Case study:

*Individual with inadequate glycaemic control due to poor adherence to medication*

Authored by Linong Ji and Clifford Bailey on behalf of the *Global Partnership for Effective Diabetes Management*.

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This case study outlines the approach taken to an adult with type 2 diabetes of long duration, who has inadequate glycaemic control due to poor adherence to medication.

The case reflects a full range of treatment and management tools available in the European/US context.*

*The management of any patient is subject to social, economic, gender, age, co-morbidity and ethnic variables, and is dependent on the range of treatment options available in specific regions or countries.
Inadequate glycaemic control due to poor adherence to medication

- Frank, aged 70 years, retired
- Diagnosed with type 2 diabetes 4 years ago and hypertension 5 years ago
- Usually attends regular check-ups, but missed his last appointment 3 months ago
- History of good control of diabetes and hypertension
- Franks visits his local health clinic for a regular follow-up appointment

**Assessments (at prior visit*)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPG:</td>
<td>4.6 mmol/l (82 mg/dl)</td>
</tr>
<tr>
<td>HbA$_{1c}$</td>
<td>6.7% (50 mmol/mol)</td>
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<tr>
<td>BP:</td>
<td>116/78 mmHg</td>
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<tr>
<td>Weight:</td>
<td>70 kg (154.3 lbs)</td>
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<tr>
<td>BMI:</td>
<td>24.2 kg/m$^2$</td>
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</table>

**Current therapy**

- Metformin 500 mg BID
- Sitagliptin 100 mg OD
- Lisinopril 40 mg OD
- Indapamide 2.5 mg OD

*6 months have elapsed since the previous visit. BID, twice daily; BMI, body mass index; BP, blood pressure; FPG, fasting plasma glucose; HbA$_{1c}$, glycosylated haemoglobin; OD, once daily.
Current status/update from prior visit

- Since his previous visit Frank says he’s felt well and hasn’t had any health problems
- The doctor asks why Frank missed his last appointment
  - Frank says that his wife had a stroke 4 months ago and is now in a nursing home
- Tests show Frank’s glucose levels and BP aren’t as well-controlled as they used to be

### Assessments

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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<tbody>
<tr>
<td>FPG:</td>
<td>8.8 mmol/l (158 mg/dl)</td>
</tr>
<tr>
<td>HbA$_{1c}$:</td>
<td>8.3% (67 mmol/mol)</td>
</tr>
<tr>
<td>BP:</td>
<td>128/83 mmHg</td>
</tr>
<tr>
<td>Weight:</td>
<td>74 kg (163.1 lbs)</td>
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<tr>
<td>BMI:</td>
<td>25.6 kg/m$^2$</td>
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**Question**
Which of the following is an appropriate initial response to the loss of glycaemic and BP control?

- Schedule another appointment in 1 month to see if the problem persists
- Intensify antihyperglycaemic and antihypertensive medication
- Talk to Frank about his wife’s stroke and how he’s adapted to living alone

BMI, body mass index; BP, blood pressure; FPG, fasting plasma glucose; HbA$_{1c}$, glycosylated haemoglobin.
Response to loss of control: Schedule another appointment/reassess in 1 month

- Even short periods of poorly controlled BG or BP increase the risk of a range of vascular complications
- The combination of uncontrolled hyperglycaemia and hypertension puts Frank at a substantially increased risk of complications
- Immediate steps should be taken to restore control of BG and BP

BG, blood glucose; BP, blood pressure.
Response to loss of control: Intensify therapies

• Restoration of good glycaemic and BP control is a priority for Frank
• The possible causes of the loss of control need to be considered in planning an effective response
• Until now Frank’s diabetes and hypertension had been well-controlled
  – However, glycaemic and BP control have failed and Frank has begun to gain weight
• These changes coincide with a major life-changing event – his wife having a stroke and him now living alone
• Loss of control can be related to behavioural change rather than a decrease in efficacy of antihyperglycaemic or antihypertensive therapy
• Discussing how Frank’s life has changed since his wife’s stroke may help to establish why his BG and BP control has worsened

BG, blood glucose; BP, blood pressure.
Response to loss of control: Discuss with patient

• Restoration of good glycaemic and BP control is a priority for Frank
• The possible causes of the loss of control need to be considered in planning an effective response
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BG, blood glucose; BP, blood pressure.
Further discussion (1)

• The doctor asks Frank how he has been coping since his wife’s stroke
• Frank says it hasn’t been easy and he realizes how much he relied on his wife
  – Preparing family meals: Frank never learned to cook and now eats ready meals or takeaway dinners
  – Exercise: they used to regularly visit friends and go out for walks
  – Company: he rarely feels like going out and spends most days at home on his own
  – Medication schedule: Frank admits his wife reminded him to take his medicine
Further discussion (2)

• The doctor asks Frank whether he has been taking his medicine as instructed:
  – Frank says he sometimes forgets but that he tries to take it every day
• The doctor asks him to estimate how often he forgets to take his medicine
  – Frank admits that it’s quite often and for the past month he has rarely taken his pills
  – Frank explains this is partly because his wife is no longer living at home and can’t remind him
  – He also says that it doesn’t seem to make much difference whether he takes the pills or not
Factors contributing to poor adherence

**Question**
Which of the following do you think may be a factor in Frank’s poor adherence? *(You may select more than one option – press reveal for the answer.)*

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Lack of awareness of increased health risks</td>
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<tr>
<td>Depression</td>
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<tr>
<td>Tolerability issues</td>
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<tr>
<td>Polypharmacy/dosing complexity</td>
</tr>
<tr>
<td>Lack of family/social support</td>
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**REVEAL**

Lack of awareness of increased health risks, Depression, Tolerability issues, Polypharmacy/dosing complexity, Lack of family/social support.
Factors contributing to poor adherence

- Poor adherence to treatment for chronic conditions such as diabetes and hypertension is common\(^1\)
- A number of factors may be contributing to Frank’s poor adherence\(^1\) and need to be addressed, including:
  - Lack of awareness of the consequences of not taking medication and poor glycaemic and BP control
  - Possible depression
  - The need for treatment with multiple medications with different dosing schedules
  - Living on his own with a lack of social support
- Tolerability issues – actual or perceived – are a frequent cause of poor adherence\(^1\) but do not appear to be a problem in this case

BP, blood pressure.
Improving adherence

• The doctor discusses with Frank why it is important that he controls his diabetes and BP through lifestyle interventions and medication adherence
• He suggests a number of strategies to help Frank to do this and stay healthy
• He refers Frank to one of the practice nurses who specializes in diabetes and other chronic conditions

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<td>• Programme of continuous, structured diabetes education in partnership with specialist diabetes nurse</td>
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<tr>
<td>• Provision of dietary/nutritional advice</td>
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<td>• Assessment of social and psychological needs</td>
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<td>• Simplification of drug regimens including substitution of fixed-dose combination for individual medicines (e.g. metformin/sitagliptin; 500/50 mg BID)</td>
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<tr>
<td>• Establish contact with a local support group for people with diabetes</td>
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<tr>
<td>• Use of a 1-month pill box</td>
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BID, twice daily; BP, blood pressure.
Follow-up visit

- Frank visits his doctor for a follow-up visit 1 month later
- He reports good adherence to medication and his BG and BP control have improved
- Frank has been to two meetings of the local diabetes support group and says he intends to go again
  - Their help and encouragement have really made a difference
- He still struggles with eating healthily, but is eating more fruit and vegetables
- Frank is also trying to exercise more often and has taken up gardening
- Although a great improvement, Frank needs to keep focusing on taking his medication and maintaining a healthy lifestyle

Assessments

- **FPG:** 6.5 mmol/l (117 mg/dl)
- **HbA\textsubscript{1c}:** 7.7% (61 mmol/mol)
- **BP:** 118/80 mmHg
- **Weight:** 74 kg (163.1 lbs)
- **BMI:** 25.6 kg/m\textsuperscript{2}

BP, blood pressure; BG, blood glucose; BMI, body mass index; FPG, fasting plasma glucose; HbA\textsubscript{1c}, glycosylated haemoglobin.
10 Steps to get more people with type 2 diabetes to goal:

- Aim for an appropriate individualized glycaemic target, e.g. HbA$_{1c}$ 6.5–7% (48–53 mmol/mol) (or fasting/preprandial plasma glucose 110–130 mg/dL [6.0–7.2 mmol/L] where assessment of HbA$_{1c}$ is not possible) when safe and appropriate.
- Monitor HbA$_{1c}$ every 3 months in addition to appropriate glucose self-monitoring.
- Appropriately manage all cardiovascular risk factors.
- Refer all newly diagnosed patients to a unit specializing in diabetes care where possible.
- Address the underlying pathophysiology of diabetes, including the treatment of β-cell dysfunction and insulin resistance.
- Treat to achieve appropriate target HbA$_{1c}$ within 6 months of diagnosis.
- After 3 months, if patients are not at the desired target HbA$_{1c}$, consider combination therapy.
- Consider initiating combination therapy or insulin for patients with HbA$_{1c} \geq 9\%$ (≥75 mmol/mol).
- Use combinations of antihyperglycaemic agents with complementary mechanisms of action.
- Implement a multidisciplinary team approach that encourages patient self-management, education and self-care, with shared responsibilities to achieve goals.

HbA$_{1c}$, glycosylated haemoglobin.
