

Vitamin intake without prescription: a review of self-medication trends and determinants among consumers



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ABSTRACT

Vitamin self-medication has become a common and expanding global behavior, shaped by sociocultural influences, commercial marketing, online information, and minimal regulatory oversight. This review examines recent evidence on non-prescribed vitamin intake, focusing on prevalence, usage patterns, determinants, potential benefits, and documented risks, especially vitamin toxicity. A narrative synthesis of studies published between 2019 and 2025 was conducted, incorporating epidemiological surveys, systematic reviews, clinical toxicology reports, and regulatory frameworks. Findings show that self-medication with vitamins ranges from 15% to over 60% across populations, with vitamin D, C, multivitamins, and B-complex products being the most frequently consumed. Determinants include health beliefs, educational background, social influence, pandemic-related concerns, and the proliferation of e-commerce platforms. Although vitamins play a significant role in preventing deficiency states, inappropriate intake—especially of fat-soluble vitamins—can lead to clinically significant toxicity and drug interactions. Regulatory gaps, inconsistent labeling, and the widespread perception of vitamins as harmless further exacerbate risks. Addressing these issues requires targeted public-health education, pharmacist-led counseling, stronger labeling requirements, and enhanced oversight of online supplement markets.

Keywords: dietary supplements, consumer behavior, self-medication, vitamin supplementation.

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INTRODUCTION

Vitamin self-medication refers to the use of vitamins without professional consultation or diagnostic confirmation, often relying on personal judgment, family recommendations, advertisements, or online content. Over recent decades, vitamin use has increased substantially as part of a broader shift toward self-directed health practices and preventive behaviors. Many consumers perceive vitamins as inherently harmless because they are “natural,” despite clinical evidence showing otherwise, particularly for fat-soluble vitamins that accumulate within tissues and can reach toxic levels.¹

The rapid expansion of the global supplement industry, coupled with easy access through pharmacies, supermarkets, and online marketplaces, has made non-prescribed vitamin consumption both effortless and socially normalized. The COVID-19 pandemic further accelerated this trend as populations turned to supplements, especially vitamin C and D, for perceived immune support and protection against infections.²

Although appropriate vitamin supplementation can prevent and correct deficiencies, many individuals take supplements in the absence of any clinical need, resulting in unnecessary exposure, financial burden, and potential

toxicity. To ensure safe and rational vitamin use, it is essential to understand the underlying behavioral, social, and structural determinants driving self-medication practices, as well as the clinical consequences of inappropriate intake.

METHODS

A narrative review approach was used. Literature published between 2019 and 2025 was identified through searches in PubMed, Scopus, Google Scholar, the CDC, NIH Office of Dietary Supplements, StatPearls, and regulatory documents from the FDA, CRN, and the UK Committee on Toxicity. Search terms included: self-medication, vitamins, dietary

supplements, vitamin D, vitamin toxicity, consumer determinants, over-the-counter supplements, and supplement regulation. Studies included epidemiological surveys, meta-analyses, observational studies, toxicology reports, population health analyses, and regulatory guidelines. Literature focusing on unsupervised vitamin use among adults, students, and general consumers was prioritized. The synthesis provides a comprehensive overview of global trends.

Prevalence and Global Trends of Vitamin Self-Medication

Self-medication with vitamins is widely documented across multiple regions. A 2025 systematic review reported a prevalence between 15.7% and 61.2%, with an approximate mean of 34.8% across populations.³ This wide range reflects differences in cultural norms, access to healthcare, supplement availability, and public-health messaging.

In the United States, NHANES 2017–2020 data revealed that 57.6% of adults used dietary supplements regularly, and nearly one-third consumed multivitamin-mineral preparations daily. Similar patterns have been documented in Europe, the Middle East, and parts of Asia, where vitamins are routinely purchased without consultation, especially vitamin D and C.^{4,5}

Vitamin D self-prescription has seen the steepest rise. Several studies in the Gulf and Middle Eastern regions report that 40–70% of adults consume vitamin D supplements without testing serum levels or receiving medical advice.⁶ After the onset of the COVID-19 pandemic, vitamin D and C sales increased globally, driven by widespread beliefs that these vitamins prevent or reduce the severity of viral infections.²

The prevalence is notably higher in health-professional students, who often believe they are capable of managing their own supplementation and interpreting online health information. Older adults also exhibit high supplement use, often taking multiple products simultaneously, which increases cumulative exposure.⁷

Patterns of Vitamin Consumption

The pattern of vitamin self-medication is characterized by frequent use of multiple

supplements, variability in dose, and inconsistent adherence to recommended guidelines. Some of the most frequently used vitamins are vitamin D (immunity, bone health, fatigue management), vitamin C (general immunity, treatment of colds), multivitamins (general well-being, prevention), vitamin B-complex (stress, energy improvement), and vitamin E (skin, cosmetic use, antioxidant claims). Consumers often engage in multi-supplement stacking, where multiple products (e.g., multivitamin + vitamin D + immunity boosters) are taken together without understanding overlapping nutrient content. This practice significantly increases the risk of surpassing tolerable upper intake levels. Vitamin D is especially prone to misuse. Standard multivitamins commonly contain 400–1,000 IU, while additional immune support formulas may include 2,000–5,000 IU. Chronic intake above 10,000 IU/day increases the likelihood of toxicity.¹

Determinants of Self-Medication with Vitamins

There are some determinants of self-medication with vitamins, including individual determinants, social and cultural determinants, market and system-level determinants, and special considerations for specific populations. Personal beliefs play a major role in vitamin self-medication. Individuals who view supplements as essential for good health or disease prevention are more likely to self-medicate. Previous positive experiences, habitual use, and the perception of vitamins as “risk-free” further reinforce the behavior. Socioeconomic factors also influence usage; higher education and income levels are positively associated with supplement intake.⁸

The social and cultural determinants that happen in family practices, especially recommendations by parents or older relatives, significantly influence supplement choices. Peer influence is also strong among younger adults and students. Social media, health influencers, and online advertisements amplify supplement uptake by presenting vitamins as beneficial lifestyle products rather than pharmacologically active substances.⁹

The market and system-level determinants are determined by several

structural determinants such as easy otc availability, minimal regulatory restrictions, pharmacy promotions, and e-commerce platforms offering bulk or imported vitamins at discounted prices. The absence of mandatory professional consultation contributes to the normalization of unsupervised vitamin use. Under frameworks such as the U.S. DSHEA (1994), supplements enter the market without requiring pre-market approval for safety or efficacy.¹⁰

There is also special consideration for some populations. Health-sciences students often exhibit higher self-medication rates due to confidence in their medical knowledge and familiarity with supplement indications.⁷ Pregnant women may also self-medicate, especially with folic acid or iron, but such practices require caution because high doses of vitamin A or other fat-soluble vitamins pose teratogenic risks.¹¹

Benefits of Vitamin Supplementation

Vitamins are essential micronutrients, and supplementation plays a vital role in specific contexts: Vitamin D: treating deficiency and improving bone health. Folic acid: preventing neural tube defects. Vitamin B12: treating pernicious anemia. Iron, iodine, and calcium: addressing specific nutritional deficiencies. However, evidence indicates that routine daily intake of multivitamins does not significantly reduce overall mortality or prevent chronic diseases in healthy individuals.⁴ Thus, supplementation remains beneficial primarily for diagnosed deficiencies or high-risk groups, not as a universal preventive strategy.

The role of vitamins, particularly antioxidant vitamins, in cardiovascular health has been a subject of extensive research. Despite some observational studies indicating a protective effect of antioxidants, such as vitamin E, against coronary heart disease, large randomized controlled trials (RCTs) have shown no significant benefits from routine supplementation for primary cardiovascular disease prevention.¹² For example, a systematic review indicated that vitamin E supplementation could be associated with an increased risk of stroke in patients with cardiovascular disease.^{12,13}

Similarly, a recent review confirmed that most clinical trials have failed to demonstrate a meaningful impact of vitamin D on cardiovascular outcomes.¹⁴ Thus, while some vitamins may contribute to cardiovascular health, reliance on supplementation without addressing lifestyle factors could be misplaced.

In the realm of mental health, several studies have reported positive effects of B vitamin supplementation on depressive symptoms, anxiety, and stress levels. A systematic review by Young et al. indicated that B vitamin supplementation could help decrease subjective stress in healthy and at-risk individuals, corroborating the role of these vitamins in mood regulation. Research supports the efficacy of vitamin B12 in enhancing cognitive functions in older adults, particularly in those with deficiencies.¹⁵ However, contradictory evidence exists; for instance, trials like the VITACOG study demonstrated that supplementation with B vitamins did not significantly improve cognitive decline in individuals with mild cognitive impairment, suggesting variability in the outcomes based on patient population and baseline vitamin status.¹⁶

The COVID-19 pandemic has spurred interest in the role of vitamins in immune response. Vitamins C and D have been noted to modulate immune responses, possibly reducing the severity of infections.¹⁷ A systematic review found that vitamin D could mitigate cytokine storms associated with severe cases of COVID-19, indicating potential therapeutic applications during viral infections.¹⁷ However, the evidence is not uniform; other studies have shown that vitamin D's benefits on respiratory infections may not extend to all populations, emphasizing the need for personalized approaches based on vitamin status and individual health.^{14,18}

Risks and Adverse Outcomes of Unsupervised Vitamin Use

The fat-soluble vitamins (vitamin A, D, E, and K) have the highest toxicity potential. Fat-soluble vitamins accumulate in tissue, making toxicity more likely during long-term high-dose intake. Specifically, excessive vitamin D results in hypercalcemia, which can cause nausea, vomiting, constipation, polyuria,

dehydration, confusion, renal impairment, and cardiac rhythm disturbances. Most documented cases arise from consuming overly high doses for prolonged periods or from mislabeled supplements containing significantly higher concentrations than stated.¹

Chronic vitamin A supplementation without any monitoring can lead to liver damage, bone pain and fractures, hair loss, headaches, and vision changes, and also teratogenic effects in early pregnancy. Several previous studies have reported that doses exceeding 10,000 IU/day pose serious risks for pregnant women.¹¹ Vitamin E interferes with vitamin K-dependent clotting pathways. Overuse may cause increase bleeding risk, magnify warfarin effects, and cause hemorrhagic complications.¹¹

In other words, excess water-soluble vitamins also possess risk of toxicity. Though generally safer, water-soluble vitamins can cause harm when taken in high doses, vitamin B6 (pyridoxine): sensory neuropathy at doses >100–200 mg/day, vitamin B3 (niacin): hepatotoxicity and flushing, and vitamin C: gastrointestinal distress and kidney stone risk in predisposed individuals.¹⁹ Despite potential benefits for deficiency states, population-level use of multivitamins offers limited evidence for reducing chronic disease risks. Conversely, the risks associated with inappropriate intake, particularly toxicity of fat-soluble vitamins, are clinically relevant and well-documented.^{20,21}

Regulatory Landscape and Gaps

The regulatory environment for vitamin and dietary supplement products remains highly heterogeneous across regions, creating uneven oversight from product development to post-market surveillance. In the United States, under DSHEA (1994), vitamins are regulated as dietary supplements. Key characteristics: No pre-market FDA approval for safety or efficacy, manufacturers are responsible for product safety, and FDA intervenes only post-market through recalls or warnings [9]. While in Europe and the United Kingdom, supplements are treated as food products. Safe upper intake levels exist, but enforcement varies by country. The UK

Committee on Toxicity provides detailed UL recommendations for each vitamin.²²

In the Gulf Region and Middle East, regulations are improving, but supplements remain widely available. Many consumers rely heavily on pharmacist recommendations or online markets, contributing to unmonitored usage. Clear labeling, enhanced consumer education, and structured pharmacist counseling are necessary to reduce harm. Regulatory bodies must strengthen post-market surveillance and require more transparent identification of ULs on product labels. In addition, digital tools and mobile applications could support consumers by monitoring cumulative vitamin intake across multiple supplement products.²²

However, as a narrative (non-systematic) review, it is inherently limited by potential selection and publication bias, the absence of a formal risk-of-bias appraisal and quantitative pooling, and reliance on heterogeneous, largely self-reported survey data with variable definitions of self-medication settings, consequently, prevalence estimates and determinants should be interpreted as directional rather than definitive, and causal inferences cannot be established.

CONCLUSION

Vitamin self-medication is a common global practice driven by accessibility, misperceptions of safety, and strong social and commercial influences. While vitamins play an essential role in preventing deficiencies, inappropriate intake contributes to clinically significant toxicity, especially for fat-soluble vitamins. Improving supplement literacy, promoting pharmacist-led guidance, enforcing clearer labeling standards, and enhancing regulatory oversight, particularly in online marketplaces, are essential steps to protect consumers and reduce vitamin-related adverse outcomes.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ETHICAL STATEMENT

Ethical approval was not required for this study as it is a narrative review based exclusively on previously published literature and did not involve human participants, patient data, or animal subjects.

AUTHOR CONTRIBUTIONS

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All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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