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Epidemiological Analysis of the Actual Nutrition Status of Women Living in the De-occupied Territory of Bucha District, Kyiv Region

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Abstract

The article evaluates the actual nutrition and physical development of women living in the de-occupied territories of Bucha district, Kyiv region. Special attention is paid to the impact of martial law, which has heightened risks to the food security of the local population. One of the indicators for assessing nutritional status is body harmony. Therefore, the study included an examination of the physical development of women. It was noted that due to poor-quality, unbalanced nutrition, a significant number of women over 30 show a tendency toward increased body weight (ranging from 40.0% to 43.8%), as well as class I and class II obesity (40.0% after 40 years, and 22.0% after 60 years). Data obtained through questionnaire-based survey methods showed that the actual nutrition of women did not correspond to rational nutrition-diets are distorted and deficient in basic nutrient content. The most unbalanced diets among women were in terms of bread and grain products-up to 31.4%, meat and meat products-up to 33.9%, milk and dairy products-up to 40.0%, vegetables-up to 25.5%, and fruits-up to 20.0%. At the same time, women consumed an excess of cereals-by 38.0%, potatoes-by 12.2%, and confectionery products-by 30.0%. It is noted that under wartime conditions, the likelihood of consuming local foods potentially contaminated with radionuclides and toxic chemical substances (nitrogen oxides, heavy metals, etc.) increases, which further complicates food security under martial law. The importance of restoring comprehensive monitoring, educational work, and financing programs for the preservation of public health is emphasized.

Keywords: *actual nutrition, body mass index, de-occupied territories, female population, food security, nutrient deficiency, physical development*

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1. Introduction

With the beginning of the full-scale Russian aggression, Ukraine faced a number of social, economic, and environmental challenges [1, 2, 3, 4]. The situation has significantly complicated both nutrition and health outcomes [5].

The impact of harmful exo- and endogenous factors on the human body leads to the suppression of immune reactivity, an increase in non-specific diseases, exacerbation of chronic diseases, psycho-emotional distress, body allergization, and manifestations of carcinogenic and mutagenic effects [6, 7].

Armed aggression has led to a large-scale humanitarian crisis, a sharp increase in the number of vulnerable population categories, the destruction of social infrastructure, and significant pressure on the budget system [8, 9].

A comprehensive indicator characterizing the impact of the environment on the human population is the state of health. According to modern interpretation, health is a natural state characterized by complete equilibrium with the biosphere and the absence of any morbid deviations in the body [10, 11].

In Ukraine, the birth of children with various malformations has already increased by 2–4 times, and mortality exceeds the birth rate [12, 13].

Scientific studies [14, 15, 16, 17] have shown that nutrition exerts a modifying effect on the action of toxicants entering the human body. Diseases caused by the complex action of anthropogenic factors include cardiovascular diseases (hypertension, atherosclerosis, ischemic heart disease, etc.), oncological diseases, metabolic disorders, and diseases of the endocrine and digestive systems [18, 19, 20, 21, 22].

Nutrition is one of the most important functions of living organisms, without which their existence is impossible. Understanding the significance of nutrition in human vital activity, the biochemical processes of individual food component transformations, and their impact on the functioning of the body's physiological systems is extremely important. Food quality is one of the factors influencing human health and working capacity. Violation of the basic principles of rational nutrition causes a wide range of diseases [23].

Prolonged stay under occupation conditions and the immediate proximity of military operations constitute a powerful stress factor that exerts a complex destructive impact on human physical and mental health [24]. This impact is caused by a combination of psychological pressure, environmental threats, limited access to medical care, and proper nutrition, which is critically important.

Rational and balanced nutrition is one of the key non-specific protective factors allowing the body to better withstand the action of stressors. The body's supply of essential nutrients (macro- and micronutrients) determines the quality and completeness of metabolic, immune, and adaptive processes that neutralize negative environmental impacts [25, 26].

Over 90 different organic and inorganic substances enter the body with food, performing plastic, catalytic, and energy functions (cell building, metabolism regulation, immunity support). Prolonged imbalance or deficiency of these substances under occupation conditions leads to clinical signs of the exhaustion of adaptive reserves.

Malnutrition under occupation conditions leads to a significant spread of alimentary-associated diseases:

- **Micronutrient deficiencies:** various types of anemia, hypo- and avitaminosis states, iodine deficiency, lack of calcium, magnesium, zinc, selenium, and other critically important trace elements.

- **Immune disorders:** exhaustion of antioxidant systems, excessive formation of free oxygen radicals and peroxidation products, which indicates oxidative stress. This is reflected in changes in systemic and local immunity and, in particular, in an increased frequency of dysbiosis and associations of opportunistic microorganisms.

- **Endocrine system imbalance:** regulatory disruptions, especially in the pituitary-gonadal-thyroid axis. The fertile period is particularly vulnerable, as the body requires additional expenditure of plastic and energy resources. The impact of occupation on this population category has the most dramatic long-term consequences.

Unsatisfactory nutritional conditions significantly increase the threat of developing chronic diseases (metabolic, cardiovascular) in subsequent periods of life, which has long-term social and economic consequences.

Providing the population of occupied territories with balanced nutrition is a practical step toward preventing an increase in morbidity and mortality.

Considering the prolonged unsatisfactory nutritional status and the presence of nutrient deficiencies, there is an urgent need for scientifically grounded measures of alimentary correction.

Focusing attention on modern nutritional problems is an urgent issue, as it is a guarantee of ensuring and strengthening health, disease prevention, and reducing infectious diseases among the population. In Ukraine, considerable attention is paid to these issues, and scientific foundations of rational nutrition are being developed, taking into account environmentally unfavorable living conditions.

1.1. Aim of the study

The aim was to investigate physical development and establish nutrient deficiencies affecting the state of alimentary-associated diseases among women living in de-occupied territories, and to assess the effectiveness of dietary intake under martial law conditions.

1.2. Materials and methods

Bibliosemantic method (study of professional modern special scientific-methodological and international literature on the studied problem); theoretical analysis and generalization of data on public health and nutrition; somatometric methods; medical questionnaires; mathematical statistics.

Questionnaire responses were analyzed using computer data processing methods via the Microsoft Excel program.

1.3. Study of the Physical development of Women

The study involved women aged 18 to 60 and older living in the de-occupied territories of Bucha district, Kyiv region.

Bucha district includes 141 settlements. The population of the district as of 2020 was 352.3 thousand people.

During the full-scale invasion of Russian troops into Ukraine, the entire territory of the community was occupied from the first days of the attack on the Kyiv region and liberated on March 31, 2022.

To assess the nutritional status of the population, such an integral indicator as body mass index (BMI) is widely used, which indicates dietary balance. The classification developed by the US National Institutes of Health and approved by the World Health Organization (WHO) is standard [27, 28].

Body harmony is one of the indicators for assessing nutritional status.

Body composition is understood as the quantitative ratio of the main somatic components that have different metabolic and functional activities. The most functionally active is the multi-component fat-free active mass (skeletal muscles, visceral organ mass, etc.), which is counterbalanced by more labile and metabolically active adipose tissue.

Data on the physical development and BMI of the examined women are presented in Table 1.

As can be seen from the table, the body weight and height of women aged 18–29 were within average statistical values.

The average age of women aged 18–29 was 26.6 years. The maximum age was 29, and the minimum was 23 years.

It was noted that the maximum values of body weight and height for women were 82 kg and 175 cm, while the minimum values were 54 kg and 155 cm.

Average BMI values corresponded to normal body weight (Fig. 1). At the same time, among these 17 women, 52.9% (9 individuals) were found to have normal body weight, 35.3% (6 individuals) were overweight, and 11.8% (2 individuals) had class I obesity. It was noted that the maximum BMI value was at the level of 31.2 kg/m^2, corresponding to class I obesity, and the minimum value was 19.3 kg/m^2, equivalent to normal body weight.

The average age of women aged 30–39 was 35.3 years. Meanwhile, the maximum age was 39 and the minimum was 30 years.

For women aged 30–39, body weight and height were within average statistical limits. At the same time, it was noted that the maximum values of body weight and height for women were 108 kg and 174 cm, respectively, while the minimum values were 51 kg and 158 cm.

The BMI among women aged 30–39 corresponded to normal body weight values (Fig. 1). Among these women (16 individuals), 43.8% (7 individuals) were found to have a normal body weight, 43.8% (7 individuals) had an increased body weight, and 12.5% (2 individuals) had class II obesity. It was noted that the maximum BMI value among women reached 37.4 kg/m^2, which corresponds to class II obesity, while the minimum value was 19.9 kg/m^2, corresponding to a normal body weight.

The average age of women aged 40–59 was 52.3 years. The maximum age was 59 and the minimum was 40 years.

The body weight of women was, on average, slightly elevated, amounting to 82.2 kg. The height of the women was within average statistical limits. The maximum values of body weight and height for women were 120 kg and 179 cm, while the minimum values were 62 kg and 154 cm.

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Table 1. Indicators of Physical development of Women (M±m)

Indicator	18–29 years (n=17)	30–39 years (n=16)	40–59 years (n=20)	60 and older (n=16)
Body weight, kg	70.2±2.0	71.2±3.9	82.2±3.4	84.9±4.1
Body length, cm	167.4±1.3	165.6±1.3	165.5±1.2	166.4±1.7
BMI, kg/m^2	25.1±0.8	25.9±1.2	29.9±1.2	30.5±1.2

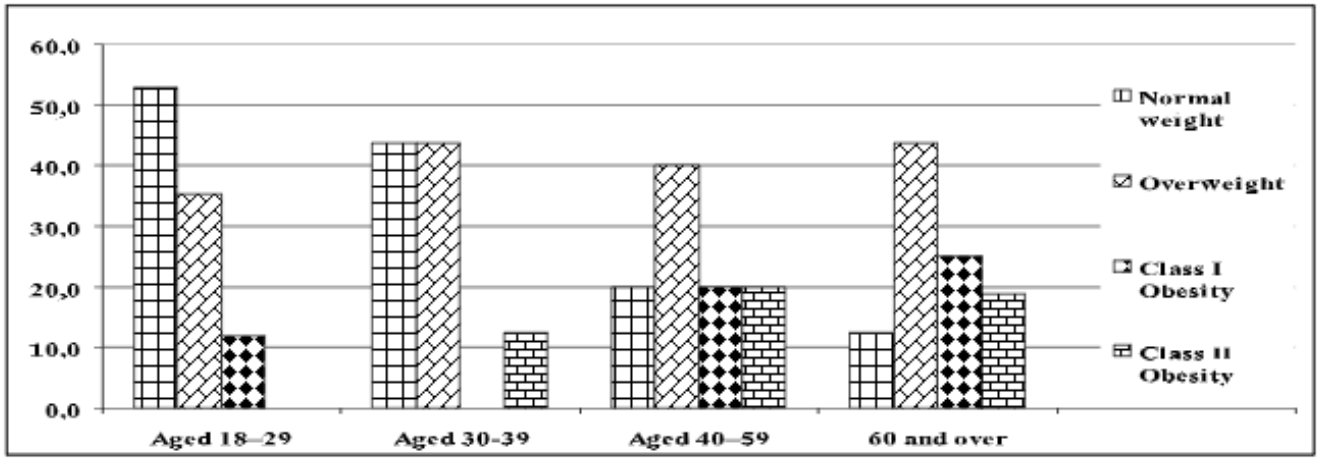


Figure 1. Body Mass Index of Women

BMI values averaged in the overweight range (Fig. 1). Among these women (20 individuals), 20.0% (4 individuals) had a normal body weight, 40.0% (8 individuals) had an increased body weight, and 40.0% (8 individuals) had class I and class II obesity. The maximum BMI value reached 39.9 kg/m^2, corresponding to class II obesity, and the minimum value was 23.0 kg/m^2, equivalent to a normal body weight.

The average age of women aged 60 and older was 64.9 years. The maximum age was 72 and the minimum was 60 years.

The height of women aged 60 and older was within average statistical limits. However, women in this age group had an increased body weight, averaging 84.9 kg. The maximum values of body weight and height were 120 kg and 176 cm, while the minimum values were 65 kg and 160 cm.

BMI values averaged in the class I obesity range (Fig. 1). Among these women (16 individuals), 12.5% (2 individuals) had a normal body weight, 43.8% (7 individuals) had an increased body weight, 25.0% (4 individuals) had class I obesity, and 18.8% (3 individuals) had class II obesity. The maximum BMI value was 39.2 kg/m^2, corresponding to class II obesity, and the minimum value was 23.0 kg/m^2, corresponding to a normal body weight.

Thus, a tendency toward increased body weight is observed among women after 30 years of age. Specifically, an increased body weight was observed in 43.8% of women aged 30–39 and those aged 60 and older. Among women aged 40–59, increased body weight reached 40.0%, and obesity of varying degrees was observed in an average of 40.0% of women aged 40–59 and 22.0% of those aged 60 and older. Over time, this may lead to an increase in alimentary-associated diseases, in which excess body weight plays a leading role.

1.4. Hygienic assessment of the Actual Dietary Intake of Women

Balanced, rational, and nutritionally adequate diets in both qualitative and quantitative terms are among the most critical factors influencing normal development, active labor productivity, and human longevity.

The issue of proper nutrition acquires special significance when people reside in territories de-occupied as a result of Russian aggression. In such cases, nutrition must be aimed at increasing the body's stability and resistance to the effects of physical, chemical, and biological factors.

One of the most important socio-economic factors influencing the morbidity rate of the population is the per capita consumption of food products. Therefore, studying the dynamics of changes in per capita consumption of basic food products over time and establishing the causes underlying them is relevant to modern medicine.

The actual dietary intake of women was studied using a questionnaire-survey method. The obtained data were compared with the recommended food intake values for demographic population groups [29].

Table 2 presents data on the average daily food consumption by women living in the de-occupied territories of the Bucha district, Kyiv region.

Bread and bread products [30]. Bread is one of the few products consumed daily. Bread is the only food eaten worldwide and valued across all religious denominations. Bread is a source of B-complex vitamins, predominantly B_1, B_2, PP, vitamin E (2–3 mg per 100 g), phospholipids (0.2–0.3 g per 100 g), and minerals including potassium, chlorine, phosphorus, iron, copper, and manganese. Most nutrients in bread are easily digested by the human body: proteins by 75–92%, and carbohydrates by 93–98%.

As seen from the data in Table 2 regarding the consumption of bread and bread products by women aged 18–29, intake averaged (224.1±9.2) g/day, or 80.0% of the recommended values. Women aged 30–39 consumed (188.3±13.7) g/day (67.3%); those aged 40–59 consumed (216.3±15.1) g/day (77.3%); and those aged 60 and older consumed (208.2±10.4) g/day (74.4%) of the recommended values, respectively.

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Table 2. Average Daily Food Consumption by Women (M±m), in Grams

Food Product Name	Recommended Values	18–29 years (n=17)	30–39 years (n=16)	40–59 years (n=20)	60 and older (n=16)
Bread and bread products	280	224.1±9.2*	188.3±13.7*	216.3±15.1*	208.2±10.4*
Groats (Cereals)	20	32.0±2.8*	39.4±2.2*	28.0±2.7*	34.8±2.6*
Meat and meat products	140	105.2±8.5*	76.0±6.4*	102.5±11.7*	98.4±7.3*
Fish and fish products	36	25.0±6.8*	25.7±7.6	21.7±6.9*	32.1±5.3
Pork fat (Salo)	6	2.5±0.9*	2.4±0.9*	1.8±0.9*	7.6±0.9
Vegetable oil	20	13.4±0.6*	24.1±1.8	16.1±1.7	22.9±0.4
Eggs	30	35.0±5.2	39.3±7.6	40.7±7.4	34.5±5.2
Milk and dairy products	345	239.3±19.6*	237.4±15.9*	210.2±17.2*	255.5±10.4*
Butter	14	14.8±1.2	12.1±1.3	12.3±1.1	14.5±1.2
Sour cream	14	9.5±1.9*	11.7±2.4	9.3±2.3*	8.0±1.7*
Cottage cheese (Tvorog)	27	35.0±9.4	23.1±11.9	38.2±11.3	39.3±9.2
Hard cheese	10	12.0±1.4	7.1±2.0	6.3±2.1*	13.2±1.4*
Potatoes	260	283.4±13.2	299.8±12.7	280.2±17.9	287.5±10.6
Vegetables	250	162.5±9.7*	195.5±9.8*	186.3±12.1*	162.9±9.1*
Legumes	5	2.0±0.7*	4.5±1.3	3.6±1.3	7.6±0.7*
Fruits	175	159.3±18.5	154.0±10.8	181.8±10.7	142.5±19.6
Sugar	65	37.3±2.6*	58.8±3.5	54.6±3.6	44.5±2.0*
Confectionery products	36	46.0±3.4*	40.3±7.7	45.1±7.6	53.6±3.4*

** The discrepancy between the recommended values is statistically significant, $p \leq 0.05$.*

In terms of the carbohydrate component, this accounted for 896.4 kcal (3750 kJ); 753.2 kcal (3150 kJ); 865.3 kcal (3620 kJ); and 832.8 kcal (3484 kJ) across the respective age groups.

Thus, women of all age groups consumed bread and bread products below the recommended levels, by an average of 25.2%.

It should be noted that in the 1990s, the consumption of bread and bread products by women exceeded recommended values by almost twofold [31].

According to recommended norms, the consumption quantity of groats is 20 g/day.

Our research established that the consumption of various types of groats by women according to age was (32.0±2.8); (39.4±2.2); (28.0±2.7); and (34.8±2.6) g/day, averaging 33.6 g/day, which provides 134.2 kcal (561 kJ) per day in carbohydrates.

Thus, women of all age groups consumed groats above the recommended values: by an average of 60.0% (18–29 years); 97% (30–39 years); 40.0% (40–59 years); and 74.0% (60 and older), averaging 67.7% overall.

Meat and meat products. Meat and meat products are a source of complete protein (18–22%), fats (10–33%), mineral and extractive substances, and vitamins. Muscle proteins hold the highest value (myosin and myogen – 50%, actin – 12–15%, globulin X – about 20%). Meat proteins contain all essential amino acids required by humans.

Meat has a high nutritional value. Completely excluding it from the diet, as vegans and vegetarians do, is unjustified for adults and absolutely unacceptable regarding children. A deficient intake of meat delays growth and development. However, an excess of animal-derived proteins (meat) exceeding 12% of caloric intake is also undesirable, as it may disrupt mineral metabolism (meat contains high amounts of phosphorus but little calcium), disturbing the phosphorus-calcium ratio and hindering calcium absorption.

Our research established that the consumption of meat and meat products by women aged 18–29; 30–39; 40–59; and 60 and older was (105.2±8.5); 70.3% of the recommended daily requirement.

Thus, it was found that all surveyed women, regardless of age, consumed insufficient amounts of meat and meat products, by an average of 31.8%.

Salo (pork fat). Salo contains 20% less saturated fatty acids and 40% less stearic acid than beef and mutton fat, ensuring better bodily absorption. Pork fat contains three times more polyunsaturated fatty acids (PUFAs) than beef fat and 2.5 times more than mutton fat. Pork fat is particularly rich in biologically highly active arachidonic acid, which participates in cholesterol metabolism, containing 5 times more than beef or mutton fat. The caloric content of salo is 897–841 kcal (3753–3519 kJ) per 100 grams and contains no carbohydrates.

Our research established that salo consumption did not correspond to recommended values. Specifically, women aged 18–29 consumed (2.5±0.9) g/day (41.7%); those aged 30–39 consumed (2.4±0.9) g/day (40.0%); and those aged 40–59 consumed (1.8±0.9) g/day (30%) of the recommended values. Meanwhile, women aged 60 and older consumed (7.6±0.9) g/day of salo, which exceeded recommended values by 26.7%.

The presented data indicate that against the recommended 6 g/day, all surveyed women consumed insufficient amounts of salo regardless of age, with the exception of women aged 60 and older.

Fish and fish products. Fish, like meat and poultry, is an essential protein food. Depending on the species, fish contains 10 to 23% protein. The amino acid profile of various fish species contains all essential amino acids.

Fish and fish products play a significant role in human nutrition. Fish fats are characterized by high biological properties. They contain numerous PUFAs and fat-soluble vitamins A and D. Fish meat also contains minerals such as potassium, phosphorus, iron, and zinc, while marine fish meat contains iodine. Therefore, adequate consumption of such products is crucial.

The consumption of fish and fish products by women aged 18–29 was (25.0±6.8) g/day; aged 30–39, (25.7±7.6) g/day; aged 40–59, (21.7±6.9) g/day; and aged 60 and older, (32.1±5.3) g/day, falling short of requirements by 30.6, 28.6, 39.7, and 10.8%, respectively.

Thus, it was established that all surveyed women, regardless of age, consumed fish and fish products below the recommended levels.

Vegetable oil. The raw materials for obtaining vegetable oils are oilseed seeds. The primary biological value of oils lies in their high PUFA content (sunflower, corn, soybean – 40–50%; olive, with a predominance of oleic acid – over 80%; mustard and rapeseed,

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with a predominance of erucic acid – over 50%), vitamin E, and certain other biologically active substances such as beta-sitosterol, which exhibits pronounced lipotropic properties and plays an important role in normalizing fat and cholesterol metabolism. The beta-sitosterol content in most oils ranges from 200 to 300 mg per 100 g of product. Various types of oils are represented on the Ukrainian market: flaxseed, hempseed, sunflower, corn, olive, etc. However, Ukrainians traditionally use sunflower and corn oils in their diet.

Research established that the consumption of vegetable fats by women aged 18–29 was (13.4±0.6) g/day, or 67.0% of recommended values; by those aged 30–39, (24.1±1.8) g/day, or 20.5% above recommended values; by those aged 40–59, (16.1±1.7) g/day, or 80.5% of recommended values; and by those aged 60 and older, (22.9±0.4) g/day, or 14.5% above recommended values.

These data indicate that all surveyed women aged 18–29 consumed insufficient amounts of vegetable fats (33.0% below recommended values), whereas women aged 30–39 and over 60 consumed vegetable fats 20.5% and 14.5% above recommended values, respectively.

Eggs. From ancient times to the present day, populations worldwide have used various types of eggs in their diet. However, chicken eggs have achieved the widest prevalence. Due to their nutritional and biological value, dietitians consider them the most perfect natural food product [32].

Research established that women aged 18–29 consumed eggs in amounts of (35.0±5.2) g/day, which corresponded to recommended values, while those aged 30–39 consumed (39.3±7.6) g/day and those aged 40–59 consumed (40.7±7.4) g/day, exceeding recommended values by 31.0% and 35.7%, respectively.

Thus, women aged 30 to 59 consumed excessive amounts of eggs relative to recommended values.

Milk and dairy products. In terms of nutritional and biological value, milk and milk-based products are extremely important for various segments of the population. Nutrients in these products are in an optimal, balanced ratio and are easily digested by the body [33].

The consumption of milk, including fermented milk products such as kefir, ryazhenka, yogurt, etc., was significantly lower than recommended values. Specifically, the consumption of milk and fermented milk products by women aged 18–29 was (239.3±19.6) ml/day; aged 30–39, (237.4±15.9) ml/day; aged 40–59, (210.2±17.2) ml/day; and aged 60 and older, (255.5±10.4) ml/day.

Thus, the consumption of such essential products as milk and fermented milk products by women of all age categories, regardless of age, was insufficient: by an average of 30.6% (women 18–29 years); 31.2% (women 30–39 years); 39.7% (women 40–59 years); and 25.9% (women 60 and older).

The consumption of butter by women aged 18–29 was (14.8±1.2) g/day; aged 30–39, (12.1±1.3) g/day; aged 40–59, (12.3±1.1) g/day; and aged 60 and older, (14.5±1.2) g/day, which corresponded to recommended values.

The consumption of sour cream by women aged 18–29 was (9.5±1.9) g/day; aged 30–39, (11.7±2.4) g/day; aged 40–59, (9.3±2.3) g/day; and aged 60 and older, (8.0±1.7) g/day.

Thus, sour cream consumption by women across all age categories and labor intensity groups did not correspond to recommended values. The deficit of this product averaged 32.2% (18–29 years); 16.5% (30–39 years); 33.6% (40–59 years); and 42.9% (60 and older).

The consumption of cottage cheese (tvorog) by women aged 18–29 was (35.0±9.4) g/day; aged 30–39, (23.1±11.9) g/day; aged 40–59, (38.2±11.3) g/day; and aged 60 and older, (39.3±9.2) g/day.

Thus, the diets of women aged 18–29, 30–39, and 60 and older exceeded recommended values for cottage cheese by an average of 29.6, 41.4, and 45.5%, respectively.

The consumption of hard cheese by women aged 18–29 was (12.0±1.4) g/day; aged 30–39, (7.1±2.0) g/day; aged 40–59, (6.3±2.1) g/day; and aged 60 and older, (13.2±1.4) g/day.

The above indicates that women aged 30 to 59 consumed insufficient amounts of hard cheese, with the deficit averaging 33.0%.

Potatoes. Potatoes, alongside bread, are the most consumed food product by the population of Ukraine. Potatoes serve as a primary source of vitamin C and B-complex vitamins. About 40% of the requirement for vitamin C is met through potatoes. In terms of caloric content, potatoes surpass other vegetables by 3 to 5 times. On average, potatoes contain (as a percentage): water – 64–75; starch – 12–24; sugars – 0.5–1.5; fiber – 1; fats – 0.1; pectin substances – 0.6; mineral salts – about 1.

Potato consumption by women aged 18–29 was (283.4±13.2) g/day; aged 30–39, (299.8±12.7) g/day; aged 40–59, (280.2±17.9) g/day; and aged 60 and older, (287.5±10.6) g/day.

An analysis of the obtained data indicates that women in all age groups consumed potatoes within recommended limits, except for the diets of women aged 30–39, who consumed an average of 15.3% more potatoes than recommended values.

Vegetables. Vegetables occupy a significant portion of human nutrition. Most vegetables have a low energy value (averaging up to 20 kcal (84 kJ) per 100 g). With a higher sugar content (carrots, beets), vegetables possess a higher energy value (up to 25–40 kcal (105–167 kJ) per 100 g).

In Ukraine, vegetables traditionally cultivated include various types of cabbage, carrots, beets, tomatoes, cucumbers, onions, garlic, etc.

Vegetables form the basis of a rational human diet and are the most accessible source of vitamins and minerals. Due to their beneficial properties, they should be present in the daily diet of every person. The recommended daily vegetable consumption is 250 g/day [29].

Vegetable consumption by women aged 18–29 was (162.5±9.7) g/day; aged 30–39, (195.5±9.8) g/day; aged 40–59, (186.3±12.1) g/day; and aged 60 and older, (162.9±9.1) g/day.

Thus, the diets of women were deficient in vegetable content by 35.0% (18–29 years); 21.8% (30–39 years); 25.5% (40–59 years); and 34.8% (60 and older), averaging 29.3%.

Among legumes, the population of Ukraine most frequently consumes peas, beans, and lentils. These are valuable crops that have been used in nutrition since ancient times. They are rich in proteins (from 24 to 50%). The nutritional quality of proteins is determined primarily by three factors: essential amino acid content, digestibility, and the physiological needs of the body. Unlike most other plant proteins, legume proteins are rich in lysine in a form easily absorbed by the human body. Legumes also contain carbohydrates (glucose, fructose, sucrose, maltose, starch, fiber); organic acids (malic, citric); vitamins (C, B-complex, beta-carotene); and macro- and microelements (potassium, calcium, phosphorus, copper, zinc, iron, etc.). Furthermore, legumes contain an insulin-like substance that lowers blood sugar levels in diabetes mellitus, as well as potassium, which is known to be an antagonist of cesium. The recommended daily consumption of legumes is 5 g/day [29].

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Legume consumption by women aged 18–29 was (2.0±0.7) g/day; aged 30–39, (4.5±1.3) g/day; aged 40–59, (3.6±1.3) g/day; and aged 60 and older, (7.6±0.7) g/day.

Thus, the obtained data indicate that the diets of women aged 18–29 and 40–59 were deficient in legumes by an average of 60.0% and 28%, respectively, whereas the diets of women aged 60 and older showed a surplus in legume content by 52.0%.

Fruits and berries, like vegetables, are classified as important daily consumption foods. Fruits and berries are the primary source of vitamins and minerals for the human body. Almost all fruits contain from 5 to 15 mg of vitamin C, while citrus fruits (oranges, lemons, and grapefruit) contain from 40 to 60 mg of vitamin C.

Berries are a rich source of vitamins. For instance, raspberries and gooseberries, considered the poorest sources of vitamins, contain from 20 to 39 mg of vitamin C, while black currants and rose hips contain significantly higher concentrations.

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