy food/drinks as and when needed.
 - Availability of food and/or a hypokit to counteract a hypoglycaemic event.
 - Time off or a flexible schedule may be required for diabetes-related care or illness.
 - Reasonable modifications to accommodate diabetic complications, such as:
 - An individual with diabetic retinopathy or other visual impairments may benefit from a larger computer screen or other visual aids.
 - An individual with neuropathy may benefit from reduced unnecessary movement or a mainly seated position.
 - An individual with diabetic nephropathy may require designated time off work to receive dialysis treatment.
- These workplace accommodations should be based on:
 - The specific requirements of the job; and
 - The individual's, medical history, and their treatment regimen.

7 Diabetes at School

7.1 Background

Most children spend a significant portion of their day in school and/or various childcare programmes; therefore, proper management of diabetes within the school setting is essential to ² [L2, RGA]:

- Reduce the risk of short- and long-term diabetic complications.
- Ensure the safety of the child.
- Allow for full participation in all school activities.
- Reduce any interruptions to academic performance.
- Ensure a normal school attendance ³.
- Ensure child quality of life.

Appropriate monitoring and responding to glucose levels must be carried out throughout the day. This should be facilitated by a multi-disciplinary approach involving the coordination of care amongst ²:

- The child.
- The parent/guardian of the child.
- The school staff.
- The healthcare provider in the school setting.
- The diabetic educator in the school setting, where available.

7.2 Diabetes Medical Management Plan

The diabetes medical management plan (DMMP) is a written document developed by the student's healthcare provider that outlines the specific needs of the child during the school day and throughout any related activities, including ²:

- The frequency and situations requiring glucose monitoring and the use of continuous glucose monitoring.
- Insulin administration (if required):
 - Using the child's preferred insulin delivery method, including prescribed doses/injection times for specific glucose values and carbohydrate intake.
 - The appropriate storage of insulin, glucagon, and other diabetes supplies (glucose strips, ketone strips, glucometer, alcohol swabs, etc.).
 - When necessary, physician authorisation of parent/guardian adjustments to insulin dosage.
- Meals and snacks - food content, amounts, and timing.
- Symptoms and treatment of hypoglycaemia - the administration of glucagon or glucose gel/tablets, if recommended by the student's healthcare provider.
- Symptoms and treatment of hyperglycaemia - the administration of insulin, if recommended by the student's healthcare provider.
- Checking for ketones and appropriate actions to take for abnormal glucose and ketone levels, if requested by the student's healthcare provider.
- Ensuring participation in physical activity (see *Section 7.9*).
- Emergency contacts and plans.
- Children using insulin pump or glucose sensor, might also use a mobile phone with medical application to share data in real life with their parents/caregivers [R-GDG].

An individualised record keeping system should be maintained by school staff, of glucose and ketone results throughout the day and shared with the student's care-givers [R-GDG].

NB: Where available, the student's own glucometer should be used in preference to the school's glucometer to enable storage of school-time glucose readings by the student [R-GDG].

7.3 Responsibilities of the Child

All children will require assistance from a trained member of staff in the event of a diabetes emergency. However, many older children can self-manage their diabetes and should be allowed to do so at school to the extent that is appropriate based on the child's development and experience with diabetes. The ages at which the child is able to be independent in performing the management tasks vary ²:

- The degree of self-management by the student should be assessed and agreed upon by the parent/guardian, the student's health care provider, and school staff.
- Independence in older youth should be encouraged and facilitated to allow the child to become responsible for all aspects of their own care.

Children aged 5 years and below, are usually unable to manage their diabetes independently and will require care provided by a trained member of staff ²:

- Young children may have hypoglycaemia unawareness – it is therefore crucial that the staff member who is supervising the child, can recognise hypoglycaemia and provide immediate treatment.
- Young children may feel comfortable with selecting which finger to prick and an injection site.

7.4 Responsibilities of the Parent or Guardian

The parent or guardian is responsible for providing and maintaining all equipment, materials, and supplies necessary for diabetes management, including ²:

- Glucose monitoring.
- Insulin administration (if required).
- Glucose gel/tablets or a source of fast-acting carbohydrate.
- Glucagon emergency kit.
- Blood or urine ketone monitoring.
- Healthy food and snacks.
- The appropriate tools for safe handling and disposal of materials.

The parent/guardian is also responsible for ²:

- Ensuring the DMMP contains correct and up to date information, regarding:
 - The student's diabetes management – including any changes to glucose monitoring or insulin administration.
 - Emergency contact details of the parent/guardian, healthcare provider, and diabetes educator.
 - The student's meal and snack schedule:
 - The parent/guardian should liaise with the school staff prior to the start of the year to coordinate a schedule that coincides with that of the other students.
 - Instructions should be given for situations when food is provided during school events/activities.

7.5 Responsibilities of the School

The school has a responsibility to ensure the appropriate staff are trained and are able to manage daily diabetes-specific tasks and diabetes emergencies competently ².

Specific training for school staff can be delivered by a diabetes educator or a member of the diabetes specialist team, and includes ⁴:

- **Level 1 Training:**
 - Should be given to all school staff.
 - Includes:
 - A basic overview of diabetes.
 - Basic needs of a student with diabetes.
 - How to recognise hypoglycaemia and hyperglycaemia.
- **Level 2 Training:**
 - Should be given to school staff members who are responsible for students with diabetes.
 - Includes Level 1 training and:
 - Management of mild hypoglycaemia using fast-acting carbohydrate or glucose gel; and
 - Any accommodations required by the student.
- **Level 3 Training:**
 - Should be given to a small group of school staff who will be performing student-specific management and emergency care tasks when a school nurse is not available.
 - Includes all elements of Level 1 and 2 Training, as well as:
 - Glucose monitoring with glucometer and continuous glucose monitoring with glucose sensors.
 - Insulin administration (e.g. syringe, insulin pen, or insulin pump).
 - Glucagon administration.

The trained school staff should provide ²:

- Immediate management of hypoglycaemia – supplies should be in close proximity to the child.
- Access to trained staff as and when required.
- Scheduled insulin at predetermined times as per the student's DMMP.
- A location that allows for privacy during glucose and ketone monitoring, and insulin administration where the child feels comfortable.
- A location and means for safe disposal of sharps/equipment.
- Permission for children who are able to self-manage, to carry equipment, supplies, medication, and snacks and use whenever required.
- Permission to miss school or leave the classroom without consequence, to manage their diabetes and prevent hypoglycaemia.
- Information on food served at school – i.e. carbohydrate, fat, and caloric content of meals.
- At least one trained school staff member who is available at all times, including during school-sponsored extracurricular activities and field trips.
- Identification of children with diabetes to school staff (trained to Levels 2 and 3), in a manner which protects the child's privacy, according to the child and family's wishes [R-GDG].

7.6 Responsibilities of the Healthcare Provider

The student's healthcare provider should develop an individualised DMMP in collaboration with the student and parent/guardian² [L1, RGA]:

- A signed release of confidentiality limited to diabetes-related care may be required so that the healthcare provider can communicate with the school.

Frequent contact (clinic, telephone, etc.) with the child, parent/caregiver, and school staff is recommended to optimise management and the fluctuating requirements of diabetes, particularly in its early phases⁵. Confident, clear, and positive support and advice should be offered⁵ [L2, RGA].

7.7 The Role of the Diabetes Educator

The diabetes educator serves as a consultant, educator, resource, facilitator, and advocate for the child and their parents/caregivers, the healthcare provider, and school staff⁵. The diabetes educator may⁵:

- Be the primary contact and liaison between the school, parent/guardian, and healthcare provider to coordinate care and achieve:
 - Maintenance of glucose levels within the child's target range.
 - Prevention of hypoglycaemia and hyperglycaemia.
 - Positive coping skills, minimising any diabetes-related school stress and/or depression.
 - Reduction in the risk of any chronic complications of diabetes.
- Be a resource for training and educating the relevant medical and non-medical staff who are responsible for the child whilst at school.
- Educate and facilitate behaviour change of children with diabetes, parents/guardians, and school staff.
- Develop education material and provide awareness and training across the school [R-GDG].
- Liaise with the healthcare provider to develop, implement, and monitor the child's DMMP.
- Promote Diabetes Self-Management Education (DSME) and Support (DSMS).
- Provide emergency contact telephone numbers to the school.

Education to be provided to the school, by the diabetes educator should include the following⁵:

- Types of diabetes and the pathophysiology of T1DM and T2DM.
- Education about normal glucose levels and glucose targets.
- The importance of medication, types, and storage conditions.
- Teaching practical skills, including:
 - Insulin and glucagon injection technique and sites.
 - Glucose testing, safe glucometer use, and timings.
 - Interpretation of results.
- Simple explanation of prevention and management of hypoglycaemia or hyperglycaemia.
- How to prevent diabetic ketoacidosis (DKA).
- Management of diabetes during illnesses.
- T1DM management during physical activity.
- Education regarding insulin pumps or new technologies, if prescribed by the diabetologist.
- Re-education when needed (at least annually [R-GDG]).
- Meal planning and carbohydrate counting [R-GDG].

7.8 Nutrition

In general, nutritional requirements for children with diabetes do not differ from those of all other children, however³:

- A child may benefit from an individualised food plan that follows the basic diabetes nutrition principles of health eating with the addition of carbohydrate counting.
- The diabetes educator should liaise with school staff about appropriate meal planning in line with the child's eating patterns and insulin/and or oral diabetes medication plan, including:
 - A flexible or more regimented carbohydrate counting approach to ensure carbohydrates are carefully matched to balance insulin action.
- If the parent/guardian provides the child with food for school, the school staff member responsible for diabetes care of the child should be aware and communicated with.

School personnel should be attentive to any eating disorders/disordered eating behaviours in youth with diabetes, particularly in adolescent females. These behaviours can range from bulimia and insulin-purging (deliberate omission of, or reduction in, insulin doses to lose weight), to binge eating³.

7.9 Physical Activity

Children with diabetes should participate fully in physical activity, which should be facilitated by the recommendations made by the diabetes educator, including³ [**L1, RGA**]:

- Consideration of the type and duration of physical activity when planning meal/snack times and medication dosages:
 - The child's DMMP should include information regarding specific times when physical activity should be delayed, avoided, or encouraged².
 - Any exercise should be avoided if pre-activity glucose levels are high (>14 mmol/L, 250 mg/dL) with ketonemia (>0.5 mmol/L) or ketonuria²⁹:
 - Give approximately 0.05 U/kg or 5% of total daily dose (TDD), as a bolus of rapid-acting insulin and postpone exercise until ketones have cleared.
- Tailor insulin regimen to activity, including²⁹:
 - Determine the percentage reductions in insulin before exercise.
 - When exercise is planned at a time of peak insulin action, a marked reduction in dose should be made.
 - If the child is on an insulin pump:
 - The pump should be disconnected, or a temporary basal rate applied at least 60-90 minutes prior to exercise to induce a reduced basal effect.
 - Avoid injection of insulin into a site that will be predominantly involved in muscular activity.
- The need for food intake during physical activity²⁹:
 - Consume up to 1.0–1.5 g of carbohydrate (without insulin), per kilogram of body mass, per hour of mild to moderate exercise if pre-exercise insulin doses are not decreased.
 - School personnel should understand the signs, symptoms, and treatment of exercise-induced hypoglycaemia:
 - Ensure a fast-acting carbohydrate containing snack is readily accessible to the child.
 - Hypoglycaemia is also possible up to 24 hours' post-exercise due to increased insulin sensitivity.

8 Ramadan and Hajj

8.1 Background

All patients with T1DM and T2DM are considered exempt from fasting during Ramadan on medical and religious grounds, due to the risk of severe complications^{6,7}. However, fasting may still be permitted if the patient is at low-risk of complications and has an optimal glucose control, and several individuals may participate, even against medical advice. For those who do participate, ensuring optimal management of diabetes is imperative⁶.

The key components to managing diabetes during fasting include^{6,7} [**L2, RGA**]:

- Risk stratification.
- Glucose monitoring.
- Nutritional advice.
- Exercise advice.
- Medication adjustments.
- Advice on when to break a fast to avoid any acute complications.

Hajj also present a particular challenge for diabetics, as Hajj duties can be demanding both physically and mentally⁸ [**L2**]. Considerable care must therefore be taken for all individuals with diabetes prior to and during Hajj⁸.

8.2 Risk Stratification for Fasting During Ramadan

During fasting, insulin resistance/deficiency may result in^{6,7,30,31}:

- Excessive glycogen breakdown.
- Increased gluconeogenesis.
- Ketogenesis.
- Increased risk of:
 - Hypoglycaemia.
 - Hyperglycaemia.
 - Diabetic ketoacidosis.
 - Dehydration.
 - Thrombosis⁷:
 - Hyperglycaemia and hypovolaemia contribute towards hypercoagulability, which increases the risk of thrombosis.

A pre-Ramadan assessment should occur 8-12 weeks prior to the start of Ramadan [**R-GDG**] to allow for risk stratification of the patient, determine whether the patient intends to fast, and develop an individualised management plan^{6,7} [**L1, RGA**].

Pre-Ramadan risk stratification assessment should incorporate^{6,7}:

- A review of the patient's diabetic and general medical history.
- Assessment of the risk of hypoglycaemia and degree of hypoglycaemia unawareness.
- Determination of self-management capabilities.
- Assessment of any diabetic complications or associated comorbidities.

The following risk stratification classifies patients with diabetes into 3 different risk groups^{6,30,31}:

- Very high and high risk groups are strongly advised against fasting.
- In moderate/low risk patients, fasting may be possible, where insisted upon by the patient.

Moderate/Low Risk	High Risk	Very High Risk
May be Allowed to Fast	Should NOT Fast	MUST NOT Fast
Well-controlled T2DM in a patient treated with one or more of the following: <ul style="list-style-type: none"> • Lifestyle therapy. • Metformin. • Thiazolidinediones. • Second-generation sulfonylureas (SUs). • Incretin-based therapy. • SGLT-2 inhibitors. • Basal insulin. 	Patient has one or more of the following: <ul style="list-style-type: none"> • T2DM with sustained poor glycaemic control*. • Well-controlled T2DM on multi-dose injections or mixed insulin. • Pregnant T2DM or GDM controlled by diet only or metformin. • Chronic kidney disease (CKD) Stage 3. • Stable macrovascular complications. • Patients with comorbid conditions that present additional risk factors. • People with T2DM performing intense physical labour. • Treatment with drugs that may affect cognitive function. 	Patient has one or more of the following: <ul style="list-style-type: none"> • Severe hypoglycaemia within the 3 months prior to Ramadan. • DKA within the 3 months prior to Ramadan. • Hyperosmolar hyperglycaemic coma within the 3 months prior to Ramadan. • History of recurrent hypoglycaemia. • History of hypoglycaemia unawareness. • Acute co-existing illness. • Pregnancy in pre-existing diabetes, or GDM treated with insulin or SUs. • Chronic dialysis or CKD stage 4 or 5. • Advanced macrovascular complications. • Old age with ill health.

*The level of glycaemia control should be agreed between the patient and their physician.

Table 8.2: Risk Stratification of Patients with Diabetes Who Wish to Fast During Ramadan ⁶.

If patients insist on fasting during Ramadan, then they should ⁶:

- Have a pre-Ramadan medical assessment – 2-3 months prior to Ramadan [R-GDG].
- Receive structured pre-Ramadan education (see Section 8.3).
- Be given a robust assessment of hypoglycaemia awareness.
- Be followed by a qualified diabetes team.
- Perform self-monitoring of blood glucose (SMBG) regularly.
- Adjust medication dose according to the recommendations outlined below.
- Be prepared to break a fast if hypoglycaemia or hyperglycaemia develops.
- Be prepared to stop fasting altogether, if frequent hypoglycaemia or hyperglycaemia events occur, or there is worsening of other related medical conditions.

8.3 Structured Pre-Ramadan Education

Ramadan-focused education should raise the awareness of the risks of diabetes and fasting, allowing the patient to make informed decisions regarding their diabetes management. Such education should aim to reduce the risks of fasting with a simplified delivery from trained professionals ⁶ [L2, RGA].

Pre-Ramadan education should comprise of the following components ^{6,32}:

- SMBG or Continuous Glucose Monitoring:
 - Measuring glucose levels does not invalidate or break the fast.
 - All patients should measure their glucose levels after iftar and if experiencing symptoms of either hypoglycaemia, hyperglycaemia or feeling unwell.
 - Patients at moderate-low risk of complications:
 - Measure at least 1-2 times/day.
 - Patients at high-very high risk (or those taking insulin or sulfonylureas):
 - Measure several times each day.
 - Patients should always check their glucose level before driving, especially while fasting.
 - Provide education on when patients should break their fast:
 - Glucose level <3.9 mmol/L (70 mg/dL). Recheck within 1 hour if their glucose level is 3.9-5.0 mmol/L (70-90 mg/dL).
 - Glucose level is >16.6 mmol/L (>300 mg/dL).
 - Symptoms of hypoglycaemia, hyperglycaemia, dehydration, or acute illness occur.
- Dietary advice ⁶:
 - Divide daily calories between iftar and suhoor, plus 1-2 snacks are permitted if necessary.
 - Ensure meals are well balanced:
 - 45-50% carbohydrate.
 - 20-30% protein.
 - <35% fat (preferably mono- and polyunsaturated).
 - Include low glycaemic index, high fibre foods that release energy slowly before and after fasting, e.g. granary bread, beans, rice.
 - Include some fruits, and plenty of non-starchy vegetables and salads.
 - Minimise foods that are high in saturated fats, e.g. ghee, samosas, pakoras, etc.
 - Avoid sugary desserts.
 - Use small amounts of oil when cooking, e.g. olive oil, rapeseed oil.
 - Keep hydrated between sunset and sunrise by drinking water or other non-sweetened beverages.
 - Minimise caffeinated drinks and avoid sweetened drinks.
- Exercise ⁶:
 - Avoid vigorous exercise whilst fasting.
 - Take light-to-moderate exercise during Ramadan (including Tarawih prayers).

8.4 Pharmacological Management During Ramadan

The following guidance outlines how patients should adjust their medication when fasting ⁶:

Metformin ⁶:

- Daily dose remains unchanged.
- Immediate-release preparations:
 - If taking once/day:
 - Take usual dose at iftar.
 - If taking twice/day:
 - Take usual doses at iftar and suhoor.
 - If taking 3 times/day:
 - Take the morning dose before suhoor.
 - Take afternoon and evening doses together at iftar.
- Modified-release preparation:
 - Take usual dose at iftar.

Thiazolidinediones:

- No adjustment to thiazolidinedione (TZD) medication is needed during Ramadan and doses can be taken with iftar or suhoor ⁶.

Sulfonylureas:

Use of older sulfonylureas (SUs), e.g. glyburide/glibenclamide, should be avoided. Second-generation SUs should be used instead (e.g. glicazide, glimepiride) ⁶:

- If taking once/day:
 - Take at iftar.
 - Dosing may be reduced if glucose levels are well-controlled.
- If taking twice/day:
 - Take the usual evening dose at iftar.
 - Reduce the suhoor dose if glucose levels are well controlled.

SGLT2 inhibitors ⁶:

- No dose modifications.
- Take the usual dose at iftar.
- Use with caution and consume additional clear fluids during the evening after a fast to reduce the risk of dehydration.
- Should not be used in:
 - The elderly.
 - Patients with renal impairments, hypotension or those taking diuretics.

DPP-4 inhibitors:

- No treatment modification is required during Ramadan ⁶.

GLP-1 receptor agonists:

- No treatment modification is required during Ramadan, as long as the dose has been adequately titrated at least 6 weeks prior to Ramadan beginning ⁶.
- Ensure adequate fluid intake throughout Ramadan ³².

Insulin:

The use of insulin analogues is preferred over regular human insulin during Ramadan fasting ^{30,31} [**L2, RGA**]. Gla-300 ³¹ and IDegAsp ³⁰ are recommended in patients with T2DM [**L2, RGA**]. IDegAsp should be preferred over BAsp 30 ³⁰.

Insulin treatment must be appropriately individualised:

- Long-acting (basal insulin) and short-acting insulin regimens ⁶:
 - Basal insulin:
 - If using NPH/detemir/glargine/degludec once daily:
 - Reduce dose by 15-30% and take at iftar.
 - If using NPH/detemir/glargine twice daily:
 - Take the usual morning dose at iftar.
 - Reduce the usual second dose by 50% and take at suhoor.
 - Short-acting insulin:
 - Take the normal dose at iftar.
 - Omit the lunchtime dose.
 - Reduce the suhoor dose by 25-50%.

- Pre-mixed insulin dosing regimen ⁶:
 - Once-daily dosing:
 - Take the normal dosing at iftar.
 - Twice-daily dosing:
 - Take the larger dose at iftar.
 - Take the smaller dose at suhoor and reduce dose by 25-50%.
 - 3 times/day dosing:
 - Omit the afternoon dose.
 - Adjust iftar and suhoor doses as for twice daily dosing.
 - Titrate doses every 3 days (see below).

NB: Treatment with an insulin pump system (continuous subcutaneous insulin infusion (CSII)) may benefit those patients with T2DM and poor glycaemic control already being treated with multiple daily injections of insulin, as this can be used safely in patients who fast ⁶.

The following table outlines recommended dose adjustments according to SMBG in patients prescribed long and short acting insulin regimens and appropriate dose titration in patients taking pre-mixed insulin.

Fasting, Pre-Iftar or Pre-Suhoor Glucose Results	Pre-iftar	Post-Iftar or Post-Suhoor	Dose Titration
	Basal insulin	Short-acting insulin	Pre-mixed insulin
<3.9 mmol/L (70 mg/dL) or Symptoms	Reduce by 4 units	Reduce by 4 units	Reduce by 4 units
3.9–5.0 mmol/L (70–90 mg/dL)	Reduce by 2 units	Reduce by 2 units	Reduce by 2 units
5.0–7.2 mmol/L (90–130 mg/dL)	No change required	No change required	No change required
7.2–11.1 mmol/L (130–200 mg/dL)	Increase by 2 units	Increase by 2 units	Increase by 2 units
>11.1 mmol/L (200 mg/dL)	Increase by 4 units	Increase by 4 units	Increase by 4 units

Table 8.4: Dose Adjustment and Titration in Insulin Regimens ⁶.

8.5 Management of High Risk Populations

8.5.1 Adults with T1DM

Fasting is not advised in patients with T1DM, particularly in those who have ⁶:

- A history of recurrent hypoglycaemia.
- Hypoglycaemia unawareness.
- Poor diabetes control.
- Brittle diabetes.
- Non-compliance with medical treatment.
- Patients who are 'unwilling' or 'unable' to monitor and manage their glucose levels.

For those with T1DM who do insist on fasting against medical advice, an emphasis must be placed on ⁶:

- Increased frequency of monitoring glucose levels throughout the day:
 - Especially when symptoms of hypoglycaemia are recognised.
- A firm understanding of:

- The risks of hypoglycaemia and hyperglycaemia.
- When to break their fast.
- Circumstances in which fasting should not occur, i.e. when unwell.

8.5.2 Young Adults or Adolescents with T1DM

Hypoglycaemia unawareness is of considerable concern in adolescents with T1DM and fasting is not advised in this group of patients ⁶:

- Commonly, hypoglycaemic episodes during fasting hours go unrecognised.

If the patient insists on fasting, they require the same considerations as adults with an emphasis on ⁶:

- Good glycaemia awareness.
- Appropriate glycaemic control pre-Ramadan.
- Knowledge and willingness to continuously monitor their glucose levels.
- The capability of appropriate medication adjustment as needed.
- Careful supervision by a physician.

Medication considerations ⁶:

- If the adolescent is on an MDI regimen:
 - Take long -acting insulin at iftar, but reduce dose by 30-40%; and
 - A usual dose of short-acting insulin at iftar, suhoor and any other meals and snacks, based on the carbohydrate content and glucose level.
- If the adolescent is on insulin pumps:
 - The changes to dose should be assessed by the patient's physician.

8.5.3 Pregnant Women

Pregnant women with hyperglycaemia (GDM or pre-existing diabetes) are stratified as very high risk and are strongly advised not to fast, especially those who are on insulin therapy as they are at an increased risk of hypoglycaemia ^{6,7}.

For those that insist on fasting ⁶:

- Modifications to their treatment regimen:
 - Diet and insulin modifications are the same as for adults with T1DM in conjunction with:
 - Increased frequency of glucose monitoring.
 - Focused education on the potential effects of fasting on the mother and the foetus.
 - Strict medical supervision by a diabetes specialist.

8.6 Diabetes Care During Hajj

8.6.1 General Health Considerations

Hajj duties can be challenging due to increased physical and mental demands, and disruption to routine, which may result in ³³:

- Neglected self-management of diabetes.
- Inadequate supply of medication.
- Decreased access to medical services when required.
- Aggravated chronic medical conditions, particularly in the elderly population.

- Intercurrent illness, e.g. upper respiratory tract infection, diarrhoea, heat stroke or dehydration.

8.6.2 Diabetes-Related Considerations:

8.6.2.1 Severe Hyperglycaemia

Severe hyperglycaemia ³³:

- Intercurrent illnesses and/or lack of sufficient insulin/medication predisposes a patient to the risk of severe hyperglycaemia and hyperglycaemic complications, such as:
 - Diabetic ketoacidosis.
 - Hyperglycaemic hyperosmolar state.
- Advise the patient that if illness occurs (e.g. respiratory infection), diabetes management may include ^{8,33}:
 - Seeking urgent medical attention.
 - Continuation or adjustment to diabetes medication.
 - Frequent monitoring of glucose levels – at least four times per day:
 - Adjust medication dose in response to test results.
 - For patients with T1DM, and T2DM on basal-bolus regimens:
 - Basal insulin should always be continued, but doses should be modified if food consumption is less than usual.
 - If glucose level is >13.9 mmol/L (250 mg/dL), or ketones are detected in urine:
 - Give additional correction doses of rapid-acting insulin analogues.
 - Encourage eating between doses of rapid-acting insulin analogues.
 - NB:
 - Omit additional doses if the glucose level is not elevated, even if ketones are present in blood or urine.
 - Ketones should decrease within 8 hours from the first dose of additional insulin.
 - For patients with T2DM:
 - If the patient is on oral anti-diabetic medication, the patient may require insulin temporarily during acute illnesses.

8.6.2.2 Hypoglycaemia

Hypoglycaemia ³³:

- Hypoglycaemic episodes commonly occur at Hajj due to:
 - Increased physical activities.
 - Inappropriate medication doses which do not reflect the change in normal routine and increased strenuous exercise.
 - A change in meal schedule due to performing prayers.

The risk of hypoglycaemia can be mitigated by appropriate modification of treatment regimens as outlined in *Table 8.6.2.2* below.

Drug Class	Modification to Regimen
<ul style="list-style-type: none"> • Metformin • Pioglitazone • GLP-1 agonists, • DPP-4 inhibitors 	<ul style="list-style-type: none"> • No dose adjustment required.
<ul style="list-style-type: none"> • Sulfonylureas • Meglitinides (glinides) 	<ul style="list-style-type: none"> • Dose should be reduced by 25-50% in most cases depending on the level of exertion, age of the patient and degree of renal function.
<ul style="list-style-type: none"> • SGLT-2 inhibitors 	<ul style="list-style-type: none"> • Temporarily withhold the use of SGLT-2 inhibitors during the Hajj period. • Consider adjusting the dose of other medication.
<ul style="list-style-type: none"> • Insulins 	<ul style="list-style-type: none"> • Patient's usual doses of insulin may require reduction depending on individual circumstances. • Basal insulins and pre-mixed insulins may require dose reduction by approximately 20% with further reductions under individual circumstances. • Fast-acting insulins should be adjusted according to glucose monitoring.

Table 8.6.2.2: Management of medication to mitigate risk of hypoglycaemia [R-GDG].

Mild to Moderate Hypoglycaemia:

Treatment of patients with mild-to-moderate hypoglycaemia comprises of⁹:

- 15–20g of Glucose (juice or glucose tablets/gels) is the preferred treatment for the conscious individual with hypoglycaemia, although any form of carbohydrate that contains glucose may be used.
- 15 mins after treatment, if SMBG shows continued hypoglycaemia, the treatment should be repeated.
- Once SMBG returns to normal, the individual should consume a meal or snack to prevent recurrence of hypoglycaemia.

Severe Hypoglycaemia:

Patients with a decreased level of consciousness³⁴ [L1]:

- Should be administered intramuscular glucagon by a family member or friend who has been educated on its use; and
- Then monitored for 10 minutes, if their level of consciousness is not significantly improving then they should be administered intravenous glucose; and
- Then given oral carbohydrate when it is safe for the patient and put under continued observation by a third party who has been warned of the risk of relapse.
- Send the patient to the Emergency Department if not improving [R-GDG].

8.6.2.3 Foot Problems

Foot problems^{33,35}:

- Most individuals at Hajj will travel on foot, which increases the risk of foot complications for those with diabetes, particularly those with diabetic neuropathy or peripheral vascular disease.
- Common problems include³⁵:
 - Blisters.
 - Soft tissue infections or contusions.
 - Superficial fungal infections, e.g. tinea pedis.

- To avoid risk of infection and/or poor healing, advise:
 - Regular foot inspection at least once per day and after performing any exercise.
 - Moisturising the feet 2 to 3 times per day to reduce the risk of cracking skin and potential infection ³⁵, but avoid moisturising between the toes [R-GDG].
 - Ensure appropriate footwear and avoid walking barefoot, throughout Hajj to avoid injuries, blistering and consequent infection.
 - Seek medical attention urgently if foot injury occurs [R-GDG].

8.6.2.4 Renal and Cardiovascular Disease

Renal and cardiovascular disease ³³:

- Heatstroke and renal failure are of considerable risk during Hajj, especially during summer.
- Patients with diabetic nephropathy must:
 - Ensure dehydration does not occur - by continuously consuming water (>2 litres per day).
 - If illness occurs. e.g. diarrhoea or vomiting:
 - Seek medical attention to ensure dehydration is immediately corrected.
 - If the patient is on diuretics:
 - Consider a dose reduction to avoid dehydration.

8.6.3 Pre-Hajj Assessment of Diabetic Patients

Individuals with diabetes who are going for Hajj should allow sufficient time to educate, discuss and construct a management plan with their treating physician ^{33,36}.

The physician should ensure ^{33,36}:

- Blood pressure, HbA_{1c} and renal function have been recently assessed.
- Treatment regimens are appropriate for the trip.
- Necessary vaccinations are completed:
- The patient is prepared with:
 - Sufficient medication and monitoring equipment.
 - Cool storage for insulin, if necessary.
 - Identifying wristband or card.
 - A letter detailing medical conditions and medications to expedite emergent medical care if required.
 - A diabetes emergency kit (i.e. glucogel and glucagon), particularly if the patient is on insulin or sulfonylurea.
 - For patients who cannot self-care, care givers should be trained in the administration of medication [R-GDG].
 - Carbohydrate containing fluids and food.
 - Appropriate protective footwear.
- A pre-travel cardiovascular assessment by a cardiologist, is recommended in patients with established or suspected coronary artery disease [R-GDG].
- Advise the patient to seek immediate medical attention if they experience ³⁶:
 - Chest pain.
 - Shortness of breath.
 - Palpitations.
- In the hypertensive patient [R-GDG]:
 - Blood pressure control should be optimised prior to Hajj.
 - Advise to self-monitor blood pressure throughout Hajj, when possible.

9 Diabetes in Dementia

9.1 Diabetes and Dementia

Cognitive dysfunction associated with T1DM ³⁷ [L2, RGB]:

- Subtle changes in reduced intelligence, processing speed, and mental flexibility, usually with slow progression over time, may represent a pre-dementia stage in patients aged over 65 years.
- Causal link with dementia is not yet established.

Older adults with T2DM are at increased risk of cognitive decline and institutionalisation ⁹:

- The presentation of cognitive impairment ranges from subtle executive dysfunction, to memory loss, and overt dementia.
- Compared to individuals with normal glucose tolerance, people with diabetes have higher incidences of:
 - All-cause dementia.
 - Vascular dementia.
 - Alzheimer's disease.

Cognitive impairment can present the following challenges for a patient with diabetes ^{9,10}:

- Difficulty reaching glycaemia, blood pressure, and lipid targets.
- Difficulty performing complex self-care tasks, such as glucose monitoring and adjusting insulin doses.
- Difficulty maintaining the appropriate timing and content of their diet.
- An increased risk of patient distress.
- Increased risk of hospitalisation.
- Increased likelihood of medication error and hypoglycaemia.

9.2 Dementia Screening

Screening for dementia ⁹:

- Elderly patients should be screened and monitored for cognitive impairment ⁹ [L2, RGA].
- May be considered in elderly patients who have difficulties with their activities of daily living ⁹ [L3, RGA].
- Consider screening and treating depression in older adults (≥ 65 years of age) with diabetes as a high priority ⁹ [L2].

Benefits of timely detection of dementia in a person with diabetes ¹⁰:

- Triggers a review of a patient's ability to self-manage and adherence with treatment regimen:
 - A new set of treatment goals and targets may be necessary.
- Provides the opportunity to consider the nature and degree of carer support required.
- Opportunity for forward planning of social and financial affairs, and provision of information about local support groups.
- Opportunity for health professionals to review glycaemic and blood pressure control and minimise hypoglycaemia.

9.3 Management of Diabetes in Dementia

Management considerations for patients with both diabetes and dementia include ^{9,10} [L2, RGA]:

- Simplify drug regimens and give once daily medication wherever possible.
- Involve caregivers in all aspects of care.
- Review the nutritional status often, aiming to maintain weight and good nutrition.
- Recognise the onset of the terminal phase of severe dementia and modify medications appropriately.
- For those who are dependent on supportive care, carers should:
 - Be aware of appropriate timing of medication and access to food:
 - Particularly important for those on insulin and some oral glucose lowering therapies.
 - Know which medications put people at risk of hypoglycaemia and how to recognise the signs and symptoms of hypoglycaemia.
 - Patients with dementia should have regular glucose monitoring (at least twice daily) if they are being treated with insulin, or certain oral anti-diabetic agents, as they are at risk of hypoglycaemia.

9.4 Skills Required for Managing a Patient with Dementia and Diabetes

Skills required for a specialist clinician to manage a patient with dementia and diabetes ¹⁰ [L2]:

- Understand dementia:
 - The progression of the diseases.
 - The effect on the person.
- Understand the difference between dementia and delirium:
 - Have the skills to identify delirium.
 - Awareness of management guidelines for delirium.
- Have the skills to communicate effectively with the person with dementia, their families, and carers.
- Understand the position of a person with dementia as a vulnerable adult.
- Have the skills required to:
 - Complete dementia screening.
 - Undertake a simple cognitive test, such as the Montreal Cognitive Assessment (MoCA).
 - Refer a patient to appropriate support services.
- Have the skills to understand the balance between managed risk and patient autonomy:
 - Assess the patient's ability to self-manage.
 - Understand the Mental Capacity Act.
 - Can undertake an assessment of a patient's mental capacity.
 - Understand the risks associated with a self-management model of care in dementia.
- Have an in-depth knowledge of the impact of dementia on the patient's:
 - Eating, drinking, appetite.
 - Swallowing.
 - Nutritional requirements.
- Understand the risk and can identify the triggers for hypoglycaemia in patients with dementia.
- Understand the requirements and can tailor the diabetes treatment:
 - To the lifestyle requirements and limitations of the patient.
 - With a primary focus on optimising patient outcomes, such as:
 - Decreased instances of hypoglycaemia and hyperglycaemia.
 - Maximising independence.
- Understand the rationale behind a flexible approach to HbA_{1c} management in this patient group.

9.5 End of Life Care

The primary goals for management of a patient with diabetes at the end of life are ^{9,38} [L3, RGA]:

- Overall comfort.
- Prevention of distressing symptoms (pain, hypoglycaemia, hyperglycaemia, and dehydration).
- Preservation of quality of life.
- Preservation of dignity.

Treatment regimens should need to be mindful of quality of life ⁹.

- Careful monitoring of oral intake is warranted.
- Pharmacological therapy may include oral agents as first line, followed by a simplified insulin regimen:
 - If required, basal insulin may be administered with oral agents, and without rapid-acting insulin.

Patients with advanced disease ⁹ [L2, RGA]:

- Stable patients:
 - Continue with the patient's current regimen.
 - Focus on:
 - The prevention of hypoglycaemia.
 - The management of hyperglycaemia.
 - Keeping glucose levels below the renal threshold for glucose.
 - There is little need for HbA_{1c} monitoring and lowering.
- A patient with organ failure:
 - Primary goal of avoiding hypoglycaemia and preventing dehydration.
 - In T1DM:
 - Insulin should be reduced, as oral food intake will likely decline.
 - In T2DM:
 - Agents that may cause hypoglycaemia will need to be titrated.
- A dying patient:
 - In T1DM:
 - A small amount of basal insulin may maintain glucose levels and avoid acute hyperglycaemic complications which may cause additional distress.
 - In T2DM:
 - Discontinue all medication, as patients are unlikely to have any oral intake.

9.5.1 Key Considerations

Key considerations ⁹:

- The patient has the right to refuse treatment and testing.
- Healthcare providers may consider limiting testing, such as finger stick testing frequency, and withdrawing treatment if appropriate ^{9,39,40} [L3, RGA].
- Any glycaemic targets should aim to prevent hypoglycaemia and hyperglycaemia.
- Bear in mind quality of life when considering treatment interventions.
- Carefully monitor oral intake.
- There may need to be involvement by the patient, their family, and other caregivers as part of the decision process.
- A care plan should be developed that is both convenient and effective for the goals of care.

10 Diabetes and Mental Health

10.1 Background

Both T1DM and T2DM can be a psychologically challenging disease for patients and their families/carers⁴¹. It may have a considerable impact on the patient's quality of life, and is a risk factor for diabetes-related distress and various psychiatric disorders⁴¹ [L1].

Following a diagnosis of diabetes, a patient may be challenged with^{11,41}:

- Adjusting to the disease.
- Adherence to a specific treatment regimen.
- Psychosocial factors:
 - Complex environmental factors.
 - Social factors.
 - Behavioural factors.
 - Emotional factors.

Psychosocial factors influence the patient's ability to live with diabetes, achieve appropriate medical outcomes, and maintain psychological well-being¹¹. Individualised, patient-centred care is required for an optimal outcome, which involves considering the needs and preferences of the patient in¹¹:

- Communication and interaction.
- Problem identification.
- Psychosocial screening.
- Diagnostic evaluation.
- Intervention.

Patients with mental health disorders, particularly individuals with depressive symptoms or syndromes, and those with diabetes share a reciprocal susceptibility and a high degree of comorbidity⁴¹. There are a variety of mechanisms responsible for the relationships between mental health disorders and diabetes, such as⁴¹:

- Treatment for mental health disorders may increase the risk of diabetes, especially with the use of second-generation (atypical) antipsychotic agents.
- Biochemical change due to the mental health disorders.
- Lifestyle changes and symptoms of mental health disorders.

Mental health comorbidities commonly associated with diabetes include¹¹:

- Depression.
- Anxiety.
- Eating disorders.
- Various psychiatric disorders, including^{11,12}:
 - Bipolar disorder; and
 - Schizophrenia.

Appropriate referrals to qualified mental health professionals should occur following routine monitoring and screening for¹¹ [L3]:

- Diabetes distress.
- Depression.
- Anxiety.
- Eating disorders.
- Other serious mental illness.
- Psychosocial factors, such as:
 - Levels of social, family, and carer support.

10.2 Psychosocial Effects of Diabetes

Psychosocial factors that may affect diabetes outcomes may include ^{11,42} [L2]:

- Adequacy of medical management.
- Duration of diabetes.
- The presence of other comorbidities and associated medication.
- Social-structural factors, e.g. income, education, employment access to care, and health insurance coverage.
- Functional limitations, e.g. low dexterity, health literacy, and numeracy.
- Inadequate support from family/friends/carers.
- Poor coping skills.
- Emotional distress or depressive symptoms.

The healthcare provider should encourage the patient in regards to self-management instead of placing blame, as patient perceptions about their own ability to self-manage diabetes is an important psychosocial factor related to improved management and treatment outcomes ¹¹.

Consider the patient's psychosocial circumstances while managing patients with diabetes ⁹:

- Psychosocial screening, includes consideration of ⁹ [L2]:
 - Attitude about the illness.
 - Expectations surrounding medical management and outcomes.
 - Mood.
 - Quality of life.
 - Resources:
 - Financial.
 - Social/Familial
 - Emotional.
 - Past psychiatric history.
- Routinely screen for psychosocial problems, using the Patient Health Questionnaire (PHQ-2 questions) ⁹ [L1, RGA]:
 - If positive, assess for depression using the PHQ-9 scoring system:
 - The PHQ-9 is a relatively short questionnaire that can be completed by most patients or carers in a clinic setting within 10-15 minutes.
- Offer patients with diabetes and their family members/carers ⁹ [L2]:
 - Timely and ongoing access to mental health professionals.
 - Emotional support after diagnosis, which should be tailored to their emotional, social, cultural, and age-dependent needs.

Encourage patients to join the *Qatar Diabetes Association* to promote a healthy lifestyle, emotional support and improve motivation [R-GDG].

10.3 Psychological and Psychiatric Comorbidities

Many factors affect diabetes self-management and glycaemic control, including each of the following.

10.3.1 Diabetes Distress

Diabetes distress may be attributed to ^{11,12,42}:

- The emotional impact of having the condition.
- The need for continuous monitoring and treatment, such as:

- Medication dosing, frequency, and titration.
- Fear of hypoglycaemia or hyperglycaemia.
 - The risk of hypoglycaemia and hyperglycaemia presents a major physiological and psychological challenge to attaining optimal glycaemic control.
- Monitoring glucose levels, food intake, eating schedule, and physical activity.
- Persistent concerns about complications and the possible loss of personal and professional relationships.
- High levels of diabetes distress significantly impact self-management and are associated with:
 - Higher levels of HbA_{1c}.
 - Decreased self-efficacy.
 - Poorer dietary and exercise behaviours.

In children and adolescents ⁴²:

- Approximately one-third will develop diabetes distress.
 - Parents of children with diabetes are also prone to diabetes distress:
 - Could impact their ability to provide support for the child.
 - Diabetes distress should be routinely monitored using patient-appropriate validated measures, i.e. Diabetes Distress Scale:
 - It is important to distinguish between diabetes distress, major depressive disorder, and the presence of depressive symptoms.
 - If diabetes distress is identified:
 - Refer the patient for diabetes education to focus on areas of diabetes self-management that impact diabetes outcomes.
 - If self-management remains impaired, refer patient to a mental health professional for further evaluation and support.
 - Teach family members effective problem-solving and conflict resolution skills to facilitate their ability to support their child with diabetes and achieve better glycaemic control.

10.3.2 Depression

In patients with diabetes, the prevalence of clinically relevant depressive symptoms and major depressive disorder (MDD) is approximately 30% and 10%, respectively ⁴¹. The prognosis for comorbid depression and diabetes is worse than with each illness individually, and depression in patients with diabetes amplifies symptom burden by a factor of 4 ⁴¹.

Risk factors for developing depression in those with diabetes include ⁴¹:

- Female gender.
- Adolescents/young adults and older adults.
- Poverty.
- Few social supports.
- Poor glycaemia control, especially with recurrent hypoglycaemia.
- Longer duration of diabetes.
- Presence of long-term complications.

Comorbid depression negatively impacts clinical outcomes in diabetes, which may be due to ⁴¹:

- Lethargy reduces motivation for continuous self-management.
- Lowered physical and psychological fitness.
- Increased use of healthcare services.
- Reduced adherence to medication regimens.

Assessment for depression should occur at diagnosis of diabetes, after development of any co-morbid conditions such as renal, eye or cardiovascular disease or when there are significant changes in medication¹¹.

Healthcare providers should consider an annual screening of all patients with diabetes with age-appropriate depression screening measures¹¹:

- If the patient screens positive, refer to a mental health professional for further evaluation and treatment, e.g. cognitive behavioural therapy.
- Consider incorporating mental and physical health care¹¹:
 - Integrate a mental health provider into the diabetes management team.
 - Incorporate a physical activity regimen into routine self-management, as it has been shown to improve the mental well-being of a patient with diabetes.
- Depression is often not recognised and inadequately managed in older people with diabetes^{9,11,12}:
 - Depression screening and treatment should be a high priority for older adults (≥65 years of age) with diabetes.
 - Social isolation may occur in many older people with diabetes, particularly if they have mental health problems and/or limited support.

10.3.3 Anxiety Disorders

Common anxiety symptoms and disorders in people with diabetes¹¹:

- Generalised anxiety disorder.
- Body dysmorphic disorder.
- Obsessive compulsive disorder.
- Specific phobias.
- Posttraumatic stress disorder.

Consider screening for anxiety in people displaying anxiety or worries regarding¹¹:

- Diabetes complications.
- Insulin injections or infusion.
- Taking medications.
- Hypoglycaemia that impacts self-management behaviours.
- Fear, dread, or irrational thoughts.
- Avoidance behaviours.
- Social withdrawal.

Common-diabetes specific concerns¹¹:

- Fear of hyperglycaemia or hypoglycaemia.
- Concerns about not meeting glucose targets.
- Insulin injections.
- Refer the patient to a mental health professional if anxiety is present.

10.3.4 Eating Disorders

Eating disorders^{11,41}:

- Compared to the general population, individuals with T1DM and T2DM are more frequently found to have an eating disorder, such as:
 - Anorexia nervosa.
 - Bulimia nervosa.
 - Binge eating.

- Being an adolescent female with T1DM appears to be a prominent risk factor for developing an eating disorder, specifically in regard to:
 - An increased prevalence of established eating disorder features; and
 - Deliberate insulin omission or under-dosing (diabulimia).
- Night Eating Syndrome:
 - Prevalent in individuals with T2DM and comorbid depressive symptoms.
 - Involves consumption of >25% of daily caloric intake following the evening meal, waking in the night to eat at least 3 times per week.
 - Can result in:
 - Weight gain.
 - Poor glycaemic control.
 - Increased incidence of diabetic complications.
- If identified, changes to the medication regimen are required until maladaptive eating patterns can be modified.
- Assessment and screening of disordered and disrupted eating should involve age-appropriate methods that account for medication, regimen behaviours, and diabetes-specific eating problems resulting from disease processes, such as:
 - The use of Eating Disorders Inventory-3 (EDI-3).

10.3.5 Other Serious Mental Illness

Bipolar Disorder:

- The prevalence of bipolar disorder has been found to be triple that of the general population in patients with diabetes ⁴¹.

Schizophrenia:

- Schizophrenia and various other psychotic disorders may contribute an independent risk factor for diabetes ⁴¹.

Recommendations ¹¹:

- Screen people annually who are prescribed atypical antipsychotic medications for prediabetes/diabetes.
- Incorporate monitoring of diabetes self-care activities into management goals in individuals with diabetes and serious mental illness.
- Disordered thinking can present a serious challenge to appropriate self-management of diabetes, and the patient may require consistent monitoring and support to achieve glycaemic control.

10.4 Mental Health Specialist Referral

Referral to an appropriate mental health specialist (i.e. psychologist, social worker, and psychiatrist) should be considered if ^{9,11,42}:

- Self-care remains impaired in a person with diabetes distress after tailored diabetes education is delivered.
- A person has a positive screen on a validated screening tool for depressive symptoms.
- In the presence of symptoms or suspicions of disordered eating behaviour, an eating disorder, or disrupted patterns of eating.
- Intentional omission of insulin or oral medication to cause weight loss is identified.
- Person has a positive screen for anxiety or fear of hypoglycaemia.
- A serious mental illness is suspected.

- In youth and families with behaviour self-care difficulties, repeated hospitalisations for diabetic ketoacidosis, or significant distress.
- A person screens positive for cognitive impairment.
- The patient's ability to perform self-care behaviours is declining or impaired.
- Self-harm or suicidal ideation.
- Gross disregard for the medical regimen.
- Depression.
- Debilitating anxiety (alone or with depression).
- Indications of an eating disorder.
- Cognitive function that significantly impairs judgement.

10.5 General Management of Psychological or Psychiatric Risk Factors

The following should be incorporated into diabetes management for all patients ⁴¹:

- Promote well-being and moderate distress.
- Motivational interventions.
- Coping skills.
- Self-efficacy enhancement.
- Stress management.
- Family interventions.

Individuals with diagnosed diabetes distress and/or psychiatric disorder will benefit from professional interventions, including:

- Psychotherapy; and/or
- Prescription medication.

10.6 Monitoring Metabolic Risks

Patients with diabetes with comorbid psychiatric illnesses are at an increased risk for developing metabolic syndrome, which could be attributed to a combination of factors, including ⁴¹:

- Patient-related factors, e.g.:
 - Lifestyle.
 - Diet.
 - Smoking.
 - Alcohol.
 - Exercise.
 - Obesity.
 - Decreased exposure to education programs.
- Illness factors, e.g.:
 - Proinflammatory states from major depressive disorder or depressive symptoms.
 - Potential disease-related risks for developing diabetes.
- Pharmacological factors, e.g.:
 - Psychiatric medications have a variable effect on metabolic factors, such as:
 - Glycaemic control.
 - Weight.
 - Lipid profile.
 - Immunomodulating effects.

Regular monitoring of all metabolic parameters is recommended, including ⁴¹:

- Weight and BMI.
- Waist circumference.
- Blood pressure.
- Fasting glucose and/or HbA_{1c}.
- Fasting lipid profile.

11 Diabetes in People with Disabilities

11.1 Background

The term intellectual disabilities (ID) is characterised by significant limitations in intellectual functioning and adaptive behaviours originating before the age of 18 years¹³. People with ID commonly demonstrate an IQ of <70, and have limited⁴²:

- Conceptual skills.
- Social skills.
- Practical skills.
- Adaptive behavioural skills.

Some people with ID are more likely to be at risk of developing either T1DM or T2DM as a result of having a genetic condition, such as Down syndrome or Autistic Spectrum Disorder¹⁴. People with an ID and diabetes may experience challenges with tasks involved in diabetes management, such as⁴³ [L2]:

- Maintaining a dietary plan:
 - Selecting appropriate foods, beverages, and portion sizes.
- Monitoring and interpreting glucose levels and/or urine levels.
- Participating in physical activity.
- Adhering to a specific treatment regimen.
- Taking or physically administering medication.

Physical disability is defined by 'long term limitations in major activities of daily life' [36]. An individual with physical disabilities may experience limitations in various aspects of self-care and activities of daily living, including⁴³:

- Self-care:
 - Feeding, washing, and dressing.
- Mobility limitations:
 - Transferring in and out of a chair, bed, or to the toilet.
- Diabetes specific tasks such as:
 - Physically administering medication.
 - Monitoring glucose levels.

11.2 Diabetes and Intellectual Disabilities

Diabetes is commonly poorly controlled in individuals with ID, which is also correlated with a higher frequency of admission to an emergency department for diabetes-related health problems¹⁴ [L2].

Maintaining an optimal glucose range is more complicated in people with ID, due to^{13,14} [L2]:

- Inability to consistently recognise the symptoms of hyperglycaemia or hypoglycaemia, resulting in poor glycaemic control.
- Lack of comprehension and communication difficulties.
- Interference of prescribed medication e.g. antiepileptics, antipsychotics and neuropathic pain management.
- Challenging behaviours demonstrated.
- Difficulty differentiating between diabetes symptoms and symptoms arising from other comorbid health conditions.
- Lack of support from family or carers, or they lack understanding of how to appropriately manage diabetes.

11.2.1 Redefined Self-Management

Self-management of diabetes involves ⁴⁴:

- Understanding and following a specific treatment regimen.
- Making challenging changes in lifestyle.
- Addressing the emotions arising from living with a chronic illness.

Self-management is not necessarily carried out just by the individual alone, and many people with ID require the support of family or a designated carer to effectively manage their condition ⁴⁵. If an individual is unable or does not wish to be independent in their diabetes management, partial self-management should be the goal ⁴⁵.

In order for effective self-management support to occur, ensure the caregiver ^{45,46}:

- Considers the individual's needs i.e. recognising the level of assistance required, even if the individual appears knowledgeable and confident.
- Provides opportunities for the patient to learn and increase confidence in their capability to sustain health behaviours.
- Remains positive and proactive about their ability to be involved:
 - This will encourage the individual with an ID to remain motivated to participate in diabetes self-management.

11.2.2 Diabetes Education

Diabetes education in patients with ID is crucial to optimise glycaemic control, which should ⁴⁵:

- Consist of adapted delivery techniques to make education accessible for the individual patient, such as:
 - The use of visual representation/pictorial guides.
 - The use of language that is familiar and comprehensible to the individual.
 - Repetition of information delivered, which may facilitate retention among those with ID.
 - Ensuring there is sufficient time for presentation, integration, and repetition.
- Engage the individual and their caregiver collaboratively ^{13,15}:
 - The individual's family member/professional carer should accompany the individual to consultations when requested and participate in structured diabetes education programs.
 - Including family members and care staff to attend can enhance understanding, reinforce learning, and enable individuals with ID to self-manage their condition.
- Be context specific ¹⁴:
 - If the individual with an ID and diabetes is a child, education should be directed to the family member/caregiver and ensuring the relevant carers at school are knowledgeable and trained.
 - If appropriate, consider a simplified explanation to the individual as to why continuous blood tests are required throughout the school day.
- Ensure at a minimum ¹³:
 - The caregiver has a good understanding of diabetes and potential emergencies; and
 - The individual and caregiver have a basic understanding of physical signs and symptoms, and long-term complications associated with diabetes.
- Be ongoing ¹⁵:
 - Diabetes education should be consistently revisited over time.
 - Increased communication with the individual and their carer will improve collaborative support.
- People with diabetes and their caregivers are encouraged to attend one of the structured education programmes depending on the type of diabetes, such as ^{13,15}:

- Dose Adjustment for Normal Eating (DAFNE) programme (www.dafne.uk.com) for adults with T1DM:
 - Education on intensive insulin therapy.
- Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) programme (www.desmond-project.org.uk) for adults with T2DM:
 - Education on diet and exercise requirements.
- However, these education programmes are not routinely offered to individuals with ID at a level that is suitable for their learning needs ¹⁵:
 - Appropriate education regarding diabetes and self-management should be provided by the treating physician and the diabetes educator.
 - Physicians should have the ability to adapt mainstream diabetes information to the needs of the individual to ensure they have equal opportunity to those without an ID.
 - With tailored diabetes education, people with ID can achieve a level of autonomy and improved quality of life.

NB: Diabetes education and medical care should be readily accessible to patients with ID and their caregivers and delivered at regular intervals by a specialist diabetes educator with appropriate time allocated [R-GDG].

11.2.3 Pharmacological Management

Exercise clinical judgement by setting alternative diabetes management targets for individuals with ID to allow safe and effective diabetes management, such as ¹⁵ [L2, RGA]:

- Consider prescribing modified insulin regimens to reduce the treatment burden and risk of potential complications.
- The individual with ID may lack an understanding of risks and consequences of hypoglycaemia, so maintaining higher glucose levels may be appropriate.
- Consider the side effect profile of oral anti-diabetic medications, when prescribing, such as:
 - Increased risk of urinary tract infection (UTI) with SGLT-2 Inhibitors.
 - Weight loss and reduced appetite with Metformin and GLP-1 agonists.

11.3 Diabetes and Physical Disabilities

The complexity of self-management of diabetes will increase with any physical disability, particularly if the individual's eyesight, hearing or fine motor skills are altered ¹⁵ [L2].

To overcome barriers in achieving good glycaemic control, there are several adaptations a healthcare professional and the individual can make to allow for effective self-management of diabetes, including ¹⁵ [L3]:

- For someone with visual impairments who may have limited ability to take oral medication correctly or adjust insulin doses according to recommendations:
 - Communicate with the individual in a way that they feel comfortable.
 - Provide take-home materials in audible format.
 - Ensure medication is labelled in braille or with appropriate labelling aids, if available.
 - Consider the use of:
 - Insulin pens with audible clicks, so the individual is aware of how many units they are injecting and are able to maintain self-management.
 - 'Talking' glucometers, where available.

- Record glucose levels via a voice recording or electronically on a computer that is easily accessible for the individual, if available.
- For someone with reduced manual dexterity who has limited ability to handle small pills, administer insulin, monitor glucose levels, prepare meals, or exercise:
 - Ensure they have access to the supportive care they require to manage their diabetes:
 - Ensure the family member or professional carer understands the needs of the patient and are providing effective supportive management.
 - Ensure they are educated on the potential risks and consequences of their condition.
- For someone with hearing loss, who may be limited in their ability to grasp information presented verbally:
 - Use an alternative method of communication, such as:
 - Sign language interpreter, if available.
 - Visual aids/pictorial representation.
 - Provide take-home educational materials.

The physician and diabetes educator should ¹⁶ **[L2, RGA]**:

- Plan for education according to the individual's disabilities.
- Educate the individual and/or caregiver in an appropriate, accessible, and meaningful format.
- Assess the individual for both obvious and more subtle disabilities pertaining to diabetes care.

12 Key Considerations for Patient Preferences

Patient preferences refer to patient perspectives, beliefs, expectations, and goals for health and life, and to the steps employed by individuals in assessing the potential benefits, harms, costs, and limitations of the management options in relation to one another. Patients may have preferences when it comes to defining their problems, identifying the range of management options, and selecting or ranking the outcomes used to compare these options.

It is important for healthcare professionals to develop an understanding of the patient as an individual and the unique way in which each person experiences a condition and its impact on their life.

The following recommendations are therefore made for physicians and other healthcare professionals regarding general principles of patient care in Qatar:

- **Respect Patients:** Treat patients with respect, kindness, dignity, courtesy, and honesty. Ensure that the environment is conducive to discussion and that the patient's privacy is respected, particularly when discussing sensitive, personal issues. Ask the patient how they wish to be addressed and ensure that their choice is respected and used.
- **Maintain Confidentiality:** Respect the patient's right to confidentiality and avoid disclosing or sharing patients' information without their informed consent. In this context, students and anyone not directly involved in the delivery of care should first be introduced to the patient before starting consultations or meetings, and let the patient decide if they want them to stay.
- **Clarify Third-Party Involvement:** Clarify with the patient at the first point of contact whether and how they like their partner, family members or carers to be involved in key decisions about their care or management and review this regularly. If the patient agrees, share information with their partner, family members or carers.
- **Obtain Informed Consent:** Obtain and document informed consent from patients, in accordance with MOPH policy and guidance.
- **Encourage Shared Decision Making:** Ensure that patients are involved in decision making about their own care, or their dependent's care, and that factors that could impact the patient's participation in their own consultation and care including physical or learning disabilities, sight, speech or hearing impairments and problems with understanding, reading or speaking English are addressed.
- **Disclose Medical Errors:** Disclose errors when they occur and show empathy to patients.
- **Ensure Effective Communication:** Explore ways to improve communication including using pictures, symbols or involving an interpreter or family members. Avoid using medical jargon. Use words the patient will understand and confirm understanding by asking questions.
- **Ensure Continuity of Care:** Provide clear and timely sharing of patient information between healthcare professionals especially at the point of any transitions in care.

13 Performance Measures

A list of performance measures is given in the table below. Healthcare organisations are encouraged to monitor service performance using the indicator definitions below ⁴⁷.

Number	Numerator	Denominator
DSS001	Number in the denominator who are referred to a mental health professional.	Total number of people aged <18 years diagnosed with type 1 or type 2 diabetes, who have been seen at least twice in the last 12 months, who are diagnosed with a mental health condition.
DSS002	Number in the denominator in whom appropriate and individualised patient education has been provided.	Total number of people aged 18 years and older with a diagnosis of diabetes and a physical disability.

Table 13.1: Performance measures ⁴⁷.

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Appendix: Detailed Description of the Literature Search

A systematic search for existing literature on special situations in diabetes mellitus was performed in the period July 10th – August 24th, 2020.

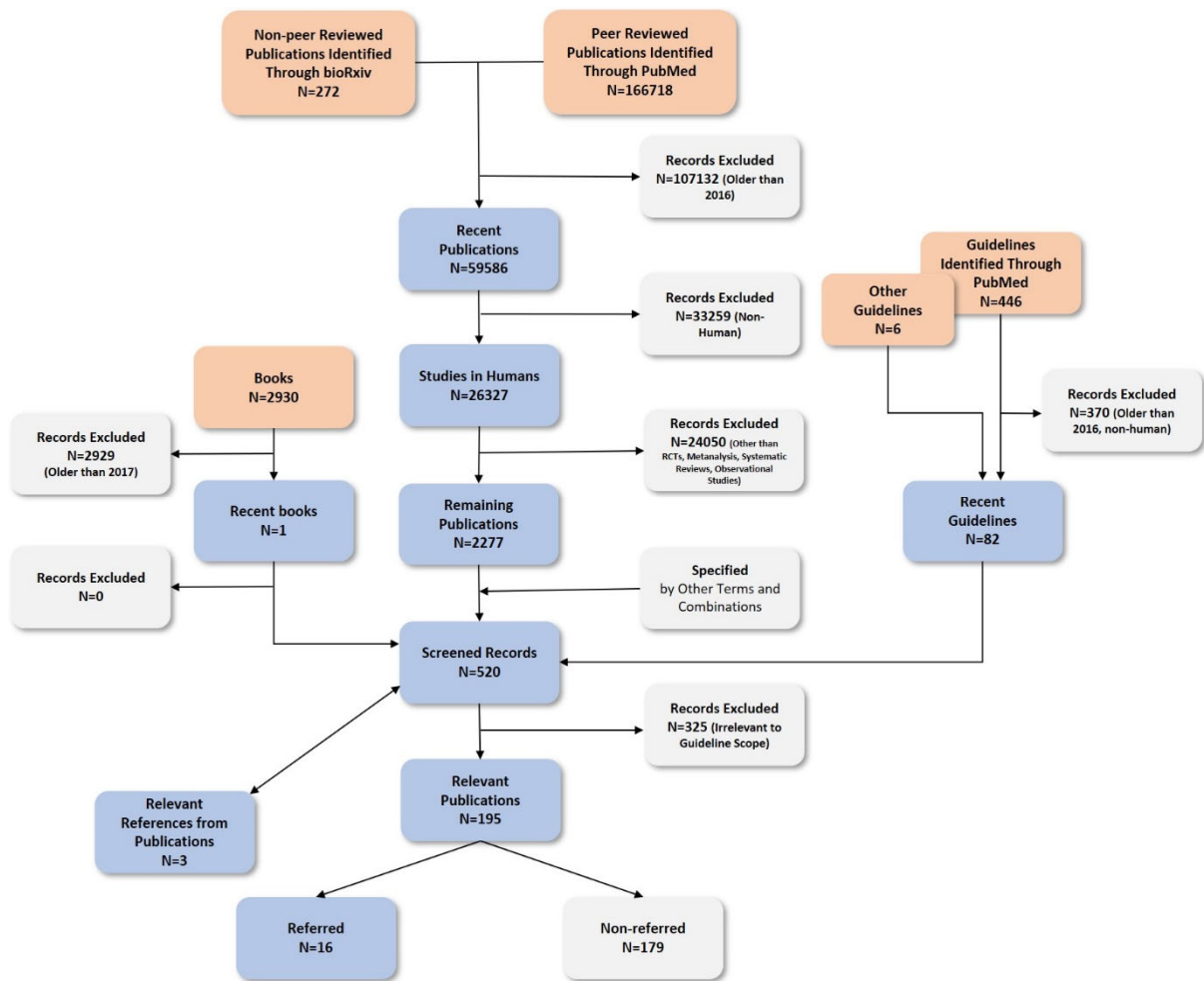
All existing references were evaluated and where necessary and applicable, the latest version of the specific manuscript was used to update the guideline and replace the older reference. The search for clinical practice guidelines on diabetes mellitus special situations management was performed in the *PubMed* database and websites of relevant organisations and societies including the *International Diabetes Federation*, the *International Federation of Gynaecology and Obstetrics*, the *Canadian Diabetes Association*, the *Qatar Supreme Council of Health* and the *UK NICE*. The present guideline is primarily based on the *American Diabetes Association*, and the *International Society for Paediatric and Adolescent Diabetes* guidelines and is supplemented with other relevant studies.

Peer-reviewed scientific publications were found in PubMed and via *Google Scholar* Internet search engine. Non-peer reviewed studies were identified in *bioRxiv*. Books were checked on *Amazon* and via *Google* and *Google Scholar* search engines.

The included publications were identified using the terms “*diabetes mellitus*” and specified with the following terms in combinations:

Special, guideline, education, school, work, safety, dementia, mental health, depression, anxiety, hajj, Ramadan, fasting, driving, disability, definition, prevalence, epidemiology, risk, assessment, hypoglycemia, complication, foot problem, kidney, heart, pregnancy, nutrition, exercise, management, treatment, metformin, insulin, referral, specialist, follow-up.

Figure A.1 on the next page demonstrates graphically the results of the search and application of exclusion criteria.



Key:

- Type of Publication
- Process
- Notes


Fig A.1: Literature Search Results and Application of Exclusion Criteria.

Acknowledgements

The following individuals are recognised for their contribution to the successful development of the National Clinical Guideline.

MOPH National Clinical Guidelines Team:

- **Ms Huda Amer Al-Katheeri**, *Director of Strategic Planning & Performance Dept, MOPH.*
- **Dr Nawal Al Tamimi**, *Head of Healthcare Quality & Patient Safety Dept, MOPH.*
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