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ASSESSMENT OF THE POPULATION'S HEALTH LITERACY AND THE CULTURE OF NUTRACEUTICAL CONSUMPTION. LITERATURE REVIEW

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Abstract

Background: In the current healthcare context, the level of health literacy and the culture of nutraceutical consumption among the population acquire particular importance. The widespread use of nutraceuticals such as vitamins, minerals, amino acids, and plant-based components contributes to the formation of public perceptions regarding their safety and universality. However, in practice, there is a tendency toward uncontrolled and unjustified use of nutraceuticals without considering individual needs and without prior medical diagnosis. This situation is further complicated by a low level of health literacy, which hampers critical evaluation of health information and increases the risks of self-medication.

Objective: To assess the level of health literacy of the population in the use of nutraceuticals.

Methods: Relevant literature was identified through searches in the PubMed, Scopus, Web of Science, CyberLeninka, and Google Scholar databases. The search covered publications up to January 2025 using the keywords: "health literacy," "nutraceuticals," "population health," and "consumption culture." A total of 263 sources in both English and Russian were found. Eighty publications were selected for analysis.

Results: The article addresses the issue of low health literacy and the uncontrolled consumption of nutraceuticals, particularly among at-risk groups, alongside the high level of adherence to nutraceutical use in European and Asian countries. People with higher education tend to have a greater demand for nutraceuticals compared to those with lower educational levels. A high level of education is also associated with higher health literacy. However, as noted by several researchers, the widespread availability of information and high trust in online sources often lead to the uncontrolled intake of dietary supplements and other nutraceutical products without consulting healthcare professionals. This approach may have potentially negative consequences for public health, including risks of overdose, adverse interactions with medications, and the development of side effects. Thus, a high level of literacy and public awareness does not always correlate with a rational approach to nutraceutical use, which requires additional attention from healthcare systems and regulatory bodies. It is necessary to promote increased interest in healthy lifestyles, disease prevention, and well-being maintenance through the rational consumption of nutraceuticals.

Conclusions: This review emphasizes that the low level of health literacy, particularly concerning the uncontrolled consumption of nutraceuticals, represents a significant risk factor for public health. The findings confirm the need to improve public awareness and promote educational programs, which are considered effective strategies to reduce self-medication, strengthen health, and, in the long term, reduce the burden on healthcare systems and improve quality of life indicators.

Keywords: *health literacy, nutraceuticals, population health, consumption culture.*

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Резюме

**ОЦЕНКА УРОВНЯ ГРАМОТНОСТИ НАСЕЛЕНИЯ В ВОПРОСАХ
ЗДОРОВЬЯ И КУЛЬТУРА ПОТРЕБЛЕНИЯ НУТРИЦЕВТИКОВ.
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Актуальность. В современных условиях здравоохранения уровень грамотности населения в вопросах здоровья и культуры потребления нутрицевтиков приобретает особую значимость. Широкое распространение нутрицевтиков, таких как витамины, минералы, аминокислоты и растительные компоненты, сопровождается формированием у населения представлений об их безопасности и универсальности. Однако на практике наблюдается тенденция к бесконтрольному и необоснованному применению нутрицевтиков без учёта индивидуальных потребностей и без предварительной медицинской диагностики. Ситуация осложняется низким уровнем медицинской грамотности, что затрудняет критическую оценку информации о здоровье и повышает риски самолечения.

Цель исследования: Оценить уровень грамотности населения в вопросах здоровья в применении нутрицевтиков.

Стратегия поиска: Актуальная литература была найдена посредством поиска в базах данных PubMed, Scopus, Web of Science, CyberLeninka и Google Scholar. Поиск охватывал публикации до января 2025 года с использованием ключевых слов: «медицинская грамотность, нутрицевтики, здоровье населения, культура потребления». Всего было найдено 263 источника на английском и русском языках. Для анализа были отобраны 80 публикаций

Результаты: В статье рассматривается проблема низкого уровня грамотности в вопросах здоровья и неконтролируемого потребления нутрицевтиков с одной стороны, особенно в группах риска и высокий уровень приверженности к потреблению нутрицевтиков в европейских и азиатских странах. Люди, имеющие высшее образование более склонны к повышенному спросу на нутрицевтики, по сравнению с населением, с более низким уровнем образования. Высокий уровень образования также связан с высоким уровнем грамотности населения. Также, широкая доступность информации и высокая доверчивость к источникам из интернета, нередко, приводят к бесконтрольному приёму биологически активных добавок (БАД) и других нутрицевтических средств без консультации специалистов. Такой подход может иметь потенциально негативные последствия для здоровья населения, включая риск передозировок, неблагоприятных взаимодействий с лекарственными препаратами и развитие побочных эффектов. Таким образом, высокий уровень грамотности и самосознания общества не всегда коррелирует с рациональным подходом к применению нутрицевтиков, что требует дополнительного внимания со стороны системы здравоохранения и регуляторных органов. Необходимо способствовать росту интереса к вопросам здорового образа жизни, профилактики заболеваний и поддержания благополучия с помощью рационального потребления нутрицевтиков.

Выводы: Настоящий обзор подчеркивает, что низкий уровень грамотности населения в вопросах здоровья, в частности в отношении неконтролируемого потребления нутрицевтиков, представляет собой значимый фактор риска для общественного здоровья. Полученные данные подтверждают необходимость повышения информированности населения и развития просветительских программ, что рассматривается как эффективное направление для снижения случаев самолечения, укрепления здоровья и, в долгосрочной перспективе, снижения нагрузки на систему здравоохранения и улучшению показателей качества жизни.

Ключевые слова: медицинская грамотность, нутрицевтики, здоровье населения, культура потребления.

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Түйіндеме

ДЕНСАУЛЫҚ МӘСЕЛЕЛЕРІНДЕГІ ХАЛЫҚТЫҢ САУАТТЫЛЫҚ ДЕҢГЕЙІН БАҒАЛАУ ЖӘНЕ НУТРИЦЕВТИКТЕРДІ ТҰТЫНУ МӘДЕНИЕТІ. ӘДЕБИЕТТІК ШОЛУ.

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Өзектілігі. Қазіргі денсаулық сақтау жағдайында халықтың денсаулық мәселелері және нутрицевтиктерді тұтыну мәдениеті бойынша сауаттылық деңгейі ерекше маңызға ие болуда. Витаминдер, минералдар, аминқышқылдары және өсімдік компоненттері сияқты нутрицевтиктердің кең таралуы бұл заттардың қауіпсіздігі мен әмбебаптығы туралы халық арасында белгілі бір көзқарастың қалыптасуына алып келді. Алайда, тәжірибеде нутрицевтиктерді алдын ала медициналық диагностикасыз және жеке қажеттіліктерді ескерместен бақылаусыз әрі негізсіз қолдану үрдісі байқалады. Бұл жағдай медициналық сауаттылық деңгейінің төмендігімен күрделене түседі, ол денсаулық туралы ақпаратты сыни тұрғыдан бағалауды қиындатып, өз бетінше емделу қаупін арттырады.

Зерттеу мақсаты: Халықтың денсаулық мәселелері жөніндегі сауаттылық деңгейін және нутрицевтиктерді қолданудағы көзқарасын бағалау.

Әдістер: Ғылыми әдебиеттер PubMed, Scopus, Web of Science, CyberLeninka және Google Scholar дерекқорларынан ізделді. Іздеу 2025 жылдың қаңтарына дейінгі жарияланымдарды қамтыды және келесі кілт сөздер қолданылды: «медициналық сауаттылық, нутрицевтиктер, халық денсаулығы, тұтыну мәдениеті». Іздеу нәтижесінде ағылшын және орыс тілдеріндегі 263 дереккөз табылды, олардың ішінен 80 мақала талдау үшін іріктелді.

Нәтижелер: Мақалада денсаулық сауаттылығының төмен деңгейі мен нутрицевтикаларды бақылаусыз қолдану мәселесі қарастырылады, әсіресе тәуекел тобына жататын адамдар арасында. Сонымен қатар, Еуропа және Азия елдерінде нутрицевтикаларды қолдануға жоғары деңгейдегі ұстаным байқалады. Жоғары білім деңгейі бар адамдар нутрицевтикаларға төмен білім деңгейіндегі халыққа қарағанда көбірек сұраныс көрсетеді. Жоғары білім деңгейі денсаулық сауаттылығының жоғары болуымен де байланысты. Дегенмен, бірнеше зерттеушілердің атап өткеніндей, ақпараттың кең қолжетімділігі және интернеттегі дереккөздерге жоғары сенім нутрицевтикалар мен биологиялық белсенді қоспаларды мамандарға кеңес алмай бақылаусыз қабылдауға әкеледі. Мұндай тәсіл денсаулыққа теріс әсер етуі мүмкін, оның ішінде дозаны асырып алу қаупі, дәрі-дәрмектермен жағымсыз өзара әрекеттесулер және жанама әсерлердің даму қаупі бар. Сондықтан, жоғары сауаттылық пен қоғамдық сананың болуы әрдайым нутрицевтикаларды рационалды пайдалануымен сәйкес келмейді, бұл денсаулық сақтау жүйесі мен реттеуші органдардың қосымша назарын талап етеді. Денсаулығы жақсы өмір салтына, аурулардың алдын алуға және әл-ауқатты сақтауға деген қызығушылықты арттыру үшін нутрицевтикаларды ұтымды пайдалану қажет.

Қорытындылар: Бұл шолу халықтың денсаулық мәселелері бойынша, әсіресе нутрицевтиктерді бақылаусыз қолдануға қатысты сауаттылық деңгейінің төмендігі қоғамдық денсаулық үшін маңызды қауіп факторы екенін көрсетеді. Алынған деректер халықтың хабардарлығын арттыру және ағартушылық бағдарламаларды дамыту қажеттілігін дәлелдейді, бұл өздігінен емделу жағдайларын азайтуға, денсаулықты нығайтуға және ұзақ мерзімді перспективада денсаулық сақтау жүйесіне түсетін жүктемені төмендетуге, сондай-ақ өмір сүру сапасын арттыруға ықпал етеді.

Түйінді сөздер: медициналық сауаттылық, нутрицевтиктер, халық денсаулығы, тұтыну мәдениеті.

Дәйексөз үшін:

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Introduction

In the current healthcare landscape, the level of health literacy and the culture of nutraceutical consumption among the population have acquired particular importance. Nutraceuticals—biologically active compounds such as vitamins, minerals, amino acids, and herbal ingredients—are now widely used both in everyday life and in clinical settings. However, the widespread perception of their safety and universality has led to a growing trend of uncontrolled and unjustified consumption. This issue is especially pronounced in the context of insufficient public awareness about health matters, lack of preliminary medical diagnostics, and the absence of professional consultations. A low level of health literacy hinders the ability to critically evaluate health-related information and increases the risks of self-medication, which can have adverse health consequences, particularly for individuals with chronic conditions or those taking pharmacological treatments.

Literacy is a fundamental human right and a crucial aspect that influences a person's ability to express themselves and actively participate in society. It forms the basis for continuous learning, personal growth, and involvement in social and economic processes. A high level of literacy not only improves the quality of life but also contributes to solving global challenges such as stabilizing demographic trends and maintaining sustainable development. Moreover, literacy is a vital condition for ensuring peace, social justice, and strengthening democratic institutions [5]. Health literacy, as a specific subset of general literacy, encompasses the intellectual and interpersonal abilities that empower individuals to seek out, comprehend, and utilize health information effectively. These skills contribute to both the desire and the capacity to make informed decisions regarding one's well-being and to actively engage in behaviors that support and sustain good health [5].

Objective of the study: To assess the level of health literacy of the population in the use of nutraceuticals

Search strategy and Source Selection Algorithm:

A comprehensive search of relevant scientific literature was conducted using the databases in PubMed, Scopus, Web of Science, CyberLeninka, and Google Scholar databases publications available up to January 2025 using the keywords "*health literacy*," "*nutraceuticals*," "*population health*," and "*consumption culture*". Both English- and Russian-language sources were considered in order to ensure a broad and inclusive analysis of the topic;

The initial search yielded a total of 263 publications. Following a thorough review, 80 publications were selected for detailed analysis based on their relevance, scientific quality, and alignment with the research objective;

The inclusion criteria focused on studies that addressed the relationship between health literacy and the use of nutraceuticals, as well as the sociocultural and behavioral aspects influencing patterns of consumption. Studies lacking empirical data or those focusing solely on the biochemical properties of nutraceuticals without reference to health literacy or consumer behavior were excluded from the final selection.

Results and Discussion:

Global and local aspects of public health literacy.

Inadequate health literacy presents a significant global challenge, impacting both developing and developed nations.

Many studies have found a clear link between insufficient medical literacy and poor health. People who do not have comprehensive knowledge about healthcare often face numerous problems. These include difficulties understanding medical information, interpreting doctors' instructions, and following prescribed treatment plans. Consequently, they face difficulties in promptly detecting diseases, effectively implementing preventive measures, and making informed decisions about their well-being. This leads to a higher prevalence of chronic diseases, a delay in seeking medical help, and an increased likelihood of hospitalization due to preventable complications. The consequences are not limited to the quality of life of individuals, which leads to a significant increase in health care costs and puts a strain on the health care system as a whole [3, 21, 34].

Despite this, some population groups continue to demonstrate significantly lower levels of health literacy compared to the general population in Europe. These include individuals with low levels of social protection, limited education, chronic illnesses, those living in socioeconomically disadvantaged conditions, as well as older adults [68, 64, 77]. Such groups often face numerous overlapping barriers, including financial instability, limited access to healthcare services, language difficulties, and a lack of access to reliable health information — all of which reduce their ability to understand and engage with health-related content.

Numerous studies have shown how health literacy varies across different segments of the population. For example, research has analyzed differences across age groups [39, 71], revealing that younger people generally possess higher levels of functional health literacy compared to older adults. Similarly, studies on various social groups [35, 37] indicate that individuals with lower income or educational attainment often face greater difficulties in understanding medical instructions or navigating healthcare systems. Gender differences in health literacy have also been examined, with some studies showing that women may be more proactive in seeking health information, while others reveal different patterns depending on cultural or regional contexts [32, 39, 79].

The situation of older adults is particularly critical, as their health literacy levels are consistently among the lowest [1, 44]. This can be explained by several age-related factors, including cognitive decline, memory impairments, reduced vision or hearing, and limited digital literacy — especially as more and more health information becomes available primarily through online platforms.

In 2013, the Asian Health Literacy Association (based in Taiwan) spearheaded a multinational research project examining health literacy levels across Asia. This initiative, known as the Health Literacy Survey - Asia, encompassed six participating nations: Indonesia, Kazakhstan, Malaysia, Myanmar, Taiwan, and Vietnam. Kazakhstan's involvement marked its contribution to this comprehensive assessment of health literacy within the region [23, 24].

The issue of health literacy in the Republic of Kazakhstan was first studied by A.M. Aringazina. The level of literacy is determined by factors such as age, marital status, religious affiliation, education level, average income, and social status of the respondents [2, 9, 47].

A study assessing health literacy in five cities of Kazakhstan revealed the following key findings: two-thirds of respondents confidently use health information, while one-third of respondents experienced difficulties in obtaining, interpreting, evaluating, and applying this information, indicating health literacy issues among this group [10].

According to researchers, the health literacy level of the adult population in Kazakhstan in 2022 was 45.8%, which is a low indicator. The authors attribute this to differences in the population size living in urban or rural areas and the level of socio-economic development [4].

Health literacy and modern nutraceutical consumption.

According to health information, people with low literacy levels are generally more susceptible to persuasion [73], and there is a correlation between health literacy and socio-economic status [12]. *Kerdsri K. and Lerkiatbundit S.* found that people with high literacy levels positively correlate their ability to self-protect with healthy food products [43]. Over the past few decades, the consumption of nutraceuticals, dietary supplements, and biological supplements has significantly increased across all age groups, including the younger generation. Awareness of supplements refers to a person's ability to rationally analyze advertising messages to use them correctly, including their intentions for future use [49]. Television and social media actively promote the use of nutraceuticals and various supplements to improve health, balanced nutrition, physical performance, and longevity, but the importance of preliminary deficiency control is often omitted [13, 56, 63].

Maintaining a stable balance of essential nutrients is crucial for human health and proper bodily function. While dietary supplements and nutraceuticals can aid in achieving this balance, their unregulated and widespread use over the past decade raises concerns [28, 53]. This trend indicates a lack of health literacy among the population, as many individuals consume supplements without adequate knowledge about appropriate dosage, potential interactions with other substances, or intended benefits. Such uninformed consumption not only diminishes the potential health advantages but can also pose risks to overall well-being. Therefore, there is an urgent need to prioritize education and awareness campaigns that promote responsible supplement use and empower individuals to make informed decisions regarding their health.

In the context of modern healthcare management, nutraceuticals are becoming increasingly important as an effective tool for maintaining health and preventing chronic diseases. This group of biologically active substances, including vitamins, minerals, probiotics, amino acids, fatty acids, and phytonutrients, affects key physiological processes such as modulating the immune system, reducing inflammatory reactions, and optimizing metabolism. The increasing attention to preventive medicine and personalized treatment approaches is contributing to the integration of nutraceuticals into comprehensive wellness programs. It should be noted that the use of nutraceuticals requires a competent and responsible approach to maximize benefits and minimize potential risks [38, 60, 66].

The term "nutraceuticals" was introduced in 1989 by Stephen DeFelice. They are substances that provide both nutrition and therapeutic effects to the body. Sources of nutraceuticals range from natural products to synthetic forms [27].

Research confirms that nutraceuticals play an important role in preventing diseases such as cardiovascular diseases. Omega-3 fatty acids found in fish and supplements reduce triglyceride levels and the risk of heart attacks. Clinical studies show the effectiveness of nutraceuticals in combination with pharmacotherapy. For example, the combination of curcumin and standard anti-inflammatory drugs demonstrates a synergistic effect in treating chronic inflammation. Although nutraceuticals have significant potential, their uncontrolled use may be associated with risks. Excess vitamins (e.g., vitamin A) can lead to toxic effects. Therefore, standardization and control of their use are important [15, 29, 33, 57, 62].

The global healthcare landscape is witnessing a significant rise in the utilization of nutraceuticals, encompassing substances like vitamins, antioxidants, fiber, trace elements, and amino acids [14, 48, 51, 61]. This trend is driven by an increasing emphasis on preventative health measures, healthy aging practices, and performance enhancement across diverse demographics. Nutraceuticals and vitamins are readily available for purchase in pharmacies [19], facilitating widespread accessibility. However, this ease of access can sometimes lead to unregulated consumption patterns [75, 76]. The perception of these products as "natural" and safe, coupled with aggressive marketing strategies, often encourages self-medication practices without seeking professional medical advice.

The role of nutraceuticals in the prevention of diseases and the problems of their uncontrolled use"

Statistics compiled by the National Center for Health Statistics reveal that a substantial portion, approximately 33.2%, of American youth utilize nutraceuticals. These products encompass a wide range, predominantly comprising multivitamins, dietary supplements such as iron, calcium, and vitamin D, as well as alternative medicines including bodybuilding supplements, melatonin, and omega-3 fatty acids. Notably, the prevalence of nutraceutical consumption varies significantly across different countries. For instance, while only 16% of children in Slovenia use these products, the figure rises to 45% for adolescents in Finland [70]. The utilization of nutraceuticals among younger demographics is notable in several countries. Research indicates substantial usage rates: 21% in Germany, 68% in Serbia, and 43% in Malaysia [69]. Furthermore, studies conducted in Japan reveal that 20.4% of individuals under the age of 18 have consumed supplements either currently or within the preceding year [20]. According to the study, it was found that the consumption of nutraceuticals among Australian youth is quite common: approximately 20.1% of teenagers and 23.5% of children regularly use these products [54]. The varying rates of dietary supplement usage across diverse populations highlight the significant impact of cultural and environmental influences. For instance, the observed differences in iron and folic acid supplement consumption among women in developing nations suggest that cultural

norms and beliefs may be key drivers in shaping these health practices [6, 42].

Prior research indicated a lack of awareness among individuals regarding the potential adverse effects linked to herbal remedies and dietary supplements. Consumption of these products often stemmed from informal recommendations within social circles, bypassing consultation with qualified healthcare providers [54, 58].

Health literacy refers to an individual's ability to successfully access, understand, critically evaluate, and apply health information. This proficiency enables them to make knowledgeable decisions concerning their overall health, encompassing aspects such as disease prevention, health enhancement, and effective healthcare utilization. Consequently, robust health literacy is a significant determinant of enhanced quality of life throughout one's lifetime [17, 18].

A study conducted in Thailand demonstrated that individuals' ability to effectively access, understand, and critically evaluate health information is closely linked to their rational use of dietary supplements [59]. Participants who possessed higher skills in navigating health-related content were more likely to make informed decisions about supplement intake, avoiding unnecessary or excessive consumption. Conversely, limited health literacy in this area often led to misuse or overreliance on dietary supplements without proper guidance.

Individuals possessing robust health literacy skills demonstrate a greater propensity for making well-informed decisions concerning dietary supplement consumption. Their ability to locate, comprehend, and critically evaluate health information enables them to utilize supplements responsibly and minimize the risk of unnecessary or excessive intake. Conversely, those with limited health literacy are more susceptible to inappropriate use or overreliance on supplements, frequently without seeking guidance from healthcare providers or contemplating potential adverse effects. This highlights the paramount importance of adequate health literacy in ensuring the safe and efficacious utilization of dietary supplements [59].

A 2017 survey of Thai individuals aged 15 and above revealed a significant prevalence of the belief that dietary supplements are essential for health. Among the 512 participants, 70% expressed this sentiment. Notably, individuals with greater financial resources and those who engaged in healthier lifestyles were more inclined to consume nutraceuticals. However, this group tended to overlook the importance of seeking medical advice regarding supplement use. The belief in the necessity of dietary supplements was most pronounced among respondents aged 21-30 (74%), followed closely by those aged 31-40 (72%). Furthermore, a correlation was observed between educational attainment and this belief, with a higher percentage of individuals holding bachelor's degrees or higher subscribing to the view that supplements are necessary. [22, 45]. Furthermore, the study found a positive correlation between healthy lifestyle choices and nutraceutical consumption. Students who abstained from smoking, engaged in regular physical activity, and actively monitored their health exhibited a higher propensity to incorporate nutraceuticals into their diets. Other sources also emphasize that students and medical professionals,

particularly those studying healthcare and other population groups [7, 20], are more likely to consume nutraceuticals compared to students of other specialties and fields [65]. All of the above highlights that a high level of health literacy increases the likelihood of uncontrolled nutraceutical consumption. In developed countries, micronutrient deficiencies in the diet are becoming rarer, and most nutraceutical consumers actually receive excessive amounts of vitamins and minerals [26, 30, 75]. This may also be related to insufficient diagnosis of primary micronutrient levels in the body and the preventive prescription of nutraceuticals by modern doctors [16].

Some studies suggest the role of nutraceuticals in preventing or progressing chronic and non-communicable diseases [40, 72], while others have found no positive link between supplement intake and the progression of chronic diseases. The term "nutraceuticals" is widely used to denote the use and effectiveness of various plant products, "nutrient elements"—herbs, vitamins, proteins, minerals, fats, fibers, and amino acids. Nutraceuticals are purported to enhance physical well-being and offer substantial health advantages. Their claimed benefits include mitigating the risk of both acute and chronic illnesses, improving overall fitness levels, and potentially slowing down the aging process, thereby extending lifespan [25, 55].

The perceived health benefits associated with nutraceuticals may be partially attributable to the placebo effect, wherein individuals experience improvements due to their belief in the product's efficacy. Many nutraceuticals enter the market without undergoing thorough scientific scrutiny, gaining consumer trust through aggressive marketing strategies and anecdotal testimonials. This premature acceptance can lead to inappropriate usage, as consumers may rely on these products without a complete understanding of their potential benefits or risks. The lack of comprehensive scientific evidence and well-designed clinical trials underscores the need for further research to establish the safety and effectiveness of nutraceuticals [19].

While certain nutraceutical products demonstrate favorable safety records, a considerable number have been documented to engage in unfavorable interactions with conventionally prescribed medications [8, 41, 67, 78]. Their potential benefits are publicly promoted, but their possible harmful effects are less obvious, and their therapeutic efficacy is not fully established [11, 27]. Sometimes they can alter the effectiveness of medications and lead to side effects or dangerous conditions. This issue requires healthcare professionals to counsel on their use [80]. Over-the-counter supplements can increase health risks if consumed beyond recommended amounts [31, 74].

Unfortunately, as researchers have noted, the widespread practice of using nutraceuticals without a proper prescription and in the absence of thorough scientific research often leads to unjustifiably high financial costs for the general population [50, 52]. This trend is exacerbated by the easy accessibility of dietary supplements, aggressive marketing strategies, and a lack of adequate public awareness regarding their appropriate use. While dietary supplements may appear beneficial and are often perceived as a means to enhance health or prevent disease, their use is generally not recommended except in specific medical circumstances where a clear clinical need has been

established. For example, pregnant and breastfeeding women may require supplementation with essential nutrients such as folate, iodine, or iron to meet the increased physiological demands during these periods. However, even in such cases, it is crucial to consult a qualified healthcare professional to assess individual nutritional status and determine the appropriate dosages and forms of supplementation. The use of dietary supplements should be carefully reserved for instances of documented nutritional deficiencies, such as iron-deficiency anemia, folic acid deficiency, or iodine deficiency, and must always be undertaken under the guidance and supervision of medical practitioners to avoid potential adverse effects or interactions with other medications [46]. This cautious and evidence-based approach is essential to maximize the benefits of supplementation while minimizing risks and unnecessary expenditures.

Conclusions

Thus, increasing the level of public health literacy and conscious consumption of nutraceuticals is a key direction for strengthening public health and reducing the risks associated with the uncontrolled use of nutraceuticals. Despite the growing interest in nutraceuticals, supplements and their potential role in the prevention of chronic diseases, the lack of scientific evidence, lack of proper monitoring and awareness lead to health risks and significant financial costs among the population. It is especially important to pay attention to vulnerable groups, including children, the elderly and socially vulnerable segments of the population, for whom the level of health literacy remains low. An integrated approach, including education, expert advice and regulatory measures, will ensure the rational and safe use of nutraceuticals. Improving public literacy and awareness of health issues and rational consumption of nutraceuticals is one of the priorities of public health in the near future.

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