**NAT160**

**Assignment 2**

**(30 marks- 15%)**

For this assignment, choose **one** of the two options below to complete. Do not complete both options.

**General Instructions**  
Before starting this assignment, please read General Instructions for Written Assignments (in the Assignments folder). It describes the requirements for preparing and submitting your assignments, and explains how they will be marked.

**Option 1: Getting Enough Nutrients**

To complete this option, choose 1 person to investigate; either Carol or Marco. Review their case study, then answer the questions that follow below *for that person only*.

**Case Study – Carol**

Carol is 32 years old and she weighs 60 kg. The following is a sample of Carol's typical daily intake:

|  |  |
| --- | --- |
| **Breakfast** |  |
|  | 250 ml (1 cup) of coffee  5 ml (1 tsp.) sugar  15 ml (1 tbsp.) cream 1 slice of white bread, toasted, with 15 ml (1 tbsp.) jam |
| **Lunch** |  |
|  | 120 grams (4 oz.) hamburger, on a white bun  15 ml (1 tbsp.) ketchup  250 ml (1 cup) cream of mushroom soup, canned, made with water 250 ml (1 cup) orange juice, made from frozen |
| **Snack** |  |
|  | 1 blueberry muffin  250 ml (1 cup) coffee  5 ml (1 tsp.) sugar  10 ml (2 tsp.) cream |
| **Dinner** |  |
|  | 120 grams (4 oz.) of roasted chicken, dark meat  250 ml (1 cup) of cooked brown rice  125 ml (1/2 cup) cooked broccoli  250 ml (1 cup) orange juice, from frozen |

The following table analyzes each nutrient on Carol’s current diet:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Breakfast** |  | Fibre (g) | Iron (mg) | Calcium (mg) | Sodium (mg) | kcal |
|  | 250 ml (1 cup) of coffee | 0 | 0.1 | 5 | 5 | 3 |
| 5 ml (1 tsp.) sugar | 0 | 0.1 | 4 | 2 | 18 |
| 15 ml (1 tbsp.) cream |  |  | 16 | 6 | 104 |
| 1 slice of white bread, toasted, with 15 ml (1 tbsp.) jam | 1 | 1.4 | 57 | 244 | 149 |
|  |  |  |  |  |  |  |
| **Lunch** |  |  |  |  |  |  |
|  | 120 grams (4 oz.) hamburger, on a white bun | 0.9 | 1.4 | 59 | 206 | 120 |
| 15 ml (1 tbsp.) ketchup |  | 0.1 | 3 | 169 | 15 |
| 250 ml (1 cup) cream of mushroom soup, canned, made with water | 0.5 | 0.5 | 49 | 931 | 137 |
| 250 ml (1 cup) orange juice, made from frozen | 0.3 | 0.1 | 12 | 2 | 112 |
| **Snack** |  |  |  |  |  |  |
|  | 1 blueberry muffin |  | 0.6 | 14 | 216 | 149 |
| 250 ml (1 cup) coffee | 0 | 0.1 | 5 | 5 | 3 |
| 5 ml (1 tsp.) sugar | 0 | 0.1 | 4 | 2 | 18 |
| 10 ml (2 tsp.) cream |  |  | 10.3 | 2 | 35 |
| **Dinner** |  |  |  |  |  |  |
|  | 120 grams (4 oz.) of roasted chicken, dark meat |  | 0.6 |  | 72 | 227.2 |
| 250 ml (1 cup) of cooked brown rice | 3 | 0.8 | 20 | 10 | 230 |
| 125 ml (1/2 cup) cooked broccoli | 2 | 0.6 | 33 | 34 | 29 |
| 250 ml (1 cup) orange juice, from frozen | 0.3 | 0.1 | 12 | 2 | 112 |
|  |  | Fibre | Iron | Calcium | Sodium | kcal |
|  | Actual | 8 | 6.6 | 303.3 | 1908 | 1461 |
|  | Recommended | 25-30 | 18 | 1000 | 1500-2300 | 2100 |

**Table 1. Diet Nutrient Analysis**

Carol is a 32 year-old woman that weighs 60kg; the recommended number of portions for a person with this characteristics is 7 to 8 Vegetables or Fruits, 6 Grains, 2 Milk or Alternatives, and 2 Meat or Alternatives. With her current diet, she is taking 7 portions of Vegetables or Fruit, 6 Grains, 0 Milk or Alternatives, and 2 Meats or Alternatives

This table outlines the number of portions consumed per item:

|  |  |  |  |
| --- | --- | --- | --- |
| **Breakfast** |  |  |  |
|  | 250 ml (1 cup) of coffee |  |  |
| 5 ml (1 tsp.) sugar |  |  |
| 15 ml (1 tbsp.) cream |  |  |
| 1 slice of white bread, toasted, with 15 ml (1 tbsp.) jam |  | 1 Grain |
|  |  |  |  |
| **Lunch** |  |  |  |
|  | 120 grams (4 oz.) hamburger, on a white bun |  | 1 Grain and 1 Meat |
| 15 ml (1 tbsp.) ketchup |  |  |
| 250 ml (1 cup) cream of mushroom soup, canned, made with water |  | 2 Vegetables |
| 250 ml (1 cup) orange juice, made from frozen |  | 2 Vegetable (Fruit) |
| **Snack** |  |  |  |
|  | 1 blueberry muffin |  | 2 Grain |
| 250 ml (1 cup) coffee |  |  |
| 5 ml (1 tsp.) sugar |  |  |
| 10 ml (2 tsp.) cream |  |  |
| **Dinner** |  |  |  |
|  | 120 grams (4 oz.) of roasted chicken, dark meat |  | 1 Meat |
| 250 ml (1 cup) of cooked brown rice |  | 2 Grain |
| 125 ml (1/2 cup) cooked broccoli |  | 1 Vegetable |
| 250 ml (1 cup) orange juice, from frozen |  | 2 Vegetable (Fruit) |

**Table 2. Meal Portions**

1. Find the Dietary Reference Intakes for fibre, iron, calcium, and sodium with reference to the person you choose to investigate (either Carol or Marco). Then, determine how much of each nutrient Carol or Marco actually consumed by calculating the total amount of fibre, iron, calcium, and sodium, in his/her diet for the given day. Which nutrients are higher than the recommendations? Lower than the recommendations? (10 marks)

Carol diet is relatively low in terms of calories, this might be good if she’s trying to lose weight, but if she’s trying to maintain weight, this is not recommended. The major issue lies with her current nutrients intake, they are lower by 60%. This might prove non-beneficial for her health in the long-term. She consumes 8g of fibre instead of 25-30g which is the recommended amount for her age and weight, her intake is 60-70% lower than recommended. Iron is significantly low also; she consumes around 7mg which sadly is only 40% of the recommended dosage (18mg). Her current Calcium level is 303 mg, the recommended amount in this case is 1000mg; she is showing a 62% deficiency for this mineral. Her Sodium intake (1900mg) is in between the recommended range of 1500-2300mg, but is recommended to be around the lower end of this scope. She is consuming 1460 calories which is relatively low for someone slightly active; she should be close to 2000 if she wants to maintain her weight.

1. Determine the total number of servings from each food group that Carol or Marco actually ate for the given day. Compare this to what is recommended in Canada’s Food Guide to Healthy Eating for a woman of Carol’s age or for a man of Marco’s age. Which food groups are in higher amounts than recommended? Which are lower? (10 marks)

Carol is eating 6 Grains (6-7 recommended), 7 Vegetables or Fruit (7-8 recommended), 2 Meat (2 recommended) and 0 Milk and alternatives (2 recommended). The grain, vegetables, fruit and meat intake is inside the acceptable values. The milk and alternatives are extremely low, she needs at least 2 portions and she’s taking 0. The recommendations are taken from Canada’s Food Guide to Healthy Eating. It is not a surprise that she has low Calcium and Iron. Milk products are the main source of Calcium and they are essential in every diet.

1. What is your overall impression of the diet analysis you performed? Should your character (Carol or Marco) be concerned? Why or why not? What are the possible health consequences if your character continues to follow his/her current eating pattern? Make a few specific recommendations that can simultaneously improve the food groups ***and*** the nutrient intake for your character. (10 marks)

Carol has a low intake of calories and every nutrient with the exception of sodium. If she continues with this diet her immune system will be affected. The lack of each of these nutrients causes different negative effects on the human body. Iron deficiency could cause anemia since the body needs iron to make a protein called hemoglobin, which is responsible for moving the oxygen in your body. Fiber deficiency could cause constipation and weight gain because fiber makes the stomach feel full for long periods of time. Fiber also delays the absorption of sugar, the lack of it (fiber) causes fluctuations in your blood sugar. Low fiber diet has also been related to nausea, tiredness and headaches. Calcium deficiency could result in a disease called osteoporosis; not enough calcium in your body means weak hair and nails, muscle cramps and easy to fracture bones. Lack of calcium is also related to memory loss, confusion, strong headaches, hallucinations and numbness. Low calorie intake is dangerous, losing more than 2 pounds per week is consider excessive and it could cause fatigue, constipation, nausea and diarrhea. With her current diet Carol is not losing 2 pounds but she may feel one of those effects slightly.

Steps to fix Carol’s current diet:

* + Firstly, **substituting the orange juice for real fruit** is a good step towards improving the nutrient intake, eating liquid calories is not ideal, they don’t keep the stomach full and every 125ml of orange juice contains 120 calories.
  + **Replace the cream for breakfast** with better alternatives. Cream is full of fat and is not very nutritious, a good option is changing it for low fat milk which contains 448mg of calcium and it would be a perfect solution for her deficiency on calcium which is low by 600mg. Taking milk with her coffee during breakfast or even replacing the coffee and cream snack with a low-fat yogurt will add 448mg per cup of calcium too and it would mean that calcium levels would be on point.
  + She needs **to add milk or alternatives**, low fat milk is a great choice as stated before, but another terrific milk replacement is almond milk which contains 450mg of calcium per 125ml, another great choice would be yogurt, cheese or kefir yogurt. She needs to add two portions, one option is substitute the cream for milk on breakfast and snack or add cheese to her lunch, snack or dinner. The best option for cheese is undoubtedly Feta cheese; regardless of its high sodium content, Feta cheese is good for our body, low in calories and contains 7g of protein. Other options are 100% mozzarella, parmesan, swiss or cottage cheese. The cheapest and easier option to add is mozzarella; Carol just needs to make sure is 100% mozzarella and not a mix with other cheeses which occurs often with grated mozzarella cheese and diminishes significantly its beneficial nutrients.
  + If the cream and coffee is imperative because is a common habit in the morning and is hard to remove; a good option would be **adding almonds** or any other nuts to snack time since nuts, specially almonds, are considered a superfood and they hold great amount of calcium, around 378mg per cup. This will be a quick and painless fix to the diet to add sufficient calcium and many other important nutrients.
  + Almonds also contain 7.8mg of iron approximately per cup and it will be a step forward in fixing Carol’s iron deficiency.
  + One item of her diet is particularly worrisome: the **cream of mushroom soup**; canned products are usually high in sodium and have extremely lower nutrients than its natural equivalents. There’s also the risk of high level of preservatives and/or Bisphenol also known as BPA, a toxic plastic. Adding a **cup of cooked beans** is the best way to fix this diet; beans are also considered a superfood, for instance, black beans pack 6.6mg of iron and 15 g of fibre.
  + Carol’s diet has **a big fibre deficiency**. There are some foods such as beans, and Broccoli which contains 5g per cup, Raspberries 8g, Blackberries 7.6g and Oatmeal 4g that will help recovering the recommended levels, I would change the mushroom soup for cooked black beans (no canned) and then add any type of berry as a snack to get inside the 25-30 range recommended for fibre.
  + Her **levels of sodium are acceptable** and making the previously mentioned changes to the diet should not lead to any increase, in fact, removing the canned mushroom cream should reduce sodium levels.
  + The addition of all this food should raise the calories amount, is recommended for someone slightly active like Carol with that weight and age to consume close to 2000 calories, with all this changes her calories will go up but will not surpass those levels. In case she wants to lose weight using the recommendations below should be enough to adjust the diet.

Some examples of foods to fix this diet:

**Iron**

Almonds 1 cup ------------ 7.8mg

Beans 1 cup ---------------- 6.6mg

Cooked Spinach 1 cup ---- 6mg

Dark chocolate 100g ----- 23mg

**Calcium**

Low Fat Milk & Yogurt – 448mg per cup

Almonds – 378mg per cup

Chopped Broccoli – 47 mg per cup

**Fibre**

Beans in general – Black Beans 15g per cup

Cooked Broccoli - 5g per cup

Raspberries 8g per 100g

Blackberries 7.6g per 100g

Oatmeal 4g per 100g

Celery 2g per 100g

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