**Case 1: Weight Management**

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1. **Understanding the Disease and Pathophysiology**

*1. Current research indicates that the cause of childhood obesity is multifactorial. Briefly discuss how the following factors are thought to play a role in the development of childhood obesity: biological (genetic and pathophysiology); behavioral-environmental (sedentary lifestyle, socioeconomic status, modernization, culture, and dietary intake); and global (society, community, organizational, interpersonal, and individual).*

Through research, childhood obesity has shown to a multifactorial issue, which proves the difficulty in preventing it. Biological factors of obesity include genetic and pathophysiology. Obesity has been shown to have a genetic predisposition. As genetics is strongly correlated to an individual’s body weight and body composition these factors are also influenced by one’s appetite, taste preferences, energy intake, resting energy expenditure, thermic effect of food, and the body’s efficiency in storing energy (Nelms, p. 262). Looking specifically at a twin study done, it was shown that genes are 50%-90% of the reasoning to affect BMI of identical twins (Nelms, p. 262). Additionally, based on people’s genes everyone stores fat at a different rate, breaks down fat at a different rate, which affects metabolism (National Heart, Lung, and Blood Institute, 2015). Also, everyone’s genes reflect the composition as some people have higher body weights with a lower percentage of fat, such as if they are muscular with large skeletal muscle. Or even compare that to an individual who is in a healthy weight range and has a higher percentage of body fat (Nelms, p. 257). It has been proven, that individuals that are pre-disposed to obesity, their lifestyle and environmental factors can increase the severity. When the environment such as having limited access to nutritionally dense food, and instead is replaced with high-energy foods, paired with limited exercise due to humans being sedentary, this results in weight gain. People who are not genetically predisposed to obesity, may gain little to no weight even with high-energy foods, and little activity.

 Another factor that we have seen to be positively correlated with obesity is behavioral- environmental factors which include sedentary lifestyle, socioeconomic status, modernization, culture, and dietary intake. There is a term that “refers to those environments that both promote weight gain and act as a barrier to weight loss” which is called an obesogenic environment (Nelms, p. 263). Many of these environments may include as school, work, communities, neighborhoods, or food locations. These individuals will be exposed to a culture that promotes consuming energy-dense, high-fat, high-sugar foods, with sedentary behaviors (Nelms, p. 263). Through research it has consistently shown that a diet with fruits and vegetables indicated a lower calorie diet. Also there is a higher body weight correlated to increased prevalence of take-away foods. From our modern way of living, especially because of technology and watching TV, it was found that watching TV increases the simultaneous intake of energy-dense foods. Also through modernization, in more work environments we are seeing physical labor replaced, and more individuals have burnout fatigue which results in greater energy intake because when relaxing the brain individuals participate in mindless eating. Additionally, socioeconomic status affect obesity because fresh fruits and vegetables are much more expensive than fast-food or a bag of chips, and therefore results in children eating more calorie dense foods which are less nutrient-dense. Also in a lower SES, a family may not have a safe place for children to play which forces them to stay inside and increases screen time. The lack of convenient, safe areas for walking and biking creates a barrier for physical activity (Nelms, p. 265).

 The last major category of global factors that affect obesity include the society, community, organization, interpersonal and individual. The factors of society play an important role in obesity is the way in which fast-food restaurants, convenience stores, bars, and vending machines aggressively market these energy-dense foods to individuals (Nelms, p. 265). Along with pushing these energy dense foods, in our society there is also a push for having the ideal body weight and the pressure to be thin and this may cause emotional suffering for the individual who is obese with depression, anxiety and low- self worth (Nelms, p. 260). It has also been proven that children who are obese suffer in school and decreased attendance and success due to emotional related problems which interrupts with their education and social skills.

*2. Describe health consequences associated with an overweight condition. Describe how these health consequences differ for an overweight versus an obese condition.*

There are a lot of conditions associated with being overweight and obese. These could be related to the fact that obesity is a multifactorial cause of obesity. There are factors that range from physical conditions including premature death, heart disease, type 2 diabetes, cancer, breathing problems, arthritis, and reproductive complications (Nelms, p. 261).

There are about 300,000 premature deaths a year in the United States alone, due to increasing weight gain. For individuals who are obese have a 50%-100% increased rate compared to individuals of a healthy weight. Also there is an increase in the incidence of myocardial infarction, congestive heart failure, sudden cardiac death, angina, and abnormal heart rhythm. Also, it has been proven that individuals who are obese will have a higher blood pressure, as they are twice as likely to have high blood pressure and elevated serum triglycerides, and decreased HDL cholesterol resulting in heart disease (Nelms, 262). Obesity may contribute to hypertension through the release of adipocyte-related factors containing angiotensinogen and fatty acids which stimulates aldosterone secretion.

Also, type two diabetes is three times as prevalent among the obese compared with normal-weight persons. It has shown that excess body fat in the abdominal region elevated blood glucose levels and with increased size of cells due to weight gain this blocks the GLUT receptors on the cells resulting in insulin resistance and reduce glycogen storage which leads to hyeprinsulinemia, hyperglycemia, and impaired glucose tolerance (Nelms, p. 260). It has shown that slight weight loss can have dramatic results for type two diabetic patients, by helping to control their blood glucose levels.

 Also obese individuals are more likely to have elevated serum levels of total cholesterol, elevated LDL cholesterol, and decreased HDL cholesterol levels. In a study of women, completed by the Nurses’ Health Study there was a three-times greater risk of coronary heart disease for individuals with MI in the obese category. High LDL cholesterol and low HDL cholesterol is a huge indicator for coronary heart disease. Individuals who are obese have overproduction of very low density lipoprotein (VLDL) which is then converted to LDL, therefore overall increasing the serum LDL in the body (Nelms, p. 260). Another issue we see with individuals who are obese is sleep apnea and a higher prevalence of asthma.

 Tthere has been research done indicating that obesity is a significant risk factor for death from cancer. There are specific sites for male including the esophagus, rectum, pancreas, liver, and prostate, and then for women in the gallbladder, bile duct, breast, endometrium, cervix, and ovaries. There are also reproductive disorders that we see in both sexes. In obese males they are more likely to have gyneocomastia (enlarged mammary glands), hypogonadism, reduced testosterone levels, and elevated estrogen levels. Then in females we see abnormal menstrual cycles, polycystic ovarian syndrome (PCOS). PCOS is a common endocrine disorder that is characterized by menstrual irregularities, acne, excess body hair, male-pattern hair loss, and chronic failure to ovulate leading to infertility. Obese women are also at increased risk of fetal and maternal death, and high blood pressure by ten fold. Women who are obese when pregnant, are more likely to have gestational diabetes and result in complications with labor and delivery. And infants who have an obese mother, are at an increased risk of having a high birth weight and hypoglycemia, which can result in brain damage and seizures, along with neural tube defects such as spina bifida (Nelms, p. 261). Not only are there an array of complications for the pregnant mother other, but the mother’s obesity can negativity affect the newborn.

*3. Missy has been diagnosed with obstruction sleep apnea. Define sleep apnea. Explain the relationship between sleep apnea and obesity.*

Sleep apnea is defined as having one or more pauses in breathing or shallow breaths while you are sleeping (National Heart, Lund, and Blood Institute, 2012). These breathing pauses can last from a few seconds to a minute, and they may occur thirty or more times in an hour. When the individual starts to breath normally again, it may sound that thy are snorting or choking. This is a chronic condition that results in major sleep disturbance because the individual goes in and out of a deep sleep, therefore the individual may feel extremely tired and excessive daytime sleepiness (National Heart, Lung, and Blood Institute, 2012). The relationship between sleep apnea and obesity is that individuals who are obese are at increased risk for sleep apnea. The specific type of sleep apnea that obese individuals have is called obstructive sleep apnea, which is where the airway collapses or becomes blocked during sleep, and this is what causes the shallow breathing or pauses. Because there is less oxygen getting delivered in the blood this signals the brain to disrupt the sleep cycle to open up the airway. In obese individuals they have more fat stored in the area of their neck around the windpipe, which narrows the airway and results in breathing difficulty. Because sleep apnea results in increased risk of high blood pressure, heart attack, stroke, diabetes, heart failure, and irregular heartbeats it is very important to make lifestyle changes to manage their sleep apnea (National Heart, Lung, and Blood Institute, 2011).

**II. Understanding the Nutrition Therapy**

*4. What are the goals for weight loss in the pediatric population? Under what circumstances might weight loss in overweight children not be appropriate?*

The treatment goals for weight loss in the pediatric population is weight loss or weight maintenance. In the pediatric population it is very important to understand the predictors which include age, sex, race/ ethnicity and parental weight status to evaluate the child on their weight loss goals. The goal is dependent on the child’s growth percentile, their age, and the presence or absence of medical compilations due to being overweight. Weight loss is recommended for all overweight children, in the 95th percentile or higher on the growth chart, and who are older than seven, and individuals between 2-7 who have medical complications. Also weight loss should be the goal for children if they are in the 85th to 95th percentile who are older than seven and have medical complications. For children who are not overweight and are below the 85th percent range, they should have the physician or dietitian reinforce healthy behaviors and watch their percentile on the growth chart. On the other hand, weight maintenance is important at is allows children to maintain their current weight over time as they grow taller as they age. Wight maintenance should be focused for children who are at risk of being overweight in the 85th to 95th percentile and are between 2-7 years old, and children between 2-7 that do not have medical complication . Also children who are between 2-7 and in the the 95th or higher percentile who do not have medical complications should focus on weight maintenance (Fowler-Brown, p. 2596).

*5. What would you recommend as the current focus for nutritional treatment of Missy’s obesity?*

The current focuses for nutrition treatment for Missy’s obesity would be based upon her 24-hour diet recall. I would focus Missy’s treatment on excessive energy intake (NI-1.3), excessive fat intake (NI-5.5.2) and inadequate physical inactivity (NI-2.1). Focusing on these areas would help Missy cut down on the amount of calories she is consuming, but eating more fruits and vegetables and less processed foods. In general, by looking at the quantity of food that Missy is eating, she does not need all of this food. It would be important to decrease her portion sizes and include more protein in her diet so she feels fuller longer. In Missy’s current diet has is consuming a high amount of fat and sugar between her breakfast, lunch, dinner and 2 snacks. Because Missy’s fruit and vegetable consumption is limited, she is not getting the necessary vitamins and minerals that she needs for growth and development.

**III. Nutrition Assessment**

**A. Evaluation of Weight/ Body Composition**

*6. Overweight or obesity in adults is defined by BMI. Children and adolescents are oftentimes classified as “overweight” or “at risk for overweight” based on their BMI percentiles, but this classification scheme is by no means universally accepted. Use three different professional resources and compare/contrast their definitions for overweight conditions among the pediatric population.*

From the Center for Disease Control childhood obesity is defined as “a BMI at or above the 95th percentile for children and teens of the same age and sex” (CDC, 2015). In comparison overweight is defined as “a BMI at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex” (CDC, 2015). Then the World Health Organization (WHO) defined obese and overweight as “the abnormal or excessive fat accumulation that may impair health” (WHO, 2015). Lastly the Mayo Clinic defines childhood obesity as “a serious medical condition that affects children and adolescents. It occurs when a child is well above the normal weight for his or her age and height.” (Mayo Clinic, 2015). All of these definition from these professional resources provide various definition some with specific guidelines and other with general definitions of the term childhood obesity.

*7. Evaluate Missy’s weight using the CDC growth charts provided. What is Missy’s BMI percentile? How would her weight status be classified by each of the standards identified in question 6?*

According to the information provided on Missy’s chart, she is 57 inches tall which is 144.78 cm, and weights 115 pounds, which is 52.27 kilograms. When using the *Body Mass Index-for-Age Percentiles: Girls, 2 to 20 Years,* knowing that Missy is 10 years old, and followed the lined on the chart, Missy is in the 97th percentile on the growth chart for BMI and age. Then using the *Statue-for-Age and Weight-for-Age Percentiles: Girls, 2 to 20 Years*, for Missy’s weight and age she falls in the 97th percentile range and for her stature and age she falls in-between the 75th to 90th percentile range. According to the definition from the CDC, Missy is in the 97th percentile, therefore she is classified as obese based upon this definition. The WHO and Mayo Clinic definitions do not provide any useful standards for making classifications if Missy is overweight or not. BMI is not used for children but instead use the percentile range on a growth chart to know if they are overweight or not. If a BMI calculation was completed for Missy (shown below) we would be able to make the assumption that this is incorrect since she is very overweight.

Age: 10; Ht: 57”; Wt: 115 lbs.

BMI = wt. (kg) / ht. (cm)2

BMI = [(115 lbs. / 2.2 kg) / (57 in. x 2.54 cm)2]

BMI = 52.27 kg / (144.78 cm)2

BMI = 52.27 kg / (1.44)2

**BMI = 25.0 kg/m2**

**B. Calculation of Nutrient Requirements**

*8. If possible, RMR should be measured by indirect calorimetry. Identify two methods for determining Missy/s energy requirements other than indirect calorimetry and then use them to calculate Missy’s energy requirements.*

Hamwi Method:

IDB = 106 lbs. - (6 lbs. x inch. over 5 ft.)

IDB = 106 lbs. - (6 lbs. x 3 in.)

**IDB = 88 lbs.**

**IDB =** 88 lbs. / 2.2 kg = **40 kg**

Adjusted Body Weight:

ABW = IBW + 0.25 (UBW - IBW)

ABW = 88 lbs. + 0.25 (115 lbs. - 88 lbs.)

ABW = 88 lbs. + (0.25 x 27 lbs.)

ABW = 160 lbs. + 6.75 lbs.

**ABW = 166.75 lbs.**

**ABW =** 166.75 lbs. / 2.2 kg = **75.8 kg**

Mifflin St. Jeor:

EER = [10 x ABW (kg) + 6.25 x ht (cm) - 5 x age (yrs) + 5] x PAL

EER = [10 x 75.8 kg + 6.25 x 144.78 cm - 5 x 10 + 5] x 1.2

EER = [758 + 904.88 - 50 + 5] x 1.2

EER = [1617.88] x 1.2

EER = 1941.46 kcal

**EER Range = 1,900- 2,000 kcal**

Harris Benedict

EER = 655+ (9.56 x wt (kg)) + (1.85 x ht (cm)) – (4.68 x age (yrs))

EER = 655+ (9.56 x 52.27 kg) + (1.85 x 144.78cm) – (4.68 x 10 yrs)

EER = 655 + (499.70) + (267.84) – (45.8)

EER = 1376.74 kcal

EER with PAL of 1.2 = 1376.74 x 1.2

EER= 1652.1 kcal

**EER Range = 1,600-1,700 kcal**

Two different methods were completed to compute the amount of calories that Missy needs. Based on the calculations the Harris Benedict provides the more appropriate number of calories that Missy should be consuming each day. The Mifflin St. Jeor EER, seems not to be appropriate for a 10 year old child who lives a very sedentary lifestyle.

**C. Intake Domain**

*9. Dietary factors associated with increased risk of overweight are increased dietary fat intake and increased kilocalorie-dense beverages. Identify foods from Missy’s diet recall that fit these criteria. Calculate the percentage of kilocalories from each macronutrient and the percentage of kilocalories provided by fluids for Missy’s 24-hour recall.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Food** | **Serving** | **Calories** | **Fat (gr)** | **Carbs (g)** | **Protein (g)** |
| Breakfast Burrito | 2 | 600 | 32  | 52 | 24 |
| Whole Milk | 8 oz. | 150 | 8 | 12 | 8 |
| Apple Juice | 4 oz.  | 60 | 0 | 14.5 | 0 |
| Coffee | 6 oz. | 0 | 0 | 0 | 0 |
| Cream | ¼ cup | 200 | 20 | 0 | 1.2 |
| Sugar | 2 tsp | 30 | 0 | 8.4 | 0 |
| Bologna | 2 slices | 120 | 9 | 6 | 6 |
| Cheese | 2 slices | 120 | 8 | 4 | 6 |
| Bread | 4 slices | 280 | 3 | 58 | 8 |
| Mayonnaise | 1 Tbsp | 90 | 10 | 0 | 0 |
| Frito Corn Chips | 1 oz. package | 160 | 10 | 16 | 2 |
| Twinkies | 2  | 270 | 9 | 46 | 2 |
| Whole Milk | 8 oz.  | 150 | 8 | 12 | 8 |
| Enriched bread | 2 slices | 160 | 3 | 52 | 4 |
| Crunchy peanut butter | 2 Tbsp | 190 | 16 | 8 | 7 |
| Grape jelly | 2 Tbsp | 100 | 0 | 26 | 0 |
| Whole Milk | 12 oz.  | 225 | 12 | 18 | 12 |
| Fried Chicken  | 2 legs, 1 thigh | 550 | 30 | 13 | 60 |
| Mashed potatoes (made with whole milk and butter) | 1 cup | 215 | 9 | 32 | 4 |
| Fried Okra | 1 cup | 85 | 4 | 16 | 2.5 |
| Sweet Tea | 20 oz.  | 175 | 0 | 42.5 | 0 |
| Microwave popcorn | 3 cups | 170 | 11 | 14 | 2 |
| Coca-Cola | 12 oz.  | 157.5 | 0 | 40 | 0 |
| **Total**  |  | 4257.5 kcal | 202 grams | 490.4 grams | 156.7 grams  |

**Percentage of kcal from Fats**

 202 grams from fat x 9 kcal/gram = 1,818 kcal from fat

1,818 kcal/ 4,257.5 kcal = 42% kcal from fat

**Percentage of kcal from Carbohydrates**

490.4 grams from CHO x 4 kcal/gram = 1,961.6 kcal from CHO

1,961.6 kcal/ 4,257.5 kcal= 46% kcal from CHO

**Percentage of kcal from Protein**

156.7 grams from PRO x 4 kcal/gram= 626.8 kcal from PRO

626.8 kcal/ 4,257.5 kcal= 12% kcal from CHO

**Percentage of kcal from Beverages**

Total beverage kcal: 150 kcal (whole milk) + 60 kcal (apple juice) + 200 kcal (cream) +150 kcal (whole milk) + 225 kcal (whole milk) + 175 kcal (sweet tea) + 157.5 kcal (coca- cola) =1,117.5 kcal

(1,117.5 kcal/ 4,357.5 kcal) x 100%= 25.6%

*10. Increased fruit and vegetable intake is associated with decreased risk for overweight. Using Missy’s usual intake, is Missy’s fruit and vegetable intake adequate?*

Missy’s fruit and vegetable is very low and not adequate. The only fruit that she had was 1 serving at breakfast, which was 4 ounces of apple juice, but apple juice does not have any fiber. The only vegetable that she was was mashed potatoes, which is a starchy vegetable, and then fried okra. And because the mashed potatoes had whole milk and added butter and the okra was fried, there is a lot of extra added calories to these vegetables that Missy does not need in her diet. It is very important for her to consume at least 5 fruits and vegetables a day, which will also help with increasing the fiber in her diet.

*11. Use the MyPlate online too to generate a personalized MyPlate for Missy. Using this eating pattern, plan a 1-day menu for Missy.*

|  |  |  |
| --- | --- | --- |
| Meal  | Menu | Calories (kcal) |
| Breakfast  | 1 cup of Oatmeal 1 cup of 1% milk1 medium banana1 cup vanilla yogurt | 143 102 105193 |
| Lunch | Turkey Sandwich 2 Slices of whole wheat bread1 Tbsp Hummus2-ounce Turkey 1-ounce Swiss cheese½ cup Lettuce2 Medium Slices of Tomato 8 Harvest Wheat Crackers 1 cup of water | 1382787 49 5 71090  |
| Snack | 1 cup of water1 medium apple ½ ounce of almonds | 0 72 85 |
| Dinner | 1 cup of 1% milk3 ounces of baked chicken1 cup of broccoli 1 cup garden salad1 tablespoon Italian salad dressing½ cup brown rice  | 1021385513 43107 |
| Snack | 3 Tbsp Trail mix8 Baby carrots  | 137 33  |
| Total  |  | 1620 |

*12. Now enter and assess the 1-day menu plan for Missy using the MyPlate tracker. Does your menu meet macro- and micro nutrient recommendations for Missy?*

|  |  |
| --- | --- |
| **Macro- Nutrient**  | Percent (%) Calories  |
| Carbohydrates | 57% |
| Proteins | 23% |
| Fats | 23%  |

The normal distribution of carbohydrates is about 50%, protein is about 20%, and fat is about 30%. As stated, the carbohydrates are a little higher and the fats is a little lower. I wanted to ensure Missy had a lot of smaller side dishes that she could snack on so this diet is not too much change compared her to her old one. Also in Missy’s new diet, she does have low-fat products such as the milk, yogurt and cheese, but this could easily be changed. Since Missy was originally used to whole milk, she may not tolerate the low fat (1%) milk that was recommended, so 2% may be a better option that she would tolerate, and week by week decrease this to skim milk. According to MyPlate Missy can have 2000 calories assuming she is participating in 60 minutes of physical activity a day. Since currently Missy is not active she is on a 1600 calories diet. Based on the 1-day menu that was planned this will meet all of her macronutrient needs. I think in general the distribution would meet her needs with smaller portions and she still is consuming her recommended amount of calories.

|  |  |  |  |
| --- | --- | --- | --- |
| Nutrient | Target Range | Amount Consumed | Status |
| Calcium | >1300 mg | 1515 mg | Ok |
| Potassium  | 4500 mg | 3439 mg | Slightly under |
| Sodium | <2300 mg | 1612 | Ok |
| Vitamin A  | 600 μg | 1142 μg | OK |
| Vitamin C | 45 mg | 98 mg | OK |
| Vitamin D | 15 μg | 7 μg | Under  |

The only micronutrient that is of concern from the ones listed here and on her full nutrient report is that potassium is slightly under which she can get from from dried fruit that can be added to her trail mix, or avocado added to her salad. Another nutrient was low was vitamin D, but if Missy is playing outside and receiving vitamin D from the sun, along with consuming fortified dairy products she will be able to meet her vitamin D needs.

**D. Clinical Domain**

*13. Why did Dr. Null order a lipid profile and a blood glucose test?*

A lipid profile and a blood glucose test were ordered so the doctor was able to see if Missy had high cholesterol when looking at here total cholesterol, LDL and HDL cholesterol (Nelms, 260). Because Missy is obese she is at risk for heart disease if she has hyperlipidemia and hypertension; therefore, a blood lipid test would asses her risk of these type of complications (Nelms, 262). Also being overweight increases the risk of Missy getting type two diabetes, so it important to check her blood glucose levels and her Hemoglobin A1C to look at her blood glucose over a three month period. Based upon Missy’s 24-hour diet recall she is consuming a high amount of high-fat processed foods and a low amount of fruits and vegetables which is associated with diabetes. Also since Missy has a family history of type two diabetes in her mother and grandmother, and her maternal grandmother has hypertension, she is at increased risk of getting type two diabetes, and it is never very too early to evaluate her lipids and blood glucose since it runs in the family. Lastly, since Missy’s is in the 97% percentile on the growth chart, it is important to evaluate if Missy has any issues that may result in metabolic syndrome. Both the lipid profile and the blood glucose tests are very good indicators to the dietitian and doctor to formulate a treatment plan for Missy to improve her health for a better quality of life.

*14. What lipid and glucose levels are considered to be abnormal for the pediatric*

*population?*

When lipid profile includes total cholesterol (TC), low-density lipoproteins (LDL), and high-density lipoproteins (HDL) and triglycerides (TG). According to the American Family Physician for children 18 and under their total cholesterol should be less than 170 mg/dL of blood. If a child’s TC is from 170-199 mg/dL this is considered borderline, and greater than 200 mg/dL is considered elevated. The acceptable LDL level in children is less than 110 mg/dL, borderline is 110 to 129 mg/dL and elevated is greater than 130 mg/dL (AAFP, 2009). All components of the lipid profile vary based upon age, and sex of the child. The appropriate HDL levels for a 10-year-old female is is 53 mg/ dL, therefore anything lower than 53 mg/dL would be considered low (AAFP, 2009). HDL is necessary to removed the LDL in the blood to decrease the overall cholesterol and associated with increased risk of cardiovascular disease. The appropriate levels of TG, again for a 10-year-old females is 150 mg/ dL, anything above 150 mg/dL would be considered abnormal (AAFP, 2009). The triglycerides are normally elevated in patients who are obese because from consuming simple sugar such as soda or candy. According the American Heart Association the diet of a child from the ages of 4-18 years old, should contain 25-35% of their calories from fat. These types of fats should be from polyunsaturated, and monounsaturated fatty acids such as fish, nuts and vegetable oils (American Heart Association, 2015).

According the the MayoClinic and the American Diabetes Association their recommendations are as follows. When a random blood sugar test is done for a child from the age of 6-12 years old their blood sugar that is done before meals should be from 70-110 mg/dL, if it is greater than 110 mg/dL this could indicate that the child has diabetes (UCSF Benioff Children’s Hospital, 2015). Another test that can be cone is the A1C levels for children younger than 6 years old, it is recommended that the AIC is between than 4.9-5.3%. Then for children between 6 and 12 years old, their A1C should be less than 5.5%. Lastly from 12 years old to 18 years old, teenagers are recommended to have an A1C of less than .5% (Mayoclinic, 2015).

*15. Evaluate Missy’s lab results.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Lab- Value** | **Normal Range** | **Patient Value**  | **Status**  |
| Cholesterol | <170 mg/dL | 190 mg/dL | Elevated |
| LDL  | <110 mg/dL | 110 mg/dL | Elevated |
| HDL  | >53 mg/dL | 50 mg/dL | Low |
| TG | <150 mg/dL | 114 | OK |
| Glucose | 70-110 mg/dL | 108 mg/dL | Elevated |
| HbA1c | 4.9-5.3% | 5.5% | Elevated |

Based on the above lipid profile and glucose test that was completed we can see which lab values are elevated, low and in the appropriate range accordingly. Her cholesterol is high along with her LDL and her HDL which is low, all of these can be associate with the amount of fried and processed food, and not getting natural sources of fat. Both her blood glucose and HbA1c indicate her blood sugars high and indicate a long period of elevated blood glucose, which can be associated with diabetes. Other lab values that are important to look at include her transferrin which was 254 mg/dL while the normal range is from 250-380 mg/dL in children. Transferrin is important because it serves as a transporter for iron throughout the body and is an indicator of protein status (Nelms, 59). It is important to note this when completing the diet evaluation for Missy, and watch her iron levels. Another lab value that is important to note is her that her ammonia is low at 8 μmol/L, with the normal range from 9-33 μmol/L. Because Missy’s ammonia levels are low this could indicate that the kidneys are not removing this waste from the body properly and has a kidney dysfunction (University of Rochester Medical Center, 2015).

**E. Behavioral- Environmental Domain**

*16. What behaviors associated with increased risk of overweight would you look for when assessing Missy’s and her family’s diets?*

The behaviors that I would look at for a risk of overweight would be first if the family had time that they sit down once an evening and eat dinner together. Sitting down and having a family meal together is very important so the family is able to re-connect and feel a sense of togetherness, while sharing a delicious meal. Also another aspect that I would look at is if when the family is sitting down, are they in front of the TV. It would also be important to look at the size of plate wear that the family is eating off of. If the size of the plate is very large, this could relate back to why the portion sizes that Missy is eating are so large. Although this could be a minor change, this is one that could have huge impact. Along with this, I would be interested in who is serving dinner, if Missy is allowed to serve herself and have as many servings as she wants, or do her parents control the amount she has. Also who in the household is cooking. Is it the mother, father, both or is the family more often than not ordering take out of having fast food when they do not have time to cook. Further, I would be interested in who does the grocery shopping in the household, where the family goes to buy their groceries and how it works when the family is shopping at the store. For example, are they starting in the middle isles of the store and skipping all of the fresh produce? These are very important questions to find out to understand what factors are increasing Missy’s consumption of calories.

*17. What aspects of Missy’s lifestyle place her at increased risk for overweight.*

The aspects of Missy’s lifestyle that place her at an increased risk for being over weight is first of all the amount of calories that she is consuming every day. Missy is eating a lot of processed food that she should not be having as often as she does, since these foods are calorie dense and lack the necessary nutrients. Another reason that Missy is at increased risk is that she states she does little to no exercise. Depending on the environment of where Missy’s household is located this may be a barrier for her to go outside and play. Another reason that Missy is at increased risk for being overweight is that Missy’s school recently had budget cuts, which removed the funding for physical education at school. Because of this cut, this has decreased Missy’s physical activity from about 30 minutes per day three to five times per week to now, little not no physical activity. Another risk that Missy is at is that her hobby includes playing video games. As studies have shown, increased screen time results in a greater risk of obesity, due to being sedentary and increased chance of Missy also snacking while she is playing video game, which results in excess consumption of calories. Also based upon Missy’s 24-hour diet recall, we can see that the size of her meal that is she is consuming is very large large. It would be more appropriate to have smaller meals and snacks throughout the day which if she was hungry she could eat more often, instead of a huge amount of food in one sitting. Also since Missy is not consuming many fruits and vegetables, this would also be a risk factor for Missy being overweight.

*18. You talk with Missy and her parents. They are all friendly and cooperative. Missy’s mother asks if it would help for them to not let Missy snack between meals and to rewarded her with dessert when she exercises. What would you tell them?*

As the dietitian it is very helpful that Missy’s parents are cooperative and friendly as it indicates that they are concerned about their daughter’s health. The parents have a key role in how they influence their daughter’s choice by being a role model for her, so it is helpful that they are willing to make change. I would tell Missy’s parents that snacking between meals is not a bad thing, but rather if it is done in the correct way it can be helpful. I would suggest that Missy eat smaller meals, so she is more likely to have small snacks between meals that are high in protein to help her feel longer. Great snack ideas would include a piece of fruit, cut up vegetables, whole grain crackers or lean protein as well. I would provide ideas that Missy would like such as a yogurt with a little granola, a piece of turkey with an apple, hummus with carrot sticks. It is important for her parents to understand that snacks are important because Missy is eating less during her three main meals, the snacks will hold her over between meals.

It is important to stress to Missy’s parents that providing a reward for exercising, especially with desert is not recommended. A way in which they may want to reward Missy for exercising is that she can have a sleepover with a friend for example, or do something special she does not normally do at home. They should enforce exercise with a behavior that Missy is excited for and looks forward to she may be more willing to exercise.

*19. Identify one specific physical activity recommendation for Missy.*

Since Missy is not very active currently, it is important to ease her into physical activity that she would enjoy, and look forward to, to ultimately keep her moving. A great family activity is for her and her parents to go for a walk after dinner for example. This is a time of day that the family can go together, get fresh air, and stay active. It is important that Missy’s parents are supportive of her getting physical activity and this is a great way for them to participate. I would suggest starting with a 30-45 minute brisk walk in a park or around the neighborhood for 5 days a week.

**IV. Nutrition Diagnosis**

*20. Select two high-priority nutrition problems and complete a PES statement for each.*

1. Excessive energy intake (NI-1.3) related to consumption of high-fat food, calorie-dense foods and low intake of fruits and vegetables as evidence by 24-hour diet recall, is in the 97th percentile of her age and BMI on the growth chart.

2. Excessive fat intake (NI-5.5.2) related to consumption of highly processed foods, and high fat from fried foods as evidence by her 24-hour diet recall and results of lipid profile TC of 190 mg/ dL, LDL of 110 mg/dL and HDL of 50 mg/dL.

**V. Nutrition Intervention**

*21. For each PES statement written, establish an ideal goal (based on signs and symptoms and an appropriate intervention (based on etiology).*

1.Excessive energy intake (NI-1.3)

* Goals- Reduce calorie consumption of 500 per week until the client is between a 1600-2000 calorie diet. By reducing calories this will result in loss of 1 pound per week.
* Intervention- To alter the clients diet it is important to provide structured nutrition education. In the nutrition education it should involve the parents to discuss reducing Missy’s portion size. Also it would be important to discuss with the parents the type of foods they are purchasing and if they could decrease the amount of processed foods and increase the amount of fruits and vegetables.

2. Excessive fat intake (NI-5.5.2)

* Goals- The goal would be decreased Missy’s fat in her diet to 25-30% of fat in her diet from the 42% she is currently consuming.
* Intervention- Missy should eliminate fried food completely and decrease her consumption of processed foods. Missy should also decrease the fat from animal products by consuming lean meat such as chicken or turkey along with drinking a lower fat milk and cheese products.

*22. Mr. and Mrs. Bloyd ask about using over-the-counter diet aids, specifically Alli (orlistat). What would you tell them?*

Alli is an over-the-counter diet that is a reduced-strength form of Xenical, which is also used for weight loss. Alli promotes weight loss by decreasing the amount of dietary fat the is absorbed in the intestines. Alli works by inhibiting lipase, which is the enzyme that breaks down fats into smaller pieces. As instructed, Alli should be take with a meal, and about 30% of the fat that you consume in the diet, is not broken down and is eliminated through bowel movements. There are many side effects from Alli including reduced absorption of fat-soluble nutrients including vitamin A, D, E and K along with abdominal pain, oily discharge from the anus, gas, oily stools, more- frequent bowl movements, and possibly headache, back pain (Mayo Clinic, 2015).

At this time, I would not recommend for Missy to put on Alli but instead should try methods to lose weight including what I have prescribed her, and increasing her physical activity. I would not put her on Alli also because she is a young child and is still developing and needs to eat a balanced diet for proper development and not have stunted growth or any other complications. Potentially, if Missy lost weight and she consulted with her doctor and they recommended that it was safe and appropriate for Missy to be put on Alli, then it would be a consideration.

*23. Mr. and Mrs. Bloyd ask about gastric bypass surgery for Missy. What are the recommendations regarding gastric bypass surgery for the pediatric population?*

Based on thorough research it is not recommended to do pediatric bypass surgery for Missy because the child needs to be done growing, about the age of 13 years old for girls and 15 years old for boys (U.S. National Library of Medicine, 2015). Though if Missy did not lose the weight she hoped to lose, in the future if she met the criteria of the American Society for Metabolic and Bariatric Surgery (ASMBS) then she could consider the surgery. According to the ASMBS the criteria for adolescents to be considered for a bariatric procedure is that they should have a BMI of ≥35 kg/m2 and have demonstrate co- morbidity such as type two diabetes, moderate to severe sleep apnea or a BMI of ≥40 kg/m2 with other co-morbidity such as hypertension, insulin resistance, glucose intolerance, impaired quality of life or activities of daily living (ADL’s), dyslipidemia, or sleep apnea (ASMS, 2015). At this time Missy does not meet the qualifications for bariatric bypass surgery and therefore is not appropriate.

**VI. Nutrition Monitoring and Evaluation**

*24. When should the next counseling session with Missy be scheduled?*

Missy should schedule the next counseling in a week after her first one. Because Missy and her parents are new to nutrition education, and is making a lot of changes to her diet and is starting to participate in physical activity. It is important to keep contact with the client and provide a positive supporting environment for Missy and her family so they do not get frustrated if she is not having success. Missy also may not tolerate the new nutrition plan that she is put on and may strain the relationship with her parents, if her parents are trying to get here to eat that food. Therefore, if this was the case it is important for the dietitian to discuss with Missy how she is feeling and what she may or may not like about what she is eating. After the second session it would be important to for her to continue seeing the dietitian every week for a month, and then see the dietitian twice a month for up to three months, and once a month up to the six-month mark.

*25. Should her parents be included? Why or why not?*

Missy’s parents should be included in every counseling session. Since Missy is only 10 years old, her parents are still purchasing the food in the household. Therefore, it would be beneficial to provide the parents with nutrition counseling lessons about foods they should buy such as fruits and vegetables, and foods that the family should stray away from such as Twinkies or other processed foods. When anyone is the family is trying to lose weight is very important to have a supportive environment with a positive attitude about eating and physical activity. Also Missy may want to get more involved what she is eating, such as preparing snacks for her-self, which would be best under parental supervision. Overall, at this stage in Missy’s life, her parents are the people who she looks up to and if they are portraying positive healthy lifestyle, she is more likely to participate in the same activities.

*26. What would you assess during this follow-up counseling session?*

In a follow up counseling session with Missy the main concern I would have is what she is eating. As the nutrition related concern that I have about her is concerning her caloric intake and the amount of fat she is consuming. I would ask her how she is tolerating the new diet plan that she should be following. Since I suggested seeing the client only once after her first visit, I would not weight her after four sessions. Another component I would ask the family about after a month, is if her sleep apnea has improved if she had lost weight. Also I would ask Missy to talked to about what she ate that day, and I would ask her parents to keep a 24-hour diet log of what she ate and complete a calorie count on it. Also I would ask the family if they have been going on walks like I had suggested. Overall since Missy is a child she may not understand all the changes that are being made to her diet, and if she is adjusting well or not. Depending on how she is adjusting, changes may need to be made and discussed with the family.

Resources

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American Heart Association (2014). Dietary Recommendations for Healthy Children.

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American Society for Metabolic and Bariatric Surgery (2015). Pediatric Best Practice Guidelines. <https://asmbs.org/resources/pediatric-best-practice-guidelines>

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