Problem based learning exercise diabetes health and social care essay

What would be appropriate clinical goals for Roger?

Blood glucose level

Roger's HbA1c reads 8. 5% which is higher than the normal value of 7. 0%.

Roger's fasting blood glucose level is 5. 2-7. 5 mmol/L. However, the target

fasting blood glucose level should be 4. 0-6. 0 mmol/L (1, 2). In addition,

Roger's postprandial concentration should achieve the target of 6 to 8

mmol/L (2).

Blood pressure

Roger's blood pressure is 145/90mmHg which is considered to be Grade 1

(mild) hypertension and his target blood pressure reading should be

130/80mmHg (1-3).

Lipid profile

Roger's current lipid profile reads total cholesterol as 10. 7mmol/L, LDL as 6.

6mmol/L, HDL as 1. 7mmol/L and triglycerides as 5. 6mmol/L. Roger should

achieve a lipid profile with total cholesterol less than 4. 0mmol/L, LDL less

than 2. 0mmol/L and triglycerides less than 2. 0mmol/L. His HDL level falls

within the recommended range which is more than 1. 0mmol/L, hence

maintenance at this level would be appropriate (1).

Body mass index (BMI)

Furthermore, Roger currently has BMI of 31 kg/m2 (normal range: 18-24. 9

kg/m2) which indicates that he is obese (1, 2). Roger's current weight is

97kg and his healthy weight is 78kg, which suggests that he should reduce

19 kg in order to achieve his healthy weight (1).**(healthy weight(kg) is

approximately: Height(cm) – 100) (1). Is Roger's current diabetes

management appropriate? What other options would be appropriate? Roger is currently taking Metformin 1000mg twice daily and Glimepiride 2mg daily. However, his HbA1c is increasing above target reading of 7% and has reached 8. 5%. Roger may be started on triple therapy which consists of metformin, glimepiride and exenatide (1). The exenatide is used to improve glycaemic control in Type 2 diabetes mellitus patients who failed to achieve adequate glycaemic control with metformin or sulphonylureas (1). Pioglitazone is not chosen as it may increase weight gain and Roger is now obese. Basal insulin which is another alternative option is not chosen due to the risk of inducing hypoglycaemia since Roger is already on sulphonylurea which may also potentially cause hypoglycaemia. In addition, basal insulin may also cause further weight gain in Roger. What other management (if any) should be instituted at this time?

Dyslipidaemia

The management of dyslipidaemia is also important in Roger's case since he has high total cholesterol, high LDL level as well as hypertriglyceridaemia. This will increase his coronary disease risk, especially since Roger is presenting with type 2 diabetes. Roger should be initiated on non-pharmacological treatment first such as dietary management and weight reduction as well as ensure adequate control of glycaemic level. If the treatment plan fails and his total cholesterol remains high, he may be started on pharmacological treatment with HMGCoA reductase inhibitor (statins) (1, 3, 4). As Roger is presenting with both raised cholesterol and triglycerides, a fibrate such as fenofibrate or gemfibrozil may be added with statin based on his lipid subfractions levels. However, the combination of fibrate and statin

may result in muscle damage especially with the combination of statin and gemfibrozil (1, 4). Hence, specialist consultation should be sought first. Alternatively, a combination of a fibrate with ezetimibe or resin can be used (1, 3, 4).

Hypertension

Roger also has hypertension which may increase the risk of developing macrovascular diasease. His target blood pressure level is to be less than 130/80mmHg. Hence, Roger may be started on antihypertensive agent such as angiotensin receptor antagonist to reduce his blood pressure (1, 3). Roger may be given Losartan 50-100mg once daily (3). Angiotensin receptor antagonists are also known to have renal and cardio protective effects. Roger should also have follow-up session to have his blood pressure as well as his plasma potassium and creatinine level checked one week after the treatment is initiated for the purpose of monitoring his own progress (1).

Microalbuminuria

On top of that, Roger has microalbuminuria which indicates he might have renal damage and high cardiovascular risk. His microalbuminuria reading is 50mg/24 hour which suggests that initial intermittent low grade proteinuria has occurred since the 24-hour urinary albumin excretion rate is more than 20 microgram/minute (1, 3). During this stage, adequate control of blood pressure and glycaemia can stabilise renal function. This is because blood pressure control is able to slow down the progression of renal damage. Roger should have his renal function and plasma creatinine level checked annually to monitor the progression of his kidney function with diabetes (1).

Retinopathy

Furthermore, Roger has retinopathy which may be due to his microalbuminuria. It occurs because of the microvascular disease of the retina. Hence, Roger should also have his retinal problem reviewed and he may be started on photocoagulation treatment if necessary (1). What lifestyle changes could Roger make to improve his glucose levels?

Physical exercise

Roger is encouraged to do moderate-intensity of physical exercise for minimum 30 minutes each day for at least 3 to 4 times per week, to an accumulation of more than 150 minutes per week (1, 2). This will help to improve metabolic control as well as reduce other cardiovascular risks. However, since Roger is on Glimepiride (sulphonylurea), care should be taken to prevent hypoglycaemia. He may need to reduce the dosage of Glimepiride or take extra food prior to exercise (1, 5). Roger should also wear appropriate and comfortable footwear during exercise (1).

Weight loss

Furthermore, Roger currently has BMI of 31 kg/m2 (normal range: 18-24. 9 kg/m2) which indicates that he is obese. Roger's current weight is 97kg while his healthy weight is 78kg. Physical exercise will help Roger to reduce weight and thus achieve a lower BMI. The reduction in body weight is important because it will allow Roger to achieve near normal glycaemic, blood pressure and lipid profiles (1, 3). A reduction of 5-20% of weight will also improve glycaemic control. While setting goal to achieve great weight loss might discourages patient, we should encourage any degree of weight loss initially

and then gradually increases it to help the patient in achieving his healthy weight (1).

Healthy diet

Roger should maintain healthy eating habit to reduce and restrict his glucose intake. The combination of increased physical activity and reduced glucose intake will generally help to control diabetes condition. Roger should also be educated that his energy input (kilojoules) from daily food intake must be less than the energy expended in daily activities (1, 3). Roger is encouraged to take diet with high percentage of carbohydrate foods which have low density and rich in fibre. The carbohydrate foods may constitute up to 50% or total energy intake. These carbohydrate intakes should be spread evenly throughout the day to maintain a steady glycaemic level. Roger should also achieve glycaemic load of less than 80 per day and have each meal constitutes of one high fibre and low GI carbohydrate food. For example, food such as wholegrain breads, low fat, low sugar breakfast cereals, lentils, beans and temperate foods. Carbohydrate foods such as potato, rice and topical fruit may be included but in lesser amounts(1). Roger is also encouraged to keep his total dietary fat intake less than 30% of his total energy intake. The level of cholesterol, saturated, trans and total fat should be low in his diet (1, 3). He should avoid fried foods in his diet. He may take olive oil, canola or seed sourced polyunsaturated oils which help to reduce LDL-C and fish oils (5g/day) which help to reduce triglyceride levels. His protein intake should only constitute around 10-20% of his total energy intake. Furthermore, since Roger has hypertension, he should also reduce his dietary salt intake to less than 4g/day (65 mmol/day sodium) (1, 3). Roger

can choose foods processed without salt and avoid takeaway foods high in salt or have salt added during cooking and at the table (3). In addition, Roger should perform blood glucose monitoring on his own since he is on Glimepiride (6). This will help him to monitor his blood glucose level and improve his understanding on the impact of medication, food and physical activity on his blood glucose control. Moreover, it will also help to prevent hypoglycaemic events (6). Last year Roger's asthma worsened. In addition to inhaled medications, he has intermittently required Prednisone in doses up to 40mg daily. Exercise has been less regular and he has gained a further 10 pounds in weight. HbA1c has risen to 8. 5%, corresponding to overall average blood glucose of 12mmol/L. Prednisone is a synthetic corticosteroid which possesses glucocorticoid and anti-inflammatory effects (7, 8). Prednisone therefore will induce hepatic and extrahepatic insulin resistance and hence its use is associated with elevation of the fasting and post-prandial insulin and glucagon concentrations. I will recommend basal insulin to be given to Roger to compensate for the hyperglycaemic effect caused by prednisone as it will suppress the production of glucose and stimulates glucose utilization (8, 9). The major goal of the treatment is to prevent potential acute hyperglycaemic complications and adverse events associated with glucocorticoid use. Hence, I will also recommend Roger to do regular self-monitoring of his blood glucose level and ensure that his glucose concentration is less than 180 mg/dL to avoid increased risk of infections due to hyperglycaemia. It is also important to educate Roger to be aware of hypoglycaemic event after the initiation of insulin therapy (6, 9).