



## A Worktext on Nutrition and Diet Therapy

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### OVERVIEW:

This course deals with the study of food in relation to health and illness. It covers nutrients and other substances and their action, interaction and balance in relation to health and diseases and the process by which the human body ingests, digests, absorbs, transports, utilizes, and excretes food substances. It also focuses on the therapeutic and food service aspects of the delivery of nutritional services in hospitals and other healthcare institutions. Hence, you are expected to develop the competencies appropriate meal planning and education of a given client.

As a student in nursing, you are expected to advise your clientele about his/her appropriate diet. This module will help you in understanding the basic concepts in nutrition and diet therapy. Further, a more topics on nutrients and why the body needs them as well as the amounts needed and the effects of their deficiency or excess are tackled. A pre-test and a post-test are given to help you evaluate the extent of your learning. The correct answers are found at the end of this module, but you must NOT take a peek at them unless you have finished answering the questions. Also, an activity at the end of each subtopic is given.

Prior to this course, you are expected to have taken and passed the subjects Biochemistry, NCM 101, NCM 102, and NCM 103. Henceforth, you have a background on the concepts of the action and interaction of the different compounds in our body and how their respective deficiency and excess affects our body.

You have learned in Lesson 1 on how to calculate for the nutrient intake as well as the recommended daily intake of the different nutrients. In this lesson you will learn about how much of the individual nutrients you are taking in for a particular meal. This topic deals with tools used in measuring an individual's daily nutrient intake in a meal. Also included are guidelines and standards on how to maintain good nutrition or nutriture. Take note that lack or excess of any nutrient

could lead to an undesirable condition. Whenever you go to a grocery store or supermarket to buy foods, you have to look at the back of the package and check "Nutrition Facts" portion. Remember, it always helps to check the labels.

### LEARNING OUTCOMES:

Apply appropriate concepts of nutrition and diet therapy holistically and comprehensively.

### ACTIVITY:

Since, at this moment, you cannot go to a supermarket and check on labels of any food that you desire to eat, here's what you can do. Go to your kitchen/food pantry and look for your favorite food. At the back of the package, check for the nutrition facts and calculate how much of a particular nutrient you are taking in in a day. You may refer to the activity in Lesson 1 if necessary. Are you having a healthy meal/snack?

### ANALYSIS:

If you are eating correctly all the nutrients needed by your body, congratulations! But then again, it is very seldom that you get all the nutrients needed in just one food. Or you may be having excessive intakes of a certain nutrient while being deficient with another.

### OBJECTIVES:

At the end of the lesson, challenge yourself to:

1. Know the different tools used in measuring an individual's daily nutrient intake.
2. Identify ways to measure a person's nutrient intake.

## LESSON 2: Nutrition Tools, Standards and Nutrient Recommendations

### Dietary Reference Intakes (DRIs)

Dietary Reference Intakes (DRIs) is the general term used for a set of reference values used to plan and assess nutrient intakes of healthy people. These values, which vary by age and sex, include:

1. Estimated Average Requirements (EAR)
2. Recommended Dietary Allowance (RDA)

3. Adequate Intake (AI)
4. Tolerable Upper Intake Levels (UL)



In some countries, like Canada and the USA, Dietary Reference Intakes provide 3 sets of measures for each nutrient, whenever sufficient data are available for their establishments.

### 1. Estimated Average Requirement (EAR)

A daily nutrient intake value that is estimated to meet the requirement half of the healthy individuals in a life stage and gender group, corrected for incomplete utilization or dietary nutrient bioavailability.

### 2. Recommended Dietary Allowances (RDA)

These are the average daily dietary intakes level sufficient to meet nutrient requirements of nearly all (97%-98%) of the healthy population in a life stage and gender group.

The RDAs were based on the amount of each vitamin or mineral needed to prevent symptoms of the corresponding nutrient-deficiency disease.

### 3. Adequate Intake (AI)

A recommended intake value based on observed or experimentally determined estimates of nutrient intake by a group of healthy people that are assumed to be adequate (used when RDA cannot be determined).

It is established when evidence is insufficient to develop an RDA and is set at a level assumed to ensure nutritional adequacy.

### 4. Tolerable Upper Intake Levels (UL)

The highest level of daily nutrient intake that is likely to pose no risk or adverse health effects in almost all individuals in the general population.

### APPLICATION AND EXERCISE:

Make a menu for yourself, using any of the DRIs. You start with just one meal. Take into consideration what you have learned in Lesson 1.

### FEEDBACK:

How did you go about with the lesson? Were you able to meet the objectives in Lesson 2 by being able to work correctly on your exercise? Being able to do so

will make you have a better grasp on the lessons ahead. If you were able to work on the exercise and application, my earnest congratulations, you can be an excellent nurse dietitian/counselor in the future! You may proceed to Lesson 3. If you, however, encountered confusion, do not be dissuaded. Allot the lesson some more time to scan. You may refer to other books to help you with the topic and hence with the activities. Make sure you review on topics which you find confusing/difficult. And remember, do not hesitate to give me a call so we can work together until you master the lesson.

### BASIC CONCEPTS IN NUTRITION

In this concept, let me take you to a journey towards health through munching. On the right side is the way to good health, and on the left side, the way to illness.

Diet plays a very important role in the life of every individual, not only in the growth and development but also in the maintenance of health, and in the recovery from illness. Diet also plays a role in the development of an individual's health conditions. Your nutrition depends on the diet that you are having.

Now, let's get started. First, let us define key words in this concept for you to have better understanding on this subject.

### A. DEFINITION OF TERMS

What comes to your mind when you hear the word "nutrition"?

**NUTRITION** is defined by Maria Lourdes C. Caudal as the study of food and how the body makes use of it. This means that it is not merely concerned with the quantity and quality of food that we eat, but also the process by which we receive and utilize the food in the body for growth and development as well as for health maintenance and recovery from illness.

According to Virginia S. Claudio et. al, nutrition is the study of food in relation to health of an individual, community or society and the process through which food is used to sustain life and growth.

At this point, let us take a look at the definitions of other terms:

**MALNUTRITION**, according to TK Indrani, is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. It comprises 4 forms: undernutrition, over-nutrition, imbalance, and specific deficiency.

Undernutrition – the condition which results when insufficient food is eaten over an extended period of time.

Overnutrition – the pathological state resulting from the consumption of excessive quantity of food over an extended period of time. The high incidence of obesity, cardiovascular diseases and diabetes mellitus is attributed to overnutrition.

Imbalance – the pathological state resulting from a disproportion essential nutrients without the absolute deficiency of any nutrient.

Specific deficiency – the pathological state resulting from a relative or absolute lack of an individual nutrient.

**NUTRIENTS** according to Caudal, are chemical substances found in food. They perform diverse roles in the body namely: to provide heat and energy, to build and repair body tissues, and to regulate body processes. Since nutrients are found mainly in natural foods, adequate intake of these nutrients is necessary to carry out physiological functions of organisms.

Some nutrients are manufactured in the body (“biosynthesis”) while some are made in the laboratory. The latter are man-made nutrients useful for research or therapeutic purposes.

Classification of nutrients:

1. As to function – nutrients form tissues in the body and body building. These furnish heat and energy such as fats, carbohydrates and protein.
2. As to chemical properties – nutrients are classified as either organic or inorganic.
3. As to essentiality – this refers to their significant contribution to the body’s physiological functioning.
4. As to concentration – some nutrients are needed in large amounts than others.

**FOOD** is anything that which when taken and digested nourishes the body. It is a vital need without which man cannot live. Foods are also culturally acceptable substances that supply heat and energy, build and repair body tissues and regulate body processes.

Ideally, according to Claudio et. al, food must have the following qualities:

1. It is safe to eat. It is prepared under sanitary conditions, aesthetically and scientifically.
2. It is nourishing or nutritious.
3. Its palatability factors (color, aroma, flavor, texture, etc.) satisfy the consumer.

4. It has satiety value.

5. It offers variety and planned within the socio-economic context (e.g., within the budget and suitable to the lifestyle of the person, including cultural, religious practices, and other aspects).

6. It is free from toxic agents or does not contain substances deemed deleterious to health.

**FOODSTUFF** is anything which can be used as food.

**METABOLISM** the chemical process of transforming foods into complex tissue elements and of transforming complex body substances simple ones, along with the production of heat and energy.

**ENERGY** is the force or power that enables the body to do its work. When used in nutrition, energy deals mostly with chemical energy locked in foodstuffs by reason of chemical process.

**CALORIE** the standard unit of measurement for energy that our body gets from food. They are byproducts when carbohydrates, fats, and protein are oxidized in the body.

**KILOGRAM CALORIE (KCAL)** is the unit of energy commonly used in human nutrition. One kcal is the heat energy required to raise the temperature of 1 kilogram of water to 1 degree centigrade.

### **BASIC CONCEPTS IN NUTRITION**

After knowing the meaning of different terms used in this concept, let’s tackle the basic concepts in nutrition.

What is the basic function of nutrition?

The basic function of nutrition is to maintain life by allowing one to grow and be in a state of optimum health. The following are reasons why nutritional science is applied to nursing care: (1) the recognition of the role of nutrition in preventing diseases or illnesses; (2) the concern for adapting food patterns of individuals to their nutritional needs within the framework of their cultural, economic and psychological situation and style; and (3) the awareness of the need in specified disease states to modify nutritional factors for therapeutic purpose.

Metabolism refers to the changes which take place in nutrients from the time of their absorption, until they reach the end products of the various organs through which they pass.

There are several components of energy expenditure, and these are the basal metabolism, physical activity, specific dynamic action of foods, and energy balance.

Basal metabolism is the measure of energy needed by the body at rest for all its internal chemical activities;

approximately 1 calorie per kilogram of body weight per hour for an adult. It is the minimum amount of energy needed by the body at rest in the fasting state. It indicates the amount of energy needed to sustain the life processes; respiration, cellular metabolism, circulation, glandular activity, and the maintenance of body temperature. It accounts for more than one-half of calorie requirements for most people.

*Basal Metabolic Rate* (BMR) is the rate of basal metabolism in a given person at a given time and situation. It refers to the amount of energy required by a person who is awake, at a complete mental and physical rest and has no food for 12-14 hours.

There are 8 factors that affect BMR:

1. Surface area – The greater the body surface area or skin area, the greater the amount of heat loss will be, and in turn, the greater the necessary heat produced by the body. Muscle tissue requires more O<sub>2</sub> than does adipose tissue.
2. Sex – Women, in general, have a metabolism of about 5-10% lower than men even when they are of the same weight and height. Women have a little more fat and less muscular development than men.
3. Age – The metabolic rate is highest during the periods of rapid growth, chiefly during the 1<sup>st</sup> and 2<sup>nd</sup> years and reaches a lesser peak through the ages of puberty and adolescence in both sexes. The BMR declines slowly with increasing age to lower muscle tone from lessened activity.
4. Body composition – A large portion of inactive adipose tissue lowers the BMR. Athletes with great muscular development show about 5% increase in basal metabolism over non-athletic individuals.
5. State of nutrition – A decrease in mass of active tissue like in undernourishment or starvation causes a lowered metabolism often as much as 50% below normal.
6. Sleep – During sleep, the metabolic rate falls approximately 10-15% below that of waking levels. This is due to muscular relaxation and decreased activity of the sympathetic nervous system.
7. Endocrine glands – The secretion of the endocrine glands are the principal regulators of the metabolic rate. The male sex hormones increase the BMR about 10-15% and the female sex hormones a little less.
8. Fever – It increases the BMR about 7% for each degree rise in the body temperature above 98.6°F.

Another composition of energy expenditure is physical activity. Calorie requirements depend upon the type and amount of exercise. The more vigorous physical work, the greater the calorie cost. The kind of physical activity we engage in and the amount of time spent determine the amount of energy the body uses.

**Table 1 Calorie Expenditure for Various Types of Activities**

Type of Activity	Calories
Sedentary Activities reading, writing, eating, watching TV, office work, sitting at work	80-100
Light Activities cooking, washing dishes, ironing, welding, standing at work, rapid typing	110-160
Moderate Activities mopping, scrubbing, sweeping, gardening, carpentry, walking fast, standing at work with moderate arm movement, sitting at work with vigorous arm movement	170-240
Heavy Activities heavy scrubbing, hand washing, walking fast, bowling, golfing, heavy gardening	250-350

The next component of energy expenditure is the specific dynamic action of food. Carbohydrate or fat increases the heat production of about 5% of the total calories consumed. It is the energy required to digest, transport, and utilize food.

The last component of energy expenditure is energy balance. The amount of energy taken in by an individual should be equal to the amount of energy expended during the day. If this is so, then the individual is said to be in energy balance and attains a desirable body weight. A desirable or ideal body weight is still debatable since body weight is made up of fat, muscle, organs, bone and fluid. Two individuals having the same height and age may not necessarily have the same weight because of the above components.

#### **SUMMARY:**

Congratulations! You have just completed Lesson 2. Recall that in this lesson we have looked into the different Dietary Reference Index to ensure proper nutrition. You have to bear in mind that all these topics will be used in the lessons that we will be having in the future.