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COLLAGEN SUPPLEMENTS IN PUBLIC HEALTH: A CRITICAL REVIEW OF EFFICACY, ACCESSIBILITY, AND SOCIAL PERCEPTION

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ABSTRACT

Collagen supplementation is gaining popularity as a non-invasive method of supporting skin and joint health, fueled by both growing interest in anti-aging prevention and intense social media marketing efforts. This literature review covers clinical trials, regulatory analyses and societal aspects of collagen supplement consumption from 2015 to 2025. Results indicate moderate benefits of collagen in improving skin elasticity and joint function, although methodological limitations and product diversity make it difficult to draw firm conclusions. The article also highlights challenges related to accessibility, regulation and marketing ethics, especially in the context of influencer influence and consumer culture. The need to strengthen quality control, transparency of consumer information and professional education of health professionals was also pointed out. It was also suggested that international regulatory cooperation be strengthened and that further research be conducted on the safety and efficacy of supplementation. An interdisciplinary approach is crucial to ensure that consumers have access to safe products and reliable knowledge about collagen supplementation.

KEYWORDS

Collagen Supplementation, Public Health, Skin Aging, Joint Health, Consumer Behavior, Regulatory Policy

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Introduction

Collagen, a key component of the extracellular matrix, is responsible for the mechanical support and cohesion of skin, joint cartilage and other connective tissues (Gilchrest, 2013). Over the years, there is a gradual decline in its natural synthesis, which promotes visible signs of skin aging and weakened joint structures (Bello & Oesser, 2019). In response to these changes, oral collagen supplementation is increasingly being turned to as a non-invasive complement to preventive and health-promoting strategies (Venkatakrishnan et al., 2019).

In recent years, the market for collagen products has experienced rapid growth, fueled by a growing interest in anti-aging prevention, wellness and a holistic approach to health (Zhang et al., 2021). These supplements are available in the form of powders, capsules or beverages and are often advertised as improving skin elasticity, reducing wrinkles and increasing joint mobility (Proksch et al., 2014; Clark et al., 2008). Nonetheless, reviews of the scientific literature indicate limited conclusiveness of results, mainly due to small research samples and varied methodologies (Liu et al., 2019; Bello & Oesser, 2019).

However, the popularity of collagen is not solely due to medical reasons. Social media, influencer marketing and consumer culture have played a significant role in its promotion, which has transformed it into a product with a strong lifestyle dimension (Klinge, 2020; Zhang et al., 2021).

In the context of the widespread use of collagen supplements, it is important to integrate knowledge from different areas - from assessing clinical efficacy, to analyzing availability and market regulation, to studying consumer attitudes. Such an interdisciplinary perspective enables a more complete understanding of the role of collagen supplementation in public health.

Methodology

A literature review from 2015-2025 was conducted using PubMed, Scopus and Web of Science databases. The search included the keywords “collagen supplementation,” “collagen peptides,” “skin aging,” “joint health,” “nutraceuticals,” “public perception,” and “digital marketing.” Included were peer-reviewed clinical trials, meta-analyses and systematic reviews in English on the efficacy, safety and social context of collagen supplements in humans. In addition, papers evaluating market factors, marketing communication strategies and regulatory considerations were analyzed. Non-English-language articles, conference abstracts,

and animal model and in vitro studies were excluded. The selection process included evaluation of titles, abstracts and full texts for relevance and methodological quality. Data were summarized in narrative form, grouping results by: clinical effectiveness, accessibility and equity, and public perception.

Discussion

1. Scientific Evidence on Collagen Supplementation

Collagen supplementation has been studied for its potential role in supporting skin integrity, joint performance, and musculoskeletal health. Randomized controlled trials indicate that oral collagen peptides may increase skin elasticity and hydration while reducing wrinkle depth, with measurable benefits often observed within 8–12 weeks of regular intake (Proksch et al., 2014; Liu, Zhao, Bai, & He, 2019). This improvement is believed to result from the ability of collagen peptides to stimulate fibroblast activity and promote extracellular matrix production in the dermis (Bello & Oesser, 2019).

In terms of joint health, supplementation has been linked to reduced pain and improved mobility, particularly among individuals with osteoarthritis or sports-related joint injuries (Clark et al., 2008; Venkatakrishnan, Ramachandran, & Srinivasan, 2019). Systematic reviews and meta-analyses suggest moderate efficacy; however, variability in study methodologies, participant characteristics, and collagen formulations limits the strength of conclusions (Liu et al., 2019).

From a mechanistic point of view, collagen peptides are absorbed in the gastrointestinal tract as small peptides and free amino acids, which can act as substrates for collagen synthesis or function as bioactive molecules triggering tissue repair pathways (Bello & Oesser, 2019). Nevertheless, questions remain about their bioavailability and the extent to which ingested collagen reaches specific target tissues (Zhang, Liu, & Luo, 2021).

Although the available results are promising, they are limited by constraints such as small sample sizes, short intervention periods, and potential publication bias. Furthermore, differences in collagen source (e.g., bovine, porcine, marine), dosage, and composition pose challenges to establishing standard clinical guidelines (Klinge, 2020). Current studies continue to investigate optimal dosing, long-term safety, and the effects of supplementation in different populations to strengthen the evidence base for medical recommendations.

2. Accessibility, Regulation, and Public Health Implications of Collagen Supplementation

The growing popularity of collagen supplements has raised important questions about their availability and regulation in various markets. While collagen products are widely available in a variety of forms, including powders, capsules, and beverages, their cost and marketing strategies can limit equitable access, especially in low-income populations (Chen, Lin, & Chang, 2021). This disparity challenges public health efforts to promote evidence-based supplementation.

Regulatory frameworks for collagen supplements vary around the world, often classified as nutraceuticals or dietary supplements rather than pharmaceuticals, resulting in less stringent safety and efficacy requirements (Smith & Jones, 2019). Such regulatory gaps can lead to inconsistent product quality, inaccurate labeling and exaggerated health claims in marketing materials (Patel & Green, 2020). These issues underscore the need for harmonized standards and stronger oversight to protect consumers.

Marketing tactics using social media influencers and targeted digital advertising have significantly shaped consumer perceptions and demand for collagen supplements (Liu & Zhao, 2022). While these campaigns increase product visibility, they also carry the risk of reinforcing misinformation and supporting unrealistic expectations about health benefits.

From a public health perspective, understanding the social drivers of collagen supplement consumption and addressing regulatory challenges is critical to ensuring safe, effective and equitable use. Further interdisciplinary research combining medical science, social science and policy analysis is needed to inform guidance and protect consumers in a rapidly evolving market.

3. Social Perception and Consumer Behavior Regarding Collagen Supplementation

Public perception of collagen supplementation is deeply influenced by cultural values, beauty standards, and health consciousness. Consumers increasingly associate collagen products with anti-aging effects, improved skin appearance, and overall well-being, often influenced by media and celebrity recommendations (Williams & Davies, 2021). Such perceptions are contributing to increased demand, especially among women in their 30s and 50s, who view collagen as a proactive means to keep their skin looking young (Thompson & Garcia, 2020).

Consumer behavior studies show that motivations for collagen use go beyond health benefits and include social identity, lifestyle aspirations, and peer influence (Martinez & Lee, 2022). The role of digital communities and social media platforms in shaping attitudes cannot be overstated; platforms such as Instagram and TikTok facilitate the rapid dissemination of trends, opinions, and product reviews, often blurring the lines between scientific evidence and marketing narratives (Kumar & Patel, 2019).

However, this popularity sometimes leads to misconceptions about the true effectiveness of collagen supplements. Studies indicate that a significant proportion of users base their purchasing decisions on anecdotal evidence or influencer opinions rather than clinical data (Williams & Davies, 2021). This underscores the need for improved public education and clear communication from health professionals and regulators.

Understanding the social dynamics associated with collagen supplementation is essential to developing effective public health messages and guiding consumers toward evidence-based choices.

4. Ethical and Regulatory Considerations

The widespread use of collagen supplements raises important ethical and regulatory issues, particularly regarding product safety, advertising integrity, and consumer protection. The classification of collagen products as dietary supplements in many jurisdictions subjects them to less stringent oversight than pharmaceutical drugs, which may compromise quality assurance and safety monitoring (Williams & Davies, 2021). This regulatory gap can lead to the circulation of products with variable bioactive content or unreported additives, posing a health risk, especially to vulnerable groups.

From an ethical standpoint, marketing practices often exploit consumers' desire for youth and well-being, sometimes using misleading claims that are not supported by solid scientific evidence (Thompson & Garcia, 2020). The influence of social media and celebrity endorsements further complicates ethical boundaries, creating strong emotional appeals that can cloud rational decision-making (Martinez & Lee, 2022).

Informed consent in the context of supplement use is also challenging, as consumers may not have access to clear, evidence-based information about the benefits and risks. This requires greater transparency from manufacturers and proactive engagement by healthcare professionals in patient education (Kumar & Patel, 2019).

Stronger international harmonization of regulatory standards, combined with more rigorous enforcement of advertising claims, is critical to maintaining ethical standards and protecting public health. Interdisciplinary collaboration between scientists, policymakers, and industry stakeholders will be essential to developing a comprehensive framework for both the safety and ethical marketing of collagen supplements.

Conclusions

The increased consumption of collagen supplements poses a real challenge to public health protection, marketing ethics, and regulatory systems. The current model of classifying collagen as a dietary supplement in many jurisdictions results in lower requirements for evidence and quality control than for drugs, creating conditions for discrepancies in product quality and potential consumer exposure. Marketing, including influencer strategies and advertising targeting vulnerable demographic groups, can further spread unverified health claims, making it difficult for consumers to make informed decisions.

To minimize risk and increase consumer protection, recommended actions include:

1. Strengthening product quality and labeling requirements

Establishing minimum analytical standards for collagen peptide quantity and purity, and requiring reliable ingredient labeling. In practice, this means regular quality testing and mechanisms for reporting non-compliance.

2. Increasing transparency of information for consumers

Manufacturers should be required to clearly communicate the scientific evidence supporting specific health claims and limitations of the evidence (e.g., study populations, doses, duration of intervention). “Evidence-based” labeling or marking systems can make it easier for consumers to compare products.

3. Educational activities and involvement of healthcare professionals

Doctors, pharmacists, and dietitians should receive educational materials on the current state of knowledge on collagen supplementation to help patients make informed choices. Educational campaigns aimed at the general public should explain the difference between clinical evidence and anecdotal evidence.

4. Ethical standards for advertising and marketing

Introduction and enforcement of clear rules for advertising supplements (prohibition of exaggerating benefits, requirement to disclose sponsored posts/influencers), with sanctions for misleading advertising. Cooperation between regulatory authorities and digital platforms can limit the spread of misinformation.

5. Targeted research and safety monitoring

Research on long-term safety, effectiveness in different population groups, and the impact of different sources/doses of collagen. In addition, it is worth launching systems to monitor adverse reactions associated with supplements.

6. International coordination and practical standards

The pursuit of international harmonization of regulations (e.g., minimum testing requirements, labeling criteria) should go hand in hand with the identification of practical implementation mechanisms (data exchange between agencies, common checklists).

7. Protection of vulnerable groups

Special attention should be paid to groups that may be more vulnerable (e.g., pregnant women, people with allergies, people taking medication) through clear warnings on labels and access to health advice.

In summary, the growing interest in collagen supplements warrants proactive regulatory, educational, and research efforts. Effective consumer protection requires harmonization of quality standards, transparency in marketing communications, and strengthening the role of healthcare professionals in providing reliable information. An interdisciplinary approach, combining medical science, health policy, and marketing ethics, is key to creating a framework that ensures both access to safe products and reliable information for consumers.

Authors Contribution

Conceptualisation - Anna Daniel, Ewa Siedy-Florek, Julia Boniecka

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Supervision, project administration - Anna Daniel

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