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ASSESSMENT 2

INTRODUCTION TO PHYSIOLOGY

BMHP 5003-A2

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Introduction

According to Danaei G. et al (2011), Over the years, the prevalence and occurrence of diabetes in developing as well as developed countries has risen considerably and at quick pace, thereby globally making diabetes a key health priority.

Diabetes is a digestive disorder in which the human body does not produce or properly uses the hormone called insulin which is required to convert starches, sugar, and other food into absorbable and useable energy. Reduction or absolute absence of insulin leads to persistently abnormal high blood sugar and glucose in tolerance. This disease is probably the oldest disease in man's record. In the 14th Century, was also referred as black-death Deepti B et al (2017)

To properly understand diabetes, first, it is essential to understand the physiological process and changes involved before, during and after a meal. Generally, in the human body, food ingested/taken in passes through the digestive system, and here proteins, carbohydrates, fat and oils and other nutrients present in the food is being absorbed into the bloodstream. The consumption or presence of carbohydrate or sugar in the said meal sends a signal to the endocrine pancreas for the release of the insulin hormone. When this insulin hormone is made available in the body, it activates and regulates the conversion and storage of sugar by many tissues of the body, particularly the liver, the musculature, and fat tissues.

Pathophysiology of diabetes

According to Micheal J. and Vieira L (2004), the pancreas is one of the most essential organ of the body with dual functions and as a digestive system and as an endocrine organ in the body. The digestive enzyme secreted by the exocrine pancreas are 99% and are taken up and circulated by the ducts in the pancreatic acini, and then poured into the small intestine. The remaining 1% is therefore taken up and circulated by clusters of the cells known as pancreatic islets, which is comprised of a huge percentage of the endocrine pancreas. These pancreatic islets aids in hormone secretion. They are made up of four cells as follows: F cells, delta cells, beta cells and alpha cells. Each cells generating selected hormones, for instance: F cells releases pancreatic polypeptide, delta cells produce somatostatin or growth hormone-inhibiting hormone (GH-IH), alpha cells produce glucagon, and the alpha cells produce glucagon. The Pancreatic polypeptide arranges and control the secretion of enzymes in the digestive system as well as inhibiting gall bladder contraction, GH-IH helps to slow and lengthen

the secretion and absorption process from the Gastrointestinal tract (GIT) and it also hinders the secretion of both insulin and glucagon, mainly in reaction to food with high protein content.

A Brief Discussion on Regulation of Glucose in the Blood

The pancreas secretes glucagon as well as insulin. These hormones work hand in hand to play a crucial role in blood sugar levels regulation. If the level of any of the hormones is distorted (either higher or lower) than the normal range, blood glucose levels might be on an increase or drop drastically. According to Han H (2016), glucose regulation involves several processes which include glycogenolysis, gluconeogenesis, glycogenesis, and glycolysis. Glycolysis as a process involves different enzymes responsible for glucose catabolism in cells. Among these enzymes is glucokinase, which aids the liver to sense blood glucose levels: to use glucose when blood glucose levels rise, for instance, after a meal and to involve the process of gluconeogenesis when there is no glucose intake for instance, during the night while asleep. In addition, during this fasting periods (Overnight, when there is no intake of any sugar content), the pancreas is signaled to secrete glucagon, which starts the glycogenolysis process. During this process of glycogenolysis, glycogen (the saved up/stored form of blood sugars), is released as glucose.

Types of Diabetes

From research there are different types of diabetes but according to NHS (2019) two unique and dominating forms of diabetes exist and they include diabetes type 1 and type 2. Apart from this two general diabetes classification, diabetes can occur during pregnancy and in other conditions which may include genetic disorders, insulin receptor disorders, chemical toxicity, pancreatic exocrine dysfunction and endocrinopathies.

Diabetes Type 1

This disorder results from complications of different disease in which environmental and genetic conditions give rise to an autoimmune reaction, Davies, J.L. (1994). During the incidence of this diabetes type, the pancreatic Beta-cells which are situated within the Langerhans' islet are destroyed, and this gives rise to individuals with diabetes type 1 and requires total reliance on external administration of insulin to live an almost normal life, Keenan, H.A. et al (2010). Usually, the inception of this disease emerges before one is 30 years of age. Despite the fact that

diabetes type-1 is an insulin-inadequate situation, typical insulin-resistance has becoming more prevalent due to increased obesity rate among the Western populace. In addition, this insulin resistance may be worsen by increased consumption of external insulin by diabetes type 1 patients, Josephine M, and Mark E (2013).

Type 2 Diabetes

According to Josephine M, and Mark E (2013) Type 2 diabetes (the most prevalent of the types of diabetes) is noted and established in about 85% of the world's entire population. In this type of health disorder, specific tissues show notable decrease in insulin sensitivity and these issues includes the liver, skeletal muscles and adipose tissues, this is solely because of the peculiar requirement for blood glucose build up as well as use up at these positions. The increased frequency of type 2 diabetes, mostly in growing countries, is due to changes in individual and collective lifestyle as well as urbanization trend/habits. Most significantly, Western lifestyle and feeding habit is related to obesity and with this being established, it points to the fact that Diabetes Type 2 is an autoimmune disease which is greatly activated by environmental elements. It is very uncertain that genetic factors or aging can singlehandedly pull the occurrence, existence, happenings and prevalence of this disease, on the contrary, it is established that high calories consumption, increase in dietary fat intake, increased body mass, and sedentary lifestyle will in due course lead to Diabetes type 2.

Intervention and management options

Persons with diabetes require a lifetime treatment with exposure to a timed and controlled drug administration, accompanied by multifaceted disease management therapy options and techniques. The management of Diabetes Type 1 specifically necessitate regular treatment options which could include alteration of meal intake, regulation and alteration of insulin administration/doses depending on the current and updated physical engagement levels, as well as glucose status. This disorder's management and intervention choices consist of correct use of medical devices, suitable handling the patient by Health Care Providers (HCPs), and adequate and accurate measurement of progressive outcomes to relevant and necessary therapeutic decisions. People with Diabetes are aided by Health Care Personnel who are laden with the responsibility of frequently checking glucose control indicators and helping to work on new treatment plans to get better results. Recovery in health due to the application of

medical devices and equipment are not attained by the machine itself but by the behavioral changes the device boost, Petersen, .B. et al (2021).

Lifestyle Modification

Drawing conclusions with the answered questioner as a guide, Patient A is above 40 years old, does not get involved in any exercise accompanied with a total sedentary lifestyle, BMI of 31.25 which is seen as obese, has blood pressure reading 140/90 which is considered high blood pressure, eats lots of chocolates and junk food, has family history of high cholesterol level and stroke, loves alcohol and is addicted to smoking.

Junk foods are known to have low nutritional value but loaded with high calories content, and consumption of excess amount of sugars and fats in junks will lead to gaining weight in due time which can subsequently lead to diabetes this is recorded in research by to Bhaskar, (2012). Normally, junk foods are rated the most common and universally accepted health-damaging non-nutritional foods which includes all types of fast foods, processed foods and already-made snack foods. All these kind of food can contribute to the occurrence and incidence of diabetes by increasing blood pressure, elevating blood sugar levels in as well as level of triglyceride in the body, and weight gain, *Asif, M. (2014)* The negative impact of junk foods is highlighted in Figure 1 below.



Figure 1: <https://www.askdrmakkar.com/Blog/fast-food-impact-on-health-in-detail.aspx>.

On the other hand, high Body Mass Index (25.0 above) which is increased body mass or weight (obesity) is in connection with increase in the occurrences of several diseases such as

hypertension, dyslipidaemia, as well as diabetes mellitus. Bay, Grandy, Chapman, (2007). Body Mass Index which is mostly recognized and known as BMI is realistically associated with insulin resistance and diabetes in obese persons. In people with body mass index which exceeds the normal range, elements accountable for the incidence and development of insulin resistance are raised, and these substances generally include: cytokines, proinflammatory substances, NEFA, hormones, and glycerol. Insulin resistance together with deficiency of Beta-cell activities paves way for the advancement of diabetes. Weight gain at an early age in life is unquestionably connected with the development of type 1 diabetes Abdullah, S. et al (2014) Figure 2 appropriately explain how increased BMI (obesity) proliferates to diabetes Type 2.

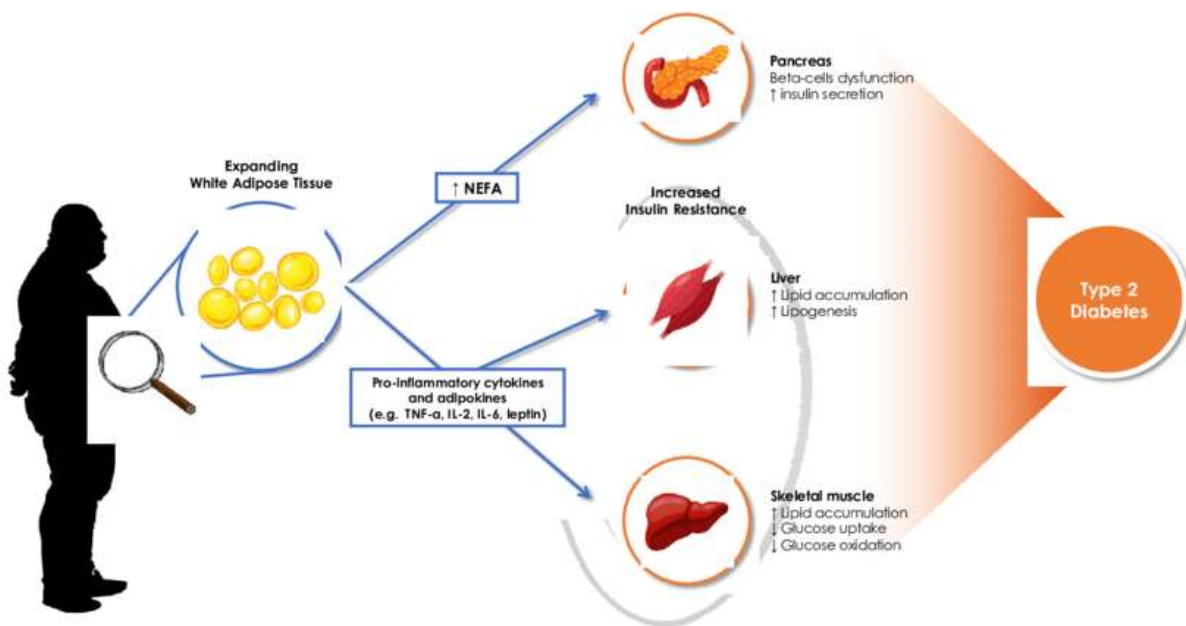


Figure 2: https://www.researchgate.net/figure/Overview-of-mechanistic-links-between-obesity-and-type-2-diabetes-NEFA-Non-esterified_fig2_350376274

Furthermore, it is not a hidden fact that cigarettes increases one's chances of developing disorders in body parts like kidney, lungs, and heart and increases exposure to cancer but it is not a well-known fact that smoking is a long-established risk factor of diabetes type 2. According to Pan et al (2015), smoking cigarette is one of the highly rated risk factor for diabetes mellitus and it is largely known that smoking significantly increases exposure to macrovascular and microvascular impairment in people with diabetes type-2. Lastly, it has been recognised that excessive alcohol consumption is a lifetime indicator for numerous severe

conditions, diabetes type 2 and its impediments inclusive, Volaco, (2018) Figures 3 and 4 explains how these happen.

HOW SMOKING CAUSES TYPE 2 DIABETES

- Smoking increases inflammation in the body. Inflammation occurs when chemicals in cigarette smoke injure cells, causing swelling and interfering with proper cell function. Smoking also causes oxidative stress, a condition that occurs as chemicals from cigarette smoke combine with oxygen in the body. This causes damage to cells.

Evidence strongly suggests that both inflammation and oxidative stress may be related to an increased risk of diabetes.

Figure

3:

https://www.google.com/url?sa=i&url=https%3A%2F%2Fpt.slideshare.net%2Fahmadmohd2%2Fsmoking-and-diabetes%3Fnext_slideshow%3Dtrue&psig=AOvVaw3yt0aEyNtLDEsW_RTPMqkm&ust=1647514651554000&source=images&cd=vfe&ved=2ahUKEwinoui9vMr2AhVGyioKHVLUBaIQjRx6BAgAEAk

3 Ways Alcoholism is Linked to Diabetes

1. Drinking large amounts of alcohol can make your body less sensitive to insulin, which is a trigger for Type 2 diabetes.



2. Diabetes is also frequently a side effect of pancreatitis, which is primarily caused by excessive drinking.



3. Alcohol is a contributing factor to weight gain. The more you drink, the more likely you are to become overweight, which is a risk factor for developing Type 2 diabetes.



Figure 4: <https://www.therecoveryvillage.com/wp-content/uploads/2020/12/3-can-alcoholism-lead-to-diabetes.jpg>

Recommendation and Conclusion

From this study it has been established that Patient A has Type 2 diabetes (Diabetes mellitus). As a social worker, I do recommend that Patient A improve dieting/eating habits and should have an healthy diet of eating more of vegetables and fruits than junks, Patient A should actively engage in exercising more often, should quit smoking and excessive alcohol intake, focus to and aim at losing lot of weight, drink enough water mostly during night hours in order to clear toxins and most importantly see a doctor to get back healthy life and living. Owing to the fact that most reasonable results in diabetic control and management is owed to environmental and lifestyle/habits changes, all these should be cultivated and health is sure to be restored to Patient A.

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APPENDIX

LIFESTYLE QUESTIONNAIRE

Introduction:

In order to help us focus our Health Promotion activities in the practice, we would be grateful if you could fill in this

short questionnaire. If you have already completed one on a previous visit, please return this questionnaire to the receptionist.

Name

Date of Birth

Do you smoke? Yes [] No []

If Yes, do you –

smoke less than 1 cigarette/day []

1-9 cigarettes/day []

10-19 cigarettes/day []

20-39 cigarettes/day []

more than 40 cigarettes/day []

smoke a pipe []

smoke cigars []

If No, have you –

never ever smoked []

given up smoking in the last year []

not smoked for more than 1 year []

Do you have high blood pressure? Yes [] No []

Have you ever had a heart attack

or suffered from angina? Yes [] No []

Have you ever had a stroke, “shock”

or any weakness down one side? Yes [] No []

Have any of the following – mother, father,

brothers or sisters had –

a heart attack below the age of 60 Yes [] No []

a heart attack above the age of 60 Yes [] No []

a stroke Yes [] No []

trouble with very high cholesterol Yes [] No []

(hyperlipidaemia)

.....

Practice Use Only

Health Education Smoking

BP /

Height

Weight

EXERCISE

Healthy exercise usually involves activity that lasts for at least 20 minutes, raises your pulse and produces

hard breathing. In younger people this might be running, cycling or sport, or brisk walking for older people.

Do you take this type of exercise –

daily []

3 times weekly []

once weekly []

once monthly []

seldom []

I cannot take exercise because of disability []

DIET

Please tick the one category which is closest to your usual eating pattern.

I eat no meat, fish or dairy produce []

I eat no meat []

I eat a mixture including daily fruit and vegetables []

I eat a mixture including regular chips and fries []

I eat frozen meals (eg TV dinners) 3 or 4 times/week []

I eat mainly snacks []

I eat a special medical diet []

Please specify

ALCOHOL

Please tick the statement which most closely describes your usual average alcohol intake. (1 unit is 1 glass

wine, 1/2 pint beer or a single measure of spirit.)

I never drink alcohol []

I drink less than 1 unit per day []

I drink between 1 and 2 units a day []

I drink between 3 and 6 units a day []

I drink between 7 and 9 units a day []

I drink more than 9 units a day on average []

.....

Practice Use Only

Health Education Alcohol []

Alcohol Brief Intervention []

ANSWERS TO QUESTIONNAIRE

Name: patient A

Date of birth: 1st January 1976

Yes, 20-39 a day,

yes,

No heart attack,

No stroke

Yes, father had stroke with high cholesterol

BP 140/90,

Height 5.2ft, 160cm;

weight 80kg, 176lb

Exercise: seldom exercise.

Diet: chips and fries, snacks, cookies & chocolate when watching TV. Eat all these because, doesn't know how to cook.

Alcohol: 2 glasses a day