

Rational nutrition as a factor of healthy lifestyle and prevention of chronic non-communicable diseases

Grygoriy P. Griban¹, Olha S. Zablotska², Olena O. Mitova³, Soslan G. Adyrkhaiev⁴, Ludmyla V. Adyrkhaieva⁴, Yuliia V. Paryshkura⁵, Alimia M. Osmanova⁴

¹ZHYTOMYR IVAN FRANKO STATE UNIVERSITY, ZHYTOMYR, UKRAINE

²ZHYTOMYR MEDICAL INSTITUTE OF ZHYTOMYR REGIONAL COUNCIL, ZHYTOMYR, UKRAINE

³PRYDNIPROVSK STATE ACADEMY OF PHYSICAL CULTURE AND SPORT, DNIPRO, UKRAINE

⁴VOLODYMYR DAHL EAST UKRAINIAN NATIONAL UNIVERSITY, KYIV, UKRAINE

⁵STATE UNIVERSITY OF TRADE AND ECONOMICS, KYIV, UKRAINE

ABSTRACT

Aim: The aim is to conduct medical and sociological research on public awareness of the impact of rational nutrition on promoting human health and preventing chronic non-communicable diseases.

Materials and Methods: The research was conducted in 2022-2024 and involved 214 respondents of different ages and genders who were patients of outpatient clinics in Zhytomyr (Ukraine). Research methods included theoretical analysis of literary sources, medical and sociological (questionnaire), mathematical and statistical, system analysis, and logical generalization.

Results: It has been found that less than a third of the surveyed population (31.0 %) is in good health; 26.0 % report chronic diseases of the cardiovascular, excretory, hepatobiliary, and endocrine systems; 12.1 % of the respondents each suffer from diabetes and obesity. Despite this, only 18.0 % of the respondents adhere to healthy eating habits, and more than half abuse junk food and violate their diet. It has also been found that 79.0 % of the respondents do not have sufficient information about healthy eating; 93.0 % expressed a desire to improve their knowledge of the basics of healthy eating.

Conclusions: It has been found that rational nutrition is the most important factor in the body's vital activity, which ensures human health and working capacity, the ability to withstand adverse environmental influences, and determines the quality and duration of life. The article substantiates a set of measures for organizing public health professionals' outreach and awareness-raising activities to promote public health and prevent chronic non-communicable diseases through dietary nutrition.

KEY WORDS: rational nutrition, nutrition quality, health, healthy lifestyle, prevention of chronic non-communicable diseases

Pol Merkur Lek, 2025; 53(4): 502-508 doi: 10.36740/Merkur202504110

INTRODUCTION

Maintaining public health is one of the most important tasks of society. The health phenomenon is influenced by socio-economic, socio-biological, environmental, natural and climatic, and organizational and medical factors. The state of health mainly (by 50-60 %) depends on a person's lifestyle, including their diet [1]. Healthy, i.e., balanced nutrition, improves human health, increases working capacity, and extends life expectancy. An imbalance in the chemical composition of the diet triggers the mechanisms of developing non-communicable diseases. Dietary nutrition is used to prevent chronic non-communicable disease exacerbation. Correction of food components in the diet positively affects the condition of individual organs, their systems, and human health in general [2].

The problem of nutrition and its impact on public health remains one of the priorities in forming and implementing international projects of the World Health Organization (WHO). Studies [3] show a deterioration in the quality of

nutrition of the Ukrainian population, manifested in a decrease in the consumption of valuable food products such as meat, milk, and vegetable fats. Such an imbalance in the intake of nutrients weakens the human body, causing the corresponding diseases associated with impaired metabolism of proteins, lipids, and carbohydrates.

According to scientists [4], the issues of "nutrition and health" and "nutrition and disease" are closely related. An unhealthy diet is the main cause of overweight, hypertension, and other diseases. At the same time, food consumption is a necessity and one of the greatest pleasures for most people. People eat food not only to satisfy hunger but also to enjoy it. At the same time, food is a carrier and source of many pharmacologically and biologically active substances with a significant therapeutic and health-promoting effect [5]. Therefore, studying the awareness of the population of Ukraine about the impact of rational nutrition on improving human health, as well as the prevention of chronic non-communicable diseases, is relevant and timely.

AIM

The aim is to conduct medical and sociological research on public awareness of the impact of rational nutrition on promoting human health and preventing chronic non-communicable diseases.

MATERIALS AND METHODS

The research was conducted in 2022-2024 at Zhytomyr Medical Institute of Zhytomyr Regional Council and Zhytomyr Ivan Franko State University. The research involved 214 respondents of different ages and genders. All respondents were patients of outpatient clinics in Zhytomyr (Ukraine).

Research methods: theoretical analysis of literature sources on the topic of the research (16 literature sources from various world scientometric databases were processed); medical and sociological (questionnaire) – to determine the population's adherence to the principles of healthy eating, as well as to understand its importance for the prevention of chronic non-communicable diseases; mathematical and statistical – to process and analyze the results of the research; system analysis and logical generalization – to substantiate the content of outreach and awareness-raising activities of public health professionals on the prevention of chronic non-communicable diseases among the population through rational nutrition.

The survey was conducted using the author's questionnaire, which contains 20 questions and consists of three sections: socio-demographic information, respondent's consent to participate in the research, and the section with targeted questions. The questionnaire was anonymous without any references to the authors of the article in the answers. The results were used for scientific purposes only. Questionnaire was assessed by the experts in this field (3 professors and 3 associate professors) and was approved by the Academic Council of Zhytomyr Ivan Franko State University (Protocol No. 2 dated 12.09.2022).

Data collection, processing, and analysis of the research results were performed on a personal computer using MS Excel, a software package that allows the use of statistical data processing methods. Consent to voluntary participation in the survey was obtained from all the respondents involved in the study. This research followed the regulations of the World Medical Association Declaration of Helsinki – ethical principles for medical research involving human subjects.

RESULTS

The analysis of socio-demographic characteristics of the respondents showed that 176 (82 %) women and 38 (18 %) men of the following age groups took part in the questionnaire survey: 18-29 years old – 17.0 %, 30-39 years old – 19.0 %, 40-49 years old – 28.0 %, 50-59 years old – 15.0 %, 60-69 years old – 18.0 %, over 70 years old – 3.0 %. The distribution of answers to the question "Do you follow a balanced and rational diet?" presented in Fig. 1 shows that only a small proportion of the respondents specifically follow nutrition rules and monitor their diet (18.2 %). The overwhelming majority of the respondents (59.8 %) stated that they do not follow the rules of healthy (rational) eating.

It was found that almost half (47.3 %) of the respondents assessed their health as "satisfactory," 31.0 % as "good," and 6.0 % as "very poor." This percentage may be because the survey was conducted in outpatient clinics, where patients usually seek medical care for existing illnesses. It was found that 56.0 % of the respondents drink alcohol several times a month, 18.0 % – several times a year, and 20.0 % – do not drink at all. It should be noted that according to research by scientists, repeated or frequent alcohol consumption leads to functional disorders, which in turn gradually turn into organic disorders. Serious illnesses such as gastritis, hepatitis, liver cirrhosis, pancreatitis, chronic lung disease, etc. develop.

The analysis of the question about the presence of chronic diseases showed that 26.0 % of the respondents indicated

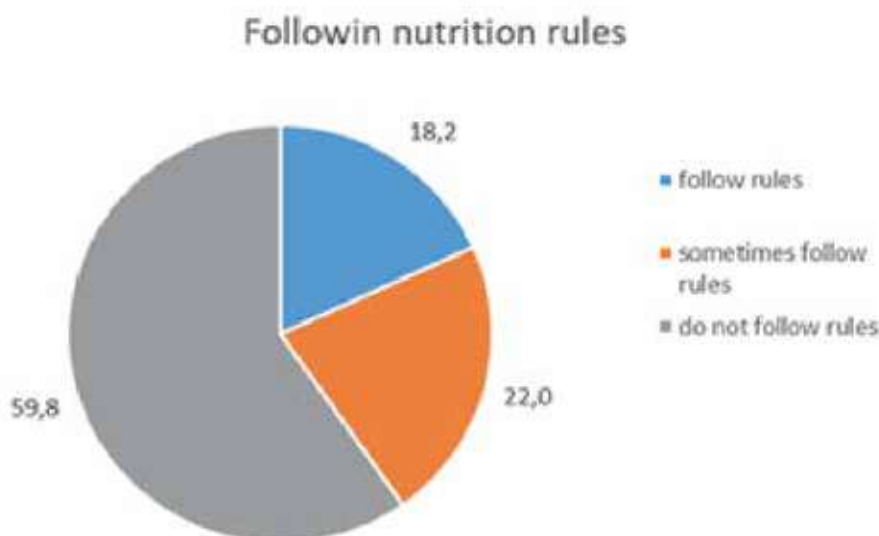


Fig. 1. Respondents' compliance with the rules of rational and balanced nutrition (n = 214, %)

that they had chronic diseases of various kinds. Among these respondents, only 80.0 % are under constant supervision of a family doctor or other specialist. When specifying chronic diseases, it was found that the majority of the respondents have cardiovascular diseases – 20.7 %, diabetes mellitus, and obesity – 12.1 % each, gallbladder and biliary tract diseases – 10.3 %, liver and kidney diseases – 8.6 % and 5.2 %, respectively, urolithiasis – 6.9 %, atherosclerosis, and gout – 5.2 %, and the smallest proportions were gastrointestinal diseases, tuberculosis and lactose deficiency – 3.4 % each.

At the same time, 78.0 % of the respondents consume excessive amounts of sour and pickled food and canned food; 71.5% eat sugar and sweets; 52.8 % eat fatty, smoked, and fried food; 45.3% eat bakery products, and 22.9% eat fast food. The proportion of responses about food abuse in the respondents' diets is presented in Table 1.

The questionnaire survey results also show that almost 100 % of the respondents have health complaints of various kinds. Thus, more than a third of the respondents (38.0 %) say they suffer from frequent headaches, 30.0 % say they are often tired, and 22.0 % have difficulty concentrating. The smallest number of the respondents (10.0 %) report periodic abdominal pain, and when specifying the causes of pain, they mention overeating, irregular eating, or eating out. Answering the question "Do you control your blood glucose level?" more than half (53.3 %) indicated that they "systematically" take blood tests to control their glucose level. More than a third of the respondents (36.0 %) said they check their glucose levels only when directed or recommended by their doctors. Only 20.0 % of the respondents have undergone lipid testing. Among the respondents who had undergone lipid testing, a quarter of them reported elevated blood cholesterol levels (26.0 %), which is the main reason for the risk of developing many cardiovascular diseases that can be life-threatening. Elevated levels of urea and creatinine are an indicator of protein metabolism disorders. The distribution of the respondents' answers to the question "Do you check your urea and creatinine levels?" shows that only 10.0 % of the respondents systematically perform such tests.

Lack of time, long hours at work or school, lack of sleep, excessive workload, financial means, etc., often make it impossible to prepare meals and have regular and balanced meals, which leads to snacks between meals, fast food consumption, or eating out. Our research shows that most of the respondents neglect the rules of eating, most of whom eat only twice a day. The analysis of the respondents' answers reveals that only half of the respondents have breakfast in the morning before going to work or school (53.0 %). Regarding the time of breakfast, the following distribution of answers was obtained. Thus, most respondents – 85.0 %) have breakfast from 6.00 to 9.00, i.e., immediately before going to work or school, and a sixth (14.0 %) have breakfast after 9.00. As a rule, it is a quick snack or breakfast in a public catering establishment. Younger respondents stated that they neglected breakfast due to lack of time and noted that they overwhelmingly preferred coffee or tea to a full meal. A significant number of the respondents reported frequent headaches and rapid fatigue from daily activities. Every person's body consumes a lot of energy that needs replenishment. Each meal should provide a certain amount of nutrients, vitamins, and minerals. Nutritionists believe 35–40 % of the daily diet should be spent on lunch. However, a fifth of the respondents (20.0 %) state that they do not eat lunch due to lack of time and heavy work or study loads. It was found that 41.0 % of the respondents eat food they take from home or prepare themselves for lunch; 26.0 % buy food in stores or at street stalls; 13.0 % have lunch in public catering establishments. Thus, a significant portion of the respondents neglect the rules of rational nutrition and the regularity of meals.

There are frequent discussions about the importance and usefulness of evening meals. Nutritionists have different opinions on this matter, but they unanimously say that the human body not only rests but also recovers at night. Human skin and muscles are restored, and hair and nails grow. Therefore, the main task of dinner is to replenish the human body with amino acids. When asked, "Do you usually eat dinner?" most respondents answered in the affirmative. The majority of the respondents eat dinner

Table 1. Proportion of responses about food abuse in the respondents' diet

Products	Yes		No	
	Number of responses	Proportion	Number of responses	Proportion
Salt	39	18.2%	175	81.8%
Hot sauces and spices	21	9.8%	193	90.2%
Sour foods, pickled foods, canned foods	167	78.0%	47	22.0%
Fatty, smoked, fried foods	113	52.8%	101	47.2%
Sugar and sweets	153	71.5%	61	28.5%
Dairy products	107	50.0%	107	50.0%
Bakery products	97	45.3%	117	54.7%
Fast food	49	22.9%	165	77.1%

from 18.00 to 21.00; 18.0 % do not eat dinner. Almost a tenth of the respondents state that they do not observe the time intervals for eating, and the dinner hours are often late – between 21.00 and 24.00. Most respondents say they usually eat dinner at home – 82.0 %; 11.0 % – dine in public catering establishments; 7.0 % – at work or school. To the question “What do you usually eat between main meals?” the distribution of answers was as follows: baked goods (buns, pies, cookies, muffins, cakes, pancakes) and sweets (candies, chocolate, chocolate bars, waffles) accounted for the largest share – 24.3 % and 17.1 % respectively; tea or coffee – 16.4 %, sandwiches with cheese or sausage – 16.4 %; seasonal fruits (apple, pear, strawberry, cherry, orange, banana) – 13.8 %; fruit juices or compote showed a small share – 5.9 %; potato chips, crackers, dry noodles – 3.3 %; energy drinks – 2.6 %; sweet carbonated drinks – 1.3 %. At the same time, 76.0 % of the respondents state that they have skipped meals due to lack of time. The results of the analysis of answers to the question “Please indicate how often you eat different foods” are presented in Table 2.

The analysis of the answers presented in Table 2 shows that the respondents’ diets are rather unbalanced. Thus, only a quarter of the respondents (26.6 %) eat fish and seafood 2-3 times a month; 43.5 % eat vegetables and fruits 2-3 times a week; 21.5 % eat sweets (candy, chocolate) daily; chips, snacks, and sweet carbonated drinks – 8.4 %.

To the question, “How often do you undergo preventive examinations?” 71.0 % of the respondents answered “I don’t,” indicating that doctor visits are chaotic. 18.0 % of the respondents had undergone preventive examinations at school. The smallest number of the respondents (11.0 %) undergo preventive examinations once a year.

The distribution of answers to the question “Please indicate if you have the following health problems?” is presented in Table 3

As can be seen from Table 3, the following health problems were reported by the respondents: “frequent headaches” – 88.3 %, “severe hair loss” – 83.2 %, “poor sleeping” – 79.9 %, “brittle nails and hair” – 71.0 %, “joint pain” – 69.6 %, “heart pain” – 53.3 %, “tachycardia” – 54.7 %. The survey also showed

that the respondents have insufficient knowledge and information about the impact of nutrition on improving people’s health. One-third of the respondents (32.0 %) mistakenly believe that diets harm health rather than improve it. At the same time, 93.0 % of the respondents would like to receive information about rational nutrition.

DISCUSSION

Preserving and promoting public health has always been one of the most important issues in society [6]. In modern Ukraine, there is a steady deterioration in the population’s health, which has generally reached the threat level. This situation is due to a decline in the population’s quality of life in general and unhealthy eating behavior in particular. Therefore, the issue of preserving public health has recently become a priority area of research in the public health system.

According to WHO experts [7], the importance of lifestyle as a factor in promoting health is up to 60 %, followed by genetic predisposition (up to 20 %), ecology (up to 20 %), and the effectiveness of the health care system in the country (up to 10 %). Among a person’s lifestyle components, nutrition is perhaps the most important. Physiologists argue that nutrition replenishes the human body with nutrients and energy, which enables it to function normally and maintain a sufficient level of health [8]. According to scientists [9], a healthy diet should meet the body’s needs for nutrients and energy and prevent various non-communicable diseases.

A balanced diet is a way of eating that contains an optimal ratio of food quantity and quality and biologically active compounds. Particular importance is attached to the balance of essential substances that cannot be synthesized in the body on their own and/or are synthesized in minimal amounts, not fast enough. The main crucial components of food include vitamins, unsaturated fatty acids, and micro- and macro-elements [10].

The analysis of nutritional adequacy is characterized by the ratio of the amount of food substances absorbed by the body to their total amount. The adequacy of nutrition depends on the quality of the food and the state of human health necessary for food absorption. Animal products are

Table 2. Proportion of answers about the frequency of consumption of different products

Products	Every day		Once a week		2-3 times a week		2-3 times a month		Once a month		Other	
Vegetables and fruits	53	24.8%	32	15.0%	93	43.5%	29	13.6%	7	3.3%	-	-
Sea fish and seafood	12	5.6%	39	18.2%	24	11.2%	57	26.6%	79	36.9%	3	1.4%
Meat and meat products	74	34.6%	32	15.0%	28	13.1%	19	8.9%	47	22.0%	14	6.5%
Dairy products	36	16.8%	32	15.0%	56	26.2%	19	8.9%	53	24.8%	18	8.4%
Ketchup, sauces	31	14.5%	32	15.0%	72	33.6%	42	19.6%	37	17.3%	-	-
Sweets	46	21.5%	32	15.0%	88	41.1%	19	8.9%	29	13.6%	-	-
Chips, snacks, sweet drinks	18	8.4%	32	15.0%	42	19.6%	51	23.8%	50	23.4%	21	9.8%

Table 3. The ratio of respondents' answers regarding the presence or absence of health problems

Health problems	Yes		No	
Quick tiredness from physical activity	78	36.4%	136	63.6%
Shortness of breath	34	15.9%	180	84.1%
Brittle nails and hair	152	71.0%	62	29.0%
Severe hair loss	178	83.2%	36	16.8%
Lips often crack	98	45.8%	116	54.2%
Poor sleeping	171	79.9%	43	20.1%
Frequent headaches	189	88.3%	25	11.7%
Bruises often appear, and wounds take a long time to heal	23	10.7%	191	89.3%
Constant stomach pain	29	13.6%	185	86.4%
Constant pain in the right side under the rib	42	19.6%	172	80.4%
Frequent nighttime toileting	36	16.8%	178	83.2%
Joint pain	149	69.6%	65	30.4%
Heart pain	114	53.3%	100	46.7%
Tachycardia	117	54.7%	97	45.3%
Dry mouth	52	24.3%	162	75.7%
Persistent coughing	41	19.2%	173	80.8%
Bloating after eating dairy foods	62	29.0%	152	71.0%

best absorbed (95 %), while vegetable products are absorbed worse (80 %). Mixed food is absorbed by 82-90 % [11]. Various factors, such as proper cooking and temperature, influence the digestibility of food. The optimal temperature for food digestibility is 50°C for the first and second courses.

Another essential factor in digestibility is the culture of food consumption. When eating, you should not do other things; eat food on the go and chew it well. Creating a pleasant atmosphere in eating places and eating habits are also important factors. It is recommended that meals be taken simultaneously, which contributes to the systemic functioning of the digestive glands and, as a result, better absorption of food. Correct observance of the quantity and quality of food consumed prevents overloading of the digestive system and contributes to overall health [12]. An eating regimen is the consumption of food at a set time and the optimal distribution of meals throughout the day. It depends on the nature of work, production and living conditions, individual habits, age, local traditions, etc. The most traditional and widespread diet is the one that divides the daily ration into three meals according to the energy value of the food. Breakfast accounts for 30 % of energy expenditure, lunch 45 %, and dinner 25 % [13]. Recently, nutritionists have been advising to eat four meals a day. With four meals a day, the daytime area is redistributed as follows: the first breakfast accounts for 15 % of the daily energy intake, the second breakfast – 25 %, lunch accounts for 35 %, and dinner accounts for 25 %. For rational and balanced nutrition, the time intervals between meals should not exceed 6 hours.

According to experts [14], the basic principles of a healthy diet include daily consumption of a variety of vegetables and fruits; consumption of whole grain products; reduced consumption of red meat; increased consumption of lean proteins of plant origin, as well as fish and poultry; limited consumption of sweetened beverages and foods with added sugar. These nutritional models contain general recommendations that can improve health. Still, each person's choice of a specific model should be individual, considering age, working conditions, climatic and geographical features, traditions, etc. [15].

As doctors and nutritionists explain, healthy eating is based on three basic principles: variety, balance, and moderation. These principles should be followed in your diet at all times. The principle of variety – the food we eat should be varied. Consuming the same food leads to addiction, and food begins to seem tasteless. This limits the body's ability to receive the full range of nutrients and vitamins from eating various foods. Addiction leads to the fact that the body is not fully satiated, and therefore, food consumption increases, causing weight gain. That's why you should combine different foods in your diet. The principle of balance – at each main meal, the body should receive a rational proportion of proteins, fats, carbohydrates, water, fiber, vitamins, and minerals. The principle of moderation is that the amount of food we consume should fully cover our energy expenditure but not exceed it [16].

Summarizing the results of the research on the essence of rational nutrition and its impact on public health promotion, we propose the following areas of outreach and awareness-raising activities for public health professionals:

1. To use the Internet platform of the Public Health Center of Ukraine and regional centers for disease control and prevention of the Ministry of Health of the country to post educational materials on dietary nutrition for different groups by age, existing diseases, degree of energy expenditure, children and pregnant women.
2. To conduct outreach activities of specialists of the regional Centers for Disease Control and Prevention of the Ministry of Health of Ukraine in territorial communities (educational institutions, enterprises, etc.) to promote healthy eating, including dietary nutrition, to prevent chronic non-communicable diseases.
3. To disseminate and systematically update information about dietary menus to prevent and treat various diseases in popular social networks (YouTube, WhatsApp, Facebook, TikTok, etc.).
4. To create and distribute short videos about healthy eating in the media aimed at children and youth, using animation, modern music, etc., promoting various foods, daily consumption of vegetables, fruits, and dairy products, and limiting fat, salt, and sugar.

Thus, proper nutrition is a simple and sure way to stay healthy. One of the causes of many diseases is the consumption of unhealthy food and an improper drinking regimen. A balanced diet is an essential component of a healthy life. It helps maintain normal health, control weight, and reduce the risk of developing various pathologies. Unhealthy diets can lead to chronic diseases that can have serious consequences.

CONCLUSIONS

It has been found that healthy nutrition is the most important factor in the body's vital activity, which ensures human health and working capacity, the ability to withstand adverse environmental influences, and determines the quality and

duration of life. It has been established that today, there is no single model of nutrition and no strict, legally enshrined rules for preparing a food ration. The basic principles of healthy eating are variety, balance, and moderation.

The survey found that less than a third of the population (31.0 %) is in good health; 26.0 % report chronic diseases of the cardiovascular, excretory, hepatobiliary, and endocrine systems; 12.1 % of the respondents each have diabetes and obesity. Despite this, only 18.0 % of the respondents adhere to healthy eating habits; more than half of them abuse "junk" food (smoked, fried, pickled, salty, sweet, etc.), violate dietary regimens, eat excessive amounts of food, and eat for the night.

Only 11.0 % of the respondents regularly monitor their health during systematic preventive examinations; 37.0 % limit their food intake to reduce body weight; and 53.3 % constantly monitor their blood glucose levels. It has also been found that 79.0 % of the respondents do not have sufficient information about healthy eating and identify it with weight loss diets; 32.0 % of the respondents believe that diets are harmful to health; only 3.0 % of the respondents know about the essence of diets and their purpose; 93.0 % of the respondents expressed a desire to improve their knowledge of the basics of healthy eating. Given the low public awareness of dietary nutrition as a factor in promoting health and preventing chronic non-communicable diseases, a set of preventive measures to promote public health and organize outreach and awareness-raising activities of public health professionals in this area has been justified.

PROSPECTS FOR FURTHER RESEARCH

A study of the impact of dietary nutrition on the dynamics of somatic health indicators in patients with various diseases is planned.

REFERENCES

1. Agrawal P, Kaur J, Singh J et al. Genetics, Nutrition, and Health: A New Frontier in Disease Prevention. *J Am Nutr Assoc.* 2024;43(4):326-338. doi:10.1080/27697061.2023.2284997.
2. Owen L, Corfe B. The role of diet and nutrition on mental health and wellbeing. *Proc Nutr Soc.* 2017;76(4):425-426. doi:10.1017/S0029665117001057.
3. Griban G, Smiiianov V, Lyakhova N et al. The impact of nutritional quality on the students' health. *Acta Balneol.* 2021;1(163):43-54. doi: 10.36740/ABAL202101107.
4. de Ridder D, Kroese F, Evers C et al. Healthy diet: Health impact, prevalence, correlates, and interventions. *Psychol Health.* 2017;32(8):907-941. doi:10.1080/08870446.2017.1316849.
5. Sinclair JR. Importance of a One Health approach in advancing global health security and the Sustainable Development Goals. *Rev Sci Tech.* 2019;38(1):145-154. doi:10.20506/rst.38.1.2949.
6. Zhang K, Ma Y, Luo Y et al. Metabolic diseases and healthy aging: identifying environmental and behavioral risk factors and promoting public health. *Front Public Health.* 2023;11:1253506. doi:10.3389/fpubh.2023.1253506.
7. Rudnicka E, Napierała P, Podfigurna A et al. The World Health Organization (WHO) approach to healthy ageing. *Maturitas.* 2020;139:6-11. doi:10.1016/j.maturitas.2020.05.018.
8. Alt KW, Al-Ahmad A, Woelber JP. Nutrition and Health in Human Evolution-Past to Present. *Nutrients.* 2022;14(17):3594. doi:10.3390/nu14173594.
9. Yeung SSY, Kwan M, Woo J. Healthy Diet for Healthy Aging. *Nutrients.* 2021;13(12):4310. doi:10.3390/nu13124310.
10. Van Dyke N, Murphy M, Drinkwater EJ. „We know what we should be eating, but we don't always do that.” How and why people eat the way they do: a qualitative study with rural australians. *BMC Public Health.* 2024;24(1):1240. doi:10.1186/s12889-024-18432-x.

11. Cena H, Calder PC. Defining a Healthy Diet: Evidence for The Role of Contemporary Dietary Patterns in Health and Disease. *Nutrients*. 2020;12(2):334. doi:10.3390/nu12020334.
12. Lai JJ, Chang LC, Lee CK, Liao LL. Nutrition Literacy Mediates the Relationships between Multi-Level Factors and College Students' Healthy Eating Behavior: Evidence from a Cross-Sectional Study. *Nutrients*. 2021;13(10):3451. doi:10.3390/nu13103451.
13. Vanstone M, Giacomini M, Smith A et al. How diet modification challenges are magnified in vulnerable or marginalized people with diabetes and heart disease: a systematic review and qualitative meta-synthesis. *Ont Health Technol Assess Ser*. 2013;13(14):1-40.
14. Cicero AFG, Fogacci F, Borghi C. An Evolving Definition of a „Healthy Diet“. *Nutrients*. 2023;15(9):2212. doi:10.3390/nu15092212.
15. Koehler K, Drenowatz C. Integrated Role of Nutrition and Physical Activity for Lifelong Health. *Nutrients*. 2019;11(7):1437. doi:10.3390/nu11071437.
16. Gantenbein KV, Kanaka-Gantenbein C. Mediterranean Diet as an Antioxidant: The Impact on Metabolic Health and Overall Wellbeing. *Nutrients*. 2021;13(6):1951. doi:10.3390/nu13061951.

CONFLICT OF INTEREST

The Authors declare no conflict of interest

CORRESPONDING AUTHOR

Grygoriy P. Griban

Zhytomyr Ivan Franko State University
40 Velyka Berdychivska St., 10008 Zhytomyr, Ukraine
e-mail: gribang@ukr.net

ORCID AND CONTRIBUTIONSHIP

Grygoriy P. Griban: 0000-0002-9049-1485 **A**
Olha S. Zablotska: 0000-0002-0850-5754 **B**
Olena O. Mitova: 0009-0003-2306-5464 **D**
Soslan G. Adyrkhaiev: 0000-0001-7083-8499 **E**
Ludmyla V. Adyrkhaieva: 0000-0002-1102-170X **E**
Yuliia V. Paryshkura: 0000-0002-8777-1726 **D**
Alimia M. Osmanova: 0000-0002-7180-8176 **F**

A – Work concept and design, **B** – Data collection and analysis, **C** – Responsibility for statistical analysis, **D** – Writing the article, **E** – Critical review, **F** – Final approval of the article

RECEIVED: 16.09.2024

ACCEPTED: 18.03.2025

