

OLD AGE PERIOD and NUTRITION

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PRESENTATION

As a result of the developments in the field of health which took place simultaneously with the developments in the field of science and technology and dependent on factors like especially the decrease in the morbidity and mortality rates in childhood period, the protection, improvements in the environment conditions, the life expectancy at birth has been increasing.

It is estimated that the average life expectancy rate of 66 in the beginning of the 21st century will increase to 73 in year 2025. This period means an increase of 50% in comparison with 48 year-living period which is the average of 1955.

It is expected that while the number of people above 60 in 2000 is 600 million, this number will be 1.2 billion in 2025 and 2 billion in 2050. The average life expectancy at birth is 69 years in Turkey and the proportion of people above 65 to total population is 6%. This number will increase to 10% in year 2025.

With the decrease in the fertility rate and the increase in the life expectancy rate, the old-aged people and the health problems that they face true gain importance in the World. The World Health Organization (WHO) has designated the following factors as fundamental for a healthy, independent and undiseased old-age period; healthy nutrition, non-smoking, regular physical activity, the prevention of injuries and disabilities and the treatment of chronic illnesses. As known before, with the understanding that positive nutrition attitudes is the most important factor that improves the life quality in especially the progressing ages and by the help of the studies carried out by our Ministry and Baskent University, the book on Old Age Period and Nutrition is prepared.

I would like to thank to Assistant Professor Emine AKSOYDAN, the honorable member of Baskent University Faculty of Health Sciences, Nutrition and Dietetics Department and everyone involved in this study and wish the benefit of this book for old-aged people.

**Professor Recep AKDAĞ, MD
Minister of Health of the
Republic of Turkey**

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WHAT IS THE OLD AGE?

“Old age is a privilege, social success and challenge.”

Old age is a process which starts from the prenatal period and continues until the end of life. These are the changes of anatomic structure and physiological functions which take place dependent on time.

World Health Organization (WHO) defines people of age 65 and above as “old age”. According to the progress of the old age and changes in body functions; people between the age group 65–74 are classified as “young olds”, 75–84 age group as “olds” and the group of age 85 and above is classified as “oldest old”.

1. CHANGES IN THE STRUCTURE AND FUNCTIONS OF THE BODY IN OLD AGE PERIOD



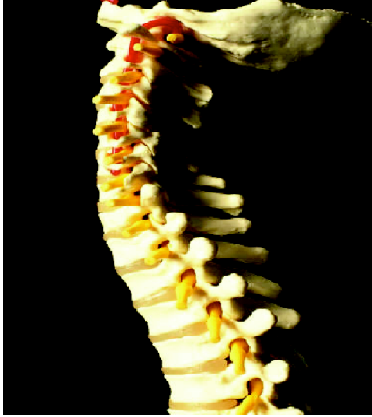
Within the normal aging period, some changes concerning the body structure, organs and functions of the organs take place dependent on time. Apart from this, life style changes, some of which occur as a result of the changes in body structures and functions and some of which take place on emanation from the environmental factors take place. For instance, being alone as a result of the death of one of the mates, decrease in social relations, economic deficiencies can be stated as an example for the above-stated condition. These changes may cause inadequate nutrition by affecting the nutrition condition negatively.

1.A. PHYSICAL CONDITIONS

The Physical Changes Which Occur in Old Age Period Are As Follows:

Body Weight: Generally, body weight begins to decrease after the age of 60. Especially the decrease in the weight becomes clear after the age of 80.

Body Composition: Some changes are observed in the body composition in line with aging. The amount of lean body tissue is decreases and the amount of fat tissue is increases. After the age of 80 and later, the speed of reduction in the fatless tissues increases. The amount of lean body tissue in the women is less than the men. The decrease in the amount of lean body tissue masses affects walking and balance by causing decrease in the amount of muscles and their strength. This factor increases the risk of falling and fracture.



Skeleton System:

Decrease in the amount of calcium within the bones occurs in the old age. Women lose 40% of the total skeleton calcium in the old age period. Half of this loss occurs in the first five years after the menopausal period. This loss continues with a slowing rate. Furthermore, activity is reduced due to the limitations and decrease in the flexibility of the joints. This effect may create the risk of obesity due to the difficulties in access to food and limitations of physical activity.



Water Metabolism:

Water percentage in the body decreases from 60% to 50%. Dependent upon the decrease in the feeling of thirst, water intake decreases. However, water loss from the body is more. Unless the water loss is compensated by the consumption of water and other drinks serious health problems may occur.

1.B. CHANGES IN THE ORGAN FUNCTIONS

Changes in the functions of the organs in the body also occur in the old age period. The changes which may cause inadequate nutrition by affecting the nutritional conditions are as follows:

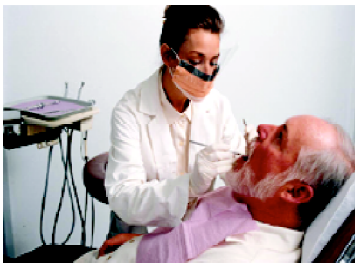


1. Decrease in the sense of taste and smell: With all the senses, a decrease in the sense of smell also occurs. Approximately, 25% of the individuals above the age of 65 are not able to define one or more than one of the four fundamental senses (hot, sweet, salty, sour) because of the decrease in the taste cells in the tongue and mouth space. The decrease in the sense of taste and smell

may cause dislike of the consumed foods and may create risks for the nutritional condition due to decrease in appetite.

2. Decrease in the saliva secretion: The dry mouth which is a result of reduction in the saliva secretion affects the intake of food and complicates the swallowing of food. Dry mouth conditions may occur as a result of the treatment by medicines as well as being a result of aging.

3. Mouth and teeth problems: The decrease in the number of teeth and usage of dental prosthesis complicates the disintegration and chewing of some foods. The difficulty in chewing may be a barrier the intake of different nutritional elements.



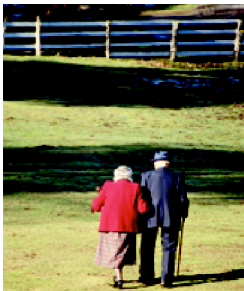
4. Swallow difficulties: As a result of the decrease in the contraction ability of the esophagus, the swallowing of the chewed foods becomes complicated. This complication may reduce the appetite for food and the frequency of eating.



5. Decrease in the stomach functions: The decrease in the evacuation rate of the foods in the stomach may create a long-term satiety sense. This long-term satiety sense may create the risk of inadequate nutrition by causing the consumption of less food.

With the decrease in the enzyme activity and quantity of the consumed food, the absorption of nutrients like calcium, iron, vitamin B₁₂ and folic acid decreases. This condition may cause to anemia.

6. Decrease in the functions of liver and gallbladder: As a result of the decrease in the biliary enzymes, a decrease occurs in the body activity of the fat soluble vitamins. The speed of the blood stream from the liver is decreases.



7. Decrease in the functions of intestine: As a result of the changes in the small intestine, the utilization of nutrients in the body decreases.



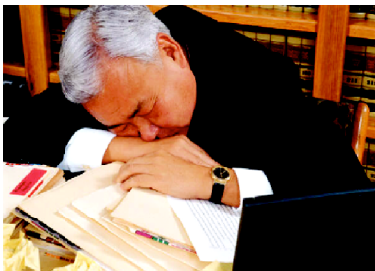
8. Decrease in the functions of immune system:

The multiplication of the immunity cells slow down and the body resistance to the infections decreases. As a result of the deficiencies in the immune system in the old age, frequency of upper respiration infections,

other infections and cancer and the number of deaths caused by these diseases increases.

9. Decrease in the functions of nervous system:

As a result of the loss in the nerve cells, a decrease in the information storage and remembrance abilities occurs. Dementia and depression are the most prevalent symptoms. These changes hinder the intake of food.



10. Energy metabolism:

The rate of basal metabolism slow down. Total energy consumption and the calorie requirement decreases.

1. C. CHANGES IN THE LIFE STYLES

The emotional, physical and biological changes which occur in the old age period are as follows:

1. Living alone.
2. Loss of mate.
3. Separation from family or friends.
4. Separation from work or home.
5. Physical handicap, difficulty in activities.
6. Absence of associate persons or institutions.
7. Lack of income.
8. Dependency.
9. Social isolation.
10. Mental problems (depression or dementia)
11. Drug Usage



The above-stated reasons may give rise to the risk of inadequate nutrition by affecting the purchase, preparation, cooking and consumption of the foods by psychologically or physically influencing these phases (decline in the appetite for food, refusal of food)



II. IMPORTANCE OF NUTRITION IN THE OLD AGE PERIOD



Nutrition plays an important role in the prevention, retardation and treatment of the diseases affiliated with aging. Adequate and balanced nutrition is important with respect to the perpetuation of the functional situation and protection from injuries.

Energy need in the elderly may increase due to the diseases, injuries and fractions. In these types of situations where energy need increases, inadequate nutrition may cause the malnutrition. Inadequate nutrition increases the frequency of the chronic diseases and the number of deaths caused by these diseases.

The nutrition conditions in the old age period are affected by the changes in the body, chronic diseases, and used medicines, physical, social or economic situation.



In normal conditions, adjustment to the changes which come into existence as a natural result of the aging process can be ensured by the protective measures like appropriate planning of nutrition to the requirements, regular physical exercise, and non-smoking.

However, in the existence of chronic diseases like hypertension, cardiovascular application, kidney disease, diabetes, application of special diets to these diseases is necessary.



- To live healthy;**
- **Maintain adequate and balanced nutrition**
 - **Increase your physical activity**
 - **Avoid unhealthy life styles and behaviors**

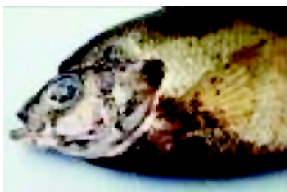


III. NUTRITION COMPONENTS, THE IMPORTANCE OF THESE ELEMENTS IN OLD AGE PERIOD, THE REQUIRED AMOUNTS

Nutrition elements are the chemical substances which are existent in the composition of foods. After being eaten, foods are separate to nutrients in the digestive organs and they are used in the body in that form. For the growth, development and maintain healthy of their life, human beings need more than forty kinds of nutrient components. The nutrients which human beings need can be enumerated as follows:

1. Proteins
2. Fats
3. Carbohydrates
4. Vitamins and Minerals
5. Water

1. PROTEINS



a. Its Importance in Old Age:

Protein is necessary for:

- Production of the body organs
- Restoration of cells
- Protection of the body from external effects
- Development of resistance to diseases by strengthening of the immune system
- Facilitating of recovery in conditions of fall, injury and fracture
- The protection and strengthening of muscle tissues

Protein provides energy for the body. One gram of protein provides 4 calories. Protein is used for energy when carbohydrates and fats are taken in small amounts. This is an undesirable situation since protein cannot carry out its real functions when it is used as energy.

b. Protein Sources:

Protein is present in all animal and vegetative foods. However, these foods are different with respect to their protein amounts and qualities (the condition of usage in the body). The proteins provided by foods of animal origin like meat, meat products, egg, fish are of high quality whereas the protein from the vegetative foods is of low quality.

Since high proportion of fresh vegetables and fruits is water, protein amount consisted by them is small. Generally, fresh vegetables comprise 1-2% and fresh fruits 0,5-1% protein.

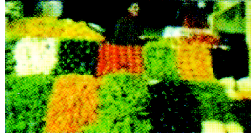
<u>The foods comprising most protein amounts</u>	<u>Protein amounts in 100 g</u>
Leguminous seeds	20-25 gr.
Soya beans	30-35 gr.
Meat, chicken, fish	15-22 gr.
Cheese	15-25 gr.
Egg	12-13 gr.
Cereals	8-12 gr.
Milk	3-4 gr.

c. Protein requirements in old age:

Health problems like infection, surgical operations, injuries and fracture increase protein requirements. Furthermore, 1 gr. protein per 1kg. of body weight may satisfy the daily requirements when the immune system functions which decrease by aging are taken into consideration. With that respect, daily protein requirement of a person with 70 kg. is $70 \times 1 = 70$ gr.

In the situations like chronic kidney disease where the daily protein intake should be decreased, the daily requirements must be determined by the experts on the basis of the condition of the disease.

2. CARBOHYDRATES



a. Its' importance in old age:

- It supplies the major amounts of the energy requirements of the body. (1 gr. carbohydrate provides 4 calories.)
- It prevents constipation by increasing the peristalsis of the intestine.
- It provides the maintenance of the brain functions.

When they are consume less than required or not used in the body as in the diabetes, proteins and fats are used as energy sources. In this situation, the amount of substance which turns the blood acidic and the operation order of the body deteriorate.

b. Carbohydrate sources:

It is generally found in vegetable foods. Vegetables comprise different amounts of carbohydrates on the basis of their types. Cereals comprise 60-90% carbohydrates. This amount is 10-20% in fruits, 18-20% in potatoes and sugar beet and 10% in other vegetables.

c. Carbohydrate needs in old age period:

Nearly 60% of the daily energy intake is supplied from the carbohydrates. Since proteins shall be used as energy sources when carbohydrates are taken in insufficient amounts, the complete satisfaction of the daily carbohydrate requirements is important. However, carbohydrates consumed more than the necessary amount are turned into fat and cause obesity. The cereals and cereal products which contain most carbohydrate amounts supply the nutrient elements like protein, vitamins, minerals as well as vegetables and fruits. However, sugar and starch are just carbohydrates and they may lead to diabetes by increasing the blood sugar very quickly. Meanwhile they may cause obesity by being turned into fat. Because of these factors, the well-sugared and starchy nutrients should not be consumed excessively and cereals, cereal flours its brans are not separated, fruits and vegetables should be consumed as sources of carbohydrates.



3. FATS



a. Its importance in old age:

- It is a source of energy. (1 g fat provides 9 calories)
- It provides for the intake and usage of the vitamins A, D, E and K which fat soluble.
- It is essential for the production of some hormones which ensure the functions of the body.
- When taken more than the necessary amount, it provides energy for the body after being stored.
- The omega 3 fatty acids reduce the risk of heart attacks and strengthen the immune system and protect people from depression.

b. Fat sources:

All vegetable or animal foods comprise less or more fats. The vegetables comprising the most fat amounts are as follows: olive, sunflower, hazelnut, pistachio nut, walnut, soy beans. Less fat is existent in the other cereal types, vegetables and fruit. Fats and fat tissues are existent in animal body and they are also existent in the composition of meat. This fatty part are not apparent. Fat is also existent in milk and yolk.

c. Fat requirements in old age:

Minimum 25% of the daily energy intake should be provided from fats. While the fats in the animal-origin nutrients can be produced in the human body with the exception of omega 3, the fats in the vegetables cannot be produced and these fats must be provided with the nutrients in required amounts.

If there are not any limitations caused by the diseases, the amount to be consumed as daily fat is 35-40 gr. It is appropriate that half of this amount is supplied from vegetative liquid oils and the other half from olive oil.



Since too much fat consumption may cause obesity, cancer and cardiovascular diseases, it is necessary to avoid excessive consumption. When oil is not added to meat-meals and the skins of the chicken and turkey meats are not eaten, the fat amount eaten as per the diet may be reduced.

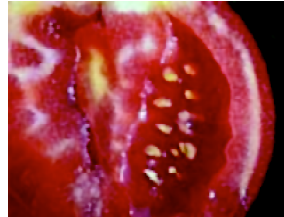
The consumption of solid fats like margarines and butter should be avoided in order to be protected from hypertension, high cholesterol and cardiovascular diseases. Especially margarines should not be used because of their detriments for health.

Since there is fat in the natural composition of animal foods and some vegetable, the used of liquid vegetative oils and especially the olive oil when cooking is healthier.

The omega 3 oils which are existent in fish and sea products protect heart and vessel health in elderly by reducing the blood fats and accumulation of plates in vessels. Furthermore, they prevent inflammation in the joints and fat build up in especially the abdomen area and protect people from obesity.



4. VITAMINS AND MINERALS



a. Its' importance in old age period:

The word “vitamin” means an “essential element for life”. Vitamins and minerals are existent in many organs of the body and they are necessary for the perpetuation of the body functions. Since many of them cannot be produced in the human body, intake of them by foods is necessary. As a result of inadequate vitamin and mineral intake, some deficiencies in the functions of particular organs appear dependent on the defects in metabolism. Due to the reduction in energy requirement in the old age period, the intake of the vitamins and minerals assigned in the energy metabolism decreases. Thus, the required amounts should be provided from the foods.

The impacts of vitamins and minerals in old age:

- Forming resistance to diseases by strengthening the immune system
- The protection of the bone and teeth health and the prevention of osteoporosis.
- The protection of skin health
- Blood formation
- The prevention of hypertension
- The protection from diabetes.
- Reducing the blood cholesterol which may create risk for cardiovascular diseases.
- Protection from cardiovascular diseases.
- Strengthening the brain functions and preventing problems like forgetfulness, dementia and depression
- Strengthening of muscles

b. Sources of vitamin and minerals:

Vitamins and minerals are existent in vegetables, fruits, cereals, meat, fish, milk and dairy products. While vitamin B₁₂ is merely existent in animal products like meat and meat products, milk and egg, other Group B vitamins are existent in both vegetative foods and animal foods. The best source of vitamin D is sunlight. Osteoporosis, a disease which occurs as a result of vitamin D deficiency is widely existent in individuals whose contact with sunlight is rare. The vitamin, mineral and some nutrient group types whose deficiency may create problems in elderly are stated in Table-1 with their functions and sources.

c. The vitamin and mineral requirements in old age period:

The vitamin and mineral requirements increase due to the reasons like reduction in the energy requirement, decrease in the body resistance, limitation of mobility, frequency rates of chronic diseases.







Vitamin and mineral deficiencies may cause deaths by affecting the progress and deepening the impact of the acute and chronic diseases. In situations where there is no health problem or limitation of food intake concerning the usage of vitamins and minerals, the requirements of vitamins and minerals with the exception of vitamin D, may be provided from the foods with a well-planned diet.

Since intake of excessive amounts of some vitamins and minerals like supplements may cause poisoning, vitamin and mineral (nutrients like tablets, syrups which are taken as supplements for diet) should be taken by the recommendation of a dietician or doctor. This requirement should be satisfied by natural sources or foods unless compulsory usage of the diet supplements.

In some studies, a positive effect or side-effect of vitamin supplements like vitamin-A (beta carotene) or vitamin E which are retardant with respect to frequency rates of cancers and cardiovascular diseases or deaths was not observed. Therefore, the providing of vitamins and minerals (with the exception of vitamin D) through a diet is more beneficial with respect to their functions.

Recommended daily energy and nutrient element consumption amounts and their variations dependent on the adult period are given in Table-2.

Table 1. The Vitamin, Mineral and Some Nutrient Components-Sources

NUTRIENT COMPONENT	FUNCTIONS	SOURCES
<p>Calcium and Phosphorus</p> 	<p>The protection of bone and teeth health. The prevention of osteoporosis. The strengthening of muscles The functioning of nervous system.</p>	<p>Milk and milk products, almond, hazelnut, soy beans, legumes, green-leaved flowers, curds and flour soup, boiled grape juice, sesame oil, fishes which can be eaten with their fishbone, foods enriched with calcium</p>
<p>Zinc</p> 	<p>Development of immune system- Development of resistance to diseases The protection from forgetfulness and demans</p>	<p>Lean red meat, liver, milk, cheese, egg, sea products, hazelnut, walnut, banana, complete cereals, legumes, wheat bran, yeast</p>
<p>Magnesium</p> 	<p>Protection of bone health Arrangement of blood pressure Arrangement of blood sugar/protection from diabetes</p>	<p>Complete cereals, wheat bran, soy beans, hazelnut, pistachio nut, walnut, salmon, green-leaved vegetables</p>
<p>Copper</p> 	<p>Formation of blood cells Reduction of blood cholesterol Arrangement of blood sugar/protection from diabetes</p>	<p>Offals, hazelnut, walnut, legumes, wheat barn, fish, sea products, meat, green-leaved vegetables</p>
<p>Selenium</p> 	<p>Strengthening of immune system- Development of resistance to diseases Strengthening of muscles</p>	<p>Sea products, kidney, heart and other meats</p>
<p>Chromium</p> 	<p>Arrangement of blood sugar Arrangement of blood cholesterol</p>	<p>Organ meats (offals), meats, cereals, spices</p>


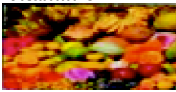





<p>Vitamin B₆</p> 	<p>Protection of cardiovascular health Protection from paralysis and other limitations of motion Continuation of mental functions</p>	<p>Meat, liver, yolk, complete cereals, legumes, yeast</p>
<p>Vitamin C</p> 	<p>Protection from cataract Protection from cardiovascular diseases Protection from cancer</p>	<p>Rosehip, paprika, green pepper, dark green-leaved vegetables, orange and orange-type fruits like lemon</p>
<p>Vitamin B₁₂</p> 	<p>Protection of cardiovascular health Formation of blood cells Continuation of mental functions Protection from liver diseases Continuation of nervous system functions</p>	<p>meat and meat products, milk and milk products, fish, egg</p>
<p>Folic Acid (folate)</p> 	<p>Formation of blood cells Continuation of mental functions Protection of cardiovascular health</p>	<p>Fresh green-leaved vegetables, broccoli, orange, avocado, yeast, liver, legumes complete cereals, hazelnut, walnut</p>
<p>Vitamin D</p> 	<p>Providing of bone concentration (protection from osteoporosis), protection from fractures</p>	<p>Pilchard, trout, fish oil, yolk, butter, cheese</p>
<p>Vitamin E</p> 	<p>To delay of aging by preventing cell destruction Protection from cataract Protection of cardiovascular health Protection from cancer Providing elevation of well-intended cholesterol Strengthening of immune system Continuation of mental functions Protection from Parkinson disease</p>	<p>Vegetative oil, cereal grains, wheat essence, green-leaved vegetables, hazelnut, walnut</p>
<p>Omega 3 Acids</p> 	<p>Protection of cardiovascular health Protection from obesity Protection from joint inflammations</p>	<p>Fish, fish oil, seafoods, rape, linseed oil, green-leaved vegetables (especially purslane)</p>

Table 2. Recommended Daily Energy and Nutrient Component Consumption Amounts for the Old Age Period and Their Variation Conditions According to Adult Period

Energy and Nutrient Components	Recommended Amounts	Change With Respect to Adult Period
Energy	30 calorie/kg	Decrease
Protein	1 g/kg	No change
Fat (gram)	25% of total energy	Decrease (especially the saturated oil acids)
Carbohydrate (gram)	60% of total energy	No change
Calcium	1000-1200 milligrams	Increase
Magnesium	5-6 milligrams/kg	Increase
Iron	10 milligrams	Decrease in women
Zinc	15 milligrams	Increase
Iodine	150 microgram	No change
Selenium	70 microgram	Increase

Vitamin A-RE*	15 microgram/kg	Increase
Vitamin D	10 microgram	Increase
Vitamin E	30 milligrams	Increase
Vitamin K	70 microgram	No change
Vitamin C	75-100 milligrams	Increase
Thiamine	1.2 milligrams	Increase
Riboflavin	1.2 milligrams	Increase
Niacin	15 milligrams	Increase
Vitamin B ₆	1.5 milligrams	Increase
Vitamin B ₁₂	3.0 microgram	Increase
Folic Acid (Folate)	300-400 microgram	Increase
Water	1500-2000 milliliters (8-10 water glass)	Increase

*RE: Retinol equivalence

5.WATER



a. Importance of water in old age:

Water is a necessary element for life. Human beings are able to live without having any nutrients but they can live without water for only a few days. While the loss of whole fat and carbohydrates and half of the proteins in the body give rise to danger for human life, loss of 15% of the body water cause the loss of life.

- The digestion, absorption, transportation of the food eaten.
- The operation of the cells, tissues and organs
- The monitoring of body heat
- The slickness of the joints
- The remove of harmful substances from the body is carried out by water.

While 60% of the body is water in the adult period, this amount decreases to 50% in the elderly. The reduction in the body water may create risk. Normally, the sense of thirst develops in parallel with the increase in the water lost in the body and the lost water is recovered. However, the reduction of the sense of thirst in the aging period may cause failure in the recovery of the lost water and this may create serious health risks which may result with death.

b. Water requirements in old age period:

Nearly 2,5 liter (equivalent to 15-20 glasses of water) are thrown out of the body per day. Water thrown out from the body through urine, perspiration, excretion of feces and respiration every day must be replaced. The amount of water required by the body is met by water, foods, water and other beverages and water formed as a result of the metabolism function. When too much exercise is carried out in warm weather conditions and in case of too much salty and protein ingredients are consumed or in feverish diseases or diarrhea, water loss from the body increases. In these conditions, the amount of consumed water or liquids should be increased.

In the old age period, at least 8-10 glasses of water (1500ml) per day should be consumed.



FIBRE



Fibre is the parts of vegetable foods which can not be digested.

a. The Importance of Fibre In Old Age:

- Increasing the activities of intestine and prevention of constipation
- Regulation of blood sugar and protection from the diabetes
- Lowering the blood cholesterol and as a result of it prevention of cardiovascular diseases
- Prevention of overweight
- Protection from the intestinal cancer

b. Fibre Sources:

Legumes, grains, vegetables and fruits are the foods in which the most fibre is present. The amount of fibre decreases with the separation of its bran while the grain units are granulated. Therefore the consumption of the whole grains is healthier for fibre and vitamins.

c. Fibre Need in the Old Age:

25-30 grams of fibre consumption per day is sufficient. This amount is provided by increasing the amount of vegetable and fruit, legumes and whole grain products consumption.



IV. ENERGY REQUIREMENTS IN THE OLD AGE PERIOD



As a result of decrease at working rate of the body and reduce of activity, energy needs decrease in comparison to the adult period. In this case, the contents of the foods which are consumed are important. Because the need for some foods increase although energy

needs decreases in the period of old age. It is necessary to decrease taking of the refined sugars and fat and that energy needs are provided from the foods in which the nutritional elements are concentrated as grains, legumes, vegetables, fruits, low-fatty milk and lean meat.



30 calorie per kilo of body weight can meet daily energy needs for old persons who are healthy and have no individual case, normal weight and light physical activity. According to it, daily energy needs for a person weighted 70 kilos is $70 \times 30 = 2100$ calorie.

It is advised that daily energy that is taken should not descend under 1500 calorie.

V. FOOD GROUPS

The foods are separated into the groups according to kind and amount of the nutritional elements they contain. These groups are;

1. The group of meat-egg-legumes,
2. The group of milk and milk products,
3. The group of bread and grains,
4. The group of vegetable and fruit.



1. The group of meat-egg-legumes:

In this group there are foods as meat, chicken, fish, offal, egg, haricot bean, chickpea, and lentil. The oily seeds as walnut, hazelnut and take place in this group. The oily seeds contain more oil than other foods so that it should be careful about their consumption levels. This group contains:

- Protein
- Vitamin
- Mineral
- Fibre

In the period of old age the consumption of red meat, offal and egg taking place in this group should be limited and the consumption of fish and legumes should be increased.



2. The group of milk and milk products:

Milk and milk products such as yogurt, cheese, milk powder take place in this group. This group contains:

- Protein
- Vitamin
- Mineral

The foods taking place in this group is very important for protection of bone health (they are rich foods calcium and phosphor). However, the use of fatless or low-fatty milk and milk products is more useful for cardiac health because of high level of fat other foods in this group contain.



3. The group of bread and grains:

The grains as wheat, rice, corn, rye and oat and flour, bulgur, crisp and similar products take place in this group. This group contains:

- Carbohydrates
- Vitamins
- Minerals
- Fibre
- Protein (at low level)

The foods taking place in the group of bread and wheat, especially the grains that is called as whole-grain and its peel and core part is not separated and the foods made from them are the foods required often consumption in the period of old age, because of their richness vitamin, mineral and diet fibre.



4. The group of vegetable and fruit:

The parts of plants that can be eaten are collected under the group of vegetable and fruit. Because the water forms the important part of their composition, their contribution is at very low level in meeting daily energy, protein and fat needs. However, they are rich in vitamin and mineral. This group contains:

- Vitamin and minerals which especially delay ageing and strengthen immune system
- Vitamin and minerals which are necessary for bone and muscle health
- Preventive compositions (phytochemicals) against chronic diseases as cardiovascular diseases, hypertension and cancer.
- Fibre



PHYTOCHEMICALS

In studies made on the effects of the foods on body functions in recent years, it is stated that chemical substances found in the vegetables and fruits have preventive features against health problems, which can constitute risk especially in the period of old age, and diseases. These substances are called as phytochemicals.



The group of vegetables and fruits decreases the risk of overweight depending on unbalanced nutrition, cardiovascular diseases, and hypertension and of emergence of some cancer types; provides resistance against diseases by strengthening immune system; contains basic elements for health of skin and eye; protects health of teeth and gum. The amount of the foods in this group, which are protective against risks met in the period of old age, at meals should be more than other groups.

In Table 3 the amounts that should be taken daily from four basic food groups and in Table 4 the foods that have phytochemical feature and their effects on the health are given.

Sugar and fats and the foods made from them, except four basic food groups, also take place in diet. The consumption of the refined sugars and the foods made with these sugars as sweets, mayonnaise, cream, butter, margarine, fatty meat, offal, salami, sausage, sausage flavoured with garlic, etc should be consumed at least level.



Table 3. The Basic Food Groups and the Amounts Required Daily Consumption

The Food Groups	Daily Amounts Required Consumption
<p><u>The group of meat-egg-legumes</u> Total meat, egg and legume Meat, chicken, fish Egg</p> <p>Legumes Oily seeds (walnut, hazelnut)</p>	<p>120-150 gram 90 gram* (approximately 3 meatball) 25 gram (1/2 egg) (the amount is equal to 3-4 number for a week) 50 gram (1 portion cooked legume meal) A handful of hazelnut or 3-4 whole walnut (because of their oil level is high over-consumption of them can cause to the obesity) * Consumption of fish 2-3 times in a week is useful for cardiac health. 1 egg replaces meat as a meatball. If the meat can never be consumed one part of need can be met with egg.</p>
<p><u>Milk group (low-fatty or fatless)</u> Total milk and milk products Milk and yogurt Cheese, cheese made of skim milk or yogurt curds, etc. (preferably without salt)</p>	<p>500-600 gram 500-550 cc (as 3 water glasses) 30 gram (as 1 matchbox)</p>

The Food Groups	Daily Amounts Required Consumption
<p><u>The group of bread and grains</u> Total group of grains Bread (Branny should be preferred) Rice, bulgur, macaroni, soup, etc.</p>	<p>200 gram* 150 gram (5 thin slices) 50 gram (1 portion rice, macaroni or 1 bowl soup or 1 small slice flaky pastry) The amount of grains can be increased by decreasing the amount of bread. * If there is a weight problem consumption of grains group should be limited.</p>
<p><u>The group of vegetable and fruit</u> Total vegetable and fruit At least two portions of daily consumed vegetables and fruits should be vegetables with green leafed or sour and bitter oranges as orange and lemon or tomato.</p>	<p>At least 5 portion (3-4 dishes vegetable meal/salad, 2-3 fruits) The amounts can be increased when they are consumed as uncooked and without adding oil.</p>

Table 4. The Phytochemicals and Their Effects on the Health

The Name of Food	Its Effects on the Health
Fruits orange-coloured, carrot, tomato, spinach, vegetables with green and yellow leaved, parsley, celery stalk, soybean and its products	They are protective against cell destruction and cancer, strengthen the immune system.
Cornelian cherry, raspberry, blackberry, rosemary, sweet marjoram, thyme	They are protective against cell destruction. They develop the body resistance against bacteria. They are protective against urethral infection.
Green tea	It is protective against cancer, toxins and microbes.
Radish, broccoli, cabbage	They are protective against gene destruction.
Onion, garlic, leek	They are protective against cancer; develop the body resistance against bacteria; have cholesterol-lowering effect.
Sour-bitter-seville orange (orange, lemon, tangerine)	They are protective against breast tumours.

The Name of Food	Its Effects on the Health
Pumpkin seed	It reduces the other health problems the prostate caused.
Grape, date, cherry, pineapple, orange, apricot, cucumber, mushroom, red pepper, zucchini fit for stuffing	It is protective against diseases related with artery and gene destruction.
Fava bean	It is effective in the treatment of Parkinson disease.
Artichoke, chicory, corn, garlic, oat, vegetables and fruits	They develop the body resistance against microbes and have cholesterol-lowering effect.



VI. FOOD VARIETY

The foods are different in the food elements they contain and the chemicals that are not food element. Different kinds of foods should be consumed in order to provide food elements and other chemicals that are necessity of the body at adequate level as kind and amount. A balanced nutrition can be provided by the consumption of different kinds of foods at meals. The few kinds of foods can cause that some food elements are taken inadequate.

The contents of food element of the foods that take place in the same group are not the same with each other. For this reason, not only the variety of 4 basic food groups but the variety of the foods that take place in the same group should also be provided.

The nutrition also effects the physiological situation besides meeting physiological needs.

**In our daily nutrition;
the variety of the foods that take place in the same
group should also be as provided as the variety of
4 basic food groups.**

The appearance of prepared foods is an appetizing factor. A dinner table in which different colours take place is a good indicator of food variety besides its appetizing feature.



VII. THE CONTROL OF BODY WEIGHT

The body weight is an indicator which has direct relationship with the health. Having the weight less or more than the ideal weight determined according to age and sex increases the risk of illness. It facilitates the emergence of chronic diseases in the period of old age as obesity, diabetes, hypertension, cardiovascular diseases, in addition, pave the way for accidents and fallings by causing activity restriction. Thinness is also an indicator of inadequate nutrition from energy and protein. This case decrease the resistance against diseases increases the risk of break and lowers the life quality. Involuntary decrease in body weight is also an indicator of a health problem and a situation that requires health control.

The Evaluation of Body Weight

1. Evaluation According to Body Mass Index

It is the most practical method. After the weight and height is measured, it is calculated with the formula given below and the result is evaluated.

$$\text{Body Mass Index} = \frac{\text{Weight (kg)}}{\text{Height}^2 \text{ (meter)}}$$

The body mass index of a person weighted 70 kilos and heightened 1.68 meter (168 centimetres) is calculated as follows:

$$\text{Body Mass Index} = \frac{70}{(1.68) \times (1.68)} = \frac{70}{2.82} = 24.8$$

Classification for Body Mass Index:

Under 18.5	Thin
18.5-24.9	NORMAL
25.0-29.9	Over weight
30.0-39.9	Obese
40.0 and above	Morbid obese

The people whose body mass indexes are under 18.5 should reach to the weight suitable for them by increasing food consumption, if they have not any health problems that cause them to lose weight.

The people whose body mass indexes are 25 and above can reach to the normal weight whereby diet and exercise. The diet programmes that will be applied for gaining or losing weight should be definitely carried out under the supervision of a dietician.

2. Evaluation According to Waist Circumference

The measurement of waist circumference is one of the methods that determine fat ratio in the body. The high measurement of waist circumference is an indicator of health risks. The waist circumference should not be above 94 cm in men and 80 cm in women. The waist circumference above 102 cm in men and 88 cm in women increases the health risks.

The fat dispersion that is accumulated in the body is, in particular, related with the risk of cardiovascular diseases. Accumulation of fat amount in the body at the top of the body (apple type) is an undesired situation from the health. The risk of disease is less in the pear type fatness that comes into being with the fatty tissue accumulated at the bottom of the body (at the hips).

3. Evaluation According to Waist and Hip Circumference

The calculation of waist/hip circumference rate is another method that serves to determine fat ratio in the body.

$$\text{Waist/Hip Circumference Ratio} = \frac{\text{Waist Circumference (cm)}}{\text{Hip Circumference (cm)}}$$

$$\text{Example} = \frac{85}{100} = 0,85$$

The ratio of waist circumference to the hip circumference should not pass 0.8 in women and 1.0 in men.

The values exceed these values are risk factor for cardiovascular diseases and diabetes.

If the person whose waist/hip circumference ratio is calculated in example above is woman she is in risk group, but if the person mentioned above is man he takes place in normal group.



VIII. PHYSICAL ACTIVITY and HEALTH

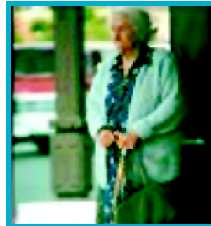
In the period of old age; the physical activity is synonymous with taking of more energy and food element and higher quality life. In the process of ageing, the physical dependency increases and life quality decrease by depending on decrease in functional ability. The most important reason for loss in functional abilities is inactive life style. The inactive life style is a problem that paves the way for the diseases and resulted in handicap.

The exercises that will be done 30 minutes period for a day as walking, bicycling, gardening, and jogging are suitable for the period of old age.

The regular physical activity;

- Prevent activity restriction by developing functional capacity.
- Reduce cardiovascular diseases and occurrence frequency of deaths they caused.
- Reduce the diabetes risk that is not depending on insulin.
- Reduce the risk of hypertension.

- Reduce the risk of intestine cancer.
- Lower blood pressure, blood sugar, blood cholesterol.
- Reduce the risk of falling and break.
- Protect and develop the mental health.
- Maintain the body weight at balance.
- Raise the life quality.



IX. THE HEALTH PROBLEMS FREQUENTLY OCCURRED IN THE OLD AGE PERIOD AND THE GENERAL PRINCIPALS RELATED WITH NUTRITION IN DISEASES

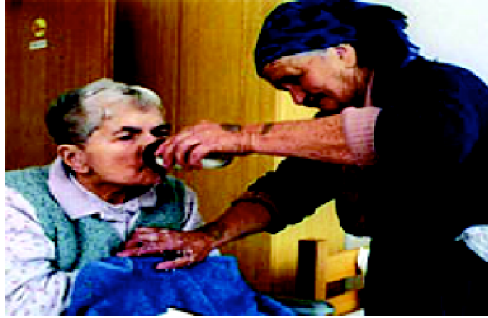
The occurrence frequency of the chronic diseases as hypertension, osteoporosis, high cholesterol, cardiovascular diseases, diabetes and cancers and of other health problems and the number of deaths depended on these diseases increase in the period of old age. There is a direct relationship between nutritional situation and prevention, delaying and lessening side effects of these diseases. In the period of old age, the determination of the disease-related diets of the persons who have any of these chronic diseases should be definitely made by a dietician. Here the general principals are given.

1. HYPERTENSION

- Control of weight - reach to ideal weight.
- Limitation of salt consumption and the foods that is rich in sodium (pickle, brines and ready-made cakes).
- Taking sufficient calcium and potassium from the foods.
- Regular exercise.
- No smoking.

2. DECREASE IN BONE DENSITY (OSTEOPOROSIS)

- Increase taking of calcium and vitamin D through the foods and supportive additions.
- Regular exercise.



3. HIGH BLOOD CHOLESTEROL, HIGH BLOOD LIPIDS, CARDIOVASCULAR DISEASES

- No consumption of lubricants as margarine, butter, grease and offal.
- Increasing the consumption of green leafed vegetables, fruits with red and orange-coloured, fish and legumes.
- Limitation of taking the foods that are rich in salt and sodium (pickle, brines and ready-made cakes).
- Preservation of ideal weight.
- No smoking.

4. CANCERS

- Decreasing the amount of fat in the diet.
- Increasing fibre consumption.
- Increasing the consumption of the foods that are rich in vitamins and minerals that increases the immunity (vitamin A, C, E and selenium) and in phytochemicals.
- Limitation of the consumption of prepared foods that contains especially additive ingredient (prepared soup, bouillon, dyed foods).
- No alcohol consumption and smoking.

5. DIABETES

- Control of weight – reach to ideal weight.
- Consumption of the foods that are rich in fibre as legumes, whole grains, vegetables and fruits, and have low glycaemic index*.
- Regular exercise.
- No alcohol consumption and smoking.

*Glycaemic Index:

It is the index that is determined according to the foods' speed of raising the blood sugar when they are taken into the body. The foods with low glycaemic index provide protective effect especially against diabetes by raising the blood sugar slowly while the foods with high glycaemic index are raising the blood sugar suddenly. The glycaemic index of refined sugar is 100. Corn, rice, potato, white bread and banana are the foods with high glycaemic index (between 90-70). Lentil, haricot bean, pear and soybean are the foods with low glycaemic index (29-15). The consumption of the foods with low glycaemic index is advised in diabetes and obesity. The glycaemic index values of some foods are given in Table 5.

Table 5. Glycemic Index Value in Some Foods

Having High Glycemic Index		Having Low Glycemic Index	
Glucose	100	Whole-wheat bread, whole-wheat rice, pea	50
Table sugar	100	Macaroni	50
French-fries, complete white bread	95	Oaf, rye bread	40
Mashed potatoes, honey	90	Macaronis made from unrefined flour	40
Fried carrot, cornflakes	85	Fresh fruit juice without sugar, green bean	40
Potato	79	Kidney bean, diet breads, milk products	35
Banana	77	Lentil, chickpea, fresh fruits	30
White bread, refined grains with sugar	70	Haricot bean	28
Chocolate, biscuit, corn, white rice	70	Semisweet/bitter chocolate	22
Beet	65	Soy	15
Jam, cakes	55	Green vegetables, tomato, lemon, mushroom	Under 15

6. MENTAL INSUFFICIENCY, LOSS OF MEMORY, BRAIN DAMAGE

- Taking adequate energy and protein.
- Increasing the consumption of the foods that are rich in vitamin and minerals that develops brain functions (vegetables with green leafed, fruits with red and orange-coloured, fish).
- No alcohol consumption and smoking.

7. CONSTIPATION

- Regular exercise.
- Increasing the consumption of fibre and liquid.

8. IMMUNE SYSTEM WEAKNESS / LOW RESISTANCE AGAINST THE DISEASES

- Increasing taking of protein.
- Increasing the consumption of fish, soy oil, hazelnut, walnut, almond, vegetables and fruits.
- Regular exercise.
- No alcohol consumption and smoking.



X. THE PRINCIPALS OF NUTRITION IN THE OLD AGE PERIOD

1. The number of daily meal should be regulated as 3 main and 3 interim meals. Therefore, the digestion difficulties are prevented by decreasing the amount of the foods that falls to meals.
2. In every meal, the foods from 4 basic food groups (meat and meat products, milk and milk products, vegetables and fruits, bread and grains) should take place and it should be taken care of the providence of food variety.



Healthy aging
begins in
childhood period

3. At least 5 portion vegetable and fruit should be consumed every day.

4. It should be taken care that the foods that have high amount of fibre as legumes, vegetables, fruits, and wholegrain is consumed.
5. The liquid consumption should be increased. At least 8-10 glasses of water (1500 ml) should be consumed. If the all of that amount can not be consumed by drinking water, this amount can be met by drinking linden tea, fresh fruit juice, herbal teas, buttermilk, stewed fruit or light tea. However, none of them is as effective as water in body functions.



6. The foods that contain high level of calcium should be consumed. The low-fatty or fatless milk and milk productions are the best calcium resource.
7. The fish species that contains omega 3 fatty acids intensely should be consumed at least twice in a week.
8. The consumption of the lubricants as margarine, butter, grease creates risk for cardiovascular diseases by causing increase in the level of blood cholesterol. The meat, milk and their products contains invisible saturated fat. For this reason, fatless ones of these foods and the parts of the chicken and turkey meat without skin should be consumed; extra fat should not be added to the foods that are cooked with meat.
9. The salt consumption should be limited. The over-consumption of salt causes to the problems as hypertension, cardiovascular diseases, osteoporosis. The salt should not be added to the foods at dinner table and it should be avoided from the consumption of the foods that contains high sodium as pickle, brine, tomato paste, canned food.
10. The consumption of sugar, well-sugared foods and sweet dessert made from pasta should be limited.

11. It should be avoided from the consumption of the fast foods (like hamburger, French fries, pizza). These foods that contain very high fat and salt can create health risks.
12. It should be careful about the risks that can appear during buying and cooking of the foods. The foods whose date is expired, and package is damaged and that lost their freshness should not be bought. The foods should be cooked by the methods as boiling or grilling instead of frying and roasting. It should be careful about the hygiene rules during preparing or keeping of the foods. Therefore, adequate and balanced nutrition is provided by preserving the nutrition value of the foods.
13. The appropriate body weight should be preserved. The fatness and thinness increases the risk of disease.
14. The cigarette and alcohol should not be used.

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