



## Research

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## Introduction

As a science, Nutrition is relatively new, but it has existed since human beings have existed on Earth. Going back to the Paleolithic Period of humanity, we can see that humans satisfied this hunger need by collecting fruits, vegetables and plants. Some time later, as humanity evolved, the way we get our food also changed.

In the course of the twentieth century, there was a significant advance in knowledge about nutrition. Currently, health problems linked to nutrition in developed societies are closely related to food excesses, which lead to the appearance of various chronic diseases and certain types of cancer. According to the World Health Organization (WHO, 1996), the primary challenge today is not hunger, but micronutrient deficit, which prevents the body from ensuring adequate growth and maintaining its vital functions. The prevailing trend is to achieve optimal nutrition, and the food industry is attentive to the opportunity to market value-added foods, through the so-called functional foods. These products, which are increasingly present on supermarket shelves, have preventive and curative capabilities that must be understood and properly communicated to patients and consumers. (1)





## 1. What is Nutrition?

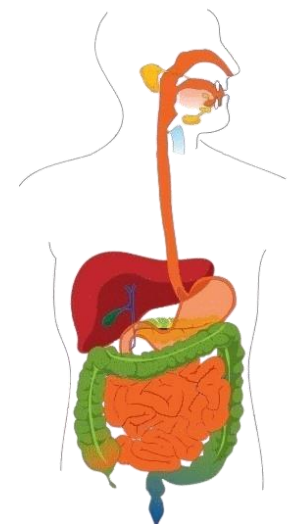
Nutrition can be described in two concepts, as the action of the body and as a science. As a process of the body, we can say that it is the biological process that happens after we eat our food, through which nutrients are obtained, assimilated and digested in the body. Human beings consume different types of food and, after physical and chemical processes, the body incorporates the nutrients extracted from these foods and transforms them into essential energy to perform the vital functions of every human being, such as movement, reproduction and growth.

Now, as a science, we can understand nutrition as that which includes all the processes by which the body incorporates, transforms and uses the nutrients contained in food. We refer to the science that studies food and its relationship with human health.

### 1.1. Stages of Nutrition

The stages of nutrition encompass the entire process from eating food to using nutrients in the body. This process can be divided into three phases, each with specific functions and different mechanisms.

1. **Food consumption:** The first step of the digestive process occurs in the mouth, where food is chewed and mixed with saliva, so that it is transformed into a homogeneous mass known as a food bolus, facilitating its passage to the stomach.
2. **Food breakdown:** Once in the stomach, the breakdown of food into nutrients begins. This digestion process continues with the breakdown of complex molecules into simpler, more absorbable forms.
3. **Nutrient displacements:** Subsequently, the nutrients released are transported and distributed through the





bloodstream to various parts of the body, where they fulfill their respective functions. The direction in which these nutrients move and their specific destination depend on their type and the nutritional needs of the body at that time. (2)

## 1.2. Characteristics

As a field of study and practice, it has several fundamental characteristics that define its scope, objectives, and applications. Among them we find:

- Multidisciplinary (integrates knowledge from various disciplines)
- Scientific approach (based on scientific principles and empirical evidence to develop recommendations and practices)
- Personalization (recognizes that nutritional needs vary between individuals and depend on various factors)
- Disease prevention and management (promotes long-term health and is crucial in preventing disease through healthy eating)
- Adaptability and evolution (this science is constantly evolving, ensuring that practices and recommendations are kept up to date with the latest scientific and technological knowledge)
- Social and cultural impact (allows for the development of intervention and education strategies that respect and adapt to the specific cultural and social contexts of communities)

## 2. Relationship with other areas of health.

Nutrition is a multidisciplinary science that establishes a close relationship with various scientific areas. Each of these disciplines contribute unique perspectives and insights that deepen our understanding of food and its influence on health and well-being. This integration of knowledge is essential for the development of comprehensive and effective approaches to improving nutrition and promoting public health. (3)

## 2.1. Medicine and Nutrition

The interrelationship between nutrition and medicine plays an essential role in the integral promotion of health. While medicine facilitates methods for diagnosing and treating diseases, nutrition provides the resources necessary for the prevention and effective management of these conditions. Collaboration between these disciplines allows for the development of more comprehensive and effective strategies aimed at optimizing health and well-being at both the individual and community levels.



### 2.1.1. Disease prevention, management and treatment



Medicine focuses on the prevention, diagnosis, and treatment of diseases, while nutrition contributes to the prevention of diseases through proper nutrition. Specific dietary interventions can be used to complement medical treatments and improve health outcomes.

For example, in the treatment of type 2 diabetes, a carbohydrate-controlled eating plan can help regulate blood glucose levels along with medications prescribed by a doctor. (4)

### 2.1.2. Politics and Public Health

Public health policies and programs often incorporate nutritional recommendations to address community health issues. In Mexico, the Government maintains public policies aimed at promoting healthy and sustainable eating, including the Front Warning Labeling of Prepackaged Food and Non-Alcoholic Beverages, through which the consumer is informed about the nutrients and ingredients that represent a risk to their health. (5)

## 2.2. Chemistry and Nutrition

Chemistry plays an essential role in the field of nutrition by providing the knowledge needed to understand and improve the impact of nutrients on human health. This ranges from analyzing the composition and digestion of food to developing diets and supplements. Chemistry is essential even in the analysis of food quality and safety, because based on this, various techniques have been created to ensure that all foods are safe for consumption and meet nutritional standards. (6)

Among them we find:

- Agrochemicals
- Preservatives and food additives
- Cold chain
- Fermentation



## 2.3. Biology and Nutrition

Biology and nutrition are deeply interconnected, since food intake has a direct impact on the biological processes of the body, influencing its general functioning. Food supplies the essential nutrients required for the body to perform its vital functions, as well as for its growth, development, and maintenance in optimal health conditions. Within the framework of this interrelationship, biological nutrition is distinguished. It is a science that investigates these processes based on the functional cycles of the human body, its purpose is to define the criteria for the choice and timing of food intake, as well as for the appropriate combination of foods. (7)



## 2.4. Psychology and Nutrition

Social, cultural and media changes have a significant influence on our eating habits. Currently, aspects such as the extension of the working day, the proliferation of pre-cooked foods and the low cost of products rich in saturated fats contribute to the adoption of inappropriate eating patterns, which can have serious repercussions on health.



There is a clear interrelationship between emotions and nutrition, a phenomenon known as "emotional eating", which is inscribed within the field of Nutrition Psychology. Both disciplines study how emotions, behaviors, and social and cultural contexts affect individuals' relationship with food, offering strategies and resources to improve eating habits. In addition, it is dedicated to helping people identify and manage their psychological and emotional processes related to food. (8,9)

## 3. Nutrition in Mexico

Over time, food has undergone continuous changes that have had significant repercussions on health, not always favorable. In recent decades, the increase in overweight and obesity in Mexico has been largely attributable to excessive calorie consumption and reduced physical activity. Additionally, this phenomenon is also related to a decrease in the intake of vitamins and minerals, linked to low consumption of fruits, vegetables, legumes, and fish.

A dietary pattern is defined by a deep attachment to the products that make up the eating habits of a population, it is characterized by a socially segmented consumption structure and a manifestation of cultural, regional and national expressions.

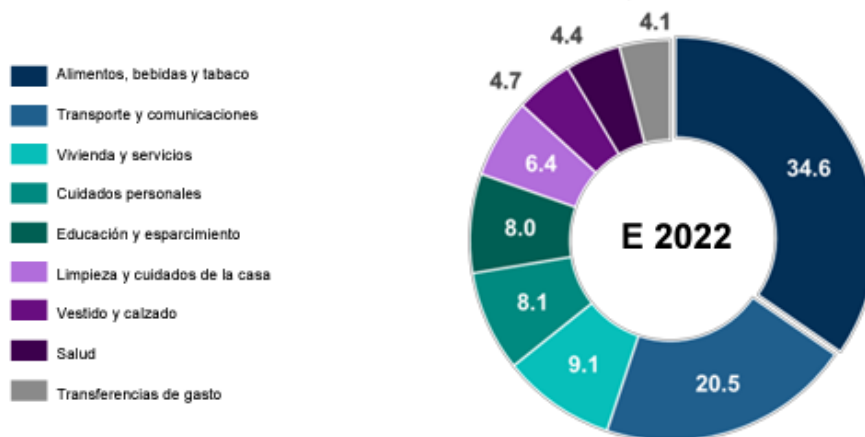
On the other hand, a food consumption pattern is made up of a set of products that an individual, family or group of families consumes regularly, on an estimated average of once a week, or that these products are sufficiently present to be remembered within 24 hours of consumption. This pattern is essential to understand the food system, as it reflects its functioning and influences the nutritional status of the population. (10,11)



### 3.1. National Survey of Household Income and Expenditure

In 2022, the National Survey of Household Income and Expenditure (ENIGH), within the quarterly average current monetary expenditure, the item of food and beverages consumed within the household was the largest at 34.6%.

**DISTRIBUCIÓN PORCENTUAL DEL GASTO CORRIENTE MONETARIO TOTAL TRIMESTRAL, POR GRANDES RUBROS DE GASTO, 2022**



Nota: La suma de los parciales puede no dar 100 debido al redondeo.  
Fuente: INEGI. ENIGH E, 2022.

In the food and beverages consumed by households, expenditure on meat consumption (18.18%) stood out, followed by expenditure on cereals (13.67%) and, in third place, expenditure on other miscellaneous foods (12.51%). Vegetables presented an expenditure of 8.63% and fruits of 4.09%. So, despite having access to a variety of foods, cereals continue to be present in products such as corn tortillas, rice, bread and pasta for soups. (12)

**GASTO CORRIENTE MONETARIO PROMEDIO TRIMESTRAL POR HOGAR Y POR RUBROS DE GASTO EN ALIMENTOS, BEBIDAS Y TABACO, 2022 (pesos)**

Rubros de gasto en alimentos, bebidas y tabaco	Gasto promedio
<b>Alimentos, bebidas y tabaco</b>	<b>14 167</b>
<b>Alimentos y bebidas consumidas dentro del hogar</b>	<b>11 442</b>
Carnes	2 576
Cereales	1 937
Otros alimentos diversos*	1 773
Verduras, legumbres, leguminosas y semillas	1 222
Leche y sus derivados	1 026
Bebidas alcohólicas y no alcohólicas	955
Frutas	580
Huevo	440
Pescados y mariscos	267
Aceites y grasas	188
Tubérculos	169
Café, té y chocolate	106
Azúcar y mieles	104
Espesias y aderezos	99
<b>Alimentos y bebidas consumidas fuera del hogar</b>	<b>2 647</b>
<b>Tabaco</b>	<b>78</b>

\* Incluye conceptos tales como: cereal de arroz, avena, plátano, manzana, mixto para bebé, papillas para bebé, hongos frescos, flanes, gelatinas, pudines en polvo, etc.  
Fuente: INEGI. ENIGH E, 2022.

According to national income-expenditure surveys, since the period 1994-1996 there has been a decrease in the consumption of fruits and vegetables, and, on the contrary, an increase in fat intake in the consumption of sugars and refined carbohydrates, mainly soft drinks. (13)

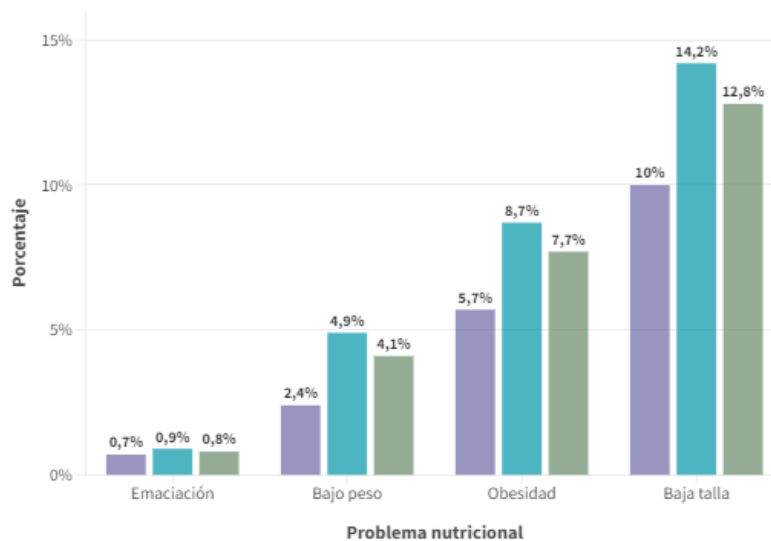
### 3.2. Malnutrition: malnutrition and obesity in Mexico.

The National Health and Nutrition Survey 2022 (ENSANUT 2022) showed that chronic malnutrition, iron deficiency and overweight are public health problems for the country's children. The figures showed that 12.8% of children under 5 years of age suffer from chronic malnutrition and 30.6% are iron deficient. In addition, 37% of schoolchildren and 41% of adolescents are overweight or obese.

In 2022, short stature or chronic malnutrition reached 12.8% in Mexico. Although the problem is exacerbated in children between 24 and 59 months of age, 10% of children under 2 years of age have this condition, which translates into growth arrest.

**Problemas nutricionales en menores de 5 años (2022)**

Edad: 0 a 23.9 meses 24 a 59.9 meses Nacional



Gráfica creada para Medscape en español con datos de la [ENSANUT 2022](#)



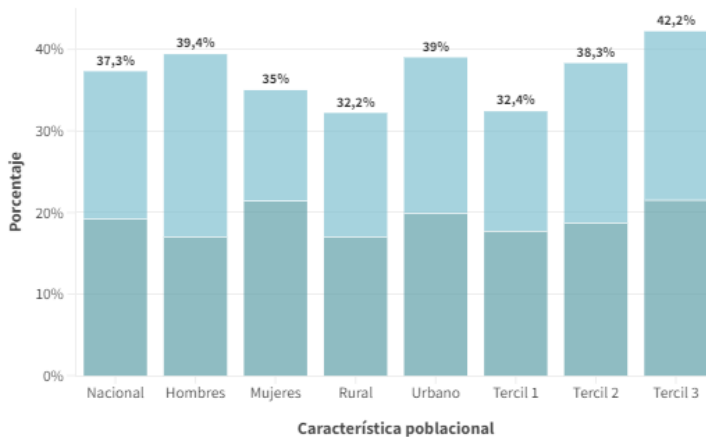
Malnutrition is also present to a greater extent in the southern states of Mexico, specifically in the regions of the peninsula (Campeche, Chiapas, Quintana Roo, Tabasco and Yucatán) and the South Pacific (Guerrero, Morelos, Oaxaca and Puebla). It should be noted that the ENSANUT 2022 found no significant differences in malnutrition between rural and urban areas of the country.

As for overweight, Mexico is in the first places of childhood obesity. With worrying figures, it is estimated that 70% of Mexicans are overweight and almost a third suffer from obesity. In schoolchildren, a total of 37% and 41% of adolescents suffer from obesity or overweight. It affects men more than women, children living in an urban environment, and those who belong to the second and third deciles of welfare status (with lower incomes) (14)

#### Sobrepeso y obesidad en niños y adolescentes (2022)

Edad:

■ Sobrepeso ■ Obesidad

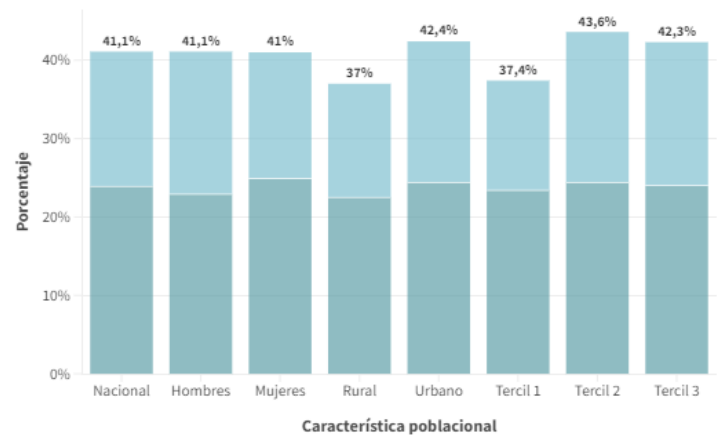


Gráfica creada para Medscape en español con datos de la [ENSANUT 2022](#)

#### Sobrepeso y obesidad en niños y adolescentes (2022)

Edad:

■ Sobrepeso ■ Obesidad



Gráfica creada para Medscape en español con datos de la [ENSANUT 2022](#)



### 3.3. Diseases related to poor diet

Poor nutrition can have a wide variety of negative health effects, both in the short and long term. If we do not eat a balanced diet, the response of our immune system can be altered, increasing vulnerability to diseases. (15)

- **Diabetes:** This disease causes the body to have too much sugar in the blood, causing several disorders, mainly low insulin production. This disease can occur in children and young people, but more commonly in people over 40 years of age, usually overweight.
- **Overweight and obesity:** The main cause of a poor diet is weight gain due to high food consumption that exceeds the amounts necessary for the body. This is one of the most current growing diseases, in addition to representing a very high risk to health.
- **Malnutrition:** This disease generates a weak immune system, which increases the risk of infections, improper recovery from wounds, muscle weakness and decreased bone mass.
- **High blood pressure:** This is caused by excess fat and salt in the diet. High blood pressure prevents proper blood circulation, which can lead to cardiovascular diseases with consequences including heart attacks or strokes.
- **Cardiovascular diseases:** Together with obesity, they make up an important and almost determining group of risk factors for heart disease or strokes.
- **Anemia:** It is characterized by a lack of iron, it is a disease that causes irritability, slowness, less muscle effort, lack of appetite and even headaches and dizziness.

## 4. Branches of Nutrition

Nutrition is a broad, multidisciplinary field that is divided into several branches, each of which plays a critical role in promoting health and well-being by addressing the specific nutritional needs of different populations and conditions.



#### 4.1. Clinical Nutrition

Clinical nutritionists design inpatient nutrition plans and work closely with doctors and nurses in clinics, hospitals, and community centers. They adapt the programs according to the income status, educational level, and physical and psychological well-being of the patients to ensure strict adherence. In addition, they must have knowledge in anatomy, physiology, biochemistry, epidemiology and microbiology, also considering the culture and food preferences of the patients to offer balanced diets that favor their recovery.

#### 4.2. Pediatric Nutrition

It is a specialization that focuses on the specific dietary and nutritional needs of children and adolescents, from birth to adolescence. Its fundamental purpose is to ensure optimal growth and development throughout the different phases of childhood. Pediatric nutritionists can work in a wide variety of work environments from elementary schools to private homes.

Among its responsibilities are:

- Design nutritious school menus.
- Guide children in healthy food choices.
- Assist in the transition of infants' diet from milk to solid foods.
- Collaborate with schools on nutrition and exercise programs.
- To investigate nutrition in children with diabetes and high cholesterol.
- To analyze the causes of childhood obesity.



#### 4.3. Sports Nutrition

It focuses on maximizing physical performance and promoting athletes' recovery through proper nutrition. Its purpose is to supply athletes with essential nutrients to boost their performance, achieve their sports goals and preserve optimal health.

The main responsibilities are:

- Analyze diets and recommend best practices based on athletes' body composition and energy.
- Create feeding programs to maintain competitiveness.
- Suggest foods to maintain healthy body mass.
- Develop strategies to prevent dehydration.
- Evaluate and recommend necessary supplements, vitamins, and minerals.



#### 4.4. Food Auditor

It is responsible for evaluating and guaranteeing the quality, safety and integrity of food products and associated processes. Their primary role is to ensure that food handling systems and practices comply with established regulations and standards.

The key tasks of food auditors are:

- Inspect companies to ensure compliance with health and safety regulations.
- Verify the accuracy of product labels.
- Recommend the closure of businesses that do not comply with the rules.
- Check for the absence of toxins in food.
- Advise on compliance with environmental regulations.

#### 4.5. Veterinary Nutrition

Veterinary nutrition is equally crucial because a large part of our diet comes from animal products. Veterinary nutritionists may specialize in livestock or companion animals. They must consider the specific nutritional needs of each species and prepare balanced

rations according to their physical activity and possible nutritional deficiencies. Evaluate the





muscle and bone structure of animals in reproduction and lactation. They must also collaborate with veterinarians, animal technicians, and wildlife rehabilitators in research activities and in educating the public. (16)

## **Conclusion**

Nutrition is a core discipline that interrelates with different sciences, facilitating a comprehensive understanding of how nutrients affect the health and functioning of the body. This multidisciplinary perspective is essential to address the challenges associated with inadequate nutrition, such as the high rates of obesity and type 2 diabetes in Mexico. These issues highlight the need for effective prevention and food education strategies adapted to the local context.

The various branches of nutrition allow for specialized interventions that address the specific needs of different population groups. Thus, a proper understanding of these specializations and the implementation of approaches based on sound nutritional principles are critical to improving public health and preventing diet-related diseases.



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