Type 2 diabetes: prevention, diagnosis and management

Type 2 diabetes now affects 6% of the UK population, and 90% of those affected have type 2 diabetes (T2DM). In addition, it is estimated that 500,000 people in the UK have undiagnosed diabetes and 7 million have impaired glucose tolerance that may lead to diabetes (Diabetes UK, 2013). Prevention, or early diagnosis and good diabetic control are essential to reduce the burden of diabetes for patients, and for health and social care.

What is T2DM?
T2DM is a long-term condition in which the body’s ability to use insulin – a hormone that helps the body to control blood glucose levels – is impaired. People with T2DM produce insulin but the body cannot use it properly; this is also called insulin resistance. Initially the body produces more insulin in an attempt to override the resistance until, ultimately, there is a resulting insulin insufficiency. This combination of insulin resistance and insulin insufficiency leads to a T2DM diagnosis. The risk factors are:

- Being over 40 years old;
- Being overweight;
- Being of South Asian, Black African or African-Caribbean ethnic origin – even if born in the UK;
- Having a close family member with T2DM (parent, brother, sister);
- Having previous gestational diabetes.

Prevention
In most cases T2DM can be prevented: the main risk factor is being overweight or obese (National Institute for Health and Care Excellence, 2012). Evidence suggests increasing activity and losing weight are key to preventing the condition.

A diet based on starchy foods such as rice, potatoes and pasta (wholegrain where possible) is recommended, with the addition of fibre-rich foods such as beans, peas, lentils, oats, grains, seeds, and fruit and vegetables. NICE (2014) recommends that people who need to lose weight aim for at least five portions of fruit and vegetables a day, and a diet that is low in fat with reduced portion sizes and limited snacks.

The current recommendation for physical activity from the Department of Health is that adults should achieve 150 minutes of moderate-intensity exercise a week. Moderate intensity is achieved when the person achieves:

- Increased heart rate;
- Slight breathlessness (still able to hold a conversation);
- Perspiration.

Diagnosis
It is important to diagnose T2DM as early as possible to achieve good glycaemic control; poor control increases the risk of developing complications associated with diabetes. T2DM is mainly diagnosed by a glycated haemoglobin test (HbA1c). An HbA1c of $>48mmol/mol (6.5%)$ is generally considered to signify diabetes.

Managing T2DM
Once diagnosed it is important for patients to be encouraged to self-manage their condition and to make any lifestyle changes that may be necessary to control it. The role of diet and exercise are hugely important not only on diagnosis but for the rest of their lives (NICE, 2012).

The diet recommended for people with diabetes does not differ significantly from that recommended for the general population. Attention needs to be paid to the quality and quantity of carbohydrates consumed as these are converted into glucose. Eating more complex forms of carbohydrate such as nuts, seeds, wholegrain bread and pasta, fruits and vegetables, will slow the rise in blood glucose levels after a meal. The quantity of carbohydrate eaten will also affect glucose levels, so eating a diet not excessive in carbohydrates will also help control blood glucose.

From the moment of diagnosis it is important to keep blood glucose levels as near normal as possible, aiming for levels of $4-8mmol/L$ across the day. This will prevent or delay the onset of the complications associated with diabetes. Ongoing regular surveillance of diabetes is imperative to monitor for the onset of complications and to act early if signs are found.

Medications used in T2DM
First-line treatment is metformin, which prevents the liver from responding to a lack of energy in the body by increasing the production of new glucose, driving the blood glucose level higher (gluconeogenesis). Metformin can be combined with second-line medications depending on desirable outcome measures (NICE, 2009). These include sulphonylureas, which stimulate insulin production from the pancreas,
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trolled diabetes is the leading cause of complications, most of which are preventable
80% is spent on managing long-term com-
Of the estimated £10 billion NHS budget,
hyperglycaemic state. This carries a high
» Blood pressure;
» Blood glucose levels by HbA1c;
» Cholesterol;
» Retinal eye screen;
» Foot assessment – pulses and sensation;
» Renal function – urine test for protein and blood test for full renal function;
» Weight measurement;
» Smoking status – help should be offered if the person wants to try to quit.

Complications
Short-term complications
Many situations can lead to hypoglycaemia – most commonly too much insulin or sul-
phenylurea medication and too little food intake. Other causes can be too much or unexpected exercise, alcohol consump-
tion, illness or poor injection technique (Forum for Injection Technique, 2011).
High blood glucose levels in the short term often cause no symptoms and are not treated urgently but can lead to dehydra-
tion and, if untreated, a hyperosmolar hyperglycaemic state. This carries a high mortality rate and must be treated in a high-dependency unit as an emergency.

Long-term complications
Of the estimated £10 billion NHS budget, 80% is spent on managing long-term comp-
ications, most of which are preventable (Diabetes UK, 2013).

Retinopathy caused by poorly con-
trolled diabetes is the leading cause of blindness in the working-age population. People with diabetes are at four times greater risk of cardiovascular disease than the general population, increasing their risk of stroke and myocardial infarction.
In the UK more than 100 diabetes-related amputations take place every week. Poorly controlled diabetes can damage the circu-
lation and affect the sensory, motor and autonomic nerves. If feet become ulcerated there is poor blood supply to aid healing; poor nerve supply means they can be badly damaged without patients realising.

Neuropathy is a major complication. High glucose levels can block the minute blood vessels that feed the nerve cells, starving the nerve fibres to cause sensory, autonomic and/or motor neuropathy.

Symptoms of sensory neuropathy include tingling and numbness, loss of pain or temperature sensation, loss of coordina-
tion or burning/shooting pains. Autonomic neuropathy affects nerves that control organs and glands – for example to regu-
late stomach emptying, bowel control, heart beating and sexual organ func-
tioning. Motor neuropathy affects the nerves that control movement, leading to weakness and wasting of the muscles that receive messages from the affected nerves. This can lead to problems such as muscle weakness (which could cause falls), muscle wasting, muscle twitching and cramps.

Nephropathy is caused by damage to small blood vessels that can cause nephrons to leak proteins and other nutrients. Main-
taining blood glucose and blood pressure levels as near normal as possible can greatly cut the risk of kidney disease developing and slow its development once started.

Susan Down is nurse consultant diabetes at Somerset Partnership Foundation Trust

References
FITRecommendations
National Institute for Health and Care Excellence (2014) Obesity: Identification, Assessment and Management of Overweight and Obesity in Children, Young People and Adults. nice.org.uk/CG189
National Institute for Health and Care Excellence (2012) Preventing Type 2 Diabetes: Risk Identification and Interventions for Individuals at High Risk. nice.org.uk/PH138
National Institute for Health and Care Excellence (2009) Type 2 Diabetes: The Management of Type 2 Diabetes. nice.org.uk/CG87

TEST YOUR KNOWLEDGE

Can you answer these questions? To check whether you are correct go to our learning unit at nursingtimes.net/type2diabetes
1 How many people in the UK today are estimated to have undiagnosed type 2 diabetes (T2DM)?
A. One million
B. 540,000
C. 500,000
D. 280,000

2 What are the available methods for people with T2DM to regularly monitor their diabetes control? Select all that apply.
A. Blood glucose monitoring
B. Blood ketone testing
C. Urine dipstick for glucose
D. Urine dipstick for protein

3 Which of the following long-term complications are annually screened for in people with diabetes? Select all that apply.
A. Myopathy
B. Nephropathy
C. Neuropathy
D. Retinopathy

4 Which of the following oral diabetes therapies target insulin resistance? Select all that apply.
A. DPP4 inhibitor
B. Metformin
C. Pioglitazone
D. Sulphonylurea

5 Which of the following symptoms are associated with poorly controlled or undiagnosed T2DM? Select all that apply.
A. Blurred vision
B. Dry cough
C. Frequently passing urine
D. Thirst

WHAT’S IN A NURSING TIMES LEARNING UNIT:
Learning objectives so you know what you will learn

Pre-study multiple choice questionnaire to find out what you already know
Evidence-based review with live links to key reading, national policy and guidelines
Case-based scenarios with questions and feedback, so you can apply your learning
Live links to further reading
Downloadable portfolio pages to undertake optional further study and store in your portfolio
Post-study multiple choice questionnaire to see how your learning has grown
Personalised certificates as a record of your learning