**JBP****Journal of Biochemicals and Phytomedicine**

eISSN: 2958-8561



Traditional Herbal Remedies for Diarrhea: Insights from Iranian Traditional Medicine

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Review

Article History:

Received: 11 Nov 2025

Revised: 10 Mar 2026

Accepted: 13 Mar 2026

Available online: 05 May 2026

Keywords:Gastrointestinal disorders,
Ethnopharmacology,
Herbal therapeutics,
Plant-based medicine,
Traditional remedies,
Phytotherapy,
Gut health*** Corresponding author:****E-mail:** Hashemi5225@yahoo.com**ABSTRACT**

Diarrhea is a common gastrointestinal disorder that may result from infections, dietary disturbances, or intestinal dysfunction. In Iranian traditional medicine, several medicinal plants such as sumac, psyllium, quince seed, and pomegranate rind are recommended due to their astringent and gut-regulating properties. This review aims to identify key traditional remedies and compare them with available modern scientific evidence. This study was conducted as a document-based review. Primary sources included authoritative texts in Iranian traditional medicine, standard reference books on herbal pharmacotherapy, and relevant scientific databases. The therapeutic claims reported in classical medical literature were systematically compared with findings from modern preclinical and experimental studies. The reviewed literature indicates that a wide range of medicinal plants, including *Phoenix dactylifera* L., *Ferula assa-foetida* L., *Anethum graveolens* L., *Trachyspermum ammi* (L.) Sprague, *Bunium persicum* (Boiss.) B. Fedtsch, *Apium graveolens* L., *Coriandrum sativum* L., *Matricaria chamomilla* L., *Achillea millefolium* L., *Borago officinalis* L., *Trigonella foenum-graecum* L., *Quercus brantii* L., *Cinnamomum verum* J. Presl, *Ocimum basilicum* L., *Mentha piperita* L., *Origanum vulgare* L., *Sideritis* spp. L., *Thymus kotschyanus* Boiss., *Myrtus communis* L., *Plantago major* L., *Plantago ovata* Forsk., *Descurainia sophia* (L.) Webb ex Prantl, *Rosa damascena* Mill., and *Zingiber officinale* Roscoe, have been traditionally used to alleviate diarrheal symptoms. Many of these plants have also demonstrated antimicrobial, anti-inflammatory, and gut motility-modulating activities in experimental studies. The available evidence suggests that medicinal plants documented in classical Iranian medical sources may serve as potential natural or adjunct therapeutic agents for the management of diarrhea. Integrating traditional medical knowledge with contemporary scientific evidence may contribute to the development of safer and more effective treatment strategies for gastrointestinal disorders.

Please cite this paper as:Hashemi A. Traditional herbal remedies for diarrhea: Insights from Iranian traditional medicine. *Journal of Biochemicals and Phytomedicine*. 2026; 5(1): 80-89. doi: 10.34172/jbp.2026.8.

Introduction

Gastrointestinal diseases encompass a broad spectrum of disorders affecting the digestive system, which can impair digestion and nutrient absorption, ultimately reducing an individual's quality of life. Timely prevention and management of these conditions are essential not only for preserving physical health but also for preventing serious complications and minimizing the substantial costs associated with medical care (Ghasemi et al., 2020; Shojaasadat et al., 2019; Azary et al., 2011). Diarrhea is among the most common disorders of the gastrointestinal tract and is typically characterized by increased stool frequency and decreased stool consistency. It may result from a broad range of etiologies, including microbial infections, foodborne intoxications, dietary incompatibilities, and impaired intestinal function (Schiller, 2000). In addition to these biomedical explanations, Iranian traditional medicine attributes diarrhea to underlying "Soo-e-Mizaj" (humoral imbalance), weakened digestive force, excess cold or heat in the gastrointestinal tract, and improper gastric or intestinal fermentation, which collectively disrupt the absorptive function of the intestines. When not managed promptly, if not managed promptly, diarrhea may lead to dehydration, electrolyte imbalance, and generalized weakness, thereby placing affected individuals at substantial clinical risk (Aranda-Michel and Giannella, 1999).

Clinically, patients may present with abdominal pain, nausea, low-grade fever, and reduced physical strength. In more severe cases such as those involving hematochezia or persistent symptoms urgent medical intervention becomes essential (Thielman and Guerrant, 2004; Aranda-Michel and Giannella, 1999). Accurate identification of the underlying cause is therefore crucial for selecting an appropriate therapeutic strategy and for preventing secondary complications (Marks, 2012).

The pathophysiology of diarrhea largely reflects a disturbance in the balance between intestinal absorption and secretion of water and electrolytes (Camilleri et al., 2017). This imbalance may arise from excessive secretion, diminished absorption, alterations in intestinal motility, or the osmotic effects of unabsorbed solutes. These mechanisms collectively result in loose or watery stools and an elevated risk of dehydration (Camilleri et al., 2017; Marks, 2012).

Current therapeutic approaches prioritize fluid and electrolyte replacement, symptomatic management, and targeted treatment of the

underlying etiology when identified (Abraham and Sellin, 2007; Alam and Ashraf, 2003). Antidiarrheal agents are generally reserved for specific clinical situations, while antibiotic therapy is indicated only in confirmed bacterial infections (Alam and Ashraf, 2003). Prolonged or inappropriate use of synthetic pharmaceuticals, however, may disrupt the gut microbiota, induce adverse reactions, and contribute to antimicrobial resistance (Pietrusko, 1979).

Within this context, Iranian traditional medicine shaped by centuries of clinical observation and empirical practice offers a substantial pharmacopeia of medicinal plants with astringent, anti-inflammatory, antispasmodic, and motility-regulating properties. Classical Iranian texts emphasize numerous native medicinal plants specifically recommended for diarrhea, including species such as *Ziziphus jujuba* (Annab), *Vaccinium myrtillus* (Bilberry), *Punica granatum* rind, *Plantago ovata* seeds, and *Rosa damascena*. These plants are traditionally believed to strengthen the stomach, regulate intestinal motility, and restore humoral balance. These botanicals, including several widely documented in classical medical texts, have long been used to manage diarrheal disorders by alleviating symptoms, promoting hydration, and supporting systemic balance (Brandelli et al., 2009; Chandra and Wanda, 2017; Isnawati et al., 2019).

The therapeutic value of these plants is closely tied to their bioactive constituents, which may reduce stool frequency, normalize stool form, and mitigate intestinal inflammation (Plaatjie et al., 2024). In addition, many exert antispasmodic and anti-inflammatory effects that help regulate intestinal motility and relieve abdominal discomfort (Gonçalves et al., 2005). Contemporary scientific studies increasingly corroborate these traditional claims, demonstrating antimicrobial, antioxidant, anti-inflammatory, and gut-modulatory activities in numerous medicinal plants historically used for diarrhea (Gonçalves et al., 2005). This highlights an important point of convergence between traditional and modern medicine, where empirical historical knowledge aligns with pharmacological findings, although limitations such as variability in herbal composition and lack of standardized dosages remain significant considerations. This convergence of traditional knowledge and modern evidence highlights the potential of these botanicals as complementary or alternative therapeutic options (Stark et al., 2013).

Despite centuries of traditional use, systematic documentation and pharmacological evaluation of these plants remain limited. Consequently, the present study focuses on medicinal plants native to Iran, particularly those repeatedly recommended in classical Iranian texts for the treatment of diarrhea. Investigating and evaluating these plants not only bridges the gap between traditional medical knowledge and modern pharmacological understanding but also contributes to the development of safer and more effective interventions for gastrointestinal disorders. Therefore, the primary aim of this study is to identify the key medicinal plants endorsed in Iranian traditional medicine for the management of diarrhea.

Methods

Study Design

This study was conducted as a comprehensive review of classical Iranian medical literature and contemporary botanical sources related to the use of medicinal plants in the management of diarrhea. The primary objective was to identify, compile, and synthesize information on plants traditionally employed within Iranian traditional medicine to alleviate diarrheal symptoms.

Data Sources

Data were obtained from a wide range of authoritative references, including seminal texts of Iranian traditional medicine, works by prominent Persian physicians, specialized herbal encyclopedias, modern botanical monographs published in Iran, and peer-reviewed scientific articles retrieved from online databases. These sources encompassed both historical and modern literature on Iranian materia medica and the application of medicinal plants in gastrointestinal disorders and diarrhea (Avicenna, 2003; Avicenna, 2004; Razi, 2005; Ahvazi, 1996; Monis, 1999; Tabrizi, 2002; Jandi, 2007).

Search Terminology

To ensure comprehensive retrieval of relevant information, both Persian and English search terms were used.

English terms: diarrhea, gastrointestinal disorders, medicinal plants, traditional Iranian medicine, herbal therapy.

These terms were applied across classical texts, botanical references, and scientific online databases to maximize search coverage.

Inclusion Criteria

Sources were considered eligible for inclusion if they specifically addressed the use of medicinal plants in the treatment of diarrhea within the framework of Iranian traditional medicine, were based on the works of authoritative Persian physicians or widely recognized herbal references, consisted of books, reference texts, or peer-reviewed articles in Persian or English, and provided scientific evidence evaluating the antidiarrheal effects of the plants documented in traditional Iranian sources.

Exclusion Criteria

Sources were excluded if they were irrelevant to diarrhea or its treatment, lacked sufficient information on plant identity, therapeutic use, or preparation methods, constituted duplicate content without additional scientific value, originated from non-credible or low-quality sources, or focused exclusively on non-Iranian medicinal plants without contextual relevance, except when contributing to comparative analyses.

Data Extraction

An initial list of medicinal plants traditionally recommended for diarrhea treatment was compiled. For each plant, data were extracted on its Persian and scientific names, parts used, preparation methods, and modes of administration. All extracted information was reviewed, verified, and systematically organized for analysis.

Data Analysis

Extracted data were summarized using descriptive tables and narrative synthesis. Plants were categorized according to traditional therapeutic actions (e.g., astringent, anti-inflammatory, antispasmodic) and corroborating scientific evidence. This combined analytical approach facilitated a clearer understanding of the role of medicinal plants within the traditional Iranian medical framework and provided a structured basis for evaluating their potential therapeutic applications in modern diarrheal management.

Results

A comprehensive review of classical medical texts and contemporary ethnopharmacological studies reveals a wide spectrum of medicinal plants traditionally used in Iranian medicine and herbal therapy for the management of diarrhea. Among the most frequently reported species are *Phoenix*

dactylifera L., *Ferula assa-foetida* L., *Anethum graveolens* L., *Trachyspermum ammi* (L.) Sprague, *Bunium persicum* (Boiss.) B. Fedtsch, *Apium graveolens* L., *Coriandrum sativum* L., *Matricaria chamomilla* L., *Achillea millefolium* L., *Borago officinalis* L., *Trigonella foenum-graecum* L., *Quercus brantii* L., *Cinnamomum verum* J. Presl, *Ocimum basilicum* L., *Mentha piperita* L., *Origanum vulgare* L., *species of Sideritis*, *Thymus kotschyanus* Boiss., *Myrtus communis* L., *Plantago major* L., *Plantago ovata* Forsk., *Descurainia sophia* (L.) Webb ex Prantl, *Rosa damascena* Mill., and *Zingiber officinale* Roscoe.

Many of these plants have been substantiated by modern scientific studies, which demonstrate their antimicrobial, anti-inflammatory, and gut-motility-modulating properties. These pharmacological activities provide a scientific rationale supporting their traditional application in alleviating diarrheal symptoms.

Table 1 presents a detailed compilation of Iranian medicinal plants historically used for diarrhea, including their scientific names, plant parts utilized, and modes of administration, highlighting both traditional practices and their potential therapeutic relevance.

Analysis of Table 1 revealed that the most frequently represented plant families were Apiaceae and Lamiaceae. The distribution of all plant families included in the review is presented in Figure 1.

Leaves, seeds, and flowers were the most commonly used plant parts for the treatment of diarrhea in Iranian traditional medicine. The proportional use of other plant parts is illustrated in Figure 2.

Infusions and decoctions were the most commonly employed traditional preparations of medicinal plants for the treatment of diarrhea in Iranian traditional medicine.

Table 1. Traditional uses of medicinal plants for diarrhea

Family	Common Name	Scientific Name	Plant Part Used	Traditional Use	Reference
Arecaceae	Date	<i>Phoenix dactylifera</i> L.	Fruit	Consumed fresh	Avicenna, 2003; Avicenna, 2004; Jandi, 2007
Apiaceae	Asafoetida	<i>Ferula assa-foetida</i> L.	Resin	Decoction, Added to food	Ahvazi, 1996; Jandi, 2007
Apiaceae	Dill	<i>Anethum graveolens</i> L.	Leaf and seed	Infusion, Added to food	Avicenna, 2003; Razi, 2005
Apiaceae	Ajwain	<i>Trachyspermum ammi</i> (L.) Sprague	Seed	Decoction	Avicenna, 2004; Monis, 1999; Jandi, 2007
Apiaceae	Black Cumin	<i>Bunium persicum</i> (Boiss.) B. Fedtsch	Seed	Decoction	Jandi, 2007
Apiaceae	Celery	<i>Apium graveolens</i> L.	Leaf and seed	Infusion, Decoction	Monis, 1999; Jandi, 2007
Apiaceae	Coriander	<i>Coriandrum sativum</i> L.	Leaf and seed	Infusion, Added to food	Avicenna, 2003; Razi, 2005
Asteraceae	Chamomile	<i>Matricaria chamomilla</i> L.	Flower	Infusion, Decoction	Ahvazi, 1996)
Asteraceae	Yarrow	<i>Achillea millefolium</i> L.	Leaf and flower	Infusion, Decoction	Tabrizi, 2002
Boraginaceae	Borage	<i>Borago officinalis</i> L.	Leaf and flower	Infusion, Decoction	Avicenna, 2003; Ahvazi, 1996
Fabaceae	Fenugreek	<i>Trigonella foenum-graecum</i> L.	Seed	Decoction	Avicenna, 2003
Fabaceae	Oak	<i>Quercus brantii</i> L.	Bark	Decoction	Ahvazi, 1996
Lauraceae	Cinnamon	<i>Cinnamomum verum</i> J. Presl	Bark	Infusion; spice in food	Avicenna, 2004; Ahvazi, 1996
Lamiaceae	Basil	<i>Ocimum basilicum</i> L.	Leaf	Decoction, Added to food	Avicenna, 2003
Lamiaceae	Peppermint	<i>Mentha piperita</i> L.	Leaf	Infusion, Decoction	Razi, 2005
Lamiaceae	Oregano	<i>Origanum vulgare</i> L.	Leaf	Infusion, Tea	Avicenna, 2004
Lamiaceae	Sideritis Tea	<i>Sideritis</i> spp.	Leaf and flower	Infusion, Beverage	Ahvazi, 1996
Lamiaceae	Wild Thyme	<i>Thymus kotschyanus</i> Boiss.	Leaf and flower	Infusion, Tea	Avicenna, 2003; Razi, 2005
Myrtaceae	Myrtle	<i>Myrtus communis</i> L.	Leaf	Infusion, Decoction	Avicenna, 2004; Jandi, 2007
Plantaginaceae	Plantain	<i>Plantago major</i> L.	Leaf and seed	Infusion, Decoction	Tabrizi, 2002; Jandi, 2007
Plantaginaceae	Psyllium	<i>Plantago ovata</i> Forsk	Seed	Dissolved in water	Jandi, 2007; Avicenna, 2003
Resedaceae	Descurainia	<i>Descurainia sophia</i> (L.) Webb ex Prantl	Seed	Dissolved in water	Jandi, 2007; Avicenna, 2004
Rosaceae	Damask Rose	<i>Rosa damascena</i> Mill.	Flower	Infusion, Decoction	Ahvazi, 1996; Monis, 1999
Zingiberaceae	Ginger	<i>Zingiber officinale</i> Roscoe	Rhizome	Infusion, Tea, Added to food	Tabrizi, 2002; Jandi, 2007

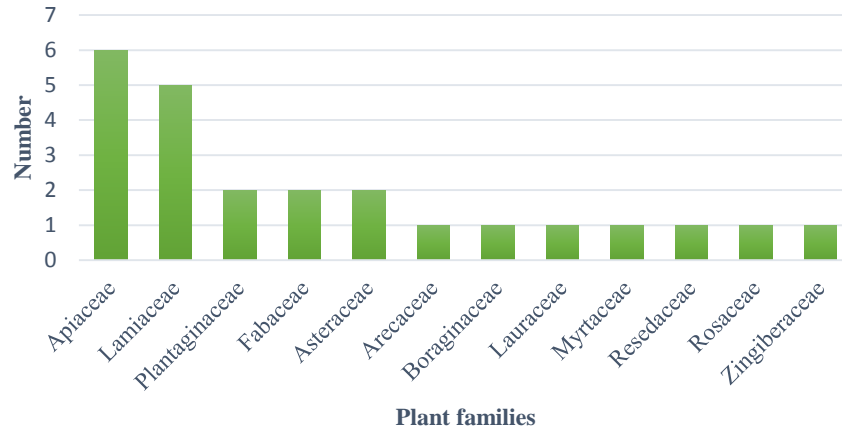


Figure 1: Frequency of plant families used in the treatment of diarrhea in traditional Iranian medicine

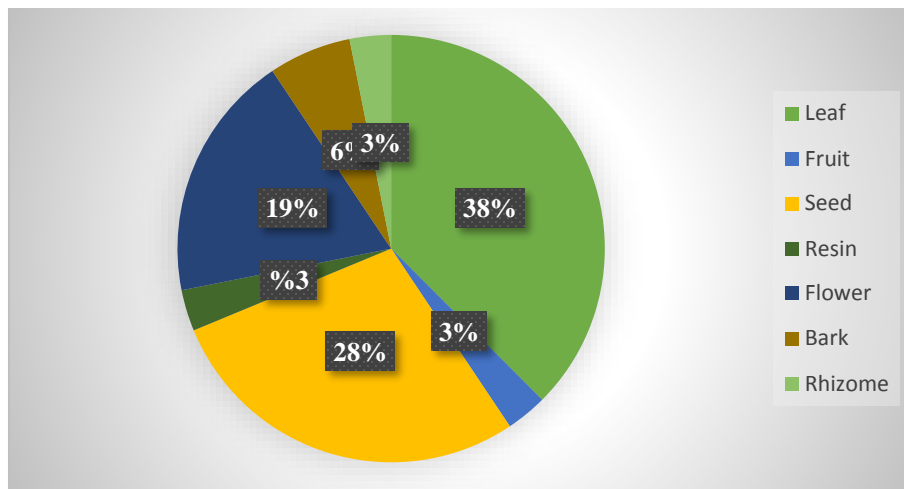


Figure 2: Frequency of plant parts used in the treatment of diarrhea in traditional Iranian medicine

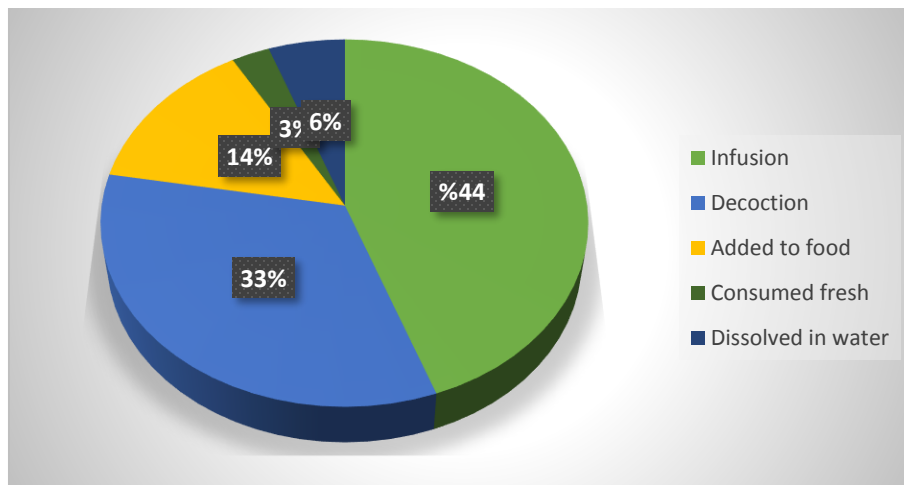


Figure 3: Frequency of traditional preparations of medicinal plants used for the treatment of diarrhea in Iranian traditional medicine

Discussion

Diarrhea is a prevalent gastrointestinal disorder characterized by frequent passage of loose or watery stools, and it may result from a variety of causes, including infections, digestive dysfunctions, or the consumption of unsuitable foods. This condition can rapidly lead to dehydration and serious health complications, particularly in resource-limited settings where access to modern medical care is restricted. Under such circumstances, the use of medicinal plants as natural and effective remedies has been widely embraced in traditional medical systems for alleviating symptoms and promoting recovery.

In numerous cultures, including Iranian traditional medicine, plants with antibacterial, anti-inflammatory, and astringent properties have long been employed to treat diarrhea. For example, recent studies have highlighted that aqueous extracts of *Phoenix dactylifera* contain bioactive nutrients and phytochemicals that may serve as an effective antidiarrheal intervention in developing countries (Megbo et al., 2017). These extracts, owing to their antioxidant and anti-inflammatory activities, can support gastrointestinal function and mitigate complications associated with diarrhea.

Several studies have also demonstrated the antidiarrheal efficacy of plant extracts such as *Anethum graveolens*, which can reduce hypersecretion, inhibit peristaltic activity, attenuate inflammation, and enhance antioxidant levels, thereby alleviating diarrheal symptoms (Brinsi et al., 2024). Similarly, certain plants like celery exhibit dose-dependent inhibition of ileal contractions, an effect primarily attributed to the flavonoid apigenin, which modulates activity through voltage-dependent calcium channels (Gharib et al., 2007).

Other botanicals, including *Coriandrum sativum* and *Trigonella foenum-graecum*, have shown both antibacterial and antidiarrheal effects. Notably, methanolic extracts of coriander demonstrate strong inhibitory activity against pathogenic bacteria such as *E. coli*, *Salmonella*, and *Shigella*, whereas petroleum ether and hexane extracts lack such properties (Uma et al., 2009). Fenugreek extracts have also been shown to reduce fecal output in a dose-dependent manner in experimental models, confirming their antidiarrheal potential (Boyina et al., 2014).

Plants traditionally recognized for antidiarrheal use, such as *Chamomilla recutita* and *Achillea millefolium*, possess notable anti-inflammatory and antioxidant properties that contribute to symptom relief. Evidence suggests that the

inclusion of *A. millefolium* extract alongside standard gastroenteritis treatments can shorten recovery time (Abdi et al., 2016).

Recent research has further identified multiple mechanisms by which botanical extracts, including cinnamon, thyme, and sage, mitigate diarrhea. For instance, cinnamon extract has been shown to prolong colonic transit time and induce favorable metabolic changes, thereby alleviating diarrheal symptoms (Park et al., 2023). Likewise, extracts from *Origanum majorana* and *Thymus kotschyianus* have been demonstrated to reduce chloride secretion and enhance sodium absorption in the intestine, contributing to improved fluid balance and symptom control (Makrane et al., 2019; Mahmoudnia, 2025).

In many regions, particularly across Africa and Asia, indigenous plants are widely utilized for diarrhea management. For example, in the Amhara region of Ethiopia, local communities rely on approximately 50 plant species, predominantly from the Lamiaceae, Fabaceae, and Asteraceae families. Over 98% of these plants are administered orally, and their antidiarrheal efficacy has been validated in animal models (Damtie, 2023).

This review has several limitations, including inconsistencies across traditional sources, a limited number of clinical studies, and a predominant reliance on animal models or isolated compounds, which may not fully reflect the holistic effects of traditional preparations. Nonetheless, the novelty of this study lies in its systematic integration of classical Iranian medical knowledge with contemporary pharmacological evidence. By categorizing plant families, plant parts, and traditional methods of preparation, this review provides a practical reference for researchers and clinicians and establishes a foundation for future clinical studies and the standardization of traditional herbal therapies within modern gastrointestinal care.

Conclusion

Collectively, these findings highlight that medicinal plants possessing antibacterial, anti-inflammatory, and astringent properties can serve as effective agents for alleviating diarrhea and promoting recovery. Their use in traditional medicine particularly in developing countries represents a viable alternative or complementary approach to conventional pharmacological treatments. Given the encouraging preclinical evidence, further research is strongly warranted,

including multicenter clinical trials, comparative studies of herbal remedies versus conventional drugs, and cross-cultural investigations across different countries to evaluate safety, efficacy, and optimal dosages. Such efforts will facilitate the integration of evidence-based herbal therapies into mainstream diarrhea management and support the global adoption of safe, effective, and accessible treatment strategies.

Declarations

Conflict of Interest

The author has no competing interests to declare that are relevant to the content of this article.

Acknowledgments

The author wishes to thank the Clinical Research Development Unit of Imam Khomeini Hospital, Urmia University of Medical Sciences, for their assistance with English language editing.

Consent to participate

Not application.

Funding Support

None.

Author contributions

Conceptualization: Asad Hashemi

Data curation: Not applicable

Formal analysis: Asad Hashemi

Funding acquisition: Not applicable

Investigation: Asad Hashemi

Methodology: Not applicable

Project administration: Asad Hashemi

Resources: Not applicable

Software: Not applicable

Supervision: Asad Hashemi

Validation: Not applicable

Visualization: Not applicable

Writing – original draft: Asad Hashemi

Writing – review & editing: Asad Hashemi

Ethical Considerations

All ethical principles and standards for scholarly research—covering plagiarism, data integrity, originality, and proper citation—were diligently upheld throughout the development and submission of this work.

AI Use Disclosure

During the preparation of this review article, generative AI and AI-assisted technologies were

used solely as supporting tools under full human oversight and control. The following discloses the use of such tools in accordance with current journal publishing standards.

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