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KNH 411
Case Study 1
14 October 2014

Case Study 1: Pediatric Weight Management

1. Current research indicates that the cause of childhood obesity is multifactorial. Briefly outline the roles of genetics, environment, and nutritional intake in development of obesity in children.

Genetic, environmental, and nutritional intake are all major causes in childhood obesity. Genetics affect body weight and body composition by influencing such factors as appetite, taste preferences, energy intake, resting energy expenditure, the thermic effect of food, nonexercise activity thermogenesis, and the body's efficiency in storing energy. Studies show that up to 40% of offspring with one obese parent eventually become obese. Other studies have identified the fat mass and obesity-associated gene to be a likely marker of obesity (Harbron, et al., 2014). More research on the exact link of the gene and obesity still needs to be done.

Environment is another large determinant of obesity. Often obesigenic environments are referred to as toxic food environments. This refers to the low-cost, processed, convenience foods. This environment is very common throughout America. Toxic food environments promote high-energy intake and is largely responsible for the obesity epidemic throughout the nation. Environment has also been largely impacted by the food industry. Recent trends in the industry have shown increased in portion sizes, which have also contributed, to this obesity epidemic. A negative environment can also lead to stressful eating and other negative health behaviors to deal with the stressors. Family and peer environment

Finally, nutritional intake is the largest determinant of obesity. Much of the convenience foods and processed foods are high energy, high fat, and high sugar products. These products contribute to the obesity epidemic. Inappropriate portion sizes created by the food industry and unregulated portions in the home increase the chances of obesity as well. Binge eating and excessive snacking are large contributors to the nutritional intake of children and also impacts obesity. (Nelms, 2011, pg. 256-259).

2. Describe health consequences of overweight and obesity for children.

There are a multitude of health consequences to being overweight and obese for children. These include many long-term and short-term consequences. One of the most immediate consequences is social discrimination. Often overweight children are bullied and face issues among their peers. This can lead to many psychological consequences. Health issues also include higher risk for heart disease through hyperlipidemia and hypertension. The prevalence of type II diabetes has also dramatically

increased in children. Finally, overweight children have a significantly higher chance of being overweight or obese as adults. This chance increases about 70% and increases to 80% if one or more parent is overweight or obese. (Nelms, 2011, pg. 257)

3. Jamey has been diagnosed with obstructive sleep apnea. Define sleep apnea.
Sleep apnea is defined as a chronic condition in which a person has one or more pauses in breathing or shallow breaths during sleep. Often sleep apnea is caused by lack of airflow. This may last a few seconds or even minutes long and can occur over thirty times an hour. This condition can lead to sleep deficiencies from difficulties achieving deep and consistent sleep. (American Sleep Apnea Association, 2014).
4. Explain the relationship between sleep apnea and obesity.
Obesity is one of the biggest causes of sleep apnea. Excess fat around the neck can block the upper airway making it difficult for oxygen to pass through while in the sleeping position.
5. What are the goals for weight loss in the pediatric population?
The goals for weight loss in the pediatric population typically focus on increasing physical activity as well as encouraging healthy eating through nutrition education and family interventions. There are two major goals in weight loss for this population and they are to ensure that the child grows and develops properly and to achieve a healthy weight. Weight loss should not be more than about one pound per month if the patient is under the age of 12. Dietitians must be cautious in planning their interventions in order to avoid creating unhealthy body image and feelings of isolation or failure. (Weight Watchers, 2014).
6. Under what circumstances might weight loss in overweight children not be appropriate?
Weight loss may not be appropriate for children who continue to grow and develop. Children are rapidly growing and developing and therefore may grow into their bodies. They should still be taught healthy eating and nutrition education, but may not necessarily need weight loss. Another instance that weight loss is not appropriate is if the child has a preexisting condition or injury. (Weight Watchers, 2014).
7. What would you recommend as the current focus for nutritional treatment of Jamey's obesity?
I would recommend that Jamey focus on portion sizes, increasing fruit and vegetable intake, and reducing sugar sweetened beverages as the current focus for nutritional treatment for her obesity. Her 24-hour recall indicates that her energy intake far exceeds what she needs due

to very large portion size and high calorie, high fat product consumption. For breakfast she has two breakfast burritos and for lunch she has two sandwiches. I believe that the first step in intervention should be to decrease these numbers to one breakfast burrito and one sandwich and gradually should move on to making healthier diet choices. These recommendations are also consistent with her lab values. They show that her glucose levels are high, HDL levels are low, and her LDL/HDL ratio is high. The suggested nutrition focuses would help alter those lab values. Jamey would also benefit in increasing her physical activity level. She does not participate in much physical activity and enjoys inactive hobbies such as reading and playing video games. A successful intervention would target the nutritional needs as well as her physical activity needs.

8. Evaluate Jamey's weight using the CDC growth chart. What is Jamey's BMI percentile? How is her weight status classified? Use the growth chart to determine Jamey's optimal weight for height and age.

Based on the CDC growth chart, Jamey falls within the 97th percentile based on her height of 57 inches and weight of 115 pounds. Her weight status is classified as obese based on the BMI percentile. Jamey's optimal weight for height and age is 70-75 pounds to be classified in the 50th percentile.

9. Identify two methods for determining Jamey's energy requirements other than indirect calorimetry and then use them to calculate Jamey's energy requirements.

TEE for Overweight Females Aged 3-18 years (Nelms, 2011, p.243)

$$\text{TEE} = 389 - 41.2 \times \text{age} + \text{PA} \times 150 \times \text{weight} + 701.6 \times \text{height}$$

$$\text{Weight} = 115 \text{ lbs} / 2.2 \text{ kg} = 52.3 \text{ kg}$$

$$\text{Height} = 57 \text{ in.} \times 2.54 \text{ in.} = 144 \text{ cm} / 100 \text{ cm} = 1.45 \text{ m}$$

$$\text{PA} = 1.18 \text{ for low activity level}$$

$$\text{TEE} = 389 - 41.2 \times 10 \text{ years} + 1.18 \times 150 \times 52.3 \text{ kg} + 701.6 \times 1.45 \text{ m} = 2103 \text{ kcal}$$

Based on this equation, Jamey needs between 2100 – 2200 kcal/day.

EER for Females 9-18 (Nelms, 2011, 242)

$$\text{EER} = 135.3 - 30.8 \times \text{age} + \text{PA} (10 \times \text{weight} + 934 \times \text{height}) + 25$$

$$\text{Weight} = 115 \text{ lbs} / 2.2 \text{ kg} = 52.3 \text{ kg}$$

$$\text{Height} = 57 \text{ in.} \times 2.54 \text{ in.} = 144 \text{ cm} / 100 \text{ cm} = 1.45 \text{ m}$$

$$\text{PA} = 1.16 \text{ for low activity level}$$

$$\text{EER} = 135.3 - 30.8 \times 10 \text{ years} + \text{PA} (10 \times 52.3 \text{ kg} + 934 \times 1.45 \text{ m}) + 25 = 2030 \text{ kcal}$$

Based on this equation, Jamey needs between 2000 – 2100 kcal

10. Identify foods from Jamey's diet recall that fit these criteria.

Many of the products Jamey consumes are high in fat or qualify as calorie-dense beverages. High fat foods include: breakfast burritos, whole milk, cream, bologna and cheese sandwich, mayonnaise, Fritos corn chips, Twinkies, peanut butter, fried chicken, fried okra, and mashed potatoes because they were prepared with whole milk and butter. Calorie-dense beverages include: whole milk, cream, sweet tea, and Coca-Cola.

11. Calculate the percent of kcal from each macronutrient and the percent of kcal provided by fluids for Jamey's 24-hour recall.

Calculated by MyFitnessPal.com. The percent of total calories in each macronutrient is:

Carbohydrate:

$$411 \text{ g} \times 4\text{kcal/g} = 1644 \text{ kcal}$$

$$1644\text{kcal}/4843\text{kcal} = 34\%$$

Fat:

$$279 \text{ g} \times 9\text{kcal/g} = 2511 \text{ kcal}$$

$$2511\text{kcal}/4843\text{kcal} = 52\%$$

Protein:

$$180 \text{ g} \times 4\text{kcal/g} = 720 \text{ kcal}$$

$$720\text{kcal}/4843\text{kcal} = 14\%$$

Breakfast	Calories	Carbs	Fat	Protein	Sodium	Sugar
Mcdonald's - Breakfast Burrito, 2 burrito (114 g)	600	52	32	24	1,580	4
Milk - Whole Milk, 1 cup (240mL)	160	13	9	8	130	12
Treetop - Apple Juice, 4 fl oz	140	36	0	0	30	33
Coffee - Instant, regular, 6 fl oz	4	1	0	0	4	0
Cream - Half and half, 1 cup	315	10	28	7	99	0
Sugars - Granulated (sucrose), 2 tsp	33	8	0	0	0	8
Lunch						
bologna - bologna, 4 oz	340	8	30	12	1,080	0
Cheese - Cheddar, 2 slice (1 oz)	226	1	19	14	348	0
Mayonnaise - Mayonnaise, 1 tbsp	90	2	10	1	0	0
Stan - White Bread, 2 slices	125	25	2	4	270	3
Fritos - the Original Corn Chip, 1 oz (28g)	160	16	10	2	160	0
Hostess - Twinkie, 2 cake -	270	46	9	2	360	32

38g						
Milk - Whole Milk, 1 cup (240mL)	160	13	9	8	130	12
Dinner						
Fried Chicken - Fried Chicken Drumstick, 2 drumstick	240	6	13	34	87	0
Fried Chicken - Thigh - Drum, 1 piece	175	3	10	17	200	0
Potato - Homemade Mashed Potato W/ Whole Milk and Butter, 1 cup	237	35	9	4	666	3
Homemade - Fried Okra, 1 cup	173	13	13	2	121	3
Homeade - Sweet Tea, 20 oz	80	20	0	0	0	20
Snacks						
Kroger - Peanut Butter, Crunchy, 2 tbsp (32g)	190	7	15	8	130	3
Kroger - Peanut Butter, Crunchy, 2 tbsp (32g)	190	7	15	8	130	3
Smucker's - Concord Grape - Jelly, 4 Tbsp. (20g)	200	52	0	0	20	48
Stan - White Bread, 4 slices	250	50	3	8	540	6
Milk - Whole Milk, 1.5 cup (240mL)	240	20	14	12	195	18
Popcorn - Pop Secret Homestyle, 3 cup	96	34	29	5	912	0
Coke - Regular, 12.38 ounces (222 ml)	149	0	0	0	50	41
Totals	4,843 kcal	411g	279g	180g	7,242mg	249g
	Calories	Carbs	Fat	Protein	Sodium	Sugar

12. Increased fruit and vegetable intake is associated with decreased risk of overweight. What foods in Jamey's diet fall into these categories?

Based on Jamey's 24-hour recall, the foods that fall into the fruit and vegetable category would be her apple juice with breakfast, the okra, and the mashed potato with dinner. The preparation method of each item must also be considered. Whether the juice was 100% fruit juice or not is not specified, the okra was fried, and the mashed potatoes were prepared with whole milk and butter.

13. Generate a customized daily food plan to plan a 1-day menu for Jamey.

Breakfast	1 egg scrambled, 2 slices of whole wheat toast, 1 pat butter, 1 banana, 8 oz. skim milk
Lunch	Turkey and cheese sandwich (3 oz. deli turkey, 1 slice low fat cheese, 2 slices of whole wheat bread, 1 tbsp. mustard), 1 c. carrots, 2 tbsp. low-fat ranch
Snack	2 tbsp. peanut butter, 1 apple, water
Dinner	2 oz. grilled chicken, 1 sweet potato, 1 pat butter, ½ c. broccoli, 8 oz. skim milk
Snack	8 oz. low-fat vanilla yogurt, 1 c. strawberries

14. Now enter and assess the 1-day menu you planned for Jamey using MyPlate Supertracker online tool.

With this meal plan, Jamey would consume 1930 kcal/day with macronutrients being:

Carbohydrate:

$$246 \text{ g} \times 4\text{kcal/g} = 984 \text{ kcal}$$

$$984 \text{ kcal}/1930\text{kcal} = 52\%$$

Fat:

$$56 \text{ g} \times 9\text{kcal/g} = 504 \text{ kcal}$$

$$504 \text{ kcal}/1930\text{kcal} = 26\%$$

Protein:

$$103 \text{ g} \times 4\text{kcal/g} = 412 \text{ kcal}$$

$$412\text{kcal}/1930\text{kcal} = 22\%$$

Breakfast	Calories	Carbs	Fat	Protein	Sodium	Sugar
Eggs - Scrambled (whole egg), 1 large	101	1	7	7	171	1
Bread - Whole-wheat, toasted, 2 slice	139	26	2	5	296	11
Butter - Unsalted, 1 pat (1" sq, 1/3" high)	36	0	4	0	1	0
Bananas - Raw, 1 medium (7" to 7-7/8" long)	105	27	0	1	1	14
Milk - Skim (Usda), 1 cup	90	13	0	8	130	12
Lunch						
Turkey, Deli Sliced - Turkey, 3 oz.	90	3	3	18	577	3
Cheese - Low fat, cheddar or colby, 1 slice	48	1	2	7	171	0

(1 oz)							
Bread - Whole-wheat, 2 slice	138	26	2	5	295	11	
Ken's - Honey Mustard Dressing, 1 Tbsp	65	3	6	0	75	3	
Carrots - Raw, 1 cup, chopped	52	12	0	1	88	6	
Kraft - Low Fat Ranch Dressing, 2 Tbsp	70	7	5	0	350	1	
Dinner							
Homemade - Chicken: Grilled, 2 oz.	111	0	2	11	40	0	
Sweet Potato - Medium Baked Sweet Potato, 1 cup	110	27	0	2	73	5	
Butter - Unsalted, 1 pat (1" sq, 1/3" high)	36	0	4	0	1	0	
Veggies - Broccoli - Fresh Steamed, 0.5 cup chopped	15	3	0	1	18	1	
Milk - Skim (Usda), 1 cup	90	13	0	8	130	12	
Snacks							
Peanut butter - Reduced sodium, 2 tbsp	203	7	16	8	65	3	
Apple - Honeycrisp Apple, 1 medium apple (2-3/4" dia)	80	19	0	0	1	14	
Milk - Skim (Usda), 1 cup	90	13	0	8	130	12	
Yogurt - Vanilla, low fat (1% fat), 1 cup (8 fl oz)	208	34	3	12	162	34	
Strawberry - Strawberry, 1 cups	54	11	0	1	2	7	
Totals	1,930	246g	56g	103g	2,777g	150g	
	Calories	Carbs	Fat	Protein	Sodium	Sugar	

15. Why did Dr. Lambert order a lipid profile and blood glucose tests? What lipid and blood glucose levels are considered altered for the pediatric population? Evaluate Jamey's lab results.

Dr. Lambert ordered a lipid profile in order to evaluate Jamey's fat metabolism and a blood glucose test to determine the amount of

glucose in the blood. Jamey's labs show that her glucose levels are high, HDL levels are low, and her LDL/HDL ratio is high. Her intervention plan should work to lower her glucose levels, raise her HDL levels, and lower her overall LDL/HDL ratio. Normal blood glucose levels are between 70 – 110 mg/dL, normal HDL cholesterol levels are greater than 55 mg/dL for females, and a normal LDL/HDL ratio is below 3.22 for females. Jamey's blood glucose is 112 mg/dL, her HDL is 34 mg/dL, and her LDL/HDL ratio is 3.23. All of the listed values are outside of the normal range for a female her age.

16. What behaviors associated with increased risk of overweight would you look for when assessing Jamey's and her family's diets? What aspects of Jamey's lifestyle place her at increased risk for overweight?

A major aspect to be considered for increased risk of overweight when assessing her and her family's diets is the frequency of high fat, high sugar, and high calorie product intake. These types of products often lead to overweight and obesity as well as a variety of other health complications. Based on Jamey's 24-hour recall, these types of products are consumed often and in excess amounts further contributing to overweight and obesity. Another factor to consider about their diets is the portion size. Jamey is consuming two breakfast burritos, two sandwiches, and three pieces of fried chicken. This amount for a ten-year-old child is far too much. The portions must be evaluated because they also increase the risk of overweight and obesity. Finally, the lifestyle aspect that contributes to her increased risk for overweight is her inactive lifestyle. She rarely participates in physical activity, in part due to the school budget cuts that cut the physical activity and art programs as a consequence. Her interests lie in reading and playing video games, both of which contribute to her physical inactivity.

17. Jamey's mother asks if it would help to not let Jamey snack between meals and to reward her with dessert when she exercises. What would you tell them?

I would recommend that Jamey continue to have small snacks throughout the meals. Snacking on healthy foods helps to decreased sense of hunger so that the child does not then overeat at meal times. I would also avoid using foods as a reward. According to the EAL, "Using food as a reward (e.g., giving a sweet treat to a child who has performed a desired behavior) tends to increase a child's preference for that food". Therefore, if a dessert is a reward, children will desire that food more often and likely consume that food more often. (EAL, 2014).

18. Identify one specific physical activity recommendation for Jamey.

One physical activity recommendation would be for Jamey to go for a 30-minute walk with a parent after school. This could create a stronger bond between parent and child through spending time together as well as keeping moderate physical activity throughout the day.

19. Select two nutrition problems and create a PES statement for each.

Two nutrition problems would be physical inactivity and excessive energy intake.

Physical Inactivity (NB – 2.1)

Physical inactivity related to limited participation in physical activity and limited activity during school hours as evidenced by the patient's BMI.

Excessive Energy Intake (NI – 1.3)

Excessive energy intake related to knowledge deficit regarding nutrition education as evidenced by the patient's 24-hour recall and patient's BMI placing her in the 95th percentile.

20. For each PES statement, establish an ideal goal and an appropriate intervention.

Physical Inactivity:

Goal – The goal for the patient is to increase physical activity level from the reported inactive lifestyle. The appropriate intervention would be to take a 30-minute walk after school with a parent 3-4 times per week.

Excessive Energy Intake:

Goal – Based on the 24-hour recall, the patient is consuming 4,843 calories per day. The goal will be to decrease the daily caloric intake to about 2,000-2,100 kcal/day. Appropriate interventions for this would be to substitute high fat foods with reduced fat foods, decrease consumption of high calorie beverages, and carefully monitor portion sizes. All of these can be accomplished by following a suggested meal plan, similar to the one created above.

21. Mr. and Mrs. Whitmer ask about using over-the-counter diet aids, specifically Alli. What would you tell them?

I would advise against using over-the-counter diet aids. According to the EAL recommendation based on current research, orlistat has been somewhat effective in improving adiposity however more research is needed to determine the long term effects of the medication. Studies have not been done on children younger than 12 years. Jamey is a ten year old girl, thus I would not recommend the use of over-the-counter diet aids, specifically orlistat.

(EAL, 2006).

22. Mr. and Mrs. Whitmer ask about gastric bypass surgery for Jamey. Using the EAL, what are the recommendations regarding gastric bypass surgery for the pediatric population?

Based on the current EAL recommendations, gastric bypass surgery is not typically considered inappropriate for children under the age of 13 years old. I would not recommend weight loss surgery for Jamey unless her condition significantly declined and she was not losing weight with nutrition intervention alone.

(EAL, 2014).

23. What is the optimal length of weight management therapy for Jamey?

The optimal length of weight management therapy for Jamey would be at least three months or until weight management goals are achieved through the intensive therapy. Once that stage has been reached, behavior maintenance should be continued because overweight is a life-long, chronic condition and will need constant efforts to stay on target and manage weight.

(EAL, 2014).

24. Should her parents be included? Why or why not?

Yes, Jamey's parents should be included in the intervention process. EAL recommendations based on current research suggest that the most successful interventions are multicomponent weight management intervention with active participation of a parent or caregiver. Children typically need parental guidance through many realms of life, especially in eating and lifestyle behaviors.

(EAL, 2014).

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

During a follow-up session, I would reexamine Jamey's lab values. Her blood glucose levels should decrease, her HDL levels should increase, and her overall LDL/HDL ratio should also decrease. I would also have Jamey and her parents work together to keep a food diary that I would be able to assess her diet intake and caloric intake. I would make sure that Jamey's parents know how imperative it is that they help her and support her through this process in order to have the most successful outcome. Finally, I would assess Jamey's physical activity levels and either change the intervention plan if walking after school was not working or getting boring or I would increase the amount of physical activity.

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