

Case Study 1: Malnutrition and Depression

1. Calculations:

a. **BEE using Mifflin St Jeor = 1391 kcal/day**

$$\text{Men (kcal/day)} = 10 (\text{wt}) + 6.25 (\text{ht}) - 5 (\text{age}) + 5$$

$$\text{BEE} = 10 (65.91) + 6.25 (180.34) - 5 (80) + 5 = 659.1 + 1127.125 - 400 + 5 = 1391.225$$

BEE using Harris Benedict = 1333 kcal/day

$$\text{Men (kcal/day)} = 66 + 13.75 (\text{wt}) + 5 (\text{ht}) - 6.76 (\text{age})$$

$$\text{BEE} = 66 + 13.75 (65.91) + 5 (180.34) - 6.76 (80) = 66 + 906.2625 + 901.7 - 540.8 = 1333.1625$$

The calculations were done using ML's current weight in order to determine his current energy needs. The two equations produce very similar results. The Mifflin St Jeor (MSJ) equation estimated about 60 calories more than Harris Benedict (HBE). MSJ is preferred in this case, because he is not overweight or obese, and weight gain is the goal.

b. **Total energy needs for repletion (weight gain)**

ML is fairly sedentary, so an activity factor does not need to be used. He is over 65, so the injury/illness factor for older adults (>65 years: 20-30 kcal/kg) can be used to determine his total energy needs based on his current weight. This calculates to 1318.2-1977.3 kcal/day. Using a median value of 25 kcal/kg, we can determine he needs 1647.75, or **1648 kcal/day** to maintain his current weight.

To get ML back to his usual weight, he will need to gain 25 pounds. ML will need an extra 500 calories a day to gain a pound per week or an extra 1,000 calories a day to gain two pounds per week. Because his weight loss was severe, it is recommended he gain two pounds per week for faster repletion. Therefore, his total energy needs for repletion are **2648 kcal/day**.

c. **Protein needs = 77-92 g/day**

$$\text{Adults } >65: 1-1.2 \text{ g/kg} = 77-92 \text{ g/day}$$

The goal is to return to his usual weight, so his usual weight is used to determine his protein needs for repletion.

d. **Fluid needs = 1648 ml/day**

$$\text{Adults } >75: 25 \text{ ml/kg}$$

Currently, ML will need 1648 ml/day based on his current weight. As he gains weight, his fluid needs will gradually increase. Once he reaches his usual weight, he will need 1932 ml/day.

e. **Ideal body weight = 172 lb**

$$\text{Hamweii Equation} = 106\# \text{ for } 5' + 6\# \text{ for every } 1'' \text{ over } 5' \text{ (men)}$$

$$\text{For } 5'11'' \text{ male} = 106 + 6(11) = 172$$

Adding the +/- 10% range, his ideal body weight range is 155-189 lb.

f. **Percent ideal body weight = 81.4%**

$$\% \text{IBW} = \text{ABW} / \text{IBW} = 145 / 172 = 0.814 = 81.4\%$$

g. **Percent usual body weight = 85.3%**

$$\% \text{UBW} = \text{current weight} / \text{usual weight} = 145 / 170 = 0.853 = 85.3\%$$

h. **BMI = 20.2**

$BMI = (\text{weight [lb]} / (\text{height [in]} \times \text{height [in]})) \times 703$

$BMI = (145 / (71 \times 71)) \times 703 = 20.2$

2. **What do ML's BMI and percent weight change indicate about his nutritional status?**

ML's BMI of 20.2 still falls in the normal range, so it does not indicate a change in his nutritional status. BMI typically does not correlate to nutritional status for any individual, because malnutrition can occur at any BMI. ML is currently only 85% of his usual body weight, indicating he has lost 15% of his body weight over the last couple of months. This could indicate malnutrition, but not without further assessment.

3. **What nutrition-related issues do his lab values indicate?**

ML's low albumin level suggests he has a protein and calorie deficiency. His low hemoglobin and low hematocrit values indicate he has an iron deficiency.

4. **Would a functional assessment of this patient yield any extra valuable information?**

Yes, a functional assessment would help confirm malnutrition as a medical diagnosis. Through functional assessment, we can determine if there has been a loss of muscle mass and/or a reduced grip strength. If either have occurred, there would be a second factor indicating malnutrition – enough to provide an official medical diagnosis.

5. **What medical, environmental, and social factors have led to nutritional problems in this patient?**

The medical factors contributing to ML's nutritional problems include his hip fracture surgery resulting in blood loss, his depression, and osteoporosis. He is also experience hypoguesia, poor appetite, and constipation – all of which have led to a disinterest in eating. The environmental factors contributing to his situation include living alone, having no cooking or grocery shopping skills, and having no support from family or friends to manage daily meals. Socially, he now lives alone after the recent loss of his wife. He also further isolates himself from previous social outings and is very inactive.

6. **What general conclusions can you draw regarding the adequacy of his current diet?**

ML is not meeting his calorie or protein needs. He is also getting inadequate amounts of calcium and iron, contributing further to his osteoporosis and iron deficiency. Additionally, he is not consuming enough fiber.

7. **How can ML's diet be improved to meet his energy requirements, achieve weight gain, and relieve constipation? Plan a 1 day menu with specific amounts of foods and times to eat that would improve ML's nutritional status.**

Breakfast - 8:00 am

2 slices whole wheat toast

1/2 avocado, sliced

1/2 tomato, sliced

1 medium apple

1/2 cup whole milk

Morning snack - 10:00 am

1 cup Ensure

1 oz cheddar cheese

Lunch - 12:00 pm

1 cup lentil soup

1 cup microwaved frozen broccoli

Afternoon snack - 3:00 pm

1 cup Ensure

20 almonds

Dinner - 6:00 pm

Tuna fish sandwich with 1 ounce mayo, lettuce, tomato, and 1/2 avocado on whole wheat toast

1 cup microwaved frozen peas

1/2 cup whole milk

Nutrient Analysis

Total kcals: 2635 kcal

Protein: 122 g (18% of kcals)

Fat: 116 g (38% of kcals)

Carbohydrate: 295 g (44% of kcals)

Calcium: 1285 mg

Iron: 26.1 mg

Source: nutritiondata.self.com