SIGNIFICANCE OF THE EDUCATIONAL COMPONENT "SCIENCE OF NUTRITION" IN MEDICAL EDUCATION: A SURVEY OF KHARKIV NATIONAL MEDICAL UNIVERSITY STUDENTS

Zavgorodnii I.V., Litovchenko O.L., Merkulova T.V., Lysak M.S., Leshchyna I.V., Bilychenko N.P., Chekhovska I.M.

Kharkiv National Medical University, Kharkiv, Ukraine

https://doi.org/10.35339/ic.2025.12.4.zlm

ABSTRACT

Background. Non-communicable diseases account for over 90% of mortality in Ukraine, establishing preventive medicine as a strategic priority. Nutrition is one of the leading modifiable risk factors; however, nutrition-related training among healthcare professionals remains insufficient. Integrating nutritional topics into the medical curriculum is therefore strategically important for developing the professional competencies of future physicians.

Aim. To assess the awareness and attitudes of medical students toward the elective educational component "Nutritional Science" and to determine its significance for future professional practice.

Materials and Methods. A cross-sectional anonymous online survey was conducted among students of Kharkiv National Medical University who had completed the elective component "Nutritional Science" (n = 68), representing the specialties of Medicine, Pediatrics, Dentistry, and Therapy and Rehabilitation. Descriptive statistical analysis was performed using IBM SPSS Statistics v.26.0; results are presented as absolute frequencies (n) and percentages (%).

Research Ethics. The study complied with the World Medical Association Declaration of Helsinki (1964–2024), the Council of Europe Convention on Human Rights and Biomedicine, Good Clinical Practice (1996–2025), Good Laboratory Practice (1981–2002), and the Statute of the Ukrainian Association for Bioethics.

Results. Half of the respondents actively maintain a healthy lifestyle; 35.3% aspire to do so but cite limited knowledge or time. Personal interest in nutrition was the primary enrollment motivation (61.8%), while 32.4% sought to strengthen professional knowledge. Overall, 86.8% reported the course fully met their expectations. The most valued sections were "Nutritional Characteristics of Food Products," "Principles of Rational Nutrition," and "Nutritional Status Disorders and Their Correction". Most respondents (58.8%) consider the course essential for clinical practice, and 39.7% value it for forming a broader medical outlook. The strongest professional orientation was observed among Therapy and Rehabilitation students. A total of 69.1% expressed high willingness to recommend the course to peers.

Conclusions. The educational component "Nutritional Science" received high appraisal from Kharkiv National Medical University students, confirming its practical relevance. Further adaptation of the course to the specific requirements of individual medical specialties will support the preparation of physicians equipped to implement preventive strategies and apply nutritional knowledge in clinical practice.

Keywords: *public health, prevention, non-communicable diseases, healthy lifestyle.*

Introduction

Public health is a key factor in social stability, economic development and national security of the state. In the 21st century, NonCommunicable Diseases (NCDs) pose the greatest burden on healthcare systems, which account for more than 70.0% of deaths in the world. In Ukraine, this figure reaches 91.0%, which makes preventive strategies particularly relevant [1]. Leading WHO experts emphasize that up to 55.0% of human health is determined by lifestyle, with almost half of that attributable to nutrition. Imbalance in the modern diet, excessive consumption of processed foods, salt, sugar and saturated fats with a deficiency of fiber and micronutrients is directly associated with

Corresponding Author:
Litovchenko Olena L. – PhD, Docent, Associate Professor of the Department of Hygiene and Ecology, Kharkiv National Medical University, Ukraine.
✉ 4, Nauky ave., Kharkiv, 61022, Ukraine.
E-mail: latyshkaelena@gmail.com

the development of obesity, cardiovascular and metabolic disorders.

For Ukraine, which is experiencing complex demographic processes, each additional year of healthy life of citizens is of strategic importance. Treatment of chronic diseases requires significant financial resources, whereas investments in prevention and educational programs in nutrition are more effective and long-lasting [2]. In the face of information overload and the spread of unreliable advice, it is the medical professional who should serve as an authoritative source of knowledge and a guide to a healthy lifestyle. However, traditional medical education has long focused mainly on treatment, while the modern paradigm requires integrating preventive approaches.

The Science of Nutrition is an integral part of modern training of future doctors. It develops in students the ability not only to assess the nutritional status of patients, but also to provide personalized recommendations, to use diet therapy as a key element in the treatment and prevention of a wide range of diseases [3–6]. The insufficient level of training in this area creates gaps, that are often filled by pseudoscientific approaches and commercial interests. Therefore, integrating nutritional knowledge into medical education is a necessary condition for improving the efficiency of the healthcare system.

In view of the above, the current task is to study the attitude of medical students to the educational component Science of Nutrition, their motivation and readiness to use the knowledge gained in their future professional activities.

It is for this purpose that the staff of the Department of Hygiene and Ecology of Kharkiv National Medical University (KhNMU) conducted an anonymous survey among students who chose to master this elective component of the educational and professional program. The results of the study will allow improving the content and methodological approaches to teaching the Science of Nutrition and will contribute to the training of specialists capable of responding to modern challenges of public health.

The **aim** of the study was to assess the level of awareness and attitude of medical students towards the educational component "Science of Nutrition", as well as to determine its significance for the future professional activities of medical specialists.

Materials and Methods

The cross-sectional study was conducted as an anonymous questionnaire (survey) among KhNMU students who chose and completed the elective educational component "Science of Nutrition". The "Questionnaire to reveal the level of satisfaction of the students with the results of studying the elective educational component the Science of Nutrition in KhNMU" [7] was used to collect data. The questionnaire contained closed-ended questions, which allowed obtaining quantitative data on the demographic characteristics of respondents, their attitude to a healthy lifestyle, motivation for choosing the course, compliance of the educational component with expectations, assessment of the usefulness of the topics taught, the need for additional training and plans for using the acquired knowledge.

Statistical analysis was performed using IBM SPSS Statistics version 26.0 (IBM Corp., USA). Given the exploratory nature of the study, the relatively small sample size, and the descriptive design, only descriptive statistical methods were used. Categorical variables were summarized as absolute frequencies (n) and percentages (%). The results were presented in the form of frequency distribution tables and percentage ratios.

Research Ethics

The study was conducted in accordance with the basic provisions and ethical and moral-legal requirements of the Charter of the Ukrainian Association for Bioethics, the norms of Good Clinical Practice (1996–2025) and Good Laboratory Practice (1981–2002), the principles of World Medical Association Declaration of Helsinki (1964–2024) [8], as well as the Council of Europe Convention on Human Rights and Biomedicine (Oviedo Convention, 1997) [9]. The survey was conducted anonymously via the Google Forms online service. Data collection was carried out during the 2024/2025 academic year (spring semester). Before the survey, all participants were informed about the purpose of the study, the conditions of anonymity and the voluntary nature of participation. Providing answers was considered informed consent to participate.

Particular attention was paid to ensuring confidentiality and using the data obtained exclusively for scientific purposes. The study did not pose any risk to the physical or mental health, and all questions were formulated to avoid discriminatory or biased statements.

Results

The final analysis included responses from 68 respondents studying in various training areas within the health sector. The study involved students in the specialties "Therapy and Rehabilita-

tion" (first and second years), as well as "Medicine", "Pediatrics" and "Dentistry" (third year).

Among the respondents, females predominated – 73.5% of the total, while males accounted for 26.5%. By specialization, the group of students majoring in Therapy and Rehabilitation (TR) was the largest – 38 persons (55.9%), allowing us to consider their responses the most representative in this context. Other specialties were represented in smaller numbers: "Medicine" (M) – 15 persons (22.1%), "Dentistry" (D) – 10 persons (14.7%), and "Pediatrics" (P) – 5 persons (7.3%). Despite the relatively small number of representatives of some specialties, their answers were also included in the general analysis, as they reflect the value positions and specifics of professional training in the relevant areas.

First of all, the analysis of students' attitudes toward a Healthy LifeStyle (HLS) revealed a strong personal orientation toward this concept (*Table 1*). In general, 50.0% of respondents actively follow a healthy lifestyle, and 35.3% try but lack knowledge or time. It is noteworthy that no respondent expressed indifference to a healthy lifestyle.

The analysis of responses by specialty revealed differences in attitudes towards a healthy lifestyle. The highest level of personal involvement was demonstrated by the students majoring in Medicine and Dentistry. This trend may be associated with a clearer awareness of the significance of one's own example in patient interactions, as well as a desire for high professional efficiency. Among students majoring in Therapy and Rehabilitation, this indicator was 47.4%, demonstrating a general commitment to a healthy lifestyle, though with certain reservations. Particular attention was drawn to the responses of students of Pediatrics, where only a small proportion actively follow a healthy lifestyle, while the majority admit they strive for it but feel they lack knowledge or time. This situation points to potential gaps in practical training in healthy nutrition, physical activity, and chronic disease prevention – aspects that are critically important for future pediatricians who will be responsible for forming healthy habits in children from an early age.

The analysis of motivational factors for choosing the educational component "Science of Nutrition" among respondents showed that of personal interest in healthy nutrition and dietetics – was the most common factor, noted by 61.8% of respondents. The second most significant criterion was the desire to deepen knowledge for professional growth – this answer was chosen by 32.4% of respondents.

The distribution of answers by specialties revealed clear differences in motivational attitudes. The highest level of personal interest was demonstrated by students of Medicine and Dentistry – 80.0% and 70.0% of them, respectively, noted that they were guided by personal interests. This may indicate the formation of internal motivation to study the Science of Nutrition as a component of a healthy lifestyle and a holistic approach to future clinical practice. At the same time, among students of Therapy and Rehabilitation, the desire to expand knowledge for future professional activity prevailed (44.7%), which is a significantly higher figure than in similar groups: Medicine (13.3%) and Dentistry (10.0%). This trend may indicate the orientation of rehabilitation specialists towards the practical application of nutritional knowledge in professional activity, in particular in the field of functional recovery of patients. Future pediatricians also demonstrated a strong desire for profes-

Table 1. Attitudes of medical students towards a healthy lifestyle (% of responses)

Answer options	Total % of responses	Medicine	Pediatrics	Dentistry	Therapy and rehabilitation
I actively follow a healthy lifestyle	50.0	60.0	20.0	60.0	47.4
I try to maintain a healthy lifestyle, but I lack knowledge	35.3	20.0	60.0	40.0	36.8
I have problems with maintaining a healthy lifestyle	8.8	20.0	20.0	0.0	13.1
I don't care about a healthy lifestyle	0.0	0.0	0.0	0.0	0.0

sional enrichment in nutrition – 40.0% of them noted that they chose the course to improve their qualifications. This once again confirms the relevance of nutritional training for specialists who will work with children, given the key role of nutrition in shaping health from an early age.

The indicator of the compliance of the educational component with the expectations of the respondents is an important criterion for assessing its quality and content relevance. In total, 86.8% of respondents reported that the course fully met their expectations, another 13.2% reported partial compliance.

The highest level of satisfaction was found among students majoring in Medicine (93.3%) and Therapy and Rehabilitation (94.7%), which emphasizes the relevance of the topic of nutrition to these areas of training and indicates a positive perception of the structure, content and methodological approaches. Among students of Pediatrics, 80.0% assessed the course as fully meeting their expectations. This confirms the relevance of nutrition to the training of pediatricians.

In contrast, among respondents in the specialty "Dentistry", only 50% indicated that the course fully met their expectations, while the other half assessed it as only partially meeting their expectations. This distribution may indicate a need for more specialized content that highlights the interdisciplinary aspects of the relationship between nutrition and dental practice, particularly in the context of caries prevention, gum disease, and the formation of eating habits.

Among the thematic modules of the educational component, the following sections were of greatest interest and practical value, according to the students: "Nutritional characteristics of basic food products" (76.5%), "Fundamentals of rational nutrition" (69.1%), "Disorders of the nutritional status of the body and its correction" (57.4%) and "Principles of nutrition of a sick person, nutritional prophylaxis" (52.9%). Despite the lack of distribution by specialty, the generally high indicators demonstrate the universal significance of these topics for the training of specialists in all medical areas. In particular, the issues of eating disorders and their treatment are especially relevant for future doctors in the specialties "Therapy and Rehabilitation" and "Medicine", who work with patients who need dietary support. At the same time, the principles of nutrition for a sick person have direct clinical significance within all the specialties considered.

The survey results indicate unanimous support for the advisability of including the educational component "Science of Nutrition" in the educational process of KhNMU students. Thus, 58.8% of respondents consider this course to be necessary for future professional activity, while 39.7% consider it important for forming a general medical vision. Thus, over 98.0% of the study participants recognize the value of the Science of Nutrition as a component of medical training.

The analysis by specialties reveals differences in the perception of the functional role of the Science of Nutrition. The highest level of recognition of its professional significance was found by respondents of the specialties "Medicine" (53.3%) and "Therapy and Rehabilitation" (42.1%), who consider the course mandatory for future clinical practice. This position is probably due to the understanding of the role of nutrition as one of the key tools for the prevention, treatment and rehabilitation of patients. Among students of Pediatrics, 40.0% consider the course mandatory for professional training, while 60.0% consider it important the general medical outlook. This indicates their awareness of the role of the Science of Nutrition not only in therapeutic interventions, but also in counseling parents, preventing eating disorders in children, and fostering healthy habits from an early age.

The smallest percentage of respondents who consider the course mandatory for professional activity was recorded among students majoring in Dentistry, 10.0%, while 90.0% consider it important for general understanding. This may be because dental students are less likely to associate the Science of Nutrition with direct medical interventions. At the same time, this position does not deny the importance of nutritional knowledge in the prevention of dental diseases, particularly caries and periodontal pathologies. In this regard, it is advisable to focus, in the educational process, on the relationship between nutrition and disorders of mineralization of hard tooth tissues, as well as on the role of dietary factors in the development of inflammatory processes in the oral cavity.

The study of the educational component "Science of Nutrition" acquires practical significance only if the knowledge gained is further applied in everyday life and professional activity. The survey results (*Table 2*) showed that the majority of respondents (55.9%) plan to use their knowledge of the Science of Nutrition to improve their own health and nutrition. At the same time, 30.9%

Table 2. Plans for the use of acquired knowledge from the elective educational component "Science of Nutrition" by medical students (% of responses)

Answer options	Total % of responses	Medicine	Pediatrics	Dentistry	Therapy and Rehabilitation
To improve one's health and nutrition	55.9	53.3	60.0	100.0	44.7
For own future professional activity	30.9	26.7	40.0	0.0	39.5
Promoting a healthy lifestyle among family and friends	11.8	20.0	0.0	0.0	13.2
Participation in projects or initiatives related to public health or nutrition	1.5	0.0	0.0	0.0	2.6

noted that this knowledge will be important for their future professional activities, and another 11.8% plan to promote a healthy lifestyle among family and friends.

The distribution of responses by specialty showed different emphases in motivation and plans for using knowledge. The absolute majority of students of Dentistry are focused on the personal application of nutritional knowledge, without directly linking it to future clinical practice. This fact confirms the intrapersonal approach to studying the discipline among students of this specialty. A similar, but less unambiguous picture is observed among students of Medicine and Pediatrics, where, along with personal motivation, a pronounced professional interest in applying knowledge is also noticeable. This indicates a combination of personal and professional interest in this group. The most balanced approach is that of students majoring in Therapy and Rehabilitation, who plan to use their knowledge equally for their own health and in a professional context. At the same time, some of them expressed their intention to promote a healthy lifestyle in their social environment (13.2%); however, interest in joining public nutrition initiatives was minimal (2.6%). This may indicate certain limitations in understanding practical possibilities of the Science of Nutrition at the level of public health. Such results demonstrate the dominance of personal interest in using knowledge of the Science of Nutrition; however, for some students, particularly majoring in TR and Pediatrics, awareness of the potential of practical application of this knowledge in clinical and educational work is characteristic.

The high likelihood of recommending the educational component "Science of Nutrition" to friends or colleagues indicates that students are generally satisfied with the quality of teaching and the value of the knowledge gained. In total, 69.1 % of respondents answered "very likely" and 30.9% – "possibly" that they would recommend this course.

The indicators differed among specialties. The highest level of positive assessment was demonstrated by students majoring in Medicine (93.3% "very likely") and Therapy and Rehabilitation (71.1% "very likely"), indicating their strong conviction in the importance of this educational component for colleagues and the professional community. A slightly different trend is observed among future dentists: only 30.0% of respondents expressed a categorical desire to recommend the course, while 70.0% indicated the option "possibly". This may indicate the need for further adaptation and a more specific focus of the educational content, taking into account the peculiarities of the dental specialty.

Discussion

The results obtained demonstrate the high significance of the educational component "Science of Nutrition" in the training of students of health-related sciences. Most respondents noted its compliance with expectations, its practical usefulness and its direct role in future professional activities. This position is consistent with the trends recorded in similar studies both in Ukraine and abroad.

In Ukraine, the number of scientific works devoted to assessing the place of the Science of Nutrition in the medical education system is quite limited. In most universities, nutrition issues are integrated into hygiene or physiology courses, but do not have a separate structured format. Research conducted among medical students in 2022 in Poltava indicates a general interest in healthy nutrition but also demonstrates insufficient knowledge and the presence of risk factors in their own nutritional practices [10]. This is consistent with the results of the studt presented here, which found that a significant proportion of respondents indicated they strive to follow a healthy lifestyle but lack the knowledge or time. A feature of the study is the

emphasis not only on students' personal motivation, but also on the role of nutritional knowledge in future professional practice, which enables a more comprehensive assessment of educational needs.

International studies also confirm that nutrition issues remain underrepresented in medical curricula. According to a review by Cheri N. & Howells K. (2025) [3], a significant proportion of students and practicing physicians lack knowledge and confidence in nutrition issues. In the USA, the average duration of formal nutrition training is only hours [10–20], which most students consider insufficient for practical work [11]. Similar data have been obtained in Europe: the average amount of nutrition training time in medical schools is 23.7 hours, and in Germany it is only 11.3 hours; at the same time, more than 80.0% of students express the need to expand this component [12]. In several intervention programs, specialized courses in nutrition have been shown to increase not only the level of knowledge of students, but also their willingness to change their eating habits and integrate diet therapy into clinical practice [13].

Comparison of the results of the presented study with foreign studies reveals common trends: students recognize the key role of nutrition in shaping health, a significant proportion of respondents considers nutrition necessary for professional activity, and there is a deficit of systematic knowledge. At the same time, unlike most international works, this study details the differences between specialties. Thus, students of Therapy and Rehabilitation are most focused on the practical application of knowledge in professional practice, while students of Dentistry mainly view the course as a source of personal benefit. Such differentiation by specialty is rarely described in world studies, which emphasizes the novelty and relevance of the results.

It should be noted that no direct analogs of the present study were identified in either the Ukrainian or international scientific literature. This is due to the use of an original questionnaire developed by the department's research team specifically for the comprehensive evaluation of the educational component "Science of Nutrition", which limits the possibility of directly comparing the obtained results with data from other studies.

Conclusions

The findings of the study convincingly confirm the high importance of the educational component "Science of Nutrition" for students of health-related sciences of KhNMU. The absolute majority of respondents recognize the need for this knowledge, motivated by both personal interest in developing a healthy lifestyle and the desire to expand professional competencies in healthcare.

For students majoring in Therapy and Rehabilitation, the Science of Nutrition is a key tool in the comprehensive rehabilitation of patients, contributing to the acceleration of recovery and improvement of functional treatment results. They demonstrate a high level of professional orientation to the practical application of the knowledge gained.

For the specialties "Medicine" and "Pediatrics", knowledge of nutrition is fundamental for the prevention, diagnosis and treatment of a wide range of diseases. This allows future doctors to adopt a holistic approach to patient health, and the high interest of pediatricians underscores the importance of nutritional training to foster healthy eating habits from an early age.

Dental students, although more focused on the personal benefit of the course than on the direct clinical application of knowledge, show a need to strengthen the educational content that would reveal the interdisciplinary aspects of the relationship between nutrition and oral health, in particular the prevention of caries, periodontal diseases and dietary recommendations after dental interventions. Appropriate improvements to the course will contribute to a more effective integration of nutritional knowledge into the clinical practice of dentists.

In general, the educational component "Science of Nutrition" is highly rated by students, indicating its relevance and methodological quality. Further improvement of the course, taking into account the specific needs and requirements of various medical specialties, will ensure the formation of more qualified, comprehensively trained specialists, ready to meet the modern challenges of the healthcare system.

The present study fills an existing gap in the domestic literature and confirms the need for the systematic implementation of the Science of Nutrition in the curricula of medical universities. Further scientific research should aim not only at assessing students' attitudes, but also at examining the real impact of such courses on the level of knowledge, the development of clinical skills and the readiness of future doctors to integrate nutritional approaches into practice.

Funding and Acknowledgments

The research was carried out as a private initiative of the authors, without grant support and state registration of the topic.

Authors' Contributions

Contribution / Authors	A	B	C	D	E	F
Zavgorodnii I.V.	+	+			+	+
Litovchenko O.L.		+		+	+	+
Merkulova T.V.					+	+
Leshchyna I.V.					+	+
Lysak M.S.			+		+	+
Bilychenko N.P.					+	+
Chekhovska I.M.		+			+	+

Notes: A – concept; B – design; C – data collection;
D – statistical processing and interpretation of data;
E – writing or critical editing of the article;
F – approval of the final version for publication and agreement to be responsible for all aspects of the work.

Declarations

Conflict of Interest and Authorship Statement.

The authors declare no conflicts of interest. The corresponding author, on behalf of all co-authors, consents to the publication of this manuscript under the Creative Commons BY-NC-SA 4.0 International License, adhering to the public agreement with the editorial board, and authorizes the processing and disclosure of their personal data.

Furthermore, the authors explicitly state that no generative AI tools or services were utilized at any stage of this study including conceptualization, research, data analysis, drafting, or final editing in alignment with the Generative AI Delegation Taxonomy (GAIDeT, 2025). The entire work was performed exclusively by the human authors.

References

1. Bulavenko OV, Muntyan OA, Konkov DH, Furman OV. Ultrasound characteristics of blood circulation in uterine vessels in the I trimester of pregnancy in women with the history of recurrent miscarriage. Reports of Vinnytsia National Medical University. 2018;22(1):72-6. DOI: 10.31393/reports-vnmedical-2018-22(1)-14. [In Ukrainian].

2. Kaminsky VV, Konoplyanko VV, Schalko MN, Ratushnyak NY. Modern approaches in treatment of miscarriage. Reproductive health. Eastern Europe. 2018;8(1):2-10. Available at: https://surl.li/cebfym [in Ukrainian].

3. Shcherbyna MO, Lipko OP, Shcherbyna IM, Mertsalova OV, Potapova LV. New approaches in prevention of unfavorable peritoneal outcomes in women with miscarriage. Actual Problems of Pediatrics, Obstetrics and Gynecology. 2019;1:156-9. DOI: 10.11603/24116-4944.2019.1.10205. [In Ukrainian].

4. Kortekaas JC, Kazemier BM, Keulen JKJ, Bruinsma A, Mol BW, Vandenbussche F, et al. Risk of adverse pregnancy outcomes of late- and postterm pregnancies in advanced maternal age: A national cohort study. Acta Obstet Gynecol Scand. 2020;99(8):1022-30. DOI: 10.1111/aogs.13828. PMID: 32072610.

5. Nikitina IM. The combined use of various forms of micronized progesterone in the treatment of the threat of termination of pregnancy in multiple pregnancies. Reproductive Endocrinology. 2017;(35):68-73. DOI: 10.18370/2309-4117.2017.35.68-73. [In Ukrainian].

6. Roumandeh N, Zare A, Saremi A. Immunology of Recurrent Spontaneous Abortion. Sarem Journal of Reproductive Medicine. 2018;3(2):121-6. Available at: https://www.researchgate.net/publication/327674612

7. Zhivetskaya-Denisova AA, Vorobyova II, Tkachenko VB, Podolskyi VV, Tykha VG. Placenta – mirror of pregnancy (Literature review). Health of Woman. 2019;139(3):101-6. DOI: 10.15574/HW.2019.139.10. [In Ukrainian].

8. van Dijk M, Kolte AM, Limpens J, Kirk E, Quenby S, van Wely M, Goddijn M. Recurrent pregnancy loss: diagnostic workup after two or three pregnancy losses? A systematic review of the literature and meta-analysis. Hum Reprod Update. 2020;26(3):356-67. DOI: 10.1093/humupd/dmz048. PMID: 32103270.

9. Melenchuk L, Sharhorodska Ye. Maternal risk factors of perinatal women complications with the urinary system diseases. Scientific Journal of Polonia University. 2020;43(6):269-78. Available at: https://www.researchgate.net/publication/352522053

10. Shargorodska EB, Melenchuk LM. Miscarriage: a modern view. Actual Problems of the Modern Medicine: Bulletin of Ukrainian Medical Stomatological Academy. 2022;22(2):116-21. DOI: 10.31718/2077-1096.22.2.116. [In Ukrainian].

11. Frazier T, Hogue CJR, Bonney EA, et al. Weathering the storm; a review of pre-pregnancy stress and risk of spontaneous abortion. Psychoneuroendocrinology. 2018;92:142-54. DOI: 10.1016/j.psyneuen.2018.03.001. PMID: 29628283.

12. Kravchenko EV. Features of the state of extraembryonic structures in miscarriage early terms of pregnancy. The Journal of V.N. Karazin Kharkiv National University. Series "Medicine". 2024;32(1(48)):8-14. DOI: 10.26565/2313-6693-2024-48-01.

Received: 05 Oct 2025
Accepted: 29 Dec 2025
Published: 31 Dec 2025

Cite in Vancouver style as: Zavgorodnii IV, Litovchenko OL, Merkulova TV, Lysak MS, Leshchyna IV, Bilychenko NP, Chekhovska IM. Significance of the educational component "Science of Nutrition" in medical education: A survey of Kharkiv National Medical University students. Inter Collegas. 2025;12(4):46-53. https://doi.org/10.35339/ic.2025.12.4.zlm

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