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Nutraceuticals in High-Stress Lives: Awareness, Challenges, and Health Implications

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ABSTRACT

Modern life often brings high levels of stress, affecting both physical and mental health. Nutraceuticals are bioactive compounds derived from natural sources like plants, vitamins, and minerals which may aid in managing stress by bolstering resilience and reducing symptoms of anxiety, fatigue, and oxidative damage. Key nutraceuticals, including adaptogens (e.g., ashwagandha and Rhodiola), omega-3 fatty acids, B vitamins, and antioxidants, are believed to help regulate stress response systems, reduce inflammation, and support brain function. Despite promising evidence, public awareness of these benefits remains limited, with misconceptions often leading to improper or ineffective use. Challenges also persist within the industry due to inconsistent quality control, variable efficacy, and differing regulatory standards that can affect product safety and accessibility. This paper reviews the role of nutraceuticals in supporting individuals with high-stress lifestyles, focusing on current awareness, challenges, and potential health implications. While nutraceuticals offer promise, challenges such as limited awareness, variable quality, and a lack of clinical evidence present hurdles to their widespread, safe adoption. This review also suggests areas for further research and strategies to enhance public understanding and safe usage of nutraceuticals.

KEYWORDS

Nutraceuticals; High-stress lifestyle; Chronic stress; Adaptogens; Antioxidants

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Introduction

In the face of today's demanding lifestyles, chronic stress has become a significant health concern with far-reaching implications. Stress impacts both mental and physical health, contributing to a range of disorders such as anxiety, depression, cardiovascular disease, immune dysfunction, and metabolic issues [1]. As individuals increasingly seek solutions that complement traditional medical approaches, interest in nutraceuticals has grown. Nutraceuticals are natural, bioactive compounds derived from food sources, including vitamins, minerals, herbs, and other plant-based substances are viewed as a promising means of supporting health and resilience in high-stress environments [2]. Research suggests that specific nutraceuticals, such as adaptogens, omega-3 fatty acids, B vitamins, and antioxidants, may play beneficial roles in stress management by enhancing the body's ability to cope with stressors and reducing related symptoms [3].

Adaptogens, for instance, are compounds believed to modulate the stress response, helping the body adapt to physical and mental strain. Common adaptogens, such as ashwagandha and *Rhodiola rosea*, have been shown to positively influence the hypothalamic-pituitary-adrenal (HPA) axis, which regulates stress response mechanisms in the body. Omega-3 fatty acids, largely found in fish oils, are recognized for their anti-inflammatory properties, which can aid in reducing stress-induced inflammation and supporting brain health [4]. B vitamins play essential roles in cellular energy production and neurotransmitter synthesis, which are crucial for maintaining mental well-being and resilience against stress. Antioxidants, including vitamins C and E, counteract oxidative stress by neutralizing free radicals, thereby protecting cells from stress-induced damage. Collectively, these compounds offer potential benefits, although the effectiveness of nutraceuticals varies depending on individual health conditions, quality of the supplements, and dosage [5].

Despite growing consumer interest in nutraceuticals, awareness and understanding of their use remain inconsistent. Public knowledge about nutraceuticals is often influenced by marketing, media, and online sources, which can lead to misconceptions. For instance, some consumers may view nutraceuticals as cure-all solutions, despite limited scientific evidence supporting their efficacy for specific health conditions [6]. Moreover, confusion surrounding dosing, potential interactions, and product quality standards often results in improper or ineffective use. Enhancing public understanding of nutraceuticals requires accessible, evidence-based information that emphasizes both benefits and limitations [7].

The nutraceutical industry also faces significant regulatory and quality-related challenges. In many countries, nutraceuticals are regulated as dietary supplements rather than pharmaceuticals, which subjects them to less rigorous safety and efficacy standards. Consequently, product quality can vary widely, with some supplements containing inconsistent dosages, impurities, or mislabeled ingredients. This lack of standardization poses safety risks and may undermine consumer trust. Implementing stricter quality control measures and clearer labeling practices could improve both product safety and public perception [8].

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This review explores nutraceuticals' potential as supportive tools for individuals facing high-stress lifestyles, examining public awareness, industry challenges, and the health implications of nutraceutical use. By addressing these issues, the paper seeks to provide a comprehensive understanding of how nutraceuticals could be integrated into broader health strategies, offering a balanced perspective on their role in promoting resilience and well-being in the context of stress. Enhanced research, regulatory improvements, and educational initiatives could help realize the full potential of nutraceuticals, empowering consumers to make informed choices that support their health in a demanding world.

Health Implications of High-Stress Lifestyles

Defining high-stress lifestyles

High-stress lifestyles are marked by demanding work environments, multitasking, and insufficient time for self-care. These lifestyles are often associated with sleep deprivation, poor nutrition, and an over-reliance on stimulants like caffeine, which can collectively lead to negative health outcomes. Individuals experiencing high stress may also adopt unhealthy behaviours such as overeating, physical inactivity, and substance use, further compounding their health risks. The interplay between chronic stress and these behaviours underscores the need for targeted interventions to alleviate its impact [9].

Health risks associated with chronic stress

Chronic stress exerts wide-ranging effects on physical health, affecting nearly every major bodily system (Table 1). Key health risks include:

- **Cardiovascular diseases:** Prolonged stress contributes to elevated blood pressure and increased heart rate, which strain the cardiovascular system. Over time, this can lead to hypertension, heart disease, and stroke. Stress-related inflammation further exacerbates the risk of vascular damage and atherosclerosis [10].
- **Obesity and metabolic disorders:** Stress triggers the release of hormones like cortisol, which can increase appetite and encourage fat storage, particularly in the abdominal region. This hormonal response is closely linked to metabolic imbalances that may lead to weight gain and obesity [11].
- **Diabetes:** Stress can disrupt insulin sensitivity and alter glucose metabolism, increasing the risk of type 2 diabetes. Elevated stress levels also lead to behaviors like overeating or consuming high-calorie foods, further contributing to impaired blood sugar control [12].
- **Immune suppression:** Chronic stress suppresses the immune system by reducing the production of key immune cells. This makes individuals more susceptible to infections and reduces the body's ability to heal from injuries or illnesses [13].
- **Digestive issues:** Stress affects gastrointestinal function, leading to problems such as nausea, acid reflux, and irritable bowel syndrome. Stress can also alter gut motility and disrupt the balance of gut bacteria, which plays a critical role in digestive health [14].
- **Sleep disorders:** Persistent stress often interferes with sleep, causing issues like insomnia and restless sleep. The inability to achieve restful sleep can create a vicious cycle, as poor sleep exacerbates stress levels and impairs overall well-being [15].

Table 7. Categories of diseases associated with chronic stress.

Health Risk	Description	Mechanism
Cardiovascular Diseases	Increased risk of hypertension, heart disease, and stroke.	Chronic stress leads to elevated cortisol levels, causing increased blood pressure and heart rate.
Obesity	Accumulation of abdominal fat and weight gain.	Stress-induced cortisol release promotes fat storage and increases appetite, particularly for high-calorie foods.
Diabetes	Elevated blood sugar levels and insulin resistance.	Stress hormones can increase glucose production and reduce insulin sensitivity.
Gastrointestinal Issues	Conditions such as irritable bowel syndrome (IBS) and peptic ulcers.	Stress affects gut motility and increases stomach acid production.
Immune System Suppression	Reduced ability to fight infections and prolonged healing times.	Chronic stress suppresses immune function, decreasing lymphocyte production.
Musculoskeletal Disorders	Muscle tension, pain, and tension-type headaches.	Stress causes muscles to contract, leading to tension and pain.
Sleep Disorders	Insomnia and poor sleep quality.	Elevated stress hormones disrupt sleep patterns and circadian rhythms.
Anxiety and Depression	Increased prevalence of mood disorders.	Chronic stress alters neurotransmitter levels, affecting mood regulation.
Cognitive Impairment	Memory problems and decreased concentration.	Stress impacts the hippocampus, impairing cognitive functions.
Substance Abuse	Increased use of alcohol, tobacco, or drugs as coping mechanisms.	Individuals may turn to substances to alleviate stress, leading to dependency.

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Psychological effects of stress

Stress has profound effects on mental health, contributing to a variety of psychological challenges:

- **Anxiety and Depression:** Chronic stress is a significant driver of mood disorders, including anxiety and depression. It disrupts the balance of neurotransmitters and hormones that regulate mood, leading to feelings of fear, sadness, or hopelessness [16].
- **Cognitive Decline:** Stress can impair cognitive functions such as memory, attention, and decision-making. The brain regions responsible for higher-order thinking and emotional regulation, such as the prefrontal cortex, are particularly vulnerable to the effects of prolonged stress [17].
- **Behavioural Changes:** Stress often manifests as irritability, social withdrawal, and reduced productivity. It can also drive individuals to adopt maladaptive coping mechanisms such as overeating, substance abuse, or excessive screen time, which can perpetuate the stress cycle [18].

Role of nutraceuticals in stress management

Nutraceuticals, derived from natural sources, offer a promising approach to stress management. These compounds work by targeting the physiological pathways involved in the stress response, including hormone regulation, neurotransmitter activity, and inflammation (Figure 1).

- **Adaptogens:** Herbs like *Rhodiola rosea* and *Withania somnifera* (Ashwagandha) are known for their adaptogenic properties, helping the body resist physical and mental stress. They may improve resilience to stress by modulating cortisol levels and supporting energy balance [19].
- **Omega-3 Fatty Acids:** Omega-3 fatty acids, found in fish oil, have anti-inflammatory effects and can support brain health. They may help reduce symptoms of anxiety and promote emotional stability by influencing neurotransmitter activity [20].
- **B Vitamins:** B-complex vitamins, particularly B6, B9, and B12, play essential roles in neurotransmitter synthesis and brain function. These vitamins help support energy metabolism and maintain a balanced mood, making them critical for stress management [21].
- **Magnesium:** Magnesium has a calming effect on the nervous system by regulating the release of stress hormones and supporting relaxation. It may help reduce feelings of anxiety and improve sleep quality, both of which are crucial for mitigating stress [22].
- **Probiotics:** The gut-brain axis underscores the connection between gut health and mental well-being. Probiotics may help reduce stress and anxiety by promoting a healthy balance of gut bacteria, which can influence the production of mood-regulating chemicals [23].

Key Nutraceuticals for Stress Management

Nutraceuticals, derived from food sources, offer therapeutic benefits beyond basic nutrition, particularly in stress management (Table 2). Key categories include adaptogens, antioxidants, omega-3 fatty acids, and B vitamins.

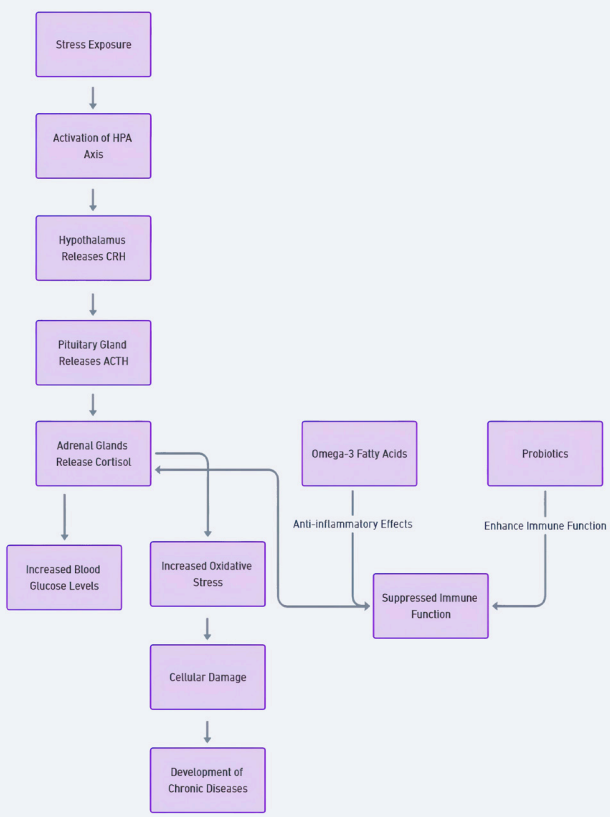

Figure 1. Impact of Stress-Induced HPA Axis Activation on Health and the Role of Nutritional Interventions.

- **Adaptogens:** These natural substances enhance the body's resilience to stress by modulating the hypothalamic-pituitary-adrenal (HPA) axis. Ashwagandha (*Withania somnifera*) has demonstrated efficacy in reducing cortisol levels and improving stress resistance. *Rhodiola rosea* and ginseng (*Panax ginseng*) are also recognized for their adaptogenic properties, contributing to improved mental performance and reduced fatigue [24].
- **Antioxidants:** Chronic stress increases oxidative stress, leading to cellular damage. Antioxidants like vitamins C and E neutralize free radicals, mitigating oxidative damage and supporting overall health. Their role in reducing oxidative stress is crucial in preventing stress-related cellular damage [25].
- **Omega-3 Fatty Acids:** Found in fish oil and flaxseeds, omega-3 fatty acids are essential for brain health. They modulate inflammation and improve neurotransmitter function, potentially reducing anxiety and depressive symptoms associated with chronic stress [26].
- **B Vitamins:** B-complex vitamins, particularly B6 and B12, are vital for mood regulation and energy production. Deficiencies in these vitamins can lead to fatigue and mental health issues, making them important for individuals under stress. Their role in neurotransmitter synthesis underscores their importance in stress management [27].

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Table 2. Different types of Nutraceuticals, food sources, health benefits and their mechanism of action.

Nutraceutical	Food Sources	Health Benefits	Mechanisms of Action
Omega-3 Fatty Acids	Fatty fish (e.g., salmon, mackerel), flaxseeds, walnuts	Cardiovascular health, anti-inflammatory effects, cognitive Function	Incorporation into cell membranes, modulation of eicosanoid production, reduction of pro-inflammatory cytokines
Probiotics	Yogurt, kefir, fermented foods (e.g., sauerkraut, kimchi)	Gut health, immune modulation, prevention of gastrointestinal infections	Enhancement of gut microbiota balance, competitive inhibition of pathogenic bacteria, stimulation of mucosal immunity
Prebiotics	Garlic, onions, bananas, whole grains	Support of beneficial gut bacteria, improved digestion, enhanced mineral absorption	Fermentation by gut microbiota producing short-chain fatty acids, lowering gut pH, promoting growth of beneficial bacteria
Polyphenols	Berries, tea, red wine, dark chocolate	Antioxidant activity, anti-inflammatory effects, reduced risk of chronic diseases	Scavenging of free radicals, modulation of cell signaling pathways, inhibition of pro-inflammatory enzymes
Carotenoids	Carrots, sweet potatoes, spinach, tomatoes	Eye health, antioxidant activity, reduced risk of certain cancers	Quenching of singlet oxygen, protection against oxidative damage, modulation of immune response
Dietary Fiber	Whole grains, legumes, fruits, vegetables	Improved digestion, reduced risk of cardiovascular disease, regulation of blood sugar levels	Promotion of bowel regularity, binding of bile acids, modulation of gut microbiota
Flavonoids	Citrus fruits, onions, tea, apples	Antioxidant activity, cardiovascular protection, anti-cancer properties	Inhibition of lipid peroxidation, modulation of cell signaling pathways, induction of detoxifying enzymes
Glucosinolates	Cruciferous vegetables (e.g., broccoli, Brussels sprouts, cabbage)	Anti-cancer properties, detoxification support, anti-inflammatory effects	Induction of phase II detoxification enzymes, inhibition of carcinogen activation, modulation of inflammatory pathways
Phytosterols	Nuts, seeds, vegetable oils, whole grains	Cholesterol-lowering effects, cardiovascular health	Inhibition of intestinal cholesterol absorption, reduction of serum LDL cholesterol levels
Saponins	Legumes (e.g., soybeans, chickpeas), quinoa, spinach	Cholesterol-lowering effects, immune modulation, anti-cancer properties	Binding to cholesterol in the digestive tract, stimulation of immune cells, induction of apoptosis in cancer cells

Mechanisms of Action in Stress Reduction

Each nutraceutical operates through distinct biological mechanisms to alleviate stress:

- **Adaptogens:** Adaptogens modulate the HPA axis, which regulates the body's response to stress. By influencing this axis, adaptogens help maintain homeostasis and enhance resilience to stressors. For instance, ashwagandha has been shown to reduce cortisol levels, thereby mitigating the physiological impact of stress [28].
- **Antioxidants:** Chronic stress leads to the production of reactive oxygen species (ROS), causing oxidative damage. Antioxidants neutralize ROS, reducing oxidative stress and protecting cellular integrity. This action is crucial in preventing stress-induced cellular damage and maintaining overall health [29].
- **Omega-3 Fatty Acids:** Omega-3s modulate inflammatory pathways by influencing cytokine production and eicosanoid synthesis. They also affect neurotransmitter function, enhancing serotonin and dopamine pathways, which are often disrupted in stress-related conditions. This dual action helps alleviate symptoms of anxiety and depression associated with chronic stress [30].
- **B Vitamins:** B vitamins serve as cofactors in the synthesis of neurotransmitters such as serotonin, dopamine, and gamma-aminobutyric acid (GABA), which are crucial for mood regulation. Adequate levels of B6 and B12 ensure proper neurotransmitter function, thereby supporting

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mental health and reducing stress-related symptoms [31].

Awareness of Nutraceuticals in High-Stress Lifestyles

Public knowledge and misconceptions

The nutraceutical industry has experienced significant growth, yet public awareness and understanding of these products remain inconsistent. A study assessing the awareness, perception, and usage of nutraceuticals in Indian society revealed that while a segment of the population recognizes their potential benefits, misconceptions persist [32]. Notably, some individuals erroneously believe that nutraceuticals can serve as complete substitutes for a balanced diet, neglecting the necessity of comprehensive nutrition. Additionally, there is a lack of awareness regarding appropriate dosages and potential interactions with medications, which can lead to misuse and adverse effects [33].

These misunderstandings are compounded by the absence of standardized regulations and quality control in the nutraceutical market, leading to variability in product efficacy and safety. Consumers often rely on anecdotal evidence or marketing claims rather than scientific validation, further perpetuating misinformation. This underscores the need for enhanced public education and transparent communication from manufacturers to ensure informed decision-making [34].

Influence of marketing and media

Media and marketing strategies significantly shape consumer perceptions of nutraceuticals. The rise of digital marketing and social media platforms has amplified the reach of nutraceutical promotions, often utilizing influencers to endorse products. While these channels increase visibility, they can also disseminate misinformation, leading consumers to overestimate benefits or overlook safety guidelines. A study on digital marketing ethics highlighted concerns regarding the accuracy of information presented online, emphasizing the need for ethical marketing practices to protect consumer interests [35].

The proliferation of unverified claims and testimonials can create unrealistic expectations and obscure potential risks associated with nutraceutical use. This environment necessitates critical evaluation of information sources and underscores the importance of regulatory oversight to ensure that marketing practices align with scientific evidence and ethical standards [36].

Role of health professionals

Healthcare professionals are pivotal in promoting accurate awareness and guiding appropriate use of nutraceuticals. Integrating nutraceutical education into health consultations can empower consumers to make informed choices, particularly those with high-stress lifestyles who may prioritize convenience over thorough research. A study on public awareness and risk perceptions of endocrine-disrupting chemicals highlighted the effectiveness of healthcare providers in disseminating accurate information and correcting misconceptions [37].

By providing evidence-based guidance, healthcare professionals can help individuals understand the role of nutraceuticals as adjuncts to, rather than replacements for, a balanced diet and healthy lifestyle. This approach fosters informed decision-making and encourages the responsible use of nutraceuticals, thereby enhancing their potential benefits while minimizing risks [38].

Challenges and Limitations of Nutraceuticals

Safety and quality control

The nutraceutical industry faces significant challenges regarding product safety and quality control. Variability in manufacturing practices can lead to inconsistencies in product composition, including inaccurate labelling and the presence of contaminants, which pose health risks to consumers [39]. For instance, analyses have revealed discrepancies in the concentration of active ingredients across different brands, raising concerns about both efficacy and safety. Such inconsistencies may result from inadequate quality assurance protocols, lack of standardized manufacturing processes, and insufficient regulatory oversight. Ensuring product quality requires stringent adherence to good manufacturing practices (GMP), comprehensive testing for contaminants, and accurate labelling to inform consumers about product contents. Implementing robust quality control measures is essential to maintain consumer trust and safeguard public health [40].

Lack of clinical evidence

While preclinical studies suggest the potential benefits of nutraceuticals, there is a paucity of large-scale clinical trials in human populations. This lack of rigorous testing makes it challenging to establish standardized dosing recommendations and predict long-term effects. The absence of comprehensive clinical evidence complicates the ability of healthcare professionals to provide reliable guidance on nutraceutical use, particularly for stress management. Moreover, without robust clinical data, it is difficult to assess the efficacy of nutraceuticals in diverse populations and to understand potential interactions with other medications or health conditions. Addressing this gap requires investment in well-designed clinical trials that evaluate the safety, efficacy, and optimal usage of nutraceuticals in human subjects [41].

Accessibility and affordability

The cost of nutraceuticals can be prohibitive, limiting access for certain populations, particularly those with lower socioeconomic status. This issue is compounded by the tendency for nutraceutical awareness and consumption to be concentrated among higher-income groups, leading to disparities in health benefits. Strategies to make these products more affordable and accessible could enhance their potential as tools for public health. Potential approaches include implementing pricing regulations, providing subsidies or insurance coverage for nutraceuticals, and increasing public awareness about their benefits. Ensuring equitable access to nutraceuticals is crucial for maximizing their impact on population health and reducing health disparities [42].

Regulatory challenges

The nutraceutical industry faces uneven regulatory oversight, which varies by country and region. In some areas, nutraceuticals are classified as food supplements rather than pharmaceuticals, resulting in less stringent safety and efficacy

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requirements. This regulatory ambiguity can lead to inconsistencies in product quality and safety standards, undermining consumer trust [43]. Improving regulations to ensure consistent quality and safety standards is essential for building consumer confidence and safeguarding public health. This may involve establishing clear definitions and classifications for nutraceuticals, implementing standardized testing and manufacturing protocols, and enforcing compliance through regular inspections and penalties for non-compliance. Harmonizing regulations across regions can also facilitate international trade and ensure that consumers worldwide have access to safe and effective nutraceutical products [44].

Future Directions and Recommendations

Enhancing public awareness

Improving public awareness of nutraceuticals is essential for informed consumer choices and effective utilization. Community education programs can disseminate accurate information about the benefits and appropriate use of nutraceuticals, addressing common misconceptions. Health authorities can leverage social media platforms to reach a broader audience, providing evidence-based content that emphasizes the importance of proper usage and potential interactions with medications. Clear and informative labelling on nutraceutical products is also crucial, enabling consumers to understand the contents, recommended dosages, and any associated health claims. By emphasizing transparency and accuracy, these strategies can foster trust and empower consumers to make informed decisions regarding nutraceutical use [45].

Promoting rigorous research

Investing in high-quality research is critical for advancing the field of nutraceuticals and validating their efficacy. Encouraging collaborations between industry stakeholders and academic institutions can facilitate comprehensive studies that assess the safety and effectiveness of various nutraceuticals. Such research should prioritize commonly used adaptogens, antioxidants, and essential nutrients with the potential to mitigate stress-related health issues. By establishing a robust evidence base, healthcare professionals can provide reliable guidance to consumers, and regulatory bodies can develop informed policies that ensure product safety and efficacy. Moreover, rigorous research can identify optimal dosages, potential side effects, and interactions with other medications, contributing to the responsible use of nutraceuticals [46].

Regulatory improvements

Implementing standardized regulatory frameworks for nutraceuticals is essential to enhance product safety and quality. Clear guidelines for quality control, labelling, and advertising would empower consumers and increase accountability within the industry. Adopting practices similar to those governing pharmaceuticals can help ensure that nutraceuticals meet consistent safety and efficacy standards. Regulatory bodies should establish stringent manufacturing practices, enforce accurate labelling that reflects the true content and benefits of the products, and monitor advertising to prevent misleading claims. By creating a transparent and accountable regulatory environment, consumers can make informed choices without compromising safety [47].

Integrating nutraceuticals into holistic health approaches

While nutraceuticals offer promising benefits, they should not be viewed as replacements for healthy lifestyles. Integrating nutraceuticals with stress-reduction techniques such as mindfulness, regular exercise, and proper sleep hygiene may enhance overall health outcomes for individuals with demanding lifestyles. Public health campaigns could emphasize the importance of a balanced approach, where nutraceuticals complement rather than replace other health strategies. By promoting a holistic perspective, individuals can adopt comprehensive health practices that address both the root causes and symptoms of stress, leading to improved well-being and resilience [48].

Conclusions

Nutraceuticals, encompassing dietary supplements and functional foods, have garnered attention for their potential to mitigate stress and enhance resilience in individuals experiencing high-stress lifestyles. These products often contain bioactive compounds such as adaptogens, antioxidants, omega-3 fatty acids, and B vitamins, which may modulate physiological pathways involved in the stress response. For instance, adaptogens like ashwagandha and Rhodiola rosea are believed to influence the hypothalamic-pituitary-adrenal axis, thereby regulating cortisol levels and improving stress resilience. Antioxidants, including vitamins C and E, combat oxidative stress, a condition exacerbated by chronic stress, thus protecting cellular integrity. Omega-3 fatty acids and B vitamins play crucial roles in neurotransmitter function and energy metabolism, supporting mental health and cognitive function. Despite these promising attributes, several challenges impede the widespread and effective use of nutraceuticals. Public awareness remains limited, with misconceptions about their efficacy and safety. Inconsistent product quality further complicates consumer trust, as variations in manufacturing practices can lead to discrepancies in active ingredient concentrations and potential contamination. Regulatory frameworks for nutraceuticals are often less stringent than those for pharmaceuticals, resulting in variability in product standards and oversight. Addressing these barriers necessitates a collaborative approach among healthcare providers, regulatory authorities, and the nutraceutical industry. Healthcare professionals can play a pivotal role by educating patients on the appropriate use of nutraceuticals, emphasizing that they should complement, not replace, a balanced diet and healthy lifestyle. Regulatory bodies must establish and enforce rigorous quality control standards to ensure product safety and efficacy. The nutraceutical industry should invest in high-quality research to substantiate health claims and adhere to ethical marketing practices. By advancing research, enhancing public awareness, and implementing stringent quality standards, nutraceuticals can become integral components of a holistic strategy for managing stress in contemporary lifestyles. Such an approach not only addresses the physiological aspects of stress but also promotes overall well-being, aligning with the growing emphasis on preventive health measures.

Disclosure statement

No potential conflict of interest was reported by the author.

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