**Obesity and Hyperlipidemia**
NUTR 48100 MNT II
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**Introduction and Background**

**Introduction**

A 43-year old female is diagnosed with obesity and hyperlipidemia. She has been obese for her entire adult life and has only had short-term success when it comes to weight loss. She is now concerned that she is at risk for heart disease.

**Background**

 Obesity is defined as an excess of body fat or adipose tissue and is generally defined as a Body Mass Index (BMI) >30.0 kg/m2. One third (35.7%) of United States adults are obese, according to the 2009-2010 NHANES, which means this affects over 78 million adults1. BMI is not always a perfect tool for assessing obesity, but should be used along with body fat distribution assessment using professional judgement. The location of adipose tissue is an important factor when considering the health implications that obesity causes. Excessive adipose tissue located deep within the abdomen and surrounding the liver and intestines is associated with a higher risk of type 2 diabetes, hypertension, dyslipidemia, coronary heart disease, and metabolic syndrome1. On the contrary, adipose tissue located on the waist and hips is not associated with an increased risk. Waist circumference is also an important factor. Adults with a BMI between 25 to 34.9 kg/m2 and a waist circumference of 40 inches in males and 35 inches in females, have a greater risk of developing type 2 diabetes, hypertension, dyslipidemia, coronary heart disease (CHD), and metabolic syndrome1.

Obesity can cause many adverse health consequences such as depression, anxiety, type 2 diabetes, lipid abnormalities, hepatobiliary disorders, cancers, and reproductive disorders. The incidence of heart disease specifically is increased in adults with a BMI greater than 25 kg/m2. Coronary heart disease is the leading cause of death worldwide and may be directly caused by hyperlipidemia associated with obesity. In a study of adults in their 50’s with hyperlipidemia, who were not on statin therapy and did not have heart disease, it was found that having hyperlipidemia in your 40s or 50s is associated with a substantially increased risk of CHD2. Obese adults are more likely to have elevated serum levels of low-density lipoprotein, total cholesterol, and triglyceride abnormalities, as well as lower serum levels of high-density lipoprotein than normal weight adults leading to increased risk of CHD. The Nurse’s Health study reported that the relative risk of coronary heart disease was three times as high at BMI’s of 29 or greater than BMIs of less than 211. Elevated LDL and lower HDL are major risk factors for coronary heart disease. According to the new obesity guidelines, sustained weight loss of as little as 3% to 5% can result in meaningful reductions in serum levels of triglycerides, blood glucose, and hemoglobin. Greater weight loss can reduce blood pressure and can lower serum LDL, triglycerides, and blood glucose and increase serum HDL4 Overall, obesity places an individual at greater risk for developing coronary heart disease.

 Obesity is caused by the body’s energy intake exceeding its energy expenditure. Obesity is complicated to combat because it influences many neuroendocrine and metabolic systems and long-term treatment is difficult. It may be caused by other medical disorders, such as Cushing’s syndrome and hypothyroidism that affect metabolism. Genetics may also affect body weight by having an influence on appetite, taste, energy intake, etc. Other factors such as socioeconomic status, culture, and social environment may play a role in obesity. Activities such as television, video games, listening to music, and sleeping decrease energy expenditure and may even increase energy intake. Changes in eating habits have also contributed to the increased prevalence of obesity. Portion sizes of energy dense foods and an increase in frequency and types of eating have also been factors. Fast and processed foods have gained popularity due to their low cost and convenience. They are usually higher in fat, refined carbohydrates, and added sugars that contribute to a consumption of excess calories and an increase in obesity.

 The 2013 ACC/AHA/TOS guidelines recommend diet, physical activity, and behavioral therapy as the first-line treatments to combat obesity. For a person with a BMI >35 kg/ m2 with comorbidities, the initial treatment is comprehensive lifestyle treatment: energy deficit with diet and physical activity and behavioral therapy and then consider pharmacotherapy1. Pharmacotherapy should be introduced only after diet, exercise, and use of nutraceutical outcomes have failed3. The most common classes of obesity drugs are lipase inhibitors and appetite suppressants. Lipase inhibitors, such as Xenical or Alli, are used by blocking the action of pancreatic lipases to reduce the digestion and amount of energy provided by triglycerides. These are the only long-term weight loss drugs approved by the U.S. Food and Drug Administration (FDA)1. Appetite suppressants promote weight loss by acting on the central nervous system to reduce appetite and increase satiety.

As for hyperlipidemia, the most useful lifestyle changes are used to reduce total cholesterol, LDL, triglycerides, and increase HDL. This is highly related to a diet low in saturated and trans fat. When diet alone does not show results, drug therapy may be introduced. The gold standard drug class used in hyperlipidemia are statins3. Armolipid Plus is a low dose statin, containing natural occurring substances used to prevent the formation of atherosclerotic plaque. According a randomized, double-blind clinical trial, Armolipid Plus was proved to be able to reduce total cholesterol by 11-21% and LDL by 15-31% among participants3. By using this medication in addition to dietary change, individuals with mild to moderate hyperlipidemia, may have an improvement in their lipid panel values.

If drug therapy along with diet and exercise do not show progress then, bariatric surgery may be considered. New Obesity Guidelines advise that patients with a BMI >40 or BMI >35 with obesity- related comorbidities consider bariatric surgery as an appropriate option to improve health1. This surgery should only be considered after trying lifestyle changes first. A reduced calorie intake to achieve a negative energy balance is also recommended.

The medical nutrition therapy recommended for obesity and hyperlipidemia is first a reduction in weight. This is usually presented in a significant reduction in calories. Lowering energy consumption by 500-1000 kcal/day can lead to weight loss of 1-2 pounds per week1. A reduction of foods that energy dense, specifically fat should be reduced. A low-fat diet may specifically help lower the blood lab values associated with hyperlipidemia. Saturated fat intake should be especially monitored and limited. Added sugars should also be avoided because they are a source of unnecessary, excess calories. Low carbohydrate diets may also be beneficial for weight loss1. Consuming low energy dense foods is a strategy used to maintain satiety and control energy intake, leading to healthier weight1. These foods include high-water vegetables and fruits, whole grains, and broth-based soups. A change in diet can lead to weight loss and potential a lower risk of many health consequences.

**Patient Profile**

A 43-year-old female was diagnosed with obesity and hyperlipidemia and has been obese her entire adult life. She has had short-term success with weight loss and is concerned that she is at risk for heart disease. Her elevated lab values, specifically total cholesterol, LDL-C, and triglycerides are somewhat of a concern for her risk for heart disease. The patient entered the Nutrition Care Process by referral, as the patient was referred by their medical doctor to a registered dietitian for weight loss. The patient lives with her husband and two teenage children and does most of the grocery shopping and cooking for herself and her family. She is a full-time secretary and usually feeds her family quick and fast foods. She eats her leftovers because she doesn’t like wasting food. She also keeps a bottle of Pepsi with her and has a small jar of M&Ms on her desk at work for when she gets hungry. The patient claims she doesn’t have time to exercise but occasionally will walk around the neighborhood.

**Nutrition Care Process**

**Nutrition Assessment**

Anthropometric

This patient is 65 inches or 1.651meters. She weights 230 pounds or 104.5 kilograms. To calculate the BMI I used 104.5kg/ (1.6512 m) = 38.3 kg/m2. A BMI of 38.3 classifies this patient as Obese Class II. She has been obese her entire adult life and has only had some short-term success with weight loss. Her doctor has encouraged her to lose weight, which is why she was referred to see a dietitian.

I used the Evidence-based Nutrition Practice Guidelines on Adult Weight Management found on the Nutrition Care Manual to calculate her estimated needs5. Her estimated energy needs were calculated using the Mifflin St. Jeor equation and was calculated as such 10x 104.5kg + 6.25x 165.1cm – 5 (43 years) + 5= 1701.33 calories. Using a 1.3 activity factor for a sedentary person, it made the energy needs 2210 calories, but since the patient is trying to lose weight 500 calories were subtracted per day to get 1710 calories per day. This can help to provide a negative energy balance each day allowing the patient to lose weight. Protein was calculated to provide 15-35% of energy as protein, which means 256.6 – 598.5 calories from protein. This guideline would recommend 64-149 g from protein. 149g of protein per day seems excessive. The RDA for protein is 0.8g/kg which would equate to 84g protein. 64-84g of protein should be adequate based on the recommendations provided, but more protein will be adequate. There are no specific recommendations for fluids, other than making sure that individuals will be well-hydrated. 30-35ml/kg should be adequate, providing 3135-3660ml fluid per day.

Biochemical

This patients CO2, blood urea nitrogen, creatinine, and calcium were within normal limits of the reference ranges. The glucose level of 117 mg/dL is slightly elevated above the acceptable range of 70-110 mg/dL1. This patient may have an elevated glucose level because of her poor diet and may be at risk for soon developing diabetes. Total cholesterol of 230 mg/dL would be considered borderline high as the acceptable range is less than 200 mg/dL. LDL-C of 155 mg/dL is considered borderline high. The optimal range is less than 100 mg/dL. HDL-C of 36 mg/dL is low, as an HDL more than 40 mg/dL is desirable. Having an HDL value less than 40 mg/dL is a major risk factor for heart disease. Normal triglycerides are less than 150 mg/dL. This patient’s triglycerides of 169 mg/dL her in the borderline high category6. The patient’s abnormal lipid panel would coincide with her diet choices of foods high in saturated fats and cause her to be at higher risk for heart disease. The above reference ranges were taken from the NIH and Nelms textbook.

Clinical

This patient was recently diagnosed with obesity and hyperlipidemia. She is obese class II based on her BMI of 38.3 kg/m2 and has been obese for her entire adult life. Her blood pressure was within normal range of 115/70 mmHg at her last doctor’s appointment. The nutrition focused physical exam found that the patient had no visible edema, but did find rounded curves at shoulders and neck.

Dietary

The patient does most of her own grocery shopping and cooking. Her normal diet usually consists of fast and quick food items because she has a full-time job as a secretary. She often eats leftovers instead of letting food go to waste. She also keeps a bottle of Pepsi and a bowl of M&Ms at her desk for when she gets hungry. The patient claims that she has a good appetite and always has. Based off her home diet, she usually skips breakfast and picks up a Starbucks Latte on her way to work. For lunch, she usually either has a taco salad or Personal Pan Pizza with a 20 oz. Pepsi. For dinner, she usually has a meal such as hamburger helper, instant mashed potatoes, dinner roll with margarine, cookies or pie, and 12 oz. of 2% milk. Her snacks for the day consist of at least 2 20oz. bottles of Pepsi, handful of M&M’s and one bag of microwave popcorn before bed.

Using Super tracker, I found a nutrient analysis of her normal home diet7. On this diet, she consumes 3172 kcals, which almost doubles the recommended amount of her estimated energy needs which are listed above as 1710 kcals per day. She consumes 86g of protein on this diet, which is within the range of recommended protein. She was over on saturated fat, probably because she often eats fast food. Her sodium consumption was 3638 mg, which is more than the recommended amount of 2300mg of sodium or less. The sodium excess is most likely caused her usual intake of fast foods. Her added sugar intake was 212g which is over the recommended amount of less than 45g. This excess amount most likely is coming from the three 20oz. Pepsi’s that she consumes per day. She is under in the dietary fiber, potassium, and iron categories. This is most likely caused by the lack of fruits and vegetables in her diet. Her diet is also lacking in Vitamin A, C, D, E, K, and choline. To improve her diet, she needs to implement more fruits, vegetables, whole grains, and lean proteins. She should also try to cut down on her consumption of sodium, added sugars, saturated fat and overall calories.

**Nutrition Diagnosis**

**1.** Excessive oral intake related to food and nutrition related knowledge deficit as evidenced by a BMI of 38.3 kg/m2, relying on fast and quick foods for most meals, and a diet high in excess calories, saturated fat, and sugar, and low in whole grains, fruits, and vegetables.

**2.** Undesirable Food Choices related to lack of prior exposure to accurate nutrition-related information as evidenced by a high lipid panel (LDL of 155 mg/dL, total cholesterol of 230 mg/dL, triglycerides of 169 mg/dL) and poor diet choices, consisting of fast foods and 3 20oz. bottles of Pepsi every day that are high in excess kilocalories, sodium, saturated fats, and added sugars and are inconsistent with current dietary reference intakes.

**Nutrition Intervention**

Nutrition Prescription

1710 calories, 64-149 grams of protein, 3135-3660ml fluid, < 45g added sugar, <10% calories from saturated fat

Nutrition Intervention

* Nutrition education on portion sizes using MyPlate as a guide
	+ Intake no more than 1710 calories per day and only eat out twice per week.
	+ Aim to make ½ of her meals fruits/vegetables
	+ 1-2 pounds of weight loss per week for the first 6 months1
* The patient should also be educated on foods high in saturated fats and added sugar and substitutions with more nutrient dense foods1.
	+ Substitute Pepsi for non-caloric beverages to cut down on added sugar and calorie intake.
	+ Cut dessert intake in half
	+ Use a food journal or tracker to monitor intake, such as MyFitnessPal or Super tracker for 1 month and bring to next follow-up.

**Monitoring and Evaluation**

The patient should come in next month for a check-up with the dietitian about 1-2 pounds per week for the first 6 months of a weight loss regiment and evaluate every 2 months. Using blood tests, her lab values for cholesterol, triglyceride, LDL, HDL, and glucose should be obtained every 4 months or every other visit. The diet adherence should be monitored by using a food journal or MyFitnessPal.

**Discussion**

The patient entered the nutrition care process after being referred by her medical doctor to see a registered dietitian for weight loss. I found that the patient was obese class II and has been obese for her entire adult life. I found that her estimated needs were 1710 calories, 64-149 grams of protein, 3135-3660ml fluid, < 45g added sugar, <10% calories from saturated fat per day. She has elevated glucose, total cholesterol, LDL, and triglycerides and a low HDL lab value. These lab values put the patient at an increased risk of heart disease. Her current diet consists of quick and fast foods that are high in saturated fats and added sugars. Her current energy intake is more than double the amount recommended. In the Nutrition Diagnosis, it was found that the patient had excessive oral intake and undesirable food choices. In the Nutrition Intervention, it was recommended that she receive nutrition education on portion size using MyPlate and be educated on foods high in saturated fats and added sugar and substitutions with more nutrient dense foods. She can obtain these interventions by making half of her meals fruits and vegetables, substituting Pepsi for a non-caloric beverage, and using a food journal to track her meals. She will be seen by a dietitian every two months to monitor and evaluate her weight loss, lab values, and adherence to her diet changes.

In the meal plan that I provided my patient, the main goal was to lower the calories that she was consuming. My meal plan provided 1611 calories of 1710 calories recommended. I increased her fruit, vegetable, whole grain, and dairy consumption. With this diet, there were only 8g of added sugar compared to 212g of added sugar from her normal diet. I also got her saturated fat to the limit of 20g, while her normal diet was over the limit. Also, the sodium was below 2300mg, as recommended. By this patient making half of her meals fruits and vegetables, she can easily cut down on added sugars, saturated fat, sodium, and excess calories. Substituting Pepsi for non-caloric beverages will also make an impact on excess calories and added sugar. In my meal plan, I made sure that the patient ate breakfast, although she normal skipped. I also swapped her Starbucks latte for homemade coffee to cut down on calories. I tried to keep foods in her diets that she seemed to like, but tried to offer it in a healthier way. For example, I gave her a mini bar of Hershey special dark chocolate instead of her M&M’s. I also allowed her to keep her popcorn, but I reduced the portion size from a whole bag to one cup. Overall, decreasing her daily calories, saturated fat, and added sugar this should lead to weight loss and a reduction in BMI that could lower her risk of heart disease and other comorbidities. This also may help to normalize her lipid panel lab values.

Obesity can lead to many adverse health effects and can put individuals at a higher risk of many comorbidities including heart disease. Weight loss is the common course of treatment, usually by diet and exercise, and sometimes drug therapy or bariatric surgery. After patients lose weight, they often gain it back. Interventions to support weight loss maintenance are important in helping patients to keep the weight off8. Face to face behavioral interventions with a nutrition counselor have been shown to significantly increase chances of a patient maintaining or losing weight. Support from others plays a key role in avoiding weight regain8. In the future, contingency plans for when plans are hard to follow, such as a busy week at work or a vacation, may be important to this patient’s success. These plans can be addressed with the registered dietitian.

Currently, diet and exercise are the most effective treatments. Research is still developing to provide safe and effective medications to help obese patients lose weight and maintain a healthy weight for long periods of time. Drugs in the future may work to reduce appetite and cravings by working to stimulate gut hormones, to shrink blood vessels that allow growth for fat cells, or to target specific genes that control body weight1.

This patient may have a significant reduction in risk of heart disease and other comorbidities with weight loss and diet change. A reduction in her consumption of excess calories, saturated fat, and added sugars may help to decrease her lab values for glucose, LDL, total cholesterol, and triglycerides and increase her HDL. An improvement in these values may help to lower her risk of developing CHD. Obesity and hyperlipidemia are reversible problems with the proper diet care and lifestyle changes made by this patient.

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