

Case study on type 2 diabetes mellitus essay sample

[Health & Medicine](#), [Diabetes](#)



Case Study on Type2 Diabetes Mellitus

This paper will look at the physiology of normal blood glucose. The pathophysiology of Diabetes mellitus type 2 with a description of some of the common presenting symptoms of polyuria, polydipsia and polyphagia.

Explore the importance of incorporating the 5 components of managing the disease and discuss why the Indigenous population are more than 3. 4 times more likely to be affected than non-indigenous Australians (AIHW 2006, Brown & Edwards 2008).

The body functions at its best with a blood glucose level of approximately 3 to 8 mmol/L despite a wide variation in food or physical activity (Brown & Edwards 2008). The independent actions of both insulin and glucagon control blood glucose levels (Marieb & Hoehn 2007). Under normal circumstances insulin is the main regulator of the metabolism and storage of carbohydrates, fats and protein. Insulin allows glucose to enter cell membranes in most tissues (Brown & Edwards 2008). An increased blood glucose level is the main stimulus of insulin synthesis and secretion (Brown & Edwards 2008). Insulin is inhibited by low glucose levels along with glucagon, somatostatin, catecholamines and hypokalaemia (Brown & Edwards 2008). A major response of insulin on glucose metabolism occurs in the liver, where the hormone stimulates glucose to be integrated into glycogen and triglycerides by stopping gluconeogenesis (Brown & Edwards 2008). Another important role of insulin is in the peripheral tissues where it facilitates glucose into cells, transport of amino acids across muscle membranes to

synthesise into protein and transport of triglycerides into adipose tissue. Thus insulin is a storage or anabolic hormone (Brown & Edwards 2008).

After changes in blood glucose levels are stimulated such as after eating a meal, insulin is responsible for the storage of nutrients (anabolism) and in the fasting state where glucose is not readily available hormones such as catecholamines, cortisol and glucagon break down stored complex fuels (catabolism) for use as simple glucose (Brown & Edwards 2008).

In type 2 diabetes the body does not utilise insulin properly or the production of insulin does not meet the needs of the body (Brown & Edwards 2008).

Three major metabolic abnormalities are seen to contribute to play a role in Diabetes mellitus, Firstly insulin resistance which can be seen as the bodies tissues do not respond to the action of insulin (Brown & Edwards 2008). This resistance according to (Capriotti 2005) encourages the pancreas to secrete increasing amounts of insulin as a regulatory response to control glycaemic levels. Secondly the inability of the pancreas to secrete enough insulin due to Beta cells becoming fatigued from the overproduction created by the resistance of the cells to uptake insulin (Brown & Edwards 2008). Lastly the liver can not regulate appropriate levels of glucose to match blood glucose levels creating an overflow into the bloodstream as insulin resistance continues and hyperglycaemia develops (Capriotti 2005).

There are many signs and symptoms, many of which go unnoticed until the disease is in the late stages (Funnell, Koutoukidis & Lawrence 2005). Classic combinations of symptoms are seen as the 3 Ps, polydipsia, polyuria and

polyphagia all of which are associated to the high levels of glucose in the blood. Hyperosmolarity and depletion of intracellular water are a result which triggers sensors in the brain to interpret this as thirst (polydipsia) (Hill 2009). An increase in hunger (polyphagia) is stimulated due to insulin deficiency activating catabolism of proteins and fats increasing appetite (Hill 2009) and polyuria (frequent urination) is due to excess glucose creating an osmotic diuresis in the kidneys (Hill 2009) drawing large amounts of water with it. The newly diagnosed patient should be informed of the importance of these symptoms which if left unnoticed or ignored can lead to hyperosmotic non-ketotic state (Hill 2009). The patient would have a high glycaemic measurement of 30mmol/l or greater and in desperate need of rehydration to prevent the onset of a diabetic coma (Hill 2009).

Long term uncontrolled diabetes mellitus leads to chronic health issues, disability, a poor quality of life and premature death in Australia s worldwide (Thomson 2003) . In Australia, aboriginal people are more likely to develop Type 2 diabetes than non aboriginal Australians (NATSIHS 2006). A study by the National Aboriginal and Torres Strait Islander Health survey (2006) found that indigenous Australians were more than 10 times more likely to die from diabetes than the rest of the Australian population.

Traditional aboriginals lived as hunters and gatherers but with the exposure of westernised lifestyles the indigenous people have changed their affinity with the land (Thomson 2003). This exposure to foods high in fat and sugars, alcohol and nicotine use along with a sedentary lifestyle have placed them in a high risk category of developing diabetes and at an earlier age than non

indigenous people (Thomson 2003). Aboriginal people had the genetic makeup to survive when food was scarce but now this once efficient metabolism, exposed to a western influence is now working against them (Thomson 2003). As Mr Daley is a newly diagnosed patient, there is a real need to focus on education. Education has been identified as a significant factor in the effective control of blood glucose levels.(Jerreat 2009)

Managing diabetes can be challenging and support is needed if the individual is to have a close to normal life (AIHW 2006).

Firstly education is important to emphasise to the patient the importance of close monitoring and management as diabetes can become a chronic disease with multiple health issues and a poor quality of life (AIHW 2006). Brown & Edwards (2008 P. 1352) points out that patient teaching enables them to take control and to become confident in participating in their own care; this also provides the basis for a successful treatment plan. Mr Daley should be educated on diabetes and provided with pamphlets to take home. The nurse could also ask him to attend a clinic daily for more education and supervision with blood glucose monitoring and she could also answer any questions he may have (AIWW 2006).

The newly diagnosed patient will need to know the importance of making changes to their lifestyle in regards to nutrition, diet and weight control (Farrell 2005). Obesity is a major contributing factor to the likelihood of developing diabetes mellitus type 2 as fat cells in particular are resistant to insulin action therefore these people can develop the disease. For this reason weight loss can dramatically improve blood glucose levels (Farrell

2005). Aboriginal people are advised to adopt their traditional bush food eating. Bush foods are found to be low in fat and sugars and the effort of 'hunting and gathering' also promotes exercise (Thomson 2003). In Mr Daley's case if the rural area is remote enough he should be encouraged to forage for traditional food and may seek guidance from elders. The nurse could provide information on low GI foods and the benefits of consuming these in relation to maintaining blood glucose levels for longer periods (Capaldi 2007). Educate the patient to eat regular meals, foods high in fibre and at least 5 portions of fruit and vegetables each day. Reduce sugar – containing foods and drink alcohol in moderation and with food (Capaldi 2007). Alcohol consumption greatly reduces the diabetic person from being able to control blood glucose as the physiological processes are changed (Farrell 2005). The patient affected by alcohol may not recognise the symptoms of hypoglycaemia and place themselves in danger (Farrell 2005).

Exercise has been found to be an effective tool in controlling blood glucose levels in people with diabetes type2 (Thomas et al. 2006, AIHW 2006).

Exercise lowers the level of glucose in the blood as muscles use up glucose when they are working (Farrell 2005). It also helps reduce weight as it increases the resting metabolic rate (Farrell 2005). Farrell (2005 p. 1164) also points out that exercise also contributes to the lowering of blood lipid levels decreasing the risk of CVD. The nurse can recommend that Mr Daley exercise at least for 30 minutes of moderate to intense impact at least 5 times a week (Diabetes Australia 2009). Careful monitoring particularly of people on insulin or oral hyperglycaemic lowering medications are needed as

hypoglycaemia can occur after exercise (AIHW 2006). A 15g carbohydrate snack with some protein before exercising can help decrease the chance of hypoglycaemia (Farrell 2005).

When exercise and diet cannot control diabetes sufficiently on their own the next management process is medication. Oral hypoglycaemic agents will be trialled first; the nurse can help determine the most suitable (Brown & Edwards 2008). Factors such as mental status, eating habits, home environment and access to resources are considered (Brown & Edwards 2008). The patient should be educated that along with medication diet and exercise still have a place in management of diabetes. If the patient experiences illness or extreme stress, they can still suffer from hyperglycaemia while taking their medications (Brown & Edwards 2008). Oral hypoglycaemic medications do not actually lower blood glucose levels they alter liver function or increase the effectiveness of insulin (Bullock, Manias & Galbraith 2007). Some of the nursing actions required are advising on the side effects, some of which are hypoglycaemia, skin reaction, gastrointestinal upsets, oedema, anaemia and hepatic disturbances. Monitoring how effective the medication is at maintaining blood glucose levels and conveying when best to take it and what to do if a dose is missed or if blood glucose levels are low (Bullock, Manias & Galbraith 2007).

Insulin therapy may need to be added to the regimen or replace the oral hypoglycaemic agents if further intervention is needed (Brown & Edwards 2008). Giving insulin allows the person to process carbohydrates, fats and proteins, to store glycogen in the liver, and to convert glucose to fat (Capaldi

2005). There are several types of insulin and they all differ in relation to their onset, peak time and duration. Timing is important in regards to administering insulin, generally 30 – 45 minutes before a meal to allow for action of insulin to coincide with meal absorption (Brown & Edwards 2008). The nurse needs to educate the patient on the type of insulin so the patient has an understanding of the action of the insulin for example long acting or rapid onset. The way it is needed to be stored and the use by date noted (Wallymahmed 2006). Correct injecting of insulin or use of pens. Rotation of injection site (Farrell 2005) and the fact that blood glucose level should be checked before insulin is injected as the adverse effect of insulin is hypoglycaemia (Bullock, Manias & Galbraith 2007).

Blood glucose monitoring is important in controlling blood glucose levels (Brown & Edwards 2008). Self monitoring of blood glucose is a useful aide in guiding the individual in diet, exercise and medication decisions (Brown & Edwards 2008), It promotes autonomy and encourages the person to take a self interest in managing their own disease (Farrell 2005). Mr Daley is of indigenous origins and lives in a rural region of Australia, access to resources such as a glucometers and other vital equipment may be limited. In that case it may be practical to have him visit a clinic daily to access these services until his blood glucose levels stable. Once a routine is under way the visits can be reduced. The nurse can also use this time to monitor, teach and answer questions the patient may have.

Ultimately for Mr Daley to combat his diabetes mellitus type 2, he will require access to a number of important resources. Education on diet and exercise

along with constant monitoring will form the bases of his needs. Advice and support from his health care team will play an important role in maintaining blood glucose levels as well. The fact that Mr Daley is indigenous and living in a remote area also draws concern for his ability to be able to prevail and optimise the best health care available. In poor socioeconomic areas the use of a community based approach can help overcome these short comings. Education and open conversation are the most important tools a healthcare provider can use.

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