

Peer Review

Review of: "Herbal Treatments and Their Impact on Male Fertility: A Comprehensive Review"

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This narrative review addresses an increasingly important issue in global health—male fertility—and explores the role of herbal medicine as a complementary strategy for its improvement. The authors adopt a multidisciplinary perspective by positioning male fertility not only as a reproductive concern but also as a broader biomarker of male health. This framing is both timely and clinically relevant, as infertility is often a neglected indicator in men's health evaluations. One of the strengths of the article is its emphasis on male fertility as a sentinel condition, linked to oncological, cardiovascular, and autoimmune disorders. The study design as a narrative review is appropriate for an exploratory synthesis of current literature, particularly in a field where evidence is still emerging and diverse in methodology. The authors performed literature searches across multiple databases—PubMed, Scopus, and Google Scholar—using a relevant set of keywords. However, the review would benefit from greater methodological transparency. Were inclusion/exclusion criteria explicitly defined? How many articles were initially retrieved, and how many were included in the final analysis? Was there a critical appraisal of the quality of the studies included?

The review effectively summarizes known modifiable factors impacting male fertility, such as diet, alcohol use, smoking, and environmental toxins. These factors are well-established in the literature and provide essential context for understanding the multifactorial nature of male infertility. Additionally, the authors acknowledge the limitations of conventional treatments, including high cost, side effects, and accessibility barriers, which justifies the interest in alternative therapies such as herbal medicine.

The section on herbal treatments offers a brief overview of traditional and emerging plant-based interventions, including maca and ginseng, highlighting their potential effects on sperm parameters and oxidative stress reduction. This focus on antioxidant mechanisms is scientifically grounded and

consistent with the pathophysiological understanding of oxidative damage in sperm function. However, the article could have provided a more detailed analysis of the biochemical mechanisms, dosing regimens, and specific outcomes from clinical or preclinical trials. What is the evidence hierarchy for these herbal agents? Are the findings consistent across studies, and what is the magnitude of the effect?

While the article rightly cautions against the unregulated use of herbal remedies, it stops short of offering practical recommendations or a framework for safe integration into clinical practice. For example, how should clinicians counsel patients interested in herbal therapies? What are the potential interactions with conventional medications or assisted reproductive technologies? The narrative could be enriched by a discussion on pharmacovigilance, standardization of herbal extracts, and regulatory considerations in different healthcare settings.

One of the limitations of the review is the lack of critical engagement with contradictory findings or studies with null results. For a balanced synthesis, it is important to highlight not only the promising effects of certain herbs but also any evidence showing ineffectiveness or adverse outcomes. Moreover, while the time frame of the literature search (1995–2024) is adequate, the authors do not mention whether older foundational studies were excluded and why. Could historical ethnobotanical knowledge contribute to the current understanding of herbal use in male fertility?

The review is also limited by the absence of demographic or geographic analysis. Given the cultural and regional specificity of herbal medicine practices, how do findings vary across different populations or health systems? Are certain herbs more effective or commonly used in particular cultural contexts? This dimension could help bridge the gap between traditional knowledge and evidence-based medicine.

The conclusion appropriately advocates for cautious optimism, emphasizing the need for herbal medicine to complement—not replace—conventional treatments. This integrative approach is commendable and aligns with holistic models of care. However, the review would be strengthened by a more forward-looking perspective. What are the research priorities in this field? Should future clinical trials explore combinations of herbal and pharmaceutical therapies? How can interdisciplinary teams (e.g., urologists, ethnopharmacologists, reproductive endocrinologists) collaborate to design robust studies?

In summary, this narrative review makes a valuable contribution by drawing attention to the potential of herbal treatments in the management of male infertility, while also acknowledging the need for scientific rigor and patient safety. It is a call for more structured investigation into therapies that are already widely used but insufficiently validated. Future research should adopt standardized methodologies, include large

and diverse populations, and ensure that herbal interventions meet the same evidentiary thresholds as conventional treatments. Only then can informed, safe, and culturally sensitive recommendations be made for couples navigating the challenges of infertility.

Declarations

Potential competing interests: No potential competing interests to declare.